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SITE INSPECTION REPORT FOR MUNITIONS RESPONSE PROGRAM SITE INSPECTIONS AT FIVE SMALL ARMS/SKEET RANGES STUMP NECK ANNEX NSWC INDIAH HEAD MD

9/1/2010

TETRA TECH

Site Inspection Report
for
Munitions Response Program
Site Inspections at
Five Small Arms/Skeet Ranges

Naval Support Facility
Indian Head - Stump Neck Annex
Indian Head, Maryland

Naval Facilities Engineering Command
Washington

Contract Number N62467-04-D-0055

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SITE INSPECTION REPORT
FOR
MUNITIONS RESPONSE PROGRAM
SITE INSPECTIONS AT
FIVE SMALL ARMS/SKEET RANGES

Naval Support Facility
Indian Head-Stump Neck Annex
Indian Head, Maryland

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TABLE OF CONTENTS

SECTION **PAGE NO.**

ACRONYMS 9

EXECUTIVE SUMMARY ES-1

1.0 INTRODUCTION 1-1
1.1 PURPOSE OF REPORT AND SCOPE OF WORK 1-1
1.2 PURPOSE 1-1
1.3 SCOPE OF WORK 1-1
1.4 OBJECTIVES 1-2
1.5 REPORT ORGANIZATION 1-3

2.0 FACILITY BACKGROUND AND PHYSICAL SETTING 2-1
2.1 GENERAL FACILITY BACKGROUND AND PHYSICAL SETTING 2-1
2.1.1 Regulatory Framework 2-1
2.1.2 History 2-1
2.1.3 Location and Setting 2-2
2.1.4 Current Land Use and Anticipated Future Land Use - Site-Specific 2-2
2.2 GENERAL FACILITY PHYSICAL/ENVIRONMENTAL CHARACTERISTICS 2-3
2.2.1 Climate 2-3
2.2.2 Topography 2-4
2.2.3 Regional Geology 2-5
2.2.4 Soil and Vegetation 2-6
2.2.5 Hydrology 2-8
2.2.6 Regional Hydrogeology 2-9
2.3 REGIONAL ECOLOGY SUMMARY 2-12
2.3.1 Endangered/Threatened Species 2-12
2.3.2 Wetlands 2-12
2.3.3 Cultural and Archaeological Resources 2-13
2.3.4 Water Resources 2-15
2.3.5 Coastal Zones 2-15
2.3.6 Range Conditions 2-16

3.0 GENERAL METHODOLOGY 3-1
3.1 FIELD INVESTIGATION APPROACH 3-1
3.1.1 Site Preparation Activities 3-1
3.1.2 Field Investigation Methods 3-2
3.1.3 Site Sampling Operations 3-8
3.1.4 Field Sample Documentation 3-15
3.1.5 Quality Control Samples 3-16
3.1.6 GPS 3-17
3.1.7 Decontamination Procedures 3-17
3.1.8 Investigation-Derived Waste 3-18
3.1.9 Site Management and Facility Support 3-18
3.1.10 Record Keeping 3-18
3.2 ANALYTICAL METHODOLOGY 3-19
3.2.1 Data Methods 3-19
3.2.2 Data Evaluation 3-19

TABLE OF CONTENTS (Continued)

SECTION **PAGE NO.**

3.3 HUMAN HEALTH RISK SCREENING METHODOLOGY 3-25
3.3.1 Identification of Chemicals of Potential Concern 3-25
3.3.2 Exposure Assessment 3-34
3.3.3 Risk Characterization 3-34
3.3.4 Uncertainty Analysis 3-38
3.4 ECOLOGICAL RISK ASSESSMENT SCREENING METHODOLOGY 3-42
3.4.1 Problem Formulation 3-43
3.4.2 Endpoints 3-44
3.4.3 Ecological Effects Evaluation 3-46
3.4.4 Characterization of Exposure 3-47
3.4.5 Risk Characterization 3-50
3.4.6 Selection of Chemicals of Potential Concern 3-51
3.4.7 Step 3A Refinement 3-52
3.4.8 Risks to Terrestrial Plants and Soil Invertebrates 3-53
3.5 CORRELATION BETWEEN XRF AND FIXED-BASE LABORATORY 3-54
3.6 STATISTICAL METHODOLOGY 3-55

4.0 OLD SKEET AND TRAP RANGE – UXO 15 4-1
4.1 SITE BACKGROUND 4-1
4.1.1 Historical Information 4-1
4.1.2 Munitions Used 4-1
4.1.3 Munitions Constituents 4-2
4.2 SITE FIELDWORK 4-2
4.2.1 Site Field Activities 4-2
4.2.2 Work Plan Deviations 4-2
4.2.3 Field Data Collection 4-2
4.3 SITE INSPECTION DATA COLLECTION RESULTS 4-3
4.3.1 MC Sampling Results 4-3
4.4 DATA PRESENTATION/DATA USABILITY 4-6
4.4.1 Data Quality Review of Samples at Old Skeet and Trap Range 4-6
4.5 HUMAN HEALTH RISK SCREENING EVALUATION 4-8
4.5.1 Identification of Chemicals of Potential Concern 4-8
4.5.2 Exposure Assessment 4-11
4.5.3 Risk Characterization 4-12
4.5.4 Uncertainty Analysis 4-15
4.5.5 Human Health Risk Screening Evaluation Summary 4-16
4.6 ECOLOGICAL RISK SCREENING EVALUATION 4-17
4.6.1 Site Description 4-17
4.6.2 Potential Ecological Receptors and Exposure Pathways 4-18
4.6.3 Ecological Screening 4-18
4.6.4 Step 3A Refinement 4-19
4.6.5 Ecological Risk Screening Summary 4-22
4.7 UPDATED CSM 4-23

TABLE OF CONTENTS (Continued)

SECTION **PAGE NO.**

4.8 CONCLUSIONS 4-25
4.8.1 Conclusions Based on Sampling Results 4-25
4.8.2 Data Gaps 4-26
4.9 RECOMMENDATIONS FOR NEXT PHASE 4-26
4.9.1 Objectives for Interim Removal Action, Remedial Investigation, or No Further Action Determination 4-26

5.0 MARINE RIFLE RANGE – UXO 14 5-1
5.1 SITE BACKGROUND 5-1
5.1.1 Historical Information 5-1
5.1.2 Munitions Used 5-3
5.1.3 Munitions Constituents 5-3
5.2 SITE FIELD WORK 5-3
5.2.1 Site Field Activities 5-3
5.2.2 Work Plan Deviations 5-4
5.2.3 Field Data Collection 5-4
5.3 SITE INSPECTION DATA COLLECTION RESULTS 5-4
5.3.1 MC Sampling Results 5-4
5.4 DATA QUALITY REVIEW/USABILITY 5-6
5.4.1 Data Quality Review of Samples at Marine Rifle Range 5-6
5.5 HUMAN HEALTH RISK SCREENING EVALUATION 5-8
5.5.1 Identification of Chemicals of Potential Concern 5-8
5.5.2 Exposure Assessment 5-10
5.5.3 Risk Characterization 5-11
5.5.4 Uncertainty Analysis 5-15
5.5.5 Human Health Risk Screening Evaluation Summary 5-15
5.6 ECOLOGICAL RISK SCREENING EVALUATION 5-17
5.6.1 Site Description 5-17
5.6.2 Potential Ecological Receptors and Exposure Pathways 5-17
5.6.3 Ecological Screening 5-18
5.6.4 Step 3A Refinement 5-19
5.6.5 Ecological Risk Screening Summary 5-21
5.7 UPDATED CSM 5-21
5.8 CONCLUSIONS 5-25
5.8.1 Data Gaps 5-26
5.9 RECOMMENDATIONS FOR NEXT PHASE 5-26
5.9.1 Objectives for Interim Removal Action, Remedial Investigation, or No Further Action Determination 5-26

TABLE OF CONTENTS (Continued)

SECTION **PAGE NO.**

6.0 SMALL ARMS PISTOL RANGE – UXO 17 6-1
6.1 SITE BACKGROUND 6-1
6.1.1 Historical Information 6-1
6.1.2 Munitions Used 6-1
6.1.3 Munitions Constituents 6-2
6.2 SITE FIELDWORK 6-2
6.2.1 Site Field Activities 6-2
6.2.2 Work Plan Deviations 6-2
6.2.3 Field Data Collection 6-3
6.3 SITE INSPECTION DATA COLLECTION RESULTS 6-3
6.3.1 MC Sampling Results 6-3
6.4 DATA QUALITY REVIEW/USABILITY 6-4
6.4.1 Data Quality Review of Samples at Small Arms Range 6-4
6.5 HUMAN HEALTH RISK SCREENING EVALUATION 6-6
6.5.1 Identification of Chemicals of Potential Concern 6-7
6.5.2 Exposure Assessment 6-8
6.5.3 Risk Characterization 6-9
6.5.4 Uncertainty Analysis 6-11
6.5.5 Human Health Risk Screening Evaluation Summary 6-11
6.6 ECOLOGICAL RISK SCREENING EVALUATION 6-12
6.6.1 Site Description 6-12
6.6.2 Potential Ecological Receptors and Exposure Pathways 6-12
6.6.3 Ecological Screening 6-12
6.6.4 Step 3A Refinement 6-14
6.6.5 Ecological Risk Screening Summary 6-15
6.7 UPDATED CSM 6-16
6.8 CONCLUSIONS 6-18
6.8.1 Data Gaps 6-19
6.9 RECOMMENDATIONS FOR NEXT PHASE 6-19
6.9.1 Objectives for Interim Removal Action, Remedial Investigation, or No Further Action Determination 6-20

7.0 RUM POINT SKEET RANGE RPSR – UXO 16 7-1
7.1 SITE BACKGROUND 7-1
7.1.1 Historical Information 7-1
7.1.2 Munitions Used 7-1
7.1.3 Munitions Constituents 7-2
7.2 SITE FIELDWORK 7-2
7.2.1 Site Field Activities 7-2
7.2.2 Work Plan Deviations 7-3
7.2.3 Field Data Collection 7-3
7.3 SITE INSPECTION DATA COLLECTION RESULTS 7-3
7.3.1 MC Sampling Results 7-3
7.4 DATA QUALITY REVIEW/USABILITY 7-5
7.4.1 Data Quality Review of Samples at Rum Point Skeet Range 7-5

TABLE OF CONTENTS (Continued)

SECTION **PAGE NO.**

7.5 HUMAN HEALTH RISK SCREENING EVALUATION 7-7
7.5.1 Identification of Chemicals of Potential Concern 7-7
7.5.2 Exposure Assessment 7-9
7.5.3 Risk Characterization 7-9
7.5.4 Uncertainty Analysis 7-12
7.5.5 Human Health Risk Screening Evaluation Summary 7-12
7.6 ECOLOGICAL RISK SCREENING EVALUATION 7-13
7.6.1 Site Description 7-13
7.6.2 Potential Ecological Receptors and Exposure Pathways 7-13
7.6.3 Ecological Screening 7-13
7.6.4 Step 3A Refinement 7-15
7.6.5 Ecological Risk Screening Summary 7-16
7.7 UPDATED CSM 7-17
7.8 CONCLUSIONS 7-19
7.8.1 Data Gaps 7-20
7.9 RECOMMENDATIONS FOR NEXT PHASE 7-20
7.9.1 Objectives for Interim Removal Action, Remedial Investigation, or No Further Action Determination 7-20

8.0 ROACH ROAD RIFLE RANGE – UXO 25 8-1
8.1 SITE BACKGROUND 8-1
8.1.1 Historical Information 8-1
8.1.2 Munitions Used 8-1
8.1.3 Munitions Constituents 8-2
8.2 SITE FIELDWORK 8-2
8.2.1 Site Field Activities 8-2
8.2.2 Work Plan Deviations 8-2
8.2.3 Field Data Collection 8-3
8.3 SITE INSPECTION DATA COLLECTION RESULTS 8-3
8.3.1 MC Sampling Results 8-3
8.4 DATA QUALITY REVIEW/USABILITY 8-4
8.4.1 Data Quality Review of Samples at Roach Road Rifle Range 8-4
8.5 HUMAN HEALTH RISK SCREENING EVALUATION 8-6
8.5.1 Identification of Chemicals of Potential Concern 8-6
8.5.2 Exposure Assessment 8-7
8.5.3 Risk Characterization 8-8
8.5.4 Uncertainty Analysis 8-9
8.5.5 Human Health Risk Screening Evaluation Summary 8-9
8.6 ECOLOGICAL RISK SCREENING EVALUATION 8-10
8.6.1 Site Description 8-10
8.6.2 Potential Ecological Receptors and Exposure Pathways 8-10
8.6.3 Ecological Screening 8-11
8.6.4 Step 3A Refinement 8-12
8.6.5 Ecological Risk Screening Summary 8-13
8.7 UPDATED CSM 8-14

TABLE OF CONTENTS (Continued)

SECTION **PAGE NO.**

8.8 CONCLUSIONS 8-16
8.8.1 Data Gaps 8-16
8.9 RECOMMENDATIONS FOR NEXT PHASE 8-17
8.9.1 RI Objectives for Interim Removal Action, Remedial Investigation, or No Further Action Determination 8-17

APPENDICES

A FIELD FORMS
B SITE PHOTOS
C ANALYTICAL RESULTS
D DATA VALIDATION/USABILTY ASSESSMENT
E HUMAN HEALTH RISK SCREENING SUPPORTING DOCUMENTATION
F ECOLOGICAL RISK SCREENING SUPPORTING DOCUMENTATION
G STATISTICAL CALCULATION SUMMARY

TABLES

NUMBER

ES-1 Summary of Findings and Recommendations
2-1 Summary of Other than Operational Ranges
2-2 Summmary of Known or Potential Portected Species
3-1 Indian Head, Maryland - Five small Arms Ranges
3-2 Boring Dates, Depths, Methods, and Intervals, Old Skeet and Trap Range (OSTR) - UXO 15
3-3 Boring Dates, Depths, Methods, and Intervals, Marine Rifle Range (MRR) - UXO 14
3-4 Boring Dates, Depths, Methods, and Intervals, Small Arms Range (SAR) - UXO 17
3-5 Boring Dates, Depths, Methods, and Intervals, Rum Point skeet Range (RPSR) - UXO 16
3-6 Boring Dates, Depths, Methods, and Intervals, Roach Road rifle Range (RRRR) - UXO 25
3-7 Field XRF and Fixed-Base Laboratory Lead Sample Correlation, Old Skeet and Trap Range (USO 15)
3-8 Field XRF and Fixed-Base Laboratory Lead Sample Correlation, Marine Rifle Range (UXO 14)
3-9 Field XRF and Fixed-Base Laboratory Lead Sample Correlation, Small Arms Range (UXO 17)
3-10 Field XRF and Fixed-Base Laboratory Lead Sample Correlation, Rum Point Skeet Range (UXO 16)
3-11 Field XRF and Fixed-Base Laboratory Lead Sample Correlation, Roach Road Rifle Range (UXO 25)

TABLES (CONTINUED)

NUMBER

4-1 Munition Types and Chemicals, Old Skeet and Trap Range (OSTR) - UXO 15
4-2a Old Trap and Skeet Range, Sediment, Background Comparison
4-2b Old Trap and Skeet Range, Discrete Surface Soil, Background Comparison
4-2c Old Trap and Skeet Range, Discrete Subsurface Soil, Background Comparison
4-2d Old Trap and Skeet Range, Composite Surface Soil, Background Comparison
4-3 Fixed Base Laboratory Soil MC Metals Results Hits/Exceedances, UXO 15, Old Skeet and Trap Range
4-4 Fixed Base Laboratory Sediment MC Analytical Results Hits/Exceedances, UXO 15, Old Skeet and Trap Range
4-5 Benzo(a)pyrene Equivalent Concentrations in Discrete Surface Soil Samples, Old Skeet and Trap Range (OSTR) - UXO 15, Site Investigation
4-6a Human Health CSM Summary, Old Skeet and Trap Range (OSTR) - UXO 15
4-6b Human Health CSM Summary, Old Skeet and Trap Range (OSTR) - UXO 15
4-7 Ecological CSM Summary, Old Skeet and Trap Range (OSTR) - UXO 15
5-1 Munition Types and Chemicals, Marine Rifle Range (MRR) - UXO 14
5-2a Marine Rifle Range, Discrete Hill Subsurface Soil, Background Comparison
5-2b Marine Rifle Range, Discrete Berm 2 Surface Soil, Background Comparison
5-2c Marine Rifle Range, Discrete Berm 1 Surface Soil, Background Comparison
5-2d Marine Rifle Range, Discrete Hill Surface Soil, Background Comparison
5-2e Marine Rifle Range, Composite Surface Soil, Background Comparison
5-3a Fixed Base Laboratory Soil MC Metals Results Hits/Exceedances, UXO 14, Marine Rifle Range
5-3b Fixed Base Laboratory Soil MC Metals Results Hits/Exceedances, UXO 14, Marine Rifle Range
5-4 Human Health CSM Summary, Marine Rifle Range (MRR) - UXO 14
5-5 Ecological CSM Summary, Marine Rifle Range (MRR) - UXO 14
6-1 Munition Types and Chemicals, Small Arms Range (SAR) - UXO 17
6-2a Small Arms (Pistol) Range, Subsurface Soil, Background Comparison
6-2b Small Arms (Pistol) Range, Discrete Surface Soil, Background Comparison
6-2c Small Arms (Pistol) Range, Composite Surface Soil, Background Comparison
6-3 Fixed Base Laboratory Soil MC Metals Results, UXO 17, Small Arms Range (Pistol)
6-4 Human Health CSM Summary, Small Arms Range (SAR) - UXO 17
6-5 Ecological CSM Summary, Small Arms (SAR) - UXO 17
7-1 Munition Types and Chemicals, Rum Point Skeet Range (RPSR) - UXO 16
7-2a Rum Pont Skeet Range, Discrete Surface Soil, Background Comparison
7-2b Rum Point Skeet Range, Composite Surface Soil, Background Comparison
7-3 Fixed Base Laboratory Soil MC Metals Results Hits/Exceedances, UXO 16, Rum Point Skeet Range
7-4 Benzo(a)pyrene Equivalent Concentrations in Discrete Surface Soil Samples, Rum Point Skeet Range (RPSR) - UXO 16 , Site Investigation
7-5 Human Health CSM Summary, Rum Point Skeet Range (RPSR) - UXO 16
7-6 Ecological CSM Summary, Rum Point skeet Range (RPSR) - UXO 16
8-1 Munition Types and Chemicals, Roach Road Rifle Range (RRRR) - UXO 25
8-2a Roach Road Rifle Range, Discrete Surface Soil, Background Comparison
8-2b Roach Road Rifle Range, Composite Surface Soil, Background Comparison
8-3 Fixed Base Laboratory Soil MC Metals Results Hits/Exceedances, UXO 25, Roach Road Rifle Range
8-4 Human Health CSM Summary, Roach Road Rifle Range (RRRR) - UXO 25
8-5 Ecological CSM Summary, Roach Road Rifle Range (RRRR) - UXO 25

FIGURES

NUMBER

ES-1 Facility Location Main Installation and Stump Neck Annex
ES-2 Facility Location and Valley Impact Fan
ES-3 Range Location Figure
3-1 Old Skeet and Trap Range Sampling Locations
3-2 Marine Rifle Range Sampling Locations
3-2a Marine Rifle Range Hillside and Target Berms Sampling Locations
3-3 Small Arms Range Sampling Locations
3-4 Rum Point Skeet Range Sampling Locations
3-5 Roach Road Rifle Range Sampling Locations
4-1 Old Skeet and Trap Range Metals Exceedances
4-2 Old Skeet and Trap Range BAP Equivalents
4-3 Old Skeet and Trap Range Lead Results (**Human Health Screening Levels**)
4-4 Old Skeet and Trap Range Soil Lead Results (**Ecological Screening Levels)**
4-5 Old Skeet and Trap Range Sediment Lead Results (**Ecological Screening Levels)**
4-6 Old Skeet and Trap Range Conceptual Site Model
4-7 Old Skeet and Trap Range Proposed Soil Removal
5-1 Marine Rifle Range Target Berms and Hillside Metals Exceedances
5-1a Marine Rifle Range Firing Lines Metals Exceedances
5-2 Marine Rifle Range Target Berms and Hillside Soil Lead results (**Human Health Screening Levels**)
5-3 Marine Rifle Range Target Berms and Hillside Soil Lead results (**Ecological Screening Levels)**
5-4 Marine Rifle Range Target Berms Conceptual Site Model
5-4a Marine Rifle Range Hillside Impact Area Conceptual Site Model
5-5 Marine Rifle Range Target Berms and Hillside Proposed Soil Removal
6-1 Small Arms Range Metals Exceedances
6-2 Small Arms Range Lead results(**Human Health Screening Levels**)
6-3 Small Arms Range Soil Lead results (**Ecological Screening Levels)**
6-4 Small Arms Range Conceptual Site Model
6-5 Small Arms Range Proposed Soil Removal
7-1 Rum Point Skeet Range Metals Exceedances
7-2 Rum Point Skeet Range BAP Equivalents
7-3 Rum Point Skeet Range Lead results (**Human Health Screening Levels**)
7-4 Rum Point Skeet Range Soil Lead results (**Ecological Screening Levels)**
7-5 Rum Point Skeet Range Conceptual Site Model
7-6 Rum Point Skeet Range Proposed Soil Removal
8-1 Roach Road Rifle Range Metals Exceedances
8-2 Roach Road Rifle Range Lead results (**Human Health Screening Levels**)
8-3 Roach Road Rifle Range Soil Lead results (**Ecological Screening Levels)**
8-4 Roach Road Rifle Range Conceptual Site Model
8-5 Roach Road Rifle Range Proposed Soil Removal

ACRONYMS

AET	Apparent Effects Threshold
AOC	Areas of Concern
AR	Administrative record
BAF	Bioaccumulation factor
BERA	Baseline Ecological Risk Assessment
bgs	Below ground surface
BSAF	Biota-sediment accumulation factors
BTAG	Biological Technical Assistance Group
CA	Corrective Action
CAP	Corrective Action Plan
CAS	Chemical Abstract Service
CCME	Canadian Council of Ministers of the Environment
CDI	Chronic Daily Intake
CEC	Cation Exchange Capacity
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	Contract Laboratory Program
COC	Chain-of-custody
COPC	Contaminant of potential concern
CSF	Cancer slope factor
CSM	Conceptual Site Model
CTO	Contract Task Order
CWM	Chemical warfare material
DAF	Dilution-attenuation factor
DI	Deionized
DMM	Discarded Military Munitions
DoD	Department of Defense
DPT	Direct-push technology
DQI	Data Quality Indicator
DQO	Data Quality Objective
DU	Depleted uranium

ED	Exposure duration
EDD	Electronic data deliverable
EEQ	Ecological effects quotient
EF	Exposure frequency
EOD	Explosive Ordnance Disposal
EPC	Exposure point concentration
ERA	Ecological Risk Assessment
FBL	fixed-base laboratory
FOL	Field Operations Leader
FS	Feasibility Study
FTMR	Field Task Modification Request
GC/MS	Gas Chromatograph/Mass Spectrometer
GIS	Geographic Information System
GPS	Global Positioning System
HA	Hand Auger
HASP	Health and Safety Plan
HDPE	High-density polyethylene
HHRA	Human health risk assessment
HI	Hazard index
HSM	Health and Safety Manager
HQ	Hazard Quotient
IAS	Initial Assessment Study
IC	Initial Calibration
IDL	Instrument Detection Limit
IDQTF	Intergovernmental Data Quality Task Force
IDW	Investigation-derived waste
IED	Improvised Explosive Device
ILCR	Incremental lifetime cancer risk
INRMP	Integrated Natural Resources Management Plan
IR	Installation Restoration
IS	Internal Standard
ITRC	Interstate Technology and Regulatory Council
IUR	Inhalation unit risk
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LFB	Laboratory Fortified Blank

LIMS	Laboratory Information Management Systems
LOAEL	Lowest-observed-adverse-effects level
MARLAP	Multi-Agency Radiological Laboratory Analytical Protocols (Manual)
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MC	Munitions Constituents
MCB	Marine Corps Base
MCL	Maximum Contaminant Level
MDE	Maryland Department of the Environment
MDL	Method detection limit
MEC	Munitions and Explosives of Concern
MOU	Memorandum of Understanding
MPC	Measurement Performance Criterion
MQO	Measurement Quality Objectives
MRA/S	Munitions Response Area or Munitions Response Site
MRR	Marine Rifle Range
MRP	Munitions Response Program
MS/MSD	Matrix Spike/Matrix Spike Duplicate
msl	Mean sea level
MSR	Management Systems Review
NAVEODTECHDIV	Naval Explosion Ordnance Disposal Technical Division
NAVFAC	Naval Facilities Engineering Command
NAVSCOLEOD	Naval School, Explosive Ordnance Disposal
NAVSEA	Naval Sea Systems Command
NCP	National Contingency Plan
NFA	No Further Action
NFESC	Naval Facilities Engineering Service Center
NG	Nitroglycerin
NIRIS	Naval Installation Restoration Information Solution
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
NOAEL	No-observed-adverse-effects level
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NSF-IH	Naval Support Facility – Indian Head
ORNL	Oak Ridge National Laboratory
ORP	Oxidation Reduction Potential

OSHA	Occupational Safety and Health Administration
OSTR	Old Skeet and Trap Range
PA	Preliminary Assessment
PAH	Polynuclear aromatic hydrocarbon
PAL	Project Action Limit
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PCB	Polychlorinated biphenyl
PD	Ponar Dredge
PDF	Portable Document Format
PEC	Probable Effects Concentration
PEL	Probable Effects Level
PG	Professional Geologist
PM	Project Manager
POC	Point of Contact
PPE	Personal Protective Equipment
PQLG	Project Quantitation Limit Goals
PQO	Project Quality Objective
PRP	Potentially Responsible Party
PRQL	Project-Required Quantitation Limit
PT	Plastic Trowel
PT	Proficiency Testing
QA	Quality Assurance
QAM	Quality Assurance Manager
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
QL	Quantitation Limit
QMP	Quality Management Plan
QS	Quality System
QSM	Quality Systems Manual
RAGS	Risk Assessment Guidance for Superfund
RBC	Risk-based Concentrations
RBSL	Risk-based Screening Levels
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RIC	Reconstructed Ion Chromatogram

RPD	Relative Percent Difference
RPM	Remedial Project Manager
RPSR	Rum Point Skeet Range
RRRR	Roach Road Rifle Range
RSD	Relative Standard Deviation
RSL	Regional Screening Level
RT	Retention Time
RTW	Retention Time Window
SAP	Sampling and Analysis Plan
SAR	Small Arms Range
SD	Standard Deviation
SDG	Sample Delivery Group
SDWA	Safe Drinking Water Act
SDZ	Safety Danger Zone
SERA	Screening-level ecological risk assessment
SI	Site Inspection
SIM	Selective Ion Monitoring
SOP	Standard Operating Procedure
SQGs	Soil Quality Guidelines
SQL	Structured Query Language
SQuiRTs	Screening Quick Reference Tables
SRM	Standard Reference Material
SSL	Soil Screening Level
SSO	Site Safety Officer
SVOA	Semivolatile Organic Analytes
SVOC	Semivolatile Organic Compound
SW	Surface Water
SWMU	Solid Waste Management unit
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TEF	Toxicity equivalency factor
TRL	Target risk level
TRV	Toxicity reference value
TOC	Total Organic Carbon
TS	Total Solids

TSA	Technical Systems Audit
USEPA	United States Environmental Protection Agency
UFP	Uniform Federal Policy
USACE	United States Army Corps of Engineers
USCS	Unified Soil Classification System
USMC	United States Marine Corps
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
UXO	Unexploded Ordnance
VOA	Volatile Organic Analyte
VOC	Volatile organic compound
VSP	Visual Sample Plan
WMA	Wildlife Management Area
WRS	Wilcoxon Rank Sum
WP	Work Plan
XRF	X-ray fluorescence

EXECUTIVE SUMMARY

INTRODUCTION

This Site Inspection (SI) Report presents the results of the SI conducted at the five small arms ranges located at the Stump Neck Annex portion of the Naval Support Facility (NSF) located in Indian Head, Maryland. The general locations of Naval Support Facility Indian Head (NSF-IH), Main Installation and the Stump Neck Annex are shown on Figure ES-1. As described in the Naval Facilities Engineering Command (NAVFAC)-approved Uniform Federal Policy Sampling Analysis Plan (UFP SAP) [Tetra Tech NUS, Inc. (TtNUS), 2009], the main objectives of the SI at the five small arms ranges were to build on information from the Preliminary Assessment (PA) by gathering initial field data, to perform field reconnaissance and surveys to further develop the Conceptual Site Model (CSM), to confirm the presence or absence of munitions constituents (MC), and to recommend potential future site actions.

BACKGROUND AND PHYSICAL SETTING

NSF-IH is located in northwestern Charles County, Maryland. Figure ES-2 shows NSF-IH in the location within Charles County and the association with the Valley Impact Fan. The Stump Neck Annex covers approximately 1,100 acres on the Stump Neck peninsula at the confluence of the Potomac River and Chicamuxen Creek in Charles County, Maryland. Stump Neck Annex was acquired by the Navy in 1901 to support activities at the 2,300-acre Indian Head Main Installation. These two Navy properties are not contiguous; the Indian Head Main Installation is northeast of the Stump Neck Annex across Mattawoman Creek. General Smallwood State Park and private property parcels are located east and southeast, respectively, of Stump Neck Annex, and the Chicamuxen Wildlife Management Area (WMA) is to the south across Chicamuxen Creek.

These five small arms skeet ranges are being investigated under the DoD/Navy Military Munitions Response Program (MRP). The purpose of the MRP is to investigate and remediate closed military ranges for munitions and explosives of concern (MEC) which consists of discarded military munitions (DMM), unexploded ordnance (UXO) and high concentrations of explosives in soil which present an explosive hazard and munitions constituents (MC) which consist of and include constituents (metals explosives, etc.) which are released into the environment. MEC is not a concern at small arms ranges as a result of operation of the small arms ranges. The DoD/Navy is following the Comprehensive Environmental Remediation and Liability Act (CERCLA) process for the environmental investigation process.

The initial phase of the CERCLA process, the PA, was completed in September 2005. It identified five small arms ranges, classified as "other than operational range" sites or Munitions Response Areas or Munitions Response Sites (MRA/Ss), for further investigation at the Stump Neck Annex. The five MRA/Ss described in the Stump Neck Annex PA Report are indicated on Figure ES-3. The sites are identified by descriptive names and assigned Unexploded Ordnance (UXO) numbers.

The size and topography of each of the five arms sites are as follows:

Old Skeet and Trap Range – UXO 15 (OSTR)

The total area of the site is 29.3 acres. The site is divided into the Range Area, Open Water Area, and the Near Shore Area. The range portion of the study area covers approximately 4.4 acres. The Open Water portion of the study area covers approximately 18 acres. The Near Shore portion of the study area covers approximately 750 linear feet. The relief of the Old Skeet and Trap Range is relatively flat; the elevation of the entire range is approximately 16 feet above mean sea level (msl). Surface runoff is to the Potomac River either directly or via a drainage ditch along Archer Avenue.

Marine Rifle Range – UXO 14 (MRR)

The total area of the site is 30.4 acres. The site is divided into nine firing lines, two target berms, and the Hillside Impact Area. The nine firing lines are approximately 200 linear feet each. Target Berm #1 covers approximately 0.42 acres. Target Berm #2 covers approximately 0.34 acres. The Hillside Impact Area covers approximately 2.7 acres. The terrain at the Marine Rifle Range is relatively flat. Elevations range from 5 to 30 feet above msl. The central and eastern portions of the range are relatively flat at an elevation of approximately 10 feet above msl. The western portion of the range has a slight slope from 10 to 30 feet above msl. Wetlands border the range to the east, and wetlands also surround an unnamed tributary in the central portion of the range.

Small Arms Pistol Range UXO 17 (SAR)

The total area of the site is 2.4 acres. The site is divided into the three Firing Lines and the Range Area. The range portion of the study area covers approximately 0.26 acres. The Firing Lines cover approximately 140 linear feet each. The topography of the Small Arms Range can be described as relatively flat with a hill on the eastern side, bordering General Smallwood State Park. The highest point on the Small Arms Range is in the northeastern corner, and has an elevation of approximately 100 feet above msl.

Rum Point Skeet Range UXO 16 (RPSR)

The total area of the site is 33.5 acres. The cleared area of the range is approximately 6 acres. The topography of the Rum Point Skeet Range is gently sloping from southeast to northwest. Over 94 percent of the range is located on upland terrain. The cleared area of the range is fairly flat. West of the cleared area, the land has a gradual downward slope toward the wetland area and beyond. Approximately 90 percent of the Rum Point Skeet Range is located at or above an elevation of 30 feet above msl.

Roach Road Rifle Range UXO 25 (RRRR)

The total area of the site is 0.27 acres. The terrain at the Roach Road Rifle Range is relatively flat, and has an elevation of approximately 50 feet above msl. There is a small downward slope toward the north.

SI FIELD ACTIVITIES

SI field activities at the five small arms ranges included the following:

- Collecting discrete surface soil samples [0 to 1 foot below ground surface (bgs)] using a hand auger in target and berm areas and within the shot fall-out areas.

- Collecting discrete subsurface soil samples (1 to 3 feet bgs) via hand auger, and 28 soil samples via direct push technology (DPT) from depths ranging from 0 to 4 feet bgs to 8 to 10 feet bgs in berm areas.

- Collecting composite surface soil samples (0 to 1 foot bgs) along and within the firing points at each of the sites.

- Collecting sediment samples at depths (0 to 6 inches bgs) from the shoreline and within 500 feet from the shoreline in Mattawoman Creek at the Old Skeet and Trap Range.

- Analyzing all soil and sediment samples in the field for lead using an x-ray fluorescence (XRF) analyzer, and selecting a representative number of samples for shipment to the fixed base laboratory (FBL) for analysis of select Target Analyte List (TAL) metals (antimony, arsenic, copper, lead, nickel, tin, and zinc), nitroglycerin (NG), polynuclear aromatic hydrocarbons, cation exchange capacity (CEC), pH, total organic carbon (TOC), and total solids (TS).

CONCLUSIONS/RECOMMENDATIONS

This section presents a summary of the results of the SI and recommendations for further actions. Table ES-1 contains a summary.

Conclusions

Old Skeet and Trap Range – UXO-15 (OSTR)

The following conclusions have been made concerning the Old Skeet and Trap Range:

- The antimony project action limit (PAL) was exceeded at 10 discrete surface soil sampling locations and 2 composite surface soil sampling locations (firing line locations). The lead PAL was exceeded at 10 discrete surface soil sampling locations. The antimony PAL was exceeded at two composite surface soil sampling locations. The zinc PAL was exceeded at two composite surface soil sampling locations.

- Sediment samples were collected from the depth of 0 to 0.5 foot bgs. The arsenic PAL was exceeded at six sediment sampling locations. The zinc PAL was exceeded at one sediment sampling location.

- Twelve discrete soil samples had total BaP equivalent concentrations that exceeded the residential risk-based screening level of 1,500 µg/kg.

- The extent of potential environmental contamination at the site appears to be limited to immediately in front of the two former trap house locations (PAHs), and northeast of the eastern former trap house location, and northwest of the western former trap house location (metals).

- The exceedances of PALs indicate that unacceptable levels of human and/or ecological risk may exist.

Marine Rifle Range – UXO-14 (MRR)

The following conclusions have been made concerning the Marine Rifle Range:

- At Berm 1, the copper PAL was exceeded at 1 discrete surface soil sampling location. The lead PAL was exceeded at 2 discrete surface soil sampling locations. The tin PAL was exceeded at 2 discrete surface soil sampling locations.

- At Berm 2, the lead PAL was exceeded at 12 discrete surface soil sampling locations. The tin PAL was exceeded at one discrete surface soil sampling location.

- At the Hillside, the antimony PAL was exceeded at 1 discrete surface soil sampling location. The copper PAL was exceeded at four discrete surface soil sampling locations, two discrete subsurface soil sampling locations at 1 to 2 feet bgs, and one discrete subsurface soil sampling location at 2 to 3 feet bgs. The lead PAL was exceeded at 43 discrete surface soil sampling locations, 3 discrete subsurface soil sampling locations at 1 to 2 feet bgs, and 1 discrete subsurface soil sampling location at 2 to 3 feet bgs. The tin PAL was exceeded at 12 discrete surface soil sampling locations, 2 discrete subsurface soil sampling locations at 1 to 2 feet bgs, and 1 discrete subsurface soil sampling location at 2 to 3 feet bgs. The zinc PAL was exceeded at three discrete surface soil sampling locations and one discrete subsurface soil sampling location at 1 to 2 feet bgs.

- At the Firing Lines, the antimony PAL was exceeded at two composite surface soil sampling locations. The tin PAL was exceeded at one composite surface sampling location. The zinc PAL was exceeded at three composite surface sampling locations. The lead PAL was not exceeded at any locations.

- The extent of the potential environmental contamination at the site appears to be limited to one sampling location on the northern target berm, on the top of the southern target berm, and randomly along the slope of the hillside.

- Unacceptable levels of human and/or ecological risk may exist.

Small Arms Pistol Range UXO-17 (SAR)

The following conclusions have been made concerning the Small Arms Range:

- The antimony PAL was exceeded at five discrete surface soil sampling locations, two discrete subsurface soil sampling locations at 1 to 2 feet bgs, one discrete subsurface soil sampling location at 6 to 8 feet bgs, and three composite surface soil sampling locations (firing line locations). The arsenic PAL was exceeded at 12 discrete surface soil sampling locations, 4 discrete subsurface soil

sampling locations at 1 to 2 feet bgs, 1 discrete subsurface soil sampling location at 4 to 6 feet bgs, 1 discrete subsurface soil sampling locations at 6 to 8 feet bgs, and 3 composite surface soil sampling locations (firing line locations). The copper PAL was exceeded at one discrete surface soil sampling locations. Lead was exceeded at seven discrete surface soil sampling locations. The nitroglycerin PAL was exceeded at three composite surface sampling locations.

- The extent of the potential environmental contamination at the site appears to be limited to the head and the toe of the hillside slope in front of the last firing line. Elevated metals concentrations in four locations were present along the range floor immediately in front of the hillside, and behind the former range targets (i.e., the primary impact berm). There appears to be some limited sloughing (slope failure) along this hillside such that uncontaminated soil at the head of the slope may now cover potentially contaminated soil at the toe of the slope.

- Unacceptable levels of human and/or ecological risk may exist.

Rum Point Skeet Range UXO-16 (RPSR)

The following conclusions have been made concerning the Rum Point Skeet Range:

- The antimony PAL was evaluated to be below the background levels for the discrete soil samples. Antimony was slightly above the PAL for the composite sample at the west firing line. The lead PAL exceeded the direct contact residential soil screening value at three discrete surface soil sampling locations. The BAP equivalents exceeded the residential risk-based screening level at three locations for the discrete surface soil samples.

- The extent of potential environmental contamination at the site appears to be limited to immediately to the right of the Right Firing Point (PAHs) and the northwest of the Left Firing Point (lead).

- Unacceptable levels of human and/or ecological risk may exist.

Roach Road Rifle Range UXO-25 (RRRR)

The following conclusions can be made concerning the Roach Road Rifle Range:

- The antimony PAL was exceeded at nine discrete surface soil sampling locations. The copper PAL was exceeded at two discrete surface soil sampling locations. The lead PAL was exceeded at

6 discrete surface soil sampling locations. The zinc PAL was exceeded at one discrete surface soil sampling locations. One composite sample was collected.

The extent of potential environmental contamination at the site appears to be limited to directly behind the target berms in the primary impact area. Expended bullets were suspected along the range floor and in the earthen embankment to the west behind the former range targets (i.e., the primary impact berm).

- Unacceptable levels of human and/or ecological risk may exist.

Recommendations

Based on the results of the SI, further actions are required at each of the five small arms sites. These subsequent actions may include a Remedial Investigation (RI) that will meet CERCLA requirements. Activities should include an interim remedial action to address the limited known areas of surface and shallow subsurface soil lead and PAH contamination. The limited removal of lead-contaminated soils and PAH–contaminated soils, or the localized chemical stabilization of lead, PAH, and nitroglycerin in soil may serve to reduce the potential threat of lead releases to the environment. Specific tasks recommended as part of the RI MC investigation for each of the five small arms sites are detailed in the Recommendation Sections 4.9, 5.9, 6.9, 7.9, and 8.9 of the SI Report. The RI tasks recommended for each of the five small arms sites are described below and summarized on Table ES-1:

Old Skeet and Trap Range – UXO-15 (OSTR)

Proceed to RI/FS to include the following:

1. Determination of impact to groundwater.
2. Potential remedial action such as the following:
   - Remediation of shallow soils in areas with elevated concentration of PAHs and metals
     - Soil to a depth of 2 feet bgs in the area of the clay targets, because of the high exceedances of PAHs.
     - Soils in areas of lead shot accumulations to 1 foot bgs.
   - The total amount of soil to be remediated is estimated at approximately 2900 cubic yards (yd^3).
   - Confirmation soil sampling to verify the effectiveness of the remediation.

Marine Rifle Range – UXO-14 (MRR)

Proceed to RI/FS to include the following:

1. Determination of impact to groundwater.
2. Potential remedial action such as the following:
   - Remediation of shallow soils in areas with elevated concentration of PAHs and metals.
     - Soil to a depth of 1 foot bgs at the top of the southern target berm in the areas of bullet accumulations.
     - Soil to a depth of 1 foot bgs from the Hillside Impact Area in the areas of bullet accumulations. However, because of the density of the trees, the excavations are proposed to be limited to soil immediately surrounding sample points with lead exceedances, not disturbing the location of the trees.
   - The total amount of soil to be remediated is estimated at approximately 850 yd^3.
   - Confirmation soil sampling to verify the effectiveness of the remedial action.

Small Arms Pistol Range UXO-17 (SAR)

Proceed to RI/FS to include the following:

1. Determination of impact to groundwater.
2. Potential remedial action such as the following:
   - Remediation of contaminated soils in areas with elevated concentrations of metals.
     - Soils in the Head of the Hillside Slope to a depth of four feet bgs in the areas of bullet accumulations.
     - Soils to a depth of 1 foot bgs at the Toe of Hillside Slope in the areas of bullet accumulations.
   - The total amount of soil to be remediated is estimated at approximately 245 yd^3.
   - Remediation of the slightly elevated NG via aeration of the soil along the firing lines. This can be accomplished by turning the soil in situ.
   - Confirmation soil sampling to verify the effectiveness of the remediation.

Rum Point Skeet Range UXO-16 (RPSR)

Proceed to RI/FS to include the following:

1. Determination of impact to groundwater.
2. Potential remedial action such as the following:

- Remediation of contaminated soils in areas with elevated concentrations of PAHs and metals.
  - Soil a depth of 2 feet bgs in the area of the clay targets, because of the high exceedances of PAHs.
  - Soil in the areas of lead shot accumulations to a depth of 1 foot bgs.
- The total amount of soil to be removed is estimated at approximately 503 yd^3.
- Confirmation soil sampling to verify effectiveness of remediation.

Roach Road Rifle Range UXO-25 (RRRR)

Proceed to RI/FS to include the following:

1. Determination of impact to groundwater.
2. Potential remedial action such as the following:
   - Removal of shallow soils in areas with elevated concentrations of metals.
     - Soil to a depth of 1 foot bgs in the earthen embankment to the west behind the former range targets (i.e., the primary impact berm) in the areas of bullet accumulations.
   - The total amount of soil to be removed is estimated at approximately 44 yd^3.
   - Confirmation soil sampling to verify the effectiveness of the remedial action.

TABLE ES-1

SUMMARY OF FINDINGS AND RECOMMENDATIONS
FIVE SMALL ARMS RANGES
NAVAL SUPPORT FACILITY INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Site Name/Subareas	Screening Exceedance	Major Contaminants	Risk Screening Evaluation Conclusions	Recommendation
Old Skeet and Trap Range (UXO 15)				
Soil	Yes	Antimony, Lead, Zinc, PAHs	Exceedances of metals in soil exist in areas of lead shot accumulations. PAH exceedances exist at locations of clay targets.	Proceed to: RI/FS or IM for soils.
Sediment	Yes	Arsenic, Zinc	Risk Screening eliminated sediment for further risk evaluation.	NFA
Marine Rifle Range (UXO 14) Soil				
Berm 1	Yes	Copper, Lead, Tin	Less than 10% of soil samples collected had low level exceedances of metals in soil.	NFA
Berm 2	Yes	Lead, Tin	Numerous locations had low to moderate levels of exceedances of lead in soil at the top of the berm.	Proceed to: RI/FS or IM for soils.
Hillside	Yes	Antimony, Copper, Lead, Tin, Zinc	Numerous locations had low to high levels of exceedances of lead in soil at the top of the berm.	Proceed to: RI/FS or IM for soils.
Firing Lines	Yes	Antimony, Tin, Zinc	Random low level exceedances of secondary metals in soil. Lead was not exceeded in soil.	NFA
Small Arms (Pistol) Range (UXO 17) Soil	Yes	Antimony, Arsenic, Copper, Lead, Nitroglycerin	A few locations had moderate to high level exceedances at the head and toe of the hillside.	Proceed to: RI/FS or IM for soils.
Rum Point Skeet Range (UXO 16) Soil	Yes	Antimony, Lead, PAHs	Exceedances of metals in soil exist in areas of lead shot accumulations. PAH exceedances exist at locations of clay targets.	Proceed to: RI/FS or IM for soils.
Roach Road Rifle Range (UXO 25) Soil	Yes	Antimony, Copper, Lead, Zinc	Exceedances of metals limited to center of primary target area.	Proceed to: RI/FS or IM for soils.

NFA = No further action
RI/FS = Remedial Investigation/ Feasibility Study
IM = Interim Measures

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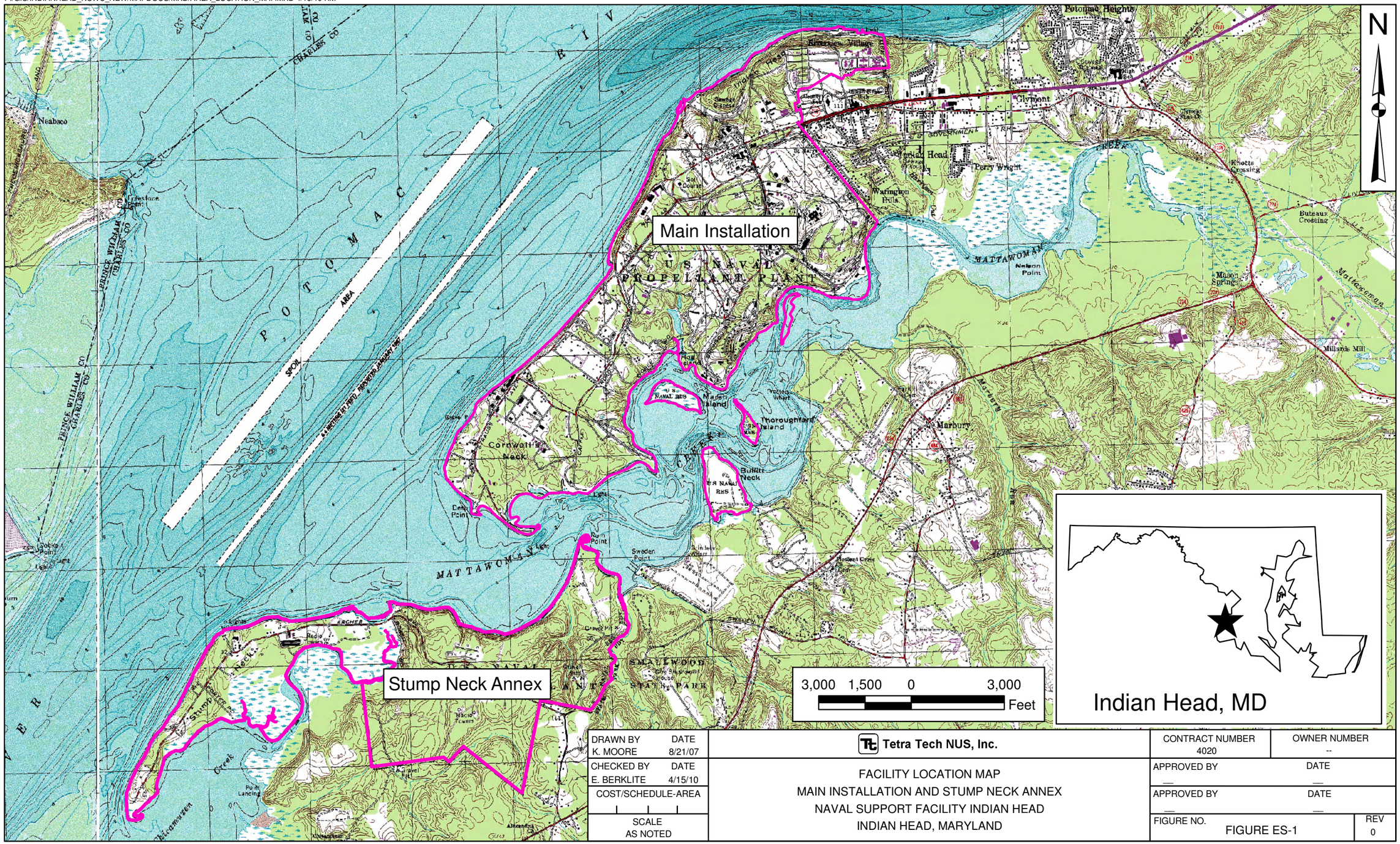

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CHECKED BY E. BERKLITE	DATE 4/15/10	FACILITY LOCATION MAP MAIN INSTALLATION AND STUMP NECK ANNEX NAVAL SUPPORT FACILITY INDIAN HEAD INDIAN HEAD, MARYLAND	APPROVED BY — / DATE —
COST/SCHEDULE-AREA			APPROVED BY — / DATE —
SCALE AS NOTED			FIGURE NO. FIGURE ES-1 / REV 0

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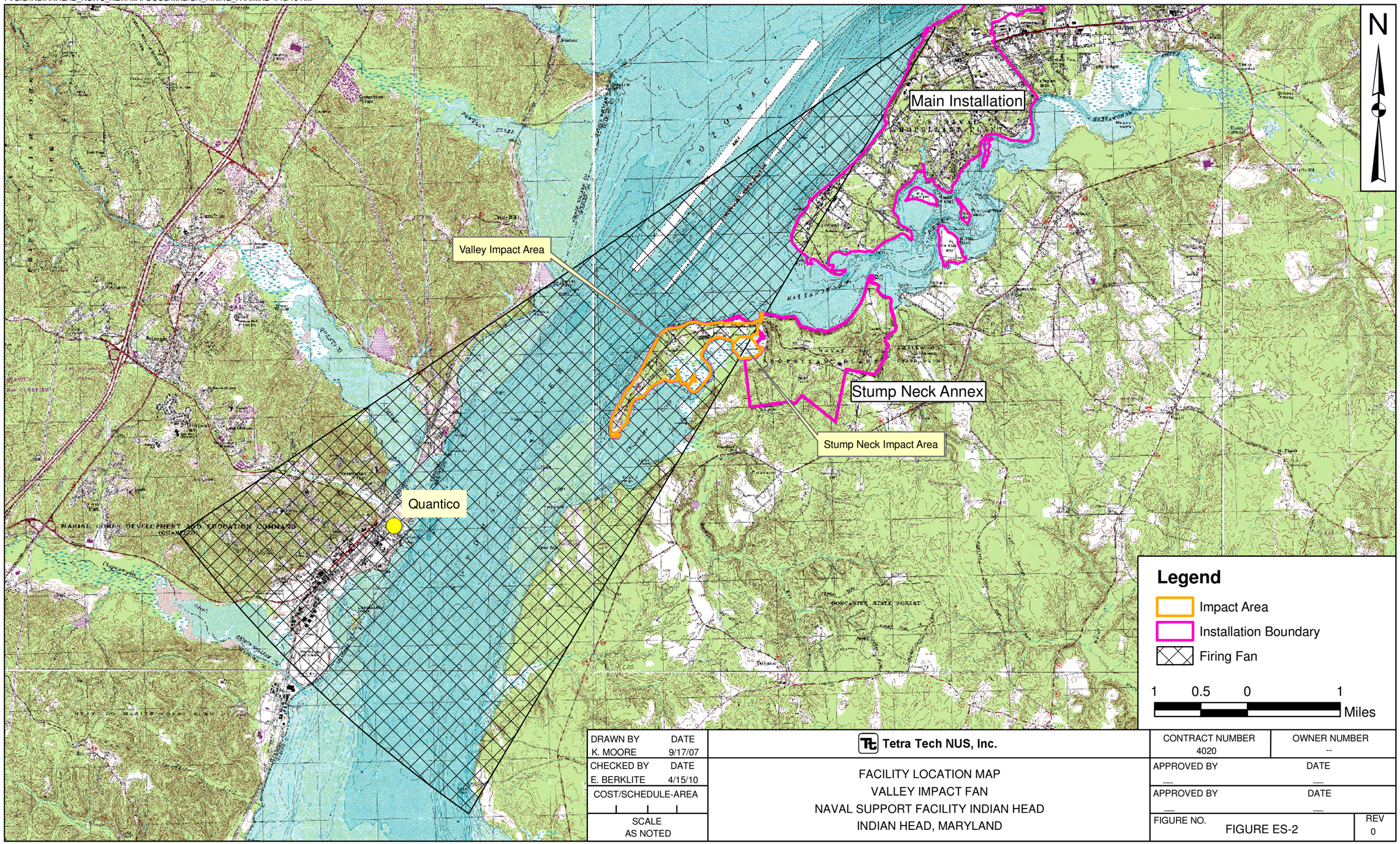

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CHECKED BY E. BERKLITE	DATE 4/15/10	FACILITY LOCATION MAP VALLEY IMPACT FAN NAVAL SUPPORT FACILITY INDIAN HEAD INDIAN HEAD, MARYLAND	APPROVED BY __ / DATE __ APPROVED BY __ / DATE __
COST/SCHEDULE-AREA			FIGURE NO. FIGURE ES-2 / REV 0
SCALE AS NOTED			

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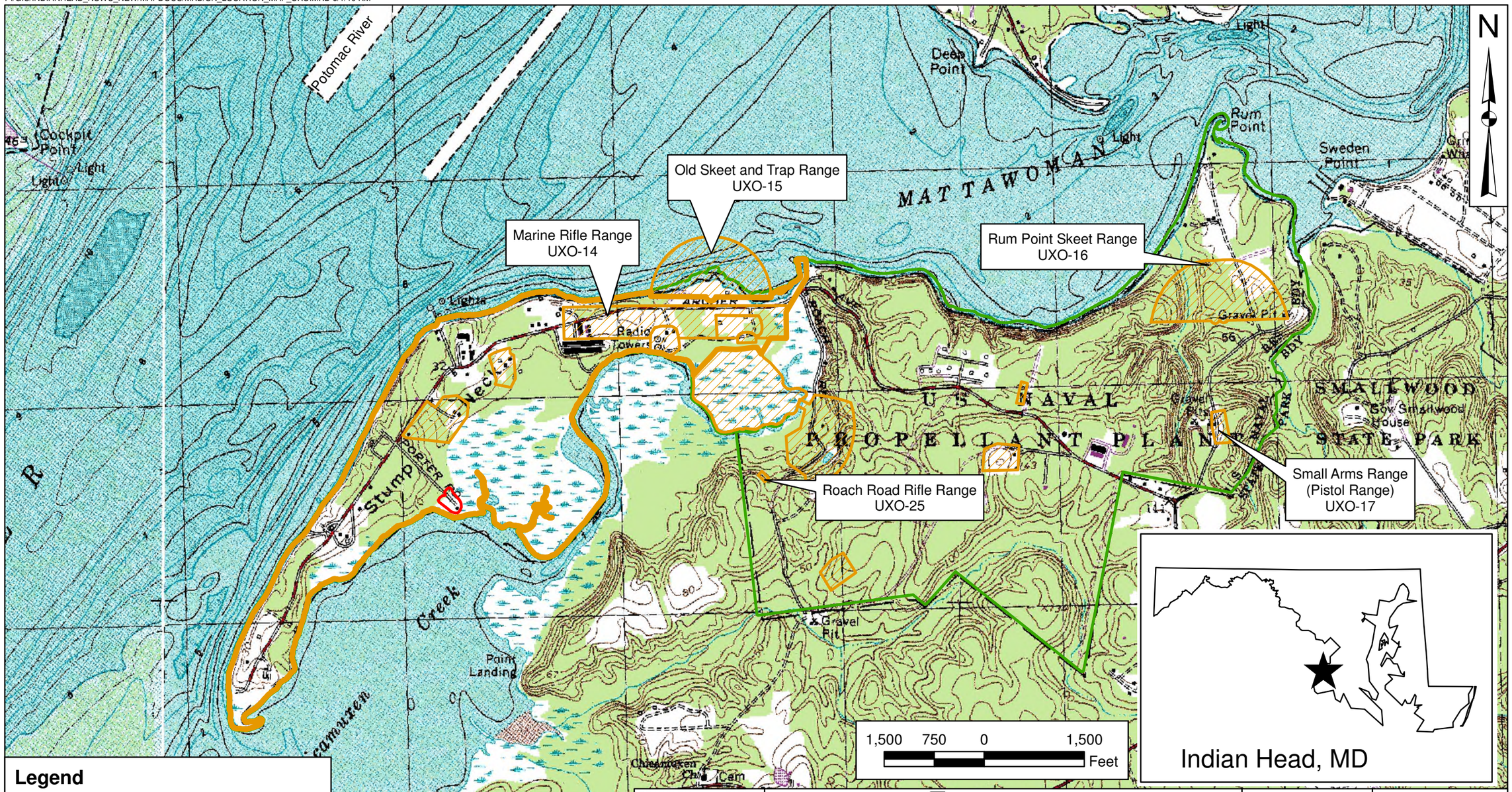


Legend

- MRP Site not included in Site Inspection
- MRP Site Boundary for Valley Impact Area
- MRP Site Boundary
- Installation Boundary

DRAWN BY / DATE	K. MOORE / 8/22/07
CHECKED BY / DATE	E. BERKLITE / 6/1/10
COST/SCHEDULE-AREA	
SCALE	AS NOTED

Tetra Tech NUS, Inc.

RANGE LOCATION MAP
NAVAL SUPPORT FACILITY INDIAN HEAD
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	4020
OWNER NUMBER	--
APPROVED BY / DATE	— / —
APPROVED BY / DATE	— / —
FIGURE NO.	FIGURE ES-3
REV	0

1.0 INTRODUCTION

1.1 PURPOSE OF REPORT AND SCOPE OF WORK

This Site Inspection (SI) Report for the five small arms ranges located at the Naval Support Facility Indian Head (NSF-IH) in Indian Head, Maryland was prepared by Tetra Tech NUS, Inc. (TtNUS) for Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic under Contract Task Order (CTO) 423 of the Comprehensive Long-Term Environmental Action Navy (CLEAN) IV Contract Number N62467-04-D-0055. This report presents the results of the SI conducted at the Stump Neck Annex portion of NSF Indian Head.

The Department of Defense (DoD) has established a separate program to address closed military ranges known as the Military Munitions Response Program (MRP). For MRP sites, DoD is following the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process, which is similar to the Resource Conservation and Recovery Act (RCRA) corrective action process. Malcolm Pirnie conducted the initial phase of the CERCLA process, which is the Preliminary Assessment (PA). The PA was completed in September 2005 and identified five small arms ranges, classified as "other than operational range" sites or Munitions Response Areas or Munitions Response Sites (MRA/Ss), for further investigation at the Stump Neck Annex. The results of the PA were used to develop the field program for the SI, which is described in this report along with the results of the field program.

1.2 PURPOSE

The main objective of the SI was to build on the PA information by gathering initial field data to determine whether Munitions Constituents (MCs) (e.g., lead) that may have originated from previous site operations are present and potentially contributing to environmental impacts in surface soil, subsurface soil, and sediment at the five small arms ranges. Other objectives were to use the data collected to further develop the Conceptual Site Model (CSM), to confirm the presence or absence of munition constituents (MC), and to recommend potential future site actions.

1.3 SCOPE OF WORK

The SI field program for the five small arms ranges included collection of surface and subsurface soil and sediment samples to identify contaminants of potential concern (COPCs) (e.g., metals) that may exist as a result of past operations at the site. If contaminants were detected at concentrations posing a risk to human health or ecological receptors, further investigation may be warranted. The principal objective of

the program was designed to determine the presence or absence of contamination. A secondary objective, if contamination was present was to provide information on the general extent of contamination.

SI field activities at the five small arms ranges included the following:

- Clearing of utilities in the investigation area guided by the use of site utility maps and a Radiodetection RD4000-series pipe and cable locator. Utilities were marked with pin flags, and all sample locations were subsequently positioned at a minimum of 2 feet from these marked locations.

- Collection of discrete surface soil samples [0 to 1 foot below ground surface (bgs)] via hand auger in target and berm areas and within the shot fall-out areas.

- Collection of discrete subsurface soil samples (1 to 3 feet bgs) via hand auger, and by utilization of soil samples direct push technology (DPT) from depths ranging from 0 to 4 feet bgs to 8 to 10 feet bgs in berm areas at one location.

- Collection of composite surface soil samples 0 to 1 foot bgs along and within the firing points at each of the sites.

- Collection of sediment samples at depths to 6 inches along and within 500 feet from the shoreline in Mattawoman Creek at the Old Skeet and Trap Range.

- Lead analysis in the field of all soil and sediment samples using an x-ray fluorescence (XRF) analyzer.

- Selection of a representative number of samples for shipment to the fixed-base laboratory (FBL) for analysis of select TAL metals (antimony, arsenic, copper, lead, nickel, tin, and zinc), nitroglycerin (NG), polynuclear aromatic hydrocarbons (PAHs), cation exchange capacity (CEC), pH, and total organic and carbon (TOC).

1.4 OBJECTIVES

The primary objective of this SI was to determine whether further response actions or remedial investigations are appropriate for any of the sites identified in the PA to restore the sites to an acceptable environmental condition. The SI considers the background information provided in the PA and collects

supplemental site-specific environmental data to further characterize the nature and extent of MC at the sites identified in the PA Report.

1.5 REPORT ORGANIZATION

This SI Report consists of nine sections: Section 1.0 is this introduction, which includes the purpose and scope and report organization; Section 2.0 describes the background and physical setting of the Indian Head Stump Neck Annex five small arms ranges, including initial SI site surveys; Section 3.0 describes the SI field work design and methodologies; Sections 4.0 through 8.0 discuss the SI of the five small arms ranges individually including data results, updated CSMs, and conclusions and recommendations; and Section 9.0 includes the references. The appendices include the following:

- Appendix A – Field Forms
- Appendix B – Site Photos
- Appendix C – Analytical Results [Lab electronic data deliverable (EDD)]
- Appendix D – Data Validation/Usability Assessment (includes all background information)
- Appendix E – Human Health Risk Screening Supporting Documentation
- Appendix F – Ecological Risk Screening Supporting Documentation
- Appendix G – Statistical Calculation Summary

2.0 FACILITY BACKGROUND AND PHYSICAL SETTING

2.1 GENERAL FACILITY BACKGROUND AND PHYSICAL SETTING

2.1.1 Regulatory Framework

This SI Report covers the investigation of five small arms ranges located on the Stump Neck Annex. The Navy is following the CERCLA process for the investigation of these sites. Although no MEC are believed to be in any of the small arms ranges, the possibility exists, and precautions were taken which included the clearing of each sample location by a UXO Technician utilizing a Schonstedt, a magnetic locating instrument at three sites which are located within the firing fan of the Valley Impact Area. The initial phase of the CERCLA process, the PA, was completed in September 2005 and identified 17 "other than operational range" sites or MRA/Ss at the Stump Neck Annex for further investigation (Malcolm Pirnie, 2005). Closed, transferred, and transferring military ranges and sites not located on an operational range are considered "other than operational".

Table 2-1 summarizes the five "other than operational ranges" at the Stump Neck Annex that were evaluated in this SI Report and summarized in the PA Report (Malcolm Pirnie, 2005).

2.1.2 History

Established in 1890, NSF-IH is the Navy's oldest ordnance station. Throughout its long and distinguished history, the facility has proved guns, armor, and propellants; developed and manufactured powder and propellants; and has been recognized as a leader in energetics research and development. Shortly after operations commenced, additional property was acquired by the Navy to increase the size of the installation. The most notable acquisition was of Stump Neck Annex as an impact area and safety buffer in 1901. Stump Neck Annex is home of the Improvised Explosive Device (IED) School where research is conducted on rendering safe technologies for items encountered in hostile situations by law enforcement and security personnel. Explosive Ordnance Disposal EOD Technology Division is also a tenant of Stump Neck Annex. Their mission is to utilize technology to develop and deliver EOD information, tools, and equipment, and to meet the needs of Joint Services EOD operating forces and other customers. In recent decades, NSF-IH has come to be known as a center of excellence in the development and manufacturing of specialized energetic materials used in demolition and propulsion, and is now under the direction of the Naval Sea Systems Command (NAVSEA).

2.1.3 Location and Setting

NSF-IH is located in northwestern Charles County, Maryland, (Figure ES-2). The Stump Neck Annex covers approximately 1,100 acres on the Stump Neck peninsula at the confluence of the Potomac River and Chicamuxen Creek in Charles County, Maryland. Stump Neck Annex was acquired by the Navy in 1901 to support activities at the 2,300-acre Indian Head Main Installation. These two Navy properties are not contiguous; the Indian Head Main Installation is northeast of the Stump Neck Annex across Mattawoman Creek. General Smallwood State Park and private property parcels are located east and southeast, respectively, of Stump Neck Annex, and the Chicamuxen Wildlife Management Area (WMA) is to the south across Chicamuxen Creek.

2.1.4 Current Land Use and Anticipated Future Land Use - Site-Specific

2.1.4.1 Old Skeet and Trap Range (UXO 15)

The Old Skeet and Trap Range (OSTR) was used for small arms recreational activities. This range is currently a routinely manicured grass field, which is used as a helicopter pad and for recreation. According to the NSF IH Master Plan, it is anticipated that in the future the area will continue to be a grass field used as a helicopter pad and for recreational activities.

2.1.4.2 Marine Rifle Range (UXO 14)

Information on land use at the Marine Rifle Range (MRR) prior to 1911 could not be found. From 1911 until 1918, the range was maintained as a rifle range for the Marines. After the Marines relocated, the buildings were abandoned and eventually demolished to make way for development of the Stump Neck Annex. Buildings within the MRR are primarily used as offices and for storage. The western portion of the range contains Building 2195, which is used by the Joint Services EOD Equipment Support Facility. The central and eastern portions of the range are primarily undeveloped with sporadic structures (Buildings 2156 and 2075). There is a fenced maintenance yard in the central portion of the range that is used to store equipment (e.g., dump trucks, backhoes). The wooded area surrounding the existing buildings and the wetland area in the eastern portion of the range are currently unused. According to the installation personnel, there are no planned changes to activities at the MRR.

2.1.4.3 Small Arms Pistol Range (UXO 17)

The Small Arms Range (SAR) was used for pistol training and qualifying activities by the facility's Security Department until 1991. Subsequently, the range was used for bow qualification. It is not known when

bow qualification was discontinued at the SAR; however, the SAR is currently not used. The range is covered with high grass and surrounded by trees on the northern edge. Open fields, trees, grass, and an access road surround the range. The area to the east and south of the SAR is General Smallwood State Park. Rum Point Road runs along the western border of the range. The Rum Point Skeet Range (RPSR) is north of the SAR.

2.1.4.4 Rum Point Skeet Range (UXO 16)

There is no available information on the land use at the RPSR prior to 1991. From 1991 until 2001, the area was maintained as a skeet and trap range. The range was primarily used and maintained by the Potomac River Gun Club. The club was operational at NSF-IH for approximately 15 years at another location on the Stump Neck Annex prior to its move to the RPSR in 1991. The club volunteered to relocate because of environmentally sensitive issues at its previous location. Building 2153 was used as the club's headquarters.

2.1.4.5 Roach Road Rifle Range (UXO 25))

There is no available information on land use at the Roach Road Rifle Range (RRRR) prior to 1963. From 1967 until 1986, the site was maintained as a rifle range. The site is currently undeveloped and is adjacent to an area used for storage of dirt, gravel, telephone poles, and other road construction supplies. According to installation personnel, there are no planned changes to activities at the RRRR. According to the 2003-2004 Stump Neck Annex Hunting Map, the RRRR is located within an upland hunting area.

2.2 GENERAL FACILITY PHYSICAL/ENVIRONMENTAL CHARACTERISTICS

2.2.1 Climate

Stump Neck Annex, located on the eastern shore of the Potomac River in Charles County, Maryland, has a continental-type climate with four well-defined seasons. Located in the middle latitudes of North America, atmospheric flow is from west to east. The Potomac River and its tributaries significantly affect the climate, moderating extreme temperatures and causing higher humidity in the region. In the winter, the Blue Ridge and Appalachian mountain ranges located west of the Stump Neck Annex obstruct the cold, continental air. The coldest period occurs in late January and early February, with low temperatures averaging 29 degrees Fahrenheit (ºF). July is the warmest month, with average high temperatures of 85ºF. Annual precipitation is well distributed, with July and August as the wettest months. Average annual precipitation is 44 inches. Maximum snow accumulation averages 9 inches between November and March. The growing season lasts approximately 190 days, starting in mid-April.

2.2.2 Topography

NSF-IH occupies two peninsulas along the eastern shore of the Potomac River. The Stump Neck Annex is on the southern peninsula, and the Main Installation is located on the northern peninsula. The two peninsulas are separated by Mattawoman Creek. The general topography of the mainland areas of Charles County can be described as gently rolling lands with a few steep slopes. These areas include many drainage swales and streams. Shoreline areas at NSF-IH are generally steeply sloped. The Stump Neck Annex has a relatively low topographic profile. The highest point is the northeastern portion of the peninsula at an elevation of approximately 140 feet above mean sea level (msl). The lowest points lie along the shorelines of the Stump Neck Annex adjacent to Mattawoman Creek and Chicamuxen Creek. These areas are mostly flat, tidal marsh areas, although several 50- to 60-foot bluffs exist along Mattawoman Creek.

2.2.2.1 Old Skeet and Trap Range (UXO 15) - Site-Specific

The relief of the OSTR is relatively flat; the elevation of the entire range is approximately 16 feet above msl. Surface runoff is to the Potomac River either directly or via a drainage ditch along Archer Avenue.

2.2.2.2 Marine Rifle Range (UXO 14)

The terrain at the MRR is relatively flat. Elevations range from 5 to 30 feet above msl. The central and eastern portions of the range are relatively flat at an elevation of approximately 10 feet above msl. The western portion of the range has a slight slope from 10 to 30 feet above msl. Wetlands border the range to the east, and wetlands also surround an unnamed tributary in the central portion of the range. Due to the topography of the area and the complete vegetative ground cover, severe erosion is not expected to occur.

2.2.2.3 Small Arms Pistol Range (UXO 17)

The topography of the SAR can be described as relatively flat with a hill on the eastern side, bordering General Smallwood State Park. The highest point on the SAR is in the northeastern corner, and has an elevation of approximately 100 feet above msl.

2.2.2.4 Rum Point Skeet Range (UXO 16)

The topography of the RPSR is gently sloping from southeast to northwest. Over 94 percent of the range is located on upland terrain. The cleared area of the range is fairly flat. West of the cleared area, the land has a gradual downward slope toward the wetland area and beyond. Approximately 90 percent of the RPSR is located at or above an elevation of 30 feet above msl. Based on the topography of the area and the complete vegetative ground cover, severe erosion is not considered to be a problem.

2.2.2.5 Roach Road Rifle Range (UXO 25)

The terrain at the RRRR is relatively flat, and has an elevation of approximately 50 feet above msl. There is a small downward slope toward the north. Because of the topography of the area and the predominant vegetative ground cover, the potential for erosion is limited.

2.2.3 Regional Geology

The Stump Neck Annex lies within the Atlantic Coastal Plain Physiographic Province 8 to 10 miles east of the Fall Line that marks the western extent of the physiographic province. The regional geology consists of a sedimentary wedge of Cretaceous to Quaternary fluvial and marine deposits overlying crystalline Precambrian metamorphic and igneous bedrock. The sedimentary wedge dips and thickens eastward and ranges in thickness from 550 feet to 900 feet in the vicinity of the Stump Neck Annex (Vroblesky, and Fleck, 1991; Hiortdahl, 1990). It lies non-conformably on the crystalline basement rock surface, which dips to the east. The geologic units underlying NSF-IH, in stratigraphically ascending order, are the Lower Cretaceous Potomac Group, Tertiary Aquia Formation of the Pamunkey Group, fluvial-estuarine deposits of Tertiary to early Quaternary age, and undivided Quaternary deposits. The lithology of the Potomac Group consists of interbedded clay, silt, sand, and gravel deposited in fluviodeltaic environments (Hiortdahl, 1990). The Potomac Group ranges in thickness from 650 to 750 feet in the vicinity of the Stump Neck Annex (Vroblesky and Fleck, 1991; Harsh and Laczniak, 1990), and consists of three geologic units (in ascending stratigraphic order): the Patuxent Formation, Arundel Formation, and Patapsco Formation. The Patuxent Formation consists of sand and pebbles with thin clay interbeds and is 300 to 400 feet thick in the study area. The Arundel Formation generally consists of massive clay with abundant lignite and siderite concretions and is less than 100 feet thick beneath most of the study area. The Patapsco Formation generally consists of sand and silt separated by thick clay layers. The interpreted thickness of the Patapsco Formation in the study area varies from about 200 feet to more than 450 feet (Hiortdahl, 1997). The Aquia Formation (Upper Paleocene) consists of marine deposits of olive black to olive gray, micaceous, glauconitic quartz sand interbedded with sand, silt, and clay. The formation is 0 to 80 feet thick in the NSF-IH peninsula area. The younger units of the Pamunkey Group

and the Chesapeake Group have been removed by erosion in the study area. Overlying the Aquia Formation are fluvial-sedimentary deposits consisting of gravel, sand, and loam. These sediments are referred to as "upland deposits" and range in age from Pliocene to early Pleistocene (Hiortdahl, 1997). The upland deposits crop out at the surface in the northern portion of NSF-IH where surface elevations exceed 40 feet above msl. However, beneath most of the study area, the surficial sediments consist of Pleistocene paleochannel deposits and Holocene alluvial and paludal deposits (Hiortdahl, 1997). These deposits consist of gravel, sand, silt, clay, and peat mixtures with irregular bedding and with an aggregate thickness of 0 to approximately 40 feet. The Aquia Formation and younger upland deposits are missing in many locations in the NSF-IH peninsula area as a result of erosion and deposition in Pleistocene and Holocene paleochannels. Where this occurs, the overlying Quaternary deposits directly overlie the Cretaceous formations.

There was no range-specific geologic information available.

2.2.4 Soil and Vegetation

Charles County is located in the inner Potomac Coastal Plain geologic province. The soils in this area are derived from unconsolidated marine sediments that vary from sandy to clayey in texture and from excessively well drained to poorly drained. Hydric and erodible soils are prevalent. High water tables, severe erosion, earthslides, and hardpans are common.

The United States Department of Agriculture (USDA) mapped the soils of the Stump Neck Annex in the Soil Survey of Charles County, Maryland (1974). The main soil series in this area are the Beltsville, Keyport, and Elkton silt loams. Some additional soil types found at the Stump Neck Annex are cut-and-fill land, gravelly land, tidal marsh, and Mattawan soil. The following discussion is a description of the soil types at the Stump Neck Annex. The eastern area of the Stump Neck Annex is primarily composed of the Beltsville silt loam, with a small area of gravelly land. Beltsville series soils consist of silt and sand with moderate amounts of clay. They are nearly level to moderately sloping, moderately deep, strongly acidic, slowly permeable, and well drained. Gravelly land is composed of gravelly deposits with soil types that are unidentifiable because of severe erosion.

2.2.4.1 Old Skeet and Trap Range (UXO 15) - Site-Specific

According to the Soil Survey of Charles County, the soils at the OSTR consist of Mattapex fine sandy loam with 0 to 2 percent slopes. Soils in this area generally have a surface layer of sandy silt and are

moderately well-drained. Available moisture capacity is high, and permeability is moderately low. Vegetation at the range consists of a grass field.

2.2.4.2 Marine Rifle Range (UXO 14)

Vegetation at this range is a mixture of mowed grass, grass fields, hardwood forest, and wetlands. The wetland area within the range is classified by the installation as a Palustrine forested broad-leaved deciduous wetland. According to the Soil Survey of Charles County, soils in the area consist of silty sand with gravel at the ground surface underlain by silty sand with clay. Specifically, Keyport silt (western portion), Elkton silt loam (central portion), and Mattapex silt loam (eastern portion) are present at the range.

2.2.4.3 Small Arms Pistol Range (UXO 17)

According to the Soil Survey of Charles County, the predominant soil types at the SAR are silty loams and gravelly sandy loam. Specifically, the soils consist of moderately eroded, Beltsville silt loam with 2 to 5 percent slopes and a moderately eroded Aura gravelly loam with a 10 to 15 percent slope. The SAR is located adjacent to a hardwood forest area.

2.2.4.4 Rum Point Skeet Range (UXO 16)

According to the Soil Survey of Charles County, the surface soil at the RPSR consists of a thick series of silty clays. The subsurface soil is a combination of Sassafras sandy loams with 0 to 5 percent slopes and moderate erodability. These soils form on upland terrains that are nearly level to moderately sloping. They are well-drained soils with moderate permeability. During construction of the range in 1991, activities affecting the soil included earth movement and excavation to level the firing pad area. Grasses and shrubs have now taken root directly within the disturbed surface soil, thus limiting possible erosion. The vegetation on the range is characterized by open fields with maintained grass surrounded by hardwood forests and wetlands. High grasses of the family Graminea and genus festuca, such as Kentucky Fescue 31, were planted by the Potomac River Gun Club within specific zones to dissuade birds and waterfowl from grazing or nesting on the range. There is a 100-yard transition zone between the grasses and the tree line containing a mix of high scrubs, bushes, and tall grasses. The trees are approximately 50 to 75 feet tall. The wetland area is classified by the installation as Palustrine forested broad-leaved deciduous wetland.

2.2.4.5 Roach Road Rifle Range (UXO 25)

Vegetation at the RRRR is a mixture of shrubs and forest. According to the Soil Survey of Charles County, soils in the area consist of silty sand with gravel at the ground surface underlain by silty sand with clay. Specifically, Aura gravelly sandy loam is present at the range.

2.2.5 Hydrology

The three primary waterways in the area are the Potomac River, Mattawoman Creek, and Chicamuxen Creek. The Potomac River and Mattawoman Creek border the Main Installation; and the Potomac River, Mattawoman Creek, and Chicamuxen Creek border the Stump Neck Annex. The Potomac River is a continuous, slow-moving, slightly brackish, tidal tributary to the Chesapeake Bay. Mattawoman Creek and Chicamuxen Creek are tributaries to the Potomac River and are also tidally influenced. Both have large floodplains and contain large expanses of tidal wetlands and swamps. Many small streams cross the area, most of which drain directly into one of the three major waterways.

The Stump Neck Annex is bordered by and contains large tracts of both tidal and non-tidal wetlands. Wetlands and floodplains are valuable habitats for wildlife, important groundwater recharge areas, and filters for surface water runoff, thus minimizing siltation and erosion. They are also important aesthetic buffers, scientific resources, and in some cases, recreational areas. The drainage divides presented in the 1983 Initial Assessment Study (IAS) indicate that the majority of the natural drainage at the Stump Neck Annex flows to both Mattawoman Creek and Chicamuxen Creek (Fred C. Hart Associates, Inc.), 1983. Initial Assessment Study of Naval Ordnance Station Indian Head, Maryland, New York, New York, May). Treated wastewater effluent is discharged directly to the Potomac River or Mattawoman Creek and is also discharged from outfalls to tributaries of these two waterways. The wastewater consists of industrial, sanitary, and storm effluents, or combinations thereof.

2.2.5.1 Old Skeet and Trap Range (UXO 15)

Surface water at the OSTR drains directly into the Potomac River.

2.2.5.2 Marine Rifle Range (UXO 14)

There are wetlands located in the central portion of the MRR surrounding an unnamed tributary, and in the eastern portion of the site. Surface water drains to two unnamed tributaries, one in the central portion and one in the eastern portion of the range. Surface water also drains to drainage swales located along Archer Avenue and surrounding the building in the western portion of the range. The surface water

drains to the wetlands and Chicamuxen Creek, both of which drain to the Potomac River. A portion of MRR along the wetlands is located within the 100-year floodplain.

2.2.5.3 Small Arms Pistol Range (UXO 17)

The closest water body to the SAR is an unnamed tributary along the western boundary of the range. Surface water runoff likely follows the topography at the range towards the unnamed tributary. There are no known wetlands in the area.

2.2.5.4 Rum Point Skeet Range (UXO 16)

The RPST has two small unnamed tributaries, and a wetland area on the western portion of the range. Surface water runoff flows toward the direction of the wetlands. The Potomac River Gun Club planted tall Fescue grass along the shot fall zone to minimize overland flow. The range was also graded so that surface runoff is directed away from the shot fall zone to the western edge of the range. The wetlands and tributaries eventually drain into Mattawoman Creek.

2.2.5.5 Roach Road Rifle Range (UXO 25)

There are no surface water bodies present at the RRRR. Based on topography, surface water flows to the north toward Chicamuxen Creek, which drains to the Potomac River.

2.2.6 Regional Hydrogeology

The hydrogeologic framework of the Indian Head area consists of a surficial aquifer and three major underlying confined aquifers: the lower Patapsco aquifer, upper Patuxent aquifer, and lower Patuxent aquifer. Although underlying the surficial aquifer, the upper Patapsco aquifer is considered a poor producer of groundwater in the area and is not considered to be a major aquifer at NSF-IH. Rather than continuous bodies of sands, the individual confined aquifers consist of multiple sand layers interbedded with lower permeability layers. The aquifers are described in detail below. Shallow, unconfined to semi-confined groundwater at NSF-IH occurs in the surficial aquifer from near surface to approximately 45 feet bgs, with water table elevations ranging from sea level to approximately 65 feet above msl. Depending on location, the surficial aquifer is composed of Quaternary paleochannel deposits, Tertiary to Quaternary upland deposits, the Aquia Formation, or sediments of Patapsco Formation. Typically, shallow groundwater occurs in perched water-bearing zones and is recharged from infiltration (Hart, 1983). In some lowland areas, surface water intrusion may be an additional source of recharge of the shallow aquifer along the edges of water bodies and during periods of high tide. Shallow groundwater flow

follows the topography and discharges to local surface water bodies. The descriptions and hydrogeologic properties of the confined aquifers presented in this section are derived primarily from Andreasen (1999).

The top of the lower Patapsco aquifer lies at 70 to 200 feet below sea level in the study area, with a thickness ranging from 65 to 140 feet. The transmissivity of the lower Patapsco aquifer ranges from about 190 to 700 square feet day (ft^2/d) near Indian Head. The aquifer is underlain by relatively low permeability sediments of the Patapsco Formation and by the low-permeability Arundel Clay. In most places the Arundel Clay serves as an effective confining unit between the lower Patapsco and upper Patuxent aquifers, although a hydraulic connection occurs where the Arundel Clay is thin or more heterogeneous.

The lower Patapsco aquifer is the principal water-supply aquifer at NSF-IH, and its potable water wells are typically screened in multiple sand layers within this aquifer at an average depth of 200 to 300 feet. These potable water wells serve approximately 4,050 people, including civilian and enlisted Navy employees and contractor employees. According to the installation, there are two potable wells located on the Stump Neck Annex. Well #42 SN was installed in 1945 and currently has minimal output. The other well, #2012 SN, was installed in 1953. NSF-IH is considering several rehabilitation options including closing #42 SN and using #2012 SN as the main well, or installing an additional well on Stump Neck Annex. There are also several private wells near Rum Point. These wells are tested quarterly or monthly, if regularly used. Although none of the NSF-IH wells supply reserves or residences beyond the facility boundaries, the lower Patapsco aquifer is used extensively for domestic and municipal water supplies in northwestern Charles County. Several production wells are screened in this aquifer northeast of NSF-IH, in and near the towns of Indian Head and Potomac Heights.

The upper Patuxent aquifer lies at 400 to 600 feet below sea level in the study area and is about 50 to 70 feet thick. The transmissivity of the upper Patuxent aquifer ranges from about 150 to 2,600 ft^2/d in northwestern Charles County. Relatively low-permeability sediments of the Patuxent Formation underlie this aquifer.

The top of the lower Patuxent aquifer lies at 800 to 1,000 feet below sea level in the study area and is about 100 feet thick. Few potable water wells are screened in the lower Patuxent aquifer because of the availability of water from the overlying confined aquifers. The lower Patuxent aquifer is underlain by crystalline basement rock. Water levels in the upper and lower Patuxent aquifer are generally similar because of the leaky nature of the intervening confining unit.

2.2.6.1 Old Skeet and Trap Range (UXO 15)

There is no range-specific hydrogeology information for the OSTR.

2.2.6.2 Marine Rifle Range (UXO 14)

It is assumed that shallow groundwater flow from the MRR follows the site topography and is connected to the area's dominant surface water bodies (Mattawoman Creek, Chicamuxen Creek, and Potomac River). No monitoring wells are located within the MRR; however, one of the potable production wells for the Stump Neck Annex, #2012 SN, is located across Archer Avenue.

2.2.6.3 Small Arms Pistol Range (UXO 17)

It is assumed that shallow groundwater flow from the SAR follows the site topography towards the unnamed tributary, and is connected to the area's dominant surface water bodies (Mattawoman Creek and Potomac River).

2.2.6.4 Rum Point Skeet Range (UXO 16)

There are no wells located on the RPSR; however, there is a monitoring well adjacent to the southern side of the range. The well is not used for drinking water, and there are no available data. The closest potable well to the RPSR is a private well located on Rum Point, approximately 1,200 feet north (downgradient) of the range along Rum Point Road. The well is considered to be private because of the low population density. This well is tested quarterly or monthly if used. The well was installed in 1978 at an elevation of 4 feet above msl with a screened interval of 231 to 246 feet below msl within the lower Patapsco aquifer, and has an estimated flow rate of 15 gallons per minute. The static water level is 18 feet below msl.

2.2.6.5 Roach Road Rifle Range (UXO 25)

It is assumed that shallow groundwater flow from the RRRR follows the site topography and is connected to the area's dominant surface water bodies (Mattawoman Creek, Chicamuxen Creek, and the Potomac River). No monitoring wells are located within the RRRR.

2.3 REGIONAL ECOLOGY SUMMARY

2.3.1 Endangered/Threatened Species

According to the 1997 Wildlife Management Plan, three endangered species are reported to be located within the Stump Neck Annex. Two of these three species, the rainbow snake and joint-vetch (flowering plant of the pea family), are federally endangered. The third species, the scaly blazing-star (perennial herb), is a species of special concern in the State of Maryland. In the July 2001 Threatened and Endangered Plant/Animal Species of Charles County, Maryland Report, the Maryland Department of Natural Resources Wildlife and Heritage Service listed these three species as federally and state endangered for Charles County. Table 2-2 summarizes the Known or Protected Species.

2.3.2 Wetlands

2.3.2.1 Old Skeet and Trap Range (UXO 15)

No wetlands are known to exist at the OSTR.

2.3.2.2 Marine Rifle Range (UXO 14) - Site-Specific

There are wetlands located in the central portion of the MRR surrounding an unnamed tributary, and in the eastern portion of the site. The wetlands located on the eastern edge of the range are protected under United States Executive Order 11990, which prohibits construction in a wetland area unless there is no practicable alternative and all possible measures are taken to minimize the environmental impacts. Wetlands are also protected under Section 404 of the Clean Water Act, which requires a permit to be obtained from the United States Army Corps of Engineers (USACE) before any work in a wetland can commence. The wetlands found at the MRR are under the category of Palustrine forested broad-leaved deciduous wetland. A portion of the MRR is located in the 100-year floodplain surrounding the wetlands. Executive Order 11988 restricts development within the 100-year floodplain to water-dependent activities. Any construction within the floodplain must be in accordance with regulations promulgated by the Federal Insurance Administration pursuant to the National Flood Insurance Act of 1968. Permits for construction within the 100-year floodplain are also required and are administered by the Waterway Permits Division of the Maryland Department of Natural Resources.

2.3.2.3 Small Arms Range (UXO 17)

No wetlands are known to exist at the SAR.

2.3.2.4 Rum Point Skeet Range (UXO 16)

The RPSR has two small unnamed tributaries, and a wetland area on the western portion of the range. Surface water runoff flows toward the direction of the wetlands.

2.3.2.5 Roach Road Rifle Range (UXO 25)

No wetlands are known to exist at the RRRR.

2.3.3 Cultural and Archaeological Resources

Charles County contains approximately 261.5 people per square mile (mi^2) according to the 2000 United States Census. NSF-IH and its tenant commands employ approximately 3,600 military and civilian personnel. Indian Head is the county's largest employer. Over 76 percent of the employees at the base live within Charles County. Approximately 500 military and family members live on the installation; however, no military or family members live on Stump Neck Annex. Recreation on and around the installation includes hunting and fishing by permit. The Chicamuxen WMA is located approximately 245 feet downstream of the MRR, and is used by recreational hikers, hunters, and fishers. Residential properties are located 2 miles south of the range.

A Phase I Cultural Resources Survey and Supplemental Architectural Investigations were conducted at Stump Neck in 1996. As a result, 33 sites were identified and investigated. Only 17 of 33 were recommended for Phase II evaluations to determine their eligibility for listing on the National Register of Historic Places. Five of these 17 sites are considered to potentially overlap with the former ranges discussed in this report:

- Site 18CH388 – overlaps with the OSTR (UXO 15) and the MRR (UXO 14).
- Sites 18CH391, 18CH628, and 18CH630 – overlap with the RPSR (UXO 16).
- Site 18CH644 – overlaps with the SAR (UXO 17).

The architectural evaluation verified three National Register-eligible historic districts and identified one additional district: the Indian Head Residential Historic District containing 64 contributing resources; the Naval Powder Factory District containing 124 contributing resources; the Naval Proving Ground Historic District containing no contributing resources; and the Extrusion Plant Historic District containing 63 contributing resources. An additional area of the base, the Polaris facility, was recommended for further research, as it was considered potentially eligible for the National Register as an exceptionally significant area. The exact locations of the contributing resources within these districts were not available.

2.3.3.1 Old Skeet and Trap Range (UXO 15)

According to the 1996 Phase I Cultural Resources Survey of Stump Neck Annex (Goodwin, R.C. & Associates, 1996. Phase I Cultural Resources Survey of Stump Neck Annex and Supplemental Architectural Investigations, Indian Head Naval Surface Warfare Center, Charles County, Maryland.), there is one archaeological site located within the OSTR. Site 18CH388 contained a mix of prehistoric and historic artifacts. This site may correspond to Indian Head Quad File #4, a Late Woodland Indian village. A total of 645 artifacts were recovered at this site, which covers the OSTR and MRR.

2.3.3.2 Marine Rifle Range (UXO 14)

Because a portion of this range is undeveloped, there is the potential for wildlife to exist at the range. According to the 2003-2004 Stump Neck Annex Hunting Map, hunting is permitted in the undeveloped portions of the MRR. The Chicamuxen WMA is located approximately 75 feet south of the MRR. The Phase I Cultural Resources Survey of Stump Neck Annex and Supplemental Architectural Investigations from August 1996 identified one site within the MRR. In addition, a reinforced concrete retaining wall approximately 130 feet long and 33 feet high was identified in the area bordering the marsh on the eastern edge of the MRR. No sites were identified within the range Maryland Register of Historic Places (State Register) or the National Register of Historic Places.

2.3.3.3 Small Arms Pistol Range (UXO 17)

According to the 1996 Phase I Cultural Resources Survey of Stump Neck Annex, Cultural Site 18CH644 overlaps with the SAR (UXO 17). However, several shovel test pits were dug on the site, and all were negative for artifacts.

2.3.3.4 Rum Point Skeet Range (UXO 16)

The range is located in a species protected area and contains a wetland area on the western side. The 1996 Phase I Cultural Resources Survey and Supplemental Architectural Investigations identified three sites that partially overlap the Rum Point Skeet Range. *Site 18CH391:* This site was previously identified in a 1966 historic survey. Artifacts recovered from this site were from the Late Archaic through Late Woodland periods. The size and nature of the site suggest that it was once a base camp or village. Many of the prehistoric materials were from the Ap horizon. It was recommended for a Phase II evaluation. The site overlaps the northeastern portion of the Rum Point Skeet Range. *Site 18CH628:* This small Late Woodland site contained a wide variety of artifact classes including debitage, flake tools,

ceramics, and fire-cracked rock. The artifacts provide evidence that the site was a resource procurement site or a briefly occupied camp. Cores and primary debitage were located in the southeastern portion of the site. Ceramic artifacts were located in the northwestern portion of the site. Recovered historic artifacts were most likely from field scatter. The site was recommended for a Phase II evaluation. This site overlaps the eastern side of the Rum Point Skeet Range. *Site 18CH630:* A diverse collection of prehistoric artifacts including debitage, a flake tool, a core, ceramics, and fire-cracked rock fragments were recovered at this small Late Woodland site. The artifacts were uncovered in unplowed Sassafrass Silt Loam soils. A Phase II evaluation of the site was recommended. The entire site is overlain by the northwestern section of the Rum Point Skeet Range.

2.3.3.5 Roach Road Rifle Range (UXO 25)

Because this range is undeveloped, there is the potential for wildlife to exist at the range. According to the 2003-2004 Stump Neck Annex Hunting Map, hunting is permitted in the undeveloped portions of the RRRR. The Chicamuxen WMA is located approximately 500 feet north of the range and is located within an eagle protection area. The Phase I Cultural Resources Survey of Stump Neck Annex and Supplemental Architectural Investigations from August 1996 did not identify archeological sites within the RRRR. Historic and prehistoric artifacts were recovered but not in sufficient concentrations to warrant a site designation. No sites were identified within the range that are listed in the Maryland Register of Historic Places (State Register) or the National Register of Historic Places (PA).

2.3.4 Water Resources

Fishing is permitted in Mattawoman Creek.

2.3.5 Coastal Zones

The Coastal Zone of Maryland includes all land and water lying within coastal counties, one of which is Charles County. Within the Coastal Zone, Maryland has defined an area within which strict land use management is needed to protect the Chesapeake Bay. The critical area is defined as a 1,000-foot-wide strip of land surrounding the bay and its tidal tributaries. Most construction within 100 feet of the Mean High Water Line (buffer) is prohibited. Most of the area of OSTR falls within the 100-foot buffer of the Mean High Water Line (buffer).

2.3.6 Range Conditions

2.3.6.1 Old Skeet and Trap Range (UXO 15)

The range consists of a neatly mowed grassy area, which is now used for recreational purposes. The former range is also currently designated as a helicopter landing pad. Facilities north of Archer Avenue consist of a recreational pavilion (Building 2174) located approximately 245 feet from the western boundary, and a utility shed (Building 2012) approximately 245 feet from the eastern boundary. There were no physical indications of where the firing points were located. No ordnance, MEC, or related debris was observed during the visual survey. Expended shotgun shell pellets missing their intended targets would have continued undisturbed on a standard trajectory to the north toward the Potomac River. Intact targets would have landed on the ground surface.

2.3.6.2 Marine Rifle Range (UXO 14)

Earthen mounds were observed in the woods along Archer Avenue and east of Building 2075, and were presumed to be the remnants of the target embankments. An improved range boundary proposed for the SI includes the downrange hillside on the eastern side of Roach Road that would most likely have received the fired ammunition from the MRR. A wetlands area is located between the southernmost target butt and the downrange earthen hillside (embankment) adjacent to Roach Road. Based on these observations, there should be two primary areas for the accumulation of expended small arms ammunition at the MRR. The bullets that missed below the range targets would have tended to accumulate in the target butt soil below the targets. The bullets that successfully hit the targets or overshot the targets most likely would have continued on a trajectory beyond the target butts and into the hillside embankment beyond the downrange wetlands (next to Roach Road).

2.3.6.3 Small Arms Range (UXO 17)

During the SI site walks, it became apparent that there had been some sloughing of the slope material on the hillside that received the small arms ammunition expended on the range. This sloughed earthen material also showed erosion rills from surface water overland flow. During the SI site walks, mounded areas were noted on the southern side of the range floor that appeared to correspond to the buried silver-contaminated soil from the X-ray Facility. The wooden firing stands on the northern side of the range may be the wooden stands reportedly used at the former RRRR, which closed in 1986. The SAR on Rum Point Road began operations in the mid-1980s and was most likely constructed as a replacement site to host the small arms training and weapons qualification testing that had previously been performed at the RRRR. Certain range-related materials such as the concrete bases for the range targets, concrete

walkways, and what appear to be rusted iron range target frames were observed on the range floor of the SAR.

2.3.6.4 Rum Point Skeet Range (UXO 16)

The range is semicircular in shape and accessed from the south at the end of Skeet Range Way. A wooden rail fence divides the range from the roadway and the small parking area, which are lined with streetlights. Building 2153RP is located on the southern side of Skeet Range Way. The range covers 13.8 acres. The range boundaries overlap Rum Point Road and a small area of land directly east of the road. This road and the cleared portion of the range are separated by forest. The western portion of the range is transected by wetlands. The range appears to be well maintained, and the grass is mowed. The cleared area of the range is approximately 6 acres. Expended shotgun shell pellets missing their intended targets would have continued undisturbed on a standard trajectory to the north toward the forested portions of the range. Intact targets would have landed on the ground surface. Targets successfully hit with shot on the range would have fragmented and fallen to the ground surface. The much denser shot pellets, after they impacted the clay targets, would have continued on a slightly revised trajectory and fallen to the ground downrange. A shallow surface depression located northwest of the firing points receives surface water runoff from the range. Transport of dissolved metals and soil/sediment particulates could potentially occur within this drainageway during precipitation events.

2.3.6.5 Roach Road Rifle Range (UXO 25)

A wooded area with similar shrubs and trees was observed that appeared to have been cleared approximately 25 years ago. Larger trees and pines surrounded this area. Construction debris/rubble including old concrete pipes and telephone poles was observed in the central portion of the range immediately north of Roach Road. Piles of dirt and gravel were also observed throughout the site. The central portion of the site is cleared and covered with gravel and dirt. During the SI site walks, it became apparent that since closure of the range in 1986, there had been significant placement of fill materials in the areas near present-day Roach Road. The piles of fill materials and the staging of construction materials, telephone poles, piping, and construction debris (e.g., corrugated metal pipe, etc.) in the general area of the RRRR added to the difficultly in locating any remaining features of the former range. There was evidence of potential small arms usage at the RRRR, which may have occurred after the 1986 closure of the range. Small arms fire was directed at a coffee pot, and shot guns may also have been used. Based on these observations, there should be a general area for the accumulation of expended small arms ammunition on the RRRR. Those bullets directed below the range targets would have tended to accumulate in the target butt soil below the targets. Those fired bullets that successfully hit the targets

most likely would have continued on a trajectory through the targets and into the hillside barricade (impact berm). Range fire that overshot the targets would have impacted the soil above and behind the targets, but most likely within the surficial soil of the impact berm.

TABLE 2-1

SUMMARY OF OTHER THAN OPERATIONAL RANGES
NAVAL SUPPORT FACILITY INDIAN HEAD
INDIAN HEAD, MARYLAND - FIVE SMALL ARMS RANGES

Site Name	NORM Site No.	Site Size (Acres)	Use	Dates of Use
Marine Rifle Range	UXO 14	30.44	Rifle Range	1911-1918
Old Skeet and Trap Range	UXO 15	29.33	Skeet and Trap Range	1966-1991
Roach Road Rifle Range	UXO 25	0.27	Rifle Range	1967-1980s
Rum Point Skeet Range	UXO 16	33.45	Skeet and Trap Range	1991-2001
Small Arms (Pistol) Range	UXO 17	2.41	Pistol Range	Mid-1980s-1991

TABLE 2-2

SUMMARY OF KNOWN OR POTENTIAL PROTECTED SPECIES
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Ecological Receptor	Species
Federal Endangered	Rainbow snake
	Joint-vetch
Federal Threatened	None reported
State Endangered	Scaly blazing-star
State Threatened	Non reported

Sources of data include:
NSF-IH Wildlife Management Plan, 1997.
Threatened and Endangered Plant/Animal Species of Charles County, Maryland, July 2001, Maryland Department of Natural Resources.

3.0 GENERAL METHODOLOGY

3.1 FIELD INVESTIGATION APPROACH

This section describes the sampling design and methods and documentation utilized during the SI field activities performed in May and June 2009 at the Five Small Arms Ranges located at NSF-IH Stump Neck Annex. All SI field work was conducted in accordance with the procedures and methodologies described in the Site-Specific Sampling and Analysis Plan (SAP), which was approved by the United States Environmental Protection Agency (USEPA) and the Maryland Department of Environment (MDE) (TtNUS, 2009). Standard Operating Procedures (SOPs) that governed the field work are included in Appendix D of the approved WP. Sample log sheets, field documentation, site photographs, and other supporting information associated with the SI are provided in Appendices A and B of this SI Report.

3.1.1 Site Preparation Activities

Following approval of the SAP, TtNUS personnel began mobilization activities on May 26, 2009. NSF-IH is an active military facility. The field team members reviewed the approved SAP, associated appendices, and Health and Safety Plan (HASP) prior to the start of project activities. In addition, the Field Operations Leader (FOL) held a field team orientation meeting to ensure that personnel were familiar with the scope of the field activities.

Prior to collecting any samples at the site, the FOL arrived at the site and began on-site mobilization activities. Mobilization activities included the receipt of all field equipment directly from vendors; upon receipt, each piece of equipment was checked to verify that it was in proper working condition. The study areas for the five sites are summarized in Table 3-1.

3.1.1.1 Utility clearance

TtNUS completed a utility clearance of the investigation area guided by use of site utility maps and a Radiodetection RD4000-series pipe and cable locator. All utilities were marked with pin flags and all sample locations were subsequently positioned at a minimum of 2 feet from these marked locations.

3.1.1.2 Vegetation Management

It was not necessary for TtNUS to perform brush clearing to access sample locations within investigation areas of the Five Small Arms Range Sites. Minimal vegetation clearance was performed.

3.1.1.3 Permitting (access/drilling/etc)

All personnel were required to have security clearance for site access. All on-site personnel presented proof of United States Citizenship (i.e., Birth Certificate or Passport), photo identification card, vehicle registration information, and proof of automobile insurance before entry to the facility was allowed.

3.1.2 Field Investigation Methods

A total of 451 samples were collected by hand auger (HA), direct push technology (DPT), plastic trowel (PT), or ponar dredge (PD) at 410 locations during the SI investigation. Tables 3-2 through 3-6 list the sample technique for each sample collected at each site.

HA samples were collected at 369 locations at depths ranging from 0 to 3 feet bgs. DPT samples were collected at 7 locations at depths ranging from 0 to 10 feet bgs. PT samples were collected at 9 sample locations at depths of 0 to 0.5 feet bgs. PD samples were collected at 25 sample locations at depths of 0 to 0.5 feet bgs. All soil and sediment samples were analyzed in the field for lead via XRF. Tables 3-7 through 3-11 present all sample locations and associated XRF and FBL lead concentrations for each site. Predicted Lab Values are also presented on these tables for three of the five sites. The correlation analyses for the predicted lab values are discussed in Section 3.5. After the initial screening by XRF, samples were selected for analysis of the following parameters at a FBL:

Metals

- Antimony
- Arsenic
- Copper
- Lead
- Tin
- Zinc

PAHs

- 1-Methylnaphthalene
- 2-Methylnaphthalene
- Acenaphthene
- Acenaphthylene

- Anthracene
- Benzo(a)Anthracene
- Benzo(a)Pyrene
- Benzo(b)Fluoranthene
- Benzo(g,h,i)Perylene
- Benzo(k)Fluoranthene
- Chrysene
- Dibenzo(a,h)Anthracene
- Fluoranthene
- Fluorene
- Indeno(1,2,3-cd)Pyrene
- Phenanthrene
- Pyrene

Explosives

- Nitroglycerin

Miscellaneous Parameters

- CEC
- pH
- TOC
- TS

The summary of the samples collected at Indian Head, Stump Neck Annex, Five Small Arms Ranges is presented below.

OLD SKEET AND TRAP RANGE (UXO 15)

Total Number of Samples Collected: 83 soil and 34 sediment.

- Four composite samples collected at firing lines with each sample composed of 10 increments.

- Fifty-six initial soil samples collected. Some XRF lead exceedences found in the northeast and northwest corners of the range.

- Seventeen additional “step-out” samples collected to try and bound any lead contamination.
- Six subsurface samples collected at depths of 1 to 2 feet bgs.
- One duplicate surface sample collected.
- Thirty-four sediment samples collected: 9 collected at the shoreline, 25 collected at various distances from the shore in Mattawoman Creek.

MARINE RIFLE RANGE (UXO 14)

Total Number of Samples Collected: 148

- Nine composite samples collected from firing lines with each sample composed of 10 increments.
- Thirty-five soil samples collected from Berm #1 (nearest to firing points) with only six locations having an XRF lead concentration greater than the field decision criteria of 300 mg/kg. Most in the 300 to 400 mg/kg range.
- Thirty-five soil samples collected from Berm #2 (farthest from firing points) with 13 locations having an XRF lead concentration greater than 300 mg/kg. Most in the range of 400 to 700 mg/kg.
- Fifty-four initial soil samples collected from the impact hillside with 42 of them having an XRF lead concentration greater than 300 mg/kg.
- Fourteen additional “step-out" samples collected to try and bound any lead contamination; four of these samples were subsurface samples.
- One duplicate subsurface sample collected.

SMALL ARMS RANGE (UXO 17)

Total Number of Samples Collected: 53

- Three composite samples collected from firing lines with each sample composed of 10 aliquots.

- Seventeen initial samples collected, with eight locations having an XRF lead concentration greater than 300 mg/kg.

- Six additional "step-out" samples collected to try and bound any lead contamination. Three of these samples collected were subsurface samples.

- Twenty-seven soil samples collected via DPT

- One duplicate surface sample collected.

RUM POINT SKEET RANGE (UXO 16)

Total Number of Samples Collected: 96

- Two composite samples collected from firing points with each sample composed of 10 increments.
- Seventy-seven initial samples collected, with six locations having an XRF lead concentration greater than 300 mg/kg.
- Fifteen additional "step-out" samples collected to try and bound any lead contamination.
- Two duplicate surface samples collected.

ROACH ROAD RIFLE RANGE (UXO 25)

Total Number of Samples Collected: 36

- One composite sample collected from area of firing lines composed of 10 increments.
- Thirty-three initial samples collected, with six locations having an XRF lead concentration greater than 300 mg/kg.
- No "step-out" samples collected.
- Two duplicate surface samples collected.

Samples selected for FBL analysis from each of the five sites are summarized in the table below.

	FBL ANALYSIS			
SITE	**METALS**	**PAHs**	**TOC**	**NITROGLYCERIN**
OSTR	18 (soil) 5 (sediment)	2 (soil) 3 (sediment)	2 (soil) 2 (sediment)	2 (soil) 0 (sediment)
MRR	32 (soil)	9 (soil)	4 (soil)	9 (soil)
SAR	25 (soil)	0	4 (soil)	3 (soil)
RPSR	25 (soil)	21 (soil)	4 (soil)	2 (soil)
RRRR	23 (soil)	0	4 (soil)	1 (soil)

3.1.2.1 XRF

Soil samples undergoing field XRF analysis were processed and analyzed in the field in accordance with SOP-13. Prior to analyzing samples, the XRF was standardized in accordance with the manufacturer's instructions, and three known lead concentrations [National Institute of Standards and Technology (NIST) standards] were analyzed to verify the accuracy of the instrument and to assess the stability and consistency of the results.

Sample processing prior to field XRF analysis consisted of homogenizing each soil sample within a large ziploc-type baggie, removing rocks and other debris, placing the sample in a small aluminum pan, drying the sample in an electric convection oven for approximately 10 to 15 minutes, and then physically processing the sample material to eliminate clods and produce a fine uniform particle size. Each sample was then transferred to a smaller ziploc-type baggie from which three separate XRF measurements were made, one from each end and one from the center of the sample ziploc-type baggie. The average lead concentration of the three readings was used as the final XRF lead concentration for the sample (Tables 3-7 through 3-11).

During sample collection activities, all soil material was visually inspected in the field for the presence of bullets or bullet fragments. The soil material was again visually monitored in the field laboratory during processing for XRF analysis.

3.1.2.2 Hand Auger

SOP-05 outlines Soil Coring and Sampling Using Hand Auger Techniques. Hand Augers were employed to collect the majority of soil cores. The hand augering system consisted of a stainless steel bucket bit (i.e., a cylinder 6-1/2-inches long and approximately 2-3/4-inches in diameter), an extension rod, and a cross handle. The area to be sampled was cleared of any surface debris and the hand auger sampler was turned into the ground to a depth of 1 foot. The 0- to 1-foot depth soil interval is considered to be the

surface soil. Subsurface soil samples were collected at depths of 1 to 3 feet bgs. The sample material was then removed from the bucket bit and placed into a sealable polyethylene bag. Any changes in the color, texture or odor of the soil were noted in a field notebook or on a standardized data sheet. The sample material was thoroughly homogenized and the sample ID, date, time, and sampler initials were written on the bag with an indelible marker. Required information was completed on the Soil Sample Log Sheet, and the Chain-of-Custody (COC) Form was updated. Excess soil core material was returned to the hole. If insufficient soil was available to fill the hole to the ground surface, then bentonite pellets were mixed with the soil for backfilling the hole, and hydrated with potable water. All soil sampling equipment was decontaminated in accordance with SOP-04 before collecting the next sample. Soil samples were transported to the field office where a portion of the sample underwent XRF analysis for lead (See SOP-13). Based on the field XRF analysis for lead and visual observations for clay target fragments, samples were selected for FBL analysis. A portion of the sample was placed in the appropriate sample container as supplied by the laboratory. The sample labels were completed and affixed to the sample container. Samples were packaged and shipped to the FBL in accordance with SOP-11. Field Forms are attached in Appendix A and include the Soil and Sediment Sample Log Sheet and the Soil Boring Log Sheet, where applicable.

3.1.2.3 Drilling

SOP-06 describes the procedures for collecting surface and subsurface soil cores from unconsolidated overburden materials using DPT. For these investigations, a Geoprobe rig with a Macrocore Sampler was the type of DPT used. The area was cleared of any surface debris. A new clear acetate liner was placed in the detachable Macrocore core barrel and a coring device was attached to the Geoprobe rig. Macrocore samplers (lined with acetate) were driven into the ground to a specified depth using hydraulic pressure. The 0- to 1-foot depth soil interval is considered to be the surface soil. Subsurface soil samples were collected at depths greater than 1 foot bgs. The sampler was retracted from the borehole, and the acetate liner and the soil core were removed from the Macrocore barrel. The acetate liner containing the soil core was placed in a metal trough and while wearing cut-resistant gloves, the acetate liner was cut through its entire length. The soil core was logged on the Boring Log Sheet (see SOP-10) and the desired interval of the soil core was placed in a sealable polyethylene bag. The sample material was thoroughly homogenized, and the sample ID, date, and time were written on the bag with an indelible marker. The required information was completed on the Soil Sample Log Sheet. The COC Form was updated. The steps were repeated for the next depth intervals, if required. The depth to water table, if encountered, was recorded on the Boring Log, and the estimated moisture content of the soil and the presence or absence of water in the boring were noted. All soil core materials were returned to the hole and if insufficient soil was available to fill the hole to the ground surface, then bentonite pellets mixed with

the soil were used to backfill the hole, and hydrated as per manufacturer recommendations. All soil sampling equipment was decontaminated in accordance with SOP-04 prior to collecting the next sample. Based on the field XRF analysis and visual observations, samples were selected for FBL analysis. A portion of the sample was placed in the appropriate sample container as supplied by the laboratory. The sample labels were completed and affixed to the sample container. Samples were packaged and shipped to the FBL in accordance with SOP-11. Field Forms are attached in Appendix A and include the Soil and Sediment Sample Log Sheet and the Soil Boring Log Sheet, where applicable.

3.1.2.4 Sediment Sampling

SOP-08 establishes the procedure for sediment sampling in streams and other waterways. The sampler wore clean, disposable medical-grade gloves. Vegetative matter or debris, if present, was cleared from the sample location using a disposable sampling trowel or dedicated stainless steel spoon. The trowel was used to collect and homogenize the sediment in an 18-inch-diameter circular area that was 6 inches deep. The sediment was stirred within the circular area, and the sediment was not moved outside the circle. The same trowel was used to scoop the homogenized sediment into a Ziploc-type baggie. The sample ID, date, time, and sampler initials were written on the bag with an indelible marker. Required information was completed on the Sediment Sample Log Sheet and the COC Form was updated. The sediment samples were transported to the field office where a portion of the sample underwent XRF analysis for lead (See SOP-14). Based on the field XRF analysis for lead and visual observations for clay target fragments, samples were selected for FBL analysis. A portion of the sample was placed in the appropriate sample container as supplied by the laboratory. The sample labels were completed and affixed to the sample container. Samples were packaged and shipped to the FBL in accordance with SOP-11. Field Forms are attached in Appendix A and include the Soil and Sediment Sample Log Sheet.

3.1.3 Site Sampling Operations

3.1.3.1 Old Skeet and Trap Range (UXO 15)

3.1.3.1.1 Sample Design

The total area of the site is 29.33 acres as indicated in Table 3-1. The site is divided into the Range Area, Open Water Area, and the Near Shore Area. The range portion of the study area covers approximately 4.4 acres. The Open Water portion of the study area covers approximately 18 acre. The Near Shore portion of the study area covers approximately 750 linear feet. See Figure 3-1 for all sample locations. Prior to initiating sample collection, all soil sample locations were marked by colored pin flags bearing the sample location ID number. Proposed sample locations identified in the approved WP were located by

global positioning system (GPS) and by measurements from stationary objects (e.g., roadways, existing buildings). All sample locations were the ones proposed in the approved WP.

A total of 83 soil samples and 34 sediment samples were collected during the SI at the OSTR. Eighty-three samples underwent field XRF analysis for lead and 18 soil and 5 sediment samples were selected for metals analysis at the FBL. Two soil and three sediment samples were selected for PAH analysis. Two soil and two sediment samples were selected for TOC analysis. There were four composite samples of which two were selected for NG analysis. Soil samples were collected using a hand auger in accordance with SOP-05.

The nine Near Shore sediment samples were collected using disposable plastic trowels. The 25 Open Water sediment samples were collected using ponar dredge from a boat. A list of the methods used to collect the samples is shown in Table 3-2. The XRF screening results are shown in Table 3-7. The XRF screened composite samples were not correlated, so they are not shown on this table.

3.1.3.1.2 Surface Soil

Discrete

Fifty-six initial soil samples were collected via hand auger. The surface soil samples were collected from 0 to 1 foot bgs. There were some XRF lead exceedances found in the northeast and northwest corners of the range. All 56 samples were analyzed in the field via XRF using the sample process discussed in Section 3.1.2.1. The average XRF lead concentration for each of these samples was used as the basis for determining if additional sampling was required in the area of that sample. The discrete sample locations with an average XRF lead concentration greater than the WP field decision criteria of 300 mg/kg resulted in the collection of 17 additional "step-out" samples for purposes of bounding the lead contamination, and an additional 5 subsurface samples. One duplicate surface sample was collected. The XRF and FBL lead results are discussed further in Section 4.3.1.

Composite

Four composite soil samples were collected at the firing lines (0 to 1 foot bgs). Soil samples were collected in accordance with SOP-15. Each composite sample consisted of ten aliquots collected in a random fashion in the area of the assumed firing points. Each sample was homogenized within a large ziploc-type baggie; a portion of the sample was processed for XRF analysis and another portion was placed in the appropriate sample container and shipped to the FBL for select TAL metals and NG analysis.

3.1.3.1.3 Subsurface Soil

Five discrete soil samples were collected from 1 to 2 feet bgs utilizing a hand auger. Specific sample depths and locations can be found in Table 3-2. Each sample was thoroughly homogenized within the baggie, and a portion of the sample was then removed for processing and field XRF analysis. Based on XRF results, one sample was selected for shipment to the FBL where it underwent select TAL metals analysis.

3.1.3.2 Marine Rifle Range (UXO 14)

3.1.3.2.1 Sample Design

The total area of the site is 30.44 acres as indicated in Table 3-1. The site is divided into the nine firing lines, two target berms, and the Hillside Impact Area. The nine firing lines are approximately 200 linear feet each. Target Berm #1 covers approximately 0.42 acres. Target Berm #2 covers approximately 0.34 acres. The Hillside Impact Area covers approximately 2.7 acres. See Figures 3-2 and 3-2a for all sample locations. Prior to initiating sample collection, all sample locations were marked by colored pin flags bearing the sample location ID number. Proposed sample locations identified in the approved WP were located by GPS and by measurements from stationary objects (e.g., roadways, existing buildings). All sample locations were the ones proposed in the approved WP.

A total of 148 soil samples were collected during the SI at the MRR. One hundred and forty-eight samples underwent field XRF analysis for lead, and 32 soil samples were selected for metals analysis at the FBL. Nine soil samples were selected for PAH analysis. Four soil samples were selected for TOC analysis. Nine soil samples were selected for NG analysis. Soil samples were collected via hand auger in accordance with SOP-05. A list of the sample collection method used for each sample is shown in Table 3-3. The XRF screening results are shown in Table 3-8. The XRF screened composite samples were not correlated, so are not shown on this table.

3.1.3.2.2 Surface Soil

Discrete

One hundred twenty-four initial soil samples were collected via hand auger. The surface samples were collected from 0 to 1 foot bgs. Thirty-five soil samples were collected from Berm #1, 35 soil samples were collected from Berm #2, and 54 samples were collected from the impact hillside. One duplicate sample

was collected. All 125 samples were analyzed in the field via XRF using the sample process discussed in Section 3.1.2.1. The average XRF lead concentration for each of these samples was used as the basis for determining if additional sampling was required in the area of that sample. Discrete sample locations with an average XRF lead concentration greater than the WP field decision criteria of 300 mg/kg resulted in the collection of 14 additional "step-out" samples for purposes of bounding the lead contamination. The XRF and FBL lead results are discussed further in Section 5.3.1.

Composite

Nine composite soil samples were collected at the firing lines (0 to 1 foot bgs). Soil samples were collected in accordance with SOP-15. Each composite sample consisted of ten aliquots collected in a linear fashion along the length of each of the firing lines. Each sample was homogenized within a large ziploc-type baggie; a portion of the sample was processed for XRF analysis and another portion was placed in the appropriate sample container and shipped to the FBL for select TAL metals and NG analysis.

3.1.3.2.3 Subsurface Soil

Three of the "step-out" soil samples were collected from 1 to 2 feet bgs and one was collected from 2 to 3 feet bgs utilizing a hand auger. Specific sample depths and locations can be found in Table 3-3. Each sample was thoroughly homogenized within the baggie, and a portion of the sample was then removed for processing and field XRF analysis. Based on XRF results, one sample was selected for shipment to the FBL where it underwent select TAL metals analysis.

3.1.3.3 Small Arms Pistol Range (UXO 17)

3.1.3.3.1 Sample Design

The total area of the site is 2.41 acres as indicated in Table 3-1. The site is divided into two areas: the firing lines and the range area, which includes the hillside impact area. The range portion of the study area covers approximately 0.26 acres. The Firing Lines cover approximately 140 linear feet each. See Figure 3-3 for all sample locations. Prior to initiating sample collection, all sample locations were marked by colored pin flags bearing the sample location ID number. Proposed sample locations identified in the approved WP were located by GPS and by measurements from stationary objects (e.g., roadways, existing buildings). All sample locations were the ones proposed in the approved WP.

A total of 53 soil samples were collected during the SI at the SAR. Fifty-three samples underwent field XRF analysis for lead, and 25 soil samples were selected for metals analysis at the FBL. No samples were selected for PAH analysis. Four soil samples were selected for TOC analysis. Three soil samples were selected for NG analysis. Soil samples were collected in accordance either via hand auger (SOP-05) or DPT (SOP-06). A list of the sample collection method used for each sample is shown in Table 3-4. The XRF screening results are shown in Table 3-9.

3.1.3.3.2 Surface Soil

Discrete

Seventeen initial soil samples were collected via hand auger. Twenty-seven soil samples were collected by DPT at seven locations in the impact hillside. The 0 to 4 feet bgs interval along the sloughed hillside was considered to be the surface soil. Surface soil samples collected were from the surface depth 0 to 4 feet bgs in the hillside. Hand auger surface soil samples were collected at 0 to 1 foot bgs at the bottom of the hillside. DPT sampling depths ranged from 0 to 4 feet bgs to 8.0 to 10 feet bgs. One duplicate sample was collected. All 45 samples were analyzed in the field via XRF using the sample process discussed in Section 3.1.2.1. The average XRF lead concentration for each sample was used as the basis for determining if additional sampling was required in the area of that sample. The discrete sample locations with an average XRF lead concentration greater than the WP field decision criteria of 300 mg/kg resulted in the collection of six additional "step-out" samples, of which three of these were subsurface, for the purposes of bounding the lead contamination. The XRF and FBL lead results are discussed further in Section 6.3.1.

Composite

Three composite soil samples were collected at the firing lines (0 to 1 foot bgs). Soil samples were collected in accordance with SOP-15. Each composite sample consisted of ten aliquots collected in a linear fashion along the length of each of the firing lines. Each of the samples was homogenized within a large ziploc-type baggie; a portion of the sample was processed for XRF analysis and another portion was placed in the appropriate sample container and shipped to the FBL for select TAL metals and NG analysis.

3.1.3.3.3 Subsurface Soil

Three of the discrete soil samples were collected from 1 to 2 feet bgs utilizing a hand auger. Specific sample depths and locations can be found in Table 3-4. Each sample was thoroughly homogenized

within the baggie, and a portion of the sample was then removed for processing and field XRF analysis. Based on XRF results, all three samples were selected for shipment to the FBL where they underwent select TAL metals analysis.

Twenty-seven discrete soil samples were collected from seven borings utilizing DPT. Four soil samples were collected at each of the seven locations at depths of 0 to 4 feet bgs, 4 to 6 feet bgs, 6 to 8 feet bgs, and 8 to 10 feet bgs. Specific sample depths can be found in Table 3-4.

Utilizing DPT, samples were removed from the ground inside a 4-foot clean plastic sleeve, which was then cut open to reveal the sample core. General observations including grain size, color, wetness, etc. were noted on the soil sample log (Appendix A). Soil was removed from each half of the plastic sleeve and placed inside a large ziploc-type baggie that was labeled with the sample date, depth, and time. The sample was thoroughly homogenized within the baggie, and a portion of the sample was then removed for processing and field XRF analysis.

Based on XRF results, nine samples were selected for shipment to the FBL where they underwent select TAL metals analysis.

3.1.3.4 Rum Point Skeet Range (UXO 16)

3.1.3.4.1 Sample Design

The total area of the site is 33.45 acres as indicated in Table 3-1. The study area consists of the Range Area which covers approximately 13.8 acres. See Figure 3-4 for all sample locations. Prior to initiating sample collection, all sample locations were marked by colored pin flags bearing the sample location ID number. Proposed sample locations identified in the approved WP were located by GPS and by measurements from stationary objects (e.g., roadways, existing buildings). All sample locations were the ones proposed in the approved WP.

A total of 96 soil samples were collected from the Range Area during the SI at the RPSR. Ninety-four discrete surface soil samples and two duplicate surface soil samples were collected. Ninety-six samples underwent field XRF analysis for lead, and 25 samples were selected for metals analysis at the FBL. Twenty-one soil samples were selected for PAH analysis. Four soil samples were selected for TOC analysis. Two soil samples were selected for NG analysis. Soil samples were collected via hand auger in accordance with SOP-05. A list of the sample collection method used for each sample is shown in Table 3-5. The XRF screening results are shown in Table 3-10.

3.1.3.4.2 Surface Soil

Discrete

Seventy-seven initial soil samples were collected via hand auger from 0 to 1 foot bgs. All 60 samples were analyzed in the field via XRF using the sample process discussed in Section 3.1.2.1. The average XRF lead concentration for each sample was used as the basis for determining if additional sampling was required in the area of that sample. The discrete sample locations with an average XRF lead concentration greater than the WP field decision criteria of 300 mg/kg resulted in the collection of 15 additional "step-out" samples for purposes of bounding the lead contamination. Two duplicate surface soil samples were collected. The XRF and FBL lead results are discussed further in Section 7.3.1.

Composite

Two composite soil samples were collected at the firing points (0 to 1 foot bgs). Soil samples were collected in accordance with SOP-15. Each composite sample consisted of ten aliquots collected in the area of the two firing points. Each sample was homogenized within a large ziploc-type baggie; a portion of the sample was processed for XRF analysis, and another portion was placed in the appropriate sample container and shipped to the FBL for select TAL metals and NG analysis.

3.1.3.4.3 Subsurface Soil

No subsurface soil samples were collected.

3.1.3.5 Roach Road Rifle Range (UXO 25)

3.1.3.5.1 Sample Design

The total area of the site is 0.27 acres as indicated in Table 3-1. The study area consists of the Range Area which covers approximately 0.23 acres. See Figure 3-5 for all sample locations. Prior to initiating sample collection, all sample locations were marked by colored pin flags bearing the sample location ID number. Proposed sample locations identified in the approved WP were located by GPS and by measurements from stationary objects (e.g., roadways, existing buildings). All sample locations were the ones proposed in the approved WP.

A total of 36 soil samples were collected from the range area during the SI at the RRRR. Thirty-four samples underwent field XRF analysis for lead, and 23 soil samples were selected for metals analysis at

the FBL. No samples were selected for PAH analysis. Four soil samples were selected for TOC analysis. One soil sample was selected for NG analysis. Soil samples were collected via hand auger in accordance with SOP-05. A list of the sample collection method used at each sample location is shown in Table 3-6. The XRF screening results are shown in Table 3-11.

3.1.3.5.2 Surface Soil

Discrete

Thirty-three initial soil samples were collected via hand auger from 0 to 1 foot bgs. All 33 samples were analyzed in the field via XRF using the sample process discussed in Section 3.1.2.1. Two duplicate samples were collected. The average XRF lead concentration for each sample was used as the basis for determining if additional sampling was required in the area of that sample. No "step-out" samples were collected. The XRF and FBL lead results are discussed further in Section 8.3.1.

Composite

One composite soil sample was collected at the firing line (0 to 1 foot bgs). The sample was collected in accordance with SOP-15. This composite sample consisted of ten aliquots collected in a random fashion in the area of the presumed firing lines. The sample was homogenized within a large ziploc-type baggie; a portion of the sample was processed for XRF analysis, and another portion was placed in the appropriate sample container and shipped to the FBL for select TAL metals and NG analysis.

3.1.3.5.3 Subsurface Soil

No subsurface soil samples were collected.

3.1.4 Field Sample Documentation

The sample numbering scheme was in accordance with SOP-02 (Sample Identification and Nomenclature). Sample documentation consisted of the completion of sample log sheets, COC forms, field logbooks, and health and safety documentation. Field documentation was completed as per SOP-03. The sample log sheets contain information such as sample location and sample identification number, container requirements and analyses to be performed, and sample type, time, and date. Any unusual circumstances encountered during sample collection were noted on the form. COC forms were used to track each sample from collection to receipt at the FBL. All field log sheets and field forms are included in Appendix A of this document. Site photographs are included as Appendix B.

Sample labeling was in accordance with SOP-01. Soil sample log sheets maintained for the samples collected during this SI are included in Appendix A and contain the following information, as appropriate, for each sample:

- Sample location and sample ID.
- Name of person(s) collecting the sample.
- Sample collection method.
- Sample depth, date, and time.
- Brief soil description.

Sample Handling, Packaging, and Shipping

Sample containers, preservation, packaging, and shipping were in accordance with SOP-11. Sample handling activities included field-related considerations concerning the selection of sample containers, allowable holding times, sample custody, and maintaining samples at the appropriate storage temperature. All sample containers shipped to the FBL were sealed in plastic ziploc-type bags to minimize the possibility of breakage during transport. The sample containers were placed in a cooler lined with a large plastic garbage bag and covered with ice. A temperature blank was placed in each cooler prior to shipment. The plastic garbage bag was sealed with a knot, and the COC form was sealed in a ziploc-type bag and taped to the inside of the cooler lid. A signed and dated custody seal was applied to each end of the cooler and then covered with strapping tape to provide a tamper-evident seal. A Federal Express airbill was applied to the shipping cooler. TtNUS maintained custody of the samples until they were relinquished to Federal Express. The Federal Express tracking number (airbill number) was recorded on the COC form, and the sender's copy of the airbill was maintained for shipment tracking, if needed. All samples were shipped to the FBL for overnight delivery and were received within sample holding times.

3.1.5 Quality Control Samples

Quality assurance (QA)/quality control (QC) samples were generated and collected during sampling activities to monitor both field and laboratory procedures, in accordance with the approved WP (TtNUS, 2009). QC for the XRF analyzer is detailed in Section 3.1.2.1 of this document. QA/QC samples included field duplicates, equipment rinsate blanks, and temperature blanks. Field duplicate results are tabulated in Appendix C of this document. Types of QA/QC samples are briefly described as follows:

- Field Duplicates - consisted of a single sample split into two portions. Field duplicates were collected at the rate of 1 in 20 during this field investigation to assess the overall precision of the sampling and analysis program.

- Equipment Rinsate Blanks - obtained under representative field conditions by collecting the rinse water generated by running analyte-free water through or over sample collection equipment after decontamination and before use. Equipment rinsate blanks were analyzed for the same chemical constituents as the associated environmental samples.

- Temperature blanks - used to determine if samples were adequately cooled during shipment. Temperature blanks consisted of analyte-free water supplied by the FBL. One temperature blank was submitted to the laboratory in each cooler, and the temperature was checked upon receipt at the laboratory.

3.1.6 GPS

Each soil sample location at the Five Small Arms Ranges was marked with a brightly covered pin flag pushed into the ground next to the boring. Northing and easting coordinates for each sample location were logged by TtNUS personnel utilizing a Trimble XT (sub-meter) GPS unit. This information is retained in the TtNUS main database and can be used as a reference if repeat sampling is required at any of the sample locations.

3.1.7 Decontamination Procedures

At the conclusion of SI field activities, the FOL completed decontamination of all equipment, which was then shipped back to the appropriate vendors.

Non-dedicated, non-disposable equipment (e.g., hand augers) involved in field sampling activities was decontaminated before beginning work, between sample locations, and at the completion of field activities in accordance with SOP-04.

The following decontamination steps were taken:

- Wash with potable water and phosphate-free detergent (scrub if necessary)
- Rinse with potable water
- Rinse with deionized (DI) water

- Air dry (if possible)
- Wrap in aluminum foil (if not used immediately)

3.1.8 Investigation-Derived Waste

Investigation-derived waste (IDW) consisted of decontamination fluids, paper towels, pin flags, and personnel protective equipment (PPE). IDW was handled in accordance with SOP-09.

All soil removed from a sample location that was not used as part of that sample was returned to its original boring.

PPE – All PPE was double bagged and placed in Base trash receptacles (i.e., dumpsters).

Sampling Equipment Decontamination Fluids – Equipment decontamination fluids were retained by TtNUS in a 55-gallon drum that was labeled, sealed, and temporarily stored at Stump Neck Annex Base. A composite sample was collected from the container and submitted to the FBL for metals analysis for determination of disposal requirements. Analytical results are included in Appendix C.

3.1.9 Site Management and Facility Support

The FOL was designated as the lead in coordinating all day-to-day activities during the investigation. The FOL was responsible for ensuring that the field team members (including subcontractors) were familiar with the approved WP and the HASP in effect during this field investigation. Additionally, the FOL was responsible for all sampling operations, QA/QC, field documentation requirements, and field change orders. The FOL reported to the Project Manager (PM) on a daily basis regarding the status of fieldwork.

3.1.10 Record Keeping

SI records including daily activity logs, sample log sheets, and COC forms were completed in accordance with SOP-03. Information recorded daily included field activities, weather conditions, identity and arrival and departure times of personnel, management issues, etc. Copies of daily activity records are included in Appendix A.

3.2 ANALYTICAL METHODOLOGY

3.2.1 Data Methods

Surface and subsurface soil sample results (XRF - lead and FBL - select TAL metals) were compared to Regional Screening Levels (RSLs) and data from the site Background Sampling Report. Statistical calculations were performed to screen for background exceedances. The statistical methodology is further discussed in Section 3.6. The screening results and the analytical results are presented in the results section for each site. Screening results are presented in Tables 4-2, 5-2, 6-2, 7-2, and 8-2. Surface and subsurface soil analytical results are summarized in Tables 4-3, 4-4, 5-3, 6-3, 7-3, 7-4, and 8-3. Complete analytical results are presented in Appendix C.

3.2.2 Data Evaluation

3.2.2.1 Summary

Soil sample locations were selected based on a bias towards areas that were believed to be most likely contaminated by past operations at the site. TtNUS provided recommendations and received approval from the MDE and the USEPA before proceeding with the implementation of the WP. Discrete surface soil samples were first collected at a depth of 0 to 1 feet bgs. Based on field XRF analysis, discrete sample locations with lead concentrations greater than the field decision criteria of 300 mg/kg were then subject to subsurface soil sampling at depths of 1.0 to 2.0 feet bgs or step-out sampling was performed. Composite sampling was performed along firing lines and in the area of firing points at the sites. The composite samples were composed of ten aliquots. At the SAR, DPT was used to advance subsurface sampling at the target hillside to depths of 0 to 4 feet bgs, 4 to 6 feet bgs, 6 to 8 feet bgs, and 8 to 10 feet bgs. At the OSTR 9 Near Shore sediment samples were collected using disposable plastic trowels, and 25 Open Water sediment samples were collected using ponar dredge from a boat. A summary of sample locations, methods of collection and sample depths is provided in Tables 3-2 through 3-6, and sample locations are presented on Figures 3-1 thru 3-5.

3.2.2.2 Data Quality Review

This section describes the data review processes used to determine whether analytical laboratory data were of acceptable technical quality for use in decision making. The review began with data validation, which is a comparison of data quality indicators (DQIs) to prescribed acceptance criteria. The DQIs used are measures to assess the bias and precision of the analytical calibrations and sample analyses. The output of this review was a set of alphabetic flags such as “U,” “J,” “R,” “L”, “K”, or combinations thereof,

that were assigned to individual results based on the validation effort. These flags were used to infer the general quality of the data. Also evaluated were the measures of data completeness, sensitivity, comparability and representativeness.

3.2.2.3 Data Validation Process

Limited data validation conducted to evaluate false positives included evaluations of data completeness, holding time compliance, calibrations, field QC and laboratory-generated blanks, field duplicate precision, and detection limits for the data collected during the SI. The data packages provided by the analytical laboratory are expansive enough to allow future complete formal data validation, if necessary.

Assignment of data qualification flags conformed to USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (1999) to the greatest extent practicable for non-Contract Laboratory Program Data. Data validation specifications require that various data qualifiers be assigned when a deficiency is detected or when a result is less than its detection limit. If no qualifier is assigned to a result that has been validated, the data user is assured that no technical deficiencies were identified during validation. The qualification flags used are defined as follows:

- U – Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) noted. Non-detected results from the laboratory are reported in this manner. This qualifier is also added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

- UJ – Indicates that the chemical was not detected; however, the detection limit (sample-specific detection limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

- J – Indicates that the chemical was detected; however, the associated numerical result is not a precise representation of the concentration that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

- UR – Indicates that the chemical may or may not be present. The non-detected analytical result reported by the laboratory is considered to be unreliable and unusable. This qualifier is applied in cases of gross technical deficiencies (e.g., holding time missed by a factor of two times the specified time limit, severe calibration non-compliance, and extremely low analyte recovery).

- R – Indicates that the chemical may or may not be present. The positive analytical result reported by the laboratory is considered to be unreliable and unusable. This qualifier is applied in cases of gross technical deficiencies.

The preceding data qualifiers may be categorized as indicative of major or minor problems. Major problems are defined as issues that result in the rejection of data and qualification with UR or R qualifiers. These data are considered invalid and are not used for decision-making purposes unless they are used in a qualitative way and the use is justified and documented. Minor problems are defined as issues resulting in the estimation of data and qualification with "U", "J", and "UJ" qualifiers. Estimated analytical results are considered to be suitable for decision-making purposes unless the data use requirements are very stringent and the qualifier indicates a deficiency that is incompatible with the intended data use. A "U" qualifier does not necessarily indicate that a data deficiency exists because all non-detect values are flagged with the "U" qualifier regardless of whether a quality deficiency has been detected. No data from the Five Small Arms Ranges were rejected or considered unusable.

3.2.2.4 Data Validation Outputs

After data were validated, a list was developed of non-conformities requiring data qualifier flags used to alert the data user to inaccurate or imprecise data. The reviewer then prepared a technical memorandum presenting qualification of the data, if necessary, and the rationale for making such qualifications (See Appendix D). The net result was a data package that had been carefully reviewed for its adherence to prescribed technical requirements. Pertinent quality estimates are summarized in a more quantitative format in the following Section.

3.2.2.5 Data Quality Review

DQIs are parameters monitored to help establish the quality of data generated during an investigation. Some of the DQIs are generated from analysis of field samples (e.g., field duplicates) and some are generated from the analysis of laboratory samples (e.g., laboratory duplicates). Individually, field and laboratory DQIs provide measures of the performance of the respective investigative operations (field or laboratory). During data validation, individual QC results were evaluated. If individual QC results were acceptable, no validation flag was assigned to an analytical result; otherwise, a flag indicating the type of QC deficiency was assigned to the result. All QC criteria were met for all samples for all parameters at the Five Small Arms Ranges.

3.2.2.6 Completeness

Completeness is a measure of the number of valid samples or measurements that are available relative to the number of samples or measurements that were intended to be generated. For this project, completeness was measured on two different bases:

- Samples collected - measure of the usable samples collected compared to those intended to be collected.

- Laboratory measurements - measure of the amount of usable valid laboratory measurements per matrix for each target analyte.

Usable valid samples (or results) were those judged, after data assessment, to represent the sampling populations and to have not been disqualified for use through data validation or additional data review. Completeness was determined using the following equation:

$$\%C = \frac{V}{T} \times 100$$

where %C = percent completeness
V = number of samples (or results) determined to be valid
T = total number of planned samples (or results)

All samples proposed for collection at the Five Small Arms Ranges were collected (100 percent completeness), and the Five Small Arms Ranges percent completeness for laboratory measurements was 100 percent.

3.2.2.7 Sensitivity

Detection limits for all of the Five Small Arms Ranges analytical parameters were less than screening levels (RSLs), except at the Old Skeet and Trap Range and the Marine Rifle Range.

3.2.2.8 Accuracy

Accuracy requirements for field measurements are typically ensured through control over sample collection and handling, and through routine instrument calibration. Field accuracies were monitored through the use of blanks to detect cross-contamination and by monitoring adherence to procedures that

prevent sample contamination or degradation. One equipment rinsate blank was collected during the SI to assess cross-contamination via sample collection equipment. The blank was obtained under representative field conditions by collecting the rinse water generated by running analyte-free water through sample collection equipment after decontamination and before use. The rinsate blank was analyzed for the same chemical constituents as the associated environmental samples.

Accuracy in the laboratory was measured through the comparison of a spiked sample or laboratory control sample (LCS) result to a known or calculated value and was expressed as a percent recovery (%R). It was also assessed by monitoring the analytical recovery of select surrogate compounds added to samples that are analyzed by organic chromatographic methods. LCSs were used to assess the accuracy of laboratory operations with minimal sample matrix effects. Matrix spike (MS) and surrogate compound analyses measure the combined accuracy effects of the sample matrix, sample preparation, and sample measurement. LCS and MS analyses were performed at a frequency of 1 per 20 associated samples of like matrix. Laboratory accuracy was assessed by comparing calculated %R values to accuracy control limits specified by the laboratory using SW-846 methods.

Percent recovery is calculated using the following equation:

$$\%R = \frac{Ss - So}{S} \times 100$$

where	%R	=	percent recovery
	Ss	=	result of spiked sample
	So	=	result of non-spiked sample
	S	=	concentration of spiked amount.

All matrix spike duplicate (MSD), LCS duplicate (LCSD), and surrogate recoveries met accuracy limits as specified by the laboratory, except at the Old Skeet and Trap Range and the Marine Rifle Range.

3.2.2.9 Precision

Precision is a measure of the degree to which two or more measurements are in agreement and describes the reproducibility of measurements of the same parameter for samples analyzed under similar conditions. Precision for chemical parameters is expressed as a Relative Percent Difference (RPD), which is defined as the ratio of the difference to the mean for the two values being evaluated. RPDs,

typically expressed as percentages, are used to evaluate both field and laboratory duplicate precision and are calculated as follows:

$$RPD = \frac{|V1 - V2|}{(V1 + V2)/2} \times 100$$

where RPD = relative percent difference
V1, V2 = two results obtained by analyzing duplicate samples.

The precision estimates obtained from duplicate field samples encompass the combined uncertainty associated with sample collection, homogenization, splitting, handling, laboratory and field storage (as applicable), preparation for analysis, and analysis. In contrast, precision estimates obtained from analyzing duplicate laboratory samples incorporate only homogenization, subsampling, preparation for analysis, laboratory storage (if applicable), and analysis uncertainties.

All field duplicate, LCS/LCSD, and MS/MSD RPDs met QC limits, except at the Old Skeet and Trap Range and the Marine Rifle Range.

3.2.2.10 Comparability

Comparability is defined as the confidence with which one data set can be compared with another (e.g., among sampling points and among sampling events). Comparability was achieved by using standardized sampling and analysis methods and standardized data reporting formats. Comparability of field data was ensured by following the SI WP (TtNUS, 2009). Comparability of laboratory measurements was achieved primarily through the use and documentation of standard sampling and analytical methods. Results were reported in units that ensured comparability with previous data and with current state and federal standards and guidelines. Comparability of laboratory measurements was assessed primarily through the use of QC samples and through adherence to the laboratory's QA plan.

3.2.2.11 Representativeness

Representativeness is an expression of the degree to which data accurately and precisely depict the actual characteristics of a population or environmental condition existing at the site. The SI WP (TtNUS, 2009) and the use of standardized sampling, sample handling, sample analysis, and data reporting procedures were designed so that the final data would accurately represent actual site conditions. It is believed that all reported data are adequately representative of site conditions.

3.3 HUMAN HEALTH RISK SCREENING METHODOLOGY

This subsection describes the methodology used to perform the human health risk screening. The purpose of the human health risk screening evaluation is to conservatively estimate risks posed to potential human receptors from chemicals present at each of the Five Small Arms Ranges. The risk screening methodology includes the following general steps involved in a baseline human health risk evaluation:

- Identification of COPCs
- Exposure Assessment
- Risk Characterization
- Uncertainty Analysis

3.3.1 Identification of Chemicals of Potential Concern

For each site, TtNUS used the following considerations in determining COPCs:

- Occurrence and distribution of chemicals in the environmental media
- Chemical toxicity
- Occurrence of chemical in background samples

At each site, TtNUS collected surface soil samples, where a surface soil sample is any soil sample whose sampling interval begins at the surface. At most sites, TtNUS also collected subsurface soil samples, where a subsurface soil sample is any soil sample whose sampling interval begins below the surface. TtNUS identified COPCs for each site for surface soil and subsurface soil separately. For some sites, TtNUS divided the site into smaller areas of interest based on historical activities that lead to a meaningful subdivision of the site. Appendix E includes the summary tables for the Human Health Risk Screening Supporting documentation. For the OSTR, TtNUS collected sediment samples in addition to soil samples.

3.3.1.1 Identification of Chemicals of Potential Concern in Soil

For TtNUS to designate a chemical as a COPC in soil for an area of interest and depth category, the chemical had to satisfy the following three criteria:

- The chemical had to be detected at least once in the area of interest and depth interval.

- If the chemical was detected at least once in the area of interest, then the maximum detected concentration had to exceed at least one human health risk-based screening level (RBSL).

- If the maximum detected concentration exceeded at least one human health RBSB, then the chemical had to be present above concentrations in background soil samples.

3.3.1.1.1 Human Health Risk-Based Screening Levels

TtNUS developed human health RBSLs to address two pathways:

- direct contact exposures to soil
- protection of groundwater

RBSLs Based on Direct Contact Exposures to Soil. Direct contact exposures include incidental ingestion of soil, dermal contact with soil, and inhalation of chemicals emitted from the soil. For residential direct contact RBSLs in soil, TtNUS used USEPA's RSLs for residential direct contact exposures to soil, where USEPA assumed child and adult direct contact exposures to soil 350 days per year for a total of 30 years (USEPA, 2009). If all concentrations in soil are below residential direct contact RSLs, then the site should be suitable for redevelopment for any purpose where people will be present on the site and can encounter soil; therefore, using residential RSLs to identify COPCs is a conservative approach. To account for additive effects that may result from exposure to multiple non-carcinogenic compounds, TtNUS used one-tenth of the residential direct contact soil RSL as the RBSL to identify COPCs for non-carcinogens.

RBSLs Based on Protection of Groundwater. USEPA has developed two soil RSLs to be protective of groundwater, one based on the maximum contaminant level (MCL) (if available), and the other based on the residential tap water RSL. For RBSBs in soil for protection of groundwater, TtNUS used RSLs for protection of groundwater that were developed with a dilution-attenuation factor (DAF) of 1. In other words, if concentrations in soil are below RSLs that are protective of groundwater, the leachate from the soil should have concentrations that are below levels considered safe for tap water (i.e., the leachate should be safe for people to use as tap water).

Summary of RBSLs. Table E-1 in Appendix E presents the RBSLs for chemicals analyzed in soil samples. For each chemical, there are up to four RBSLs: two based on the residential direct contact

RSLs (one based on cancer risks, the other based on noncancer health effects), and two soil RSLs that are protective of groundwater (one based on the tap water RSL, the other based on the MCL). If a chemical exceeded any human health RBSL, TtNUS designated the chemical a possible COPC in soil.

Three chemicals do not have toxicity data to calculate human health RBSLs: acenaphthylene, benzo(g,h,i)perylene and phenanthrene. For these chemicals, the RBSLs for other chemicals with similar chemical properties were used as surrogates. The surrogate for acenaphthylene was acenaphthene, while the surrogate for both benzo(g,h,i)perylene and phenanthrene was pyrene.

3.3.1.1.2 Evaluation of Background

For each area of interest and depth category, TtNUS performed a background evaluation on chemicals identified as possible COPCs. This section describes the statistical methodologies used to compare site data with background data. TtNUS used statistical analyses to compare soil concentrations for each area of interest and depth category to background soil concentrations for the facility to determine if the analytical results obtained from the samples represent site conditions or background/anthropogenic conditions.

To perform the comparison of site data with background data, TtNUS used summary statistics, probability plots, box plots, and several other statistical tests described below. If the site data appeared to be obviously below or above background from visual inspection, then TtNUS did not perform formal statistical tests. If the combined data sets were greater than 90 percent non-detect, then TtNUS compared maximum concentrations.

Probability Plots. Probability plots are a useful first step for visually comparing two data sets in a single graph. If the site and background distributions were identical, the plotted values would lie on a straight line through the origin. Deviations from this line show the differences between the two distributions. If the site and background distributions were similar, the scattering of the two data sets would be mixed. If there was grouping of the two data sets, then the data sets were most likely different.

Box Plots. As an additional aid for the population analysis, box plots were generated for the site data and background data. Box plots show the central tendency, degree of symmetry, range of variation, and potential outliers of a data set. The data set is shown as a rectangular box that represents the middle 50 percent of the data. The upper value of the box represents the 75th percentile and the lower value of the box represents the 25th percentile. The median is represented by the middle line in the box.

Box plots for the same analyte in the two data sets were plotted on the same graph. The plots were visually inspected to see which data sets looked similar and which ones differed. Particular attention was paid to see if the median from one data set fell within the 75th and 25th percentile range of the other data set.

Statistical Tests. As stated above, site data and background data were analyzed to determine whether they were similar. A number of statistical tests can be used to determine if the data sets are similar. If the combined percentage of non-detected concentrations was between 0 and 50 percent, then the Two Sample T-test, Wilcoxon Rank Sum (WRS) test, or Gehan test was computed. These tests determine if the mean of a site data set is greater than the mean of the background data set plus one background standard deviation, as outlined in Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites (USEPA, 2002). For site data sets that were determined to be comparable to background using one or more of these tests, the Quantile Test and, possibly, the Slippage Test were used to determine if the right tail of the distribution of site data was higher than the right tail of the distribution of background data (where "right tail" refers to the highest values in the distribution of data).

USEPA's ProUCL 4.00.04 software was used to determine the data distribution of the site and background concentrations and compute the Two sample T-test, WRS Test, or Gehan Test. If the data were log normally distributed, then the statistical tests were performed on the log-transformed concentrations. If there were more than two detection limits for data that were non-detect, then the Gehan test was computed.

Two Sample T-Test. This is a test for a difference between two populations means when it can be assumed that the data are approximately normally distributed or sample sizes are large enough (m and n at least 30). If the variances of the two data sets were not equal, then the Two Sample T-test with unequal variance was computed. The Two Sample T-test was computed using USEPA's ProUCL 4.00.04 software. The null and alternative hypothesis are:

H_o: The site distribution exceeds the background distribution by more than one background standard deviation.

H_A: The site distribution does not exceed the background distribution by more than one background standard deviation.

WRS Test. The WRS nonparametric test is used to test for a shift in location between two independent populations. The WRS test has two main advantages over the Two Sample T-test: the two data sets

need not be drawn from the normal distribution and the WRS test can handle a moderate number of nondetected values by treating them as ties. The WRS test was computed using USEPA's ProUCL 4.00.04 software. The null and alternative hypothesis are:

H_o: The site distribution exceeds the background distribution by more than one background standard deviation.

H_A: The site distribution does not exceed the background distribution by more than one background standard deviation.

Gehan Test. The Gehan nonparametric test is used to test for a shift in location between two independent populations. The Gehan test can be used when the background or site datasets contain multiple nondetects with different reporting limits. The Gehan test was computed using USEPA's ProUCL 4.00.04 software. The null and alternative hypothesis are:

H_o: The site distribution exceeds the background distribution by more than one background standard deviation.

H_A: The site distribution does not exceed the background distribution by more than one background standard deviation.

Quantile Test. The Quantile test is used to identify the differences in the right tails of the site and background distributions. This may be regarded as detecting if the values in the right-tail of the site population are greater than the right-tail of the background distribution. If the results of the Two Sample T-test, WRS test, or Gehan test found the distributions to not be different, then the Quantile test was computed. If the Quantile test found the right tail of the site data to be larger than the right tail of the background data, it was concluded that the site concentrations are greater than background. The test is valid regardless of the underlying distribution of the site and background data sets.

Slippage Test. The Slippage test is used to test for a shift to the right in the extreme right-tail of the site versus the background concentrations. This is equivalent to asking if a set of the largest values of the site distribution are larger than the maximum value of the background distribution. If the results of the Quantile test were that the right tails of the site and background distributions were not different, then the slippage test was computed. If the slippage test found the extreme right tail of the site data to be larger than the background data, it was concluded that the site concentrations are greater than background. This test can be used regardless of the underlying distribution of the site and background data sets.

3.3.1.2 Identification of Chemicals of Potential Concern in Sediment

The only site where sediment samples were collected was the OSTR. For TtNUS to designate a chemical as a COPC in sediment at this site, the chemical had to satisfy the following three criteria.

- The chemical had to be detected at least once in a sediment sample.
- If the chemical was detected at least once in a sediment samples then the maximum detected concentration had to exceed at least one human health RBSL.
- If the maximum detected concentration exceeded at least one human health RBSL, then the chemical had to be present above concentrations in background sediment samples.

3.3.1.2.1 Human Health Risk-Based Screening Levels

TtNUS developed human health RBSLs to address two pathways: direct contact exposures to sediment, and ingestion of fish (i.e., edible aquatic organisms) following uptake of chemicals from sediment by the aquatic organisms.

RBSLs Based on Direct Contact Exposures to Sediment. Direct contact exposures include incidental ingestion of sediment and dermal contact with sediment. Since sediment is covered by water, there is unlikely to be significant emissions into the air. The water cover will limit the significance of volatile emissions and should virtually eliminate particulate emissions. For direct contact RBSLs for sediment, TtNUS used ten times the residential direct contact RBSLs for soil. This is consistent with USEPA Region 3 guidance and is conservative, since this is equivalent to all-day exposure to chemicals in sediment 35 days each year for 30 years. TtNUS used ten times the residential direct contact RBSLs for soil for all chemicals except lead. For lead, TtNUS used the residential RBSL for direct contact exposures of 400 mg/kg as the direct contact RBSLs for sediment.

RBSLs Based on Ingestion of Fish. TtNUS developed RBSLs for sediments based on the fish ingestion pathway using biota-sediment accumulation factors (BSAFs) according to the following two step procedure.

First, TtNUS calculated an acceptable concentration in fish (Cfish) for each chemical detected in sediment. For noncarcinogenic effects, the chemical concentration in fish tissue associated with a target hazard index (HI) is calculated as follows:

$$Cfish = THI \times RfDo / IFing$$

where:

Cfish	=	acceptable concentration in fish (mg/kg)
THI	=	target hazard index = 0.1
RfDo	=	chemical-specific oral reference dose (mg/kg/day)
IFing	=	recreational fish ingestion intake factor (kg fish/kg BW-day)

For cancer risks, the chemical concentration in fish tissue associated with a target risk level (TRL) is calculated as follows:

$$Cfish = TRL / (IFing \times CSFo)$$

where:

TRL	=	target risk level = 10^{-6}
CSFo	=	chemical-specific oral cancer slope factor $(mg/kg/day)^{-1}$

To be consistent with the values used when developing RBSLs for direct contact exposures to soil, the target HI was set to 0.1 and the target risk level was set to 10^{-6}.

The intake factor was estimated using the following equation (USEPA, 1989):

$$IFing = IR \times FI \times EF \times ED / (BW \times AT)$$

where:

IFing	=	recreational fish ingestion intake factor (kg fish/kg BW-day)
IR	=	ingestion rate (kg fish/meal)
FI	=	fraction ingested from contaminated source (unitless)
EF	=	exposure frequency (meals/year)
ED	=	exposure duration (years)
BW	=	body weight (kg BW)

AT = averaging time (days)
for noncarcinogens, AT = ED x 365 days/yr
for carcinogens, AT = 70 yr x 365 days/yr

The majority of the exposure assumptions used to estimate chemical intakes for the ingestion-of-fish exposure pathway are based on default assumptions described in the standard USEPA guidance. However, this human health risk assessment (HHRA) specifically assumed that receptors consume one meal's worth of fish caught once per week for each week of the year, yielding an exposure frequency (EF) of 52 meals/year. The fish tissue ingestion rate was set at 0.129 kg/meal (USEPA, 1997a). This daily ingestion rate is the value recommended by the USEPA for recreational anglers based on information from several studies cited in the USEPA's Exposure Factors Handbook (Section 10.10.3, USEPA, 1997a). The exposure duration (ED) was defined as 30 years (USEPA, May 1993). The FI from the contaminated source is assumed to be 1.0 (100%), as no specific information on the dietary habits of local anglers is available. This conservatively assumes that 100 percent of the fish caught and ingested by the recreational angler come from the study area.

Second, TtNUS calculated an acceptable concentration in sediment (Csed) by using BSAFs to convert fish tissue concentrations to sediment concentrations. For inorganic chemicals, the BSAFs are the ratio of the concentration of the chemical in biota on a dry weight basis to the concentration of the chemical in sediment. However, the acceptable concentration in fish is the concentration of the chemical in fish tissue on a wet weight basis. The BSAF must be multiplied by the fraction of the fish tissue that is dry weight to make the units compatible. TtNUS used the following equation to calculate an acceptable concentration in sediment:

$$Csed = Cfish / (BSAFin \times fdry)$$

where:

Csed = acceptable concentration in sediment (mg/kg sed)
Cfish = acceptable concentration in fish (mg/kg fish wet)
BSAFin = biota (fish) to sediment accumulation factor for inorganics (kg sed/kg fish dry)
fdry = fraction of fish tissue that is dry weight (kg fish dry/kg fish wet)

Because sediment-to-fish BSAFs are not available for metals, sediment-to-aquatic invertebrate BSAFs from Oak Ridge National Laboratory (ORNL) (1998) were used to estimate tissue concentrations in fish. For this evaluation, TtNUS assumed that 16 percent of the fish tissue mass is dry mass (i.e., fdry = 0.16).

For organic chemicals, the BSAFs are the ratio of the concentration of the chemical in biota lipid to the concentration of the chemical in sediment organic carbon. However, the acceptable concentration in fish is the concentration of the chemical in fish tissue on a wet weight basis. The BSAF must be multiplied by the fraction of the fish tissue that is lipid and divided by the fraction of organic carbon in the sediment to make the units compatible. TtNUS used the following equation to calculate an acceptable concentration in sediment:

$$\mathbf{Csed = Cfish / (BSAForg \times (flip/foc))}$$

where:

Csed	=	acceptable concentration in sediment (mg/kg sed)
Cfish	=	acceptable concentration in fish (mg/kg fish wet)
BSAForg	=	biota (fish) to sediment accumulation factor for organics (kg sed OC/kg fish lip)
flip	=	fraction of fish tissue that is lipids (kg fish lip/kg fish wet)
foc	=	fraction of sediment fish tissue that is lipids (kg fish lip/kg fish wet)

For this evaluation, TtNUS assumed the fraction of lipids in fish tissue is (0.03 or 3%). The average fraction of organic carbon in sediment samples was 1020 mg/kg or approximately 0.001 (0.1%).

For chemicals analyzed in sediment, Table E-2 in Appendix E presents the acceptable concentrations in fish, BSAFs, and acceptable concentrations in sediment.

Summary of RBSLs. Table E-2 in Appendix E presents the RBSLs for chemicals analyzed in sediment samples. For each chemical, there are up to four RBSLs: two based on the direct contact with sediment (one based on cancer risks, the other based on noncancer health effects), and two based on ingestion of fish (one based on cancer risks, the other based on noncancer health effects). If a chemical exceeded any human health RBSL, TtNUS designated the chemical a possible COPC in sediment.

Three chemicals do not have toxicity data to calculate human health RBSLs: acenaphthylene, benzo(g,h,i)perylene and phenanthrene. For these chemicals, the RBSLs for other chemicals with similar chemical properties were used as surrogates. The surrogate for acenaphthylene was acenaphthene, while the surrogate for both benzo(g,h,i)perylene and phenanthrene was pyrene.

3.3.1.2.2 Evaluation of Background

TtNUS performed a background evaluation on chemicals identified as possible COPCs in sediment. This section describes the statistical methodologies used to compare site data with background sediment data. The only site with sediment samples is the OSTR and these samples were collected from Mattawoman Creek. For this creek, there are four background sediment samples. The small number of background samples limits the options for statistical evaluation to determine if the analytical results for site sediment samples represent influences from past site activities or background conditions. In the background evaluation of sediment data, TtNUS used summary statistics, probability plots, and box plots to compare the two data sets.

3.3.2 Exposure Assessment

In the exposure assessment for each site, TtNUS described current and potential future uses for the site and identified potential receptors and exposure pathways. TtNUS also conservatively estimated an exposure point concentration (EPC) for each area of interest and depth interval. In general, TtNUS used the maximum detected soil or sediment concentration as the EPC.

3.3.3 Risk Characterization

The risk characterization component of the human health risk screening evaluation involved the evaluation of different exposure pathways in more detail for chemicals that were identified as COPCs. For a number of exposure pathways, the risk characterization involved developing conservative estimates of cancer risks and noncancer HIs. These exposure pathways were direct contact exposures to soil, direct contact exposures to sediment and ingestion of fish following uptake of chemicals by the fish from sediment. For evaluating direct contact exposures to lead in soil, the concentrations of lead in soil were compared to risk-based concentrations (RBCs) in soil. For evaluating the soil to groundwater pathway, the maximum concentrations of COPCs were compared to RBCs in soil for protection of groundwater for a range of DAFs.

In this human health risk screening evaluation, TtNUS used a risk of 10^{-4} as the point of departure for evaluating cumulative incremental lifetime cancer risk (ILCR) and a HI of 1 as the point of departure for evaluating the cumulative noncancer HI. These values are taken from a USEPA memorandum issued in 1991 entitled “Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions.” One purpose of the memorandum was to identify situations where remediation was or was not required. The memorandum states: “Where the cumulative carcinogenic site risk to an individual based on reasonable maximum exposure for both current and future land use is less than 10(-4) (i.e.,10^{-4}) and the non-

carcinogenic hazard quotient (HQ) is less than 1, action generally is not warranted unless there are adverse environmental impacts." The memorandum indicates that remedial action can be taken when risks are below 10^{-4} based on site-specific circumstances (such as the exceedance of MCLs or the requirements of state or federal law), but such actions must be justified. Thus, for this evaluation, a risk of 10^{-4} and HI of 1 were used as the points of departure for evaluating cancer risks and noncancer HIs.

3.3.3.1 Calculation of Risks and Hazard Indices

For a number of exposure pathways, the risk characterization involved developing conservative estimates of cancer risks and noncancer HIs by comparing EPCs of COPCs to applicable RBCs. For cases in which a chemical exhibits both carcinogenic and non-carcinogenic human health effects, TtNUS used RBCs based on cancer and noncancer effects. The exposure pathways where TtNUS calculated risks and HIs were direct contact exposures to soil, direct contact exposures to sediment and fish ingestion exposures resulting from fish uptake from sediment. For direct contact exposures to soil, TtNUS calculated risks and HIs for residential and non-residential uses of each site.

3.3.3.1.1 Human Health Effects – Carcinogens

TtNUS estimated the risk presented by carcinogenic COPCs by calculating the ILCR according to the following equation:

$$ILCR = \Sigma (C_{max}/RBCc) \times TRL$$

where:

ILCR	=	Incremental lifetime cancer risk (unitless)
C_{max}	=	Maximum detected site concentration (mg/kg or µg/kg)
RBCc	=	Risk-based concentration for cancer effects (mg/kg or µg/kg)
TRL	=	Target risk level used to calculate the RBCcs (unitless)

To evaluate direct contact exposures to soil in a residential setting, TtNUS used USEPA's cancer-based RSLs for residential direct contact exposures to soil as the RBCs (USEPA, 2009). To evaluate direct contact exposures to soil in a non-residential setting, TtNUS used USEPA's noncancer-based RSLs for non-residential direct contact exposures to soil as the RBC; in developing the non-residential RSLs, USEPA assumed direct contact exposures to soil by a worker 250 days per year for a total of 25 years (USEPA, 2009). The target risk level for calculating the residential and non-residential RSLs for direct

contact exposures to soil is 10^{-6}. Table E-4 in Appendix E provides the cancer-based residential and non-residential direct contact RBCs for soil.

To evaluate direct contact exposures to sediment, TtNUS used the cancer-based direct contact RBSLs for sediment as the RBCs (see Table E-3). To evaluate fish ingestion exposures resulting from fish uptake from sediment, TtNUS used the cancer-based fish ingestion RBSLs for sediment as the RBCs (see Table E-3). The target risk level for calculating these RBSLs for sediment is 10^{-6}.

TtNUS compared the calculated ILCR to the USEPA target range for carcinogenic risks of 10^{-4} to 10^{-6}, and a result greater than 10^{-4}, which corresponds with one individual developing cancer in their lifetime out of an exposed population of 10,000 people, is typically deemed an unacceptable risk. The calculated ILCR should serve as a conservative risk estimate because the calculation presumes that an individual is exposed to the maximum concentration of each COPC present in an area of interest over a lifetime of exposure.

3.3.3.1.2 Human Health Effects – Non-Carcinogens

TtNUS estimated the health hazard presented by non-carcinogens by calculating the HQ and then calculating the HI by summing the individual HQs. The equations for HQs and the HI are as follows:

$$HQ = (C_{max}/RBCn) \times THQ$$

$$HI = \Sigma\ HQs$$

where:

HQ	= Hazard quotient (unitless)
Cmax	= Maximum detected site concentration (mg/kg or µg/L)
RBCn	= Risk-based concentration for noncancer effects (mg/kg)
THQ	= Target hazard quotient used to calculate RBCns (unitless)
HI	= Hazard index (unitless)

To evaluate direct contact exposures to soil in a residential setting, TtNUS used USEPA's noncancer-based RSLs for residential direct contact exposures to soil as the RBCs (USEPA). To evaluate direct contact exposures to soil in a non-residential setting, TtNUS used USEPA's noncancer-based RSLs for non-residential direct contact exposures to soil as the RBCs, the target HQ for calculating the residential and non-residential RSLs for direct contact exposures to soil is 1. Appendix E, Table 3-4 provides the noncancer-based residential and non-residential direct contact RBCs for soil.

To evaluate direct contact exposures to sediment, TtNUS used the noncancer-based direct contact RBSLs for sediment as the RBCs (see Table E-3). To evaluate fish ingestion exposures resulting from fish uptake from sediment, TtNUS used the noncancer-based fish ingestion RBSLs for sediment as the RBCs (see Table E-3). The target HQ for calculating these RBSLs for sediment is 0.1.

In general, USEPA regards HIs greater than 1 as unacceptable in terms of exposure risk. However, because various chemicals can have different mechanisms of action and affect different organs of the human body, a HI greater than 1 is not necessarily an unacceptable risk for non-carcinogenic effects. If the HI is greater than 1, the chemicals are separated into categories according to the human organ that each primarily targets. HIs greater than 1 for any target organ are generally considered to represent unacceptable risk.

3.3.3.2 Human Health Effects from Exposures to Lead

USEPA uses pharmaco-kinetic models to evaluate concentrations of lead in the environment. Therefore, lead cannot be evaluated using the cancer risk and noncancer HI methodology described above. Instead, TtNUS evaluated lead concentrations separately from all other chemicals. For direct contact exposures to soil, TtNUS compared maximum lead concentrations to residential and non-residential RBCs in soil. TtNUS used the USEPA RSLs of 400 mg/kg for residential direct contact exposures to soil and 800 mg/kg for non-residential direct contact exposures to soil as the RBCs in soil for this evaluation (USEPA, 2009).

3.3.3.3 Evaluation of the Soil to Groundwater Pathway

For evaluating the soil to groundwater pathway, TtNUS compared the maximum concentrations of COPCs in soil to RBCs in soil for protection of groundwater for a range of DAFs. As discussed previously, USEPA has developed two soil RSLs to be protective of groundwater, one based on the MCL (if available) and the other based on the residential tap water RSL. USEPA derived both RSLs using a DAF of 1 (i.e., the leachate from soil with concentrations at or below the RSL should be safe to drink directly). This is a very conservative assumption, since leachate is rarely the only source of water to groundwater. For very large sites (hundreds of acres), leachate may be the predominant source of water in a water table aquifer, but for smaller sites, upgradient groundwater is often the main source of water in a water table aquifer. For such sites, a DAF greater than 1 is appropriate. In addition, many chemicals attenuate (i.e., experience changes) as they migrate with groundwater. Chemical processes acting on chemicals include biological degradation and abiotic reactions with other chemicals in soil and water

(e.g., hydrolysis, precipitation). These attenuation processes can significantly reduce chemical concentrations in groundwater.

For this evaluation, TtNUS used the two soil RSLs determined using a DAF of 1 as RBCs. TtNUS also multiplied these RSLs by 20 to obtain RBCs in soil for a DAF of 20 and used these as additional RBCs in soil for protection of groundwater. Table E-5 in Appendix E presents the RBCs in soil for evaluating the soil to groundwater pathway.

3.3.4 Uncertainty Analysis

Various uncertainties are associated with each step of the human health risk screening evaluation. Uncertainty in the selection of COPCs is related to the current status of the predictive databases, the grouping of samples taken from the site, and the procedures used to include or exclude constituents as COPCs. Uncertainty associated with the exposure assessment includes the values used as input variables, the determination of EPCs, and the predictions regarding future land use and potential receptors. Uncertainty in the toxicity assessment includes evidence for determining the carcinogenicity of COPCs. Uncertainty in risk characterization includes that associated with exposure to multiple chemicals and the cumulative uncertainty from combining conservative assumptions made in earlier steps of the risk screening process.

Although uncertainty exists from multiple sources, the direction of uncertainty can be influenced by decisions made throughout the risk screening evaluation; in general, assumptions are made so that the risk estimates are overestimated rather than underestimated. This is done in an effort to ensure that no unacceptable risk to potential receptors goes unrecognized.

Generally, risk evaluations include two types of uncertainty: measurement and informational uncertainty. Measurement uncertainty refers to the usual variance that accompanies scientific measurements (e.g., uncertainty associated with sample collection and analysis). The resulting risk screening evaluation reflects the accumulated variances of the individual values used. Informational uncertainty is due to unavailability of information needed to complete the toxicity and exposure assessments. Examples include the absence of information on the effects of human exposure to low doses of a chemical, on the biological mechanism of action of a chemical, or on the behavior of a chemical in a particular medium.

After the risk screening evaluation is complete, the uncertainty involved must be assessed to interpret the results. Reliance on results from a risk screening evaluation without consideration of uncertainties, limitations, and assumptions inherent in the process can be misleading. For example, to account for

uncertainties in the development of exposure assumptions, conservative estimates must be made to ensure that the particular assumptions made are protective of sensitive subpopulations or maximum exposed individuals. If a number of conservative assumptions are combined in an exposure model, the resulting calculations can propagate the uncertainties associated with those assumptions, thereby producing a much larger uncertainty for the final results. This uncertainty is biased toward overpredicting both carcinogenic risks and non-carcinogenic HIs. Thus, the results of the risk screening evaluation and the uncertainties associated with those estimates must be considered when making risk management decisions.

This interpretation is especially relevant when the risk estimates exceed the point of departure for defining "acceptable" risk. For example, when risks calculated using conservative assumptions to account for a high degree of uncertainty are less than an "acceptable" risk level, the interpretation of no significant risk is typically straightforward. However, when risks calculated using conservative assumptions to account for a high degree of uncertainty exceed an "acceptable" risk level, a conclusion can be difficult unless uncertainty is considered.

3.3.4.1 Uncertainty in Selection of COPCs

The issues that contribute to uncertainty in COPC selection for the Five Small Arms Ranges are the existing database and the RSLs used. These issues are discussed below.

3.3.4.1.1 Existing Database

All laboratory analyzed soil and sediment data used for this risk screening evaluation were validated according to USEPA Region 3 data validation guidelines. Therefore, uncertainties associated with the quality of the data are considered to be minimal because no data were deemed unreliable due to laboratory non-compliances. Uncertainty attributed to sample collection is also considered to be minimal because a site sampling plan designed with site characteristics in mind was used in an attempt to ensure adequate sample collection, and to incorporate known and likely sources of contaminants.

3.3.4.1.2 COPC Screening Levels

TtNUS chose conservative soil and sediment screening levels for this evaluation. Using residential RSLs as RBSLs for direct contact exposures to soil is conservative because these sites are unlikely to be redeveloped for residential purposes. The sediment RBSLs for fish ingestion are based on the assumption that individuals will eat fish caught from Mattawoman Creek near the site 52 times a year for 30 years or 1,560 meals of fish caught from Mattawoman Creek in a lifetime. It is unlikely that any

individual will eat that many meals of fish caught from Mattawoman Creek in the vicinity of the sites. These assumptions make the resulting RBSLs for sediment conservative.

The RBSLs used to select COPCs correspond to an ILCR of 10^{-6} and a HQ of 0.1. The use of these values ensures that chemicals are retained as COPCs that could possibly be contributors to risk for a site. The elimination of chemicals present at concentrations equal to or less than an ILCR of 10^{-6} and a HQ less than 0.1 should not affect the final conclusions of the risk screening evaluation because these chemicals are not expected to contribute significantly to the total cumulative risk or total cumulative HI. These RBSLs should result in the retention as COPCs of all chemicals that could contribute significantly to the cumulative risk or cumulative HI .

3.3.4.2 Uncertainty in the Exposure Assessment

Uncertainty in the exposure assessment arises because of assumptions made about current and future land use, selection of potential human receptors, the methods used to calculate EPCs, and selection of exposure parameters.

3.3.4.2.1 Potential Receptors and Land Use

The current and future land uses at the sites vary. For this evaluation, residential land use was assumed when developing RBSLs. Also, for chemicals retained as COPCs, risks and HIs were calculated for a residential use scenario, which is conservative because it is likely that none of the five sites will be redeveloped for residential purposes. Risks and HIs were calculated for a generic non-residential use scenario to assess exposures for a more realistic future use scenario.

3.3.4.2.2 Exposure Point Concentrations

The maximum detected concentration of each COPC was used as the EPC to quantify potential risks. It is extremely unlikely that a receptor would be exposed to the maximum concentration of each COPC over the entire site area and the entire time spent at a site. Thus, the use of the maximum concentration likely results in overestimation of potential risks and HIs.

3.3.4.2.3 Exposure Parameters

The RBCs used to calculate risks and HIs for direct contact exposures to soil were USEPA RSLs. These RSLs are calculated using default exposure assumptions for residential and non-residential scenarios. These exposure assumptions are designed to conservatively estimate risks, and thus using these values

leads to an overestimation of potential risks. The RBCs used to calculate risks and HIs for direct contact exposures to sediment use residential RSLs for direct contact exposures to soil multiplied by 10. This is equivalent to assuming direct contact exposures to sediment over a lifetime are only 10 times less frequent than exposures to soil at a residence. This is a very conservative assumption. The sediment RBCs for fish ingestion are based on the assumption that individuals will eat fish caught from Mattawoman Creek near the site 52 times a year for 30 years. These exposure assumptions are very conservative.

3.3.4.3 Uncertainty in the Toxicological Evaluation

Uncertainties in the toxicity assessment of COPCs arise from the determination of the oral cancer slope factors (CSFs), inhalation unit risks (IURs), oral reference doses (RfDs), and inhalation reference concentrations (RfCs) used to calculate RBCs. CSFs and IURs are upper-bound estimates of the probability of a response per unit of exposure to an individual. RfDs and RfCs are estimates of daily exposure to particular chemicals that are unlikely to result in harmful non-carcinogenic health effects even to members of sensitive populations. CSFs, IURs, RfDs and RfCs are estimated by USEPA from available animal or human toxicological data. These toxicity parameters are estimated so as to overestimate potential health effects and thus be conservative. The USEPA RSLs and the sediment RBSLs for fish ingestion are based on the most recent CSFs, IURs, RfDs, and RfCs developed by USEPA. Because USEPA accounts for uncertainty in toxicology by conservatively estimating CSFs, IURs, RfDs, and RfCs, the use of these toxicity parameters should result in an overestimation of risk in this human health risk screening evaluation.

3.3.4.4 Uncertainty in the Risk Characterization

Uncertainty in risk characterization results primarily from assumptions made regarding additivity of effects from exposure to multiple COPCs from various exposure routes. High uncertainty exists when summing cancer risks for several substances across different exposure pathways. This assumes that each substance has a similar effect and/or mode of action. Often compounds affect different organs, have different mechanisms of action, and differ in their fate in the human body. Therefore, it may be inappropriate to assume that all effects are additive. However, the assumption of additivity is made to provide conservative estimates of cancer risks and noncancer HIs.

Finally, the risk characterization does not consider antagonistic or synergistic effects. Little or no information is available to determine the potential for antagonism or synergism for the COPCs.

Therefore, the impact of this uncertainty on the risk screening evaluation cannot be determined because the uncertainty may result in either an underestimation or overestimation of potential human health risks.

The risk characterization also evaluates the soil to groundwater pathway. This evaluation involves comparing the maximum detected concentration to two RBCs, one using a DAF of 1, the other using a DAF of 20. The RBC using a DAF of 1 is very conservative because it assumes no dilution or attenuation occurs and the leachate is used directly as a source of drinking water. The RBC using a DAF of 20 is more realistic, since most chemicals experience some dilution and some attenuation (sometimes a great deal of dilution and attenuation). In fact, for chemicals that are readily degradable, the actual DAF could be 100, 1,000, or higher. Thus, for chemicals that react or degrade in the environment with maximum concentrations that exceed RBCs using a DAF of 20, it is possible that actual impacts to groundwater for these chemicals will be negligible. However, by comparing concentrations to the RBCs for the two DAFs, context is provided for the uncertainty in evaluating this pathway while still providing a conservative evaluation.

3.4 ECOLOGICAL RISK ASSESSMENT SCREENING METHODOLOGY

The goal of this Ecological Risk Assessment (ERA) screening was to determine whether adverse ecological impacts are present as a result of exposure to chemicals released to the environment through historical activities at any of the Five Small Arms Ranges. This ERA screening contains information that enables risk managers to conclude that either ecological risks at the site are negligible or that further information is necessary to evaluate potential ecological risks at the site.

The ERA screening methodology is in accordance with guidance presented in the following documents:

- Final Guidelines for Ecological Risk Assessment (USEPA, 1998).
- Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (USEPA, 1997).

This ERA screening consists of Steps 1, 2, and 3a of the eight step ERA process. The first two screening steps comprise the screening-level ecological risk assessment (SERA), where conservative exposure estimates are compared to screening-level and threshold toxicity values. Step 3a is the first step of a baseline ecological risk assessment (BERA), and consists of refining the conservative assumptions following Steps 1 and 2 to further focus the ERA process on the chemicals of greatest concern at a site. The remaining steps of the ERA process require revision to the Work Plan and Field Sampling Plan prior

to initiation, and are not included in this ERA screening methodology. Appendix F includes the ecological risk screening supporting documentation.

3.4.1 Problem Formulation

Problem formulation is the first phase of an ERA and discusses the goals, size, and focus of the assessment. It includes general descriptions of the sites with emphasis on the habitats and ecological receptors present. This phase also involves characterization of site-related chemicals, chemical sources, migration routes, and an evaluation of routes of chemical exposure. The assessment and measures of effects to be evaluated are also selected. Finally, a CSM is developed that describes how chemicals associated with the site in question may come into contact with ecological receptors.

The objectives of this step are to initially identify and characterize the habitats and ecological resources throughout the site, and to describe the likely chemical sources, release mechanisms, migration pathways, and the fate of chemicals resulting from site-related activities, as well as ecological receptors that could be adversely affected by chemicals. The environmental setting and potential contaminant sources are discussed separately within the site-specific ERA screening sections.

3.4.1.1 Potential Exposure Pathways

3.4.1.1.1 Surface Soil

Surface soil for the purpose of this ERA screening are soil samples with a starting depth of 0 feet and ending depth of 1 foot or 4 feet bgs (for DPT soil samples collected at the Small Arms Range, where the hillside sloughed). Several groups of terrestrial ecological receptors can be exposed to chemicals in the surface soil. Invertebrates, such as earthworms, are exposed to chemicals as they move through the soil, and ingest soil particles while searching for food. Plants are exposed to chemicals via direct contact as chemicals are absorbed through the roots and may then translocate to different parts of the plants (i.e., leaves, seeds).

Small mammals may be exposed to chemicals in the soil via several exposure routes. They may be exposed by direct contact as they search for food or burrow into the soil. Exposure of terrestrial wildlife to chemicals in the soil via dermal contact is unlikely to represent a major exposure pathway because fur, feathers, and chitinous exoskeletons are expected to minimize transfer of chemicals across dermal tissue. Small mammals are most likely exposed to chemicals in the soil via incidental ingestion of soil, and ingestion of plants and/or invertebrates that have accumulated chemicals from the soil.

Larger predatory species, such as the red fox and red-tailed hawk, can be exposed (indirectly) to site chemicals in the soil by ingesting small mammals that have accumulated chemicals from the soil and food items.

3.4.1.1.2 Sediment

Ecological receptors can be exposed to chemicals in the sediment. Aquatic receptors, including aquatic vertebrates (i.e., fish), benthic invertebrates, amphibians, and reptiles can be exposed to sediment contamination through direct contact and incidental ingestion of contaminated sediment. Piscivorous wildlife, can also be exposed to contamination in sediment primarily through the ingestion of aquatic prey items. Piscivorous wildlife may also be exposed to sediment contamination, although to a lesser degree, by direct contact and incidental sediment ingestion.

3.4.2 Endpoints

3.4.2.1 Assessment Endpoints

Assessment endpoints are an explicit expression of the environmental value that is to be protected (USEPA, 1997). The selection of these endpoints is based on the habitats present, the migration pathways of chemicals, and the routes that chemicals may take to enter receptors.

For this ERA screening, the assessment endpoints include the protection of the following groups of receptors from a reduction in growth, survival, and/or reproduction caused by site-related chemicals:

- Soil invertebrates
- Benthic invertebrates
- Terrestrial vegetation
- Piscivorous birds and mammals
- Insectivorous birds and mammals
- Herbivorous birds and mammals

The following paragraphs discuss why the above assessment endpoints were selected for this ERA screening.

Soil Invertebrates: Soil invertebrates present at the site aid in the formation of soil, as well as redistribution and decomposition of organic matter in the soil, and serve as a food source for higher

trophic-level organisms. They can also accumulate some contaminants, which can then be transferred to the higher trophic-level organisms that consume invertebrates.

Benthic Invertebrates: Benthic invertebrates serve as a food source for higher trophic-level organisms (i.e., fish, amphibians, birds, mammals). They can also accumulate contaminants, which can be transferred to higher trophic-level organisms that consume invertebrates. Benthic macroinvertebrates are present in the Potomac River adjacent to the Old Skeet and Trap Range UXO 15.

Terrestrial Vegetation: Terrestrial vegetation at the site consists of grasses, shrubs, and trees. They serve as a food source, provide shade and cover for many organisms, and help prevent soil erosion, among other important functions. They can also accumulate some contaminants, which can then be transferred to the higher trophic-level organisms that consume plants.

Piscivorous Birds and Mammals: Piscivorous birds and mammals consume fish and marine invertebrates. They are present along the Potomac River at UXO 15 and are exposed to, and can accumulate, chemicals that are present in the food items they consume.

Insectivorous Birds and Mammals: Insectivorous birds and mammals consume soil invertebrates and insects and in turn serve as a food source for higher trophic level carnivores. These birds and mammals are exposed to, and can accumulate, chemicals that are present in the food items they consume.

Herbivorous Birds and Mammals: Herbivorous birds and mammals (i.e., animals that consume only plant tissue) are present at the site because of the vegetative habitats (i.e., forested, open field). Their role in the community is essential because without them, higher trophic levels could not exist (Smith, 1966). They may be exposed to and accumulate contaminants that are present in the plants they consume.

As indicated in the USEPA Ecological Risk Assessment Guidance document for Superfund (USEPA, 1997), “it is not practical or possible to directly evaluate risks to all of the individual components of the ecosystem at a site. Instead, assessment endpoints focus the risk assessment on particular components of the ecosystem that could be adversely affected by contaminants from the site.” Therefore, this ERA screening focused on the endpoints that tend to yield the highest risks, which will account for endpoints that have lower risks.

Carnivorous birds and mammals generally have large home ranges. The land area of the five sites range from approximately 0.3 acres at the Roach Road Rifle Range (UXO 25), 2.4 acres at the Small Arms Range (UXO 17), and approximately 29 to 33 acres at the Marine Rifle Range, Old Skeet and Trap

Range, and the Rum Point Skeet Range (UXOs 14, 15, and 16). When the size of the sites is compared to the home range of top carnivores, such as the red-tailed hawk (with an average of 1,692 acres) and the red fox (with an average of 1,793 acres), carnivores would only receive a very small portion of their diet from the five sites, and therefore, are not included as receptors in this ERA screening. Threshold oral toxicity values for reptiles and amphibians are not available for most chemicals, so risks to reptiles and amphibians were not quantitatively evaluated. With the above factors in mind, amphibians, reptiles, and carnivores were not selected as assessment endpoints. Instead, potential risk from bioaccumulation and biomagnification of contaminants will be assessed for herbivorous, insectivorous, and piscivorous birds and mammals.

3.4.2.2 Measures of Effects

Measures of effects are estimates of biological impacts (i.e., survival, growth and/or reproduction) that are used to evaluate the assessment endpoints. The following measures of effects were used to evaluate the assessment endpoints in this ERA screening.

- Decreases in survival, growth, and/or reproduction of plants, and soil and benthic invertebrates were evaluated by comparing the measured concentrations of chemicals in the surface soil and sediment to screening values designed to be protective of ecological receptors.

- Decreases in survival, reproduction, and/or increases in developmental effects of birds and mammals were evaluated by comparing the estimated ingested dose of contaminants in the surface soil and sediment to no-observed-adverse-effects levels (NOAELs) and lowest-observed-adverse-effects levels (LOAELs) for surrogate wildlife species.

3.4.3 Ecological Effects Evaluation

The preliminary ecological effects assessment is an investigation of the relationship between the exposure to a chemical and the potential for adverse effects resulting from exposure. In this step, screening levels for toxicity of the chemicals to ecological receptors were compiled.

3.4.3.1 Terrestrial plants and invertebrates

Potential risks to terrestrial plants and invertebrates resulting from exposure to chemicals in the surface soil were evaluated by comparing chemical concentrations to ecological screening levels. The screening levels consisted of the USEPA Ecological Soil Screening Levels (Eco SSLs) (USEPA, 2005a to 2005c and 2007a to 2007c), National Oceanic and Atmospheric Administration (NOAA) Screening Quick

Reference Tables (SQuiRTs) (Buchman, 2008), and USEPA Region 3 Biological Technical Assistance Group (BTAG) Screening Levels (USEPA, 1995). These toxicity values are expressed in units of concentration because terrestrial plants and invertebrates are in direct contact with the soil. The soil screening levels are presented in Table F-1 in Appendix F.

3.4.3.2 Benthic invertebrates

Potential risks to benthic invertebrates resulting from exposure to chemicals in the sediment were evaluated by comparing chemical concentrations to the USEPA Region 3 BTAG Sediment Screening Levels using the lower of the freshwater and salt water values (USEPA, 2006). These toxicity values are expressed in units of concentration because the benthic invertebrates are in direct contact with the sediment. The sediment screening levels are presented in Table F-2 in Appendix F.

3.4.3.3 Mammals and birds

Risks to wildlife from exposure to chemicals in surface soil and sediment were determined by estimating the Chronic Daily Intake (CDI) using food chain models and comparing the CDI to toxicity reference values (TRVs) representing acceptable daily doses in mg/kg-day. The TRVs were developed from NOAELs and LOAELs obtained from wildlife studies. The majority of the TRVs were obtained from the ORNL (Sample et al., 1996) and the USEPA Eco SSL documents, and were supplemented with other toxicity information when necessary. Only chemicals considered by USEPA to be important bioaccumulative chemicals (USEPA, 2006) or chemicals that exceeded wildlife criteria were included in the food chain model.

Appendix F presents the TRVs and the sources of the NOAELs and LOAELs used in this ERA. If a subchronic study was used to develop the TRV, the final value was multiplied by a factor of 0.1 to account for uncertainty between subchronic and chronic effects. Also, the LOAEL was multiplied by a factor of 0.1 to estimate a NOAEL TRV if only a LOAEL study was available. The chemical-specific Eco SSL documents provide both NOAELs and LOAELS for various studies, but overall TRVs are calculated only for NOAELs. The geometric mean of the chemical-specific growth and reproduction LOAELs from the chemical-specific Eco SSL documents were used as the LOAEL TRVs.

3.4.4 Characterization of Exposure

This portion of the ERA screening includes identification of contaminant concentration data used as the EPCs to represent ecological exposure in various media. Terrestrial plants and invertebrates are exposed to chemicals in the surface soil, and aquatic organisms (i.e., fish and benthic invertebrates) are

exposed to chemicals in the sediment through ingestion and/or direct contact. Maximum chemical concentrations were used as the EPCs for the initial screening step.

Data collected from grab samples and composite samples are evaluated separately. Composite samples were collected only at firing points and/or firing lines at each site. Grab samples were collected from surface soil throughout the sites.

As discussed above, the total exposure dose of terrestrial wildlife to chemicals in soil, sediment, and associated food items such as plants, invertebrates, and fish was estimated using food chain models. Selection of a particular species is required so that intake through ingestion can be estimated. The availability of exposure parameters (i.e., body mass, and ingestion rates) are factors in selecting surrogate species. The following surrogate species were used for the food chain modeling:

- Herbivorous mammal: meadow vole.
- Herbivorous bird: bobwhite quail.
- Insectivorous mammal: short-tailed shrew.
- Insectivorous bird: American robin.
- Piscivorous mammal: mink.
- Piscivorous bird: great blue heron.

Receptor profiles for the surrogate species, including the exposure parameters used in the food-chain modeling are included in Appendix F.

The following equation was used to calculate the CDI for wildlife receptors:

$$CDI = \frac{[(Cf * If) + (Cs * Is)] * H}{BW}$$

where:

CDI	=	Chronic daily intake [milligrams per kilogram (mg/kg)-day]
Cf	=	Chemical concentration in food – (see discussion below)
Cs	=	Chemical concentration in surface soil or sediment (mg/kg)
If	=	Food ingestion rate [kilograms per day (kg/day)]
Is	=	Incidental surface soil or sediment ingestion rate (kg/day)
H	=	Portion of food intake from the contaminated area (unitless)
BW	=	Body weight (kg)

Chemical concentrations in food items for soil invertivorous and herbivorous receptors were calculated using soil-to-invertebrate or soil-to-plant bioaccumulation factors (BAFs) and regression equations from the USEPA Eco SSL Guidance Document (USEPA, 2007d) or other published sources. The sources of the BAFs are documented in Appendix F. The following equation was used to calculate the chemical concentration in plants or invertebrates when BAFs are used:

$$Cf = Cs * BAF$$

where:

Cf	=	Contaminant concentration in food (mg/kg)
Cs	=	Contaminant concentration in surface soil (mg/kg)
BAF	=	Biota-soil bioaccumulation factor (unitless)

Chemical concentrations in food items for piscivorous receptors were calculated using sediment-to-fish BSAFs (USEPA, 2004), and sediment-to-invertebrate BSAFs (ORNL, 1998). Sediment-to-invertebrate BSAFs were used for the metals because sediment-to-fish BSAFs are not available for metals. Contaminant concentrations in food items for piscivorous mammals and birds were calculated as follows:

$$Cf\ (\text{for metals}) = Csd * BSAF$$

where:

Cf	=	Contaminant concentration in food (mg/kg)
Csd	=	Contaminant concentration in sediment (mg/kg)
BSAF	=	Biota-sediment bioaccumulation factor (unitless)

$$Cf\ (\text{for organics}) = Csd * \left(BSAF * \frac{\%L}{\%TOC} \right)$$

where:

Cf	=	Contaminant concentration in food (mg/kg)
Csd	=	Contaminant concentration in sediment (mg/kg)
BSAF	=	Biota-sediment bioaccumulation factor (for organics) (unitless)
%L	=	Percent lipids [14.4% (dry weight) for fish]
%TOC	=	Percent total organic carbon (TOC) (average TOC for the site)

Table F-3 in Appendix F summarizes the exposure factors that were used for the food chain model. The food ingestion rates were on a dry weight basis. The following input parameters were used in the dose equations under the conservative screening scenario:

- Maximum surface soil and sediment concentrations
- Maximum BAFs and BSAFs
- Conservative receptor body weights and ingestion rate

For refining the conservative exposure assumptions in Step 3a, the following input parameters were used:

- Average surface soil and sediment concentrations.
- Average BAFs or BSAFs (for some chemicals, these are the same as the conservative BAFs or BSAFs).
- Average receptor body weights and ingestion rates.

3.4.5 Risk Characterization

The risk characterization is the final phase of an ERA that compares exposure to ecological effects. It is at this phase that the likelihood of adverse effects occurring as a result of exposure to a stressor is evaluated. An ecological effects quotient (EEQ) approach was used to characterize the potential risk to ecological receptors by comparing exposure concentrations and doses to effects data. When EEQ values exceed 1.0, it is an indication that ecological receptors are potentially at risk; additional evaluation or data may be necessary to confirm with greater certainty whether ecological receptors are actually at risk, especially since most benchmarks are developed using conservative exposure assumptions and/or studies. The EEQ value should not be construed as being probabilistic; rather, it is a numerical indicator of the extent to which an EPC exceeds or is less than a benchmark.

The EEQs for surface soil receptors were calculated as follows:

$$EEQ = \frac{Css}{SSSL}$$

where:

EEQ = Ecological Effects Quotient (unitless)

Css = Chemical concentration in surface soil [micrograms per kilogram (µg/kg) or mg/kg]

SSSL = Surface soil screening level (µg/kg or mg/kg)

The EEQs for sediment invertebrates were calculated as follows:

$$EEQ = \frac{Csd}{SdSL}$$

where:

EEQ = Ecological Effects Quotient (unitless)

Csd = Chemical concentration in sediment (µg/kg or mg/kg)

SdSL = Sediment screening level (µg/kg or mg/kg)

The EEQs for wildlife were calculated as follows:

$$EEQ = \frac{CDI}{TRV}$$

where:

EEQ = Ecological effects quotient (unitless)

CDI = Chronic daily intake dose (mg/kg-day)

TRV = Toxicity reference value (NOAEL or LOAEL) (mg/kg-day)

3.4.6 Selection of Chemicals of Potential Concern

The final part of the screening evaluation is selection of COPCs. Chemicals that are not selected as COPCs are assumed to present negligible risk to ecological receptors and were not considered for further evaluation in the ERA. Chemicals that are retained as COPCs were evaluated further in Step 3a. Ecological COPCs were selected using the following procedures:

- Chemicals with EEQs greater than 1.0 (using screening values) were retained as COPCs for further evaluation because they have a potential to cause risk to ecological receptors.

- Chemicals with EEQs greater than 1.0 based on the conservative food chain model using NOAELs were retained as COPCs, because they have the potential to cause risk to mammals and birds.

- Chemicals without screening values were retained as COPCs, but were only evaluated qualitatively.

- Calcium, magnesium, potassium, and sodium were not retained as COPCs, because they are essential nutrients that can be tolerated by living systems even at high concentrations. No evidence indicates that these chemicals are related to site operations, and they are not considered hazardous chemicals.

The selection of COPCs for each site is presented in the site-specific ERA screening section.

3.4.7 Step 3A Refinement

Step 3a consists of a refinement of the conservative exposure assumptions and concentrations to evaluate the potential risks to ecological receptors (i.e., plants, invertebrates, aquatic biota, and wildlife receptors). The objective of the Step 3a evaluation is to further refine the number of chemicals that are retained as COPCs in order to focus additional efforts on chemicals that are of major ecological concern. The following describes the process for further evaluating chemicals initially selected as COPCs in soil and sediment.

For chemicals that are evaluated further in Step 3a, the following factors were evaluated, as appropriate, to determine if the risks are great enough to warrant additional evaluations. Note that all of these factors may not be discussed for each chemical and/or receptor group.

- Magnitude of criterion exceedance: Although the magnitude of the risks may not relate directly to the magnitude of a criterion exceedance, the magnitude of the criterion exceedance may be one item used in a lines-of-evidence approach to determine the need for further site evaluation. The greater the criterion exceedance, the greater the probability and concern that an unacceptable risk exists.

- Frequency of chemical detection and spatial distribution: A chemical detected at a low frequency typically is of less concern than a chemical detected at higher frequency if toxicity and concentrations and spatial areas represented by the data are similar. All else being equal, chemicals detected frequently were given greater consideration than those detected relatively infrequently. In addition, the spatial distribution of a chemical may be evaluated to determine the area that a sample represents.

- Contaminant bioavailability: Many contaminants (especially inorganics) are present in the environment in forms that are typically not bioavailable, and the limited bioavailability was considered when evaluating the exposures of receptors to site contaminants. Contaminants with generally less bioavailability are considered to be less toxic than the more bioavailable contaminants, all other factors being equal.

- More Appropriate Benchmarks: More appropriate benchmarks were used to further evaluate risks to specific groups of ecological receptors (e.g., plants, invertebrates, aquatic biota, and benthic organisms) because while screening levels are useful for initial screening, they are very conservative and not appropriate for evaluating all of the assessment endpoints.

3.4.8 Risks to Terrestrial Plants and Soil Invertebrates

The first step in the Step 3a evaluation was to determine whether the COPC concentrations in the site samples are greater than the concentrations in background samples. Background concentrations were only available for some chemicals in surface soil. The statistical background analyses are presented in Appendix F.

For chemicals that do not have Eco SSLs or no Eco SSL for plants or soil invertebrates, more appropriate benchmarks that were used to further evaluate risks to plants and invertebrates are listed below.

- Canadian Soil Quality Guidelines (SQGs) (CCME, 2006 and supporting documents).
- ORNL Toxicological Benchmarks (Efroymson et al., 1997a).

The Canadian SQGs were developed by the Canadian Council of Ministers of the Environment (CCME). They are derived using toxicological data to determine the threshold level for key receptors. The values are calculated for four land uses: agricultural, residential and parkland, commercial, and industrial. Exposure from direct soil contact is used to derive guidelines for the residential and parkland, commercial and industrial land uses. However, the soil guidelines for the agricultural land use incorporate direct soil contact as well as soil and food ingestion (CCME, 2006). A more detailed discussion of the derivation of the SQGs is presented in the CCME _Soil Quality Guidelines document (CCME, 1996).

Toxicological benchmarks (Efroymson et al., 1997a,b) were developed by the ORNL. These benchmarks were intended to be used as screening values, and as such, may be overly conservative.

They are based on a 20 percent reduction in growth, reproduction, or activity (for invertebrates) or growth and yield (for plants) as the threshold for significant effects (Efroymson et al., 1997a, b).

Additional sources of toxicity data from the literature were used to evaluate potential risks to terrestrial vegetation and invertebrates from contaminants in surface soil not included in the above referenced documents.

3.5 CORRELATION BETWEEN XRF AND FIXED-BASE LABORATORY

Correlation Analysis

From the samples that were analyzed in the field using XRF and also at the FBL, a regression analysis was conducted to evaluate the correlation between the FBL lead results and XRF lead results. To evaluate the regression analysis, the Pearson Correlation and the R-squared value were calculated. The Pearson Correlation is a measure of the strength of the linear relationship between two or more variables with a range of -1 to +1. The value of -1 represents a perfect negative correlation (as one variable decreases the other increases proportionally); whereas, a value of +1 represents a perfect positive correlation (as one variable increases the other increases proportionally). A value of 0 represents a lack of correlation.

Marine Rifle Range (UXO 14)

When all the concentrations are plotted, the R^2 value is 0.17. There are two groupings of data: one with XRF concentrations less 1,000 mg/kg and one with XRF concentrations greater than 1,000 mg/kg. The R^2 value for the regression using the data with XRF concentrations less than 1,000 mg/kg is 0.72. This indicates a correlation between the XRF and the FBL concentrations. A correlation for those data points with XRF concentrations greater than 1,000 mg/kg was not calculated because there are only four data points. Table 3-8 contains the predicted FBL concentrations based on the XRF concentrations less than 1,000 mg/kg.

Old Skeet and Trap Range (UXO 15)

When all the concentrations are plotted the R^2 value is 0.74. There do not appear to be any groupings of data points based on the XRF value (i.e., all data points follow the same trend line). This R^2 value indicates a correlation between the XRF lead concentration and the FBL lead concentration. Table 3-7 contains the predicted FBL concentrations for the OSTR.

Rum Point Skeet Range (UXO 16)

When all the concentrations are plotted, the R^2 value is 0.83. There is one data point with an XRF concentration of roughly 1,000 mg/kg with a corresponding FBL concentration of roughly 600 mg/kg that may be influencing the regression line. Also, it can be seen that this is the only data point above 400 mg/kg. When this data point is removed from the data set the R^2 value is 0.4. This indicates a weak correlation between the XRF lead concentrations and the FBL lead concentrations. Therefore, predicted lead laboratory concentrations based on the relationship between the XRF lead concentrations and the FBL lead concentrations were not computed.

Small Arms Pistol Range (UXO 17)

When all the concentrations are plotted, the R^2 value is 0.63. There are four data points with XRF concentrations greater than 500 mg/kg and the rest of the data points have XRF concentrations less than roughly 200 mg/kg. When these four data points are removed from the analysis, the correlation is 0.26. This indicates a weak correlation between the XRF lead concentrations and the FBL lead concentrations. Therefore, predicted lead laboratory concentrations based on the relationship between the XRF lead concentrations and the FBL lead concentrations were not computed.

Roach Road Rifle Range (UXO 25)

When all the concentrations are plotted, the R^2 value is 0.84. There are two groupings of data: one with XRF concentrations less 200 mg/kg, and one with XRF concentrations greater than 200 mg/kg. The R^2 value for the regression using the data with XRF concentrations less than 200 mg/kg is 0.82. This indicates a correlation between the XRF and the FBL concentrations. A correlation for those data points with XRF concentrations greater than 200 mg/kg was calculated and the R^2 value is 0.78. This R^2 value also indicates a correlation between the XRF lead concentrations and the FBL lead concentrations, but there is some uncertainty associated with this calculation because there are only six data points and the maximum concentration may be an influential point. In addition, the data set corresponding to XRF concentrations greater than 500 mg/kg contains lead concentrations above the action level of 400 mg/kg. Table 3-11 contains the predicted FBL concentrations based on the both regression analyses. The regression analyses are included in Appendix G, statistical calculations.

3.6 STATISTICAL METHODOLOGY

This section describes the statistical methodologies used to compare site data with background data. Facility background data for the COPCs are summarized in tables included in the individual site report

results sections. Statistical analyses were used to compare site soil concentrations to facility background soil concentrations to determine if the analytical results obtained from the samples represent site conditions or background/ anthropogenic conditions. The results of the graphical and statistical tests performed and final recommendations for each constituent tested are presented in Tables included in Appendix G.

The comparison of the site data with the background data was performed using summary statistics, probability plots, box plots, and several other statistical tests described below. If the combined data sets were greater than 90 percent non-detect, then the maximum concentrations were compared. If the site data appeared to be obviously below or above background from visual inspection, no formal statistical test was performed.

Probability Plots

Probability plots are a useful first step for visually comparing two data sets in a single graph. If the site and background distributions were exactly identical, the plotted values would lie on a straight line through the origin. Deviations from this line show the differences between the two distributions. If the site and background distributions are similar the scattering of the two data sets will be mixed. If there is grouping of the two data sets then data sets are most likely different.

Box Plots

As an additional aid for the population analysis, box plots were generated for the site data and background data.

Box plots show the central tendency, degree of symmetry, range of variation, and potential outliers of a data set. The data set is shown as a rectangular box that represents the middle 50 percent of the data. The upper value of the box represents the 75th percentile and the lower value of the box represents the 25th percentile. The median is represented by the middle line in the box.

Box plots for the same analyte in the two data sets were plotted on the same graph. The plots were visually inspected to see which data sets look similar and which ones differed. Particular attention was paid to see if the median from one data set fell within the 75th and 25th percentile range of the other data sets.

Statistical Tests

As stated above, the data were analyzed to determine whether they are similar. A number of statistical tests can be used to determine if the data sets are similar. If the combined percentage of non-detected concentrations was between 0 and 50 percent then the Two sample T-test, WRS test, or Gehan test was computed to test if the site data set is greater than the background data set plus one background standard deviation as outlined in Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites (2002).

USEPA's ProUCL 4.00.04 software was used to determine the data distribution of the site and background concentrations and compute the Two sample T-test, WRS Test, or Gehan Test. If the data were log normally distributed then the statistical tests were performed on the log-transformed concentrations. If there are more than two detection limits for data that are non-detect then the Gehan test was computed.

Two Sample T-Test

Test for a difference between two populations means when it can be assumed that the data are approximately normally distributed or sample sizes are large enough (m and n at least 30). If the variances of the two data sets are not equal than the Two sample T Test with unequal variance was computed. The Two Sample T Test was computed using USEPA's ProUCL 4.00.04. The null and alternative hypothesis are:

H_o: The site distribution exceeds the background distribution by more than one background standard deviation.

H_A: The site distribution does not exceed the background distribution by more than one background standard deviation.

Wilcoxon Rank Sum Test

The WRS nonparametric test is used to test for a shift in location between two independent populations. The WRS test has two main advantages over the independent sample t test: the two data sets need not be drawn from the normal distribution and the WRS test can handle a moderate number of nondetected values by treating them as ties. The WRS test was computed using USEPA's PROUCL 4.00.04 software.

H_o: The site distribution exceeds the background distribution by more than one background standard deviation.

H_A: The site distribution does not exceed the background distribution by more than one background standard deviation.

Gehan Test

The Gehan nonparametric test is used to test for a shift in location between two independent populations. The Gehan test can be used when the background or site datasets contain multiple nondetects with different reporting limits. The Gehan test was computed using USEPA's PROUCL 4.00.04 software.

H_o: The site distribution exceeds the background distribution by more than one background standard deviation.

H_A: The site distribution does not exceed the background distribution by more than one background standard deviation.

Quantile Test

The Quantile test is used to identify the differences in the right tails of the site and background distributions. This may be regarded as detecting if the values in the right-tail of the site population are greater than the right-tail of the background distribution. If the results of the Two Sample T-Test, WRS Test, or Gehan Test found the distributions to not be different then the quantile test was computed. If the quantile test found the right tail of the site data to be larger than the right tail of the background data it was concluded that the site concentrations are greater than background. The test is valid regardless of the underlying distribution of the site and background data sets.

Slippage Test

The Slippage test is used to test for a shift to the right in the extreme right-tail of the site versus the background concentrations. This is equivalent to asking if a set of the largest values of the site distribution are larger than the maximum value of the background distribution. If the results of the Quantile Test were that the right tails of the site and background distributions were not different than the slippage test was computed. If the slippage test found the extreme right tail of the site data to be larger than the background data it was concluded that the site concentrations are greater than background. This test can be used regardless of the underlying distribution of the site and background data sets.

TABLE 3-1

INDIAN HEAD, MARYLAND - FIVE SMALL ARMS RANGES
NAVAL SUPPORT FACILITY INDIAN HEAD
INDIAN HEAD, MARYLAND

Site Name	NORM Site No.	Site Size (Acres)	Study Area Size (Acres)	Study Area Size (Square Feet)	Linear Feet
Old Skeet and Trap Range	UXO 15	29.33			
Open Water (Sediment)			17.935	781,250	NA
Near Shore (Sediment)			NA	NA	750
Range Area			4.379	190,750	NA
Marine Rifle Range	UXO 14	30.44			
Firing Lines (Nine Total) Each:			NA	NA	200
Target Berm 1			0.418	18,200	NA
Target Berm 2			0.337	14,700	NA
Hillside Impact Area			2.686	117,000	NA
Small Arms Range	UXO 17	2.41			
Firing Lines (Three Total) Each:			NA	NA	140
Range Area			0.264	11,500	NA
Rum Point Skeet Range	UXO 16	33.45			
Range Area			13.774	600,000	NA
Roach Road Rifle Range	UXO 25	0.27			
Range Area			0.230	10,000	NA

TABLE 3-2

BORING DATES, DEPTHS, METHODS, AND INTERVALS
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Boring Location(OSTR)	Sample ID.(OSTR)	Total Depth (feet bgs)	Collection Method[(1)]	Date Drilled	Depth Interval of Soil Sample (feet bgs)
SB001	X15SS0010001	1.0	HA	5/27/2009	0.0 -1.0
SB002	X15SS0020001	1.0	HA	5/27/2009	0.0 -1.0
SB003	X15SS0030001	1.0	HA	5/27/2009	0.0 -1.0
SB004	X15SS0040001	1.0	HA	5/27/2009	0.0 -1.0
SB005	X15SS0050001	1.0	HA	5/27/2009	0.0 -1.0
SB005	X15SB0050102	1.0	HA	6/2/2009	1.0 - 2.0
SB006	X15SS0060001	1.0	HA	5/27/2009	0.0 -1.0
SB007	X15SS0070001	1.0	HA	5/27/2009	0.0 -1.0
SB007	X15SB0070102	2.0	HA	6/2/2009	1.0 - 2.0
SB008	X15SS0080001	1.0	HA	5/27/2009	0.0 -1.0
SB009	X15SS0090001	1.0	HA	5/27/2009	0.0 -1.0
SB010	X15SS0100001	1.0	HA	5/27/2009	0.0 -1.0
SB011	X15SS0110001	1.0	HA	5/27/2009	0.0 -1.0
SB012	X15SS0120001	1.0	HA	5/27/2009	0.0 -1.0
SB012	X15SS0120001RE	1.0	HA	5/27/2009	0.0 -1.0
SB013	X15SS0130001	1.0	HA	5/27/2009	0.0 -1.0
SB013	X15SB0130102	2.0	HA	6/2/2009	1.0 - 2.0
SB013	X15SB0130102RE	2.0	HA	6/2/2009	1.0 - 2.0
SB014	X15SS0140001	1.0	HA	5/27/2009	0.0 -1.0
SB015	X15SS0150001	1.0	HA	5/27/2009	0.0 -1.0
SB016	X15SS0160001	1.0	HA	5/27/2009	0.0 -1.0
SB017	X15SS0170001	1.0	HA	5/27/2009	0.0 -1.0
SB018	X15SS0180001	1.0	HA	5/27/2009	0.0 -1.0
SB019	X15SS0190001	1.0	HA	5/27/2009	0.0 -1.0
SB020	X15SS0200001	1.0	HA	5/27/2009	0.0 -1.0
SB021	X15SS0210001	1.0	HA	5/27/2009	0.0 -1.0
SB022	X15SS0220001	1.0	HA	5/27/2009	0.0 -1.0
SB023	X15SS0230001	1.0	HA	5/27/2009	0.0 -1.0
SB024	X15SS0240001	1.0	HA	5/27/2009	0.0 -1.0
SB025	X15SS0250001	1.0	HA	5/27/2009	0.0 -1.0
SB026	X15SS0260001	1.0	HA	5/27/2009	0.0 -1.0
SB027	X15SS0270001	1.0	HA	5/28/2009	0.0 -1.0
SB028	X15SS0280001	1.0	HA	5/27/2009	0.0 -1.0
SB029	X15SS0290001	1.0	HA	5/27/2009	0.0 -1.0
SB030	X15SS0300001	1.0	HA	5/27/2009	0.0 -1.0
SB031	X15SS0310001	1.0	HA	5/28/2009	0.0 -1.0
SB032	X15SS0320001	1.0	HA	5/28/2009	0.0 -1.0
SB033	X15SS0330001	1.0	HA	5/27/2009	0.0 -1.0
SB034	X15SS0340001	1.0	HA	5/28/2009	0.0 -1.0

TABLE 3-2

BORING DATES, DEPTHS, METHODS, AND INTERVALS
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Boring Location(OSTR)	Sample ID.(OSTR)	Total Depth (feet bgs)	Collection Method[(1)]	Date Drilled	Depth Interval of Soil Sample (feet bgs)
SB035	X15SS0350001	1.0	HA	5/28/2009	0.0 -1.0
SB036	X15SS0360001	1.0	HA	5/28/2009	0.0 -1.0
SB037	X15SS0370001	1.0	HA	5/28/2009	0.0 -1.0
SB038	X15SS0380001	1.0	HA	5/28/2009	0.0 -1.0
SB039	X15SS0390001	1.0	HA	5/28/2009	0.0 -1.0
SB040	X15SS0400001	1.0	HA	5/28/2009	0.0 -1.0
SB041	X15SS0410001	1.0	HA	5/28/2009	0.0 -1.0
SB041	X15SB0410102	2.0	HA	6/2/2009	1.0 - 2.0
SB042	X15SS0420001	1.0	HA	5/28/2009	0.0 -1.0
SB043	X15SS0430001	1.0	HA	5/28/2009	0.0 -1.0
SB044	X15SS0440001	1.0	HA	5/28/2009	0.0 -1.0
SB045	X15SS0450001	1.0	HA	5/28/2009	0.0 -1.0
SB046	X15SS0460001	1.0	HA	5/28/2009	0.0 -1.0
SB047	X15SS0470001	1.0	HA	5/28/2009	0.0 -1.0
SB048	X15SS0480001	1.0	HA	5/28/2009	0.0 -1.0
SB049	X15SS0490001	1.0	HA	5/28/2009	0.0 -1.0
SB050	X15SS0500001	1.0	HA	5/28/2009	0.0 -1.0
SB051	X15SS0510001	1.0	HA	5/27/2009	0.0 -1.0
SB052	X15SS0520001	1.0	HA	5/27/2009	0.0 -1.0
SB053	X15SS0530001	1.0	HA	5/27/2009	0.0 -1.0
SB054	X15SS0540001	1.0	HA	5/27/2009	0.0 -1.0
SB055	X15SS0550001	1.0	HA	5/27/2009	0.0 -1.0
SB056	X15SS0560001	1.0	HA	5/27/2009	0.0 -1.0
SB057	X15SS0570001		NS		
SB058	X15SS0580001		NS		
SB059C	X15SS059C0001	1.0	HA	6/1/2009	0.0 -1.0
SB060C	X15SS060C0001	1.0	HA	6/1/2009	0.0 -1.0
SB061	X15SS0610001	1.0	HA	6/2/2009	0.0 -1.0
SB062	X15SS0620001	1.0	HA	6/2/2009	0.0 -1.0
SB063	X15SS0630001	1.0	HA	6/2/2009	0.0 -1.0
SB064	X15SS0640001	1.0	HA	6/2/2009	0.0 -1.0
SB064	X15SB0640102	2.0	HA	6/2/2009	1.0 - 2.0
SB065	X15SS0650001	1.0	HA	6/2/2009	0.0 -1.0
SB066	X15SS0660001	1.0	HA	6/2/2009	0.0 -1.0
SB067	X15SS0670001	1.0	HA	6/2/2009	0.0 -1.0
SB068	X15SS0680001	1.0	HA	6/2/2009	0.0 -1.0
SB069	X15SS0690001	1.0	HA	6/2/2009	0.0 -1.0
SB070	X15SS0700001	1.0	HA	6/2/2009	0.0 -1.0
SB070	X15SB0700102	2.0	HA	6/2/2009	1.0 - 2.0

TABLE 3-2

BORING DATES, DEPTHS, METHODS, AND INTERVALS
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Boring Location(OSTR)	Sample ID.(OSTR)	Total Depth (feet bgs)	Collection Method[(1)]	Date Drilled	Depth Interval of Soil Sample (feet bgs)
SB071	X15SS0710001	1.0	HA	6/2/2009	0.0 -1.0
SB071	X15SS0710001-D	1.0	HA	6/2/2009	0.0 -1.0
SB072	X15SS0720001	1.0	HA	6/2/2009	0.0 -1.0
SB073	X15SS0730001	1.0	HA	6/2/2009	0.0 -1.0
SB074	X15SS0740001	1.0	HA	6/2/2009	0.0 -1.0
SB075	X15SS0750001	1.0	HA	6/2/2009	0.0 -1.0
SB076	X15SS0760001	1.0	HA	6/2/2009	0.0 -1.0
SB077C	X15SS077C0001	1.0	HA	6/9/2009	0.0 -1.0
SB078C	X15SS078C0001	1.0	HA	6/9/2009	0.0 -1.0
SD001	X15SD0010006	0.5	PT	6/1/2009	0.0 - 0.5
SD002	X15SD0020006	0.5	PT	6/1/2009	0.0 - 0.5
SD003	X15SD0030006	0.5	PT	6/1/2009	0.0 - 0.5
SD004	X15SD0040006	0.5	PT	6/1/2009	0.0 - 0.5
SD005	X15SD0050006	0.5	PT	6/1/2009	0.0 - 0.5
SD006	X15SD0060006	0.5	PT	6/1/2009	0.0 - 0.5
SD007	X15SD0070006	0.5	PT	6/1/2009	0.0 - 0.5
SD008	X15SD0080006	0.5	PT	6/1/2009	0.0 - 0.5
SD009	X15SD0090006	0.5	PT	6/1/2009	0.0 - 0.5
SD010	X15SD0100006	0.5	PD	6/10/2009	0.0 - 0.5
SD011	X15SD0110006	0.5	PD	6/10/2009	0.0 - 0.5
SD012	X15SD0120006	0.5	PD	6/10/2009	0.0 - 0.5
SD013	X15SD0130006	0.5	PD	6/10/2009	0.0 - 0.5
SD014	X15SD0140006	0.5	PD	6/10/2009	0.0 - 0.5
SD015	X15SD0150006	0.5	PD	6/10/2009	0.0 - 0.5
SD016	X15SD0160006	0.5	PD	6/10/2009	0.0 - 0.5
SD017	X15SD0170006	0.5	PD	6/10/2009	0.0 - 0.5
SD018	X15SD0180006	0.5	PD	6/10/2009	0.0 - 0.5
SD019	X15SD0190006	0.5	PD	6/10/2009	0.0 - 0.5
SD020	X15SD0200006	0.5	PD	6/10/2009	0.0 - 0.5
SD021	X15SD0210006	0.5	PD	6/10/2009	0.0 - 0.5
SD022	X15SD0220006	0.5	PD	6/10/2009	0.0 - 0.5
SD023	X15SD0230006	0.5	PD	6/10/2009	0.0 - 0.5
SD024	X15SD0240006	0.5	PD	6/10/2009	0.0 - 0.5
SD025	X15SD0250006	0.5	PD	6/10/2009	0.0 - 0.5
SD026	X15SD0260006	0.5	PD	6/10/2009	0.0 - 0.5
SD027	X15SD0270006	0.5	PD	6/10/2009	0.0 - 0.5
SD028	X15SD0280006	0.5	PD	6/10/2009	0.0 - 0.5
SD029	X15SD0290006	0.5	PD	6/10/2009	0.0 - 0.5
SD030	X15SD0300006	0.5	PD	6/10/2009	0.0 - 0.5

TABLE 3-2

BORING DATES, DEPTHS, METHODS, AND INTERVALS
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Boring Location(OSTR)	Sample ID.(OSTR)	Total Depth (feet bgs)	Collection Method[(1)]	Date Drilled	Depth Interval of Soil Sample (feet bgs)
SD031	X15SD0310006	0.5	PD	6/10/2009	0.0 - 0.5
SD032	X15SD0320006	0.5	PD	6/10/2009	0.0 - 0.5
SD033	X15SD0330006	0.5	PD	6/10/2009	0.0 - 0.5
SD034	X15SD0340006	0.5	PD	6/10/2009	0.0 - 0.5

Notes:
HA - hand auger
PT - plastic trowel
PD - ponar dredge
bgs - below ground surface
NS - not sampled

TABLE 3-3

BORING DATES, DEPTHS, METHODS, AND INTERVALS
MARINE RIFLE RANGE (MRR) - UXO 14
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Boring Location(MRR)	Sample ID.(MRR)	Total Depth (feet bgs)	Collection Method[(1)]	Date Drilled	Depth Interval of Soil Sample (feet bgs)
SB001C	X14SS001C0001	1.0	HA	5/29/2009	0.0 - 1.0
SB002C	X14SS002C0001	1.0	HA	5/29/2009	0.0 - 1.0
SB003C	X14SS003C0001	1.0	HA	5/29/2009	0.0 - 1.0
SB004C	X14SS004C0001	1.0	HA	5/29/2009	0.0 - 1.0
SB005C	X14SS005C0001	1.0	HA	5/29/2009	0.0 - 1.0
SB006C	X14SS006C0001	1.0	HA	5/29/2009	0.0 - 1.0
SB007C	X14SS007C0001	1.0	HA	5/29/2009	0.0 - 1.0
SB008C	X14SS008C0001	1.0	HA	6/1/2009	0.0 - 1.0
SB009C	X14SS009C0001	1.0	HA	6/1/2009	0.0 - 1.0
SB010	X14SS0100001	1.0	HA	6/1/2009	0.0 - 1.0
SB011	X14SS0110001	1.0	HA	6/1/2009	0.0 - 1.0
SB012	X14SS0120001	1.0	HA	6/1/2009	0.0 - 1.0
SB013	X14SS0130001	1.0	HA	6/1/2009	0.0 - 1.0
SB014	X14SS0140001	1.0	HA	6/1/2009	0.0 - 1.0
SB015	X14SS0150001	1.0	HA	6/2/2009	0.0 - 1.0
SB016	X14SS0160001	1.0	HA	6/2/2009	0.0 - 1.0
SB017	X14SS0170001	1.0	HA	6/2/2009	0.0 - 1.0
SB018	X14SS0180001	1.0	HA	6/2/2009	0.0 - 1.0
SB019	X14SS0190001	1.0	HA	6/2/2009	0.0 - 1.0
SB020	X14SS0200001	1.0	HA	6/2/2009	0.0 - 1.0
SB021	X14SS0210001	1.0	HA	6/2/2009	0.0 - 1.0
SB022	X14SS0220001	1.0	HA	6/2/2009	0.0 - 1.0
SB023	X14SS0230001	1.0	HA	6/2/2009	0.0 - 1.0
SB024	X14SS0240001	1.0	HA	6/2/2009	0.0 - 1.0
SB025	X14SS0250001	1.0	HA	6/2/2009	0.0 - 1.0
SB026	X14SS0260001	1.0	HA	6/2/2009	0.0 - 1.0
SB027	X14SS0270001	1.0	HA	6/2/2009	0.0 - 1.0
SB028	X14SS0280001	1.0	HA	6/2/2009	0.0 - 1.0
SB029	X14SS0290001	1.0	HA	6/2/2009	0.0 - 1.0
SB030	X14SS0300001	1.0	HA	6/2/2009	0.0 - 1.0
SB031	X14SS0310001	1.0	HA	6/2/2009	0.0 - 1.0
SB032	X14SS0320001	1.0	HA	6/2/2009	0.0 - 1.0
SB033	X14SS0330001	1.0	HA	6/2/2009	0.0 - 1.0
SB034	X14SS0340001	1.0	HA	6/2/2009	0.0 - 1.0
SB035	X14SS0350001	1.0	HA	6/2/2009	0.0 - 1.0
SB036	X14SS0360001	1.0	HA	6/2/2009	0.0 - 1.0
SB037	X14SS0370001	1.0	HA	6/2/2009	0.0 - 1.0
SB038	X14SS0380001	1.0	HA	6/2/2009	0.0 - 1.0
SB039	X14SS0390001	1.0	HA	6/2/2009	0.0 - 1.0
SB040	X14SS0400001	1.0	HA	6/2/2009	0.0 - 1.0

TABLE 3-3

BORING DATES, DEPTHS, METHODS, AND INTERVALS
MARINE RIFLE RANGE (MRR) - UXO 14
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Boring Location(MRR)	Sample ID.(MRR)	Total Depth (feet bgs)	Collection Method[(1)]	Date Drilled	Depth Interval of Soil Sample (feet bgs)
SB041	X14SS0410001	1.0	HA	6/2/2009	0.0 - 1.0
SB042	X14SS0420001	1.0	HA	6/2/2009	0.0 - 1.0
SB043	X14SS0430001	1.0	HA	6/2/2009	0.0 - 1.0
SB044	X14SS0440001	1.0	HA	6/2/2009	0.0 - 1.0
SB045	X14SS0450001	1.0	HA	6/3/2009	0.0 - 1.0
SB046	X14SS0460001	1.0	HA	6/3/2009	0.0 - 1.0
SB047	X14SS0470001	1.0	HA	6/3/2009	0.0 - 1.0
SB048	X14SS0480001	1.0	HA	6/3/2009	0.0 - 1.0
SB049	X14SS0490001	1.0	HA	6/3/2009	0.0 - 1.0
SB050	X14SS0500001	1.0	HA	6/3/2009	0.0 - 1.0
SB051	X14SS0510001	1.0	HA	6/3/2009	0.0 - 1.0
SB052	X14SS0520001	1.0	HA	6/3/2009	0.0 - 1.0
SB053	X14SS0530001	1.0	HA	6/3/2009	0.0 - 1.0
SB054	X14SS0540001	1.0	HA	6/3/2009	0.0 - 1.0
SB055	X14SS0550001	1.0	HA	6/3/2009	0.0 - 1.0
SB056	X14SS0560001	1.0	HA	6/3/2009	0.0 - 1.0
SB057	X14SS0570001	1.0	HA	6/3/2009	0.0 - 1.0
SB058	X14SS0580001	1.0	HA	6/3/2009	0.0 - 1.0
SB059	X14SS0590001	1.0	HA	6/3/2009	0.0 - 1.0
SB060	X14SS0600001	1.0	HA	6/3/2009	0.0 - 1.0
SB061	X14SS0610001	1.0	HA	6/3/2009	0.0 - 1.0
SB062	X14SS0620001	1.0	HA	6/3/2009	0.0 - 1.0
SB063	X14SS0630001	1.0	HA	6/3/2009	0.0 - 1.0
SB064	X14SS0640001	1.0	HA	6/3/2009	0.0 - 1.0
SB065	X14SS0650001	1.0	HA	6/3/2009	0.0 - 1.0
SB066	X14SS0660001	1.0	HA	6/3/2009	0.0 - 1.0
SB067	X14SS0670001	1.0	HA	6/3/2009	0.0 - 1.0
SB068	X14SS0680001	1.0	HA	6/3/2009	0.0 - 1.0
SB069	X14SS0690001	1.0	HA	6/3/2009	0.0 - 1.0
SB070	X14SS0700001	1.0	HA	6/3/2009	0.0 - 1.0
SB071	X14SS0710001	1.0	HA	6/3/2009	0.0 - 1.0
SB072	X14SS0720001	1.0	HA	6/3/2009	0.0 - 1.0
SB073	X14SS0730001	1.0	HA	6/3/2009	0.0 - 1.0
SB074	X14SS0740001	1.0	HA	6/3/2009	0.0 - 1.0
SB075	X14SS0750001	1.0	HA	6/3/2009	0.0 - 1.0
SB076	X14SS0760001	1.0	HA	6/3/2009	0.0 - 1.0
SB077	X14SS0770001	1.0	HA	6/3/2009	0.0 - 1.0
SB078	X14SS0780001	1.0	HA	6/3/2009	0.0 - 1.0
SB079	X14SS0790001	1.0	HA	6/3/2009	0.0 - 1.0
SB080	X14SS0800001	1.0	HA	6/4/2009	0.0 - 1.0

TABLE 3-3

BORING DATES, DEPTHS, METHODS, AND INTERVALS
MARINE RIFLE RANGE (MRR) - UXO 14
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Boring Location(MRR)	Sample ID.(MRR)	Total Depth (feet bgs)	Collection Method[(1)]	Date Drilled	Depth Interval of Soil Sample (feet bgs)
SB081	X14SS0810001	1.0	HA	6/4/2009	0.0 - 1.0
SB082	X14SS0820001	1.0	HA	6/4/2009	0.0 - 1.0
SB083	X14SS0830001	1.0	HA	6/4/2009	0.0 - 1.0
SB084	X14SS0840001	1.0	HA	6/4/2009	0.0 - 1.0
SB084	X14SB0840102	2.0	HA	6/16/2009	1.0 -2.0
SB084	X14SB0840102-D	2.0	HA	6/16/2009	1.0 -2.0
SB085	X14SS0850001	1.0	HA	6/4/2009	0.0 - 1.0
SB086	X14SS0860001	1.0	HA	6/4/2009	0.0 - 1.0
SB087	X14SS0870001	1.0	HA	6/4/2009	0.0 - 1.0
SB088	X14SS0880001	1.0	HA	6/4/2009	0.0 - 1.0
SB089	X14SS0890001	1.0	HA	6/4/2009	0.0 - 1.0
SB090	X14SS0900001	1.0	HA	6/4/2009	0.0 - 1.0
SB091	X14SS0910001	1.0	HA	6/4/2009	0.0 - 1.0
SB092	X14SS0920001	1.0	HA	6/4/2009	0.0 - 1.0
SB093	X14SS0930001	1.0	HA	6/4/2009	0.0 - 1.0
SB094	X14SS0940001	1.0	HA	6/4/2009	0.0 - 1.0
SB095	X14SS0950001	1.0	HA	6/4/2009	0.0 - 1.0
SB096	X14SS0960001	1.0	HA	6/4/2009	0.0 - 1.0
SB097	X14SS0970001	1.0	HA	6/4/2009	0.0 - 1.0
SB098	X14SS0980001	1.0	HA	6/4/2009	0.0 - 1.0
SB099	X14SS0990001	1.0	HA	6/4/2009	0.0 - 1.0
SB100	X14SS1000001	1.0	HA	6/4/2009	0.0 - 1.0
SB101	X14SS1010001	1.0	HA	6/4/2009	0.0 - 1.0
SB102	X14SS1020001	1.0	HA	6/4/2009	0.0 - 1.0
SB102	X14SB1020102	2.0	HA	6/16/2009	1.0 -2.0
SB102	X14SB1020203	3.0	HA	6/17/2009	2.0 - 3.0
SB103	X14SS1030001	1.0	HA	6/4/2009	0.0 - 1.0
SB104	X14SS1040001	1.0	HA	6/4/2009	0.0 - 1.0
SB105	X14SS1050001	1.0	HA	6/4/2009	0.0 - 1.0
SB106	X14SS1060001	1.0	HA	6/4/2009	0.0 - 1.0
SB107	X14SS1070001	1.0	HA	6/4/2009	0.0 - 1.0
SB108	X14SS1080001	1.0	HA	6/4/2009	0.0 - 1.0
SB109	X14SS1090001	1.0	HA	6/4/2009	0.0 - 1.0
SB110	X14SS1100001	1.0	HA	6/4/2009	0.0 - 1.0
SB111	X14SS1110001	1.0	HA	6/4/2009	0.0 - 1.0
SB111	X14SB1110102	2.0	HA	6/16/2009	1.0 - 2.0
SB112	X14SS1120001	1.0	HA	6/4/2009	0.0 - 1.0
SB113	X14SS1130001	1.0	HA	6/4/2009	0.0 - 1.0
SB114	X14SS1140001	1.0	HA	6/4/2009	0.0 - 1.0
SB115	X14SS1150001	1.0	HA	6/4/2009	0.0 - 1.0

TABLE 3-3

BORING DATES, DEPTHS, METHODS, AND INTERVALS
MARINE RIFLE RANGE (MRR) - UXO 14
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Boring Location(MRR)	Sample ID.(MRR)	Total Depth (feet bgs)	Collection Method[(1)]	Date Drilled	Depth Interval of Soil Sample (feet bgs)
SB116	X14SS1160001	1.0	HA	6/4/2009	0.0 - 1.0
SB117	X14SS1170001	1.0	HA	6/4/2009	0.0 - 1.0
SB118	X14SS1180001	1.0	HA	6/4/2009	0.0 - 1.0
SB119	X14SS1190001	1.0	HA	6/4/2009	0.0 - 1.0
SB120	X14SS1200001	1.0	HA	6/4/2009	0.0 - 1.0
SB121	X14SS1210001	1.0	HA	6/4/2009	0.0 - 1.0
SB122	X14SS1220001	1.0	HA	6/4/2009	0.0 - 1.0
SB123	X14SS1230001	1.0	HA	6/4/2009	0.0 - 1.0
SB124	X14SS1240001	1.0	HA	6/4/2009	0.0 - 1.0
SB125	X14SS1250001	1.0	HA	6/9/2009	0.0 - 1.0
SB126	X14SS1260001	1.0	HA	6/9/2009	0.0 - 1.0
SB127	X14SS1270001	1.0	HA	6/9/2009	0.0 - 1.0
SB128	X14SS1280001	1.0	HA	6/9/2009	0.0 - 1.0
SB129	X14SS1290001	1.0	HA	6/9/2009	0.0 - 1.0
SB130	X14SS1300001	1.0	HA	6/16/2009	0.0 - 1.0
SB131	X14SS1310001	1.0	HA	6/16/2009	0.0 - 1.0
SB132	X14SS1320001	1.0	HA	6/16/2009	0.0 - 1.0
SB133	X14SS1330001	1.0	HA	6/16/2009	0.0 - 1.0
SB134	X14SS1340001	1.0	HA	6/16/2009	0.0 - 1.0
SB135	X14SS1350001	1.0	HA	6/16/2009	0.0 - 1.0
SB136	X14SS1360001	1.0	HA	6/16/2009	0.0 - 1.0
SB137	X14SS1370001	1.0	HA	6/16/2009	0.0 - 1.0
SB138	X14SS1380001	1.0	HA	6/16/2009	0.0 - 1.0
SB139	X14SS1390001	1.0	HA	6/16/2009	0.0 - 1.0
SB140	X14SS1400001	1.0	HA	6/16/2009	0.0 - 1.0
SB141	X14SS1410001	1.0	HA	6/16/2009	0.0 - 1.0
SB142	X14SS1420001	1.0	HA	6/17/2009	0.0 - 1.0
SB143	X14SS1430001	1.0	HA	6/17/2009	0.0 - 1.0

Notes:
HA - hand auger
bgs - below ground surface.

TABLE 3-4

BORING DATES, DEPTHS, METHODS, AND INTERVALS
SMALL ARMS RANGE (SAR) - UXO 17
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Boring Location(SAR)	Sample ID.(SAR)	Total Depth (feet bgs)	Collection Method[(1)]	Date Drilled	Depth Interval of Soil Sample (feet bgs)
SB001	X17SB0010004	4.0	DPT	6/11/2009	0.0 - 4.0
SB001	X17SB0010408	8.0	DPT	6/11/2009	4.0 - 8.0
SB001	X17SB0010810	10.0	DPT	6/11/2009	8.0 - 10.0
SB002	X17SB0020004	4.0	DPT	6/11/2009	0.0 - 4.0
SB002	X17SB0020406	6.0	DPT	6/11/2009	4.0 - 6.0
SB002	X17SB0020608	8.0	DPT	6/11/2009	6.0 - 8.0
SB002	X17SB0020810	10.0	DPT	6/11/2009	8.0 - 10.0
SB003	X17SB0030004	4.0	DPT	6/11/2009	0.0 - 4.0
SB003	X17SB0030406	6.0	DPT	6/11/2009	4.0 - 6.0
SB003	X17SB0030608	8.0	DPT	6/11/2009	6.0 - 8.0
SB003	X17SB0030810	10.0	DPT	6/11/2009	8.0 - 10.0
SB004	X17SB0040004	4.0	DPT	6/11/2009	0.0 - 4.0
SB004	X17SB0040406	6.0	DPT	6/11/2009	4.0 - 6.0
SB004	X17SB0040608	8.0	DPT	6/11/2009	6.0 - 8.0
SB004	X17SB0040810	10.0	DPT	6/11/2009	8.0 - 10.0
SB005	X17SB0050004	4.0	DPT	6/11/2009	0.0 - 4.0
SB005	X17SB0050406	6.0	DPT	6/11/2009	4.0 - 6.0
SB005	X17SB0050608	8.0	DPT	6/11/2009	6.0 - 8.0
SB005	X17SB0050810	10.0	DPT	6/11/2009	8.0 - 10.0
SB006	X17SB0060004	4.0	DPT	6/11/2009	0.0 - 4.0
SB006	X17SB0060406	6.0	DPT	6/11/2009	4.0 - 6.0
SB006	X17SB0060608	8.0	DPT	6/11/2009	6.0 - 8.0
SB006	X17SB0060810	10.0	DPT	6/11/2009	8.0 - 10.0
SB007	X17SB0070004	4.0	DPT	6/11/2009	0.0 - 4.0
SB007	X17SB0070406	6.0	DPT	6/11/2009	4.0 - 6.0
SB007	X17SB0070608	8.0	DPT	6/11/2009	6.0 - 8.0
SB007	X17SB0070810	10.0	DPT	6/11/2009	8.0 - 10.0
SB008C	X17SS008C0001	1.0	HA	6/11/2009	0.0 - 1.0
SB009C	X17SS009C0001	1.0	HA	6/11/2009	0.0 - 1.0
SB010C	X17SS010C0001	1.0	HA	6/11/2009	0.0 - 1.0
SB011	X17SS0110001	1.0	HA	6/11/2009	0.0 - 1.0
SB011	X17SB0110102	2.0	HA	6/14/2009	1.0 - 2.0
SB012	X17SS0120001	1.0	HA	6/11/2009	0.0 - 1.0
SB013	X17SS0130001	1.0	HA	6/11/2009	0.0 - 1.0
SB013	X17SB0130102	1.0	HA	6/14/2009	1.0 - 2.0
SB014	X17SS0140001	1.0	HA	6/11/2009	0.0 - 1.0
SB014	X17SB0140102	2.0	HA	6/14/2009	1.0 - 2.0
SB015	X17SS0150001	1.0	HA	6/11/2009	0.0 - 1.0

TABLE 3-4

BORING DATES, DEPTHS, METHODS, AND INTERVALS
SMALL ARMS RANGE (SAR) - UXO 17
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Boring Location(SAR)	Sample ID.(SAR)	Total Depth (feet bgs)	Collection Method[(1)]	Date Drilled	Depth Interval of Soil Sample (feet bgs)
SB016	X17SS0160001	1.0	HA	6/11/2009	0.0 - 1.0
SB017	X17SS0170001	1.0	HA	6/11/2009	0.0 - 1.0
SB018	X17SS0180001	1.0	HA	6/11/2009	0.0 - 1.0
SB019	X17SS0190001	1.0	HA	6/11/2009	0.0 - 1.0
SB020	X17SS0200001	1.0	HA	6/11/2009	0.0 - 1.0
SB021	X17SS0210001	1.0	HA	6/11/2009	0.0 - 1.0
SB022	X17SS0220001	1.0	HA	6/11/2009	0.0 - 1.0
SB022	X17SS0220001-D	1.0	HA	6/11/2009	0.0 - 1.0
SB023	X17SS0230001	1.0	HA	6/11/2009	0.0 - 1.0
SB024	X17SS0240001	1.0	HA	6/11/2009	0.0 - 1.0
SB025	X17SS0250001	1.0	HA	6/12/2009	0.0 - 1.0
SB025	X17SB0250102	2.0	HA	6/14/2009	1.0 - 2.0
SB026	X17SS0260001	1.0	HA	6/12/2009	0.0 - 1.0
SB027	X17SS0270001	1.0	HA	6/12/2009	0.0 - 1.0
SB028	X17SS0280001	1.0	HA	6/12/2009	0.0 - 1.0
SB029	X17SS0290001	1.0	HA	6/14/2009	0.0 - 1.0

Notes:
HA - hand auger
DPT - direct-push technology
bgs - below ground surface.

TABLE 3-5

BORING DATES, DEPTHS, METHODS, AND INTERVALS
RUM POINT SKEET RANGE (RPSR) - UXO 16
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Boring Location(RPSR)	Sample ID.(RPSR)	Total Depth (feet bgs)	Collection Method[(1)]	Date Drilled	Depth Interval of Soil Sample (feet bgs)
SB001	X16SS0010001	1.0	HA	6/13/2009	0.0 - 1.0
SB002	X16SS0020001	1.0	HA	6/13/2009	0.0 - 1.0
SB003	X16SS0030001	1.0	HA	6/13/2009	0.0 - 1.0
SB004	X16SS0040001	1.0	HA	6/13/2009	0.0 - 1.0
SB005	X16SS0050001	1.0	HA	6/13/2009	0.0 - 1.0
SB006	X16SS0060001	1.0	HA	6/13/2009	0.0 - 1.0
SB007	X16SS0070001	1.0	HA	6/13/2009	0.0 - 1.0
SB008	X16SS0080001	1.0	HA	6/13/2009	0.0 - 1.0
SB009	X16SS0090001	1.0	HA	6/13/2009	0.0 - 1.0
SB010	X16SS0100001	1.0	HA	6/13/2009	0.0 - 1.0
SB011	X16SS0110001	1.0	HA	6/13/2009	0.0 - 1.0
SB012	X16SS0120001	1.0	HA	6/13/2009	0.0 - 1.0
SB013	X16SS0130001	1.0	HA	6/13/2009	0.0 - 1.0
SB014	X16SS0140001	1.0	HA	6/13/2009	0.0 - 1.0
SB015	X16SS0150001	1.0	HA	6/13/2009	0.0 - 1.0
SB016	X16SS0160001	1.0	HA	6/13/2009	0.0 - 1.0
SB017	X16SS0170001	1.0	HA	6/13/2009	0.0 - 1.0
SB018	X16SS0180001	1.0	HA	6/13/2009	0.0 - 1.0
SB019	X16SS0190001	1.0	HA	6/13/2009	0.0 - 1.0
SB020	X16SS0200001	1.0	HA	6/13/2009	0.0 - 1.0
SB021	X16SS0210001	1.0	HA	6/13/2009	0.0 - 1.0
SB022	X16SS0220001	1.0	HA	6/13/2009	0.0 - 1.0
SB023	X16SS0230001	1.0	HA	6/13/2009	0.0 - 1.0
SB024	X16SS0240001	1.0	HA	6/13/2009	0.0 - 1.0
SB025	X16SS0250001	1.0	HA	6/13/2009	0.0 - 1.0
SB026	X16SS0260001	1.0	HA	6/13/2009	0.0 - 1.0
SB027	X16SS0270001	1.0	HA	6/13/2009	0.0 - 1.0
SB028	X16SS0280001	1.0	HA	6/13/2009	0.0 - 1.0
SB029	X16SS0290001	1.0	HA	6/13/2009	0.0 - 1.0
SB030	X16SS0300001	1.0	HA	6/13/2009	0.0 - 1.0
SB031	X16SS0310001	1.0	HA	6/13/2009	0.0 - 1.0
SB032	X16SS0320001	1.0	HA	6/13/2009	0.0 - 1.0
SB032	X16SS0320001-D	1.0	HA	6/13/2009	0.0 - 1.0
SB033	X16SS0330001	1.0	HA	6/13/2009	0.0 - 1.0
SB034	X16SS0340001	1.0	HA	6/13/2009	0.0 - 1.0
SB035	X16SS0350001	1.0	HA	6/13/2009	0.0 - 1.0
SB036	X16SS0360001	1.0	HA	6/13/2009	0.0 - 1.0
SB037	X16SS0370001	1.0	HA	6/13/2009	0.0 - 1.0
SB038	X16SS0380001	1.0	HA	6/13/2009	0.0 - 1.0

TABLE 3-5

BORING DATES, DEPTHS, METHODS, AND INTERVALS
RUM POINT SKEET RANGE (RPSR) - UXO 16
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Boring Location(RPSR)	Sample ID.(RPSR)	Total Depth (feet bgs)	Collection Method[(1)]	Date Drilled	Depth Interval of Soil Sample (feet bgs)
SB039	X16SS0390001	1.0	HA	6/13/2009	0.0 - 1.0
SB040	X16SS0400001	1.0	HA	6/13/2009	0.0 - 1.0
SB041	X16SS0410001	1.0	HA	6/13/2009	0.0 - 1.0
SB042	X16SS0420001	1.0	HA	6/13/2009	0.0 - 1.0
SB043	X16SS0430001	1.0	HA	6/13/2009	0.0 - 1.0
SB044	X16SS0440001	1.0	HA	6/13/2009	0.0 - 1.0
SB045	X16SS0450001	1.0	HA	6/13/2009	0.0 - 1.0
SB046	X16SS0460001	1.0	HA	6/13/2009	0.0 - 1.0
SB047	X16SS0470001	1.0	HA	6/13/2009	0.0 - 1.0
SB048	X16SS0480001	1.0	HA	6/13/2009	0.0 - 1.0
SB049	X16SS0490001	1.0	HA	6/13/2009	0.0 - 1.0
SB050	X16SS0500001	1.0	HA	6/13/2009	0.0 - 1.0
SB051	X16SS0510001	1.0	HA	6/13/2009	0.0 - 1.0
SB052	X16SS0520001	1.0	HA	6/14/2009	0.0 - 1.0
SB053	X16SS0530001	1.0	HA	6/14/2009	0.0 - 1.0
SB054	X16SS0540001	1.0	HA	6/14/2009	0.0 - 1.0
SB055	X16SS0550001	1.0	HA	6/14/2009	0.0 - 1.0
SB056	X16SS0560001	1.0	HA	6/14/2009	0.0 - 1.0
SB057	X16SS0570001	1.0	HA	6/14/2009	0.0 - 1.0
SB058	X16SS0580001	1.0	HA	6/14/2009	0.0 - 1.0
SB059	X16SS0590001	1.0	HA	6/14/2009	0.0 - 1.0
SB060	X16SS0600001	1.0	HA	6/14/2009	0.0 - 1.0
SB061	X16SS0610001	1.0	HA	6/14/2009	0.0 - 1.0
SB062	X16SS0620001	1.0	HA	6/14/2009	0.0 - 1.0
SB063	X16SS0630001	1.0	HA	6/14/2009	0.0 - 1.0
SB064	X16SS0640001	1.0	HA	6/14/2009	0.0 - 1.0
SB065	X16SS0650001	1.0	HA	6/14/2009	0.0 - 1.0
SB066	X16SS0660001	1.0	HA	6/14/2009	0.0 - 1.0
SB067	X16SS0670001	1.0	HA	6/14/2009	0.0 - 1.0
SB068	X16SS0680001		NS		
SB069	X16SS0690001	1.0	HA	6/14/2009	0.0 - 1.0
SB070	X16SS0700001	1.0	HA	6/14/2009	0.0 - 1.0
SB071	X16SS0710001	1.0	HA	6/14/2009	0.0 - 1.0
SB072	X16SS0720001	1.0	HA	6/14/2009	0.0 - 1.0
SB073	X16SS0730001	1.0	HA	6/14/2009	0.0 - 1.0
SB074	X16SS0740001	1.0	HA	6/14/2009	0.0 - 1.0
SB075	X16SS0750001	1.0	HA	6/14/2009	0.0 - 1.0
SB076	X16SS0760001	1.0	HA	6/14/2009	0.0 - 1.0
SB077	X16SS0770001	1.0	HA	6/14/2009	0.0 - 1.0

TABLE 3-5

BORING DATES, DEPTHS, METHODS, AND INTERVALS
RUM POINT SKEET RANGE (RPSR) - UXO 16
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Boring Location(RPSR)	Sample ID.(RPSR)	Total Depth (feet bgs)	Collection Method[(1)]	Date Drilled	Depth Interval of Soil Sample (feet bgs)
SB078	X16SS0780001	1.0	HA	6/14/2009	0.0 - 1.0
SB079	X16SS0790001	1.0	HA	6/14/2009	0.0 - 1.0
SB080C	X16SS080C0001	1.0	HA	6/14/2009	0.0 - 1.0
SB081C	X16SS081C0001	1.0	HA	6/14/2009	0.0 - 1.0
SB082	X16SS0820001	1.0	HA	6/16/2009	0.0 - 1.0
SB083	X16SS0830001	1.0	HA	6/16/2009	0.0 - 1.0
SB084	X16SS0840001	1.0	HA	6/16/2009	0.0 - 1.0
SB085	X16SS0850001	1.0	HA	6/16/2009	0.0 - 1.0
SB086	X16SS0860001	1.0	HA	6/16/2009	0.0 - 1.0
SB087	X16SS0870001	1.0	HA	6/16/2009	0.0 - 1.0
SB088	X16SS0880001	1.0	HA	6/17/2009	0.0 - 1.0
SB089	X16SS0890001	1.0	HA	6/17/2009	0.0 - 1.0
SB090	X16SS0900001	1.0	HA	6/17/2009	0.0 - 1.0
SB090	X16SS0900001-D	1.0	HA	6/17/2009	0.0 - 1.0
SB091	X16SS0910001	1.0	HA	6/17/2009	0.0 - 1.0
SB092	X16SS0920001	1.0	HA	6/17/2009	0.0 - 1.0
SB093	X16SS0930001	1.0	HA	6/17/2009	0.0 - 1.0
SB094	X16SS0940001	1.0	HA	6/17/2009	0.0 - 1.0
SB095	X16SS0950001	1.0	HA	6/17/2009	0.0 - 1.0

Notes:
HA - hand auger
bgs - below ground surface
NS - not sampled

TABLE 3-6

BORING DATES, DEPTHS, METHODS, AND INTERVALS
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Boring Location(RRRR)	Sample ID.(RRRR)	Total Depth (feet bgs)	Collection Method[(1)]	Date Drilled	Depth Interval of Soil Sample (feet bgs)
SB001	X25SS0010001	1.0	HA	6/15/2009	0.0 - 1.0
SB002	X25SS0020001	1.0	HA	6/15/2009	0.0 - 1.0
SB003	X25SS0030001	1.0	HA	6/15/2009	0.0 - 1.0
SB004	X25SS0040001	1.0	HA	6/15/2009	0.0 - 1.0
SB005	X25SS0050001	1.0	HA	6/15/2009	0.0 - 1.0
SB006	X25SS0060001	1.0	HA	6/15/2009	0.0 - 1.0
SB007	X25SS0070001	1.0	HA	6/15/2009	0.0 - 1.0
SB007	X25SS0070001-D	1.0	HA	6/15/2009	0.0 - 1.0
SB008	X25SS0080001	1.0	HA	6/15/2009	0.0 - 1.0
SB009	X25SS0090001	1.0	HA	6/15/2009	0.0 - 1.0
SB010	X25SS0100001	1.0	HA	6/15/2009	0.0 - 1.0
SB011	X25SS0110001	1.0	HA	6/15/2009	0.0 - 1.0
SB012	X25SS0120001	1.0	HA	6/15/2009	0.0 - 1.0
SB013	X25SS0130001	1.0	HA	6/15/2009	0.0 - 1.0
SB014	X25SS0140001	1.0	HA	6/15/2009	0.0 - 1.0
SB015	X25SS0150001	1.0	HA	6/15/2009	0.0 - 1.0
SB016	X25SS0160001	1.0	HA	6/15/2009	0.0 - 1.0
SB017	X25SS0170001	1.0	HA	6/15/2009	0.0 - 1.0
SB018	X25SS0180001	1.0	HA	6/15/2009	0.0 - 1.0
SB019	X25SS0190001	1.0	HA	6/15/2009	0.0 - 1.0
SB020	X25SS0200001	1.0	HA	6/15/2009	0.0 - 1.0
SB021	X25SS0210001	1.0	HA	6/15/2009	0.0 - 1.0
SB021	X25SS0210001-D	1.0	HA	6/15/2009	0.0 - 1.0
SB022	X25SS0220001	1.0	HA	6/15/2009	0.0 - 1.0
SB023	X25SS0230001	1.0	HA	6/15/2009	0.0 - 1.0
SB024	X25SS0240001	1.0	HA	6/15/2009	0.0 - 1.0
SB025	X25SS0250001	1.0	HA	6/15/2009	0.0 - 1.0
SB026	X25SS0260001	1.0	HA	6/15/2009	0.0 - 1.0
SB027	X25SS0270001	1.0	HA	6/15/2009	0.0 - 1.0
SB028	X25SS0280001	1.0	HA	6/15/2009	0.0 - 1.0
SB029	X25SS0290001	1.0	HA	6/15/2009	0.0 - 1.0
SB030	X25SS0300001	1.0	HA	6/15/2009	0.0 - 1.0
SB031	X25SS0310001	1.0	HA	6/15/2009	0.0 - 1.0
SB032	X25SS0320001	1.0	HA	6/15/2009	0.0 - 1.0
SB033	X25SS0330001	1.0	HA	6/15/2009	0.0 - 1.0
SB034C	X25SS034C0001	1.0	HA	6/15/2009	0.0 - 1.0

Notes:
HA - hand auger
bgs - below ground surface.

TABLE 3-7

FIELD XRF AND FIXED-BASE LABORATORY LEAD SAMPLE CORRELATION
OLD SKEET AND TRAP RANGE (UXO 15)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	XRF (mg/kg)	FBL (mg/kg)	Predicted Lab Value
Range	X15SS0010001	5/27/2009	**47**	**NS**	60.0
Range	X15SS0020001	5/27/2009	**41**	**NS**	55.3
Range	X15SS0030001	5/27/2009	**30**	**NS**	47.4
Range	X15SS0040001	5/27/2009	**189**	**NS**	164.6
Range	X15SS0050001	5/27/2009	**368**	**252**	297.1
Range	X15SB0050102	6/2/2009	**15**	**12.2**	35.9
Range	X15SS0060001	5/27/2009	**119**	**NS**	113.1
Range	X15SS0070001	5/27/2009	**469**	**220**	372.3
Range	X15SB0070102	6/2/2009	**85**	**NS**	88.1
Range	X15SS0080001	5/27/2009	**286**	**NS**	236.4
Range	X15SS0090001	5/27/2009	**39**	**NS**	53.6
Range	X15SS0100001	5/27/2009	**50**	**NS**	62.0
Range	X15SS0110001	5/27/2009	**113**	**NS**	108.6
Range	X15SS0120001	5/27/2009	**199**	**NS**	172.5
Range	X15SS0120001RE	5/27/2009	**175**	**NS**	154.7
Range	X15SS0130001	5/27/2009	**839**	**NS**	645.6
Range	X15SB0130102	6/2/2009	**37**	**NS**	52.1
Range	X15SB0130102RE	6/2/2009	**40**	**NS**	54.4
Range	X15SS0140001	5/27/2009	**77**	**NS**	82.2
Range	X15SS0150001	5/27/2009	**45**	**NS**	58.5
Range	X15SS0160001	5/27/2009	**46**	**NS**	58.8
Range	X15SS0170001	5/27/2009	**106**	**NS**	103.4
Range	X15SS0180001	5/27/2009	**47**	**32**	59.8
Range	X15SS0190001	5/27/2009	**35**	**NS**	51.1
Range	X15SS0200001	5/27/2009	**69**	**NS**	75.8
Range	X15SS0210001	5/27/2009	**59**	**NS**	68.4
Range	X15SS0220001	5/27/2009	**77**	**NS**	82.0
Range	X15SS0230001	5/27/2009	**102**	**NS**	100.5
Range	X15SS0240001	5/27/2009	**31**	**NS**	47.9
Range	X15SS0250001	5/27/2009	**194**	**NS**	168.8
Range	X15SS0260001	5/27/2009	**64**	**NS**	72.6
Range	X15SS0270001	5/28/2009	**67**	**NS**	74.6
Range	X15SS0280001	5/27/2009	**56**	**NS**	66.2
Range	X15SS0290001	5/27/2009	**101**	**NS**	100.0
Range	X15SS0300001	5/27/2009	**197**	**NS**	170.5
Range	X15SS0310001	5/28/2009	**35**	**NS**	50.7
Range	X15SS0320001	5/28/2009	**54**	**NS**	65.0
Range	X15SS0330001	5/27/2009	**193**	**NS**	167.6
Range	X15SS0340001	5/28/2009	**34**	**NS**	50.4
Range	X15SS0350001	5/28/2009	**70**	**81.6**	76.6
Range	X15SS0360001	5/28/2009	**43**	**NS**	56.8
Range	X15SS0370001	5/28/2009	**248**	**203**	208.3
Range	X15SS0380001	5/28/2009	**33**	**NS**	49.4
Range	X15SS0390001	5/28/2009	**47**	**NS**	60.0
Range	X15SS0400001	5/28/2009	**47**	**NS**	60.0

TABLE 3-7

FIELD XRF AND FIXED-BASE LABORATORY LEAD SAMPLE CORRELATION
OLD SKEET AND TRAP RANGE (UXO 15)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 2 OF 2

SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	XRF (mg/kg)	FBL (mg/kg)	Predicted Lab Value
Range	X15SS0410001	5/28/2009	**744**	**NS**	575.8
Range	X15SB0410102	6/2/2009	**18**	**NS**	38.3
Range	X15SS0420001	5/28/2009	**240**	**NS**	202.4
Range	X15SS0430001	5/28/2009	**28**	**NS**	45.7
Range	X15SS0440001	5/28/2009	**20**	**NS**	40.0
Range	X15SS0450001	5/28/2009	**54**	**NS**	64.7
Range	X15SS0460001	5/28/2009	**212**	**NS**	182.1
Range	X15SS0470001	5/28/2009	**196**	**NS**	170.0
Range	X15SS0480001	5/28/2009	**130**	**NS**	121.4
Range	X15SS0490001	5/28/2009	**151**	**NS**	137.0
Range	X15SS0500001	5/28/2009	**65**	**NS**	73.3
Range	X15SS0510001	5/27/2009	**68**	**NS**	75.6
Range	X15SS0520001	5/27/2009	**96**	**NS**	96.3
Range	X15SS0530001	5/27/2009	**58**	**NS**	68.2
Range	X15SS0540001	5/27/2009	**33**	**NS**	49.2
Range	X15SS0550001	5/27/2009	**40**	**NS**	54.6
Range	X15SS0560001	5/27/2009	**85**	**NS**	88.1
Range	X15SS0610001	6/2/2009	**192**	**74.7**	167.3
Range	X15SS0620001	6/2/2009	**160**	**NS**	143.4
Range	X15SS0630001	6/2/2009	**272**	**NS**	226.3
Range	X15SS0640001	6/2/2009	**1236**	**940**	939.6
Range	X15SB0640102	6/2/2009	**16**	**NS**	36.6
Range	X15SS0650001	6/2/2009	**70**	**NS**	77.0
Range	X15SS0660001	6/2/2009	**118**	**33.3**	112.6
Range	X15SS0670001	6/2/2009	**87**	**NS**	89.4
Range	X15SS0680001	6/2/2009	**192**	**423**	167.3
Range	X15SS0690001	6/2/2009	**76**	**NS**	81.0
Range	X15SS0700001	6/2/2009	**810**	**754**	624.4
Range	X15SB0700102	6/2/2009	**52**	**NS**	63.7
Range	X15SS0710001	6/2/2009	**379**	**282**	305.7
Range	X15SS0710001-D	6/2/2009	**379**	**187**	305.7
Range	X15SS0720001	6/2/2009	**341**	**658**	277.1
Range	X15SS0730001	6/2/2009	**490**	**335**	387.6
Range	X15SS0740001	6/2/2009	**1260**	**NS**	957.6
Range	X15SS0750001	6/2/2009	**130**	**NS**	121.4
Range	X15SS0760001	6/2/2009	**553**	**238**	434.0

Acronyms
NS = No Fixed Based Lab Sample
NA = No Regression Equation Available
FBL = Fixed Based Laboratory Sample

FBL = 25 + 0.74XRF

TABLE 3-8

FIELD XRF AND FIXED-BASE LABORATORY LEAD SAMPLE CORRELATION
MARINE RIFLE RANGE (UXO 14)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 1 OF 4

SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	XRF (mg/kg)	FBL (mg/kg)	Predicted Lab Value
Berm #1	X14SS0100001	6/1/2009	**58**	**NS**	67.6
Berm #1	X14SS0110001	6/1/2009	**43**	**NS**	55.7
Berm #1	X14SS0120001	6/1/2009	**22**	**NS**	38.2
Berm #1	X14SS0130001	6/1/2009	**20**	**NS**	36.3
Berm #1	X14SS0140001	6/1/2009	**15**	**NS**	32.2
Berm #1	X14SS0150001	6/2/2009	**19**	**NS**	35.2
Berm #1	X14SS0160001	6/2/2009	**16**	**NS**	32.7
Berm #1	X14SS0170001	6/2/2009	**20**	**NS**	36.0
Berm #1	X14SS0180001	6/2/2009	**12**	**NS**	29.4
Berm #1	X14SS0190001	6/2/2009	**16**	**NS**	33.0
Berm #1	X14SS0200001	6/2/2009	**18**	**NS**	34.9
Berm #1	X14SS0210001	6/2/2009	**23**	**NS**	38.5
Berm #1	X14SS0220001	6/2/2009	**29**	**9.6**	43.5
Berm #1	X14SS0230001	6/2/2009	**16**	**NS**	33.0
Berm #1	X14SS0240001	6/2/2009	**42**	**NS**	54.6
Berm #1	X14SS0250001	6/2/2009	**62**	**NS**	71.2
Berm #1	X14SS0260001	6/2/2009	**174**	**NS**	164.1
Berm #1	X14SS0270001	6/2/2009	**24**	**NS**	39.6
Berm #1	X14SS0280001	6/2/2009	**88**	**NS**	92.7
Berm #1	X14SS0290001	6/2/2009	**324**	**NS**	288.6
Berm #1	X14SS0300001	6/2/2009	**53**	**NS**	64.0
Berm #1	X14SS0310001	6/2/2009	**70**	**NS**	77.5
Berm #1	X14SS0320001	6/2/2009	**148**	**NS**	142.8
Berm #1	X14SS0330001	6/2/2009	**54**	**75.1**	64.2
Berm #1	X14SS0340001	6/2/2009	**234**	**NS**	213.6
Berm #1	X14SS0350001	6/2/2009	**540**	**543**	468.2
Berm #1	X14SS0360001	6/2/2009	**117**	**NS**	116.8
Berm #1	X14SS0370001	6/2/2009	**106**	**NS**	108.0
Berm #1	X14SS0380001	6/2/2009	**403**	**NS**	354.5
Berm #1	X14SS0390001	6/2/2009	**128**	**111**	126.2
Berm #1	X14SS0400001	6/2/2009	**202**	**NS**	187.1
Berm #1	X14SS0410001	6/2/2009	**318**	**NS**	283.4
Berm #1	X14SS0420001	6/2/2009	**85**	**NS**	90.0
Berm #1	X14SS0430001	6/2/2009	**389**	**373**	342.6
Berm #1	X14SS0440001	6/2/2009	**330**	**NS**	293.6
Berm #2	X14SS0450001	6/3/2009	**35**	**NS**	48.5
Berm #2	X14SS0460001	6/3/2009	**21**	**NS**	37.4
Berm #2	X14SS0470001	6/3/2009	**37**	**NS**	50.4
Berm #2	X14SS0480001	6/3/2009	**50**	**85.7**	61.5
Berm #2	X14SS0490001	6/3/2009	**29**	**NS**	44.0
Berm #2	X14SS0500001	6/3/2009	**211**	**NS**	194.6
Berm #2	X14SS0510001	6/3/2009	**545**	**NS**	471.8
Berm #2	X14SS0520001	6/3/2009	**65**	**NS**	73.7

TABLE 3-8

FIELD XRF AND FIXED-BASE LABORATORY LEAD SAMPLE CORRELATION
MARINE RIFLE RANGE (UXO 14)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	XRF (mg/kg)	FBL (mg/kg)	Predicted Lab Value
Berm #2	X14SS0530001	6/3/2009	**114**	**NS**	114.6
Berm #2	X14SS0540001	6/3/2009	**366**	**NS**	323.2
Berm #2	X14SS0550001	6/3/2009	**729**	**NS**	624.5
Berm #2	X14SS0560001	6/3/2009	**114**	**NS**	114.6
Berm #2	X14SS0570001	6/3/2009	**228**	**NS**	208.9
Berm #2	X14SS0580001	6/3/2009	**661**	**606**	568.3
Berm #2	X14SS0590001	6/3/2009	**145**	**NS**	139.8
Berm #2	X14SS0600001	6/3/2009	**714**	**NS**	612.0
Berm #2	X14SS0610001	6/3/2009	**138**	**NS**	134.5
Berm #2	X14SS0620001	6/3/2009	**286**	**278**	257.4
Berm #2	X14SS0630001	6/3/2009	**173**	**188**	163.0
Berm #2	X14SS0640001	6/3/2009	**489**	**NS**	425.3
Berm #2	X14SS0650001	6/3/2009	**224**	**NS**	205.9
Berm #2	X14SS0660001	6/3/2009	**784**	**NS**	670.1
Berm #2	X14SS0670001	6/3/2009	**163**	**NS**	155.0
Berm #2	X14SS0680001	6/3/2009	**156**	**NS**	149.5
Berm #2	X14SS0690001	6/3/2009	**613**	**NS**	528.2
Berm #2	X14SS0700001	6/3/2009	**602**	**NS**	519.6
Berm #2	X14SS0710001	6/3/2009	**169**	**NS**	159.7
Berm #2	X14SS0720001	6/3/2009	**456**	**283**	398.5
Berm #2	X14SS0730001	6/3/2009	**544**	**NS**	471.2
Berm #2	X14SS0740001	6/3/2009	**220**	**NS**	202.3
Berm #2	X14SS0750001	6/3/2009	**455**	**NS**	397.1
Berm #2	X14SS0760001	6/3/2009	**138**	**NS**	134.0
Berm #2	X14SS0770001	6/3/2009	**79**	**NS**	85.0
Berm #2	X14SS0780001	6/3/2009	**401**	**NS**	352.5
Berm #2	X14SS0790001	6/3/2009	**291**	**NS**	261.0
Hillside	X14SS0800001	6/4/2009	**451**	**NS**	393.8
Hillside	X14SS0810001	6/4/2009	**5151**	**NS**	NA
Hillside	X14SS0820001	6/4/2009	**2330**	**NS**	NA
Hillside	X14SS0830001	6/4/2009	**323**	**NS**	287.8
Hillside	X14SS0840001	6/4/2009	**8972**	**NS**	NA
Hillside	X14SB0840102	6/16/2009	**358**	**6620 J**	316.6
Hillside	X14SB0840102-D	6/16/2009	**358**	**3590 J**	316.6
Hillside	X14SS0850001	6/4/2009	**175**	**NS**	165.0
Hillside	X14SS0860001	6/4/2009	**599**	**NS**	516.6
Hillside	X14SS0870001	6/4/2009	**279**	**108**	251.3
Hillside	X14SS0880001	6/4/2009	**188**	**NS**	175.5
Hillside	X14SS0890001	6/4/2009	**1246**	**NS**	NA
Hillside	X14SS0900001	6/4/2009	**1187**	**NS**	NA
Hillside	X14SS0910001	6/4/2009	**594**	**NS**	512.7
Hillside	X14SS0920001	6/4/2009	**709**	**NS**	607.9
Hillside	X14SS0930001	6/4/2009	**265**	**NS**	239.7

TABLE 3-8

FIELD XRF AND FIXED-BASE LABORATORY LEAD SAMPLE CORRELATION
MARINE RIFLE RANGE (UXO 14)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 3 OF 4

SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	XRF (mg/kg)	FBL (mg/kg)	Predicted Lab Value
Hillside	X14SS0940001	6/4/2009	**337**	**293**	299.4
Hillside	X14SS0950001	6/4/2009	**2106**	**NS**	NA
Hillside	X14SS0960001	6/4/2009	**245**	**NS**	223.3
Hillside	X14SS0970001	6/4/2009	**50**	**NS**	60.9
Hillside	X14SS0980001	6/4/2009	**1339**	**NS**	NA
Hillside	X14SS0990001	6/4/2009	**3361**	**NS**	NA
Hillside	X14SS1000001	6/4/2009	**23**	**NS**	39.1
Hillside	X14SS1010001	6/4/2009	**11341**	**NS**	NA
Hillside	X14SS1020001	6/4/2009	**19878**	**NS**	NA
Hillside	X14SB1020102	6/16/2009	**8931**	**NS**	NA
Hillside	X14SB1020203	6/17/2009	**2402**	**1220**	NA
Hillside	X14SS1030001	6/4/2009	**454**	**NS**	396.8
Hillside	X14SS1040001	6/4/2009	**1669**	**NS**	NA
Hillside	X14SS1050001	6/4/2009	**655**	**NS**	563.1
Hillside	X14SS1060001	6/4/2009	**491**	**NS**	427.0
Hillside	X14SS1070001	6/4/2009	**2732**	**NS**	NA
Hillside	X14SS1080001	6/4/2009	**54**	**31.3**	64.8
Hillside	X14SS1090001	6/4/2009	**3208**	**NS**	NA
Hillside	X14SS1100001	6/4/2009	**9119**	**NS**	NA
Hillside	X14SS1110001	6/4/2009	**11536**	**NS**	NA
Hillside	X14SB1110102	6/16/2009	**1843**	**2640**	NA
Hillside	X14SS1120001	6/4/2009	**7110**	**NS**	NA
Hillside	X14SS1130001	6/4/2009	**9883**	**NS**	NA
Hillside	X14SS1140001	6/4/2009	**2786**	**NS**	NA
Hillside	X14SS1150001	6/4/2009	**1629**	**NS**	NA
Hillside	X14SS1160001	6/4/2009	**686**	**NS**	NA
Hillside	X14SS1170001	6/4/2009	**849**	**618**	724.1
Hillside	X14SS1180001	6/4/2009	**641**	**NS**	552.0
Hillside	X14SS1190001	6/4/2009	**460**	**NS**	401.8
Hillside	X14SS1200001	6/4/2009	**288**	**741 J**	258.5
Hillside	X14SS1210001	6/4/2009	**764**	**NS**	654.1
Hillside	X14SS1220001	6/4/2009	**76**	**NS**	82.5
Hillside	X14SS1230001	6/4/2009	**106**	**NS**	108.0
Hillside	X14SS1240001	6/4/2009	**73**	**NS**	80.0
Hillside	X14SS1250001	6/9/2009	**909**	**NS**	774.4
Hillside	X14SS1260001	6/9/2009	**512**	**476**	444.9
Hillside	X14SS1270001	6/9/2009	**984**	**NS**	836.4
Hillside	X14SS1280001	6/9/2009	**2824**	**NS**	2363.3
Hillside	X14SS1290001	6/9/2009	**1183**	**NS**	1001.3
Hillside	X14SS1300001	6/16/2009	**29**	**44.7**	43.5
Hillside	X14SS1310001	6/16/2009	**122**	**120**	121.0
Hillside	X14SS1320001	6/16/2009	**110**	**17.9**	110.7
Hillside	X14SS1330001	6/16/2009	**37**	**NS**	50.1

TABLE 3-8

FIELD XRF AND FIXED-BASE LABORATORY LEAD SAMPLE CORRELATION
MARINE RIFLE RANGE (UXO 14)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	XRF (mg/kg)	FBL (mg/kg)	Predicted Lab Value
Hillside	X14SS1340001	6/16/2009	**1097**	**904**	930.5
Hillside	X14SS1350001	6/16/2009	**80**	**45.1**	86.1
Hillside	X14SS1360001	6/16/2009	**53**	**NS**	64.0
Hillside	X14SS1370001	6/16/2009	**56**	**NS**	66.5
Hillside	X14SS1380001	6/16/2009	**161**	**137**	153.1
Hillside	X14SS1390001	6/16/2009	**328**	**280**	292.2
Hillside	X14SS1400001	6/16/2009	**1031**	**676**	875.4
Hillside	X14SS1410001	6/16/2009	**351**	**405**	311.3
Hillside	X14SS1420001	6/17/2009	**19**	**11.0 B**	35.7
Hillside	X14SS1430001	6/17/2009	**290**	**166**	260.1

Acronyms
NS = No Fixed Based Lab Sample
NA = No Regression Equation Available
FBL = Fixed Based Laboratory Sample

FBL = 19.7 + 0.83XRF

TABLE 3-9

FIELD XRF AND FIXED-BASE LABORATORY LEAD SAMPLE RESULTS
SMALL ARMS RANGE (UXO 14)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	XRF (mg/kg)	FBL (mg/kg)
Mid-range	X17SB0010004	6/11/2009	**4**	**9.1**
Mid-range	X17SB0010408	6/11/2009	**12**	**NS**
Mid-range	X17SB0010810	6/11/2009	**0**	**NS**
Mid-range	X17SB0020004	6/11/2009	**4**	**NS**
Mid-range	X17SB0020406	6/11/2009	**85**	**8.1**
Mid-range	X17SB0020608	6/11/2009	**0**	**NS**
Mid-range	X17SB0020810	6/11/2009	**13**	**NS**
Mid-range	X17SB0030004	6/11/2009	**16**	**NS**
Mid-range	X17SB0030406	6/11/2009	**85**	**NS**
Mid-range	X17SB0030608	6/11/2009	**126**	**68.2**
Mid-range	X17SB0030810	6/11/2009	**8**	**NS**
Mid-range	X17SB0040004	6/11/2009	**2171**	**589**
Mid-range	X17SB0040406	6/11/2009	**371**	**NS**
Mid-range	X17SB0040608	6/11/2009	**0**	**8.9**
Mid-range	X17SB0040810	6/11/2009	**156**	**NS**
Mid-range	X17SB0050004	6/11/2009	**942**	**620**
Mid-range	X17SB0050406	6/11/2009	**37**	**NS**
Mid-range	X17SB0050608	6/11/2009	**350**	**NS**
Mid-range	X17SB0050810	6/11/2009	**41**	**32.4**
Mid-range	X17SB0060004	6/11/2009	**230**	**NS**
Mid-range	X17SB0060406	6/11/2009	**191**	**132**
Mid-range	X17SB0060608	6/11/2009	**5**	**NS**
Mid-range	X17SB0060810	6/11/2009	**55**	**NS**
Mid-range	X17SB0070004	6/11/2009	**4**	**8.2**
Mid-range	X17SB0070406	6/11/2009	**24**	**NS**
Mid-range	X17SB0070608	6/11/2009	**0**	**NS**
Mid-range	X17SB0070810	6/11/2009	**7**	**NS**
Firing Line	X17SS008C0001	6/11/2009	**96**	**21**
Firing Line	X17SS009C0001	6/11/2009	**73**	**38.7**
Firing Line	X17SS010C0001	6/11/2009	**156**	**200**
Low-range	X17SS0110001	6/11/2009	**405**	**NS**
Low-range	X17SB0110102	6/14/2009	**102**	**82.1**
Low-range	X17SS0120001	6/11/2009	**10**	**NS**
Low-range	X17SS0130001	6/11/2009	**3247**	**NS**
Low-range	X17SB0130102	6/14/2009	**31**	**39.2**
Low-range	X17SS0140001	6/11/2009	**2501**	**706**
Low-range	X17SB0140102	6/14/2009	**41**	**77.6**
Low-range	X17SS0150001	6/11/2009	**18**	**NS**
Low-range	X17SS0160001	6/11/2009	**14**	**12.2 B**
Low-range	X17SS0170001	6/11/2009	**10**	**NS**
High-range	X17SS0180001	6/11/2009	**7**	**NS**
High-range	X17SS0190001	6/11/2009	**36**	**39.4**
High-range	X17SS0200001	6/11/2009	**39**	**NS**

TABLE 3-9

FIELD XRF AND FIXED-BASE LABORATORY LEAD SAMPLE RESULTS
SMALL ARMS RANGE (UXO 14)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	XRF (mg/kg)	FBL (mg/kg)
High-range	X17SS0210001	6/11/2009	**31**	**NS**
High-range	X17SS0220001	6/11/2009	**26**	**7.0 B**
High-range	X17SS0220001-D	6/11/2009	**26**	**7.2**
High-range	X17SS0230001	6/11/2009	**0**	**NS**
High-range	X17SS0240001	6/11/2009	**11**	**10.3 B**
Low-range	X17SS0250001	6/12/2009	**732**	**479**
Low-range	X17SB0250102	6/14/2009	**127**	**87.5**
Low-range	X17SS0260001	6/12/2009	**95**	**NS**
Low-range	X17SS0270001	6/12/2009	**129**	**645**
Low-range	X17SS0280001	6/12/2009	**39**	**38.9**
Low-range	X17SS0290001	6/14/2009	**256**	**NS**

TABLE 3-10

FIELD XRF AND FIXED-BASE LABORATORY LEAD SAMPLE RESULTS
RUM POINT SKEET RANGE (UXO 16)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 1 OF 3

SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	AVG	LAB RESULT
Range	X16SS0010001	6/13/2009	**20**	**NS**
Range	X16SS0020001	6/13/2009	**16**	**NS**
Range	X16SS0030001	6/13/2009	**17**	**13.5**
Range	X16SS0040001	6/13/2009	**76**	**NS**
Range	X16SS0050001	6/13/2009	**20**	**NS**
Range	X16SS0060001	6/13/2009	**16**	**NS**
Range	X16SS0070001	6/13/2009	**75**	**NS**
Range	X16SS0080001	6/13/2009	**975**	**616**
Range	X16SS0090001	6/13/2009	**20**	**NS**
Range	X16SS0100001	6/13/2009	**47**	**NS**
Range	X16SS0110001	6/13/2009	**43**	**NS**
Range	X16SS0120001	6/13/2009	**185**	**NS**
Range	X16SS0130001	6/13/2009	**28**	**38.8**
Range	X16SS0140001	6/13/2009	**22**	**NS**
Range	X16SS0150001	6/13/2009	**24**	**NS**
Range	X16SS0160001	6/13/2009	**84**	**NS**
Range	X16SS0170001	6/13/2009	**58**	**51.4**
Range	X16SS0180001	6/13/2009	**24**	**NS**
Range	X16SS0190001	6/13/2009	**22**	**NS**
Range	X16SS0200001	6/13/2009	**58**	**51.9**
Range	X16SS0210001	6/13/2009	**106**	**NS**
Range	X16SS0220001	6/13/2009	**25**	**NS**
Range	X16SS0230001	6/13/2009	**27**	**NS**
Range	X16SS0240001	6/13/2009	**23**	**NS**
Range	X16SS0250001	6/13/2009	**156**	**159 J**
Range	X16SS0260001	6/13/2009	**21**	**NS**
Range	X16SS0270001	6/13/2009	**22**	**NS**
Range	X16SS0280001	6/13/2009	**14**	**NS**
Range	X16SS0290001	6/13/2009	**126**	**NS**
Range	X16SS0300001	6/13/2009	**24**	**NS**
Range	X16SS0310001	6/13/2009	**214**	**NS**
Range	X16SS0320001	6/13/2009	**27**	**13.9**
Range	X16SS0320001-D	6/13/2009	**27**	**13**
Range	X16SS0330001	6/13/2009	**12**	**NS**
Range	X16SS0340001	6/13/2009	**19**	**NS**
Range	X16SS0350001	6/13/2009	**14**	**NS**
Range	X16SS0360001	6/13/2009	**41**	**NS**
Range	X16SS0370001	6/13/2009	**71**	**NS**
Range	X16SS0380001	6/13/2009	**26**	**NS**
Range	X16SS0390001	6/13/2009	**21**	**NS**
Range	X16SS0400001	6/13/2009	**50**	**NS**
Range	X16SS0410001	6/13/2009	**34**	**NS**
Range	X16SS0420001	6/13/2009	**68**	**12.1**

TABLE 3-10

FIELD XRF AND FIXED-BASE LABORATORY LEAD SAMPLE RESULTS
RUM POINT SKEET RANGE (UXO 16)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	AVG	LAB RESULT
Range	X16SS0430001	6/13/2009	**39**	**NS**
Range	X16SS0440001	6/13/2009	**32**	**NS**
Range	X16SS0450001	6/13/2009	**27**	**NS**
Range	X16SS0460001	6/13/2009	**22**	**NS**
Range	X16SS0470001	6/13/2009	**32**	**NS**
Range	X16SS0480001	6/13/2009	**95**	**NS**
Range	X16SS0490001	6/13/2009	**64**	**NS**
Range	X16SS0500001	6/13/2009	**37**	**NS**
Range	X16SS0510001	6/13/2009	**22**	**NS**
Range	X16SS0520001	6/14/2009	**31**	**NS**
Range	X16SS0530001	6/14/2009	**37**	**NS**
Range	X16SS0540001	6/14/2009	**195**	**35**
Range	X16SS0550001	6/14/2009	**48**	**NS**
Range	X16SS0560001	6/14/2009	**50**	**NS**
Range	X16SS0570001	6/14/2009	**26**	**22.3**
Range	X16SS0580001	6/14/2009	**43**	**NS**
Range	X16SS0590001	6/14/2009	**31**	**NS**
Range	X16SS0600001	6/14/2009	**23**	**NS**
Range	X16SS0610001	6/14/2009	**150**	**23.5**
Range	X16SS0620001	6/14/2009	**22**	**NS**
Range	X16SS0630001	6/14/2009	**20**	**NS**
Range	X16SS0640001	6/14/2009	**18**	**NS**
Range	X16SS0650001	6/14/2009	**83**	**NS**
Range	X16SS0660001	6/14/2009	**31**	**NS**
Range	X16SS0670001	6/14/2009	**61**	**NS**
Range	X16SS0680001	**SAMPLE NOT COLLECTED**		
Range	X16SS0690001	6/14/2009	**78**	**NS**
Range	X16SS0700001	6/14/2009	**28**	**NS**
Range	X16SS0710001	6/14/2009	**24**	**NS**
Range	X16SS0720001	6/14/2009	**18**	**NS**
Range	X16SS0730001	6/14/2009	**43**	**40.1**
Range	X16SS0740001	6/14/2009	**59**	**NS**
Range	X16SS0750001	6/14/2009	**24**	**NS**
Range	X16SS0760001	6/14/2009	**29**	**NS**
Range	X16SS0770001	6/14/2009	**15**	**NS**
Range	X16SS0780001	6/14/2009	**17**	**NS**
Range	X16SS0790001	6/14/2009	**267**	**267**
Firing Point	X16SS080C0001	6/14/2009	**21**	**9.1**
Firing Point	X16SS081C0001	6/14/2009	**73**	**48.7**
Range	X16SS0820001	6/16/2009	**135**	**NS**
Range	X16SS0830001	6/16/2009	**407**	**NS**
Range	X16SS0840001	6/16/2009	**409**	**NS**
Range	X16SS0850001	6/16/2009	**159**	**NS**

TABLE 3-10

FIELD XRF AND FIXED-BASE LABORATORY LEAD SAMPLE RESULTS
RUM POINT SKEET RANGE (UXO 16)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 3 OF 3

SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	AVG	LAB RESULT
Range	X16SS0860001	6/16/2009	**87**	**NS**
Range	X16SS0870001	6/16/2009	**375**	**90.2**
Range	X16SS0880001	6/17/2009	**79**	**NS**
Range	X16SS0890001	6/17/2009	**123**	**NS**
Range	X16SS0900001	6/17/2009	**261**	**38.8**
Range	X16SS0900001-D	6/17/2009	**261**	**338 J**
Range	X16SS0910001	6/17/2009	**20**	**12.6**
Range	X16SS0920001	6/17/2009	**17**	**143**
Range	X16SS0930001	6/17/2009	**16**	**14.7**
Range	X16SS0940001	6/17/2009	**13**	**6.7**
Range	X16SS0950001	6/17/2009	**26**	**19.2**

TABLE 3-11

FIELD XRF AND FIXED-BASE LABORATORY LEAD SAMPLE CORRELATION
ROACH ROAD RIFLE RANGE (UXO 25)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	XRF (mg/kg)	FBL (mg/kg)	Predicted Lab Value
Range	X25SS0010001	6/15/2009	**0**	**6.3**	1.5
Range	X25SS0020001	6/15/2009	**13**	**NS**	13.8
Range	X25SS0030001	6/15/2009	**8**	**NS**	9.6
Range	X25SS0040001	6/15/2009	**30**	**19.5**	30.3
Range	X25SS0050001	6/15/2009	**22**	**NS**	22.8
Range	X25SS0060001	6/15/2009	**8**	**NS**	9.6
Range	X25SS0070001	6/15/2009	**32**	**43.5**	32.5
Range	X25SS0070001-D	6/15/2009	**32**	**34.5**	32.5
Range	X25SS0080001	6/15/2009	**95**	**91.4**	93.3
Range	X25SS0090001	6/15/2009	**12**	**NS**	13.5
Range	X25SS0100001	6/15/2009	**159**	**84.0 J**	155.4
Range	X25SS0110001	6/15/2009	**41**	**NS**	41.3
Range	X25SS0120001	6/15/2009	**22**	**NS**	22.5
Range	X25SS0130001	6/15/2009	**12**	**19.8 J**	13.5
Range	X25SS0140001	6/15/2009	**11**	**NS**	12.2
Range	X25SS0150001	6/15/2009	**36**	**NS**	36.7
Range	X25SS0160001	6/15/2009	**65**	**88.6**	64.2
Range	X25SS0170001	6/15/2009	**78**	**NS**	77.5
Range	X25SS0180001	6/15/2009	**1676**	**529**	1016.3
Range	X25SS0190001	6/15/2009	**2775**	**1060**	1884.3
Range	X25SS0200001	6/15/2009	**3877**	**3450**	2754.8
Range	X25SS0210001	6/15/2009	**178**	**131**	173.8
Range	X25SS0210001-D	6/15/2009	**178**	**127**	173.8
Range	X25SS0220001	6/15/2009	**60**	**62.6**	59.7
Range	X25SS0230001	6/15/2009	**538**	**546**	117.3
Range	X25SS0240001	6/15/2009	**836**	**522**	352.2
Range	X25SS0250001	6/15/2009	**48**	**34.2**	48.1
Range	X25SS0260001	6/15/2009	**37**	**NS**	37.1
Range	X25SS0270001	6/15/2009	**14**	**NS**	15.4
Range	X25SS0280001	6/15/2009	**25**	**17.9**	26.1
Range	X25SS0290001	6/15/2009	**48**	**NS**	48.1
Range	X25SS0300001	6/15/2009	**65**	**50.3**	64.2
Range	X25SS0310001	6/15/2009	**565**	**142**	138.4
Range	X25SS0320001	6/15/2009	**49**	**60.2**	49.0
Range	X25SS0330001	6/15/2009	**40**	**31.1**	40.6
Firing Line	X25SS034C0001	6/15/2009	**0**	**9.4**	1.5

Acronyms

NS = No Fixed Based Lab Sample
NA = No Regression Equation Available
FBL = Fixed Based Laboratory Sample

FBL = 1.49 + 0.97XRF (XRF is less than 200)
FBL = -308 + 0.79XRF (XRF is greater than 500)

P:/GIS/INDIANHEAD_NSWC_NEW/MAPDOCS/MXD/SN_OLD_SKEET_TRAP_RANGE_XRF.MXD 6/1/10 KM

1248500 1249000 1249500 1250000

324000

323500

Potomac River

Mattawoman Creek

Maximum Shot Distance

X-15 SD030 X-15 SD029 X-15 SD031 X-15 SD028 X-15 SD021 X-15 SD032 X-15 SD020 X-15 SD022 X-15 SD019 X-15 SD027 X-15 SD023 X-15 SD033 X-15 SD013 X-15 SD012 X-15 SD014 X-15 SD018 X-15 SD011 X-15 SD024 X-15 SD015 X-15 SD026 X-15 SD034 X-15 SD010 X-15 SD016 X-15 SD017 X-15 SD025

X15-SD001 X15-SD002 X15-SD003 X15-SD004 X15-SD005 X15-SD006 X15-SD007 X15-SD008 X15-SD009 X15-001 X15-002 X15-003 X15-004 X15-005 X15-006 X15-007 X15-008 X15-009 X15-010 X15-011 X15-012 X15-013 X15-014 X15-015 X15-016 X15-017 X15-018 X15-019 X15-020 X15-021 X15-022 X15-023 X15-024 X15-025 X15-026 X15-027 X15-028 X15-029 X15-030 X15-031 X15-032 X15-033 X15-034 X15-035 X15-036 X15-037 X15-038 X15-039 X15-040 X15-041 X15-042 X15-043 X15-044 X15-045 X15-046 X15-047 X15-048 X15-049 X15-050 X15-051 X15-052 X15-053 X15-054 X15-055 X15-056 X15-057C X15-058C X15-061 X15-062 X15-063 X15-064-0102 X15-065 X15-066 X15-067 X15-068 X15-069 X15-070-0001 X15-070-0102 X15-071 X15-072 X15-073 X15-074 X15-075 X15-076

Archer Avenue

N

Legend

- Soil Sample
- Sediment Sample
- Former Trap House Location
- MRP Area Identified during PA
- Installation Boundary

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

125 62.5 0 125 Feet

DRAWN BY K. MOORE	DATE 6/1/09
CHECKED BY E. BERKLITE	DATE 6/1/10
COST/SCHEDULE-AREA	
SCALE AS NOTED	

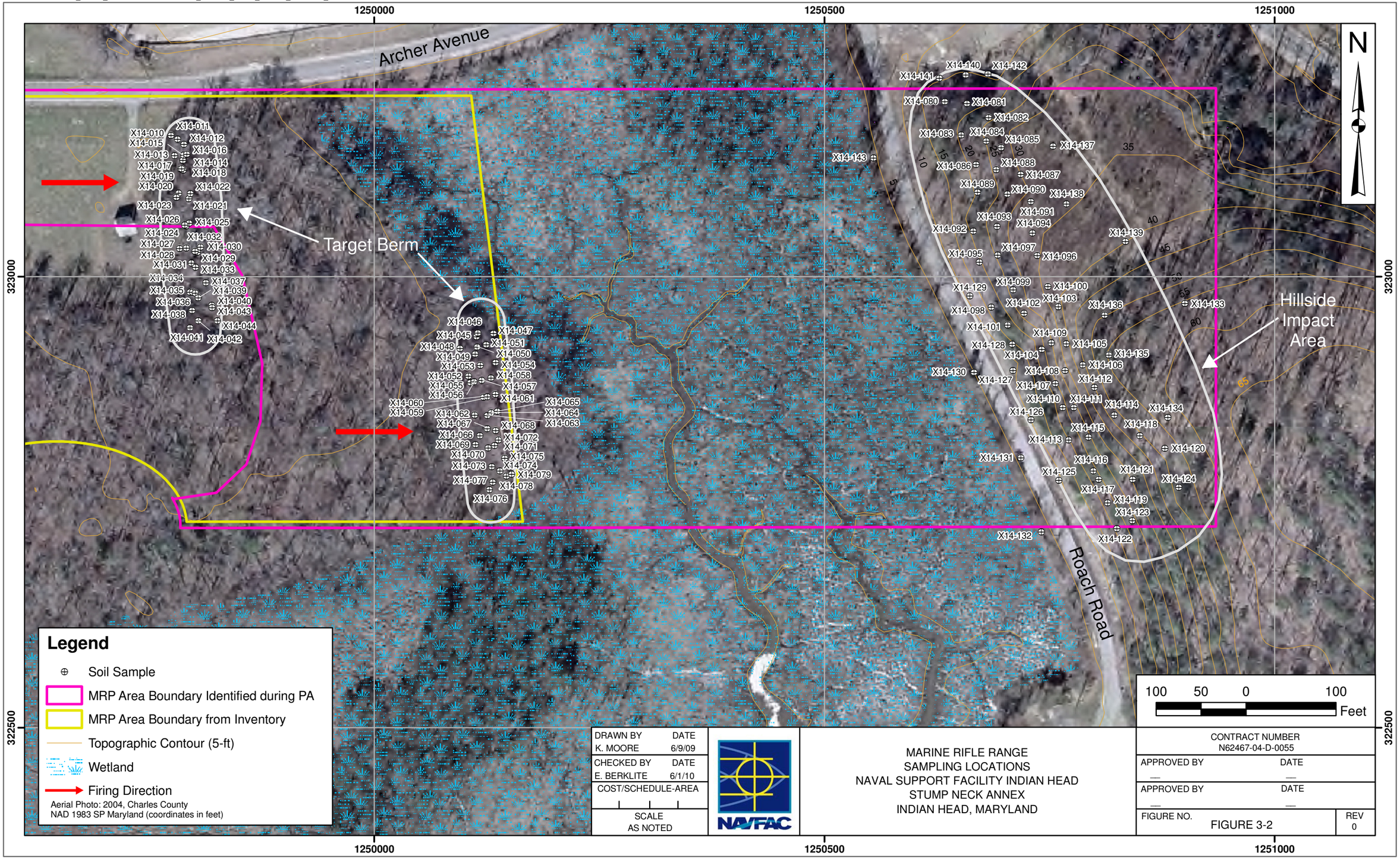
NAVFAC

OLD SKEET AND TRAP RANGE
SAMPLING LOCAITONS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

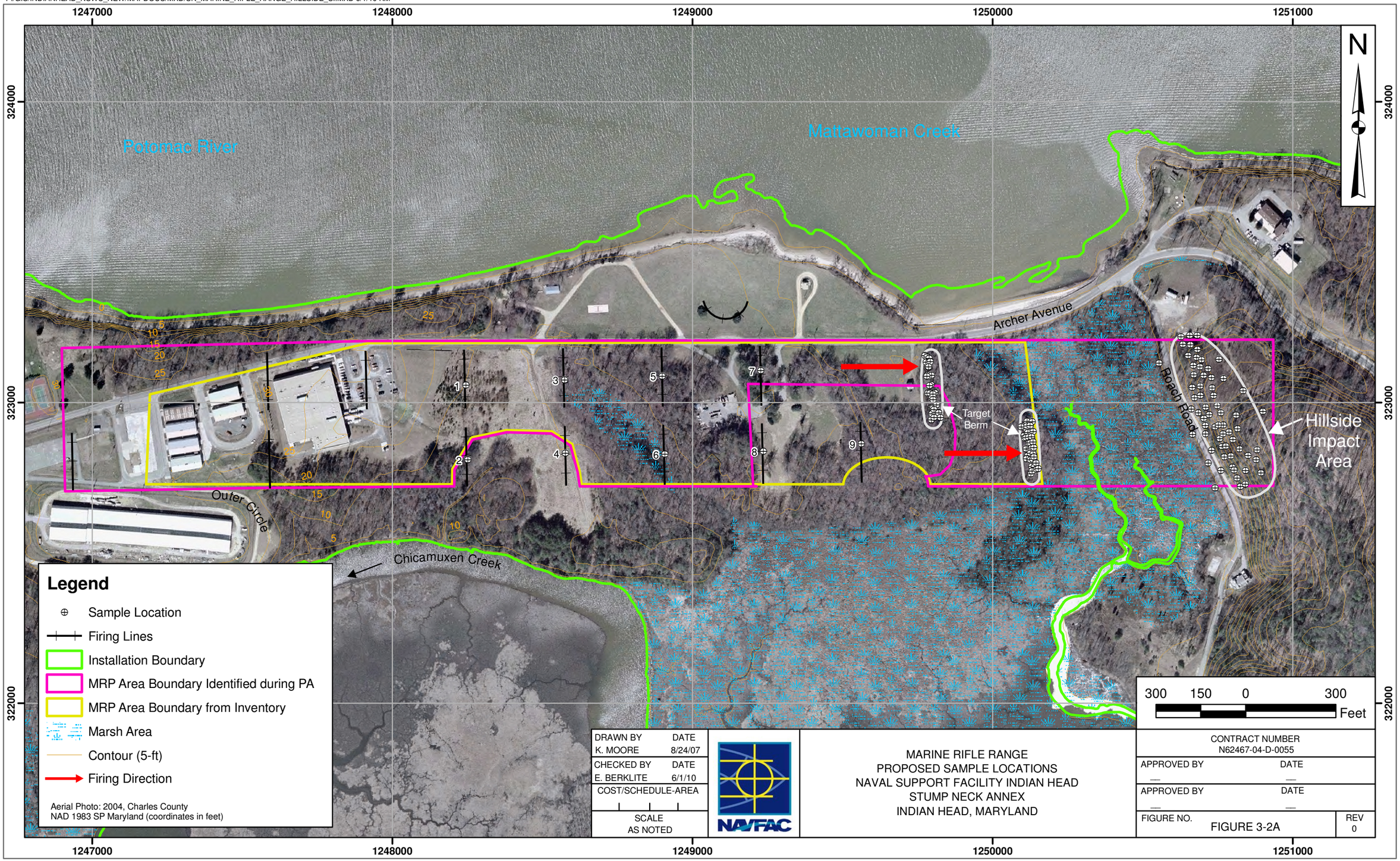
CONTRACT NUMBER N62467-04-D-0055	
APPROVED BY __	DATE __
APPROVED BY __	DATE __
FIGURE NO. FIGURE 3-1	REV 0

1248500 1249000 1249500 1250000

P:/GIS/INDIANHEAD_NSWC_NEW/MAPDOCS/MXD/SN_MARINE_RIFLE_RANGE_HILLSIDE_XRF.MXD 6/1/10 KM



P:/GIS/INDIANHEAD_NSWC_NEW/MAPDOCS/MXD/SN_MARINE_RIFLE_RANGE_HILLSIDE_SI.MXD 6/1/10 KM



DRAWN BY	DATE
K. MOORE	8/24/07
CHECKED BY	DATE
E. BERKLITE	6/1/10
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

MARINE RIFLE RANGE
PROPOSED SAMPLE LOCATIONS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	
N62467-04-D-0055	
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 3-2A	0

P:/GIS/INDIANHEAD_NSWC_NEW/MAPDOCS/MXD/SN_PISTOL_RANGE_XRF.MXD 6/1/10 KM

1256500 1257000

321500

N

Rum Point Road

X17SS-029
X17SS-0250001
X17SB-001
X17SS-0110001
X17SS-026
X17SS-017
X17SB-002
X17SS-018
X17SS-012
X17SB-003
X17SS-019
X17SS-0130001
X17SS-0040004
X17SB-0040406
X17SS-027
X17SS-020
X17SS-0050004
X17SB-0050608
X17SS-008C
X17SS-009C
X17SS-010C
X17SS-0140001
X17SS-028
X17SS-015
X17SB-006
X17SS-021
X17SS-016
X17SS-022
X17SB-007
X17SS-023
X17SS-024

95 90 95 100 105 110 115 120 125 130

Legend

- Soil Sample
- Firing Line
- MRP Area Boundary Identified during PA
- Surface Drainage
- Topographic Contour (5-ft)
- Firing Direction

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

50 25 0 50 Feet

DRAWN BY	DATE
K. MOORE	6/16/09
CHECKED BY	DATE
E. BERKLITE	6/1/10
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

SMALL ARMS (PISTOL) RANGE
SAMPLING LOCATIONS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	N62467-04-D-0055
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 3-3	0

1256500 1257000

P:/GIS/INDIANHEAD_NSWC_NEW/MAPDOCS/MXD/SN_RUM_PT_SKEET_RANGE_XRF.MXD 6/1/10 KM

1256500 1257000 1257500

323500 323000

N

Rum Point Road

Skeet Range Way

Clay target pile - 1

Firing Point A Firing Point B

Left Firing Point Right Firing Point

X16SB094 X16SB093 X16SB095 X16SB092 X16SB088 X16SB089 X16SB090 X16SB086 X16SB084 X16SB083 X16SB085 X16SB043 X16SB049 X16SB042 X16SB017 X16SB021 X16SB025 X16SB033 X16SB037 X16SB048 X16SB055 X16SB041 X16SB029 X16SB028 X16SB032 X16SB036 X16SB047 X16SB082 X16SB016 X16SB024 X16SB020 X16SB054 X16SB040 X16SB046 X16SB053 X16SB012 X16SB015 X16SB023 X16SB027 X16SB035 X16SB039 X16SB052 X16SB079 X16SB008 X16SB019 X16SB031 X16SB045 X16SB011 X16SB087 X16SB091 X16SB014 X16SB026 X16SB034 X16SB051 X16SB061 X16SB007 X16SB022 X16SB044 X16SB060 X16SB010 X16SB018 X16SB030 X16SB038 X16SB059 X16SB004 X16SB006 X16SB013 X16SB050 X16SB058 X16SB067 X16SB009 X16SB071 X16SB074 X16SB057 X16SB065 X16SB066 X16SB003 X16SB070 X16SB075 X16SB056 X16SB064 X16SB002 X16SB005 X16SB063 X16SB076 X16SB062 X16SB001 X16SB069 X16SB078 X16SB077 X16SB072 X16SB073 X16SB080C X16SB081C

30 25 30 25 20 15 10 5

Legend

- Soil Sample
- Surface Drainage
- Topographic Contour (5-ft)
- Wetland
- Skeet and Trap Range
- Left Firing Point
- Maximum Shot Fall Zone
- Right Firing Point
- Firing Direction

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

100 50 0 100 Feet

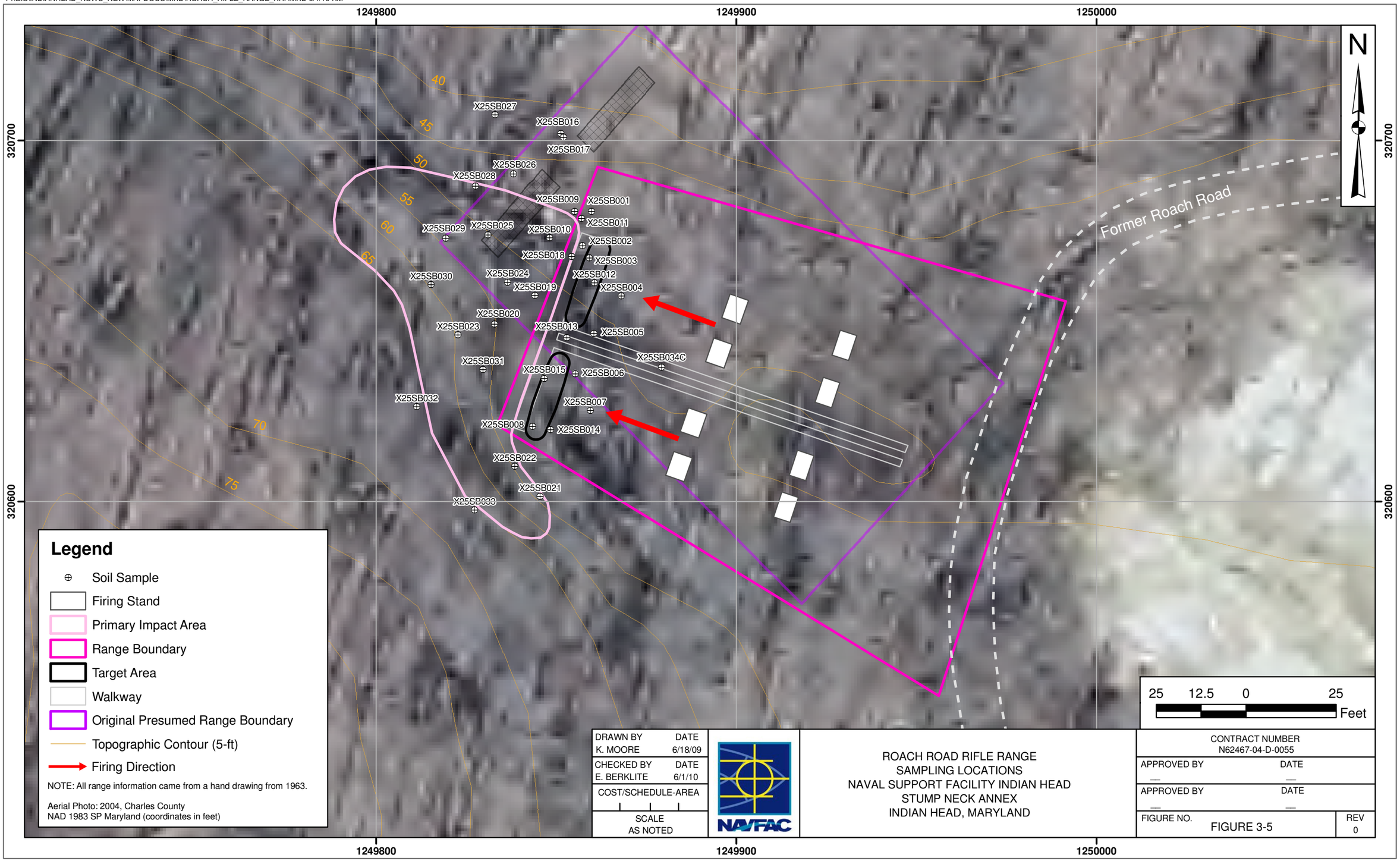
DRAWN BY	DATE
K. MOORE	6/16/09
CHECKED BY	DATE
E. BERKLITE	6/1/10
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

RUM POINT SKEET RANGE
SAMPLING LOCATIONS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	
N62467-04-D-0055	
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 3-4	0

P:\GIS\INDIANHEAD_NSWC_NEW\MAPDOCS\MXD\ROACH_RIFLE_RANGE_XRF.MXD 6/1/10 KM



DRAWN BY K. MOORE	DATE 6/18/09
CHECKED BY E. BERKLITE	DATE 6/1/10
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

ROACH ROAD RIFLE RANGE
SAMPLING LOCATIONS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER N62467-04-D-0055	
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. FIGURE 3-5	REV 0

4.0 OLD SKEET AND TRAP RANGE – UXO 15

4.1 SITE BACKGROUND

4.1.1 Historical Information

The Old Skeet and Trap Range is located in the north-central portion of Stump Neck Annex, north of Archer Avenue along the Potomac River. The eastern and western boundaries of the range consist of open fields, which are manicured. The area is currently used as a helicopter pad and for recreation. The Old Skeet and Trap Range comprises 29.33 acres and was reportedly used for small arms recreational activities. Firing may have occurred into the Potomac River. Through interviews, it was determined that the range was in use for approximately 25 years and closed in June 1991. The Old Skeet and Trap Range was identified on an April 1972 aerial photograph of Stump Neck Annex. The range does not appear on a previous aerial photograph dated September 1967. Therefore, the Old Skeet and Trap Range was constructed between 1967 and 1972. The Old Skeet and Trap Range lies on what was initially identified as Solid Waste Management Unit (SWMU) #20, Disposal Area 2, in the RCRA Corrective Action Plan (CAP), a SWMU for which no further action was recommended. However, this investigation took place while the range was still active. In 1992, the range was again added to the RCRA program as SWMU #28. At this time, the Old Skeet and Trap Range was inactive, and it was determined that lead shot still remained on the ground and in the Potomac River. The Old Skeet and Trap Range is overlapped by the firing fan from the Valley located at NSF-IH, Main Installation.

4.1.2 Munitions Used

The data collection team was unable to locate specific records of the types and quantities of small arms ammunition used at the Old Skeet and Trap Range. However, an inventory listing from the Potomac River Gun Club for 1979 revealed the following on hand for resale: .410-, 28-, 20-, and 12-gauge shells; clay targets; 5-pound containers of bulk smokeless powder; and shot. These items would be consistent with munitions normally associated with a skeet and trap range. No evidence of ordnance was found at the range during the visual survey. Based on the information obtained during the data collection process, the Old Skeet and Trap Range is not suspected to contain chemical warfare material (CWM)-filled munitions, electrically fused munitions, or depleted uranium (DU)-associated munitions. The munitions used and/or stored at the facility and the associated chemical constituents are listed in Table 4-1.

4.1.3 Munitions Constituents

For shotgun ammunition and clay targets, the primary MC of concern include lead from shot and PAHs from pitch tar used in clay pigeons. Other associated MC less likely to be of concern may include antimony, arsenic, and lead styphnate/lead azide. These MC components are not consumed when the munitions items function as they are designed. Therefore, these MC may exist at the Old Skeet and Trap Range. NG from unburned propellants and lead from primers are suspected at the firing points.

4.2 SITE FIELDWORK

4.2.1 Site Field Activities

Soil sample locations were selected based on a bias towards areas that were believed to be most likely contaminated by past operations at the site. The total area of the site is 29.33 acres as indicated in Table 3-1. The site is divided into the Range Area, Open Water Area, and the Near Shore Area. The range portion of the study area covers approximately 4.4 acres. The Open Water portion of the study area covers approximately 18 acres. The Near Shore portion of the study area covers approximately 750 linear feet. See Figure 3-1 for all sample locations. Prior to initiating sample collection, all sample locations were marked by colored pin flags bearing the sample location ID number. Proposed sample locations identified in the approved WP were located by GPS and by measurements from stationary objects (e.g., roadways, existing buildings). All sample locations were the same ones proposed in the approved WP.

4.2.2 Work Plan Deviations

There were no deviations from the work plan.

4.2.3 Field Data Collection

A total of 83 soil samples and 34 sediment samples were collected during the SI at the OSTR. All surface soil samples collected were from the depth of 0 to 1 foot. Five subsurface soil samples were collected from a depth of 1 to 2 feet bgs. Four composite samples were collected along the firing lines in ten aliquots each. Eighty-three samples underwent field XRF analysis for lead, and 18 soil and 5 sediment samples were selected for metals analysis at the FBL. Two soil and three sediment samples were selected for PAH analysis. Two soil and two sediment samples were selected for TOC analysis. Two soil composite samples were selected for NG analysis. Soil samples were collected using a hand auger in

accordance with SOP-05. See Figure 3-1 for all sampling locations. A summary of the sample collection methods used is shown in Table 3-2. Soil sample log sheets are included in Appendix A of this document.

Sediment samples were collected in accordance with SOP-08. The nine Near Shore sediment samples were collected using disposable plastic trowels. The 25 Open Water sediment samples were collected using ponar dredge from a boat.

4.3 SITE INSPECTION DATA COLLECTION RESULTS

4.3.1 MC Sampling Results

All soil and sediment samples collected were compared to the PALs and background sampling results, and a statistical evaluation was done to compare the background data with the site sampling results. The summary table of the site background screening is presented as Tables 4-2a through 4-2d. The statistical summary and calculations are presented in Appendix G. The MC analytical results are presented in Appendix C, and the data validation reports are presented in Appendix D. Table 4-3 summarizes the results as compared to the calculated screening values for metals. The PAL was the reference limit, unless the background and screening calculations exceeded this value. In Table 4-3, if a parameter had an exceedance at any sampling point, the parameter is highlighted; individual sample exceedances are also highlighted. Figure 4-1 illustrates the metals exceedances in soil at the Old Skeet and Trap Range. Based on screening calculations, the arsenic screening level was adjusted to 9.7 mg/kg. All other values used were the PAL limits for the direct contact residential values for soil. The antimony PAL was exceeded at 10 discrete surface soil sampling locations and 2 composite surface soil sampling locations (firing line locations). The lead PAL was exceeded at 10 discrete surface soil sampling locations, including both the XRF and FBL results. The zinc PAL was exceeded at two composite and one discrete surface soil sampling locations.

The PAL limits were the reference limits for the sediment samples. Sediment samples were collected from depths of 0 to 0.5 foot bgs. Table 4-4 presents the sediment sampling results. In Table 4-4, if a parameter had an exceedance at any sampling point, the parameter is highlighted; individual sample exceedances are also highlighted. Figure 4-1 illustrates the metals exceedances in sediment at the Old Skeet and Trap Range. The arsenic PAL was exceeded at six sediment sampling locations. The zinc PAL was exceeded at one sediment sampling location.

Because of the presence of clay targets, selected soil samples were analyzed for PAHs. The PAHs are associated with the fragments of the clay pigeons used as targets on the skeet range. A pitch tar

containing PAHs was used in the manufacture of the clay pigeons to help bind the clay particles. Table 4-5 presents the PAH results and the calculated benzo(a)pyrene (BaP) equivalents. The calculated screening value is 1500 µg/kg. A description of the BaP equivalents follows.

The USEPA has identified 7 PAHs as potentially carcinogenic: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene. Of these PAHs, benzo(a)pyrene has been subjected to the most toxicological study and the USEPA has used the toxicological data to establish quantitative toxicological parameters (cancer slope factors and inhalation unit risks) for benzo(a)pyrene. All seven of these PAHs have a similar chemical structure and similar chemical properties. For example, these PAHs have relatively low solubilities in water, have low potential to volatilize into the air, and have a propensity for adsorbing to soil rather than dissolving in water once they are in the environment. Laboratory studies suggest that these chemicals act similarly from the perspective of carcinogenicity, and that the carcinogenic potency of the individual PAHs can be evaluated with reference to the carcinogenic potency of benzo(a)pyrene. Therefore, USEPA has developed a toxicity equivalency factor (TEF) for each potentially carcinogenic PAH that can be used to convert the concentration of that PAH to an equivalent concentration of benzo(a)pyrene. Since benzo(a)pyrene is often abbreviated BaP, this process is known as determining the BaP equivalent concentration.

The TEFs for the seven potentially carcinogenic PAHs are given in the table below.

PAH	Toxicity Equivalency Factor (TEF)
Benzo(a)pyrene	1.0
Benz(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.01
Chrysene	0.001
Dibenzo(a,h)anthracene	1.0
Indeno(1,2,3-cd)pyrene	0.1

The BaP equivalent concentration was calculated for each sample using the following four-step process. First, for any potentially carcinogenic PAH that was not detected, half the reporting limit was used as the concentration for that PAH. Second, the concentration of each potentially carcinogenic PAH was multiplied by its TEF to calculate its BaP equivalent concentration. Third, the BaP equivalent concentrations for all potentially carcinogenic PAHs were summed to give the total BaP equivalent concentration. Fourth, if no potentially carcinogenic PAHs were detected in a sample, the reporting limit for benzo(a)pyrene was used as the total BaP equivalent concentration.

Table 4-5 presents the concentrations of potentially carcinogenic PAHs in each discrete surface soil sample submitted for analysis of PAHs. This table also provides the TEFs and the resulting total BaP equivalent concentration for each sample. In Table 4-5, the total BaP equivalent concentrations are compared to risk-based screening levels for BaP for direct contact exposures to soil (i.e., incidental ingestion, dermal contact and inhalation of constituents emitted from soil to the air). The risk-based screening level for residential exposures to BaP in soil is 15 µg/kg. This value comes from the USEPA Regional Screening Level tables and corresponds to a risk level of 10^{-6}. As discussed in Section 3, a risk level of 10^{-4} is used as the point of departure for evaluating total cancer risks in this assessment. Consequently, a residential risk-based screening level corresponding to a risk level of 10^{-4}, 1,500 µg/kg, was used to evaluate the total BaP equivalent concentrations in Table 4-5. Of the 18 samples, 12 had total BaP equivalent concentrations that exceeded the residential risk-based screening level of 1,500 µg/kg. To evaluate future nonresidential uses of the site, Table 4-5 presents a comparison of the total BaP equivalent concentrations to the non-residential risk-based screening level of 21,000 µg/kg (corresponding to a risk level of 10^{-4}). Five of the 18 samples had total BaP equivalent concentrations that exceeded the non-residential risk-based screening level of 21,000 µg/kg.

The BAP equivalents were exceeded at 12 locations for the discrete surface soil samples. The BAP equivalents are illustrated on Figure 4-2. The presence of clay target remains was observed and the locations were noted in the boring logs. Sampling locations where clay targets were present and BAP equivalents exceeded the 1,500 µg/kg screening level are color-coded red. Sampling locations where clay targets were present but the BAP equivalents screening level was not exceeded are highlighted green. In all but one soil sample location where clay target remains were present, PAHs exceeded the 1,500 µg/kg screening criteria. PAHs were not exceeded at soil sample locations where clay target remains were not present.

Lead was the primary COC for the investigation and all the screening data were based on XRF lead results. Approximately 20 percent of the XRF screened data were shipped to a FBL for lead analysis, along with other parameters determined on a site by site basis. The XRF and FBL data were plotted on Figure 4-3 using the direct contact residential soil screening value of 400 mg/kg. The values are color coded green for less than 400 mg/kg, yellow for 400 to 800 mg/kg, and red for greater than 800 mg/kg. FBL data superceded XRF data when present. The correlation between the XRF and FBL values was statistically acceptable; subsequently, the predicted lab values were used in place of the XRF values. Figure 4-3 shows the two sample points east of the eastern trap house that exceeded 400 mg/kg, and the three sample points west of the western trap house that exceeded 400 mg/kg. The Human Health Risk Screening Evaluation is discussed in Section 4.5.

Ecological screening values were 11 mg/kg for wildlife exposure to lead in soil, 120 mg/kg for plant exposure to lead in soil, and 1,700 mg/kg for soil invertebrates exposure to lead in soil. There were some exceedances of the 120 mg/kg for plant exposure, both east and west of the former trap house locations. There were no exceedances of the 1,700 mg/kg for soil invertebrates. The Eco Screening levels for lead in soil are illustrated on Figure 4-4.

Conservative ecological screening values were 30.2 mg/kg for benthic invertebrates exposure to lead in sediment, and a less conservative value of 112 mg/kg for benthic invertebrates exposure to lead in sediment. There was only one exceedance of the conservative 30.2 mg/kg for benthic invertebrates exposure. This was a sediment sample location approximately 500 feet offshore due north of the trap houses. The Eco Screening levels for lead in sediment are illustrated on Figure 4-5. The Ecological Risk Screening Evaluation is discussed in Section 4.6.

4.4 DATA PRESENTATION/DATA USABILITY

4.4.1 Data Quality Review of Samples at Old Skeet and Trap Range

This section summarizes the results of the data review processes used to determine whether analytical laboratory data collected during the sampling field effort for the Old Skeet and Trap Range were of acceptable quality for use in decision-making. The review began with data validation. The DQOs presented in the Munitions Response Program Site Inspections at Five Small Arms/Skeet Ranges QAPP (April 2009) were maintained through the course of the sampling event. The Worksheets #19 and #15 of the QAPP present the analytical methods and compounds analyzed.

Appendix D, Table 1 presents all the qualified data and the reason for the data qualification. The rejection of data was not necessary for samples collected at the Old Skeet and Trap Range and all data are considered valid for their intended purpose.

4.4.1.1 Data Quality Review

Some of the DQIs are generated from analysis of field samples (e.g., field duplicates) and some are generated from the analysis of laboratory samples (e.g., laboratory duplicates). Individually, field and laboratory DQIs provide measures of the performance of the respective investigative operations (field or laboratory). If individual QC results were acceptable, there was no assignment of validation flags to an analytical result; otherwise, there was assignment of a flag indicating the type of QC deficiency to the result.

4.4.1.2 Completeness

The sample collection and laboratory analytical completeness were 100%.

4.4.1.3 Sensitivity

The project quantitation limit goals (PQLGs) are listed in Worksheet #15 in the QAPP (April 2009). Analytical sensitivity was generally satisfactory to meet DQOs presented in the QAPP. However, at the inception of the project, the laboratory could not meet several of the PQLGs. Worksheet #15 highlights the exceedances of the PQLGs.

The amount of sample volume collected also affects the ability of the laboratory to achieve the desired PQLGs. Laboratory or field blank contamination can also elevate a result above the PQLGs, resulting in samples being qualified as non-detected. There are instances where the non-detected sample results exceed the PQLGs either because of the laboratory's inability to meet the PQLG or because of elevated detection limits because of blank contamination. Because of the large quantity of data collected and the limited number of individual chemicals driving risk, the elevated detection limits did not have a significant impact on the assessment of risk and no impact or presence or absence determinations.

4.4.1.4 Accuracy

Appendix D, Table 1 shows that several results were qualified because of matrix spike, LCS, surrogate, holding time, or calibration noncompliances. The noncompliances in general do not show any directional bias with the data except for the following cases. Antimony and copper had matrix recoveries less than the laboratory quality control limit but greater than 30% indicating a slight low bias. Two samples analyzed for PAHs had low surrogate recoveries and were extracted outside of the hold time. The sample were re-extracted outside of the extraction hold time because of the low surrogate recoveries. These outliers are not indicative of the PAHs in general and is likely due to sample matrix effect and not laboratory error. Overall, the laboratory accuracy was acceptable and no data were rejected. There were no quality control deficiencies noted for field accuracy.

4.4.1.5 Field and Laboratory Precision

Laboratory duplicate imprecision resulted in the qualification of several antimony results. Despite the data qualifications the data are acceptable for use in risk screening. Field duplicate precision was acceptable.

4.4.1.6 Comparability

No comparability issues were noted during the data validation process.

4.4.1.7 Representativeness

The QAPP (April 2009) and the use of standardized sampling, sample handling, sample analysis, and data reporting procedures were designed so that the final data would be accurate representations of actual site conditions. Based on field logs indicating the conditions during sample collection and laboratory audits all reported data are adequately representative of site conditions and intended populations.

4.5 HUMAN HEALTH RISK SCREENING EVALUATION

The purpose of the human health risk screening evaluation is to conservatively estimate risks posed to potential human receptors from chemicals present at the Old Skeet and Trap Range. The human health risk screening followed the steps described in Section 3.3, which presented the general methodology for the human health risk screening. These steps are:

- Identification of COPCs
- Exposure Assessment
- Risk Characterization
- Uncertainty Analysis

4.5.1 Identification of Chemicals of Potential Concern

4.5.1.1 Chemicals of Potential Concern in Soil

Human health COPCs in soil were identified using the following considerations:

- Occurrence and distribution of chemicals in the environmental media
- Chemical toxicity
- Occurrence of chemical in background samples

Soil samples in the Old Skeet and Trap Range were divided into three areas of interest for the risk screening evaluation:

- Composite surface soil samples collected from the firing lines
- Discrete surface soil samples
- Discrete subsurface soil samples

A soil sample was classified as a surface sample if its sampling interval begins at the surface. TtNUS classifies any soil sample whose sampling interval begins below the surface as a subsurface soil sample.

Using the methodology described in Section 3.3 the maximum concentration of each chemical in soil in each area of interest was compared to up to four risk-based screening levels: two risk-based screening levels based on direct contact exposures to soil and two based on protection of groundwater. If the maximum concentration exceeded any of the risk-based screening levels, the chemical was classified as a possible COPC. These chemicals were subjected to a comparison to background soil data to determine if the soil concentrations in the area of interest are consistent with background soil concentrations. Section 3.3 presents the approach used to determine if the chemicals are present in soil at concentrations consistent with background concentrations. Because the background evaluation is used in both the human health and ecological risk screening, the background evaluation is presented in Appendix G. For chemicals identified as possible COPCs, TtNUS retained the chemical as a COPC for the human health risk screening only if the chemical was present in soil in the area of interest at concentrations above background.

4.5.1.1.1 Composite Surface Soil Samples

Appendix E, Table 4-1 presents the results of the evaluation of composite surface soil samples. The following chemicals were identified as human health COPCs in the composite surface soil samples:

- Antimony
- Nitroglycerin

4.5.1.1.2 Discrete Surface Soil Samples

Appendix E, Table 4-2 presents the results of the evaluation of discrete surface soil samples. The following chemicals were identified as human health COPCs in the discrete surface soil samples:

- Antimony
- Lead
- 1-Methylnaphthalene

- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Chrysene
- Dibenzo(a,h)anthracene
- Indeno(1,2,3-cd)pyrene
- Naphthalene

4.5.1.1.3 Discrete Subsurface Soil Samples

Appendix E, Table 4-3 presents the results of the evaluation of discrete subsurface soil samples. No chemicals were identified as human health COPCs in the discrete subsurface soil samples.

4.5.1.2 Chemicals of Potential Concern in Sediment

Human health COPCs in sediment were identified with the following considerations:

- Occurrence and distribution of chemicals in the environmental media
- Chemical toxicity
- Occurrence of chemical in background samples

Using the methodology described in Section 3.3, the maximum concentration of each chemical in sediment was compared to up to four risk-based screening levels: two risk-based screening levels based on direct contact exposures to sediment and two based on ingestion of fish. If the maximum concentration exceeded any of the risk-based screening levels, the chemical was classified as a possible COPC. These chemicals were then compared to background sediment data to determine if the sediment concentrations are consistent with background sediment concentrations. Section 3.3 presents the approach used to determine if the chemicals are present in sediment at concentrations consistent with background concentrations. Because the background evaluation is used in both the human health and ecological risk screening, the background evaluation is presented in Appendix G. For chemicals identified as possible COPCs, TtNUS retained the chemical as a COPC in sediment for the human health risk screening only if the chemical was present in sediment at concentrations above background.

Appendix E, Table 4-4 presents the results of the evaluation of sediment samples. There were only four background sediment samples and no PAHs were found in these sediment samples, but arsenic was

detected in three of the four samples. There are seven site sediment samples with arsenic data and the maximum detected arsenic concentration in the site sediment samples (5.8 mg/kg) exceeds the maximum detected arsenic concentration in background sediment samples (4.1 mg/kg), which may mean that arsenic is present in site sediment samples at concentrations above background. However, the average arsenic concentration in the background samples (2.7 mg/kg) is greater than the average arsenic concentration in site sediment samples (1.49 mg/kg), so arsenic may be present in sediment at levels consistent with background. To be conservative, arsenic is being treated as being present in sediment at concentrations above background and designated arsenic as a human health COPC in sediment. In summary, TtNUS identified the following chemicals as COPCs in sediment:

- Arsenic
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Indeno(1,2,3-cd)pyrene

4.5.2 Exposure Assessment

This section presents the exposure assessment for the Old Skeet and Trap Range. This range, which was used for small arms recreational activities, is currently a grass field that is used as a helicopter pad and for recreational activities. According to the NSF Indian head Master Plan, future land use is not anticipated to change.

No public access is authorized at NSF-IH, Stump Neck Annex. Signs, partial fencing, locked/secured gates, login book/office check-in, and vehicle security patrols are used to control the entire facility. There are no access control features specific to the Old Skeet and Trap Range. Access from the Potomac River is not controlled. There are no known land use/development restrictions for the range.

The Coastal Zone of Maryland includes all land and water lying within coastal counties, one of which is Charles County. Within the Coastal Zone, Maryland has defined an area within which strict land use management is needed to protect the Chesapeake Bay. The critical area is defined as a 1,000-foot-wide strip of land surrounding the bay and its tidal tributaries. Most construction within 100 feet of the Mean High Water Line (buffer) is prohibited. Most of the area of Old Skeet and Trap Range falls within the 100-foot buffer.

Under the current and predicted future land use patterns for this site, potential human receptors include authorized Navy personnel (military and civilian), visitors, contractors, maintenance workers, recreational users, and trespassers.

The following exposure pathways were evaluated during the human health risk screening evaluation:

- Direct contact exposures to surface and subsurface soil (incidental ingestion of soil, dermal contact with soil, inhalation of chemicals volatilized from soil into outdoor air and inhalation of chemicals in soil emitted into the air as particulates).

- Direct contact exposures to sediment (incidental ingestion of sediment and dermal contact with sediment).

- Ingestion of fish following uptake of chemicals into the fish from sediment.

Also analyzed was the potential for COPCs in soil to leach into groundwater and adversely affect groundwater quality.

The maximum detected concentrations of the COPCs in soil and sediment were used (see Appendix E, Tables 4-1, 4-2, 4-3 and 4-4) as the EPCs in the risk characterization.

4.5.3 Risk Characterization

This section presents the risk characterization for the Old Skeet and Trap Range. The risk characterization involved:

- Calculating risks and hazard indices for direct contact exposures to soil.

- Evaluating direct contact exposures to lead in soil.

- Evaluating the potential for chemicals to leach from soil to groundwater and affect groundwater quality (the soil to groundwater pathway).

- Calculating risks and hazard indices for direct contact exposures to sediment.

- Calculating risks and hazard indices for ingestion of fish following uptake of chemicals into fish from sediment.

4.5.3.1 Evaluation of Direct Contact Exposures to Soil

As discussed previously, COPCs were identified for the human health risk screening evaluation for the composite surface soil samples and discrete surface soil samples. Using the procedures presented in Section 3.3, risks and hazard indices for direct contact exposures to these soils. TtNUS also evaluated direct contact exposures to lead in discrete surface soil samples were calculated.

4.5.3.1.1 Composite Surface Soil Samples

Appendix E, Table 4-5 presents the calculated risks and hazard indices for direct contact exposures to COPCs in the composite surface soil samples. Appendix E, Table 4-5 presents risk and hazard indices for both residential and non-residential exposures. For residential exposures, the total calculated risk is $1.3x10^{-7}$, which is well below USEPA's acceptable risk level of 10^{-4}. The calculated hazard index is 0.63, which is below USEPA's acceptable hazard index of 1.

For non-residential exposures, the total calculated risk is $3.7x10^{-8}$, which is well below USEPA's acceptable risk level of 10^{-4}. The calculated hazard index is 0.061, which is below USEPA's acceptable hazard index of 1.

4.5.3.1.2 Discrete Surface Soil Samples

Appendix E, Table 4-6 presents the calculated risks and hazard indices for residential and non-residential direct contact exposures to COPCs in the discrete surface soil samples. For residential exposures, the total calculated risk is $4x10^{-3}$, which exceeds USEPA's acceptable risk level of 10^{-4}. This risk was calculated using the maximum detected concentration, which is conservative. Using the average concentration (not the 95% upper confidence limit on the mean or the 95% UCL), the risk is $1x10^{-3}$ which also exceeds USEPA's acceptable risk level of 10^{-4}. The calculation using the average is presented for context. USEPA recommends using the 95% UCL not the average in risk calculations. The 95% UCL is an upper-bound estimate of the average, and is consequently, greater than the average. If the 95% UCL was used in the calculation, the risk would be higher than $1x10^{-3}$. These risks are due to PAHs in soil samples, principally benzo(a)pyrene. The PAHs are believed to be associated with the fragments of the clay pigeons used as targets on the skeet range. A pitch tar containing PAHs was used in the manufacture of the clay pigeons to help bind the clay particles. The calculated hazard index is 0.16, which is below USEPA's acceptable hazard index of 1.

For non-residential exposures, the total calculated risk using the maximum detected concentration is $2.9x10^{-4}$, which exceeds USEPA's acceptable risk level of 10^{-4}. Using the average concentration, the risk is $7.3x10^{-5}$, which is below USEPA's acceptable risk level of 10^{-4}. As discussed above, the calculation using the average is presented for context. Because the total risk using the average concentration is less than 10^{-4}, it is possible that the risk calculated using the 95% UCL will be less than 10^{-4}. The calculated hazard index is 0.012, which is below USEPA's acceptable hazard index of 1.

Appendix E, Table 4-7 presents the comparison of the maximum lead concentration in the discrete soil samples to residential and non-residential risk-based concentrations. Four samples out of 14 had lead concentrations exceeding the residential direct contact screening value of 400 mg/kg and one sample had a lead concentration (940 mg/kg) that exceeded the non-residential direct contact screening value of 800 mg/kg.

4.5.3.2 Evaluation of the Soil to Groundwater Pathway

Using the procedures presented in Section 3.3, the soil to groundwater pathway was evaluated for COPCs in composite surface soil samples and discrete surface soil samples.

4.5.3.2.1 Composite Surface Soil Samples

Appendix E, Table 4-8 presents the comparison of the maximum detected concentration and average concentration to the risk-based concentrations in soil for protection of groundwater. This table presents risk-based concentrations for dilution-attenuation factors of 1 (the conservative default value) and 20. The maximum concentration of antimony in soil exceeds risk-based concentrations for a dilution-attenuation factor of 1 but not 20. The maximum concentration of nitroglycerin in soil exceeds risk-based concentrations for dilution-attenuation factors of both 1 and 20. Nitroglycerin is fairly reactive in the environment, so if nitroglycerin leaches from soil into groundwater, there is a good chance that some or all of this chemical will degrade in groundwater. Also, groundwater from the Old Skeet and Trap Range is not used as a source of drinking water, so the pathway is currently incomplete.

4.5.3.2.2 Discrete Surface Soil Samples

Appendix E, Table 4-9 presents the comparison of the maximum detected concentrations and average concentrations to the risk-based concentrations in soil for protection of groundwater for dilution-attenuation factors of 1 and 20. The maximum concentration of antimony in soil exceeds risk-based concentrations for a dilution-attenuation factor of 1 but not 20. The maximum concentrations of a number

of PAHs exceed risk-based concentrations for dilution-attenuation factors of both 1 and 20. While all PAHs have relatively low solubility in water, naphthalene and 1-methylnaphthalene, which are among the more soluble PAHs, are readily biodegradable; therefore, if these PAHs leach from soil into groundwater, there is a good chance that some or all of these chemicals will degrade in groundwater. The remaining PAHs in Appendix E, Table 4-9 all have very low solubility in water. These PAHs have much higher affinity for soil solids (particularly soil organic carbon) than for soil water. It could take a long time (years to decades) for these PAHs to leach through the soil and reach groundwater. These PAHs are also susceptible to biodegradation and even a low rate of biodegradation could remove the chemicals from the leachate before it reaches the groundwater. Also, as noted above, groundwater from the Old Skeet and Trap Range is not used as a source of drinking water, so the pathway is currently incomplete.

4.5.3.3 Evaluation of Direct Contact Exposures to Sediment

COPCs in sediment samples were identified for the human health risk screening evaluation. Using the procedures presented in Section 3.3, TtNUS calculated risks and hazard indices for direct contact exposures to these sediments, as presented in Appendix E, Table 4-10. The total calculated risk is 1.5×10^{-6}, which is well below USEPA's acceptable risk level of 10^{-4}. The calculated hazard index is 0.026, which is well below USEPA's acceptable hazard index of 1.

4.5.3.4 Evaluation of Fish ingestion Via Chemical Uptake from Sediment

TtNUS identified COPCs in sediment samples for the human health risk screening evaluation. Using the procedures presented in Section 3.3, TtNUS calculated risks and hazard indices for ingestion of fish following uptake of chemicals into fish from sediment, as presented in Appendix E, Table 4-11. The total calculated risk is 6.2×10^{-5}, which is below USEPA's acceptable risk level of 10^{-4}. The calculated hazard index is 0.12, which is below USEPA's acceptable hazard index of 1. The risk is due to arsenic and PAHs in sediment. As discussed previously, arsenic may be present in sediment at background concentrations. The sediment samples came from Mattawoman Creek, and TtNUS collected fish from Mattawoman Creek and analyzed fish tissue samples for PAHs (TtNUS, 2004). No PAHs were detected in any of the fish tissue samples. Thus, the potential for PAHs to be assimilated from sediment through aquatic food webs into fish is low at this site.

4.5.4 Uncertainty Analysis

Section 3.3.4 provides a detailed discussion of the sources of uncertainty in the human health risk screening evaluation.

4.5.5 Human Health Risk Screening Evaluation Summary

In the human health risk screening evaluation, soil and sediment data for the Old Skeet and Trap Range was evaluated. The soil samples for this site was divided into three areas of interest for the risk screening evaluation:

- Composite surface soil samples collected from the firing lines
- Discrete surface soil samples
- Discrete subsurface soil samples

For the composite surface soil samples collected from the firing lines, antimony and nitroglycerin were selected as COPCs for the human health risk screening evaluation. The calculated risks for direct contact exposures for residential and nonresidential land uses were below the USEPA target level of 10^{-4} and the calculated hazard indices for residential and nonresidential land uses were below the USEPA target level of 1. Maximum antimony concentrations in soil exceeded risk-based concentrations in soil for protection of groundwater for a dilution-attenuation factor of 1, but not risk-based concentrations in soil for a dilution-attenuation factor of 20. Maximum nitroglycerin concentrations in soil exceeded risk-based concentrations in soil for protection of groundwater for dilution-attenuation factors of both 1 and 20. Nitroglycerin is fairly reactive in the environment, so nitroglycerin originating in soil may degrade as it leaches such that the resulting concentrations of nitroglycerin in groundwater are not significant. Groundwater from the Old Skeet and Trap Range is not used as a source of drinking water, so the pathway is currently incomplete.

For the discrete surface soil samples, antimony, lead and a number of PAHs were selected as COPCs for the human health risk screening evaluation. Using the maximum detected concentrations in soil, the calculated risks for direct contact exposures for residential and nonresidential land uses exceeded the USEPA target level of 10^{-4}, but the calculated hazard indices for residential and nonresidential land uses were below the USEPA target level of 1. The elevated risks were due to the presence of potentially carcinogenic PAHs in soil, and these PAHs are believed to be associated with the fragments of the clay pigeons used as targets on the rifle range. In the evaluation of direct contact exposures to lead in soil, 4 samples out of 14 had lead concentrations exceeding the residential direct contact screening value of 400 mg/kg, and one sample had a lead concentration (940 mg/kg) that exceeded the non-residential direct contact screening value of 800 mg/kg.

The maximum concentration of antimony in discrete surface soil samples exceeded risk-based concentrations for a dilution-attenuation factor of 1 but not 20. The maximum concentrations of a number

of PAHs exceeded risk-based concentrations for dilution-attenuation factors of both 1 and 20. All PAHs have relatively low solubility in water, but the more soluble PAHs that are COPCs (i.e., naphthalene and 1-methylnaphthalene) are readily biodegradable; therefore, if these PAHs leach from soil into groundwater, there is a good chance that some or all of these chemicals will degrade in groundwater. The PAHs with very low solubility in water have much higher affinity for soil solids than for soil water. It could take a long time (years to decades) for these PAHs to leach through the soil and reach groundwater. The PAHs with very low solubility are also susceptible to biodegradation and even a low rate of biodegradation could remove the chemicals from the leachate before it reaches the groundwater. As noted above, groundwater from the Old Skeet and Trap Range is not used as a source of drinking water, so the pathway is currently incomplete.

For the discrete subsurface soil samples, all chemicals were below human health risk-based screening levels for soil or were present in subsurface soil at concentrations consistent with background soil concentrations. Consequently, no potential adverse health effects are expected from exposures to subsurface soil as a result of future residential or non-residential uses of the Old Skeet and Trap Range.

For the sediment samples collected from Mattawoman Creek, arsenic and four potentially carcinogenic PAHs were selected as COPCs for the human health risk screening evaluation. The calculated risks for direct contact exposures to sediment were below the USEPA target level of 10^{-4}, and the calculated hazard indices were below the USEPA target level of 1. The calculated risks for ingestion of fish following uptake of chemicals into fish from sediment were below the USEPA target level of 10^{-4} and the calculated hazard indices were below the USEPA target level of 1. The calculated risk is attributed to arsenic and PAHs in sediment. Arsenic may be present in sediment at concentrations consistent with background concentrations, but arsenic was retained as a COPC in sediment to be conservative. In fish samples from Mattawoman Creek, no PAHs were detected in any of the fish tissues. Thus, the potential for PAHs to be assimilated from sediment through aquatic food webs into fish is low at this site.

4.6 ECOLOGICAL RISK SCREENING EVALUATION

4.6.1 Site Description

Section 4.1 presents a detailed description of the site location, history, and background of the site.

4.6.2 Potential Ecological Receptors and Exposure Pathways

The contaminated media to which ecological receptors may be exposed include surface soil and sediment. These potential ecological receptors and exposure pathways are described in detail in Section 3.4.1.1.

4.6.3 Ecological Screening

The first part of the evaluation is selection of COPCs.

4.6.3.1 COPCs for Terrestrial Invertebrates and Plants

Appendix F, Tables 4-6.3.1 and 4-6.3.2 present the chemicals that were retained as COPCs in surface soil for potential risks to plants and invertebrates for the grab samples and the composite samples, respectively. These tables also present the chemicals that were retained for food chain modeling for mammals and birds (discussed further in Section 4.6.3.3).

Terrestrial Invertebrates

Nine PAHs were selected as COPCs for terrestrial invertebrates in surface soil from grab samples because they were detected at concentrations that exceeded screening levels. Nitroglycerin was selected as a COPC for terrestrial invertebrates in the composite soil samples because a screening level was not available.

Terrestrial Plants

Fourteen PAHs and lead were selected as COPCs for terrestrial plants in surface soil from grab samples because they were detected at concentrations that exceeded screening levels. Two PAHs were selected as COPCs for terrestrial plants in surface soil from grab samples because they did not have screening levels. Nitroglycerin was selected as a COPC for terrestrial plants in the composite soil samples because a screening level was not available.

4.6.3.2 COPCs for Benthic Invertebrates

Appendix F, Table 4.6.3.3 presents the chemicals that were selected as COPCs in sediment samples for potential risks to benthic invertebrates. Four inorganics were retained as COPCs because they were detected at concentrations that exceeded screening levels.

4.6.3.3 COPCs for Mammals and Birds

Appendix F, Tables 4-6.3.1 and 4-6.3.2 present the chemicals that were retained for food chain modeling for terrestrial mammals and birds because they were detected at concentrations above screening levels or did not have screening levels for mammals or birds. Because the sediment screening levels are not based on risks to wildlife, all detected bioaccumulative chemicals were retained for food chain modeling.

Tables 4-6.3.4 to 4-6.3.6 summarize the results of the conservative inputs food chain modeling for terrestrial and piscivorous receptors. Appendix F presents the calculation worksheets. The following summarizes the results of the food chain modeling using maximum concentrations and conservative input parameters:

- Most of the PAHs had EEQs greater than 1.0 in the food chain model for surface soil from grab samples.

- Antimony, copper, and lead had EEQs greater than 1.0 in the food chain model for surface soil from grab samples.

- Antimony and lead had EEQs greater than 1.0 in the food chain model for the composite soil samples.

- Copper and zinc had EEQs greater than 1.0 in the food chain model for sediment.

- Avian TRVs were not available for antimony and nitroglycerin.

4.6.4 Step 3A Refinement

Step 3a consists of a refinement of the conservative exposure assumptions/concentrations to evaluate the potential risks to ecological receptors (i.e., plants, invertebrates, and wildlife receptors). The objective of the Step 3a refinement is to better define those chemicals that contribute to potentially unacceptable levels of ecological risk, and to identify and eliminate from further consideration those COPCs that were retained because of the use of very conservative exposure scenarios. The Step 3a evaluation is designed to eliminate chemicals from further evaluation for certain groups of receptors. For example, a chemical may be eliminated as a COPC in soil based on risks to soil invertebrates and plants but may be retained for evaluating risks to wildlife. COPCs were only discussed if there were risks from the less conservative model in step 3A.

4.6.4.1 Terrestrial Plants and Invertebrates

Terrestrial Invertebrates

PAHs were retained as COPCs for terrestrial invertebrates in surface soil from grab samples because they were frequently detected at concentrations that exceeded screening levels. Also, maximum concentrations of PAHs exceeded maximum background concentrations. Nitroglycerin was selected as a COPC for terrestrial invertebrates in the composite soil samples because a screening level was not available. No background data were available for nitroglycerin.

Terrestrial Plants

PAHs were selected as COPCs for terrestrial plants in surface soil from grab samples because they were frequently detected at concentrations that exceeded screening levels or because screening levels were not available. Also, maximum concentrations of PAHs exceeded maximum background concentrations. An Eco SSL is not available for plants. However, data presented in Appendix F, Table 3.1 in the Eco SSL document for PAHs shows that PAHs are typically not toxic to plants except at high soil concentrations with the lowest listed EC_{50} of 30 mg/kg (Mitchell et al., 1988). Also, in Appendix III of the Canadian SQG document for benzo(a)pyrene (EC, 1999), a NOEC of 4,400 mg/kg was the lowest reported NOEC value for plants and was based on seedling emergence after 3 days of exposure. Therefore, risks to plants are acceptable, and PAHs are not retained as COPCs for risks to plants. Lead was selected as a COPC for terrestrial plants in surface soil from grab samples because it was detected at concentrations that exceeded its screening level. Also, maximum concentrations of lead exceeded maximum background concentrations. Nitroglycerin was selected as a COPC for terrestrial plants in the composite soil samples because a screening level was not available. No background data were available for nitroglycerin.

4.6.4.2 Benthic Invertebrates

Several of the sediment risk screening levels used to select COPCs, are conservative because chemicals detected at concentrations below these levels are not expected to cause any adverse impacts to the benthic community. Since the objective of the ERA screening is to determine if the chemicals at the site are causing a risk to ecological receptors, alternate benchmarks were used to further evaluate the risk associated with chemicals that exceeded the conservative screening levels. The maximum concentrations of copper (36.1 mg/kg) and lead (37 mg/kg) were slightly greater than their screening levels, but were much lower than their Probable Effects Level (PEL) values (108 mg/kg and 112 mg/kg for copper and lead, respectively) (Buchman, 2008). Tin was detected in only 1 of 7 samples and was equal

to its Apparent Effects Threshold (AET) value of 3.4 mg/kg (Buchman, 2008). The AET is defined as the concentration of a given chemical above which statistically significant ($p<0.05$) biological effects are always expected to occur (Cubbage et al., 1997). The AETs are based on Microtox bioassays or bioassays using amphipods, *Hyalella azteca*. The AETs/PAETs based on Microtox bioassays are typically lower than the AETs based on amphipods. The maximum concentration of zinc (164 mg/kg) was less than its Probable Effects Concentration (PEC) value (459 mg/kg for zinc). Although maximum concentrations of copper, lead, and zinc exceeded maximum background concentrations, risks from these metals are not expected as their concentrations are well below their respective PEL and PEC values; therefore, they are eliminated as COPCs. No background data were available for tin; however, tin was eliminated as a COPC because its maximum concentration did not exceed its AET value and it was infrequently detected. A discussion of the chemicals that have EEQs greater than 1.0 using the less conservative food chain modeling for mammal and birds are presented below.

4.6.4.3 Mammals and Birds

The EEQs from the terrestrial food chain modeling were greater than 1.0 for several chemicals using maximum chemical concentrations and conservative exposure assumptions (see Section 4.6.3.3). Therefore, as part of the Step 3a refinement, risks for this pathway were recalculated using average chemical concentrations in surface soil and sediment and less conservative exposure assumptions (i.e., average ingestion rates, average body weights) (see Appendix F, Table 3.4-3).

Appendix F, Tables 4-6.3.7 to 4-6.3.9 summarize the results of the less conservative inputs food chain modeling for terrestrial and piscivorous receptors, respectively. Appendix F presents the calculation worksheets. A discussion of the risks to mammals and birds is presented below.

Terrestrial Receptors

Several of the PAHs have EEQs greater than 1.0 using the NOAEL as the TRV; however, none have EEQs greater than 1.0 using the LOAEL as the TRV. Because PAHs are related to site activities, they are retained as COPCs to be conservative.

Antimony and lead in the grab samples had EEQs greater than 1.0 using the NOAEL as the TRV, but EEQs are less than 1.0 using the LOAEL as the TRV. Maximum concentrations of antimony and lead in grab samples exceeded the maximum background concentrations. Because antimony and lead are related to site activities, they are retained as COPCs.

Lead in the composite samples had an EEQ greater than 1.0 using the NOAEL as the TRV. Maximum concentrations of lead in composite samples exceeded the maximum background concentrations. Because lead is related to site activities, it is retained as a COPC.

An avian TRV was not available for nitroglycerin; however, nitroglycerin is considered to be non-toxic to birds (USACHPPM, 2007). Therefore, it is not likely that nitroglycerin will impact birds at the site. Also, the areas potentially impacted by nitroglycerin (the firing points) are small. For these reasons, nitroglycerin is eliminated as a COPC.

Piscivorous Receptors

None of the inorganics has EEQs greater than 1.0 using the NOAEL as the TRV.

4.6.5 Ecological Risk Screening Summary

This section presents a summary of the conclusions of the ecological risk assessment that was conducted for the site.

4.6.5.1 Risks to Terrestrial Plants and Invertebrates

Nitroglycerin was not eliminated as a COPC for risks to plants and invertebrates because although toxicity data are not available, it was detected in the two composite soil samples that were analyzed for NG.

Several PAHs were detected at concentrations that exceeded invertebrate and plant screening levels. Because of the high concentrations of the PAHs and their high detection frequency, PAHs are retained as COPCs.

Lead exceeded the screening level for risk for plants in surface soil, and therefore, lead was retained as a COPC.

4.6.5.2 Benthic Invertebrates

No chemicals were retained as COPCs.

4.6.5.3 Mammals and Birds

The following chemicals were retained as COPCs for terrestrial wildlife because they had EEQs greater than 1.0 in the food chain model and are related to site activities:

- PAHs
- Antimony and lead

No chemicals were retained as COPCs for piscivorous wildlife.

4.7 UPDATED CSM

Only MC associated with the Old Skeet and Trap Range are considered in the CSM exposure pathway analysis. A general description of the CSM exposure pathway analysis was included in Section 10.2.7 of the SAP as follows: Contaminants at the Old Skeet and Trap Range may potentially migrate within soil, groundwater, surface water, and sediment. Sediment contamination in Mattawoman Creek may have resulted from shooting into the direction of the creek. Although erosion on the range is considered to be minimal, contaminants may become mobile within the surface soil, particularly during extended periods of surface runoff. Runoff would occur in the direction of Mattawoman Creek. Direct human or biota contact with surficial and subsurface soil is possible if the soil is disturbed. Precipitation infiltration may provide for contaminant mobility through the subsurface to the shallow surficial groundwater aquifer, which is assumed to be connected to the nearby surface water bodies. Based on a review of hydrogeological data, it is unlikely that MC in shallow groundwater would migrate to the deeper aquifers used as a water supply. However, shallow groundwater is still considered a potential exposure medium. Potential human receptors include authorized Navy personnel (military and civilian), visitors, contractors, maintenance workers, recreational users, and trespassers. Plant and animal biota are also potential receptors. Examples of ecological receptors include deer, wild turkey, fish, and waterfowl (ducks and geese).

Human Health Risk Exposure Summary:

The human health CSM summary table is presented as Table 4-6.

Arsenic may be present in sediment at concentrations consistent with background concentrations, but arsenic was retained as a COPC in sediment to be conservative.

Maximum nitroglycerin concentrations in soil exceeded risk-based concentrations in soil for protection of groundwater for dilution-attenuation factors of both 1 and 20. Nitroglycerin is fairly reactive in the

environment, so nitroglycerin originating in soil may degrade as it leaches such that the resulting concentrations of nitroglycerin in groundwater are not significant. Groundwater from the Old Skeet and Trap Range is not used as a source of drinking water, so the pathway is currently incomplete.

In the evaluation of direct contact exposures to lead in soil, 4 samples out of 14 had lead concentrations exceeding the residential direct contact screening value.

The maximum concentration of antimony in discrete surface soil samples exceeded risk-based concentrations for a dilution-attenuation factor of 1 but not 20.

Elevated risks of PAHs in soil appear to be associated with the fragments of the clay pigeons used as targets on the rifle range. The PAHs with very low solubility are also susceptible to biodegradation and even a low rate of biodegradation could remove the chemicals from the leachate before it reaches the groundwater. In fish samples from Mattawoman Creek, no PAHs were detected in any of the fish tissues. Thus, the potential for PAHs to be assimilated from sediment through aquatic food webs into fish is low at this site.

Ecological Risk Exposure Summary:

The Ecological CSM summary table is presented as Table 4-7.

Risks to Terrestrial Plants and Invertebrates

Nitroglycerin was not eliminated as a COPC for risks to plants and invertebrates because although toxicity data are not available, it was detected in the two composite soil samples.

Several PAHs were detected at concentrations that exceeded invertebrate and plant screening levels. Because of the high concentrations of the PAHs and their high detection frequency, PAHs are retained as COPCs.

Lead exceeded the screening level for risk for plants in surface soil, and therefore, lead was retained as a COPC.

Benthic Invertebrates

No chemicals were retained as COPCs.

Mammals and Birds

The following chemicals were retained as COPCs for terrestrial wildlife because they had EEQs greater than 1.0 in the food chain model and are related to site activities:

- PAHs
- Antimony and lead

No chemicals were retained as COPCs for piscivorous wildlife.

CSM Summary

The updated CSM is shown on Figure 4-6 and details the potential exposure sources, pathways, and receptors. The exposure sources appear to be limited to the areas of lead shot accumulation and the presence of clay target fragments. One pathway is runoff from precipitation. Leaching from soil into groundwater has been eliminated as a pathway, since groundwater is not used as the site. Receptors would be trespassers and ecological receptors by ingestion, dermal contact, and inhalation of surface soil, soil, and sediment. Potentially complete exposure pathways exist for both human and ecological receptors under both current and hypothetical future land uses.

4.8 CONCLUSIONS

4.8.1 Conclusions Based on Sampling Results

Based on the sampling performed at the site, a significant amount of the shot appears to have fallen both in the water and along the shoreline of the Potomac River and the adjoining Mattawoman Creek.

MC consisting of metals (primarily lead, and to a lesser extent, antimony, arsenic, copper, tin, and zinc), NG, and PAHs (from pitch tar used in the clay pigeon targets, Figure 4-2) are present in site soil [particularly surface soil (the 0 to 1 foot bgs interval)] and sediment of the Potomac River and adjoining Mattawoman Creek as a result of military training activities. Lead is the primary metal MC of concern in soil and sediment because it is the primary constituent of the spent munitions and because of its documented toxicity to human and ecological receptors. Elevated concentrations of antimony, and at some locations zinc, were spatially correlated with lead concentrations (Figure 4-1).

MC in surface soil may have migrated to subsurface soil and subsequently to underlying groundwater via leaching. These constituents may have also migrated to adjoining surface water and sediment via

surface soil run-off or the discharge of contaminated shallow groundwater to the Potomac River and direct fall out over the river. The extent of potential environmental contamination at the site appears to be limited to immediately in front of the two former trap house locations (PAHs), and northeast of the eastern former trap house location, and northwest of the western former trap house location (metals).

The CSM (Figure 4-6) indicates that potentially complete exposure pathways exist for both human and ecological receptors under both current and hypothetical future land uses. Potential human and ecological risks have been characterized for receptors exposed to the potentially contaminated environmental media. Unacceptable levels of human and/or ecological risk may exist. However, groundwater is not currently used at the site.

The antimony PAL was exceeded at 10 discrete surface soil sampling locations and 2 composite surface soil sampling locations (firing line locations). The lead PAL was exceeded at 10 discrete surface soil sampling locations. Antimony was exceeded at two composite surface soil sampling locations. The zinc PAL was exceeded at two composite and one discrete surface soil sampling locations. The arsenic PAL was exceeded at six sediment sampling locations. The zinc PAL was exceeded at one sediment sampling location. Twelve discrete soil samples had total BaP equivalent concentrations that exceeded the residential risk-based screening level of 1,500 µg/kg.

4.8.2 Data Gaps

There were no data gaps.

4.9 RECOMMENDATIONS FOR NEXT PHASE

Based on the results of the SI, further actions are required. These subsequent actions may include a Remedial Investigation/Feasibility Study (RI/FS) for the Old Skeet and Trap Range that will meet CERCLA requirements. RI activities should include an interim remedial action to address the limited known areas of surface and shallow subsurface soil lead and PAH contamination, and the limited removal of lead-contaminated soils and PAH–contaminated soils. Localized chemical stabilization of lead in soil may also serve to reduce the potential threat of lead releases to the environment.

4.9.1 Objectives for Interim Removal Action, Remedial Investigation, or No Further Action Determination

Specific tasks recommended as part of the RI MC investigation include the following:

Removal of shallow soils in areas with elevated concentration of PAHs and metals. Figure 4-7 illustrates the proposed soil removal areas. Soil is proposed to be excavated to a depth of 2 feet bgs in the area of the clay targets, because of the high exceedances of PAHs. Soil in the areas of lead shot accumulations are proposed to be excavated to a depth of 1 foot bgs . The total amount of soil to be removed is estimated at approximately 2900 cubic yards (yd^3). The excavation totals are calculated as follows:

Location	Dimensions: length x depth x width (ft)	Cubic Feet (ft^3)	Cubic Yards (yd^3)
Lead shot area 1	120 x 90 x 1	10,800	400
Lead shot area 2	50 x 40 x 1	2,000	74
Lead shot area 3	68 x 68 x 1	4,600	170
Clay Targets(PAHs)	300 x 100 x 2	60,000	2,222
Total Proposed Soil Removal	NA	77,400	2,866

Confirmation soil sampling should be performed in the excavation areas using one of these scenarios:

- Increment sampling (IS).
- Four corners and middle of excavation.
- Resample at same locations where there were exceedances, but at depths below the excavated material.

In each of these scenarios, the depth sampled at would be at 1 to 2 feet bgs (pre-excavation depth) in the lead shot excavation accumulation areas, and 2 to 3 feet bgs at the clay target excavation area.

TABLE 4-1

MUNITION TYPES AND CHEMICALS
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

MUNITIONS TYPES USED/STORED AT THE FACILITY

.410 gauge shells
28 gauge shells
20 gauge shells
12 gauge shells
5 pound containers of bulk smokeless powder
shot

ASSOCIATED CHEMICAL CONSTITUENTS

Primary:
Lead
PAHs
Nitroglycerin

Secondary:
Antimony
Arsenic
Copper
Nickel
Zinc
Lead Styphnate
Lead Azide

TABLE 4-2a

OLD TRAP AND SKEET RANGE
SEDIMENT
BACKGROUND COMPARISON
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Chemical	Site Maximum Detected Concentration	Background Maximum Detected Concentration	Average Background Concentration	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion Site Above Background?[4]
Inorganics(mg/kg)								
ARSENIC	5.8	4.1	2.7	7/7	3/4	10/11	9	YES
COPPER	36.1	22.7	12.6	6/7	3/4	9/11	18	YES
LEAD	37	30.7	17.4	6/7	4/4	10/11	9	YES
ZINC	164	142	84.7	7/7	4/4	11/11	0	YES

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.
4 DUE TO THE LIMITED SIZE OF THE BACKGROUND DATASET CONCLUSIONS WERE BASED ON VISUAL COMPARISON

TABLE 4-2b

OLD TRAP AND SKEET RANGE
DISCRETE SURFACE SOIL
BACKGROUND COMPARISON
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Chemical	Site Maximum Detected Concentration	Background Maximum Detected Concentration	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion Site Above Background?	Site Distribution	Background Distribution	Test	Equal Variance?[1]	Test Statistic	P-Value	Quantile Test	Slippage Test	Site Above Background?
PAHS(ug/kg)																
ACENAPHTHENE	5000	140	15/18	1/23	16/41	61	YES[2]									YES[2]
ANTHRACENE	7200	260	15/18	1/23	16/41	61	YES[2]									YES[2]
BENZO(A)ANTHRACENE	33000	480	18/18	1/23	19/41	53.7	YES[2]									YES[2]
BENZO(A)PYRENE	42000	390	18/18	1/23	19/41	53.7	YES[2]									YES[2]
BENZO(B)FLUORANTHENE	41000	420	18/18	1/23	19/41	53.7	YES[2]									YES[2]
BENZO(G,H,I)PERYLENE	25000	130	18/18	1/23	19/41	53.7	YES[2]									YES[2]
BENZO(K)FLUORANTHENE	18000	360	18/18	1/23	19/41	53.7	YES[2]									YES[2]
CHRYSENE	43000	440	18/18	1/23	19/41	53.7	YES[2]									YES[2]
DIBENZO(A,H)ANTHRACENE	7600	ND	18/18	0/23	18/41	56.1	YES[3]									YES[3]
FLUORANTHENE	38000	1100	18/18	2/23	20/41	51.2	YES[2]									YES[2]
FLUORENE	3100	150	10/18	1/23	11/41	73.2	YES[2]									YES[2]
INDENO(1,2,3-CD)PYRENE	27000	100	18/18	1/23	19/41	53.7	YES[2]									YES[2]
NAPHTHALENE	330	110	7/18	1/23	8/41	80.5	YES[2]									YES[2]
PHENANTHRENE	30000	1100	18/18	1/23	19/41	53.7	YES[2]									YES[2]
PYRENE	45000	880	18/18	2/23	20/41	51.2	YES[2]									YES[2]
Inorganics(mg/kg)																
ANTIMONY	4.8	ND	14/14	0/33	14/47	70.2	YES[3]									YES[3]
ARSENIC	7.2	18.3	14/14	30/34	44/48	8.3	SIMILAR	NORMAL	LOGNORMAL	GEHAN		-2.134	0.0164	PASS	PASS	NO
COPPER	37.6	19.45	14/14	32/34	46/48	4.2	YES									YES
LEAD	940	149	14/14	32/34	46/48	4.2	YES									YES
ZINC	53.3	42.95	14/14	34/34	48/48	0	YES									YES

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE 4-2c

OLD TRAP AND SKEET RANGE
DISCRETE SUBSURFACE SOIL
BACKGROUND COMPARISON
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Chemical	Site FOD	Background FOD	Site Maximum	Background Maximum	Background UPL		Site Exceed Background?
Inorganics(mg/kg)							
Arsenic	1/1	24/28	4.1	14.15	11.6	95% KM(t) UPL	NO
Lead	1/1	25/28	12.2	27.9	22	95% KM(t) UPL	NO

TABLE 4-2d

OLD TRAP AND SKEET RANGE
COMPOSITE SURFACE SOIL
BACKGROUND COMPARISON
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Chemical	Site FOD	Background FOD	Site Maximum	Background Maximum	Background UPL		Site Exceed Background?
Inorganics(mg/kg)							
Antimony	2/2	0/33	0.68	ND	ND		YES
Arsenic	2/2	30/34	2.7	18.3	9.7	95%KM(t)UPL	NO
Lead	2/2	32/34	77.2	149	59.44	95%KM(t)UPL	YES
Zinc	2/2	34/34	54.4	42.95	33.9	95% UPL(t)	YES

TABLE 4-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 15
OLD SKEET TRAP RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 1 OF 13

location		X15SB001		X15SB002		X15SB003		X15SB004		X15SB005		X15SB005		X15SB006	
nsample		**X15SS0010001**		**X15SS0020001**		**X15SS0030001**		**X15SS0040001**		**X15SS0050001**		**X15SB0050102**		**X15SS0060001**	
sample_dat		20090527		20090527		20090527		20090527		20090527		20090602		20090527	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		1		0	
bottom_dep		1		1		1		1		1		2		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SB		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27									**0.99**	**J**	0.11	J		
ARSENIC	9.7									3.9		4.1			
COPPER	100									10.6	L	10.1	L		
LEAD	400									252		12.2			
TIN	0.89									2	B	1.2	B		
ZINC	46									41.2		37.6			
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000	5.4	J	42	J	24	UJ								
2-METHYLNAPHTHALENE	31000	20	J	64	J	24	UJ								
ACENAPHTHENE	29000	180		690		24	U								
ACENAPHTHYLENE	29000	26	U	24	U	24	U								
ANTHRACENE	29000	330		950		1.9	J								
BENZO(A)ANTHRACENE	150	**1500**		**3000**		20	J								
BENZO(A)PYRENE	15	**1600**		**3900**		**20**	**J**								
BENZO(B)FLUORANTHENE	150	**1700**		**4500**		30									
BENZO(G,H,I)PERYLENE	1100	**1200**		**2400**		13	J								
BENZO(K)FLUORANTHENE	1100	930		**1600**		12	J								
CHRYSENE	1100	**1400**		**3600**		13	J								
DIBENZO(A,H)ANTHRACENE	15	**420**		**620**	**J**	7.8	J								
FLUORANTHENE	29000	2100		5100	J	13	J								
FLUORENE	29000	110		360	J	24	U								
INDENO(1,2,3-CD)PYRENE	150	**1200**		**2500**		12	J								
NAPHTHALENE	330	52		320		24	U								
PHENANTHRENE	29000	1100		3600		5.4	J								
PYRENE	1100	**1600**		**4500**		11	J								
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	47.333		41		30.333		188.667		367.667		14.667		119	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA									86		84			
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA	77		84		85									

TABLE 4-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 15
OLD SKEET TRAP RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X15SB007		X15SB007		X15SB008		X15SB009		X15SB010		X15SB011		X15SB012	
nsample		**X15SS0070001**		**X15SB0070102**		**X15SS0080001**		**X15SS0090001**		**X15SS0100001**		**X15SS0110001**		**X15SS0120001**	
sample_dat		20090527		20090602		20090527		20090527		20090527		20090527		20090527	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		1		0		0		0		0		0	
bottom_dep		1		2		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SB		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	**0.83**	**J**												
ARSENIC	9.7	7.2													
COPPER	100	12.2	L												
LEAD	400	220													
TIN	0.89	1.7	B												
ZINC	46	27.7													
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000											25	UJ		
2-METHYLNAPHTHALENE	31000											25	UJ		
ACENAPHTHENE	29000											25	U		
ACENAPHTHYLENE	29000											25	U		
ANTHRACENE	29000											25	U		
BENZO(A)ANTHRACENE	150											21	J		
BENZO(A)PYRENE	15											**18**	**J**		
BENZO(B)FLUORANTHENE	150											24	J		
BENZO(G,H,I)PERYLENE	1100											13	J		
BENZO(K)FLUORANTHENE	1100											11	J		
CHRYSENE	1100											15	J		
DIBENZO(A,H)ANTHRACENE	15											9.4	J		
FLUORANTHENE	29000											15	J		
FLUORENE	29000											25	U		
INDENO(1,2,3-CD)PYRENE	150											11	J		
NAPHTHALENE	330											25	U		
PHENANTHRENE	29000											6.2	J		
PYRENE	1100											15	J		
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	**469.333**		85.333		285.667		38.667		50		113		199.333	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	86													
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA											79			

TABLE 4-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 15
OLD SKEET TRAP RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 3 OF 13

location		X15SB012		X15SB013		X15SB013		X15SB013		X15SB014		X15SB015		X15SB016	
nsample		**X15SS0120001RE**		**X15SS0130001**		**X15SB0130102**		**X15SB0130102RE**		**X15SS0140001**		**X15SS0150001**		**X15SS0160001**	
sample_dat		20090527		20090527		20090602		20090602		20090527		20090527		20090527	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		1		1		0		0		0	
bottom_dep		1		1		2		2		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SB		SB		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27														
ARSENIC	9.7														
COPPER	100														
LEAD	400														
TIN	0.89														
ZINC	46														
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000											150	J		
2-METHYLNAPHTHALENE	31000											230			
ACENAPHTHENE	29000											2000	J		
ACENAPHTHYLENE	29000											25	U		
ANTHRACENE	29000											2500	J		
BENZO(A)ANTHRACENE	150											**17000**			
BENZO(A)PYRENE	15											**23000**			
BENZO(B)FLUORANTHENE	150											**21000**			
BENZO(G,H,I)PERYLENE	1100											**11000**			
BENZO(K)FLUORANTHENE	1100											**8400**			
CHRYSENE	1100											**22000**			
DIBENZO(A,H)ANTHRACENE	15											**3300**	**J**		
FLUORANTHENE	29000											16000			
FLUORENE	29000											4200	U		
INDENO(1,2,3-CD)PYRENE	150											**12000**			
NAPHTHALENE	330											4200	U		
PHENANTHRENE	29000											11000			
PYRENE	1100											**23000**			
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	175.333		**838.667**		36.667		39.667		77.333		45.333		45.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA														
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA											79			

TABLE 4-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 15
OLD SKEET TRAP RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 4 OF 13

location		X15SB017		X15SB018		X15SB019		X15SB020		X15SB021		X15SB022		X15SB023	
nsample		**X15SS0170001**		**X15SS0180001**		**X15SS0190001**		**X15SS0200001**		**X15SS0210001**		**X15SS0220001**		**X15SS0230001**	
sample_dat		20090527		20090527		20090527		20090527		20090527		20090527		20090527	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27			**0.69**	**J**										
ARSENIC	9.7			3.2											
COPPER	100			8.8	L										
LEAD	400			32											
TIN	0.89			1.3	B										
ZINC	46			30.5											
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000					26	UJ			27	U				
2-METHYLNAPHTHALENE	31000					26	UJ			17	J				
ACENAPHTHENE	29000					26	U			49					
ACENAPHTHYLENE	29000					26	U			27	U				
ANTHRACENE	29000					26	U			93					
BENZO(A)ANTHRACENE	150					37	J			**3200**					
BENZO(A)PYRENE	15					**40**	**J**			**2300**					
BENZO(B)FLUORANTHENE	150					42	J			**1500**					
BENZO(G,H,I)PERYLENE	1100					27	J			**1200**					
BENZO(K)FLUORANTHENE	1100					25	J			510					
CHRYSENE	1100					35	J			**3600**					
DIBENZO(A,H)ANTHRACENE	15					13	J			**820**					
FLUORANTHENE	29000					30	J			780					
FLUORENE	29000					26	U			29					
INDENO(1,2,3-CD)PYRENE	150					24	J			**700**					
NAPHTHALENE	330					26	U			20	J				
PHENANTHRENE	29000					11	J			500					
PYRENE	1100					28	J			**1400**					
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	106		47		35.333		68.667		58.667		77		102	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA			87											
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA					78				75					

TABLE 4-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 15
OLD SKEET TRAP RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X15SB024		X15SB025		X15SB026		X15SB027		X15SB028		X15SB029		X15SB030	
nsample		**X15SS0240001**		**X15SS0250001**		**X15SS0260001**		**X15SS0270001**		**X15SS0280001**		**X15SS0290001**		**X15SS0300001**	
sample_dat		20090527		20090527		20090527		20090528		20090527		20090527		20090527	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27														
ARSENIC	9.7														
COPPER	100														
LEAD	400														
TIN	0.89														
ZINC	46														
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000									23	UJ	27	UJ		
2-METHYLNAPHTHALENE	31000									9.2	J	27	UJ		
ACENAPHTHENE	29000									12	J	4.2	J		
ACENAPHTHYLENE	29000									23	U	27	U		
ANTHRACENE	29000									26		27	U		
BENZO(A)ANTHRACENE	150									**400**		53			
BENZO(A)PYRENE	15									**400**		**58**			
BENZO(B)FLUORANTHENE	150									**240**		66			
BENZO(G,H,I)PERYLENE	1100									230		46			
BENZO(K)FLUORANTHENE	1100									140		28			
CHRYSENE	1100									420		46			
DIBENZO(A,H)ANTHRACENE	15									**91**		**22**	**J**		
FLUORANTHENE	29000									200		55			
FLUORENE	29000									8.3	J	27	U		
INDENO(1,2,3-CD)PYRENE	150									**170**		36			
NAPHTHALENE	330									23	U	27	U		
PHENANTHRENE	29000									160		28			
PYRENE	1100									400		47			
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	31		194.333		64.333		67		55.667		101.333		196.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA														
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA									85		75			

TABLE 4-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 15
OLD SKEET TRAP RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 6 OF 13

location		X15SB031		X15SB032		X15SB033		X15SB034		X15SB035		X15SB036		X15SB037	
nsample		**X15SS0310001**		**X15SS0320001**		**X15SS0330001**		**X15SS0340001**		**X15SS0350001**		**X15SS0360001**		**X15SS0370001**	
sample_dat		20090528		20090528		20090527		20090528		20090528		20090528		20090528	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27									0.27	J			**0.37**	**J**
ARSENIC	9.7									2				1.6	
COPPER	100									9.6	L			7.3	L
LEAD	400									81.6				203	
TIN	0.89									3.9	B			1.4	B
ZINC	46									41				30.2	
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000	7700	U	25	UJ					25	UJ				
2-METHYLNAPHTHALENE	31000	7700	U	11	J					19	J				
ACENAPHTHENE	29000	2600	J	47						150					
ACENAPHTHYLENE	29000	23	U	25	U					25	U				
ANTHRACENE	29000	3500	J	98						200					
BENZO(A)ANTHRACENE	150	**18000**		**410**						**2000**					
BENZO(A)PYRENE	15	**24000**		**440**						**2900**					
BENZO(B)FLUORANTHENE	150	**26000**		**410**						**3200**					
BENZO(G,H,I)PERYLENE	1100	**14000**		270						**1800**					
BENZO(K)FLUORANTHENE	1100	**11000**		270						1100					
CHRYSENE	1100	**22000**		290						**2500**					
DIBENZO(A,H)ANTHRACENE	15	**4100**	**J**	**100**						**460**					
FLUORANTHENE	29000	22000		620						1900					
FLUORENE	29000	7700	U	32						60					
INDENO(1,2,3-CD)PYRENE	150	**16000**		**290**						**1900**					
NAPHTHALENE	330	7700	U	8.6	J					56					
PHENANTHRENE	29000	14000		350						840					
PYRENE	1100	**24000**		420						**2500**					
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	34.667		54		192.667		34.333		69.667		43		247.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA					13	K								
Miscellaneous Parameters (s.u.)															
PH	NA					5									
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA					8500									
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	85				88				80				86	
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA	86		80						78					

TABLE 4-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 15
OLD SKEET TRAP RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X15SB038		X15SB039		X15SB040		X15SB041		X15SB041		X15SB042		X15SB043	
nsample		**X15SS0380001**		**X15SS0390001**		**X15SS0400001**		**X15SS0410001**		**X15SB0410102**		**X15SS0420001**		**X15SS0430001**	
sample_dat		20090528		20090528		20090528		20090528		20090602		20090528		20090528	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		1		0		0	
bottom_dep		1		1		1		1		2		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SB		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27														
ARSENIC	9.7														
COPPER	100														
LEAD	400														
TIN	0.89														
ZINC	46														
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000	10000	U												
2-METHYLNAPHTHALENE	31000	10000	U												
ACENAPHTHENE	29000	5000	J												
ACENAPHTHYLENE	29000	24	U												
ANTHRACENE	29000	7200	J												
BENZO(A)ANTHRACENE	150	**27000**													
BENZO(A)PYRENE	15	**38000**													
BENZO(B)FLUORANTHENE	150	**38000**													
BENZO(G,H,I)PERYLENE	1100	**22000**													
BENZO(K)FLUORANTHENE	1100	**18000**													
CHRYSENE	1100	**34000**													
DIBENZO(A,H)ANTHRACENE	15	**7000**	**J**												
FLUORANTHENE	29000	**38000**													
FLUORENE	29000	3100	J												
INDENO(1,2,3-CD)PYRENE	150	**27000**													
NAPHTHALENE	330	10000	U												
PHENANTHRENE	29000	**30000**													
PYRENE	1100	**45000**													
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	33		47.333		47.333		**744.333**		18		239.667		28	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA														
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA	82													

TABLE 4-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 15
OLD SKEET TRAP RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 8 OF 13

location		X15SB044		X15SB045		X15SB046		X15SB047		X15SB048		X15SB049		X15SB050	
nsample		**X15SS0440001**		**X15SS0450001**		**X15SS0460001**		**X15SS0470001**		**X15SS0480001**		**X15SS0490001**		**X15SS0500001**	
sample_dat		20090528		20090528		20090528		20090528		20090528		20090528		20090528	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27														
ARSENIC	9.7														
COPPER	100														
LEAD	400														
TIN	0.89														
ZINC	46														
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000											150	J	86	J
2-METHYLNAPHTHALENE	31000											200		120	
ACENAPHTHENE	29000											1800	J	1500	J
ACENAPHTHYLENE	29000											24	U	25	U
ANTHRACENE	29000											2400	J	2000	J
BENZO(A)ANTHRACENE	150											**10000**		**9700**	
BENZO(A)PYRENE	15											**13000**		**12000**	
BENZO(B)FLUORANTHENE	150											**14000**		**13000**	
BENZO(G,H,I)PERYLENE	1100											**9000**		**8200**	
BENZO(K)FLUORANTHENE	1100											**6100**		**5700**	
CHRYSENE	1100											**13000**		**14000**	
DIBENZO(A,H)ANTHRACENE	15											**2300**	**J**	**2600**	**J**
FLUORANTHENE	29000											14000		12000	
FLUORENE	29000											1000	J	4200	U
INDENO(1,2,3-CD)PYRENE	150											**10000**		**8900**	
NAPHTHALENE	330											4000	U	330	
PHENANTHRENE	29000											11000		8200	
PYRENE	1100											**16000**		**14000**	
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	20.333		53.667		212.333		196		130.333		151.333		65.333	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA									21	K				
Miscellaneous Parameters (s.u.)															
PH	NA									5.5					
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA									12000					
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA									84					
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA											82		78	

TABLE 4-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 15
OLD SKEET TRAP RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 9 OF 13

location		X15SB051		X15SB052		X15SB053		X15SB054		X15SB055		X15SB056		X15SB059C	
nsample		**X15SS0510001**		**X15SS0520001**		**X15SS0530001**		**X15SS0540001**		**X15SS0550001**		**X15SS0560001**		**X15SS059C0001**	
sample_dat		20090527		20090527		20090527		20090527		20090527		20090527		20090601	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		Y	
Inorganics (mg/kg)															
ANTIMONY	0.27														
ARSENIC	9.7														
COPPER	100														
LEAD	400														
TIN	0.89														
ZINC	46														
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000			230	J	10000	U	6.1	J						
2-METHYLNAPHTHALENE	31000			3800	U	10000	U	20	J						
ACENAPHTHENE	29000			2600	J	4200	J	160							
ACENAPHTHYLENE	29000			23	U	25	U	23	U						
ANTHRACENE	29000			4100		5400	J	230							
BENZO(A)ANTHRACENE	150			**23000**		**33000**		**1800**							
BENZO(A)PYRENE	15			**27000**		**42000**		**2300**							
BENZO(B)FLUORANTHENE	150			**26000**		**41000**		**2000**							
BENZO(G,H,I)PERYLENE	1100			**15000**		**25000**		**1900**							
BENZO(K)FLUORANTHENE	1100			**10000**		**16000**		**1200**							
CHRYSENE	1100			**31000**		**43000**		**2000**							
DIBENZO(A,H)ANTHRACENE	15			**5100**		**7600**	**J**	**620**							
FLUORANTHENE	29000			23000		**37000**		2200							
FLUORENE	29000			1500	J	10000	U	94							
INDENO(1,2,3-CD)PYRENE	150			**16000**		**27000**		**1700**							
NAPHTHALENE	330			3800	U	10000	U	39							
PHENANTHRENE	29000			17000		24000		960							
PYRENE	1100			**26000**		**44000**		**1600**							
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	68.333		96.333		58.333		32.667		40		85.333		60.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA														
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA			86		80		86							

TABLE 4-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 15
OLD SKEET TRAP RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 10 OF 13

location		X15SB060C		X15SB061		X15SB062		X15SB063		X15SB064		X15SB064		X15SB065	
nsample		**X15SS060C0001**		**X15SS0610001**		**X15SS0620001**		**X15SS0630001**		**X15SB0640102**		**X15SS0640001**		**X15SS0650001**	
sample_dat		20090601		20090602		20090602		20090602		20090602		20090602		20090602	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		1		0		0	
bottom_dep		1		1		1		1		2		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SB		SS		SS	
composite		Y		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27			0.17	J							**4.8**	**J**		
ARSENIC	9.7			2.9								5.8			
COPPER	100			8.2	L							22.2	L		
LEAD	400			74.7								**940**			
TIN	0.89			1.2	B							2.4	B		
ZINC	46			33.9								33			
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000														
2-METHYLNAPHTHALENE	31000														
ACENAPHTHENE	29000														
ACENAPHTHYLENE	29000														
ANTHRACENE	29000														
BENZO(A)ANTHRACENE	150														
BENZO(A)PYRENE	15														
BENZO(B)FLUORANTHENE	150														
BENZO(G,H,I)PERYLENE	1100														
BENZO(K)FLUORANTHENE	1100														
CHRYSENE	1100														
DIBENZO(A,H)ANTHRACENE	15														
FLUORANTHENE	29000														
FLUORENE	29000														
INDENO(1,2,3-CD)PYRENE	150														
NAPHTHALENE	330														
PHENANTHRENE	29000														
PYRENE	1100														
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	129.333		192.333		160		272		15.667		**1236**		70.333	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA			85								83			
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA														

TABLE 4-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 15
OLD SKEET TRAP RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X15SB066		X15SB067		X15SB068		X15SB069		X15SB070		X15SB070		X15SB071	
nsample		**X15SS0660001**		**X15SS0670001**		**X15SS0680001**		**X15SS0690001**		**X15SB0700102**		**X15SS0700001**		**X15SS0710001**	
sample_dat		20090602		20090602		20090602		20090602		20090602		20090602		20090602	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		ORIG	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		1		0		0	
bottom_dep		1		1		1		1		2		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SB		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	0.16	J			0.26	J					**1.9**	**J**	**0.39**	**L**
ARSENIC	9.7	3.8				2.3						3.2		3.5	
COPPER	100	11.5	L			37.6	L					8.8	L	9.4	
LEAD	400	33.3				**423**						**754**		282	
TIN	0.89	1.4	B			2.8	B					1.3	B	1.7	B
ZINC	46	41.6				**53.3**						38.5		33.1	
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000														
2-METHYLNAPHTHALENE	31000														
ACENAPHTHENE	29000														
ACENAPHTHYLENE	29000														
ANTHRACENE	29000														
BENZO(A)ANTHRACENE	150														
BENZO(A)PYRENE	15														
BENZO(B)FLUORANTHENE	150														
BENZO(G,H,I)PERYLENE	1100														
BENZO(K)FLUORANTHENE	1100														
CHRYSENE	1100														
DIBENZO(A,H)ANTHRACENE	15														
FLUORANTHENE	29000														
FLUORENE	29000														
INDENO(1,2,3-CD)PYRENE	150														
NAPHTHALENE	330														
PHENANTHRENE	29000														
PYRENE	1100														
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	118.333		87		192.333		75.667		52.333		**810**		379.333	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	81				86						83		87	
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA														

TABLE 4-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 15
OLD SKEET TRAP RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 12 OF 13

location		X15SB071		X15SB071		X15SB072		X15SB073		X15SB074		X15SB075		X15SB076	
nsample		**X15SS0710001-AVG**		**X15SS0710001-D**		**X15SS0720001**		**X15SS0730001**		**X15SS0740001**		**X15SS0750001**		**X15SS0760001**	
sample_dat		20090602		20090603		20090602		20090602		20090602		20090602		20090602	
qc_type		NM		FD		NM		NM		NM		NM		NM	
sacode		AVG		DUP		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	**0.335**	**L**	**0.28**	**L**	**0.61**	**L**	**0.5**	**L**					**0.47**	**L**
ARSENIC	9.7	3.4		3.3		2.1		2.2						2.7	
COPPER	100	9.5		9.6		5.4		8.2						26	
LEAD	400	234.5		187		**658**		335						238	
TIN	0.89	1.45	B	1.2	B	1.3	B	1.3	B					2.2	B
ZINC	46	33.05		33		25.1		30.5						37.4	
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000														
2-METHYLNAPHTHALENE	31000														
ACENAPHTHENE	29000														
ACENAPHTHYLENE	29000														
ANTHRACENE	29000														
BENZO(A)ANTHRACENE	150														
BENZO(A)PYRENE	15														
BENZO(B)FLUORANTHENE	150														
BENZO(G,H,I)PERYLENE	1100														
BENZO(K)FLUORANTHENE	1100														
CHRYSENE	1100														
DIBENZO(A,H)ANTHRACENE	15														
FLUORANTHENE	29000														
FLUORENE	29000														
INDENO(1,2,3-CD)PYRENE	150														
NAPHTHALENE	330														
PHENANTHRENE	29000														
PYRENE	1100														
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	379.333				340.667		**490**		**1260.333**		130.333		**552.667**	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	87		87		85		84						86	
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA														

TABLE 4-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 15
OLD SKEET TRAP RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X15SB077C		X15SB078C	
nsample		**X15SS077C0001**		**X15SS078C0001**	
sample_dat		20090610		20090610	
qc_type		NM		NM	
sacode		NORMAL		NORMAL	
matrix	**PALs**	SO		SO	
top_depth		0		0	
bottom_dep		1		1	
depth_unit		FT		FT	
submatrix		SS		SS	
composite		Y		Y	
Inorganics (mg/kg)					
ANTIMONY	0.27	**0.68**	**L**	**0.46**	**L**
ARSENIC	9.7	2.6		2.7	
COPPER	100	23.3		14.8	
LEAD	400	66.7		77.2	
TIN	0.89	1.8	B	1.7	B
ZINC	46	**52.5**		**54.4**	
PAHs (ug/kg)					
1-METHYLNAPHTHALENE	22000				
2-METHYLNAPHTHALENE	31000				
ACENAPHTHENE	29000				
ACENAPHTHYLENE	29000				
ANTHRACENE	29000				
BENZO(A)ANTHRACENE	150				
BENZO(A)PYRENE	15				
BENZO(B)FLUORANTHENE	150				
BENZO(G,H,I)PERYLENE	1100				
BENZO(K)FLUORANTHENE	1100				
CHRYSENE	1100				
DIBENZO(A,H)ANTHRACENE	15				
FLUORANTHENE	29000				
FLUORENE	29000				
INDENO(1,2,3-CD)PYRENE	150				
NAPHTHALENE	330				
PHENANTHRENE	29000				
PYRENE	1100				
Explosives (mg/kg)					
NITROGLYCERIN	6.1	3.7	J	0.49	J
XRF Field Parameters (mg/kg)					
LEAD	400	67.667		81.333	
Miscellaneous Parameters (meq/100)					
CATION EXCHANGE CAPACITY	NA				
Miscellaneous Parameters (s.u.)					
PH	NA				
Miscellaneous Parameters (mg/kg)					
TOTAL ORGANIC CARBON	NA				
Miscellaneous Parameters (%)					
TOTAL SOLIDS	NA	81		82	
Miscellaneous Organic Parameters (%)					
TOTAL SOLIDS	NA				

TABLE 4-4

FIXED BASE LABORATORY SEDIMENT MC ANALYTICAL RESULTS HITS/EXCEEDANCES
UXO 15
OLD SKEET TRAP RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X15SD001		X15SD002		X15SD003		X15SD004		X15SD005		X15SD006		X15SD007	
nsample		**X15SD0010006**		**X15SD0020006**		**X15SD0030006**		**X15SD0040006**		**X15SD0050006**		**X15SD0060006**		**X15SD0070006**	
sample_dat		20090601		20090601		20090601		20090601		20090601		20090601		20090601	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SD		SD		SD		SD		SD		SD		SD	
top_depth		0		0		0		0		0		0		0	
bottom_dep		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		NA		NA		NA		NA		NA		NA		NA	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27					0.09	B			0.04	B				
ARSENIC	0.39					**1.4**				**1.2**					
COPPER	100					2.9				2.8					
LEAD	400					19.6				7.5					
TIN	0.89					1.9	B			0.92	B				
ZINC	46					11.4				8.1					
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000					24	UL			25	UL				
2-METHYLNAPHTHALENE	31000					24	UL			25	UL				
ACENAPHTHENE	29000					24	UL			25	UL				
ACENAPHTHYLENE	29000					24	UL			25	UL				
ANTHRACENE	29000					24	UL			25	UL				
BENZO(A)ANTHRACENE	150					24	UL			25	UL				
BENZO(A)PYRENE	15					24	UL			25	UL				
BENZO(B)FLUORANTHENE	150					24	UL			25	UL				
BENZO(G,H,I)PERYLENE	1100					24	UL			25	UL				
BENZO(K)FLUORANTHENE	1100					24	UL			25	UL				
CHRYSENE	1100					3.5	B			25	UL				
DIBENZO(A,H)ANTHRACENE	15					24	UL			25	UL				
FLUORANTHENE	29000					24	UL			25	UL				
FLUORENE	29000					24	UL			25	UL				
INDENO(1,2,3-CD)PYRENE	150					24	UL			25	UL				
NAPHTHALENE	330					24	UL			25	UL				
PHENANTHRENE	29000					24	UL			25	UL				
PYRENE	1100					24	UL			25	UL				
XRF Field Parameters (mg/kg)															
LEAD	400	17.333		8.333		185		7		29.667		3.333		27	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA					13	K								
Miscellaneous Parameters (s.u.)															
PH	NA					5.6									
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA					740									
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA					84				82					
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA					83				80					

TABLE 4-4

FIXED BASE LABORATORY SEDIMENT MC ANALYTICAL RESULTS HITS/EXCEEDANCES
UXO 15
OLD SKEET TRAP RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X15SD008		X15SD009		X15SD010		X15SD011		X15SD012		X15SD013		X15SD014	
nsample		**X15SD0080006**		**X15SD0090006**		**X15SD0100006**		**X15SD0110006**		**X15SD0120006**		**X15SD0130006**		**X15SD0140006**	
sample_dat		20090601		20090601		20090610		20090610		20090610		20090610		20090610	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SD		SD		SD		SD		SD		SD		SD	
top_depth		0		0		0		0		0		0		0	
bottom_dep		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		NA		NA		NA		NA		NA		NA		NA	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27											0.05	B		
ARSENIC	0.39											**0.54**			
COPPER	100											2.4			
LEAD	400											14			
TIN	0.89											0.9	B		
ZINC	46											12.2			
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000														
2-METHYLNAPHTHALENE	31000														
ACENAPHTHENE	29000														
ACENAPHTHYLENE	29000														
ANTHRACENE	29000														
BENZO(A)ANTHRACENE	150														
BENZO(A)PYRENE	15														
BENZO(B)FLUORANTHENE	150														
BENZO(G,H,I)PERYLENE	1100														
BENZO(K)FLUORANTHENE	1100														
CHRYSENE	1100														
DIBENZO(A,H)ANTHRACENE	15														
FLUORANTHENE	29000														
FLUORENE	29000														
INDENO(1,2,3-CD)PYRENE	150														
NAPHTHALENE	330														
PHENANTHRENE	29000														
PYRENE	1100														
XRF Field Parameters (mg/kg)															
LEAD	400	10		14		17.667		4.333		15.667		15.333		12	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA											78			
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA														

TABLE 4-4

FIXED BASE LABORATORY SEDIMENT MC ANALYTICAL RESULTS HITS/EXCEEDANCES
UXO 15
OLD SKEET TRAP RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X15SD015		X15SD016		X15SD017		X15SD018		X15SD019		X15SD020		X15SD021	
nsample		**X15SD0150006**		**X15SD0160006**		**X15SD0170006**		**X15SD0180006**		**X15SD0190006**		**X15SD0200006**		**X15SD0210006**	
sample_dat		20090610		20090610		20090610		20090610		20090610		20090610		20090610	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SD		SD		SD		SD		SD		SD		SD	
top_depth		0		0		0		0		0		0		0	
bottom_dep		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		NA		NA		NA		NA		NA		NA		NA	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27							0.05	B						
ARSENIC	0.39							**0.65**							
COPPER	100							3.3							
LEAD	400							6.7							
TIN	0.89							1	B						
ZINC	46							15.2							
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000														
2-METHYLNAPHTHALENE	31000														
ACENAPHTHENE	29000														
ACENAPHTHYLENE	29000														
ANTHRACENE	29000														
BENZO(A)ANTHRACENE	150														
BENZO(A)PYRENE	15														
BENZO(B)FLUORANTHENE	150														
BENZO(G,H,I)PERYLENE	1100														
BENZO(K)FLUORANTHENE	1100														
CHRYSENE	1100														
DIBENZO(A,H)ANTHRACENE	15														
FLUORANTHENE	29000														
FLUORENE	29000														
INDENO(1,2,3-CD)PYRENE	150														
NAPHTHALENE	330														
PHENANTHRENE	29000														
PYRENE	1100														
XRF Field Parameters (mg/kg)															
LEAD	400	2.667		8		11.333		6.667		3.333		7.333		6	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA							78							
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA														

TABLE 4-4

FIXED BASE LABORATORY SEDIMENT MC ANALYTICAL RESULTS HITS/EXCEEDANCES
UXO 15
OLD SKEET TRAP RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X15SD022		X15SD023		X15SD024		X15SD025		X15SD026		X15SD027		X15SD030		X15SD033	
nsample		**X15SD0220006**		**X15SD0230006**		**X15SD0240006**		**X15SD0250006**		**X15SD0260006**		**X15SD0270006**		**X15SD0300006**		**X15SD0330006**	
sample_dat		20090610		20090610		20090610		20090610		20090610		20090610		20090610		20090610	
qc_type		NM		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SD		SD		SD		SD		SD		SD		SD		SD	
top_depth		0		0		0		0		0		0		0		0	
bottom_dep		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		NA		NA		NA		NA		NA		NA		NA		NA	
composite		N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																	
ANTIMONY	0.27			0.06	B									0.28	B	0.083	B
ARSENIC	0.39			**0.5**										**5.8**		0.36	
COPPER	100			3										36.1		2.1	B
LEAD	400			7.6										37		5	B
TIN	0.89			0.87	B									**3.4**		0.64	B
ZINC	46			12.5										**164**		9.3	
PAHs (ug/kg)																	
1-METHYLNAPHTHALENE	22000			26	U												
2-METHYLNAPHTHALENE	31000			26	U												
ACENAPHTHENE	29000			26	U												
ACENAPHTHYLENE	29000			26	U												
ANTHRACENE	29000			26	U												
BENZO(A)ANTHRACENE	150			2.9	J												
BENZO(A)PYRENE	15			4.6	J												
BENZO(B)FLUORANTHENE	150			3.4	J												
BENZO(G,H,I)PERYLENE	1100			2.8	J												
BENZO(K)FLUORANTHENE	1100			26	U												
CHRYSENE	1100			5.4	J												
DIBENZO(A,H)ANTHRACENE	15			26	U												
FLUORANTHENE	29000			26	U												
FLUORENE	29000			26	U												
INDENO(1,2,3-CD)PYRENE	150			2.9	J												
NAPHTHALENE	330			26	U												
PHENANTHRENE	29000			26	U												
PYRENE	1100			26	U												
XRF Field Parameters (mg/kg)																	
LEAD	400	20.333		11		12		10.667		12.333		0	U				
Miscellaneous Parameters (meq/100)																	
CATION EXCHANGE CAPACITY	NA			9.5	K												
Miscellaneous Parameters (s.u.)																	
PH	NA			7													
Miscellaneous Parameters (mg/kg)																	
TOTAL ORGANIC CARBON	NA			1300													
Miscellaneous Parameters (%)																	
TOTAL SOLIDS	NA			79										41		78	
Miscellaneous Organic Parameters (%)																	
TOTAL SOLIDS	NA			78													

TABLE 4-5

BENZO(a)PYRENE EQUIVALENT CONCENTRATIONS IN DISCRETE SURFACE SOIL SAMPLES
OLD SKEET AND TRAP RANGE (OSTR) - UXO 14
SITE INVESTIGAITON
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND
PAGE 1 OF 1

location	X15SB001	X15SB002	X15SB003	X15SB011	X15SB015	X15SB019	X15SB021	X15SB028	X15SB029	X15SB031	X15SB032	X15SB035	X15SB038	X15SB049	X15SB050	X15SB052	X15SB053	X15SB054
nsample	**X15SS0010001**	**X15SS0020001**	**X15SS0030001**	**X15SS0110001**	**X15SS0150001**	**X15SS0190001**	**X15SS0210001**	**X15SS0280001**	**X15SS0290001**	**X15SS0310001**	**X15SS0320001**	**X15SS0350001**	**X15SS0380001**	**X15SS0490001**	**X15SS0500001**	**X15SS0520001**	**X15SS0530001**	**X15SS0540001**
matrix	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO
submatrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
top_depth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bottom_dep	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	20090527	20090527	20090527	20090527	20090527	20090527	20090527	20090527	20090527	20090528	20090528	20090528	20090528	20090528	20090528	20090527	20090527	20090527
PAH Concentrations (ug/kg)																		
BENZO(A)ANTHRACENE	1500	3000	20 J	21 J	17000	37 J	3200	400	53	18000	410	2000	27000	10000	9700	23000	33000	1800
BENZO(A)PYRENE	1600	3900	20 J	18 J	23000	40 J	2300	400	58	24000	440	2900	38000	13000	12000	27000	42000	2300
BENZO(B)FLUORANTHENE	1700	4500	30	24 J	21000	42 J	1500	240	66	26000	410	3200	38000	14000	13000	26000	41000	2000
BENZO(K)FLUORANTHENE	930	1600	12 J	11 J	8400	25 J	510	140	28	11000	270	1100	18000	6100	5700	10000	16000	1200
CHRYSENE	1400	3600	13 J	15 J	22000	35 J	3600	420	46	22000	290	2500	34000	13000	14000	31000	43000	2000
DIBENZO(A,H)ANTHRACENE	420	620 J	7.8 J	9.4 J	3300 J	13 J	820	91	22 J	4100 J	100	460	7000 J	2300 J	2600 J	5100	7600 J	620
INDENO(1,2,3-CD)PYRENE	1200	2500	12 J	11 J	12000	24 J	700	170	36	16000	290	1900	27000	10000	8900	16000	27000	1700
Benzo(a)pyrene (BaP) Equivalent (ug/kg)																		
BAP EQUIVALENT-HALFND	2470.7	5539.6	34.133	33.125	31406	63.585	3668.7	573.82	95.826	34232	653.99	4083.5	54414	18774	17831	38731	59903	3484

Toxicity Equivalency Factors (TEFs) for PAHs

PAH	TEF
BENZO(A)ANTHRACENE	0.1
BENZO(A)PYRENE	1
BENZO(B)FLUORANTHENE	0.1
BENZO(K)FLUORANTHENE	0.01
CHRYSENE	0.001
DIBENZO(A,H)ANTHRACENE	1
INDENO(1,2,3-CD)PYRENE	0.1

BaP Screening Levels

Risk Level	1E-06	1E-04
Resid screening level for BaP (ug/kg)	15	1500
Non-resid screening level for BaP (ug/kg)	210	21000

Comparison to Residential Screening Level of 1,500 ug/kg

BAP EQUIVALENT-HALFND (ug/kg)	2,471	5,540	34	33	31,406	64	3,669	574	96	34,232	654	4,084	54,414	18,774	17,831	38,731	59,903	3,484

Comparison to Non-Residential Screening Level of 21,000 ug/kg

BAP EQUIVALENT-HALFND (ug/kg)	2,471	5,540	34	33	31,406	64	3,669	574	96	34,232	654	4,084	54,414	18,774	17,831	38,731	59,903	3,484

TABLE 4-6a

HUMAN HEALTH CSM SUMMARY
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Pathways Associated with Soil at Old Skeet and Trap Range (UXO-15)

	Are Direct Contact Exposures to Soil Acceptable?						
	Residential			Non-Residential			Evaluation of Leaching to Groundwater Pathway
Area of Interest	Risk	Haz. Index	Lead	Risk	Haz. Index	Lead	
Firing Line (Composite Samples)	Yes	Yes	Yes	Yes	Yes	Yes	GW use pathway incomplete (Sb, NG RBC exceedances)
Surface Soil (Discrete Samples)	NO (PAHs)	Yes	NO	NO (PAHs)	Yes	NO	GW use pathway incomplete (Sb, PAH RBC exceedances)
Subsurface Soil (Discrete Samples)	Yes	Yes	Yes	Yes	Yes	Yes	GW use pathway incomplete (No RBSL exceedances)

Notes:
GW = groundwater
RBC = risk-based concentration
RBSL = risk-based screening level
Chemicals in parentheses are responsible for 1) unacceptable risks or hazard indices or 2) exceedances of soil to groundwater RBCs
NG = nitroglycerin
PAHs = polycyclic aromatic hydrocarbons
Sb = antimony

TABLE 4-6b

HUMAN HEALTH CSM SUMMARY
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Pathways Associated with Sediment at Old Skeet and Trap Range (UXO-15)

	Are Direct Contact Exposures to Sediment Acceptable?			Are Fish Ingestion Exposures Acceptable?	
Area of Interest	**Risk**	**Haz. Index**	**Lead**	**Risk**	**Haz. Index**
Sediment	Yes	Yes	Yes	Yes	Yes

TABLE 4-7

ECOLOGICAL CSM SUMMARY
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

X15 SS

	Soil Invertebrates	Plants	Wildlife
Inorganics			
ANTIMONY	0	0	X
ARSENIC	0	0	0
COPPER	0	0	0
LEAD	0	X	X
ZINC	0	0	0
PAHs			
PAHs	X	X	X

X15 Composite

	Soil Invertebrates	Plants	Wildlife
Inorganics			
ANTIMONY	0	0	0
ARSENIC	0	0	0
COPPER	0	0	0
LEAD	0	0	X
ZINC	0	0	0
Explosives			
NITROGLYCERIN	--	--	0

X15 Sediment

	Benthic Invertebrates	Wildlife
Inorganics		
ARSENIC	0	0
COPPER	0	0
LEAD	0	0
TIN	0	0
ZINC	0	0
PAHs		
PAHs	0	0

X: Potential risk to receptor from exposure to chemical
0: No risk to receptor from exposure to chemical
--: No toxicity data available to evaluate risk from exposure to chemical

P:/GIS/INDIANHEAD_NSWC_NEW/MXD/SN_OLD_SKEET_TRAP_RANGE_TAGS.MXD 6/1/10 KM

1248500 1249000 1249500 1250000

324000 323500

Potomac River

Mattawoman Creek

N

Maximum Shot Distance

X15SD030 [0-0.5]
ARSENIC 5.8
ZINC 164

X15SD023 [0-0.5]
ARSENIC 0.5

X15SD013 [0-0.5]
ARSENIC 0.54

X15SD018 [0-0.5]
ARSENIC 0.65

X15SB071 [0-1]
ANTIMONY 0.39 L
X15SB071-DUP [0-1]
ANTIMONY 0.28 L

X15SB013 [0-1]
LEAD 839

X15SB076 [0-1]
ANTIMONY 0.47 L
LEAD 552.667

X15SB068 [0-1]
LEAD 423
ZINC 53.3

X15SB007 [0-1]
ANTIMONY 0.83 J
LEAD 469.333

X15SB070 [0-1]
ANTIMONY 1.9 J
LEAD 754

X15SB064 [0-1]
ANTIMONY 4.8 J
LEAD 940

X15SB005 [0-1]
ANTIMONY 0.99 J

X15SB077C [0-1]
ANTIMONY 0.68 L
ZINC 52.5

X15SD003 [0-0.5]
ARSENIC 1.4

X15SD005 [0-0.5]
ARSENIC 1.2

X15SB037 [0-1]
ANTIMONY 0.37 J

X15SB018 [0-1]
ANTIMONY 0.69 J

X15SB078C [0-1]
ANTIMONY 0.46 L
ZINC 54.4

X15SB073 [0-1]
ANTIMONY 0.5 L
LEAD 490

X15SB074 [0-1]
LEAD 1260

X15SB041 [0-1]
LEAD 744

X15SB072 [0-1]
ANTIMONY 0.61 L
LEAD 658

Archer Avenue

Legend

- Metals Exceedance in Soil Sample
- Metals Exceedance in Sediment Sample
- Former Trap House Location
- MRP Area Identified during PA
- Installation Boundary

NOTE: White tags are FBL data and the green tags are XRF data.

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

125 62.5 0 125
Feet

DRAWN BY	DATE
K. MOORE	12/15/09
CHECKED BY	DATE
E. BERKLITE	6/1/10
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

OLD SKEET AND TRAP RANGE
METALS EXCEEDANCES
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	N62467-04-D-0055
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 4-1	0

P:/GIS/INDIANHEAD_NSWC_NEW/MXD/SN_OLD_SKEET_TRAP_RANGE_CT.MXD 6/1/10 KM

1249000

1249500

323500

323500

N

SB029[0-1]
96

SB019[0-1]
64

SB028[0-1]
574

SB032[0-1]
654

SB011[0-1]
33

SB015[0-1]
31406

SB021[0-1]
3669

SB031[0-1]
34232

SB035[0-1]
4084

SB053[0-1]
59903

SB052[0-1]
38731

SB038[0-1]
54414

SB003[0-1]
34

SB002[0-1]
5540

SB054[0-1]
3484

SB050[0-1]
17831

SB001[0-1]
2471

SB049[0-1]
18774

Archer Avenue

Legend

- Sample Location
- Clay Target Remains, BaP <1500 ug/kg
- Clay Target Remains, BaP >1500 ug/kg
- Former Trap House Location
- MRP Area Identified during PA
- Installation Boundary

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

60 30 0 60 Feet

DRAWN BY K. MOORE	DATE 11/30/09
CHECKED BY E. BERKLITE	DATE 6/1/10
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

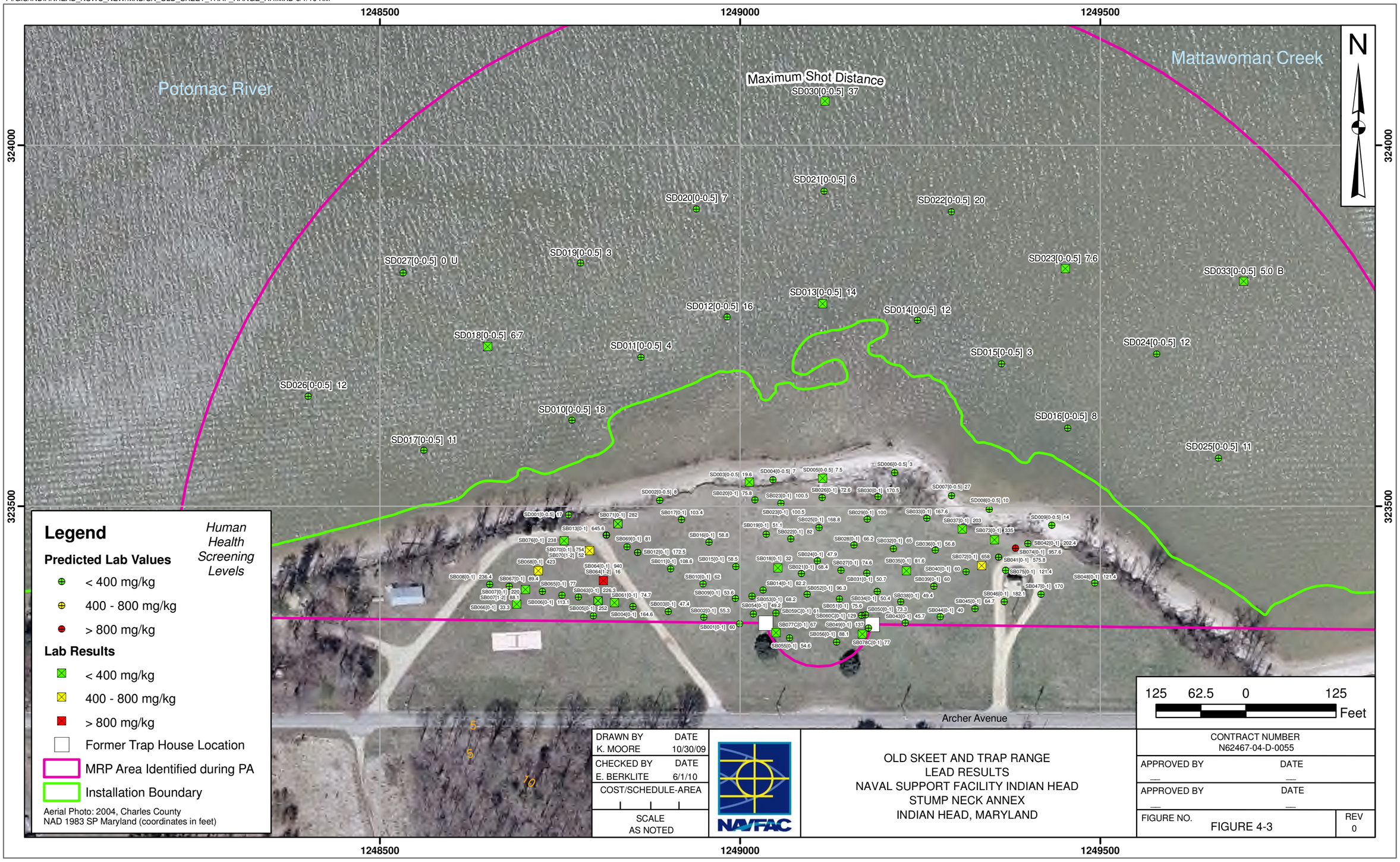
OLD SKEET AND TRAP RANGE
BAP EQUIVALENTS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER N62467-04-D-0055	
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. FIGURE 4-2	REV 0

1249000

1249500

P:/GIS/INDIANHEAD_NSWC_NEW/MXD/SN_OLD_SKEET_TRAP_RANGE_HH.MXD 6/1/10 KM



Legend

Human Health Screening Levels

Predicted Lab Values

- < 400 mg/kg
- 400 - 800 mg/kg
- > 800 mg/kg

Lab Results

- < 400 mg/kg
- 400 - 800 mg/kg
- > 800 mg/kg
- Former Trap House Location
- MRP Area Identified during PA
- Installation Boundary

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

125 62.5 0 125 Feet

DRAWN BY K. MOORE	DATE 10/30/09
CHECKED BY E. BERKLITE	DATE 6/1/10
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

OLD SKEET AND TRAP RANGE
LEAD RESULTS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER
N62467-04-D-0055

APPROVED BY — DATE —

APPROVED BY — DATE —

FIGURE NO. FIGURE 4-3

REV 0

P:/GIS/INDIANHEAD_NSWC_NEW/MXD/SN_OLD_SKEET_TRAP_RANGE_ECO_SB.MXD 6/1/10 KM

1248500 1249000 1249500

324000 323500

Potomac River

Mattawoman Creek

Maximum Shot Distance

N

Archer Avenue

Legend

Ecological Screening Levels

Predicted Lab Values

- < 11 mg/kg
- 11 - 120 mg/kg
- 120 - 1700 mg/kg

Lab Results

- < 11 mg/kg
- 11 - 120 mg/kg
- 120 - 1700 mg/kg
- Former Trap House Location
- MRP Area Identified during PA
- Installation Boundary

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

125 62.5 0 125 Feet

DRAWN BY K. MOORE	DATE 10/30/09
CHECKED BY E. BERKLITE	DATE 6/1/10
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

OLD SKEET AND TRAP RANGE
SOIL LEAD RESULTS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER
N62467-04-D-0055

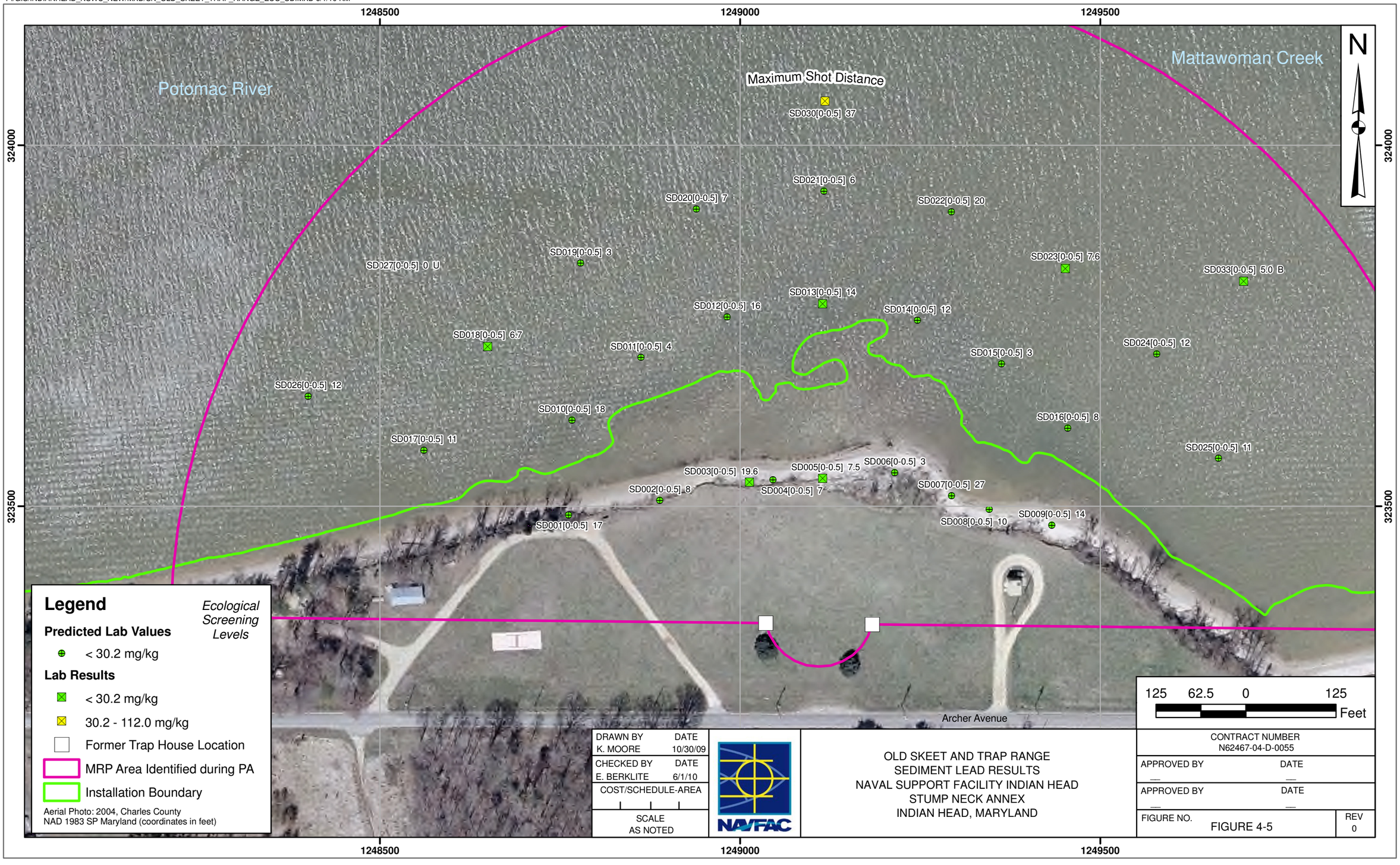
APPROVED BY — DATE —

APPROVED BY — DATE —

FIGURE NO. FIGURE 4-4

REV 0

P:/GIS/INDIANHEAD_NSWC_NEW/MXD/SN_OLD_SKEET_TRAP_RANGE_ECO_SD.MXD 6/1/10 KM

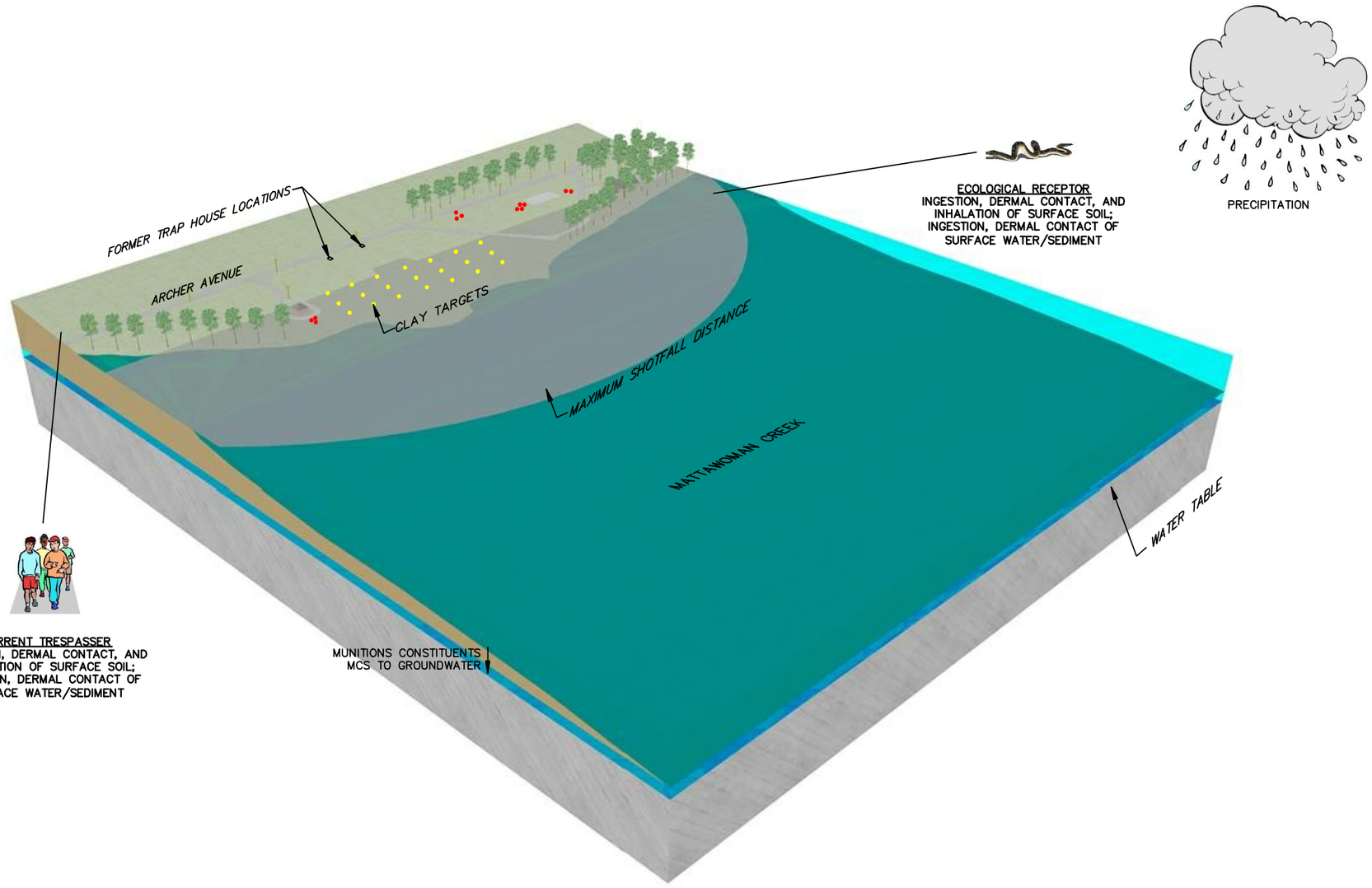


DRAWN BY	DATE
K. MOORE	10/30/09
CHECKED BY	DATE
E. BERKLITE	6/1/10
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

OLD SKEET AND TRAP RANGE
SEDIMENT LEAD RESULTS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	
N62467-04-D-0055	
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 4-5	0



LEGEND

- AREA OF LEAD SHOT ACCUMULATION
- CLAY TARGETS

DRAWN BY: BH	DATE: 12/8/09	OLD SKEET & TRAP RANGE CONCEPTUAL SITE MODEL NAVAL SUPPORT FACILITY STUMP NECK ANNEX INDIAN HEAD, MARYLAND	CONTRACT NO.: 1507
CHECKED BY: ---	DATE: ---		OWNER NO.:
REVISED BY: ---	DATE: ---		APPROVED BY: --- DATE: ---
SCALE: NOT TO SCALE			DRAWING NO.: FIGURE 4-6 REV.: 0

R:\0810\Conceptual Site Models\CSM\0810CSM005.dwg PIT CARLY.KRAMER 12/15/2009 2:16:32 PM

P:/GIS/INDIANHEAD_NSWC_NEW/MXD/SN_OLD_SKEET_TRAP_RANGE_SOIL_REMOVAL.MXD 6/1/10 KM

1249000 1249500

323500 323500

N

X15SB071 [0-1]
ANTIMONY 0.39 L
X15SB071-DUP [0-1]
ANTIMONY 0.28 L

X15SB013 [0-1]
LEAD 838.667

X15SB076 [0-1]
ANTIMONY 0.47 L
LEAD 552.667

X15SB070 [0-1]
ANTIMONY 1.9 J
LEAD 754

X15SB068 [0-1]
LEAD 423
ZINC 53.3

X15SB064 [0-1]
ANTIMONY 4.8 J
LEAD 940

X15SB007 [0-1]
ANTIMONY 0.83 J
LEAD 469.333

X15SB005 [0-1]
ANTIMONY 0.99 J

X15SB018 [0-1]
ANTIMONY 0.69 J

SB015[0-1] 31406
SB021[0-1] 3669
SB031[0-1] 34232
SB035[0-1] 4084
SB053[0-1] 59903
SB052[0-1] 38731
SB038[0-1] 54414
SB054[0-1] 3484
SB050[0-1] 17831
SB002[0-1] 5540
SB001[0-1] 2471
SB049[0-1] 18774

X15SB073 [0-1]
ANTIMONY 0.5 L
LEAD 490

X15SB037 [0-1]
ANTIMONY 0.37 J

X15SB072 [0-1]
ANTIMONY 0.61 L
LEAD 658

X15SB074 [0-1]
LEAD 1260.333

X15SB041 [0-1]
LEAD 744.333

X15SB077C [0-1]
ANTIMONY 0.68 L
ZINC 52.5

X15SB078C [0-1]
ANTIMONY 0.46 L
ZINC 54.4

Archer Avenue

Legend

- Metals Exceedance in Soil Sample
- Clay Target Remains, BaP >1500 ug/kg
- Area of 1-ft Deep Excavation
- Area of 2-ft Deep Excavation
- Former Trap House Location
- MRP Area Identified during PA
- Installation Boundary

NOTE: White tags are FBL data and the green tags are XRF data.

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

60 30 0 60 Feet

DRAWN BY	DATE
K. MOORE	12/21/09
CHECKED BY	DATE
E. BERKLITE	6/1/10
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

OLD SKEET AND TRAP RANGE
PROPOSED SOIL REMOVAL
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	
N62467-04-D-0055	
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 4-7	0

1249000 1249500

5.0 MARINE RIFLE RANGE – UXO 14

5.1 SITE BACKGROUND

5.1.1 Historical Information

The Marine Rifle Range was used for small arms training from approximately 1911 to 1918 and was identified in the Navy Range Inventory. The estimated limits of the Marine Rifle Range were mapped based on field reconnaissance, additional data collection, and historical maps. Based on this evaluation, the size of the Marine Rifle Range was estimated in the PA at 30.44 acres. The boundaries of the range were altered from the Navy Range Inventory to incorporate the firing lines and target butts identified on historical maps. The boundaries were also changed to exclude the areas occupied by other MRP sites. The Safety Danger Zone (SDZ) developed for the Marine Rifle Range covers approximately 1,369 acres. Site walks completed during the preliminary SI, and a review of historical records and photographs indicated that the hillside embankment located behind the main targets should be included in the site because it most likely received the majority of bullets passing through or over the intended targets. Bullets landing below the targets impacted the target berms. The range is located on the Stump Neck Annex, south of Archer Avenue, and parallel to Archer Avenue from the causeway west to Building 2105. The western portion of the range is developed, and the central and eastern portions of the range are wooded with sporadic structures. Earthen mounds are present in the woods along Archer Avenue and east of Building 2075. The Marine Rifle Range is also surrounded by the Air Blast Pond to the south, Torpedo Burial Site to the south, and Old Skeet and Trap Range to the north. When the Marine Rifle Range was an active training area, two range houses, barracks, and associated support buildings were present at the range. The estimated period of use, 1911 to 1918, is based on historical maps and documents. The Marine Rifle Range, as identified on maps from 1913, 1915 and 1918, is also referred to as the Rifle Range, Winthrop, Maryland. The range was identified on a January 1913 Government Reservation at Stump Neck, Maryland map, which was obtained from the National Archives. Photographs of the conditions at the Marine Rifle Range in 1913 were also obtained from the National Archives. The 1913 map obtained from the National Archives, and the Installation and Navy historian provide details of the layout of the Marine Rifle Range, including buildings, target butts, and firing lines. The 1913 map shows the location of the range within the installation and a rough outline of the range. According to the 1918 Annual Report from the Commandant of the Marine Corps, this range was used for Marine recruits from the Norfolk and Philadelphia depots for small arms training with rifles. An April 1917 memorandum from the Marine Corps states that the range was still in use and that it was dangerous to enter the portion of the reservation to the rear of the rifle butts. The 1918 Annual Report of the Chief of the Bureau of Ordnance states that “the buildings vacated by the Marines on Stump Neck were moved to

Machodoc Creek (Virginia) to form the nucleus of the station." A 1931 memorandum from the Major General Commandant of the Marine Corps states that the buildings at Winthrop were "understood to be quite dilapidated and of no value." A 1949 map showing the conditions at Stump Neck lists this area as "cultivated." Therefore, it is assumed that the range was closed between April 1917 and 1918. Mr. Miller, retired Marine Corps EOD, stated that the rifle range paralleled the Potomac River. He also stated that pistols may have been used at the range and that an embankment was present behind the targets. Two target butts were located at the eastern end of the range. Two sets of firing lines, one for each target butt, were located at 100-meter increments to a maximum of 1,000 meters. Range houses, barracks, and other support buildings were also identified on the 1913 map. According to historical photographs, there were 13 targets in each target butt. The numbers of targets, locations of firing lines, and recommended Small Arms Range Design and Construction guidance document were used to establish the SDZ. The SDZ for the Marine Rifle Range extends over Chicamuxen Creek, the Potomac River, and east over the Stump Neck Annex and off post. These features were used to establish the size, shape, and orientation of the Marine Rifle Range as it appears in this SI Report. The 1914 Annual Report stated that the Marine Rifle Range was a source of delay for the Proving Ground. Despite precautions taken at the range, the requirements at the rifle range made it necessary to suspend or curtail work at the Naval Proving Ground. However, work from the Proving Ground also caused delays and interferences with training at the rifle range when projectiles where fired toward Stump Neck. The dwellings and barracks on Stump Neck were close to the line of the 10-inch, 12-inch, and 14-inch guns and were inside the SDZ established by the Navy. Although stringent orders existed to vacate the Marine Rifle Range when firing over it was necessary, there was always an element of danger. According to a 1911 Bureau of Ordnance memorandum, no projectiles had been reported to have landed in the rifle range. The Marine Rifle Range was relocated to MCB Quantico in 1918 to eliminate the interferences between training at the rifle range and at the Proving Ground. The Marine Rifle Range is not identified as a SWMU or as an Installation Restoration (IR) range; however, the following SWMUs are overlapped by or adjacent to the Marine Rifle Range:

- SWMU #6 – Air Blast Pond
- SWMU #8 – Tool Burial Site – Site 34
- SWMU #9 – Torpedo Burial Site – Site 35
- SWMU #12 – Waste Oil Storage Site
- SWMU #18 – Waste Pile

The overlapping areas are not included in the estimated acreage for the Marine Rifle Range.

5.1.2 Munitions Used

The Marine Rifle Range was used for small arms training. Historical maps and documents state that rifles were used at the range. Reportedly pistols were also used at the range. Specific ordnance types used at the range are not known; however, general rifle ammunition from the early 1900s included .30-caliber ammunition. According to the Army Technical Manuals (AR 750-10, TM 9-855), the maximum range for .30-caliber ammunition is 10,350 feet, and the muzzle velocity is 2,700 feet per second. The SDZ extends from the end of each firing line in a 30-degree angle for 3,000 feet down range, at which point it continues for an additional 8,700 feet parallel to the direction of fire. The SDZ for the Marine Rifle Range covers 1,369 acres. The SDZ is the location where projectiles were fired over or may have landed. The munitions used and/or stored at the facility and the associated chemical constituents are listed in Table 5-1.

5.1.3 Munitions Constituents

Lead bullets/fragments are suspected within the target butts. NG from unburned powders and lead from primers is suspected at the firing points. No munitions-related debris items were identified at the Marine Rifle Range. No bullets or metallic debris were reported to have been identified in the shovel tests conducted for the Phase I Cultural Resources Survey of Stump Neck Annex (Goodwin, R.C. & Associates, 1996. Phase I Cultural Resources Survey of Stump Neck Annex and Supplemental Architectural Investigations, Indian Head Naval Surface Warfare Center, Charles County, Maryland.). Based on the information obtained during the data collection process, the Marine Rifle Range is not suspected to contain CWM-filled munitions, electrically fused munitions, or DU-associated munitions.

5.2 SITE FIELD WORK

5.2.1 Site Field Activities

Soil sample locations were selected based on a bias towards areas that were believed to be most likely contaminated by past operations at the site. The total area of the site is 30.44 acres as indicated on Table 3-1. The site is divided into the nine firing lines, two target berms, and the Hillside Impact Area. The nine firing lines are approximately 200 linear feet each. Target Berm #1 covers approximately 0.42 acres. Target Berm #2 covers approximately 0.34 acres. The Hillside Impact Area covers approximately 2.7 acres. See Figure 3-2 for all sample locations. Prior to initiating sample collection, all sample locations were marked by colored pin flags bearing the sample location ID number. Proposed sample locations identified in the approved WP were located by global positioning system (GPS) and by

measurements from stationary objects (e.g.: roadways, existing buildings). All sample locations were as proposed in the approved WP.

5.2.2 Work Plan Deviations

There were no deviations from the work plan.

5.2.3 Field Data Collection

A total of 148 soil samples were collected during the SI at the MRR. All surface soil samples collected were from the depth of 0 to 1 foot bgs. Three subsurface soil samples were collected from a depth of 1 to 2 feet bgs. One subsurface soil sample was collected from a depth of 2 to 3 feet bgs. Nine composite samples were collected along the firing lines in ten aliquots each. One hundred forty-eight samples underwent field XRF analysis for lead, and 32 soil samples were selected for metals analysis at the FBL. The XRF screened composite samples were not correlated, so are not shown on table 3-8. Nine soil samples were selected for PAH analysis. Four soil samples were selected for TOC analysis. No soil samples were selected for NG analysis. Soil samples were collected via hand auger in accordance with SOP-05. A summary of the sample collection methods used is shown in Table 3-3. Soil sample log sheets are included in Appendix B of this document.

5.3 SITE INSPECTION DATA COLLECTION RESULTS

5.3.1 MC Sampling Results

All soil samples collected were compared to the PALs and background sampling results, and a statistical evaluation was done to compare the background data with the site sampling results. The summary table of the site background screening is presented as Table 5-2. The statistical summary and calculations are presented in Appendix G. The MC analytical results are presented in Appendix C, and the data validation reports are presented in Appendix D. Table 5-3 summarizes the results as compared to the calculated screening values for metals. The PAL was the reference limit, unless the background and screening calculations exceeded this value. In Table 5-3, if a parameter had an exceedance at any sampling point, the parameter is highlighted; individual sample exceedances are also highlighted. Figure 5-1 illustrates the metals exceedances in soil at the Marine Rifle Range Hillside and Target Berms. Figure 5-1a illustrates the metals exceedances in soil at the Marine Rifle Range Firing Lines. Surface soil samples collected were from the surface depth of 0 to 1 foot bgs . Subsurface samples were collected from depths of 1 to 2 feet bgs at three locations and 2 to 3 feet bgs at one location. Screening values used were the PAL limits for the direct contact residential values for soil.

At Berm 1, the copper PAL was exceeded at one discrete surface soil sampling location. The lead PAL was exceeded at two discrete surface soil sampling locations for the FBL results. The tin PAL was exceeded at two discrete surface soil sampling locations.

At Berm 2, the lead PAL was exceeded at 12 discrete surface soil sampling locations. The tin PAL was exceeded at one discrete surface soil sampling location.

At the Hillside Impact Area, The antimony PAL was exceeded at one discrete surface soil sampling location. The copper PAL was exceeded at four discrete surface soil sampling locations, 2 discrete subsurface soil sampling locations at 1 to 2 feet bgs, and one discrete subsurface soil sampling location at 2 to 3 feet bgs. The lead PAL was exceeded for the XRF and/or FBL results at 43 discrete surface soil sampling locations, 3 discrete subsurface soil sampling locations at 1 to 2 feet bgs, and 1 discrete subsurface soil sampling location at 2 to 3 feet bgs. The tin PAL was exceeded at 12 discrete surface soil sampling locations, 2 discrete subsurface soil sampling locations at 1 to 2 feet bgs, and 1 discrete subsurface soil sampling location at 2 to 3 feet bgs. The zinc PAL was exceeded at three discrete surface soil sampling locations and one discrete subsurface soil sampling location at 1 to 2 feet bgs.

At the Firing Lines, the antimony PAL was exceeded at two composite surface soil sampling locations. The tin PAL was exceeded at one composite surface sampling location. The zinc PAL was exceeded at three composite surface sampling locations. The lead PAL was not exceeded at any locations.

Lead was the primary COPC for the investigation and all the screening data were based on XRF lead results. Approximately 20 percent of the XRF screened data were shipped to a FBL for lead analysis, along with other parameters determined on a site by site basis. The XRF and FBL data are plotted on Figure 5-2 using the direct contact residential soil screening value of 400 mg/kg. The values are color coded green for less than 400 mg/kg, yellow for 400 to 800 mg/kg, and red for greater than 800 mg/kg. FBL data superseded XRF data when present. The correlation between the XRF and FBL values was statistically acceptable; subsequently, the predicted lab values were used in place of the XRF values. Figure 5-2 shows the random low level lead exceedances in the two target berms, and the higher level lead exceedances at the hillside impact area. None of the firing line lead composite samples exceeded the lead PAL. The Human Health Risk Screening Evaluation is discussed in Section 5.5.

Ecological screening values were 11 mg/kg for wildlife exposure to lead in soil, 120 mg/kg for plant exposure to lead in soil, and 1,700 mg/kg for soil invertebrates exposure to lead in soil. The composite soil samples did not exceed the 120 mg/kg for plant exposure to lead in soil. In the target berms, there

were some exceedances of the 120 mg/kg for plant exposure, but there were no exceedances of the 1,700 mg/kg for soil invertebrates. At the hillside impact area, there were exceedances of the 120 mg/kg for plant exposure and of the 1,700 mg/kg for soil invertebrates. The Eco Screening levels for lead in soil are illustrated on Figure 5-3 for the target berms and hillside area. The Ecological Risk Screening Evaluation is discussed in Section 5.6.

5.4 DATA QUALITY REVIEW/USABILITY

5.4.1 Data Quality Review of Samples at Marine Rifle Range

This section contains a description of the data review processes used to determine whether analytical laboratory data collected during the sampling field effort for the Marine Rifle Range were of acceptable quality for use in decision-making. The review began with data validation, DQOs presented in the Munitions Response Program Site Inspections at Five Small Arms/Skeet Ranges QAPP (April 2009) were maintained through the course of the sampling event. The Worksheets #19 and #15 of the QAPP present the analytical methods and compounds analyzed.

5.4.1.1 Data Validation Results

All of the results from analytical laboratory samples were validated according to multiple specifications. Sample data validation generally followed U.S. EPA Region III Modifications to the National Functional Guidelines for Organic Data Review (September 1994), and U.S. EPA Region 3 Modifications to the National Functional Guidelines for Inorganic Data Validation (April 1993) guidelines.

Appendix D, Table 1 presents all the qualified data and the reason for the data qualification. The rejection of data was not necessary for samples collected at the Marine Rifle Range and all data are considered valid for their intended purpose.

5.4.1.2 Data Quality Review

Some of the DQIs are generated from analysis of field samples (e.g., field duplicates) and some are generated from the analysis of laboratory samples (e.g., laboratory duplicates). Individually, field and laboratory DQIs provide measures of the performance of the respective investigative operations (field or laboratory). If individual QC results were acceptable, there was no assignment of validation flags to an analytical result; otherwise, there was assignment of a flag indicating the type of QC deficiency to the result.

5.4.1.3 Completeness

The sample collection and laboratory analytical completeness were 100%.

5.4.1.4 Sensitivity

The project quantitation limit goals (PQLGs) are listed in Worksheet #15 in the QAPP (April 2009). Analytical sensitivity was generally satisfactory to meet DQOs presented in the QAPP. However, at the inception of the project, the laboratory could not meet several of the PQLGs. Worksheet #15 highlights the exceedances of the PQLGs.

The amount of sample volume collected also affects the ability of the laboratory to achieve the desired PQLGs. Laboratory or field blank contamination can also elevate a result above the PQLGs, resulting in samples being qualified as non-detected. There are instances where the non-detected sample results exceed the PQLGs either because of the laboratory's inability to meet the PQLG or because of elevated detection limits because of blank contamination. Because of the large quantity of data collected and the limited number of individual chemicals driving risk, the elevated detection limits should have a negligible impact on the assessment of risk and as impact on presence absence determinations.

5.4.1.5 Accuracy

Appendix D, Table 1 shows that several results were qualified because of matrix spike, LCS, holding time, or calibration noncompliances. The noncompliances in general do not show any directional bias with the data except for the following cases. Antimony and copper had matrix spike recoveries less than the laboratory quality control limit but greater than 30% indicating a slight low bias. Cation exchange capacity had a matrix spike recovery greater than the laboratory control limit indicating a slight high bias. Overall, the laboratory accuracy was acceptable and no data were rejected. There were no quality control deficencies noted for field accuracy.

5.4.1.6 Field and Laboratory Precision

Laboratory duplicate imprecision resulted in the qualification of several antimony results. Field duplicate imprecision was noted for arsenic, copper, lead, and tin. Despite the data qualifications the data are acceptable for use in risk assessment.

5.4.1.7 Comparability

No comparability issues were noted during the data validation process.

5.4.1.8 Representativeness

The QAPP (April 2009) and the use of standardized sampling, sample handling, sample analysis, and data reporting procedures were designed so that the final data would be accurate representations of actual site conditions. Based on field logs indicating the conditions during sample collection and laboratory audits all reported data are adequately representative of site conditions and intended populations.

5.5 HUMAN HEALTH RISK SCREENING EVALUATION

The purpose of the human health risk screening evaluation is to conservatively estimate risks posed to potential human receptors from chemicals present at the Marine Rifle Range. The human health risk screening followed the steps described in Section 3.3, which presented the general methodology for the human health risk screening. These steps are:

- Identification of COPCs
- Exposure Assessment
- Risk Characterization
- Uncertainty Analysis

5.5.1 Identification of Chemicals of Potential Concern

Human health COPCs in soil were identified using the following considerations:

- Occurrence and distribution of chemicals in the environmental media
- Chemical toxicity
- Occurrence of chemical in background samples

Soil samples in the Marine Rifle Range were divided into five areas of interest for the risk screening evaluation:

- Composite surface soil samples collected from the firing lines
- Discrete surface soil samples collected from Target Berm 1
- Discrete surface soil samples collected from Target Berm 2
- Discrete surface soil samples collected from the Hillside Impact Area
- Discrete subsurface soil samples collected from the Hillside Impact Area

Using the methodology described in Section 3.3, the maximum concentration of each chemical in soil in each area of interest was compared to up to four risk-based screening levels: two risk-based screening levels based on direct contact exposures to soil and two based on protection of groundwater. If the maximum concentration exceeded any of the risk-based screening levels, the chemical was classified as a possible COPC. These chemicals were subjected to a comparison to background soil data to determine if the soil concentrations in the area of interest are consistent with background soil concentrations. Section 3.3 presents the approach used to determine if the chemicals are present in soil at concentrations consistent with background concentrations. Because the background evaluation is used in both the human health and ecological risk screening, the background evaluation is presented in Appendix G. For chemicals identified as possible COPCs, the chemical was retained as a COPC for the human health risk screening only if the chemical was present in soil in the area of interest at concentrations above background.

5.5.1.1 Composite Surface Soil Samples from Firing Lines

Appendix E, Table 5-1 presents the results of the evaluation of composite surface soil samples from the firing lines. The following chemicals were identified as human health COPCs in the composite surface soil samples:

- Antimony
- Copper
- Nitroglycerin

5.5.1.2 Discrete Surface Soil Samples from Target Berm 1

Appendix E, Table 5-2 presents the results of the evaluation of discrete surface soil samples from Target Berm 1. The following chemicals were identified as human health COPCs in the discrete surface soil samples from Target Berm 1:

- Copper
- Lead

5.5.1.3 Discrete Surface Soil Samples from Target Berm 2

Appendix E, Table 5-3 presents the results of the evaluation of discrete surface soil samples from Berm 2. The following chemicals were identified as human health COPCs in the discrete surface soil samples from Berm 2:

- Copper
- Lead

5.5.1.4 Discrete Surface Soil Samples from Hillside Impact Area

Appendix E, Table 5-4 presents the results of the evaluation of discrete surface soil samples from the Hillside Impact Area. The following chemicals were identified as human health COPCs in the discrete surface soil samples from the Hillside Impact Area:

- Copper
- Lead

5.5.1.5 Discrete Subsurface Soil Samples from Hillside Impact Area

Appendix E, Table 5-5 presents the results of the evaluation of discrete subsurface soil samples from the Hillside Impact Area. The following chemicals were identified as human health COPCs in the discrete subsurface soil samples from the Hillside Impact Area:

- Copper
- Lead

5.5.2 Exposure Assessment

This section presents the exposure assessment for the Marine Rifle Range. This range was used for small arms training during World War I. The western portion of the range is developed with buildings on it. The central portion is partially developed with a few buildings and an area used to store construction equipment. The eastern portion, which includes the two Target Berms and the Hillside Impact Area, is undeveloped. There are marshy areas within the central and eastern portions of the Marine Rifle Range.

The remaining undeveloped parts are wooded. According to installation personnel, there are no planned changes to current activities at the Marine Rifle Range.

No public access is authorized at NSF-IH, Stump Neck Annex. Signs, partial fencing, locked/secured gates, login book/office check-in, and vehicle security patrols are used to control the entire facility. There are no access control features specific to the Marine Rifle Range. Portions of the Marine Rifle Range are classified as wetlands and portions lie within the 100-year flood plain. These features restrict future redevelopment options at the Marine Rifle Range. Hunting is allowed on parts of the Marine Rifle Range.

Under the current and predicted future land use patterns for this site, potential human receptors include authorized Navy personnel (military and civilian), visitors, contractors, maintenance workers, recreational users, and trespassers.

In the human health risk screening evaluation, direct contact exposures to surface and subsurface soil (incidental ingestion of soil, dermal contact with soil, inhalation of chemicals volatilized from soil into outdoor air and inhalation of chemicals in soil emitted into the air as particulates) were evaluated. Also analyzed was the potential for COPCs in soil to leach into groundwater and adversely affect groundwater quality.

TtNUS used the maximum detected concentrations of the COPCs in soil (see Appendix E, Tables 5-1, 5-2, 5-3, 5-4 and 5-5) as the EPCs in the risk characterization.

5.5.3 Risk Characterization

This section presents the risk characterization for the Marine Rifle Range. The risk characterization involved:

- Calculating risks and hazard indices for direct contact exposures to soil.
- Evaluating direct contact exposures to lead in soil.
- Evaluating the potential for chemicals to leach from soil to groundwater and affect groundwater quality (the soil to groundwater pathway).

5.5.3.1 Evaluation of Direct Contact Exposures to Soil

As discussed previously, COPCs were identified for the human health risk screening evaluation for soil samples from all areas of interest. Using the procedures presented in Section 3.3, risk and hazard

indices for direct contact exposures to these soils were calculated. TtNUS also evaluated direct contact exposures to lead in discrete soil samples.

5.5.3.1.1 Composite Surface Soil Samples from Firing Lines

Appendix E, Table 5-6 presents the calculated risks and hazard indices for direct contact exposures to COPCs in the composite surface soil samples from the firing lines. Appendix E, Table 5-6 presents risk and hazard indices for both residential and non-residential exposures. For residential exposures, the total calculated risk is $2.8x10^{-8}$, which is well below USEPA's acceptable risk level of 10^{-4}. The calculated hazard index is 0.19, which is below USEPA's acceptable hazard index of 1.

For non-residential exposures, the total calculated risk is $8.0x10^{-9}$, which is well below USEPA's acceptable risk level of 10^{-4}. The calculated hazard index is 0.018, which is below USEPA's acceptable hazard index of 1.

5.5.3.1.2 Discrete Surface Soil Samples From Target Berm 1

Appendix E, Table 5-7 presents the calculated hazard indices for residential and non-residential direct contact exposures to COPCs in the discrete surface soil samples from Target Berm 1. Since copper is the only COPC (other than lead, which is evaluated separately) and copper is not considered to be carcinogenic, cancer risks were not calculated. For residential direct contact exposures to soil, the total calculated hazard index is 0.035, which is well below USEPA's acceptable hazard index of 1. For non-residential direct contact exposures to soil, the total calculated hazard index is 0.0026, which is also well below USEPA's acceptable hazard index of 1.

Appendix E, Table 5-8 presents the comparison of the maximum lead concentration in the surface soil samples to residential and non-residential risk-based concentrations. The maximum lead concentration of 543 mg/kg exceeds the residential direct contact screening value of 400 mg/kg, but is below the non-residential direct contact screening value of 800 mg/kg.

5.5.3.1.3 Discrete Surface Soil Samples From Target Berm 2

Appendix E, Table 5-9 presents the calculated hazard indices for residential and non-residential direct contact exposures to COPCs in the discrete surface soil samples from Target Berm 2. Since copper is the only COPC (other than lead, which is discussed separately) and copper is not considered to be carcinogenic, cancer risks were not calculated. For residential direct contact exposures to soil, the total calculated hazard index is 0.029, which is well below USEPA's acceptable hazard index of 1. For non-

residential direct contact exposures to soil, the total calculated hazard index is 0.0022, which is also well below USEPA's acceptable hazard index of 1.

Appendix E, Table 5-10 presents the comparison of the maximum lead concentration in the surface soil samples to residential and non-residential risk-based concentrations. The maximum lead concentration of 606 mg/kg exceeds the residential direct contact screening value of 400 mg/kg, but is below the non-residential direct contact screening value of 800 mg/kg.

5.5.3.1.4 Discrete Surface Soil Samples from Hillside Impact Area

Appendix E, Table 5-11 presents the calculated hazard indices for residential and non-residential direct contact exposures to COPCs in the discrete surface soil samples from the Hillside Impact Area. Since copper is the only COPC (other than lead, which is discussed separately) and copper is not considered to be carcinogenic, cancer risks were not calculated. For residential direct contact exposures to soil, the total calculated hazard index is 0.089, which is below USEPA's acceptable hazard index of 1. For non-residential direct contact exposures to soil, the total calculated hazard index is 0.0067, which is well below USEPA's acceptable hazard index of 1.

Appendix E, Table 5-12 presents the comparison of the maximum lead concentration in the surface soil samples to residential and non-residential risk-based concentrations. The maximum lead concentration of 904 mg/kg exceeds the residential direct contact screening value of 400 mg/kg and the non-residential direct contact screening value of 800 mg/kg.

5.5.3.1.5 Discrete Subsurface Soil Samples from Hillside Impact Area

Appendix E, Table 5-13 presents the calculated hazard indices for residential and non-residential direct contact exposures to COPCs in the discrete subsurface soil samples from the Hillside Impact Area. Since copper is the only COPC (other than lead, which is discussed separately) and copper is not considered to be carcinogenic, cancer risks were not calculated. For residential direct contact exposures to soil, the total calculated hazard index is 0.27, which is below USEPA's acceptable hazard index of 1. For non-residential direct contact exposures to soil, the total calculated hazard index is 0.0021, which is also below USEPA's acceptable hazard index of 1.

Appendix E, Table 5-14 presents the comparison of the maximum lead concentration in the subsurface soil samples to residential and non-residential risk-based concentrations. The maximum lead concentration of 6620 mg/kg exceeds the residential direct contact screening value of 400 mg/kg and the

non-residential direct contact screening value of 800 mg/kg. There were three subsurface soil samples collected from the Hillside Impact Area and the concentrations of lead in all three samples exceeded the residential and non-residential screening values.

5.5.3.2 Evaluation of the Soil to Groundwater Pathway

Using the procedures presented in Section 3.3, the soil to groundwater pathway was evaluated for COPCs in soil samples from all areas of interest.

5.5.3.2.1 Composite Surface Soil Sample from Firing Lines

Appendix E, Table 5-15 presents the comparison of the maximum detected concentration and average concentration to the risk-based concentrations in soil for protection of groundwater. This table presents risk-based concentrations for dilution-attenuation factors of 1 (the conservative default value) and 20. The maximum concentrations of antimony and copper in soil exceeded risk-based concentrations for a dilution-attenuation factor of 1 but not 20. The maximum concentration of nitroglycerin in soil exceeded risk-based concentrations for dilution-attenuation factors of both 1 and 20. Nitroglycerin is fairly reactive in the environment, so if nitroglycerin leaches from soil into groundwater, there is a good chance that some or all of this chemical will degrade in groundwater. Groundwater from the Marine Rifle Range is not used as a source of drinking water, so the pathway is currently incomplete.

5.5.3.2.2 Discrete Surface Soil Samples from Target Berm 1

Appendix E, Table 5-16 presents the comparison of the maximum detected concentrations and average concentrations of surface soil samples from Target Berm 1 to the risk-based concentrations in soil for protection of groundwater for dilution-attenuation factors of 1 and 20. The maximum concentration of copper in soil exceeds risk-based concentrations for a dilution-attenuation factor of 1 but not 20. Also, as noted above, groundwater from the Marine Rifle Range is not used as a source of drinking water, so the pathway is currently incomplete.

5.5.3.2.3 Discrete Surface Soil Samples from Target Berm 2

Appendix E, Table 5-17 presents the comparison of the maximum detected concentrations and average concentrations of surface soil samples from Target Berm 2 to the risk-based concentrations in soil for protection of groundwater for dilution-attenuation factors of 1 and 20. The maximum concentration of copper in soil exceeds risk-based concentrations for a dilution-attenuation factor of 1 but not 20. As

noted above, groundwater from the Marine Rifle Range is not used as a source of drinking water, so the pathway is currently incomplete.

5.5.3.2.4 Discrete Surface Soil Samples from Hillside Impact Area

Appendix E, Table 5-18 presents the comparison of the maximum detected concentrations and average concentrations of surface soil samples from the Hillside Impact Area to the risk-based concentrations in soil for protection of groundwater for dilution-attenuation factors of 1 and 20. The maximum concentration of copper in soil exceeds risk-based concentrations for a dilution-attenuation factor of 1 but not 20. As noted above, groundwater from the Marine Rifle Range is not used as a source of drinking water, so the pathway is currently incomplete.

5.5.3.2.5 Discrete Subsurface Soil Samples from Hillside Impact Area

Appendix E, Table 5-19 presents the comparison of the maximum detected concentrations and average concentrations of subsurface soil samples from the Hillside Impact Area to the risk-based concentrations in soil for protection of groundwater for dilution-attenuation factors of 1 and 20. The maximum concentration of copper in soil exceeds risk-based concentrations for a dilution-attenuation factor of 1 but not 20. As noted above, groundwater from the Marine Rifle Range is not used as a source of drinking water, so the pathway is currently incomplete.

5.5.4 Uncertainty Analysis

Section 3.3.4 provides a detailed discussion of the sources of uncertainty in the human health risk screening evaluation.

5.5.5 Human Health Risk Screening Evaluation Summary

In the human health risk screening evaluation, TtNUS evaluated soil data for the Marine Rifle Range. TtNUS divided the soil samples for this site into five areas of interest for the risk screening evaluation:

- Composite surface soil samples collected from the firing lines
- Discrete surface soil samples from Target Berm 1
- Discrete surface soil samples from Target Berm 2
- Discrete surface soil samples from the Hillside Impact Area
- Discrete subsurface soil samples from the Hillside Impact Area

For the composite surface soil samples collected from the firing lines, antimony, copper and nitroglycerin were selected as COPCs for the human health risk screening evaluation. The calculated risks for direct contact exposures for residential and nonresidential land uses were below the USEPA target level of 10^{-4} and the calculated hazard indices for residential and nonresidential land uses were below the USEPA target level of 1. Maximum antimony and copper concentrations in soil exceeded risk-based concentrations in soil for protection of groundwater for a dilution-attenuation factor of 1, but not risk-based concentrations in soil for a dilution-attenuation factor of 20. Maximum nitroglycerin concentrations in soil exceeded risk-based concentrations in soil for protection of groundwater for dilution-attenuation factors of both 1 and 20. Nitroglycerin is fairly reactive in the environment, so nitroglycerin originating in soil may degrade as it leaches such that the resulting concentrations of nitroglycerin in groundwater are not significant. Groundwater from the Marine Rifle Range is not used as a source of drinking water, so the pathway is currently incomplete.

For the discrete surface soil samples from Target Berm 1, copper and lead were selected as COPCs for the human health risk screening evaluation. Using the maximum detected concentrations in soil, the calculated hazard indices for residential and nonresidential land uses were below the USEPA target level of 1. Copper is not considered to be carcinogenic, so risks were not calculated for direct contact exposures to soil. In the evaluation of direct contact exposures to lead in soil, the maximum detected lead concentration in soil was greater than the residential direct contact screening value of 400 mg/kg, but less than the non-residential direct contact screening value of 800 mg/kg. Maximum copper concentrations in soil exceeded risk-based concentrations in soil for protection of groundwater for a dilution-attenuation factor of 1, but not risk-based concentrations in soil for a dilution-attenuation factor of 20. As noted above, groundwater from the Marine Rifle Range is not used as a source of drinking water, so the pathway is currently incomplete.

For the discrete surface soil samples from Target Berm 2, copper and lead were selected as COPCs for the human health risk screening evaluation. Using the maximum detected concentrations in soil, the calculated hazard indices for residential and nonresidential land uses were below the USEPA target level of 1. In the evaluation of direct contact exposures to lead in soil, the maximum detected lead concentration in soil was greater than the residential direct contact screening value of 400 mg/kg, but less than the non-residential direct contact screening value of 800 mg/kg. Maximum copper concentrations in soil exceeded risk-based concentrations in soil for protection of groundwater for a dilution-attenuation factor of 1, but not risk-based concentrations in soil for a dilution-attenuation factor of 20. As noted above, groundwater from the Marine Rifle Range is not used as a source of drinking water, so the pathway is currently incomplete.

For the discrete surface soil samples from the Hillside Impact Area, copper and lead were selected as COPCs for the human health risk screening evaluation. Using the maximum detected concentrations in soil, the calculated hazard indices for residential and nonresidential land uses were below the USEPA target level of 1. In the evaluation of direct contact exposures to lead in soil, the maximum detected lead concentration in soil was greater than both the residential direct contact screening value of 400 mg/kg and the non-residential direct contact screening value of 800 mg/kg. Maximum copper concentrations in soil exceeded risk-based concentrations in soil for protection of groundwater for a dilution-attenuation factor of 1, but not risk-based concentrations in soil for a dilution-attenuation factor of 20. As noted above, groundwater from the Marine Rifle Range is not used as a source of drinking water, so the pathway is currently incomplete.

For the discrete subsurface soil samples from the Hillside Impact Area, copper and lead were selected as COPCs for the human health risk screening evaluation. Using the maximum detected concentrations in soil, the calculated hazard indices for residential and nonresidential land uses were below the USEPA target level of 1. In the evaluation of direct contact exposures to lead in soil, there were three discrete subsurface soil samples and all had concentrations exceeding both the residential direct contact screening value of 400 mg/kg and the non-residential direct contact screening value of 800 mg/kg. Maximum copper concentrations in soil exceeded risk-based concentrations in soil for protection of groundwater for a dilution-attenuation factor of 1, but not risk-based concentrations in soil for a dilution-attenuation factor of 20. As noted above, groundwater from the Marine Rifle Range is not used as a source of drinking water, so the pathway is currently incomplete.

5.6 ECOLOGICAL RISK SCREENING EVALUATION

5.6.1 Site Description

Section 5.1 presents a detailed description of the site location, history, and background of the site. Grab samples were collected from three separate areas, including Berm 1, Berm 2, and the Hillside Impact Area. Composite samples were collected at the firing lines.

5.6.2 Potential Ecological Receptors and Exposure Pathways

The contaminated media to which ecological receptors may be exposed include surface soil. These potential ecological receptors and exposure pathways are described in detail in Section 3.4.1.1.

5.6.3 Ecological Screening

The first part of the evaluation is selection of COPCs.

5.6.3.1 COPCs for Terrestrial Invertebrates and Plants

Appendix F, Tables 5-6.3.1 to 5-6.3.4 present the chemicals that were retained as COPCs in surface soil for potential risks to plants and invertebrates for Berm 1 grab samples, Berm 2 grab samples, Hillside Impact Area grab samples, and the composite samples taken from the firing lines, respectively. These tables also present the chemicals that were retained for food chain modeling for mammals and birds (discussed further in Section 5.6.3.2).

Terrestrial Invertebrates

Copper was selected as a COPC for terrestrial invertebrates in surface soil from Berm 1, Berm 2, and Hillside Impact Area grab samples because it was detected at a maximum concentration that exceeded its screening level. Tin was selected as a COPC for terrestrial invertebrates in surface soil from Berm 1, Berm 2, and Hillside Impact Area grab samples because no screening level was available. Although lead based on lab data did not exceed its screening level, lead from Hillside Impact Area grab samples based on XRF data exceeded its screening level; therefore, lead was selected as a COPC for terrestrial invertebrates in surface soil from Hillside Impact Area samples. Nitroglycerin was selected as a COPC for terrestrial invertebrates in the composite soil because no screening level was available.

Terrestrial Plants

Copper and lead were selected as COPCs for terrestrial plants in surface soil from Berm 1 and Berm 2 grab samples because they were detected at concentrations that exceeded screening levels. Copper, lead, and tin were selected as COPCs for terrestrial plants in surface soil from Hillside Impact Area grab samples because they were detected at concentrations that exceeded screening levels. Nitroglycerin was selected as a COPC for terrestrial plants in the composite soil because a screening level was not available.

5.6.3.2 COPCs for Mammals and Birds

Appendix F, Tables 5-6.3.1 to 5-6.3.4 present the chemicals that were retained for food chain modeling for terrestrial mammals and birds because they were detected at concentrations above screening levels or did not have screening levels for mammals or birds.

Tables 5-6.3.5 to 5-6.3.8 summarize the results of the conservative inputs food chain modeling for terrestrial receptors. Appendix F presents the calculation worksheets. The following summarizes the results of the food chain modeling using maximum concentrations and conservative input parameters:

- Copper and lead had EEQs greater than 1.0 in the food chain model for surface soil from Berm 1 and Berm 2 grab samples.

- Copper, lead, and tin had EEQs greater than 1.0 in the food chain model for surface soil from Hillside Impact Area grab samples.

- Antimony, copper, and lead had EEQs greater than 1.0 in the food chain model for the composite soil.

- Avian TRVs were not available for antimony and nitroglycerin.

5.6.4 Step 3A Refinement

Step 3a consists of a refinement of the conservative exposure assumptions/concentrations to evaluate the potential risks to ecological receptors (i.e., plants, invertebrates, and wildlife receptors). The objective of the Step 3a refinement is to better define those chemicals that contribute to potentially unacceptable levels of ecological risk, and to identify and eliminate from further consideration those COPCs that were retained because of the use of very conservative exposure scenarios. The Step 3a evaluation is designed to eliminate chemicals from further evaluation for certain groups of receptors. For example, a chemical may be eliminated as a COPC in soil based on risks to soil invertebrates and plants but may be retained for evaluating risks to wildlife.

5.6.4.1 Terrestrial Plants and Invertebrates

Terrestrial Invertebrates

Copper was retained as a COPC for terrestrial invertebrates in surface soil from grab samples from Berm 1, Berm 2, and the Hillside Impact Area because it was detected at concentrations that exceeded screening levels; copper greatly exceeded the screening level of 80 mg/kg in samples from Berm 1 (107 mg/kg) and the Hillside Impact Area (276 mg/kg). Also, maximum concentrations of copper exceeded maximum background concentrations. Tin was selected as a COPC for terrestrial invertebrates in surface soil from grab samples from Berm 1, Berm 2, and the Hillside Impact Area because a screening

level was not available. However, maximum concentrations of tin from Berm 1, Berm 2, and Hillside Impact Area (9.1, 10.1, and 81.8 mg/kg, respectively) were well below the ORNL soil invertebrate toxicological benchmark for tin of 2000 mg/kg (Efroymson et al., 1997b). Therefore, tin is not expected to be toxic to soil invertebrates at the detected concentrations, and is not retained as a COPC. Nitroglycerin was detected in only one of nine samples; therefore, it was eliminated as a COPC in composite soil. No background data were available for tin and nitroglycerin.

Terrestrial Plants

Copper and lead were retained as COPCs for terrestrial plants in surface soil from Berm 1 and Berm 2 grab samples because they were detected at concentrations that exceeded screening levels and greatly exceeded the screening level in at least one sample. Copper, lead, and tin were retained as COPCs for terrestrial plants in surface soil from Hillside Impact Area grab samples because they were detected at concentrations that exceeded screening levels and greatly exceeded the screening level in at least one sample. Also, maximum concentrations of copper, lead, and tin exceeded maximum background concentrations. Nitroglycerin was detected in only one of nine samples; therefore, it was eliminated as a COPC in composite soil. No background data were available for nitroglycerin. A discussion of the chemicals that have EEQs greater than 1.0 using the less conservative food chain modeling for mammal and birds are presented below.

5.6.4.2 Mammals and Birds

The EEQs from the terrestrial food chain modeling were greater than 1.0 for several chemicals using maximum chemical concentrations and conservative exposure assumptions (see Section 5.6.3.2). Therefore, as part of the Step 3a refinement, risks for this pathway were recalculated using average chemical concentrations in surface soil and sediment and less conservative exposure assumptions (i.e., average ingestion rates, average body weights) (see Appendix F, Table 3.4-3).

Tables 5-6.3.9 to 5-6.3.12 summarize the results of the less conservative inputs food chain modeling for terrestrial receptors. Appendix F presents the calculation worksheets. A discussion of the risks to mammal and birds is presented below.

Terrestrial Receptors

- Copper and lead had EEQs greater than 1.0 using the NOAEL as the TRV, but EEQs are less than 1.0 using the LOAEL as the TRV. Maximum concentrations of copper and lead in grab samples

exceeded the maximum background concentrations. Because copper and lead are related to site activities, they are retained as COPCs.

- For the composite sample, lead had an EEQ greater than 1.0 using the NOAEL as the TRV. Because lead is related to site activities, it is retained as a COPC. Antimony had an EEQ less than 1.0 using the NOAEL as the TRV; therefore, it is eliminated as a COPC. An avian TRV was not available for nitroglycerin; however, nitroglycerin is considered to be non-toxic to birds (USACHPPM, 2007). Therefore, it is not likely that nitroglycerin will impact birds at the site. Also, the areas potentially impacted by nitroglycerin, which are the firing lines, are small. For these reasons, nitroglycerin is eliminated as a COPC.

5.6.5 Ecological Risk Screening Summary

This section presents a summary of the conclusions of the ecological risk assessment that was conducted for the site.

5.6.5.1 Risks to Terrestrial Plants and Invertebrates

Concentrations exceeded the copper screening level for risk to invertebrates in surface soil from Berm 1, Berm 2, and Hillside Impact Area samples; therefore, copper was retained as a COPC. Concentrations exceeded the lead screening level for risk to invertebrates in surface soil from Hillside Impact Area samples; therefore, lead was retained as a COPC. Copper and lead exceeded the screening level for risk to plants in surface soil from Berm 1, Berm 2, and Hillside Impact Area samples; therefore copper and lead were retained as COPCs. Tin was retained as a COPC for plants for the Hillside Impact Area as maximum concentrations of tin exceeded the screening level in Hillside grab samples. Nitroglycerin was eliminated as a COPC for invertebrates and plants because it was infrequently detected.

5.6.5.2 Mammals and Birds

Copper and lead were retained as COPCs for terrestrial wildlife because they had EEQs greater than 1.0 in the food chain model and are related to site activities.

5.7 UPDATED CSM

Only MC associated with the Marine Rifle Range are considered in the CSM exposure pathway analysis. The following general description of the CSM exposure pathway analysis was included in Section 10.1.7 of the SAP: “Contaminants at the Marine Rifle Range may potentially migrate within soil, groundwater,

surface water, and sediment. The Marine Rifle Range's proximity to Chicamuxen Creek and its unnamed tributaries provides possible migration routes to surface water. Storm water discharges to surface water via overland flow. Groundwater flow in the shallow water table aquifer also likely trends towards Chicamuxen Creek; therefore, MC leaching from soil into shallow groundwater may migrate to surface water. Sediments can act as contaminant repositories, and sediment mixing and dredging can act as migration routes to surface water. MC in surface soil and sediment may migrate via plant/animal uptake. Direct human or biota contact with surficial and subsurface soil is possible if the soil is disturbed. Based on a review of hydrogeological data, it is unlikely that MC in shallow groundwater would migrate to the deeper aquifers that are used as water supplies. However, shallow groundwater is still considered a potential exposure medium. Potential current and future human receptors include authorized Navy personnel (military and civilian), visitors, contractors, maintenance workers, recreational users, and trespassers. Plant and animal biota are also potential receptors. Examples of ecological receptors include deer, wild turkey, and waterfowl."

Human Health Risk Exposure Summary

The human health CSM summary table is presented as Table 5-4.

In the human health risk screening evaluation, TtNUS evaluated soil data for the Marine Rifle Range. TtNUS divided the soil samples for this site into five areas of interest for the risk screening evaluation:

- Composite surface soil samples collected from the firing lines
- Discrete surface soil samples from Target Berm 1
- Discrete surface soil samples from Target Berm 2
- Discrete surface soil samples from the Hillside Impact Area
- Discrete subsurface soil samples from the Hillside Impact Area

Maximum antimony and copper concentrations in soil exceeded risk-based concentrations in soil for protection of groundwater for a dilution-attenuation factor of 1, but not risk-based concentrations in soil for a dilution-attenuation factor of 20. Maximum nitroglycerin concentrations in soil exceeded risk-based concentrations in soil for protection of groundwater for dilution-attenuation factors of both 1 and 20. Nitroglycerin is fairly reactive in the environment, so nitroglycerin originating in soil may degrade as it leaches such that the resulting concentrations of nitroglycerin in groundwater are not significant.

For the discrete surface soil samples from Target Berm 1, copper and lead were selected as COPCs for the human health risk screening evaluation. Using the maximum detected concentrations in soil, the

calculated hazard indices for residential and nonresidential land uses were below the USEPA target level of 1. Copper is not considered to be carcinogenic, so risks were not calculated for direct contact exposures to soil. In the evaluation of direct contact exposures to lead in soil, the maximum detected lead concentration in soil was greater than the residential direct contact screening value of 400 mg/kg, but less than the non-residential direct contact screening value of 800 mg/kg. Maximum copper concentrations in soil exceeded risk-based concentrations in soil for protection of groundwater for a dilution-attenuation factor of 1, but not risk-based concentrations in soil for a dilution-attenuation factor of 20.

For the discrete surface soil samples from Target Berm 2, copper and lead were selected as COPCs for the human health risk screening evaluation. Using the maximum detected concentrations in soil, the calculated hazard indices for residential and nonresidential land uses were below the USEPA target level of 1. In the evaluation of direct contact exposures to lead in soil, the maximum detected lead concentration in soil was greater than the residential direct contact screening value of 400 mg/kg, but less than the non-residential direct contact screening value of 800 mg/kg. Maximum copper concentrations in soil exceeded risk-based concentrations in soil for protection of groundwater for a dilution-attenuation factor of 1, but not risk-based concentrations in soil for a dilution-attenuation factor of 20.

For the discrete surface soil samples from the Hillside Impact Area, copper and lead were selected as COPCs for the human health risk screening evaluation. Using the maximum detected concentrations in soil, the calculated hazard indices for residential and nonresidential land uses were below the USEPA target level of 1. In the evaluation of direct contact exposures to lead in soil, the maximum detected lead concentration in soil was greater than both the residential direct contact screening value of 400 mg/kg and the non-residential direct contact screening value of 800 mg/kg. Maximum copper concentrations in soil exceeded risk-based concentrations in soil for protection of groundwater for a dilution-attenuation factor of 1, but not risk-based concentrations in soil for a dilution-attenuation factor of 20.

For the discrete subsurface soil samples from the Hillside Impact Area, copper and lead were selected as COPCs for the human health risk screening evaluation. Using the maximum detected concentrations in soil, the calculated hazard indices for residential and nonresidential land uses were below the USEPA target level of 1. In the evaluation of direct contact exposures to lead in soil, there were three discrete subsurface soil samples and all had concentrations exceeding both the residential direct contact screening value of 400 mg/kg and the non-residential direct contact screening value of 800 mg/kg. Maximum copper concentrations in soil exceeded risk-based concentrations in soil for protection of groundwater for a dilution-attenuation factor of 1, but not risk-based concentrations in soil for a dilution-attenuation factor of 20.

Groundwater from the Marine Rifle Range is not used as a source of drinking water, so the pathway is currently incomplete.

Ecological Risk Exposure Summary:

The Ecological CSM summary table is presented as Table 5-5.

This section presents a summary of the conclusions of the ecological risk assessment that was conducted for the site.

Risks to Terrestrial Plants and Invertebrates

Concentrations exceeded the copper screening level for risk to invertebrates in surface soil from Berm 1, Berm 2, and Hillside Impact Area samples; therefore, copper was retained as a COPC. Concentrations exceeded the lead screening level for risk to invertebrates in surface soil from Hillside Impact Area samples; therefore, lead was retained as a COPC. Copper and lead exceeded the screening level for risk to plants in surface soil from Berm 1, Berm 2, and Hillside Impact Area samples; therefore copper and lead were retained as COPCs. Tin was retained as a COPC for plants for the Hillside Impact Area as maximum concentrations of tin exceeded the screening level in Hillside grab samples. Nitroglycerin was eliminated as a COPC for invertebrates and plants because it was infrequently detected.

Mammals and Birds

Copper and lead were retained as COPCs for terrestrial wildlife because they had EEQs greater than 1.0 in the food chain model and are related to site activities.

CSM Summary

The updated CSM is shown on Figures 5-4 (Target Berms) and 5-4a (Hillside Impact Area) and details the potential exposure sources, pathways, and receptors. The exposure sources appear to be limited to the top of the target berms and the slope of the hillside. One pathway is runoff from precipitation. Leaching from soil into groundwater has been eliminated as a pathway, since groundwater is not used at the site. Receptors would be trespassers and ecological receptors by ingestion, dermal contact, and inhalation of surface soil, soil, and sediment. Potentially complete exposure pathways exist for both human and ecological receptors under both current and hypothetical future land uses.

5.8 CONCLUSIONS

The following summary can be made concerning the Marine Rifle Range:

- MC consisting of metals (primarily lead and, to a lesser extent, antimony, arsenic, copper, tin, and zinc), and NG are present in site soil [particularly surface soil (0 to 1 foot bgs interval)], and in surface water and sediment of drainageways leading from the range to the adjoining unnamed tributaries, wetlands, and Chicamuxen Creek. Lead is assumed to be the primary metal MC of concern because it is the primary constituent in the spent munitions and because of its documented toxicity to both human and ecological receptors. Copper, tin, and zinc contamination were sporadically correlated with lead concentrations because they are associated with the lead in the bullets.

- MC are present in surface soil, and may have migrated to subsurface soil and subsequently infiltrated to the underlying groundwater. These constituents may also have migrated to the aforementioned adjoining surface water bodies via surface soil runoff or the discharge of contaminated shallow groundwater to surface water. The extent of the potential environmental contamination at the site appears to be limited to one sampling location on the northern target berm, on the top of the southern target berm, and randomly along the slope of the hillside.

- The CSMs (Figures 5-4 and 5-4a) indicate that potentially complete exposure pathways exist for both human and ecological receptors under both current and hypothetical future land uses. Unacceptable levels of human and/or ecological risk may exist. However, groundwater is not currently used at the site.

- At Berm 1, the copper PAL was exceeded at one discrete surface soil sampling location. The lead PAL was exceeded at two discrete surface soil sampling locations. The tin PAL was exceeded at two discrete surface soil sampling locations.

- At Berm 2, the lead PAL was exceeded at 12 discrete surface soil sampling locations. The tin PAL was exceeded at one discrete surface soil sampling location.

- At the Hillside Impact Area, the antimony PAL was exceeded at one discrete surface soil sampling location. The copper PAL was exceeded at four discrete surface soil sampling locations, two discrete subsurface soil sampling locations at 1 to 2 feet bgs, and one discrete subsurface soil sampling location at 2 to 3 feet bgs. The lead PAL was exceeded at 43 discrete surface soil sampling locations, 3 discrete subsurface soil sampling locations at 1 to 2 feet bgs, and 1 discrete subsurface

soil sampling location at 2 to 3 feet bgs. The tin PAL was exceeded at 12 discrete surface soil sampling locations, 2 discrete subsurface soil sampling locations at 1 to 2 feet bgs, and 1 discrete subsurface soil sampling location at 2 to 3 feet bgs. The zinc PAL was exceeded at 3 discrete surface soil sampling locations and 1 discrete subsurface soil sampling location at 1 to 2 feet bgs.

- At the Firing Lines, the antimony PAL was exceeded at two composite surface soil sampling locations. The tin PAL was exceeded at one composite surface sampling location. The zinc PAL was exceeded at three composite surface sampling locations. The lead PAL was not exceeded at any locations.

5.8.1 Data Gaps

There were no data gaps.

5.9 RECOMMENDATIONS FOR NEXT PHASE

Based on the results of the SI, further actions are required. These subsequent actions may include a RI for the Marine Rifle Range that will meet CERCLA requirements. RI activities should include an interim remedial action to address the limited known areas of surface and shallow subsurface soil lead contamination, the limited removal of lead-contaminated soils, or the localized chemical stabilization of lead in soil to reduce the potential threat of lead releases to the environment.

5.9.1 Objectives for Interim Removal Action, Remedial Investigation, or No Further Action Determination

Specific tasks recommended as part of the RI MC investigation include the following:

- Removal of shallow soils in areas with elevated concentration of PAHs and metals. Figure 5-5 illustrates the proposed soil removal areas. Soil is not proposed to be removed in the northern target berm, because only one sample point exceeded the PAL of 400 mg/kg for lead. Soil is proposed to be excavated to a depth of 1 foot bgs at the top of the southern target berm in the areas of bullet accumulations. Soil is also proposed to be excavated to a depth of 1 foot bgs from the Hillside Impact Area in the areas of bullet accumulations. However, because of the density of the trees, the excavations are proposed to be limited to soil immediately surrounding sample points with lead exceedances, so that trees are not disturbed (this is estimated as one-quarter of the overall Hillside

excavation area). The total amount of soil to be removed is estimated at approximately 850 cubic yards (yd^3). The excavation totals are calculated below.

Location	Dimensions: length x depth x width (ft)	Cubic Feet (ft^3)	Cubic Yards (yd^3)
Southern Target Berm	140 x 30 x 1	4,200	156
Hillside	(500 x 150 x 1)/4	18,750	694
Total Proposed Soil Removal	NA	22,950	850

- Confirmation soil sampling should be performed in the excavation areas using one of these scenarios:

  1. MIS.
  2. Four corners and middle of excavation.
  3. Resample at same locations where there were exceedances, but at depths below the excavated material.

In each of these scenarios, the depth sampled at would be at 1 to 2 feet bgs (pre-excavation depth).

TABLE 5-1

MUNITION TYPES AND CHEMICALS
MARINE RIFLE RANGE (MRR) - UXO14
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

MUNITIONS TYPES USED/STORED AT THE FACILITY
.30-caliber ammunition

ASSOCIATED CHEMICAL CONSTITUENTS
Primary:
Lead
Nitroglycerin

Secondary:
Antimony
Arsenic
Copper
Nickel
Lead Styphnate
Lead Azide

TABLE 5-2a

MARINE RIFLE RANGE
DISCRETE HILL SUBSURFACE SOIL
BACKGROUND COMPARISON
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Chemical	Site FOD	Background FOD	Site Maximum	Background Maximum	Background UPL		Site Exceed Background?
Inorganics(mg/kg)							
ARSENIC	3/3	24/28	7.8	14.15	11.6	95% KM(t) UPL	NO
COPPER	3/3	26/28	849	25.9	20.3	95% KM(t) UPL	YES
LEAD	3/3	25/28	6620	27.9	22	95% KM(t) UPL	YES
TIN	3/3	0/14	139	ND	ND	ND	YES[1]
ZINC	3/3	28/28	53.9	70.4	44.5	95% WH APPROXIMATE GAMMA UPL	YES

1 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE 5-2b

MARINE RIFLE RANGE
DISCRETE BERM 2 SURFACE SOIL
BACKGROUND COMPARISON
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Chemical	Site Maximum Detected Concentration	Background Maximum Detected Concentration	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion Site Above Background?	Site Distribution	Background Distribution	Test	Equal Variance?[1]	Test Statistic	P-Value	Quantile Test	Slippage Test	Site Above Background?
Inorganics(mg/kg)																
ARSENIC	3.3	18.3	5/5	30/34	35/39	10	NO									NO
COPPER	88.6	19.45	5/5	32/34	37/39	5	YES									YES
LEAD	606	149	5/5	32/34	37/39	5	YES									YES
TIN	10.1	ND	1/5	0/12	1/17	94	YES[3]									YES

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE 5-2c

MARINE RIFLE RANGE
DISCRETE BERM 1 SURFACE SOIL
BACKGROUND COMPARISON
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Chemical	Site Maximum Detected Concentration	Background Maximum Detected Concentration	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion Site Above Background?	Site Distribution	Background Distribution	Test	Equal Variance?[1]	Test Statistic	P-Value	Quantile Test	Slippage Test	Site Above Background?
Inorganics(mg/kg)																
ARSENIC	4.2	18.3	5/5	30/34	35/39	10	NO									NO
COPPER	107	19.45	5/5	32/34	37/39	5	YES									YES
LEAD	543	149	5/5	32/34	37/39	5	YES									YES
TIN	9.1	ND	2/5	0/12	2/17	88	YES[3]									YES

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE 5-2d

MARINE RIFLE RANGE
DISCRETE HILL SURFACE SOIL
BACKGROUND COMPARISON
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Chemical	Site Maximum Detected Concentration	Background Maximum Detected Concentration	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion Site Above Background?	Site Distribution	Background Distribution	Test	Equal Variance?[1]	Test Statistic	P-Value	Quantile Test	Slippage Test	Site Above Background?
Inorganics(mg/kg)																
ANTIMONY	0.32	ND	5/17	0/33	5/50	90	NO[3]									NO
ARSENIC	7.3	18.3	16/17	30/34	46/51	10	SIMILAR	LOGNORMAL	LOGNORMAL	GEHAN		-2.146	0.0159	PASS	PASS	NO
COPPER	276	19.45	17/17	32/34	49/51	4	YES									YES
LEAD	904	149	16/17	32/34	48/51	6	YES									YES
TIN	81.8	ND	11/17	0/12	11/29	62	YES[3]									YES
ZINC	60.3	42.95	17/17	34/34	51/51	0	YES									YES

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE 5-2e

MARINE RIFLE RANGE
COMPOSITE SURFACE SOIL
BACKGROUND COMPARISON
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Chemical	Site FOD	Background FOD	Site Maximum	Background Maximum	Background UPL		Site Exceed Background?
Inorganics(mg/kg)							
Antimony	9/9	0/33	1.4	ND	ND		YES
Arsenic	9/9	30/34	3.3	18.3	9.7	95%KM(t)UPL	NO
Copper	9/9	32/34	52.4	19.45	13.83	95% KM(t)UPL	YES
Lead	9/9	32/34	52.5	149	59.44	95%KM(t)UPL	NO
Zinc	9/9	34/34	66.5	42.95	33.9	95% UPL(t)	YES

TABLE 5-3a

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB001C		X14SB002C		X14SB003C		X14SB004C		X14SB004C		X14SB004C		X14SB005C	
nsample		**X14SS001C0001**		**X14SS002C0001**		**X14SS003C0001**		**X14SS004C0001**		**X14SS004C0001-AVG**		**X14SS004C0001-D**		**X14SS005C0001**	
sample_dat		20090529		20090529		20090529		20090529		20090529		20090529		20090529	
qc_type		NM		NM		NM		NM		NM		FD		NM	
sacode		NORMAL		NORMAL		NORMAL		ORIG		AVG		DUP		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		Y		Y		Y		Y		Y		Y		Y	
Inorganics (mg/kg)															
ANTIMONY	0.27	0.15	J	0.19	J	0.18	J	**1.4**	**J**	**1.4**	**J**			0.13	J
ARSENIC	9.7	3.2		2.8		3		3.3		3.3				1.6	
COPPER	100	13.8	L	9.3	L	11.9	L	25.5	L	25.5	L			12.7	L
LEAD	400	18.4		17.6		19.6		52.5		52.5				12	
TIN	0.89	1.2	B	1.2	B	1.3	B	3.2	B	3.2	B			1.2	B
ZINC	46	29.6		26.7		36		**66.5**		**66.5**				25.1	
Explosives (mg/kg)															
NITROGLYCERIN	6.1	1.2	UJ	1.2	UJ	1.2	UJ	1.2	UJ	1.2	UJ	1.2	UJ	1.2	UJ
XRF Field Parameters (mg/kg)															
LEAD	400	19.667		18.333		15.667		82.333		82.333				16.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	83		79		76		84		84				86	

TABLE 5-3a

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB006C		X14SB007C		X14SB008C		X14SB009C		X14SB010		X14SB011		X14SB012	
nsample		**X14SS006C0001**		**X14SS007C0001**		**X14SS008C0001**		**X14SS009C0001**		**X14SS0100001**		**X14SS0110001**		**X14SS0120001**	
sample_dat		20090529		20090529		20090601		20090601		20090601		20090601		20090601	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		Y		Y		Y		Y		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	0.19	J	0.16	J	0.19	J	**0.3**	**J**						
ARSENIC	9.7	2		3		2.6		2.5							
COPPER	100	8	L	8.7	L	52.4	L	12.8	L						
LEAD	400	36.7		21.2		22.3		20.1							
TIN	0.89	1	B	1.7	B	1.2	B	1.5	B						
ZINC	46	**46.4**		31.9		**65.4**		34.5							
Explosives (mg/kg)															
NITROGLYCERIN	6.1	1.2	UJ	1.2	UJ	1.2	U	0.8	J						
XRF Field Parameters (mg/kg)															
LEAD	400	19.667		19		30		22		57.667		43.333		22.333	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	79		84		80		73							

TABLE 5-3a

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB013		X14SB014		X14SB015		X14SB016		X14SB017		X14SB018		X14SB019	
nsample		**X14SS0130001**		**X14SS0140001**		**X14SS0150001**		**X14SS0160001**		**X14SS0170001**		**X14SS0180001**		**X14SS0190001**	
sample_dat		20090601		20090601		20090602		20090602		20090602		20090602		20090602	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27														
ARSENIC	9.7														
COPPER	100														
LEAD	400														
TIN	0.89														
ZINC	46														
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	20		15		18.667		15.667		19.667		11.667		16	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA														

TABLE 5-3a

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB020		X14SB021		X14SB022		X14SB023		X14SB024		X14SB025		X14SB026	
nsample		**X14SS0200001**		**X14SS0210001**		**X14SS0220001**		**X14SS0230001**		**X14SS0240001**		**X14SS0250001**		**X14SS0260001**	
sample_dat		20090602		20090602		20090602		20090602		20090602		20090602		20090602	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27					0.12	L								
ARSENIC	9.7					4.2									
COPPER	100					9.2									
LEAD	400					9.6									
TIN	0.89					1.8	B								
ZINC	46					29.8									
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	18.333		22.667		28.667		16		42		62		174	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA					20	K								
Miscellaneous Parameters (s.u.)															
PH	NA					4.8									
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA					15000									
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA					84									

TABLE 5-3a

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB027		X14SB028		X14SB029		X14SB030		X14SB031		X14SB032		X14SB033	
nsample		**X14SS0270001**		**X14SS0280001**		**X14SS0290001**		**X14SS0300001**		**X14SS0310001**		**X14SS0320001**		**X14SS0330001**	
sample_dat		20090602		20090602		20090602		20090602		20090602		20090602		20090602	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27													0.1	L
ARSENIC	9.7													2.4	
COPPER	100													24.4	
LEAD	400													75.1	
TIN	0.89													2.2	B
ZINC	46													20.4	
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	24		88		324		53.333		69.667		148.333		53.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA													86	

TABLE 5-3a

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB034		X14SB035		X14SB036		X14SB037		X14SB038		X14SB039		X14SB040	
nsample		**X14SS0340001**		**X14SS0350001**		**X14SS0360001**		**X14SS0370001**		**X14SS0380001**		**X14SS0390001**		**X14SS0400001**	
sample_dat		20090602		20090602		20090602		20090602		20090602		20090602		20090602	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27			0.14	L							0.16	L		
ARSENIC	9.7			2.9								1.8			
COPPER	100			**107**								41			
LEAD	400			**543**								111			
TIN	0.89			**9.1**								2.9	B		
ZINC	46			33.3								23.3			
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	233.667		**540.333**		117		106.333		**403.333**		128.333		201.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA			85								84			

TABLE 5-3a

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB041		X14SB042		X14SB043		X14SB044		X14SB045		X14SB046		X14SB047	
nsample		**X14SS0410001**		**X14SS0420001**		**X14SS0430001**		**X14SS0440001**		**X14SS0450001**		**X14SS0460001**		**X14SS0470001**	
sample_dat		20090602		20090602		20090602		20090602		20090603		20090603		20090603	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27					0.13	L								
ARSENIC	9.7					1.3									
COPPER	100					76.5									
LEAD	400					373									
TIN	0.89					**4.1**									
ZINC	46					18.6									
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	317.667		84.667		389		330		34.667		21.333		37	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA					86									

TABLE 5-3a

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB048		X14SB049		X14SB050		X14SB051		X14SB052		X14SB053		X14SB054	
nsample		**X14SS0480001**		**X14SS0490001**		**X14SS0500001**		**X14SS0510001**		**X14SS0520001**		**X14SS0530001**		**X14SS0540001**	
sample_dat		20090603		20090603		20090603		20090603		20090603		20090603		20090603	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	0.14	L												
ARSENIC	9.7	2.7													
COPPER	100	14.6													
LEAD	400	85.7													
TIN	0.89	2	B												
ZINC	46	33.1													
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	50.333		29.333		210.667		**544.667**		65		114.333		365.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	71													

TABLE 5-3a

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB055		X14SB056		X14SB057		X14SB058		X14SB059		X14SB060		X14SB061	
nsample		**X14SS0550001**		**X14SS0560001**		**X14SS0570001**		**X14SS0580001**		**X14SS0590001**		**X14SS0600001**		**X14SS0610001**	
sample_dat		20090603		20090603		20090603		20090603		20090603		20090603		20090603	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27							0.15	L						
ARSENIC	9.7							1.6							
COPPER	100							88.6							
LEAD	400							**606**							
TIN	0.89							**10.1**							
ZINC	46							18.2							
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	**728.667**		114.333		228		**661**		144.667		**713.667**		138.333	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA							13	K						
Miscellaneous Parameters (s.u.)															
PH	NA							4.6							
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA							10000							
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA							84							

TABLE 5-3a

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB062		X14SB063		X14SB064		X14SB065		X14SB066		X14SB067		X14SB068	
nsample		**X14SS0620001**		**X14SS0630001**		**X14SS0640001**		**X14SS0650001**		**X14SS0660001**		**X14SS0670001**		**X14SS0680001**	
sample_dat		20090603		20090603		20090603		20090603		20090603		20090603		20090603	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	0.17	L	0.11	B										
ARSENIC	9.7	3.1		2.1											
COPPER	100	29.7		40.8											
LEAD	400	278		188											
TIN	0.89	2	B	3	B										
ZINC	46	35.2		21.8											
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	286.333		172.667		**488.667**		224.333		**783.667**		163		156.333	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	80		83											

TABLE 5-3a

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB069		X14SB070		X14SB071		X14SB072	
nsample		**X14SS0690001**		**X14SS0700001**		**X14SS0710001**		**X14SS0720001**	
sample_dat		20090603		20090603		20090603		20090603	
qc_type		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO	
top_depth		0		0		0		0	
bottom_dep		1		1		1		1	
depth_unit		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS	
composite		N		N		N		N	
Inorganics (mg/kg)									
ANTIMONY	0.27							0.13	L
ARSENIC	9.7							3.3	
COPPER	100							85	
LEAD	400							283	
TIN	0.89							2.5	B
ZINC	46							34.5	
Explosives (mg/kg)									
NITROGLYCERIN	6.1								
XRF Field Parameters (mg/kg)									
LEAD	400	**612.667**		**602.333**		168.667		**456.333**	
Miscellaneous Parameters (meq/100)									
CATION EXCHANGE CAPACITY	NA								
Miscellaneous Parameters (s.u.)									
PH	NA								
Miscellaneous Parameters (mg/kg)									
TOTAL ORGANIC CARBON	NA								
Miscellaneous Parameters (%)									
TOTAL SOLIDS	NA							81	

TABLE 5-3b

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB073		X14SB074		X14SB075		X14SB076		X14SB077		X14SB078		X14SB079	
nsample		**X14SS0730001**		**X14SS0740001**		**X14SS0750001**		**X14SS0760001**		**X14SS0770001**		**X14SS0780001**		**X14SS0790001**	
sample_dat		20090603		20090603		20090603		20090603		20090603		20090603		20090603	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27														
ARSENIC	9.7														
COPPER	100														
LEAD	400														
TIN	0.89														
ZINC	46														
XRF Field Parameters (mg/kg)															
LEAD	400	**544**		220		**454.667**		137.667		78.667		**401**		290.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA														

TABLE 5-3b

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB080		X14SB081		X14SB082		X14SB083		X14SB084		X14SB084		X14SB084	
nsample		**X14SS0800001**		**X14SS0810001**		**X14SS0820001**		**X14SS0830001**		**X14SS0840001**		**X14SB0840102**		**X14SB0840102-AVG**	
sample_dat		20090604		20090604		20090604		20090604		20090604		20090616		20090616	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		ORIG		AVG	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		1		1	
bottom_dep		1		1		1		1		1		2		2	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SB		SB	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27											0.88	B	0.67	B
ARSENIC	9.7											7.8	J	5.9	J
COPPER	100											**849**	**J**	**641.5**	**J**
LEAD	400											**6620**	**J**	**5105**	**J**
TIN	0.89											**131**	**J**	**104.3**	**J**
ZINC	46											**53.9**		**46.65**	
XRF Field Parameters (mg/kg)															
LEAD	400	**450.667**		**5150.667**		**2329.667**		323		**8971.667**		357.667		357.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA											79		78.5	

TABLE 5-3b

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB084		X14SB085		X14SB086		X14SB087		X14SB088		X14SB089		X14SB090	
nsample		**X14SB0840102-D**		**X14SS0850001**		**X14SS0860001**		**X14SS0870001**		**X14SS0880001**		**X14SS0890001**		**X14SS0900001**	
sample_dat		20090616		20090604		20090604		20090604		20090604		20090604		20090604	
qc_type		FD		NM		NM		NM		NM		NM		NM	
sacode		DUP		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		1		0		0		0		0		0		0	
bottom_dep		2		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SB		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	0.46	B					0.12	L						
ARSENIC	9.7	4	J					3.2							
COPPER	100	**434**	**J**					32.6							
LEAD	400	**3590**	**J**					108							
TIN	0.89	**77.6**	**J**					1.7	B						
ZINC	46	39.4						32.9							
XRF Field Parameters (mg/kg)															
LEAD	400			175		**598.667**		279		187.667		**1245.667**		**1186.667**	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA							23	K						
Miscellaneous Parameters (s.u.)															
PH	NA							4.9							
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA							15000							
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	78						85							

TABLE 5-3b

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB091		X14SB092		X14SB093		X14SB094		X14SB095		X14SB096		X14SB097	
nsample		**X14SS0910001**		**X14SS0920001**		**X14SS0930001**		**X14SS0940001**		**X14SS0950001**		**X14SS0960001**		**X14SS0970001**	
sample_dat		20090604		20090604		20090604		20090604		20090604		20090604		20090604	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27							0.14	L						
ARSENIC	9.7							2.4							
COPPER	100							39.5							
LEAD	400							293							
TIN	0.89							**7.1**							
ZINC	46							24.8							
XRF Field Parameters (mg/kg)															
LEAD	400	**594**		**708.667**		265		337		**2105.667**		245.333		49.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA							83							

TABLE 5-3b

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 5 OF 11

location		X14SB098		X14SB099		X14SB100		X14SB101		X14SB102		X14SB102		X14SB102	
nsample		**X14SS0980001**		**X14SS0990001**		**X14SS1000001**		**X14SS1010001**		**X14SS1020001**		**X14SB1020102**		**X14SB1020203**	
sample_dat		20090604		20090604		20090604		20090604		20090604		20090616		20090617	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		1		2	
bottom_dep		1		1		1		1		1		2		3	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SB		SB	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27													0.18	B
ARSENIC	9.7													3.9	
COPPER	100													**113**	
LEAD	400													**1220**	
TIN	0.89													**29.3**	
ZINC	46													25.8	
XRF Field Parameters (mg/kg)															
LEAD	400	**1339**		**3361.333**		23.333		**11340.67**		**19878**		**8931**		**2401.667**	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA													86	

TABLE 5-3b

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB103		X14SB104		X14SB105		X14SB106		X14SB107		X14SB108		X14SB109	
nsample		**X14SS1030001**		**X14SS1040001**		**X14SS1050001**		**X14SS1060001**		**X14SS1070001**		**X14SS1080001**		**X14SS1090001**	
sample_dat		20090604		20090604		20090604		20090604		20090604		20090604		20090604	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27											0.14	L		
ARSENIC	9.7											6.9			
COPPER	100											21.9			
LEAD	400											31.3			
TIN	0.89											1.6	B		
ZINC	46											**50.7**			
XRF Field Parameters (mg/kg)															
LEAD	400	**454.333**		**1668.667**		**654.667**		**490.667**		**2731.667**		54.333		**3208.333**	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA											81			

TABLE 5-3b

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 7 OF 11

location		X14SB110		X14SB111		X14SB111		X14SB112		X14SB113		X14SB114		X14SB115	
nsample		**X14SS1100001**		**X14SS1110001**		**X14SB1110102**		**X14SS1120001**		**X14SS1130001**		**X14SS1140001**		**X14SS1150001**	
sample_dat		20090604		20090604		20090616		20090604		20090604		20090604		20090604	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		1		0		0		0		0	
bottom_dep		1		1		2		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SB		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27					0.6	B								
ARSENIC	9.7					2.2									
COPPER	100					**251**									
LEAD	400					**2640**									
TIN	0.89					**139**									
ZINC	46					9.8									
XRF Field Parameters (mg/kg)															
LEAD	400	**9119.333**		**11536**		**1842.667**		**7109.667**		**9883**		**2786**		**1628.667**	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA					84									

TABLE 5-3b

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 8 OF 11

location		X14SB116		X14SB117		X14SB118		X14SB119		X14SB120		X14SB121		X14SB122	
nsample		**X14SS1160001**		**X14SS1170001**		**X14SS1180001**		**X14SS1190001**		**X14SS1200001**		**X14SS1210001**		**X14SS1220001**	
sample_dat		20090604		20090604		20090604		20090604		20090604		20090604		20090604	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27			0.07	B					0.14	B				
ARSENIC	9.7			1.1						1.6	B				
COPPER	100			**151**						**276**					
LEAD	400			**618**						**741**	**J**				
TIN	0.89			**4.6**						**3.7**					
ZINC	46			7.2						9.3					
XRF Field Parameters (mg/kg)															
LEAD	400	**685.667**		**848.667**		**641.333**		**460.333**		287.667		**764.333**		75.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA			15	K										
Miscellaneous Parameters (s.u.)															
PH	NA			4.6											
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA			28000											
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA			86						79					

TABLE 5-3b

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 9 OF 11

location		X14SB123		X14SB124		X14SB125		X14SB126		X14SB127		X14SB128		X14SB129	
nsample		**X14SS1230001**		**X14SS1240001**		**X14SS1250001**		**X14SS1260001**		**X14SS1270001**		**X14SS1280001**		**X14SS1290001**	
sample_dat		20090604		20090604		20090609		20090609		20090609		20090609		20090609	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27							0.07	B						
ARSENIC	9.7							1.2							
COPPER	100							53.3							
LEAD	400							**476**							
TIN	0.89							**29.4**							
ZINC	46							15.3							
XRF Field Parameters (mg/kg)															
LEAD	400	106.333		72.667		**909.333**		**512.333**		**984**		**2823.667**		**1182.667**	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA							68							

TABLE 5-3b

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB130		X14SB131		X14SB132		X14SB133		X14SB134		X14SB135		X14SB136	
nsample		**X14SS1300001**		**X14SS1310001**		**X14SS1320001**		**X14SS1330001**		**X14SS1340001**		**X14SS1350001**		**X14SS1360001**	
sample_dat		20090616		20090616		20090616		20090616		20090616		20090616		20090616	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	0.02	B	0.02	B	0.22	L			**0.32**	**L**	0.28	B		
ARSENIC	9.7	2.2		3.1		3.2				7.3		4.5			
COPPER	100	18.8		36.4		8.6				77.9		9.4			
LEAD	400	44.7		120		17.9				**904**		45.1			
TIN	0.89	0.49	B	0.58	B	0.54	B			**32.3**		**1.6**			
ZINC	46	41.1		**46.2**		**60.3**				28.2		30.5			
XRF Field Parameters (mg/kg)															
LEAD	400	28.667		122		109.667		36.667		**1097.333**		80		53.333	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	86		81		87				88		86			

TABLE 5-3b

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 14
MARINE RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X14SB137		X14SB138		X14SB139		X14SB140		X14SB141		X14SB142		X14SB143	
nsample		**X14SS1370001**		**X14SS1380001**		**X14SS1390001**		**X14SS1400001**		**X14SS1410001**		**X14SS1420001**		**X14SS1430001**	
sample_dat		20090616		20090616		20090616		20090616		20090616		20090617		20090617	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27			0.14	B	0.14	B	0.32	B	0.1	B	0.14	B	0.14	B
ARSENIC	9.7			2.2		2.3		3		1.2		4.8		3.8	
COPPER	100			28.2		63.4		**141**		13.6		9.8		20.3	
LEAD	400			137		280		**676**		**405**		11	B	166	
TIN	0.89			**2.8**		**4.9**		**81.8**		**3**		1.3	B	**1.7**	
ZINC	46			33.8		25.4		20		7		29.2		19.7	
XRF Field Parameters (mg/kg)															
LEAD	400	56.333		160.667		328.333		**1031**		351.333		19.333		289.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA			85		84		81		85		86		84	

TABLE 5-4

HUMAN HEALTH CSM SUMMARY
MARINE RIFLE RANGE (MRR) - UXO 14
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Pathways Associated with Soil at Marine Rifle Range (UXO-14)

Area of Interest	Are Direct Contact Exposures to Soil Acceptable?						Evaluation of Leaching to Groundwater Pathway
	Residential			Non-Residential			
	Risk	Haz. Index	Lead	Risk	Haz. Index	Lead	
Firing Line (Composite Samples)	Yes	Yes	Yes	Yes	Yes	Yes	GW use pathway incomplete (Sb, Cu, NG RBC exceedances)
Berm 1 Surface Soil (Discrete Samples)	Yes	Yes	NO	Yes	Yes	Yes	GW use pathway incomplete (Cu RBC exceedances)
Berm 2 Surface Soil (Discrete Samples)	Yes	Yes	NO	Yes	Yes	Yes	GW use pathway incomplete (Cu RBC exceedances)
Hillside Surface Soil (Discrete Samples)	Yes	Yes	NO	Yes	Yes	NO	GW use pathway incomplete (Cu RBC exceedances)
Hillside Subsurface Soil (Discrete Samples)	Yes	Yes	NO	Yes	Yes	NO	GW use pathway incomplete (Cu RBC exceedances)

Notes:
GW = groundwater
RBC = risk-based concentration
Chemicals in parentheses are responsible for exceedances of soil to groundwater RBCs
Cu = copper
NG = nitroglycerin
Sb = antimony

TABLE 5-5

ECOLOGICAL CSM SUMMARY
MARINE RIFLE RANGE (MRR) - UXO 14
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

X14 SS BERM 1

	Soil Invertebrates	Plants	Wildlife
Inorganics			
ANTIMONY	0	0	0
ARSENIC	0	0	0
COPPER	X	X	X
LEAD	0	X	X
TIN	0	0	0
ZINC	0	0	0

X14 SS BERM 2

	Soil Invertebrates	Plants	Wildlife
Inorganics			
ANTIMONY	0	0	0
ARSENIC	0	0	0
COPPER	X	X	X
LEAD	0	X	X
TIN	0	0	0
ZINC	0	0	0

X14 SS HILLSIDE

	Soil Invertebrates	Plants	Wildlife
Inorganics			
ANTIMONY	0	0	0
ARSENIC	0	0	0
COPPER	X	X	X
LEAD	0	X	X
TIN	0	X	0
ZINC	0	0	0

X14 Composite

	Soil Invertebrates	Plants	Wildlife
Inorganics			
ANTIMONY	0	0	0
ARSENIC	0	0	0
COPPER	0	0	0
LEAD	0	0	X
ZINC	0	0	0
Explosives			
NITROGLYCERIN	0	0	0

P:/GIS/INDIANHEAD_NSWC_NEW/MXD/SN_MARINE_RIFLE_RANGE_HILLSIDE_TAGS.MXD 1/11/10 KM

1250000 1250500 1251000

323000 322500

Archer Avenue

Target Berm

Hillside Target Area

Roach Road

N

X14SB043 [0-1] TIN 4.1

X14SB038 [0-1] LEAD 403

X14SB035 [0-1] COPPER 107 LEAD 543 TIN 9.1

X14SB051 [0-1] LEAD 545

X14SB060 [0-1] LEAD 714

X14SB066 [0-1] LEAD 784

X14SB069 [0-1] LEAD 613

X14SB072 [0-1] LEAD 456

X14SB075 [0-1] LEAD 455

X14SB055 [0-1] LEAD 729

X14SB058 [0-1] LEAD 606 TIN 10.1

X14SB064 [0-1] LEAD 489

X14SB070 [0-1] LEAD 602

X14SB073 [0-1] LEAD 544

X14SB078 [0-1] LEAD 401

X14SB084 [0-1] LEAD 8971.667 X14SB084 [1-2] COPPER 849 J LEAD 6620 J TIN 131 J ZINC 53.9 X14SB084-DUP [1-2] COPPER 434 J LEAD 3590 J TIN 77.6 J

X14SB102 [0-1] LEAD 19878 X14SB102 [1-2] LEAD 8931 X14SB102 [2-3] COPPER 113 LEAD 1220 TIN 29.3

X14SB141 [0-1] LEAD 405 TIN 3

X14SB080 [0-1] LEAD 451

X14SB143 [0-1] TIN 1.7

X14SB086 [0-1] LEAD 599

X14SB089 [0-1] LEAD 1246

X14SB092 [0-1] LEAD 709

X14SB095 [0-1] LEAD 2106

X14SB099 [0-1] LEAD 3361

X14SB125 [0-1] LEAD 909

X14SB098 [0-1] LEAD 1339

X14SB101 [0-1] LEAD 11341

X14SB126 [0-1] LEAD 476 TIN 29.4

X14SB104 [0-1] LEAD 1669

X14SB127 [0-1] LEAD 984

X14SB108 [0-1] ZINC 50.7

X14SB107 [0-1] LEAD 2732

X14SB128 [0-1] LEAD 2824

X14SB110 [0-1] LEAD 9119

X14SB131 [0-1] ZINC 46.2

X14SB113 [0-1] LEAD 9883

X14SB129 [0-1] LEAD 1183

X14SB132 [0-1] ZINC 60.3

X14SB116 [0-1] LEAD 686

X14SB117 [0-1] COPPER 151 LEAD 618 TIN 4.6

X14SB140 [0-1] COPPER 141 LEAD 676 TIN 81.8

X14SB081 [0-1] LEAD 5151

X14SB082 [0-1] LEAD 2330

X14SB090 [0-1] LEAD 1187

X14SB091 [0-1] LEAD 594

X14SB138 [0-1] TIN 2.8

X14SB094 [0-1] TIN 7.1

X14SB139 [0-1] TIN 4.9

X14SB103 [0-1] LEAD 454

X14SB105 [0-1] LEAD 655

X14SB106 [0-1] LEAD 491

X14SB109 [0-1] LEAD 3208

X14SB135 [0-1] TIN 1.6

X14SB112 [0-1] LEAD 7110

X14SB111 [0-1] LEAD 11536 X14SB111 [1-2] COPPER 251 LEAD 2640 TIN 139

X14SB134 [0-1] ANTIMONY 0.32 L LEAD 904 TIN 32.3

X14SB121 [0-1] LEAD 764

X14SB118 [0-1] LEAD 641

X14SB115 [0-1] LEAD 1629

X14SB120 [0-1] COPPER 276 LEAD 741 J TIN 3.7

X14SB114 [0-1] LEAD 2786

X14SB119 [0-1] LEAD 460

Legend

- Metals Exceedance Location
- MRP Area Boundary Identified during PA
- MRP Area Boundary from Inventory
- Topographic Contour (5-ft)
- Wetland
- Firing Direction

NOTE: White tags are FBL data and the green tags are XRF data.

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

100 50 0 100 Feet

DRAWN BY	DATE
K. MOORE	12/11/09
CHECKED BY	DATE
E. BERKLITE	1/11/10
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

MARINE RIFLE RANGE
TARGET BERMS AND HILLSIDE
METALS EXCEEDANCES
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	
N62467-04-D-0055	
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 5-1	0

P:/GIS/INDIANHEAD_NSWC_NEW/MXD/SN_MARINE_RIFLE_RANGE_TAGS.MXD 1/8/10 KM

1247000 1248000 1249000 1250000 1251000

324000 323000 322000

Potomac River

Mattawoman Creek

Archer Avenue

Outer Circle

Chicamuxen Creek

Target Berm

Roach Road

Hillside Impact Area

X14SB004C [0-1]
ANTIMONY 1.4 J
ZINC 66.5

X14SB006C [0-1]
ZINC 46.4

X14SB009C [0-1]
ANTIMONY 0.3 J

X14SB008C [0-1]
ZINC 65.4

N

300 150 0 300 Feet

Legend

- Metals Exceedance Location
- Firing Lines
- Contour (5 ft)
- Installation Boundary
- MRP Area Boundary Identified during PA
- MRP Area Boundary from Inventory
- Marsh Area
- Firing Direction

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

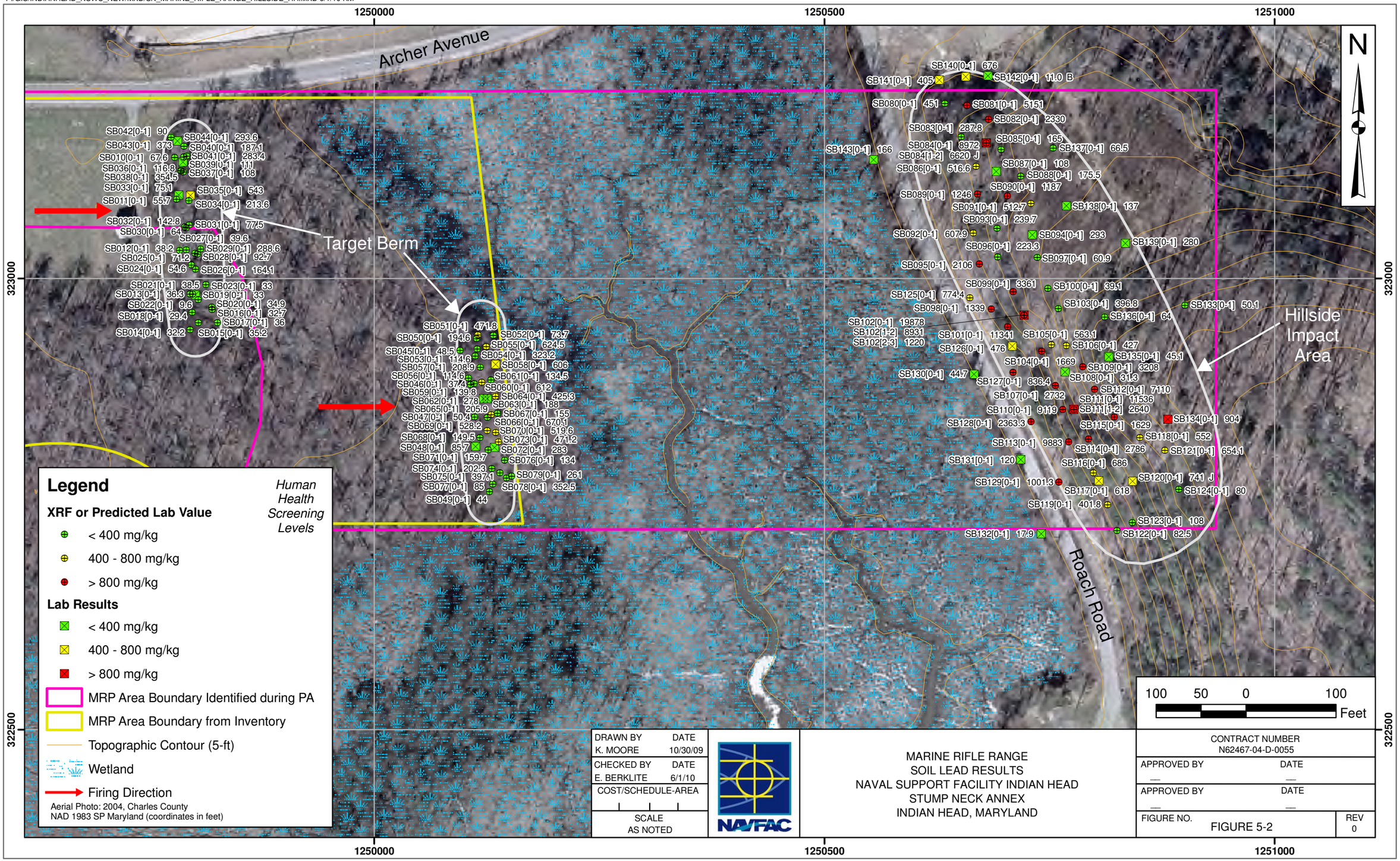
DRAWN BY	10/21/09
K. MOORE	12/16/09
CHECKED BY	DATE
E. BERKLITE	1/8/10
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

MARINE RIFLE RANGE
FIRING LINES
METALS EXCEEDANCES
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	N62467-04-D-0055
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 5-1A	0

P:/GIS/INDIANHEAD_NSWC_NEW/MXD/SN_MARINE_RIFLE_RANGE_HILLSIDE_HH.MXD 6/1/10 KM



P:/GIS/INDIANHEAD_NSWC_NEW/MXD/SN_MARINE_RIFLE_RANGE_HILLSIDE_ECO.MXD 6/1/10 KM

1250000 1250500 1251000

323000 322500

Archer Avenue

Target Berm

Hillside Impact Area

Roach Road

N

SB042[0-1] 90 SB044[0-1] 293.6
SB043[0-1] 373 SB040[0-1] 187.1
SB010[0-1] 67.6 SB041[0-1] 283.4
SB036[0-1] 116.8 SB039[0-1] 111
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SB032[0-1] 142.8 SB031[0-1] 77.5
SB030[0-1] 64 SB027[0-1] 39.6
SB012[0-1] 38.2 SB029[0-1] 288.6
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SB021[0-1] 38.5 SB023[0-1] 33
SB013[0-1] 36.3 SB019[0-1] 33
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SB018[0-1] 29.4 SB016[0-1] 32.7
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SB098[0-1] 1339 SB136[0-1] 64
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SB128[0-1] 2363.3 SB115[0-1] 1629 SB134[0-1] 904
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SB113[0-1] 9883 SB114[0-1] 2786 SB121[0-1] 654.1
SB131[0-1] 120 SB116[0-1] 686
SB120[0-1] 741 J
SB129[0-1] 1001.3 SB117[0-1] 618 SB124[0-1] 80
SB119[0-1] 401.8
SB123[0-1] 108
SB132[0-1] 17.9 SB122[0-1] 82.5

Legend

Ecological Screening Levels

XRF or Predicted Lab Value

- < 11 mg/kg
- 11 - 120 mg/kg
- 120 - 1700 mg/kg
- > 1700 mg/kg

Lab Results

- < 11 mg/kg
- 11 - 120 mg/kg
- 120 - 1700 mg/kg
- > 1700 mg/kg
- MRP Area Boundary Identified during PA
- MRP Area Boundary from Inventory
- Topographic Contour (5-ft)
- Wetland
- Firing Direction

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

100 50 0 100 Feet

DRAWN BY	DATE
K. MOORE	10/30/09
CHECKED BY	DATE
E. BERKLITE	6/1/10
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

MARINE RIFLE RANGE
SOIL LEAD RESULTS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	N62467-04-D-0055
APPROVED BY	DATE
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APPROVED BY	DATE
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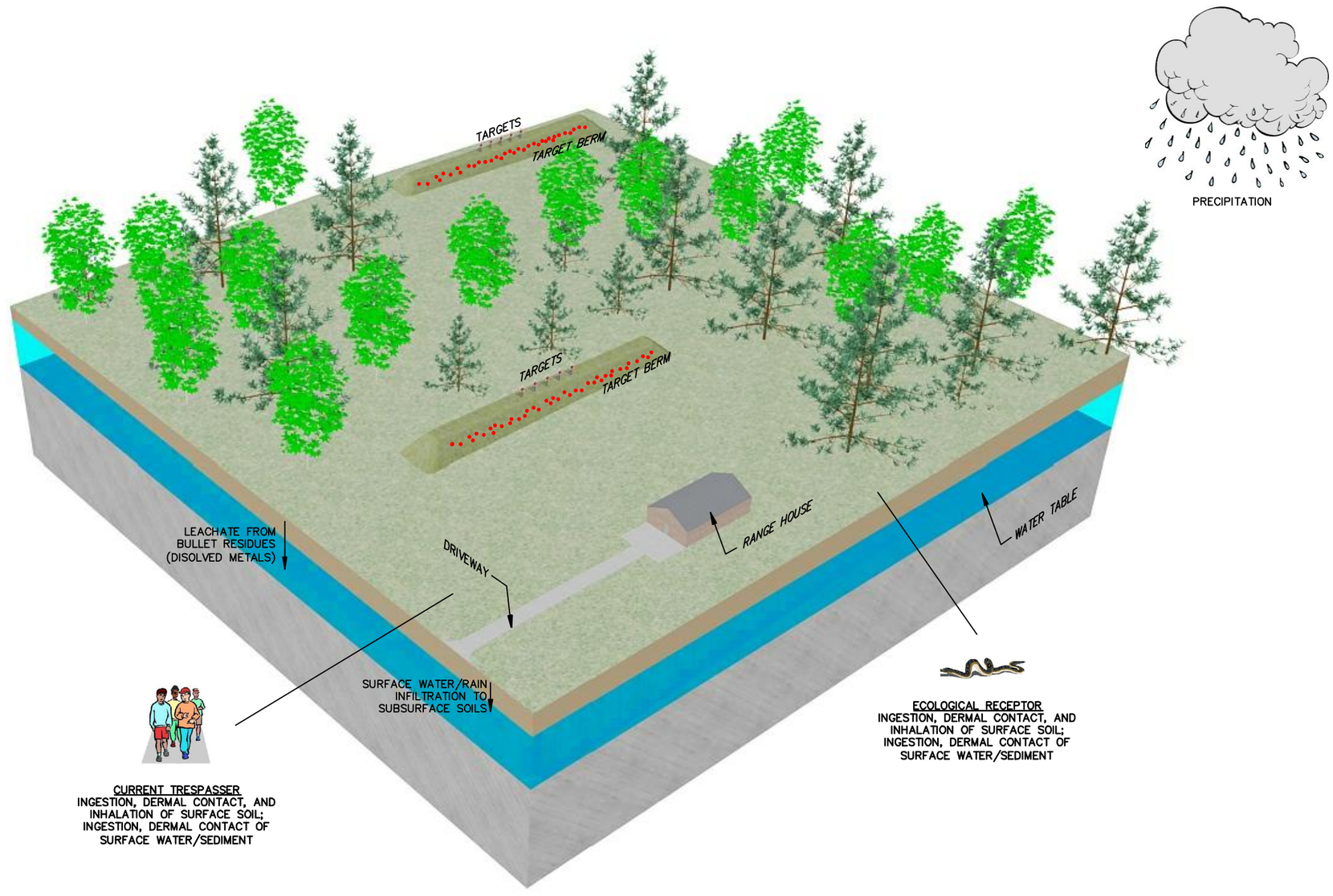
FIGURE NO.	REV
FIGURE 5-3	0



LEGEND

AREA OF BULLET ACCUMULATION

DRAWN BY / DATE	BH 12/8/09
CHECKED BY / DATE	--- ---
REVISED BY / DATE	--- ---
SCALE	NOT TO SCALE

NAVFAC

MARINE RIFLE RANGE TARGET BERM AREA
CONCEPTUAL SITE MODEL
NAVAL SUPORT FACILITY
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NO.	0811
OWNER NO.	
APPROVED BY / DATE	--- ---
DRAWING NO.	FIGURE 5-4
REV.	0

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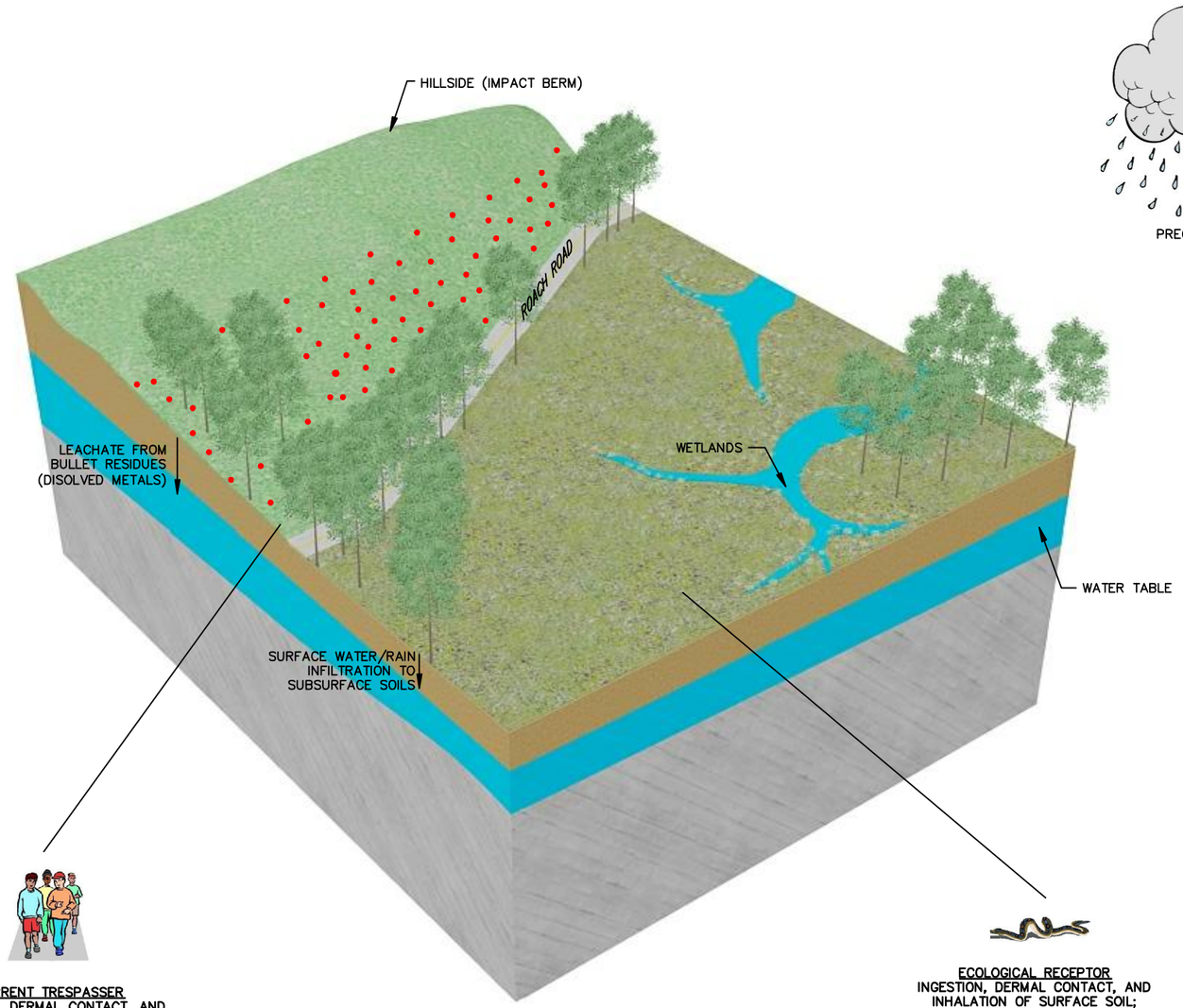

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AREA OF BULLET ACCUMULATION

DRAWN BY / DATE	BH 12/08/09
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SCALE	NOT TO SCALE

NAVFAC

MARINE RIFLE RANGE HILLSIDE IMPACT AREA
CONCEPTUAL SITE MODEL
NAVAL SUPPORT FACILITY
STUMP NECK ANNEX
INDIAN HEADD, MARYLAND

CONTRACT NO.	0810
OWNER NO.	
APPROVED BY / DATE	--- ---
DRAWING NO.	FIGURE 5-4A
REV.	0

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1250000 1250500 1251000

323000 322500

Archer Avenue

Target Berm

Hillside Impact Area

Roach Road

N

SB042[0-1] 90 SB044[0-1] 293.6
SB043[0-1] 373 SB040[0-1] 187.1
SB010[0-1] 67.6 SB041[0-1] 283.4
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SB119[0-1] 401.8
SB123[0-1] 108
SB132[0-1] 17.9 SB122[0-1] 82.5

Legend

Human Health Screening Levels

XRF or Predicted Lab Value

- < 400 mg/kg
- 400 - 800 mg/kg
- > 800 mg/kg

Lab Results

- < 400 mg/kg
- 400 - 800 mg/kg
- > 800 mg/kg
- Area of 1-ft Deep Excavation
- Area of Limited 1-ft Deep Excavation
- MRP Area Boundary Identified during PA
- MRP Area Boundary from Inventory
- Topographic Contour (5-ft)
- Wetland
- Firing Direction

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

100 50 0 100 Feet

DRAWN BY	DATE
K. MOORE	12/21/09
CHECKED BY	DATE
E. BERKLITE	6/1/10
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

MARINE RIFLE RANGE
PROPOSED SOIL REMOVAL
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	N62467-04-D-0055
APPROVED BY	DATE
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FIGURE NO.	REV
FIGURE 5-5	0

6.0 SMALL ARMS PISTOL RANGE – UXO 17

6.1 SITE BACKGROUND

6.1.1 Historical Information

The Small Arms Range is approximately 2.41 acres in area and is located at the eastern perimeter of the Stump Neck peninsula. The SDZ, which extends east of the Small Arms Range, covers 382.12 acres. Navy personnel used this range for training and qualifying activities from the mid-1980s until 1991. Rounds were fired into targets in front of the side of a hill located on the range. The Small Arms Range was closed in August 1991 because of its proximity to General Smallwood State Park, which borders the range on the target side, presenting the potential for stray rounds to enter the park. Subsequently, the range was used for bow qualification, the exact dates of which are unknown. The Small Arms Range is also known as the Old Pistol Range. When used as a pistol range, the range had three firing lines with a north-south orientation, two concrete walkways with east-west orientation, and a stone walkway located in the northern portion of the range. According to personnel interviews, silver-contaminated soil from the X-ray Facility (IR Site #5, Building 731 on the Main Installation) was buried and covered with a clay layer at the Small Arms Range after the range was closed. The buried soil is in two earthen mounds located near the center of the Small Arms Range and is not considered part of the range. Currently the Small Arms Range is an open field. In 1992, this range was identified as SWMU #29: Pistol Range, and was added to the IR Program at the Stump Neck Annex. In January 2002, a desktop audit was performed and concluded that insufficient information was available; therefore, the Small Arms Range still remains an area of concern (AOC) pending investigation.

6.1.2 Munitions Used

This section describes the munitions or munitions-related materials known or suspected to be at the range, including the types and estimated maximum penetration depths. Potential ordnance concentration areas are presented along with a discussion on the presence of any special consideration ordnance. According to the Army Technical Manuals on small arms ranges (AR 750-10, TM 9-855), the maximum range for .22-cal ammunition is 4,500 feet, with a muzzle velocity of 1,100 feet per second. The maximum range for .45-cal ammunition is 4,800 feet, with a muzzle velocity of 802 feet per second. The SDZ for a .45-cal pistol range extends downrange from each end of each firing line at a 5 degree angle for 4,800 feet. An additional SDZ, also originating from the end of each firing line, extends downrange at a 25 degree angle for 3,600 feet. According to a 1991 memorandum regarding the Small Arms Range, the SDZ reportedly extends 6,234 feet from the firing line. From this information, ammunition fired at the

Small Arms Range likely included .50-cal ammunition, which travels further than the typical .22-cal and .45-cal ammunition. The Stump Neck Annex property line is approximately 900 feet from the firing line. The SDZ extends east of the installation boundary into the General Smallwood State Park. Detailed records of the types and quantities of small arms ammunition used at the Small Arms Range were not available. However, the following small arms ammunitions were likely used at the Small Arms Range: .22-cal, 9-mm, .45-cal, and .50-cal. Based on the information obtained during the data collection process, the Small Arms Range is not suspected to contain CWM-filled munitions, electrically fused munitions, or DU-associated munitions. The munitions used and/or stored at the facility and the associated chemical constituents are listed in Table 6-1.

6.1.3 Munitions Constituents

For small arms, the primary MC of concern are lead from bullets. Other associated MC less likely to be of concern may include antimony, arsenic, copper, tin, zinc, and lead styphnate/lead azide. These items are not consumed when the munitions items function as they are designed. NG from unburned propellants and lead from primers is suspected at the firing points. Therefore, the potential exists for these constituents to remain in surface soil at the Small Arms Range.

6.2 SITE FIELDWORK

6.2.1 Site Field Activities

Soil sample locations were selected based on a bias towards areas that were believed to be most likely contaminated by past operations at the site. The total area of the site is 2.41 acres as indicated in Table 3-1. The site is divided into the three Firing Lines and the Range Area. The range portion of the study area covers approximately 0.26 acres. The Firing Lines cover approximately 140 linear feet each. See Figure 3-3 for all sample locations. Prior to initiating sample collection, all sample locations were marked by colored pin flags bearing the sample location ID number. Proposed sample locations identified in the approved WP were located by global positioning system (GPS) and by measurements from stationary objects (e.g.: roadways, existing buildings). All sample locations were as proposed in the approved WP.

6.2.2 Work Plan Deviations

There were no deviations from the work plan.

6.2.3 Field Data Collection

A total of 53 soil samples were collected during the SI at the SAR. There appears to be some limited sloughing (slope failure) along this hillside such that uncontaminated soil at the head of the slope may now cover potentially contaminated soil at the toe of the slope. The 0 to 4 foot interval along the sloughed hillside was considered to be the surface soil. Surface soil samples collected were from the surface depth 0 to 4 feet in the hillside and 0 to 1 foot at the bottom of the hillside. Subsurface samples were collected for depths of 4 to 6, 6 to 8, and 8 to 10 feet at 7 locations via DPT. Three composite samples were collected along the firing lines in ten aliquots each. Fifty-three samples underwent field XRF analysis for lead, and 25 soil samples were selected for metals analysis at the FBL. No samples were selected for PAH analysis. Four soil samples were selected for TOC analysis. Three soil samples were selected for NG analysis. Hand augering soil samples were collected in accordance with SOP-05. DPT soil samples were collected in accordance with SOP-06. See Figure 3-3 for all sampling locations. A summary of the sample collection methods used are shown on Table 3-4. Soil sample log sheets are included in Appendix A of this document.

6.3 SITE INSPECTION DATA COLLECTION RESULTS

6.3.1 MC Sampling Results

All soil samples collected were compared to the PAL and background sampling results, and a statistical evaluation was conducted to compare the background data with the site sampling results. The summary table of the site background screening is presented as Table 6-2. The statistical summary and calculations are presented in Appendix G. The MC analytical results are presented in Appendix C, and the data validation reports are presented in Appendix D. Table 6-3 summarizes the results as compared to the calculated screening values for metals. The PAL was the reference limit, unless the background and screening calculations exceeded this value. In Table 6-3, if a parameter had an exceedance at any sampling point, the parameter is highlighted; individual sample exceedances are also highlighted. Figure 6-1 illustrates the metals exceedances in soil at the Small Arms Range. Screening values used were the PAL limits for the direct contact residential values for soil.

The antimony PAL was exceeded at five discrete surface soil sampling locations, two discrete subsurface soil sampling locations at 1 to 2 feet bgs, one discrete subsurface soil sampling location at 6 to 8 feet bgs, and three composite surface soil sampling locations (firing line locations). The arsenic PAL was exceeded at 12 discrete surface soil sampling locations, 4 discrete subsurface soil sampling locations at 1 to 2 feet bgs, 1 discrete subsurface soil sampling location at 4 to 6 feet bgs, 1 discrete subsurface soil sampling location at 6 to 8 feet bgs, and 3 composite surface soil sampling locations (firing line locations).

The copper PAL was exceeded at one discrete surface soil sampling location. Lead was exceeded at seven discrete surface soil sampling locations. The nitroglycerin PAL was exceeded at three composite surface sampling locations.

Lead was the primary COPC for the investigation and all the screening data were based on XRF lead results. Approximately 20 percent of the XRF screened data were shipped to a FBL for lead analysis, along with other parameters determined on a site by site basis. The XRF and FBL data are plotted on Figure 6-2 using the direct contact residential soil screening value of 400 mg/kg. The values are color coded green for less than 400 mg/kg, yellow for 400 to 800 mg/kg, and red for greater than 800 mg/kg. FBL data superseded XRF data when present. The correlation between the XRF and FBL values was not statistically acceptable; subsequently the predicted lab values were not computed. Figure 6-2 illustrates that one soil sample had a low level exceedance for lead at the firing line, and one soil sample had a high level lead exceedance from the bottom of hillside. None of the firing line composite samples had lead exceedances. The Human Health Risk Screening Evaluation is discussed in Section 6.5.

Ecological screening values were 11 mg/kg for wildlife exposure to lead in soil, 120 mg/kg for plant exposure to lead in soil, and 1,700 mg/kg for soil invertebrates exposure to lead in soil. One composite soil sample exceeded the 120 mg/kg for plant exposure to lead in soil. There were some exceedances of the 120 mg/kg for plant exposure along the hillside, and one exceedance of the 1,700 mg/kg for soil invertebrates. The Eco Screening levels for lead in soil are illustrated on Figure 6-3. The Ecological Risk Screening Evaluation is discussed in Section 6.6.

6.4 DATA QUALITY REVIEW/USABILITY

6.4.1 Data Quality Review of Samples at Small Arms Range

This section summarizes the results of the data review processes used to determine whether analytical laboratory data collected during the sampling field effort for the Small Arms Range were of acceptable quality for use in decision-making. The review began with data validation. DQOs presented in the Munitions Response Program Site Inspections at Five Small Arms/Skeet Ranges QAPP (April 2009) were maintained through the course of the sampling event. The Worksheets #19 and #15 of the QAPP present the analytical methods and compounds analyzed.

6.4.1.1 Data Validation Results

Appendix D, Table 1 presents all the qualified data and the reason for the data qualification. The rejection of data was not necessary for samples collected at the Small Arms Range and all data are considered valid for their intended purpose.

6.4.1.2 Data Quality Review

Some of the DQIs are generated from analysis of field samples (e.g., field duplicates) and some are generated from the analysis of laboratory samples (e.g., laboratory duplicates). Individually, field and laboratory DQIs provide measures of the performance of the respective investigative operations (field or laboratory). If individual QC results were acceptable, there was no assignment of validation flags to an analytical result; otherwise, there was assignment of a flag indicating the type of QC deficiency to the result**.**

6.4.1.3 Completeness

The sample collection and laboratory analytical completeness were 100%.

6.4.1.4 Sensitivity

The project quantitation limit goals (PQLGs) are listed in Worksheet #15 in the QAPP (April 2009). Analytical sensitivity was generally satisfactory to meet DQOs presented in the QAPP. However, at the inception of the project, the laboratory could not meet several of the PQLGs. Worksheet #15 highlights the exceedances of the PQLGs.

The amount of sample volume collected also affects the ability of the laboratory to achieve the desired PQLGs. Laboratory or field blank contamination can also elevate a result above the PQLGs, resulting in samples being qualified as non-detected. There are instances where the non-detected sample results exceed the PQLGs either because of the laboratory's inability to meet the PQLG or because of elevated detection limits because of blank contamination. Because of the large quantity of data collected and the limited number of individual chemicals driving risk, the elevated detection limits should have a negligible impact on the assessment of risk and no impact on presence/absence determinations.

6.4.1.5 Accuracy

Appendix D, Table 1 shows that several results were qualified because of matrix spike noncompliances. The noncompliances in general do not show any directional bias with the data except for the following cases. Antimony had matrix spike recoveries less than the laboratory quality control limit but greater than 30% indicating a slight low bias. Copper had high matrix spike recoveries indicating a slight high bias. Overall, the laboratory accuracy was acceptable and no data were rejected. There were no quality control deficiencies noted for field accuracy.

6.4.1.6 Field and Laboratory Precision

Field duplicate imprecision resulted in the qualification of several antimony, lead, and several PAH results. Despite the data qualifications the data are acceptable for use in risk assessment. Laboratory duplicate precision was acceptable.

6.4.1.7 Comparability

No comparability issues were noted during the data validation process.

6.4.1.8 Representativeness

The QAPP (April 2009) and the use of standardized sampling, sample handling, sample analysis, and data reporting procedures were designed so that the final data would be accurate representations of actual site conditions. Based on field logs indicating the conditions during sample collection and laboratory audits all reported data are adequately representative of site conditions and intended populations.

6.5 HUMAN HEALTH RISK SCREENING EVALUATION

The purpose of the human health risk screening evaluation is to conservatively estimate risks posed to potential human receptors from chemicals present at the Small Arms Range. The human health risk screening followed the steps described in Section 3.3, which presented the general methodology for the human health risk screening. These steps are:

- Identification of COPCs
- Exposure Assessment

- Risk Characterization
- Uncertainty Analysis

6.5.1 Identification of Chemicals of Potential Concern

Human health COPCs in soil were identified with the following considerations:

- Occurrence and distribution of chemicals in the environmental media
- Chemical toxicity
- Occurrence of chemical in background samples

Soil samples in the Small Arms Range were divided into three areas of interest for the risk screening evaluation:

- Composite surface soil samples collected from the firing lines
- Discrete surface soil samples
- Discrete subsurface soil samples

A soil sample was identified as a surface sample if its sampling interval begins at the surface. TtNUS classifies any soil sample whose sampling interval begins below the surface as a subsurface soil sample.

Using the methodology described in Section 3.3, the maximum concentration of each chemical in soil in each area of interest was compared to up to four risk-based screening levels: two risk-based screening levels based on direct contact exposures to soil and two based on protection of groundwater. If the maximum concentration exceeded any of the risk-based screening levels, the chemical was classified as a possible COPC. These chemicals were subjected to a comparison to background soil data to determine if the soil concentrations in the area of interest are consistent with background soil concentrations. Section 3.3 presents the approach used to determine if the chemicals are present in soil at concentrations consistent with background concentrations. Because the background evaluation is used in both the human health and ecological risk screening, the background evaluation is presented in Appendix G. For chemicals identified as possible COPCs, TtNUS retained the chemical as a COPC for the human health risk screening only if the chemical was present in soil in the area of interest at concentrations above background.

6.5.1.1 Composite Surface Soil Samples From Firing Lines

Appendix E, Table 6-1 presents the results of the evaluation of composite surface soil samples from the firing lines. TtNUS identified the following chemical as a human health COPC in the composite surface soil samples:

- Nitroglycerin

6.5.1.2 Discrete Surface Soil Samples

Appendix E, Table 6-2 presents the results of the evaluation of discrete surface soil samples. TtNUS identified the following chemicals as human health COPCs in the discrete surface soil samples:

- Antimony
- Arsenic
- Lead

6.5.1.3 Discrete Subsurface Soil Samples

Appendix E, Table 6-3 presents the results of the evaluation of discrete subsurface soil samples. TtNUS did not identify any chemicals as human health COPCs in the discrete subsurface soil samples.

6.5.2 Exposure Assessment

This section presents the exposure assessment for the Small Arms Range. This range was used for pistol training and qualifying until 1991. Subsequently, the range was used for bow qualification. It is not known when bow qualification was discontinued at the Small Arms Range; however, the Small Arms Range is currently not used. The range is currently an open field.

No public access is authorized at NSF-IH, Stump Neck Annex. Signs, partial fencing, locked/secured gates, login book/office check-in, and vehicle security patrols are used to control the entire facility. There are no access control features specific to the Small Arms Range. Hunting is allowed on the Small Arms Range.

Under the current and predicted future land use patterns for this site, potential human receptors include authorized Navy personnel (military and civilian), visitors, contractors, maintenance workers, recreational users, and trespassers.

In the human health risk screening evaluation, TtNUS analyzed direct contact exposures to surface and subsurface soil (incidental ingestion of soil, dermal contact with soil, inhalation of chemicals volatilized from soil into outdoor air and inhalation of chemicals in soil emitted into the air as particulates). TtNUS also analyzed the potential for COPCs in soil to leach into groundwater and adversely affect groundwater quality.

TtNUS used the maximum detected concentrations of the COPCs in soil (see Appendix E, Tables 6-1, 6-2 and 6-3) as the EPCs in the risk characterization.

6.5.3 Risk Characterization

This section presents the risk characterization for the Small Arms Range. The risk characterization involved:

- Calculating risks and hazard indices for direct contact exposures to soil.
- Evaluating direct contact exposures to lead in soil.
- Evaluating the potential for chemicals to leach from soil to groundwater and affect groundwater quality (the soil to groundwater pathway).

6.5.3.1 Evaluation of Direct Contact Exposures to Soil

As discussed previously, TtNUS identified COPCs for the human health risk screening evaluation for composite surface soil samples from the firing lines and discrete surface soil samples. Using the procedures presented in Section 3.3, risks and hazard indices were calculated for direct contact exposures to these soils. TtNUS also evaluated direct contact exposures to lead in discrete soil samples.

6.5.3.1.1 Composite Surface Soil Samples From Firing Lines

Appendix E, Table 6-4 presents the calculated risks and hazard indices for direct contact exposures to the COPC nitroglycerin in the composite surface soil samples from the firing lines. Appendix E, Table 6-4 presents risk and hazard indices for both residential and non-residential exposures. For residential exposures, the total calculated risk is 7.0×10^{-7}, which is well below USEPA's acceptable risk level of 10^{-4}. The calculated hazard index is 3.3, which exceeds USEPA's acceptable hazard index of 1. There were three composite surface soil samples collected and all three exceeded the residential risk-based concentration for direct contact exposures of 6.1 mg/kg.

For non-residential exposures, the total calculated risk is $2.0x10^{-7}$, which is well below USEPA's acceptable risk level of 10^{-4}. The calculated hazard index is 0.33, which is below USEPA's acceptable hazard index of 1.

6.5.3.1.2 Discrete Surface Soil Samples

Appendix E, Table 6-5 presents the calculated risks and hazard indices for residential and non-residential direct contact exposures to COPCs in the discrete surface soil samples. For residential exposures, the total calculated risk is $2.2x10^{-5}$, which is below USEPA's acceptable risk level of 10^{-4}. The calculated hazard index is 0.59, which is below USEPA's acceptable hazard index of 1. For non-residential exposures, the total calculated risk using the maximum detected concentration is $5.4x10^{-6}$, which is below USEPA's acceptable risk level of 10^{-4}. The calculated hazard index is 0.048, which is well below USEPA's acceptable hazard index of 1.

Appendix E, Table 6-6 presents the comparison of the maximum lead concentration in the surface soil samples to residential and non-residential risk-based concentrations. The maximum lead concentration of 706 mg/kg exceeds the residential direct contact screening value of 400 mg/kg, but is below the non-residential direct contact screening value of 800 mg/kg. Five of the 12 discrete surface soil samples had concentrations of lead between 400 mg/kg and 800 mg/kg.

6.5.3.2 Evaluation of the Soil to Groundwater Pathway

Using the procedures presented in Section 3.3, TtNUS evaluated the soil to groundwater pathway for COPCs in the composite surface soil samples and discrete surface soil samples.

6.5.3.2.1 Composite Surface Soil Sample From Firing Lines

Appendix E, Table 6-7 presents the comparison of the maximum detected concentration and average concentration of the COPC nitroglycerin to the risk-based concentrations in soil for protection of groundwater. This table presents risk-based concentrations for dilution-attenuation factors of 1 (the conservative default value) and 20. The maximum concentration of nitroglycerin in soil exceeds risk-based concentrations for dilution-attenuation factors of both 1 and 20. Nitroglycerin is fairly reactive in the environment, so if nitroglycerin leaches from soil into groundwater, there is a good chance that some or all of this chemical will degrade in groundwater. Groundwater from the Small Arms Range is not used as a source of drinking water, so the pathway is currently incomplete.

6.5.3.2.2 Discrete Surface Soil Samples

Appendix E, Table 6-8 presents the comparison of the maximum detected concentration and average concentration to the risk-based concentrations in soil for protection of groundwater. This table presents risk-based concentrations for dilution-attenuation factors of 1 and 20. The maximum concentration of antimony in soil exceeds the risk-based concentrations using the tap water RSL for a dilution-attenuation factor of 1 but not 20. However, the maximum concentration of antimony in soil exceeds the risk-based concentrations using the MCL for both dilution-attenuation factors. The maximum concentration of arsenic in soil exceeds risk-based concentrations for dilution-attenuation factors of both 1 and 20. As noted above, groundwater from the Small Arms Range is not used as a source of drinking water, so the pathway is currently incomplete.

6.5.4 Uncertainty Analysis

Section 3.3.4 provides a detailed discussion of the sources of uncertainty in the human health risk screening evaluation.

6.5.5 Human Health Risk Screening Evaluation Summary

In the human health risk screening evaluation, soil data for the Small Arms Range was evaluated. The soil samples for this site were divided into three areas of interest for the risk screening evaluation:

- Composite surface soil samples collected from the firing lines
- Discrete surface soil samples
- Discrete subsurface soil samples

For the composite surface soil samples collected from the firing lines, nitroglycerin was the only COPC for the human health risk screening evaluation. The calculated risks for direct contact exposures for residential and nonresidential land uses were below the USEPA target level of 10^{-4}. The calculated hazard index for residential land uses exceeded the USEPA target level of 1. The calculated hazard index for non-residential land uses was below the USEPA target level of 1. Maximum nitroglycerin concentrations in soil exceeded risk-based concentrations in soil for protection of groundwater for dilution-attenuation factors of both 1 and 20. Nitroglycerin is fairly reactive in the environment, so nitroglycerin originating in soil may degrade as it leaches such that the resulting concentrations of nitroglycerin in groundwater are not significant. Groundwater from the Small Arms Range is not used as a source of drinking water, so the pathway is currently incomplete.

For the discrete surface soil samples, antimony, arsenic and lead were selected as COPCs for the human health risk screening evaluation. Using the maximum detected concentrations in soil, the calculated risks for residential and nonresidential land uses were below the USEPA target level of 10^{-4}. The calculated hazard indices for residential and nonresidential land uses were below the USEPA target level of 1. In the evaluation of direct contact exposures to lead in soil, the maximum detected lead concentration in soil was greater than the residential direct contact screening value of 400 mg/kg, but less than the non-residential direct contact screening value of 800 mg/kg. The maximum concentration of antimony in soil exceeds the risk-based concentrations for protection of groundwater using the tap water RSL for a dilution-attenuation factor of 1 but not 20. However, the maximum concentration of antimony in soil exceeds the risk-based concentrations for protection of groundwater using the MCL for both dilution-attenuation factors. The maximum concentration of arsenic in soil exceeds risk-based concentrations for dilution-attenuation factors of both 1 and 20. Also, groundwater from the Small Arms Range is not used as a source of drinking water, so the pathway is currently incomplete.

For the discrete subsurface soil samples, all chemicals were below human health risk-based screening levels for soil or were present in subsurface soil at concentrations consistent with background soil concentrations. Consequently, no potential adverse health effects are expected from exposures to subsurface soil as a result of future residential or non-residential uses of the Small Arms Range.

6.6 ECOLOGICAL RISK SCREENING EVALUATION

6.6.1 Site Description

Section 6.1 presents a detailed description of the site location, history, and background of the site.

6.6.2 Potential Ecological Receptors and Exposure Pathways

The contaminated media to which ecological receptors may be exposed include surface soil. These potential ecological receptors and exposure pathways are described in detail in Section 3.4.1.1.

6.6.3 Ecological Screening

The first part of the evaluation is selection of COPCs.

6.6.3.1 COPCs for Terrestrial Invertebrates and Plants

Appendix F, Tables 6-6.3.1 and 6-6.3.2 present the chemicals that were retained as COPCs in surface soil for potential risks to plants and invertebrates for grab samples and the composite samples, respectively. These tables also present the chemicals that were retained for food chain modeling for mammals and birds (discussed further in Section 6.6.3.2).

Terrestrial Invertebrates

Although lead based on lab data did not exceed its screening level, lead from grab samples based on XRF data exceeded its screening level; therefore, lead was selected as a COPC for terrestrial invertebrates in surface soil from grab samples. Nitroglycerin was selected as a COPC for terrestrial invertebrates in the composite soil because no screening level was available.

Terrestrial Plants

Antimony and lead were selected as COPCs for terrestrial plants in surface soil from grab samples because they were detected at concentrations that exceeded screening levels. Lead was selected as COPCs for terrestrial plants in the composite soil because it was detected at concentrations that exceeded screening levels. Nitroglycerin was selected as a COPC for terrestrial plants in the composite soil because a screening level was not available.

6.6.3.2 COPCs for Mammals and Birds

Appendix F, Tables 6-6.3.1 and 6-6.3.2 present the chemicals that were retained for food chain modeling for terrestrial mammals and birds because they were detected at concentrations above screening levels or did not have screening levels for mammals or birds.

Tables 6-6.3.3 and 6-6.3.4 summarize the results of the conservative inputs food chain modeling for terrestrial receptors. Appendix F presents the calculation worksheets. The following summarizes the results of the food chain modeling using maximum concentrations and conservative input parameters:

- Antimony, copper, and lead had EEQs greater than 1.0 in the food chain model for surface soil from grab samples. Copper had EEQs less than 1.0 using the NOAEL as the TRV; therefore, copper was eliminated as a COPC.
- Antimony and lead had EEQs greater than 1.0 in the food chain model for the composite soil.
- Avian TRVs were not available for antimony and nitroglycerin.

6.6.4 Step 3A Refinement

Step 3a consists of a refinement of the conservative exposure assumptions/concentrations to evaluate the potential risks to ecological receptors (i.e., plants, invertebrates, and wildlife receptors). The objective of the Step 3a refinement is to better define those chemicals that contribute to potentially unacceptable levels of ecological risk, and to identify and eliminate from further consideration those COPCs that were retained because of the use of very conservative exposure scenarios. The Step 3a evaluation is designed to eliminate chemicals from further evaluation for certain groups of receptors. For example, a chemical may be eliminated as a COPC in soil based on risks to soil invertebrates and plants, but may be retained for evaluating risks to wildlife. COPCs were only discussed if there were risks from the less conservative model in step 3A.

6.6.4.1 Terrestrial Plants and Invertebrates

Terrestrial Invertebrates

Nitroglycerin was retained as a COPC for terrestrial invertebrates in the composite soil because it was detected in three of three samples and no screening level was available. Also, no background data were available for nitroglycerin.

Terrestrial Plants

Although the maximum concentration of antimony in the grab samples exceeded the background concentration, antimony was eliminated as a COPC because concentrations in 1 of 12 samples only slightly exceeded the screening level. Lead was retained as a COPC for terrestrial plants in grab samples and composite samples because it was detected at concentrations in several samples that exceeded screening levels. Also, maximum concentrations of lead exceeded maximum background concentrations. Nitroglycerin was retained as a COPC for terrestrial plants in the composite soil because a screening level was not available. No background data were available for nitroglycerin.

6.6.4.2 Mammals and Birds

The EEQs from the terrestrial food chain modeling were greater than 1.0 for several chemicals using maximum chemical concentrations and conservative exposure assumptions (see Section 6.6.3.2). Therefore, as part of the Step 3a refinement, risks for this pathway were recalculated using average chemical concentrations in surface soil and sediment and less conservative exposure assumptions (i.e., average ingestion rates, average body weights) (see Appendix F, Table 3.4-3).

Tables 6-6.3.3 and 6-6.3.4 summarize the results of the less conservative inputs food chain modeling for terrestrial receptors. Appendix F presents the calculation worksheets. A discussion of the risks to mammal and birds are presented below.

Terrestrial Receptors

- Antimony and lead in the grab samples had EEQs greater than 1.0 using the NOAEL as the TRV, but EEQs are less than 1.0 using the LOAEL as the TRV. Maximum concentrations of antimony and lead in grab samples exceeded the maximum background concentrations. Because antimony and lead are related to site activities, they are retained as COPCs.

- Antimony and lead in the composite samples had EEQs greater than 1.0 using the NOAEL as the TRV, but EEQs are less than 1.0 using the LOAEL as the TRV. Maximum concentrations of lead in composite samples exceeded the maximum background concentrations. Maximum concentrations of antimony in composite samples were less than the maximum background concentrations. Because antimony and lead are related to site activities, they are retained as COPCs.

An avian TRV was not available for nitroglycerin in the composite soil; however, nitroglycerin is considered to be non-toxic to birds (USACHPPM, 2007). Therefore, it is not likely that nitroglycerin will impact birds at the site. Also, the areas potentially impacted by nitroglycerin, which are the firing lines, are small. For these reasons, nitroglycerin is eliminated as a COPC. A discussion of the chemicals that have EEQs greater than 1.0 using the less conservative food chain modeling for mammal and birds are presented below.

6.6.5 Ecological Risk Screening Summary

This section presents a summary of the conclusions of the ecological risk assessment that was conducted for the site.

6.6.5.1 Risks to Terrestrial Plants and Invertebrates

Nitroglycerin was retained as a COPC for terrestrial invertebrates in the composite soil because it was detected in three of three samples and no screening level was available. Lead was retained as a COPC for terrestrial plants in grab samples and composite samples because it was detected at concentrations that exceeded screening levels. Nitroglycerin was retained as a COPC for terrestrial plants in the composite soil because a screening level was not available.

6.6.5.2 Mammals and Birds

Antimony and lead were retained as COPCs for terrestrial wildlife because they had EEQs greater than 1.0 in the food chain model and are related to site activities.

6.7 UPDATED CSM

Only MC associated with the Small Arms Range are considered in the CSM exposure pathway analysis. A general description of the CSM exposure pathway analysis was included in Section 10.5.7 of the SAP as follows: "Contaminants at the Small Arms Range may potentially migrate within soil, groundwater, surface water and sediment. Direct human or biota contact with surficial soil is considered the most likely exposure scenario. An unnamed tributary is located near the western boundary of the Small Arms Range and represents a primary source medium for MC. MC could potentially migrate from surface soil to subsurface soil or groundwater. Based on a review of hydrogeological data, it is unlikely that MC in shallow groundwater would migrate to the deeper aquifers that are used as water supplies. However, shallow groundwater is still considered a potential exposure medium. MC in surface soils may also migrate via plant/animal uptake. Potential current and future human receptors include authorized Navy personnel (military and civilian), visitors, contractors, maintenance workers, recreational users, and trespassers. Plant and animal biota are also potential receptors. Examples of ecological receptors include deer, wild turkey, and waterfowl."

Human Health Risk Exposure Summary

The human health CSM summary table is presented as Table 6-4.

In the human health risk screening evaluation, TtNUS evaluated soil data for the Small Arms Range. TtNUS divided the soil samples for this site into three areas of interest for the risk screening evaluation:

- Composite surface soil samples collected from the firing lines
- Discrete surface soil samples
- Discrete subsurface soil samples

For the composite surface soil samples collected from the firing lines, nitroglycerin was the only COPC for the human health risk screening evaluation. The calculated risks for direct contact exposures for residential and nonresidential land uses were below the USEPA target level of 10^{-4}. The calculated hazard index for residential land uses exceeded the USEPA target level of 1. The calculated hazard

index for non-residential land uses was below the USEPA target level of 1. Maximum nitroglycerin concentrations in soil exceeded risk-based concentrations in soil for protection of groundwater for dilution-attenuation factors of both 1 and 20. Nitroglycerin is fairly reactive in the environment, so nitroglycerin originating in soil may degrade as it leaches such that the resulting concentrations of nitroglycerin in groundwater are not significant. Groundwater from the Small Arms Range is not used as a source of drinking water, so the pathway is currently incomplete.

For the discrete surface soil samples, antimony, arsenic and lead were selected as COPCs for the human health risk screening evaluation. Using the maximum detected concentrations in soil, the calculated risks for residential and nonresidential land uses were below the USEPA target level of 10^{-4}. The calculated hazard indices for residential and nonresidential land uses were below the USEPA target level of 1. In the evaluation of direct contact exposures to lead in soil, the maximum detected lead concentration in soil was greater than the residential direct contact screening value of 400 mg/kg, but less than the non-residential direct contact screening value of 800 mg/kg. The maximum concentration of antimony in soil exceeds the risk-based concentrations for protection of groundwater using the tap water RSL for a dilution-attenuation factor of 1 but not 20. However, the maximum concentration of antimony in soil exceeds the risk-based concentrations for protection of groundwater using the MCL for both dilution-attenuation factors. The maximum concentration of arsenic in soil exceeds risk-based concentrations for dilution-attenuation factors of both 1 and 20. Also, groundwater from the Small Arms Range is not used as a source of drinking water, so the pathway is currently incomplete.

For the discrete subsurface soil samples, all chemicals were below human health risk-based screening levels for soil or were present in subsurface soil at concentrations consistent with background soil concentrations. Consequently, no potential adverse health effects are expected from exposures to subsurface soil as a result of future residential or non-residential uses of the Small Arms Range.

Ecological Risk Exposure Summary:

The Ecological CSM summary table is presented as Table 6-5.

Risks to Terrestrial Plants and Invertebrates

Nitroglycerin was retained as a COPC for terrestrial invertebrates in the composite soil because it was detected in three of three samples and no screening level was available. Lead was retained as a COPC for terrestrial plants in grab samples and composite samples because it was detected at concentrations

that exceeded screening levels. Nitroglycerin was retained as a COPC for terrestrial plants in the composite soil because a screening level was not available.

Mammals and Birds

Antimony and lead were retained as COPCs for terrestrial wildlife because they had EEQs greater than 1.0 in the food chain model and are related to site activities.

CSM Summary

The updated CSM is shown on Figure 6-4 and details the potential exposure sources, pathways, and receptors. The exposure sources appear to be limited to the slope of the hillside just beyond the last firing line and along the target berm area, where bullet fragments have accumulated. One pathway is runoff from precipitation. Leaching from soil into groundwater has been eliminated as a pathway, since groundwater is not used as the site. Receptors would be trespassers and ecological receptors by ingestion, dermal contact, and inhalation of surface soil, soil, and sediment. Potentially complete exposure pathways exist for both human and ecological receptors under both current and hypothetical future land uses.

6.8 CONCLUSIONS

The following summary can be made concerning the Small Arms Range:

- MC consisting of metals (primarily lead and, to a lesser extent, antimony, arsenic) and NG are present in site soil [particularly surface soil (0 to 4 foot bgs interval)], surface water, and sediment of drainageways that lead to an unnamed tributary creek along the western boundary of the range and from the range to property that is beyond the boundary of the Stump Neck Annex (i.e., into General Smallwood State Park). Lead is assumed to be the primary metal MC of concern because it is the primary constituent in the spent munitions, and because of its documented toxicity to both human and ecological receptors. Arsenic and antimony contamination were correlated with lead concentrations in surface soil because they are associated with the lead in the bullets. Two subsurface locations had elevated arsenic and antimony (6 to 8 foot bgs interval), but not lead. NG was present at a slightly elevated concentration in each of the firing line composite soil samples (Figure 6-1).

- Elevated metals concentrations in four locations were present along the range floor immediately in front of the hillside, and behind the former range targets (i.e., the primary impact berm). There appears to be some limited sloughing (slope failure) along this hillside such that uncontaminated soil

at the head of the slope may now cover potentially contaminated soil at the toe of the slope. The 0 to 4-foot bgs interval along the sloughed hillside was considered to be the surface soil.

- MC are present in surface soil, and may have migrated to subsurface soil and subsequently infiltrated to the underlying groundwater. These constituents may also have migrated to the aforementioned adjoining surface water bodies via surface soil runoff or the discharge of contaminated shallow groundwater to surface water. The extent of the potential environmental contamination at the site appears to be limited to the head and the toe of the hillside slope in front of the last firing line.

- The CSM (Figure 6-4) indicates that potentially complete exposure pathways exist for both human and ecological receptors under both current and hypothetical future land uses. Unacceptable levels of human and/or ecological risk may exist. However groundwater is not currently used at the site.

- Antimony was exceeded at 5 discrete surface soil sampling locations, 2 discrete subsurface soil sampling locations at 1 to 2 feet bgs, 1 discrete subsurface soil sampling location at 6 to 8 feet bgs, and 3 composite surface soil sampling locations (firing line locations). Arsenic was exceeded at 12 discrete surface soil sampling locations, 4 discrete subsurface soil sampling locations at 1 to 2 feet bgs, 1 discrete subsurface soil sampling location at 4 to 6 feet bgs, 1 discrete subsurface soil sampling location at 6 to 8 feet bgs, and 3 composite surface soil sampling locations (firing line locations). Copper was exceeded at 1 discrete surface soil sampling location. Lead was exceeded at 7 discrete surface soil sampling locations. Nitroglycerin was exceeded at 3 composite surface sampling locations.

6.8.1 Data Gaps

There were no data gaps.

6.9 RECOMMENDATIONS FOR NEXT PHASE

Based on the results of the SI, further actions are required. These subsequent actions may include a RI for the Small Arms Range that will meet CERCLA requirements. RI activities should include an interim remedial action to address the limited known areas of surface and shallow subsurface soil lead, arsenic, antimony and NG contamination, the limited removal of lead-contaminated soils, or the localized chemical stabilization of lead in soil to reduce the potential threat of lead releases to the environment.

6.9.1 Objectives for Interim Removal Action, Remedial Investigation, or No Further Action Determination

Specific tasks recommended as part of the RI MC investigation include the following:

- Removal of shallow soils in areas with elevated concentration of metals. Figure 6-5 illustrates the proposed soil removal areas. Soil is proposed to be removed in the Head and the Toe of the Hillside Slope. Soil is proposed to be excavated to a depth of 4 feet at the Head of Hillside Slope in the areas of bullet accumulations. Soil is proposed to be excavated to a depth of 1 foot bgs at the Toe of Hillside Slope in the areas of bullet accumulations. The total amount of soil to be removed is estimated at approximately 245 cubic yards (yd^3). The excavation totals are calculated below:

Location	Dimensions: length x depth x width (ft)	Cubic Feet (ft^3)	Cubic Yards (yd^3)
Head of Hillside Slope	50 x 25 x 4	5,000	185
Toe of Hillside Slope	50 x 32 x 1	1,600	60
Total Proposed Soil Removal	NA	6,600	245

- Confirmation soil sampling in the excavation areas in one of these scenarios:

  1. MIS.
  2. Four corners and middle of excavation.
  3. Resample at same locations where there were exceedances, but at depths below the excavated material.

In each of these scenarios, the depth sampled at would be at 4 to 5 feet bgs (pre-excavated depth) at the Head of Hillside Slope, and at 1 to 2 feet bgs (unexcavated depth) at the Toe of Hillside Slope.

- Remediation of the slightly elevated NG via aeration of the soil along the firing lines. This can be accomplished by turning the soil in situ.

TABLE 6-1

MUNITION TYPES AND CHEMICALS
SMALL ARMS RANGE (SAR) - UXO 17
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

MUNITIONS TYPES USED/STORED AT THE FACILITY

.22 caliber ammunition
.45 caliber ammunition
.50 caliber ammunition
9 mm ammunition

ASSOCIATED CHEMICAL CONSTITUENTS

Primary:
Lead
Nitroglycerin

Secondary:
Antimony
Arsenic
Copper
Magnesium
Nickel
Strontium
Tin
Zinc
Lead Styphnate
Lead Azide

TABLE 6-2a

SMALL ARMS (PISTOL) RANGE
SUBSURFACE SOIL
BACKGROUND COMPARISON
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Chemical	Site Maximum Detected	Background Maximum	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion	Site Distribution	Background Distribution	Test	Equal Variance?[1]	Test Statistic	P-Value	Quantile Test	Slippage Test	Site Above Background?
Inorganics(mg/kg)																
ANTIMONY	1	1.8	6/9	3/28	9/37	76	NO									NO
ARSENIC	7.8	14.15	7/9	24/28	31/37	16	NO									NO
LEAD	132	27.9	9/9	25/28	34/37	8	YES									YES

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE 6-2b

SMALL ARMS (PISTOL) RANGE
DISCRETE SURFACE SOIL
BACKGROUND COMPARISON
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Chemical	Site Maximum Detected Concentration	Background Maximum Detected Concentration	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion Site Above Background?	Site Distribution	Background Distribution	Test	Equal Variance?[1]	Test Statistic	P-Value	Quantile Test	Slippage Test	Site Above Background?
Inorganics(mg/kg)																
ANTIMONY	6	ND	8/12	0/33	8/45	82	YES[3]									YES
ARSENIC	8.7	18.3	12/12	30/34	42/46	87	SIMILAR	NORMAL	LOGNORMAL	GEHAN		-1.619	0.0527			YES
COPPER	42	19.45	12/12	32/34	44/46	4	YES									YES
LEAD	706	149	10/12	32/34	42/46	87	YES									YES

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE 6-2c

SMALL ARMS PISTOL RANGE
COMPOSITE SURFACE SOIL
BACKGROUND COMPARISON
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Chemical	Site FOD	Background FOD	Site Maximum	Background Maximum	Background UPL		Site Exceed Background?
Inorganics(mg/kg)							
Antimony	3/3	0/33	1.4	ND	ND	ND	NO
Arsenic	3/3	30/34	6.2	18.3	9.7	95%KM(t)UPL	NO
Lead	3/3	32/34	200	149	59.44	95%KM(t)UPL	YES

TABLE 6-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS
UXO 17
SMALL ARMS RANGE (PISTOL)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X17SB001		X17SB001		X17SB001		X17SB001		X17SB002		X17SB002		X17SB002	
nsample		**X17SB0010004**		**X17SB0010408**		**X17SB0010810**		**X17SS0010001**		**X17SB0020004**		**X17SB0020406**		**X17SB0020608**	
sample_dat		20090611		20090611		20090611		20090611		20090611		20090611		20090611	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		4		8		0		0		4		6	
bottom_dep		4		8		10		1		4		6		8	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SB		SB		SB		SS		SB		SB		SB	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	0.15	L									0.22	L		
ARSENIC	0.39	**4.6**										**7.8**			
COPPER	100	6										8.2			
LEAD	400	9.1										8.1			
TIN	0.89	1.1	B									0.92	B		
ZINC	46	15.6										24.1			
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	4.333		12.333		0	U			3.667		85.333		0	U
Miscellaneous Parameters (s.u.)															
PH	NA							7.3							
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA							660							
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	92						91				88			

TABLE 6-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS
UXO 17
SMALL ARMS RANGE (PISTOL)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 2 OF 8

location		X17SB002		X17SB003		X17SB003		X17SB003		X17SB003		X17SB004		X17SB004	
nsample		**X17SB0020810**		**X17SB0030004**		**X17SB0030406**		**X17SB0030608**		**X17SB0030810**		**X17SB0040004**		**X17SB0040406**	
sample_dat		20090611		20090611		20090611		20090611		20090611		20090611		20090611	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		8		0		4		6		8		0		4	
bottom_dep		10		4		6		8		10		4		6	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SB		SB		SB		SB		SB		SB		SB	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27							**0.3**	**L**			**2.2**	**L**		
ARSENIC	0.39							**5.7**				**7**			
COPPER	100							8				37.1			
LEAD	400							68.2				**589**			
TIN	0.89							1	B			1.2	B		
ZINC	46							17.9				33.2			
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	12.667		16.333		85.333		126.333		7.667		**2171**		371.333	
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA							90				91			

TABLE 6-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS
UXO 17
SMALL ARMS RANGE (PISTOL)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X17SB004		X17SB004		X17SB005		X17SB005		X17SB005		X17SB005		X17SB006	
nsample		**X17SB0040608**		**X17SB0040810**		**X17SB0050004**		**X17SB0050406**		**X17SB0050608**		**X17SB0050810**		**X17SB0060004**	
sample_dat		20090611		20090611		20090611		20090611		20090611		20090611		20090611	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		6		8		0		4		6		8		0	
bottom_dep		8		10		4		6		8		10		4	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SB		SB		SB		SB		SB		SB		SB	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	0.13	B			**1.7**	**L**					**0.3**	**L**		
ARSENIC	0.39	**4.2**				**5.9**						2.3	B		
COPPER	100	5.3				42	K					7.8			
LEAD	400	8.9				**620**						32.4			
TIN	0.89	0.76	B			1.6	B					0.99	B		
ZINC	46	14.8				23.8						14			
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	0	U	156		**942.333**		36.667		349.667		41.333		230	
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	91				87						89			

TABLE 6-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS
UXO 17
SMALL ARMS RANGE (PISTOL)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X17SB006		X17SB006		X17SB006		X17SB007		X17SB007		X17SB007		X17SB007	
nsample		**X17SB0060406**		**X17SB0060608**		**X17SB0060810**		**X17SB0070004**		**X17SB0070406**		**X17SB0070608**		**X17SB0070810**	
sample_dat		20090611		20090611		20090611		20090611		20090611		20090611		20090611	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		4		6		8		0		4		6		8	
bottom_dep		6		8		10		4		6		8		10	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SB		SB		SB		SB		SB		SB		SB	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	**1**	**L**					0.19	L						
ARSENIC	0.39	2.4	B					**4.8**							
COPPER	100	10						8.3							
LEAD	400	132						8.2							
TIN	0.89	1	B					1.3	B						
ZINC	46	13.1						17.5							
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	191		4.667		55.333		4.333		24.333		0	U	6.667	
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	91						87							

TABLE 6-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS
UXO 17
SMALL ARMS RANGE (PISTOL)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 5 OF 8

location		X17SB008C		X17SB009C		X17SB010C		X17SB011		X17SB011		X17SB012		X17SB013	
nsample		**X17SS008C0001**		**X17SS009C0001**		**X17SS010C0001**		**X17SS0110001**		**X17SB0110102**		**X17SS0120001**		**X17SB0130102**	
sample_dat		20090611		20090611		20090611		20090611		20090614		20090611		20090614	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		1		0		1	
bottom_dep		1		1		1		1		2		1		2	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SB		SS		SB	
composite		Y		Y		Y		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	**0.39**	**L**	**0.43**	**L**	**1.3**	**L**			**0.52**	**L**			**0.42**	**L**
ARSENIC	0.39	**5**		**4.4**		**6.2**				**5.1**				**3.7**	
COPPER	100	12		11.2		24				10.7				8.6	
LEAD	400	21		38.7		200				82.1				39.2	
TIN	0.89	0.92	B	1.4	B	1.3	B			1.2	B			0.86	B
ZINC	46	23.1		19		35.2				21.8				13.2	
Explosives (mg/kg)															
NITROGLYCERIN	6.1	**20.4**		**9.8**		**13**									
XRF Field Parameters (mg/kg)															
LEAD	400	96.333		73.333		156.333		**405**		101.667		10		30.667	
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	91		91		91				90				93	

TABLE 6-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS
UXO 17
SMALL ARMS RANGE (PISTOL)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 6 OF 8

location		X17SB013		X17SB014		X17SB014		X17SB015		X17SB016		X17SB017		X17SB018	
nsample		**X17SS0130001**		**X17SS0140001**		**X17SB0140102**		**X17SS0150001**		**X17SS0160001**		**X17SS0170001**		**X17SS0180001**	
sample_dat		20090614		20090611		20090614		20090611		20090611		20090611		20090611	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		1		0		0		0		0	
bottom_dep		1		1		2		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SB		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27			**6**	**L**	0.44	B			0.19	B				
ARSENIC	0.39			**8.7**		**5.5**				**5.1**					
COPPER	100			36.3		11.8				9.6					
LEAD	400			**706**		77.6				12.2	B				
TIN	0.89			1.5	B	**1.5**				1.3	B				
ZINC	46			23.5		25.4				19.5					
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	**3247**		**2501**		40.667		18		13.667		9.667		7	
Miscellaneous Parameters (s.u.)															
PH	NA	7.3													
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA	10000													
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	84		92		90				84					

TABLE 6-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS
UXO 17
SMALL ARMS RANGE (PISTOL)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X17SB019		X17SB020		X17SB021		X17SB022		X17SB022		X17SB022		X17SB023	
nsample		**X17SS0190001**		**X17SS0200001**		**X17SS0210001**		**X17SS0220001**		**X17SS0220001-AVG**		**X17SS0220001-D**		**X17SS0230001**	
sample_dat		20090611		20090611		20090611		20090611		20090611		20090611		20090611	
qc_type		NM		NM		NM		NM		NM		FD		NM	
sacode		NORMAL		NORMAL		NORMAL		ORIG		AVG		DUP		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	0.26	L					0.13	B	0.13	B	0.13	B		
ARSENIC	0.39	**8.5**						**3.5**		**3.55**		**3.6**			
COPPER	100	12						8.2		8.1	K	8	K		
LEAD	400	39.4						7	B	5.35		7.2			
TIN	0.89	0.56	B					1	B	1	B	1	B		
ZINC	46	24						13.7		13.75		13.8			
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	36		39		31.333		26		26				0	U
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	85						87		87		87			

TABLE 6-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS
UXO 17
SMALL ARMS RANGE (PISTOL)
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND
PAGE 8 OF 8

location		X17SB024		X17SB025		X17SB025		X17SB026		X17SB027		X17SB028		X17SB029	
nsample		**X17SS0240001**		**X17SS0250001**		**X17SB0250102**		**X17SS0260001**		**X17SS0270001**		**X17SS0280001**		**X17SS0290001**	
sample_dat		20090611		20090612		20090614		20090612		20090612		20090612		20090614	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		1		0		0		0		0	
bottom_dep		1		1		2		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SB		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	0.15	B	3.3	B	0.55	B			**2.1**	**L**	**0.5**	**L**		
ARSENIC	0.39	**3.9**		**5.1**		**4.6**				**3.6**		**4**			
COPPER	100	7.2		26		10.9				5.6	K	8.1	K		
LEAD	400	10.3	B	**479**		87.5				**645**		38.9			
TIN	0.89	1.2	B	0.96	B	1.2	B			0.58	B	1.1	B		
ZINC	46	14.8		20		24				10		13.5			
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	11.333		**731.667**		126.667		95.333		128.667		39		256	
Miscellaneous Parameters (s.u.)															
PH	NA											7.8			
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA											3100			
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	87		92		91				92		93			

TABLE 6-4

HUMAN HEALTH CSM SUMMARY
SMALL ARMS RANGE (SAR) - UXO 17
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Pathways Associated with Soil at Small Arms Range (UXO-17)

Area of Interest	Are Direct Contact Exposures to Soil Acceptable?						Evaluation of Leaching to Groundwater Pathway
	Residential			Non-Residential			
	Risk	Haz. Index	Lead	Risk	Haz. Index	Lead	
Firing Line (Composite Samples)	Yes	NO (NG)	Yes	Yes	Yes	Yes	GW use pathway incomplete (NG RBC exceedances)
Surface Soil (Discrete Samples)	Yes	Yes	NO	Yes	Yes	Yes	GW use pathway incomplete (Sb, As RBC exceedances)
Subsurface Soil (Discrete Samples)	Yes	Yes	Yes	Yes	Yes	Yes	GW use pathway incomplete (No RBSL exceedances)

Notes:
GW = groundwater
RBC = risk-based concentration
RBSL = risk-based screening level
Chemicals in parentheses are responsible for 1) unacceptable risks or hazard indices or 2) exceedances of soil to groundwater RBCs
As = arsenic
NG = nitroglycerin
Sb = antimony

TABLE 6-5

ECOLOGICAL CSM SUMMARY
SMALL ARMS RANGE (SAR) - UXO 17
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

X17 SS

	Soil Invertebrates	Plants	Wildlife
Inorganics			
ANTIMONY	0	0	X
ARSENIC	0	0	0
COPPER	0	0	0
LEAD	X	X	X
ZINC	0	0	0

X17 Composite

	Soil Invertebrates	Plants	Wildlife
Inorganics			
ANTIMONY	0	0	X
ARSENIC	0	0	0
COPPER	0	0	0
LEAD	0	X	X
ZINC	0	0	0
Explosives			
NITROGLYCERIN	--	--	0

P:/GIS/INDIANHEAD_NSWC_NEW/MXD/SN_PISTOL_RANGE_TAGS.MXD 6/1/10 KM

1256500

1257000

321500

Rum Point Road

X17SB025	[0-1]
Inorganics	(mg/kg)
ARSENIC	5.1
LEAD	479
X17SB025	[1-2]
Inorganics	(mg/kg)
ARSENIC	4.6

X17SB011	[0-1]
XRF Field Parameters	(mg/kg)
LEAD	405
X17SB011	[1-2]
Inorganics	(mg/kg)
ANTIMONY	0.52 L
ARSENIC	5.1

X17SB002	[4-6]
Inorganics	(mg/kg)
ARSENIC	7.8

X17SB013	[1-2]
Inorganics	(mg/kg)
ANTIMONY	0.42 L
ARSENIC	3.7
X17SB013	[0-1]
XRF Field Parameters	(mg/kg)
LEAD	3247

X17SB027	[0-1]
Inorganics	(mg/kg)
ANTIMONY	2.1 L
ARSENIC	3.6
LEAD	645

X17SB008C	[0-1]
Inorganics	(mg/kg)
ANTIMONY	0.39 L
ARSENIC	5
Explosives	(mg/kg)
NITROGLYCERIN	20.4

X17SB009C	[0-1]
Inorganics	(mg/kg)
ANTIMONY	0.43 L
ARSENIC	4.4
Explosives	(mg/kg)
NITROGLYCERIN	9.8

X17SB010C	[0-1]
Inorganics	(mg/kg)
ANTIMONY	1.3 L
ARSENIC	6.2
Explosives	(mg/kg)
NITROGLYCERIN	13

X17SB016	[0-1]
Inorganics	(mg/kg)
ARSENIC	5.1

X17SB001	[0-4]
Inorganics	(mg/kg)
ARSENIC	4.6

X17SB003	[6-8]
Inorganics	(mg/kg)
ANTIMONY	0.3 L
ARSENIC	5.7

X17SB019	[0-1]
Inorganics	(mg/kg)
ARSENIC	8.5

X17SB004	[0-4]
Inorganics	(mg/kg)
ANTIMONY	2.2 L
ARSENIC	7
LEAD	589
X17SB004	[6-8]
Inorganics	(mg/kg)
ARSENIC	4.2

X17SB005	[0-4]
Inorganics	(mg/kg)
ANTIMONY	1.7 L
ARSENIC	5.9
COPPER	42 K
LEAD	620

X17SB014	[0-1]
Inorganics	(mg/kg)
ANTIMONY	6 L
ARSENIC	8.7
LEAD	706
X17SB014	[1-2]
Inorganics	(mg/kg)
ARSENIC	5.5

X17SB028	[0-1]
Inorganics	(mg/kg)
ANTIMONY	0.5 L
ARSENIC	4

X17SB022	[0-1]
Inorganics	(mg/kg)
ARSENIC	3.5

X17SB007	[0-4]
Inorganics	(mg/kg)
ARSENIC	4.8

X17SB024	[0-1]
Inorganics	(mg/kg)
ARSENIC	3.9

95 90 95 100 105 110 130 125 120 115 110 105 100

N

Legend

- Metals Exceedance Location
- Firing Line
- MRP Area Boundary Identified during PA
- Surface Drainage
- Topographic Contour (5-ft)
- Firing Direction

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

50 25 0 50 Feet

DRAWN BY	DATE
K. MOORE	12/15/09
CHECKED BY	DATE
E. BERKLITE	6/1/10
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

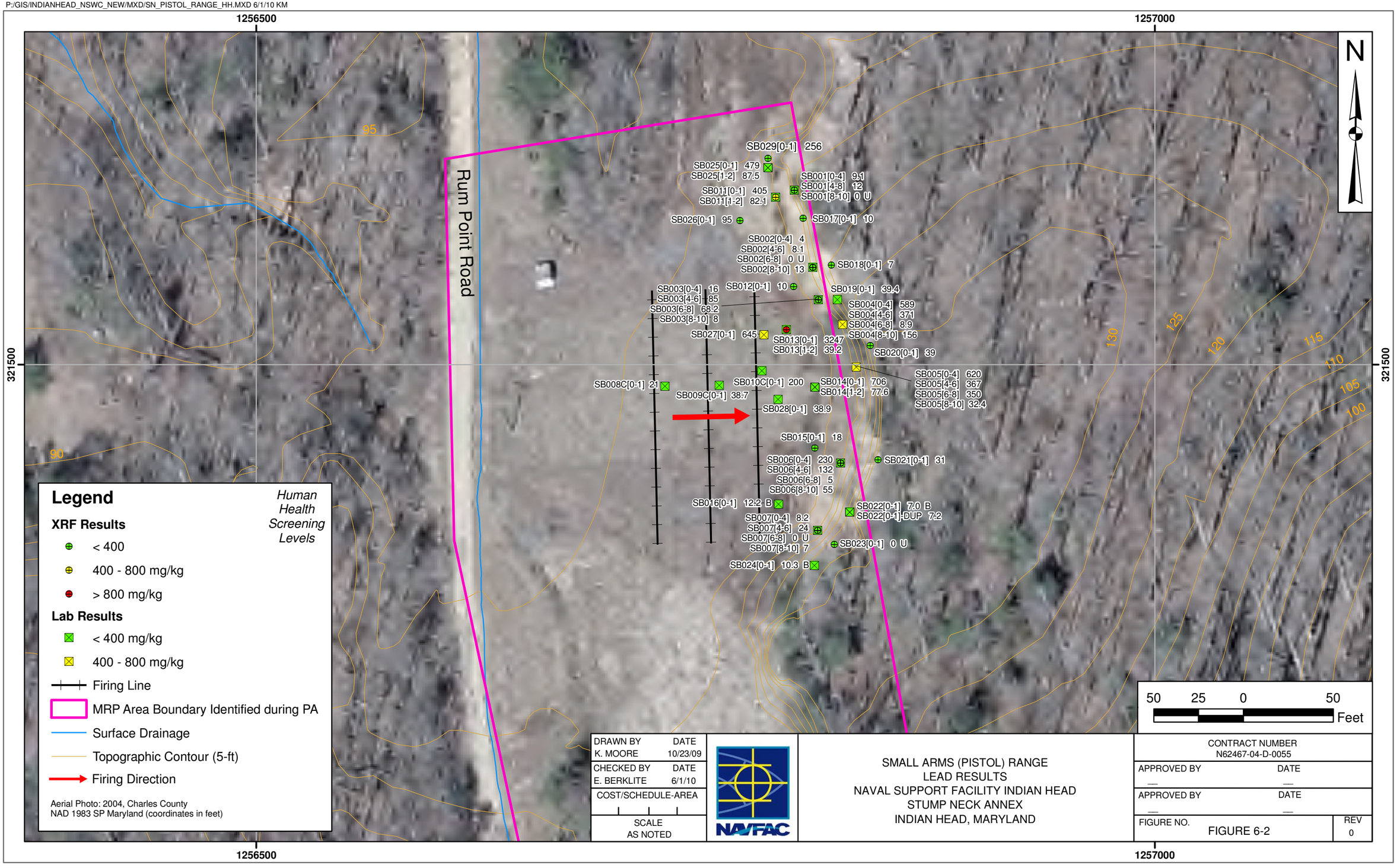
SMALL ARMS (PISTOL) RANGE
METALS EXCEEDANCES
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	
N62467-04-D-0055	
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 6-1	0

1256500

1257000

P:/GIS/INDIANHEAD_NSWC_NEW/MXD/SN_PISTOL_RANGE_HH.MXD 6/1/10 KM



Legend

Human Health Screening Levels

XRF Results

- < 400
- 400 - 800 mg/kg
- > 800 mg/kg

Lab Results

- < 400 mg/kg
- 400 - 800 mg/kg
- Firing Line
- MRP Area Boundary Identified during PA
- Surface Drainage
- Topographic Contour (5-ft)
- Firing Direction

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

50 25 0 50 Feet

DRAWN BY	DATE
K. MOORE	10/23/09
CHECKED BY	DATE
E. BERKLITE	6/1/10
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

SMALL ARMS (PISTOL) RANGE
LEAD RESULTS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	N62467-04-D-0055
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 6-2	0

P:/GIS/INDIANHEAD_NSWC_NEW/MXD/SN_PISTOL_RANGE_ECO.MXD 6/1/10 KM

1256500 1257000

321500

N

Rum Point Road

95 100 105 110 115 120 125 130

SB029[0-1] 256
SB025[0-1] 479
SB025[1-2] 87.5
SB001[0-4] 9.1
SB001[4-8] 12
SB001[8-10] 0 U
SB011[0-1] 405
SB011[1-2] 82.1
SB026[0-1] 95
SB017[0-1] 10
SB002[0-4] 4
SB002[4-6] 8.1
SB002[6-8] 0 U
SB002[8-10] 13
SB018[0-1] 7
SB003[0-4] 16
SB003[4-6] 85
SB003[6-8] 68.2
SB003[8-10] 8
SB012[0-1] 10
SB019[0-1] 39.4
SB004[0-4] 589
SB004[4-6] 371
SB004[6-8] 8.9
SB004[8-10] 156
SB027[0-1] 645
SB013[0-1] 3247
SB013[1-2] 39.2
SB020[0-1] 39
SB005[0-4] 620
SB005[4-6] 367
SB005[6-8] 350
SB005[8-10] 32.4
SB008C[0-1] 21
SB010C[0-1] 200
SB014[0-1] 706
SB014[1-2] 77.6
SB009C[0-1] 38.7
SB028[0-1] 38.9
SB015[0-1] 18
SB006[0-4] 230
SB006[4-6] 132
SB006[6-8] 5
SB006[8-10] 55
SB021[0-1] 31
SB016[0-1] 12.2 B
SB022[0-1] 7.0 B
SB022[0-1]-DUP 7.2
SB007[0-4] 8.2
SB007[4-6] 24
SB007[6-8] 0 U
SB007[8-10] 7
SB023[0-1] 0 U
SB024[0-1] 10.3 B

Legend

Ecological Screening Levels

XRF Results

- < 11 mg/kg
- 11 - 120 mg/kg
- 120 - 1700 mg/kg
- > 1700 mg/kg

Lab Results

- < 11 mg/kg
- 11 - 120 mg/kg
- 120 - 1700 mg/kg
- Firing Line
- MRP Area Boundary Identified during PA
- Surface Drainage
- Topographic Contour (5-ft)
- Firing Direction

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

50 25 0 50 Feet

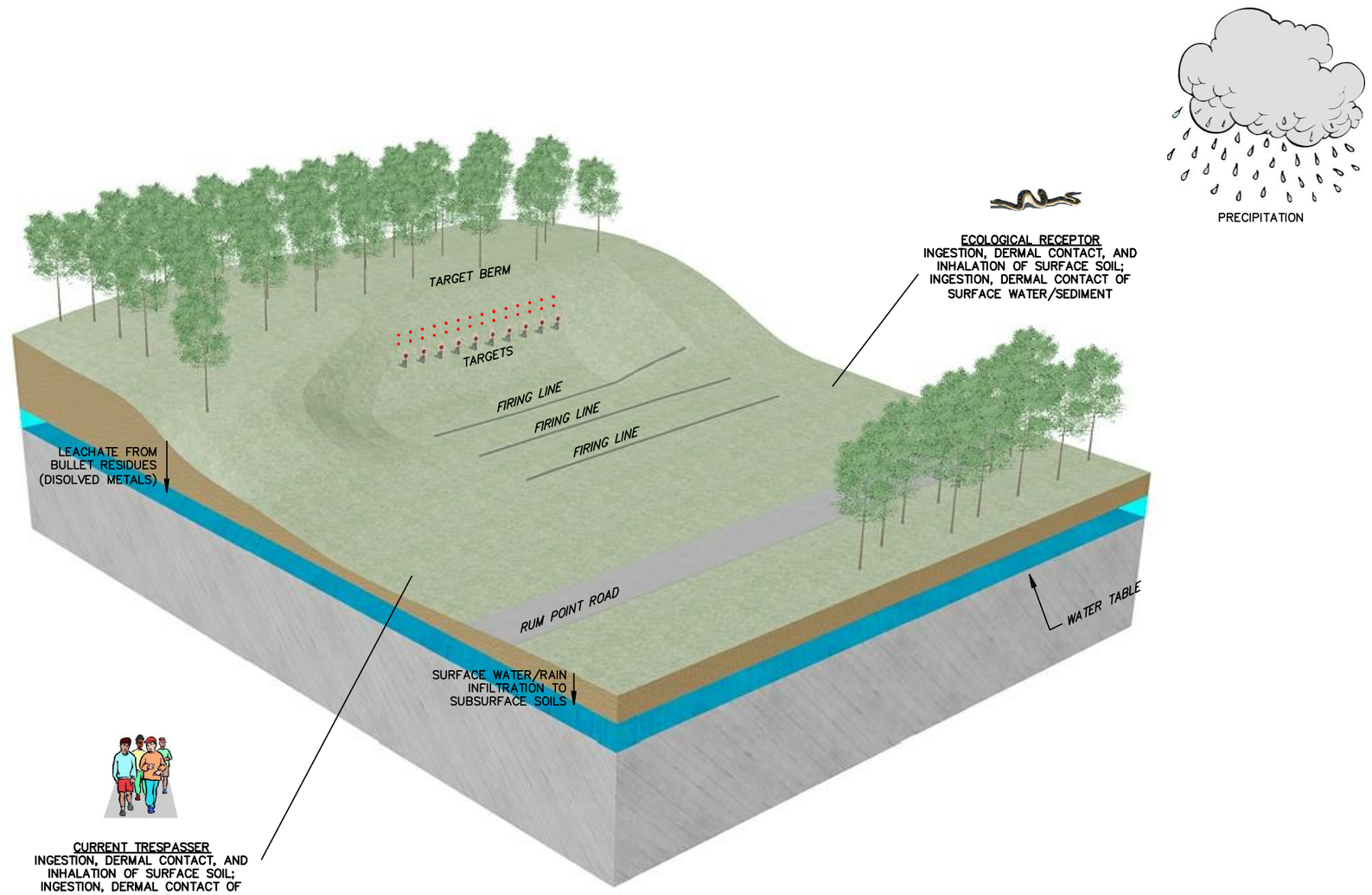
DRAWN BY	DATE
K. MOORE	10/23/09
CHECKED BY	DATE
E. BERKLITE	6/1/10
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

SMALL ARMS (PISTOL) RANGE
SOIL LEAD RESULTS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	N62467-04-D-0055
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 6-3	0

1256500 1257000



LEGEND

AREA OF BULLET ACCUMULATION

DRAWN BY BH	DATE 12/8/09	SMALL ARMS (PISTOL RANGE) CONCEPTUAL SITE MODEL NAVAL SUPPORT FACILITY STUMP NECK ANNEX INDIAN HEAD, MARYLAND	CONTRACT NO. 0810
CHECKED BY ---	DATE ---		OWNER NO.
REVISED BY ---	DATE ---		APPROVED BY --- DATE ---
SCALE NOT TO SCALE			DRAWING NO. FIGURE 6-4 REV. 0

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P:/GIS/INDIANHEAD_NSWC_NEW/MXD/SN_PISTOL_RANGE_SOIL_REMOVAL.MXD 6/1/10 KM

1256500 1257000 321500

N

Rum Point Road

95 100 105 110 115 120 125 130

SB029[0-1] 256
SB025[0-1] 479
SB025[1-2] 87.5
SB001[0-4] 9.1
SB001[4-8] 12
SB001[8-10] 0 U
SB011[0-1] 405
SB011[1-2] 82.1
SB026[0-1] 95
SB017[0-1] 10
SB002[0-4] 4
SB002[4-6] 8.1
SB002[6-8] 0 U
SB002[8-10] 13
SB018[0-1] 7
SB003[0-4] 16
SB003[4-6] 85
SB003[6-8] 68.2
SB003[8-10] 8
SB012[0-1] 10
SB019[0-1] 39.4
SB004[0-4] 589
SB004[4-6] 371
SB004[6-8] 8.9
SB004[8-10] 156
SB027[0-1] 645
SB013[0-1] 3247
SB013[1-2] 39.2
SB020[0-1] 39
SB005[0-4] 620
SB005[4-6] 367
SB005[6-8] 350
SB005[8-10] 32.4
SB008C[0-1] 21
SB010C[0-1] 200
SB014[0-1] 706
SB014[1-2] 77.6
SB009C[0-1] 38.7
SB028[0-1] 38.9
SB015[0-1] 18
SB006[0-4] 230
SB006[4-6] 132
SB006[6-8] 5
SB006[8-10] 55
SB021[0-1] 31
SB016[0-1] 12.2 B
SB022[0-1] 7.0 B
SB022[0-1]-DUP 7.2
SB007[0-4] 8.2
SB007[4-6] 24
SB007[6-8] 0 U
SB007[8-10] 7
SB023[0-1] 0 U
SB024[0-1] 10.3 B

Legend

Human Health Screening Levels

XRF Results

- < 400
- 400 - 800 mg/kg
- > 800 mg/kg

Lab Results

- < 400 mg/kg
- 400 - 800 mg/kg
- Firing Line
- Area of 1-ft Deep Excavation
- Area of 4-ft Deep Excavation
- MRP Area Boundary Identified during PA
- Surface Drainage
- Topographic Contour (5-ft)
- Firing Direction

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

50 25 0 50 Feet

DRAWN BY	DATE
K. MOORE	10/23/09
CHECKED BY	DATE
E. BERKLITE	6/1/10
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

SMALL ARMS (PISTOL) RANGE
PROPOSED SOIL REMOVAL
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	N62467-04-D-0055
APPROVED BY	DATE
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APPROVED BY	DATE
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FIGURE NO.	REV
FIGURE 6-5	0

7.0 RUM POINT SKEET RANGE RPSR – UXO 16

7.1 SITE BACKGROUND

7.1.1 Historical Information

The Rum Point Skeet Range was constructed and became operational in 1991 as part of the Morale, Welfare, and Recreation program. The area has two skeet ranges side by side separated by a wooden fence. A 30-foot by 60-foot modular administrative building was constructed in the observation area directly south of the shooting points. An August 1990 range plan drawing outlines the construction plans for the skeet and trap houses, concrete pads and walkways, new access road and parking lot, and new clearing limits. According to installation personnel, this range was used exclusively as a recreational facility. The Potomac River Gun Club used and maintained the range as a private combination skeet, trap and three-dimensional archery range. During this time, the Administration Building (#2153) became the gun club's headquarters. The skeet range was closed in 2001. The former Rum Point Skeet Range covers approximately 33.45 acres in the northeastern section of the Stump Neck Annex. This acreage covers a 900-foot arc from the firing points on the southern end of the range to the northern edge of the range. This distance complies with the skeet range safety requirements as stated in the 1958 U.S. Naval Aeronautical Shore Facilities Programming Guide. According to the 1999 Environmental Management Plan produced by the Potomac River Gun Club (ref), an estimated 85,000 targets were thrown per year for practice and competition shooting. Only shotguns were used at the range. Approximately 5,300 pounds of lead were deposited at the skeet range each year. From this estimation, roughly 53,000 pounds of lead shot fell within the shot fall zone at the range during its 10 years of operation.

7.1.2 Munitions Used

This section describes the munitions or munitions-related materials known or suspected to be at the range. This includes both MEC and non-hazardous munitions-related debris (e.g., fragmentation, base plates, inert mortar fins). The Rum Point Skeet Range was used as a recreational small arms range. According to the installation and documents from the Potomac River Gun Club, only shotguns were used at the range. Based on the information obtained during the data collection process, the Rum Point Skeet Range is not suspected to contain CWM-filled munitions, electrically fused munitions, or DU-associated munitions. The munitions used and/or stored at the facility and the associated chemical constituents are listed in Table 7-1.

7.1.3 Munitions Constituents

The potential for lead contamination exists over the entire 900-foot arc covered by the Rum Point Skeet Range. According to the Interstate Technology and Regulatory Council (ITRC) guidance, the positions of the shooters and the angles at which the skeet targets are thrown create a fan-shaped shot fall zone. Depending on the shot angle, wind, and blocking effect of trees, the typical shotfall zone extends up to 680 feet. The overlapping fans create an area of maximum shot fall positioned approximately 375 to 600 feet from the firing point. The maximum shot fall zone is the area in which the highest concentrations of lead and debris are expected. At the Rum Point Skeet Range, the cleared area of the range extends approximately 400 feet from the firing point. Thus, the theoretical maximum shot fall zone would extend past the tree line. The actual shot fall zone is an area slightly less than the theoretical shot fall zone because of the blocking effect of the trees. The potential for lead contamination is greatest along the actual shot fall zone located at the tree line. There is a concern that the lead shot is embedded within the trees or possibly within the wetland area located on the western edge of the range. There was no record found of any excavations or environmental sampling on the range. Other MC at the range may include elevated concentrations of metals such as antimony, copper, zinc, and arsenic from bullets, fragments, and bullet jackets. The only munitions-related debris items located on range were clay targets. These targets normally contain approximately 32 percent petroleum pitches [Chemical Abstract Service (CAS) 68334-31-6, CAS 68187-58-6] and 67 percent dolomite limestone (CAS 16389-88-1). Petroleum pitch contains PAHs, some of which are classified as carcinogens. The targets are not considered an explosive or fire hazard. Several of these targets were found at the range during the visual survey. NG from unburned propellants and lead from primers is suspected at the firing range.

7.2 SITE FIELDWORK

7.2.1 Site Field Activities

Soil sample locations were selected based on a bias towards areas that were believed to be most likely contaminated by past operations at the site. The total area of the site is 33.45 acres as indicated in Table 3-1. The study area consists of the Range Area which covers approximately 13.8 acres. See Figure 3-4 for all sample locations. Prior to initiating sample collection, all sample locations were marked by colored pin flags bearing the sample location ID number. Proposed sample locations identified in the approved WP were located by global positioning system (GPS) and by measurements from stationary objects (e.g.: roadways, existing buildings). All sample locations were as proposed in the approved WP.

7.2.2 Work Plan Deviations

There were no deviations from the work plan.

7.2.3 Field Data Collection

A total of 96 soil samples were collected from the Range Area during the SI at the RPSR. All soil samples collected were from the surface depth of 0 to 1 foot bgs. No subsurface samples were collected. Two composite samples were collected at the firing points. Ninety-six samples underwent field XRF analysis for lead, and 25 samples were selected for metals analysis at the FBL. Twenty-one discrete and two composite soil samples were selected for PAH analysis. Four soil samples were selected for TOC analysis. Two soil samples were selected for NG analysis. Soil samples were collected via hand auger in accordance with SOP-05. See Figure 3-4 for all sampling locations. A summary of the sample collection methods used are shown in Table 3-5. Soil sample log sheets are included in Appendix A of this document.

7.3 SITE INSPECTION DATA COLLECTION RESULTS

7.3.1 MC Sampling Results

All soil samples collected were compared to the PALs and background sampling results, and a statistical evaluation was done to compare the background data with the site sampling results. The summary table of the site background screening is presented as Table 7-2. The statistical summary and calculations are presented in Appendix G. The MC analytical results are presented in Appendix C, and the data validation reports are presented in Appendix D. Table 7-3 summarizes the results as compared to the calculated screening values for metals. The PAL was the reference limit, unless the background and screening calculations exceeded this value. In Table 7-3, if a parameter had an exceedance at any sampling point, the parameter is highlighted; Individual sample exceedances are also highlighted. Figure 7-1 illustrates the metals exceedances in soil at the Rum Point Skeet Range. Screening values used were the PAL limits for the direct contact residential values for soil.

Antimony was evaluated to be below the background levels for the discrete soil samples. Antimony was slightly above the PAL for the composite sample at the west firing line. Lead exceeded the direct contact residential soil screening value at three discrete surface soil sampling locations.

Table 7-4 presents the PAH results and the calculated BAP equivalents. The calculated screening value is 1,500 µg/kg.

PAHs were analyzed in discrete surface soil samples at this site. The results for potentially carcinogenic PAHs were converted to BaP equivalent concentrations using the procedure described in Section 4.3.1. Appendix E, Table 7-1 presents the concentrations of potentially carcinogenic PAHs in each discrete surface soil sample submitted for analysis of PAHs. This table also provides the TEFs and the resulting total BaP equivalent concentration for each sample. In Appendix E, Table 7-1, the total BaP equivalent concentrations are compared to risk-based screening levels for BaP for direct contact exposures to soil (i.e., incidental ingestion, dermal contact and inhalation of constituents emitted from soil to the air). The risk-based screening level for residential exposures to BaP in soil is 15 µg/kg, as discussed in Section 3. This value comes from the USEPA Regional Screening Level tables and corresponds to a risk level of 10^{-6}. As discussed in Section 3, a risk level of 10^{-4} is used as the point of departure for evaluating total cancer risks in this assessment. Consequently, a residential risk-based screening level corresponding to a risk level of 10^{-4}, 1,500 µg/kg, was used to evaluate the total BaP equivalent concentrations in Appendix E, Table 7-1. Of the 25 samples (23 original samples and 2 field duplicates), 3 had total BaP equivalent concentrations that exceeded the residential risk-based screening level of 1,500 µg/kg. To evaluate future nonresidential uses of the site, Appendix E, Table 7-1 presents a comparison of the total BaP equivalent concentrations to the non-residential risk-based screening level of 21,000 µg/kg (corresponding to a risk level of 10^{-4}). None of the 25 samples had total BaP equivalent concentrations that exceeded the non-residential risk-based screening level of 21,000 µg/kg.

The BAP equivalents exceeded the residential risk-based screening level at three locations for the discrete surface soil samples. The BAP equivalents are illustrated on Figure 7-2. The presence of clay target remains were observed and the locations were noted in the boring logs. Sampling locations where clay targets were present are highlighted. At three soil sample locations where clay target remains were present, BAPs exceeded the 1,500 µg/kg screening criteria and are color coded red. Sampling locations where clay targets were present but the BAP equivalent residential risk-based screening level was not exceeded are highlighted green. BAP equivalent residential risk-based screening levels were not exceeded at soil sample locations where clay target remains were not present.

Lead was the primary COC for the investigation and all the screening data were based on XRF lead results. Approximately 20 percent of the XRF screened data were shipped to a FBL for lead analysis, along with other parameters determined on a site by site basis. The XRF and FBL data were plotted on Figure 7-3 using the direct contact residential soil screening value of 400 mg/kg. The values are color coded green for less than 400 mg/kg, yellow for 400 to 800 mg/kg, and red for greater than 800 mg/kg. FBL data superceded XRF data when present. The correlation between the XRF and FBL values was not statistically acceptable; subsequently, predicted lab values were not computed. Figure 7-3 shows

three soil sample that exceeded 400 mg/kg. Two of these soil samples, SB-83 and SB-84, only slightly exceeded 400 mg/kg, at concentrations of 407 and 409 mg/kg, respectively. These are XRF values and statistically could be discounted because of the slight exceedance and because of the higher comparison value for XRF versus FBL at this site. The Human Health Risk Screening Evaluation is discussed in Section 7.5.

Ecological screening values were 11 mg/kg for wildlife exposure to lead in soil, 120 mg/kg for plant exposure to lead in soil, and 1,700 mg/kg for soil invertebrates exposure to lead in soil. There were some exceedances of the 120 mg/kg for plant exposure, randomly distributed across the site. There were no exceedances of the 1,700 mg/kg for soil invertebrates. The Eco Screening levels for lead in soil are illustrated on Figure 7-4. The Ecological Risk Screening Evaluation is discussed in Section 7.6.

7.4 DATA QUALITY REVIEW/USABILITY

7.4.1 Data Quality Review of Samples at Rum Point Skeet Range

This section summarizes the results of the data review processes used to determine whether analytical laboratory data collected during the sampling field effort for the Rum Point Skeet Range were of acceptable quality for use in decision-making. DQOs presented in the Munitions Response Program Site Inspections at Five Small Arms/Skeet Ranges QAPP (April 2009) were maintained through the course of the sampling event. The Worksheets #19 and #15 of the QAPP present the analytical methods and compounds analyzed.

7.4.1.1 Data Validation Results

Appendix D, Table 1 presents all the qualified data and the reason for the data qualification. The rejection of data was not necessary for samples collected at the Rum Point Skeet Range and all data are considered valid for their intended purpose.

7.4.1.2 Data Quality Review

Some of the DQIs are generated from analysis of field samples (e.g., field duplicates) and some are generated from the analysis of laboratory samples (e.g., laboratory duplicates). Individually, field and laboratory DQIs provide measures of the performance of the respective investigative operations (field or laboratory). If individual QC results were acceptable, there was no assignment of validation flags to an analytical result; otherwise, there was assignment of a flag indicating the type of QC deficiency to the result.

7.4.1.3 Completeness

The sample collection and laboratory analytical completeness were 100%.

7.4.1.4 Sensitivity

The project quantitation limit goals (PQLGs) are listed in Worksheet #15 in the QAPP (April 2009). Analytical sensitivity was generally satisfactory to meet DQOs presented in the QAPP. However, at the inception of the project, the laboratory could not meet several of the PQLGs. Worksheet #15 highlights the exceedances of the PQLGs.

The amount of sample volume collected also affects the ability of the laboratory to achieve the desired PQLGs. Laboratory or field blank contamination can also elevate a result above the PQLGs, resulting in samples being qualified as non-detected. There are instances where the non-detected sample results exceed the PQLGs either because of the laboratory's inability to meet the PQLG or because of elevated detection limits because of blank contamination. Because of the large quantity of data collected and the limited number of individual chemicals driving risk, the elevated detection limits should have a negligible impact on the assessment of risk and as impact or presence/absence determinations.

7.4.1.5 Accuracy

Appendix D, Table 1 shows that several results were qualified because of matrix spike, LCS, surrogate, holding time, or calibration noncompliances. The noncompliances in general do not show any directional bias with the data except for the following cases. Antimony had matrix spike and LCS recoveries less than the laboratory quality control limit but greater than 30% indicating a slight low bias. Copper and cation exchange capacity had high matrix spike recoveries indicating a slight high bias. Several PAHs affecting several samples had low matrix spike, LCS, or surrogate recoveries resulting in a low bias. Overall, the laboratory accuracy was acceptable and no data were rejected. There were no quality control deficencies noted for field accuracy.

7.4.1.6 Field and Laboratory Precision

Field duplicate imprecision resulted in the qualification of several antimony, lead, and several PAH results. Despite the data qualifications the data are acceptable for use in risk assessment. Laboratory duplicate precision was acceptable.

7.4.1.7 Comparability

No comparability issues were noted during the data validation process.

7.4.1.8 Representativeness

The QAPP (April 2009) and the use of standardized sampling, sample handling, sample analysis, and data reporting procedures were designed so that the final data would be accurate representations of actual site conditions. Based on field logs indicating the conditions during sample collection and laboratory audits all reported data are adequately representative of site conditions and intended populations.

7.5 HUMAN HEALTH RISK SCREENING EVALUATION

The purpose of the human health risk screening evaluation is to conservatively estimate risks posed to potential human receptors from chemicals present at the Rum Point Skeet Range. The human health risk screening followed the steps described in Section 3.3, which presented the general methodology for the human health risk screening. These steps are:

- Identification of COPCs
- Exposure Assessment
- Risk Characterization
- Uncertainty Analysis

7.5.1 Identification of Chemicals of Potential Concern

Human health COPCs in soil were identified with the following considerations:

- Occurrence and distribution of chemicals in the environmental media
- Chemical toxicity
- Occurrence of chemical in background samples

Soil samples in the Rum Point Skeet Range were divided into two areas of interest for the risk screening evaluation:

- Composite surface soil samples collected from the firing lines
- Discrete surface soil samples

A soil sample was classified as a surface sample if its sampling interval begins at the surface.

Using the methodology described in Section 3.3, the maximum concentration of each chemical in soil in each area of interest was compared to up to four risk-based screening levels: two risk-based screening levels based on direct contact exposures to soil and two based on protection of groundwater. If the maximum concentration exceeded any of the risk-based screening levels, the chemical was classified as a possible COPC. These chemicals were subjected to a comparison to background soil data to determine if the soil concentrations in the area of interest are consistent with background soil concentrations. Section 3.3 presents the approach used to determine if the chemicals are present in soil at concentrations consistent with background concentrations. Because the background evaluation is used in both the human health and ecological risk screening, the background evaluation is presented in Appendix G. For chemicals identified as possible COPCs, TtNUS retained the chemical as a COPC for the human health risk screening only if the chemical was present in soil in the area of interest at concentrations above background.

7.5.1.1 Composite Surface Soil Samples

Appendix E, Table 7-1 presents the results of the evaluation of composite surface soil samples. TtNUS identified the following chemical as a human health COPC in the composite surface soil samples:

- Antimony

7.5.1.2 Discrete Surface Soil Samples

Appendix E, Table 7-2 presents the results of the evaluation of discrete surface soil samples. TtNUS identified the following chemicals as human health COPCs in the discrete surface soil samples:

- Lead
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Chrysene
- Dibenzo(a,h)anthracene
- Naphthalene

7.5.2 Exposure Assessment

This section presents the exposure assessment for the Rum Point Skeet Range. This site was a skeet and trap range operated by the Potomac River Gun Club from 1991 to 2001, but the site currently is not used. Portions of the range are grass covered and the remainder is forested or wetland. The wetland is along the western part of the range and water in the wetland eventually drains through an unnamed tributary to Mattawoman Creek to the north. The range has a building on it that the Potomac River Gun Club used as their headquarters.

A locked gate at the east end of Skeet Range Way limits access to the range; however, the Rum Point Skeet Range is not within the Stump Neck secured perimeter fence. Hunting is permitted on the range. The existing building has water supplied to it. There is a drinking water well located about 1200 feet north of the site on Rum Point. This well is screened from 231 to 246 feet below mean sea level in the Patapsco aquifer. As noted above, the site currently is not used. Future use of the range is not specified at this time. The presence of wetlands and a high water table could restrict or limit future development efforts on parts of the range.

Under the current and possible future land use patterns for this site, potential human receptors include authorized Navy personnel (military and civilian), visitors, contractors, maintenance workers, recreational users, and trespassers.

In the human health risk screening evaluation, TtNUS analyzed direct contact exposures to surface soil (incidental ingestion of soil, dermal contact with soil, inhalation of chemicals volatilized from soil into outdoor air and inhalation of chemicals in soil emitted into the air as particulates). TtNUS also analyzed the potential for COPCs in soil to leach into groundwater and adversely affect groundwater quality.

TtNUS used the maximum detected concentrations of the COPCs in soil (see Appendix E, Tables 7-1 and 7-2) as the EPCs in the risk characterization.

7.5.3 Risk Characterization

This section presents the risk characterization for the Rum Point Skeet Range. The risk characterization involved:

- Calculating risks and hazard indices for direct contact exposures to soil.
- Evaluating direct contact exposures to lead in soil.
- Evaluating the potential for chemicals to leach from soil to groundwater and affect groundwater quality (the soil to groundwater pathway).

7.5.3.1 Evaluation of Direct Contact Exposures to Soil

As discussed previously, TtNUS identified COPCs for the human health risk screening evaluation for the composite and discrete surface soil samples. Using the procedures presented in Section 3.3, risks and hazard indices were calculated for direct contact exposures to these soils. TtNUS also evaluated direct contact exposures to lead in discrete surface soil samples.

7.5.3.1.1 Composite Surface Soil Samples

Appendix E, Table 7-3 presents the hazard indices for direct contact exposures to antimony, the only COPC for the composite surface soil samples. Antimony is not considered to be potentially carcinogenic, so cancer risks were not calculated. Appendix E, Table 7-3 presents hazard indices for both residential and non-residential exposures. For residential exposures, the calculated hazard index is 0.014, which is well below USEPA's acceptable hazard index of 1. For non-residential exposures, the calculated hazard index is 0.001, which is also well below USEPA's acceptable hazard index of 1.

7.5.3.1.2 Discrete Surface Soil Samples

Appendix E, Table 7-4 presents the calculated risks and hazard indices for residential and non-residential direct contact exposures to COPCs in the discrete surface soil samples. For residential exposures, the total calculated risk is 2.7×10^{-4}, which exceeds USEPA's acceptable risk level of 10^{-4}. This risk was calculated using the maximum detected concentration, which is conservative. Using the average concentration (not the 95% upper confidence limit on the mean or the 95% UCL), the risk is 4.7×10^{-5} which is below USEPA's acceptable risk level of 10^{-4}. The calculation using the average is presented for context. USEPA recommends using the 95% UCL not the average in risk calculations. The 95% UCL is an upper-bound estimate of the average, and is consequently, greater than the average. These risks are as a result of PAHs in soil samples, principally benzo(a)pyrene. The PAHs are believed to be associated with the fragments of the clay pigeons used as targets on the rifle range. A pitch tar containing PAHs was used in the manufacture of the clay pigeons to help bind the clay particles. The calculated hazard index is 0.000048, which is well below USEPA's acceptable hazard index of 1.

For non-residential exposures, the total calculated risk using the maximum detected concentration is $1.9x10^{-5}$, which is below USEPA's acceptable risk level of 10^{-4}. Using the average concentration, the risk is $3.4x10^{-6}$, which is also below USEPA's acceptable risk level of 10^{-4}. As discussed above, the calculation using the average is presented for context. The calculated hazard index is 0.000011, which is well below USEPA's acceptable hazard index of 1.

Appendix E, Table 7-5 presents the comparison of the maximum lead concentration in the discrete surface soil samples to residential and non-residential risk-based concentrations. The maximum concentration of 616 mg/kg exceeded the residential direct contact risk-based concentration of 400 mg/kg, but not the non-residential direct contact risk-based concentration of 800 mg/kg. Of the 20 samples collected for lead analysis at an analytical laboratory, only the sample with the maximum concentration exceeded the residential direct contact risk-based concentration of 400 mg/kg.

7.5.3.2 Evaluation of the Soil to Groundwater Pathway

Using the procedures presented in Section 3.3, TtNUS evaluated the soil to groundwater pathway for COPCs in composite surface soil samples and discrete surface soil samples.

7.5.3.2.1 Composite Surface Soil Samples

Appendix E, Table 7-6 presents the comparison of the maximum detected concentration and average concentration to the risk-based concentrations in soil for protection of groundwater. This table presents risk-based concentrations for dilution-attenuation factors of 1 (the conservative default value) and 20. The maximum concentration of antimony in soil is below the risk-based concentrations using the tap water RSL for both dilution-attenuation factors. The maximum concentration of antimony in soil exceeds the risk-based concentrations using the MCL for the dilution-attenuation factor of 1, but not 20. This exceedance is slight since the maximum detected concentration is 0.42 mg/kg as compared to the MCL-derived risk-based concentration of 0.27 mg/kg. Groundwater from the Rum Point Skeet Range is not used as a source of drinking water, so the pathway is currently incomplete.

7.5.3.2.2 Discrete Surface Soil Samples

Appendix E, Table 7-7 presents the comparison of the maximum detected concentrations and average concentrations to the risk-based concentrations in soil for protection of groundwater for dilution-attenuation factors of 1 and 20. The maximum concentrations of a number of PAHs exceed risk-based concentrations for dilution-attenuation factors of both 1 and 20. While all PAHs have relatively low solubility in water, naphthalene, which is the most soluble of the PAHs listed in Appendix E Table 7-7, is

readily biodegradable, so if naphthalene leaches from soil into groundwater, there is a good chance that some or all of this chemical will degrade in groundwater. The remaining PAHs in Appendix E Table 7-7 all have very low solubility in water. These PAHs have much higher affinity for soil solids (particularly soil organic carbon) over soil water. It could take a long time (years to decades) for these PAHs to leach through the soil and reach groundwater. These PAHs are also susceptible to biodegradation, and even a low rate of biodegradation could remove the chemicals from the leachate before it reaches the groundwater. Also, as noted above, groundwater from the Rum Point Skeet Range is not used as a source of drinking water, so the pathway is currently incomplete.

7.5.4 Uncertainty Analysis

Section 3.3.4 provides a detailed discussion of the sources of uncertainty in the human health risk screening evaluation.

7.5.5 Human Health Risk Screening Evaluation Summary

In the human health risk screening evaluation, soil and sediment data for the Rum Point Skeet Range was evaluated. The soil samples for this site was divided into two areas of interest for the risk screening evaluation:

- Composite surface soil samples collected from the firing lines
- Discrete surface soil samples

For the composite surface soil samples collected from the firing lines, antimony was selected as the only COPC for the human health risk screening evaluation. Antimony is not considered to be carcinogenic, so in the evaluation of direct contact exposures to soil in the firing lines, only hazard indices were calculated. The calculated hazard indices for residential and nonresidential land uses were below the USEPA target level of 1. In the evaluation of the soil to groundwater pathway, the maximum concentration of antimony in soil was below the risk-based concentrations using the tap water RSL for both dilution-attenuation factors, but exceeded the risk-based concentrations using the MCL for the dilution-attenuation factor of 1, but not 20. This exceedance was slight since the maximum detected concentration is 0.42 mg/kg as compared to the MCL-derived risk-based concentration of 0.27 mg/kg. Groundwater from the Rum Point Skeet Range is not used as a source of drinking water, so the groundwater use pathway is currently incomplete.

For the discrete surface soil samples, antimony, lead and a number of PAHs were selected as COPCs for the human health risk screening evaluation. Using the maximum detected concentrations in soil, the

calculated risks for direct contact exposures for residential land uses exceeded the USEPA target level of 10^{-4}, but the calculated risks for direct contact exposures for non-residential land uses were below the USEPA target level. The calculated hazard indices for residential and non-residential land uses were well below the USEPA target level of 1. The elevated risks were a result of the presence of potentially carcinogenic PAHs in soil, and these PAHs are believed to be associated with the fragments of the clay pigeons used as targets on the skeet range. In the evaluation of direct contact exposures to lead in soil, one sample out of 20 had a lead concentration (616 mg/kg) exceeding the residential direct contact risk-based concentration of 400 mg/kg. This concentration of 616 mg/kg is below the non-residential direct contact risk-based concentration of 800 mg/kg.

The maximum concentrations of a number of PAHs exceeded risk-based concentrations for dilution-attenuation factors of both 1 and 20. All PAHs have relatively low solubility in water, but naphthalene, which is the most water soluble of the COPCs, is readily biodegradable, so if naphthalene leaches from soil into groundwater, there is a good chance that some or all of these chemicals will degrade in groundwater. The PAHs with very low solubility in water have much higher affinity for soil solids over soil water. It could take a long time (years to decades) for these PAHs to leach through the soil and reach groundwater. The PAHs with very low solubility are also susceptible to biodegradation and even a low rate of biodegradation could remove the chemicals from the leachate before it reaches the groundwater. As noted above, groundwater from the Rum Point Skeet Range is not used as a source of drinking water, so the pathway is currently incomplete.

7.6 ECOLOGICAL RISK SCREENING EVALUATION

7.6.1 Site Description

Section 7.1 presents a detailed description of the site location, history, and background of the site.

7.6.2 Potential Ecological Receptors and Exposure Pathways

The contaminated media to which ecological receptors may be exposed include surface soil. These potential ecological receptors and exposure pathways are described in detail in Section 3.4.1.1.

7.6.3 Ecological Screening

The first part of the evaluation is selection of COPCs.

7.6.3.1 COPCs for Terrestrial Invertebrates and Plants

Appendix F, Tables 7-6.3.1 and 7-6.3.2 present the chemicals that were retained as COPCs in surface soil for potential risks to plants and invertebrates for grab samples and the composite samples, respectively. These tables also present the chemicals that were retained for food chain modeling for mammals and birds (discussed further in Section 7.6.3.2).

Terrestrial Invertebrates

No chemicals were selected as COPCs for terrestrial invertebrates in the grab and composite samples.

Terrestrial Plants

Twelve PAHs and lead were selected as COPCs for terrestrial plants in surface soil from grab samples because they were detected at concentrations that exceeded screening levels. Two PAHs were selected as COPCs for terrestrial plants in surface soil from grab samples because they did not have screening levels. Two PAHs were selected as COPCs for terrestrial plants in composite soil samples because they were detected at concentrations that exceeded screening levels. One PAH was selected as a COPC for terrestrial plants in composite soil samples because it did not have a screening level.

7.6.3.2 COPCs for Mammals and Birds

Appendix F, Tables 7-6.3.1 and 7-6.3.2 present the chemicals that were retained for food chain modeling for terrestrial mammals and birds because they were detected at concentrations above screening levels or did not have screening levels for mammals or birds.

Tables 7-6.3.3 and 7-6.3.4 summarize the results of the conservative inputs food chain modeling for terrestrial receptors. Appendix F presents the calculation worksheets. The following summarizes the results of the food chain modeling using maximum concentrations and conservative input parameters:

- Antimony, lead, and chrysene had EEQs greater than 1.0 in the food chain model for surface soil from grab samples.
- Lead had EEQs greater than 1.0 in the food chain model for the composite soil.
- Avian TRVs were not available for antimony.

COPCs were only discussed if there were risks from the less conservative model in step 3A.

7.6.4 Step 3A Refinement

Step 3a consists of a refinement of the conservative exposure assumptions/concentrations to evaluate the potential risks to ecological receptors (i.e., plants, invertebrates, and wildlife receptors). The objective of the Step 3a refinement is to better define those chemicals that contribute to potentially unacceptable levels of ecological risk, and to identify and eliminate from further consideration those COPCs that were retained because of the use of very conservative exposure scenarios. The Step 3a evaluation is designed to eliminate chemicals from further evaluation for certain groups of receptors. For example, a chemical may be eliminated as a COPC in soil based on risks to soil invertebrates and plants, but may be retained for evaluating risks to wildlife.

7.6.4.1 Terrestrial Plants and Invertebrates

Terrestrial Invertebrates

No chemicals were retained as COPCs for terrestrial invertebrates in the grab and composite samples.

Terrestrial Plants

Lead was retained as a COPC for terrestrial plants in surface soil from grab samples because it was detected at concentrations that exceeded screening levels in several samples. PAHs were initially selected as COPCs for terrestrial plants in grab samples and composite soil samples because they were detected at concentrations that exceeded screening levels or screening levels were not available. Maximum concentrations of several PAHs in the grab samples exceeded maximum background concentrations. Concentrations of PAHs in composite soil were less than background concentrations; however, background concentrations were not available for all PAHs. An Eco SSL is not available for plants. However, data presented on Table 3.1 in the Eco SSL document for PAHs shows that PAHs are typically not toxic to plants except at high soil concentrations with the lowest listed EC_{50} of 30 mg/kg (Mitchell et al. 1988). Also, in Appendix III of the Canadian SQG document for benzo(a)pyrene (EC, 1999), a NOEC of 4,400 mg/kg was the lowest reported NOEC value for plants and was based on seedling emergence after 3 days of exposure. Therefore, risks to plants are acceptable, and PAHs are not retained as COPCs for risks to plants.

7.6.4.2 Mammals and Birds

The EEQs from the terrestrial food chain modeling were greater than 1.0 for several chemicals using maximum chemical concentrations and conservative exposure assumptions (see Section 7.6.3.2).

Therefore, as part of the Step 3a refinement, risks for this pathway were recalculated using average chemical concentrations in surface soil and sediment and less conservative exposure assumptions (i.e., average ingestion rates, average body weights) (see Appendix F, Table 3.4-3).

Tables 7-6.3.5 and 7-6.3.6 summarize the results of the less conservative inputs food chain modeling for terrestrial receptors. Appendix F presents the calculation worksheets. A discussion of the risks to mammal and birds are presented below.

Terrestrial Receptors

- Lead in the grab samples had EEQs greater than 1.0 using the NOAEL as the TRV, but EEQs are less than 1.0 using the LOAEL as the TRV. Maximum concentrations of lead in grab samples exceeded the maximum background concentrations. Because lead is related to site activities, it is retained as a COPC.

- Lead in the composite samples had EEQs greater than 1.0 using the NOAEL as the TRV, but EEQs are less than 1.0 using the LOAEL as the TRV. Maximum concentrations of lead in composite samples were less than the maximum background concentrations; therefore, lead was eliminated as a COPC for composite soil.

7.6.5 Ecological Risk Screening Summary

This section presents a summary of the conclusions of the ecological risk assessment that was conducted for the site.

7.6.5.1 Risks to Terrestrial Plants and Invertebrates

Lead was retained as a COPC for terrestrial plants in surface soil from grab samples because it was detected at concentrations that exceeded its screening level in several samples.

7.6.5.2 Mammals and Birds

Lead was retained as a COPC for terrestrial wildlife in grab samples because it had EEQs greater than 1.0 in the food chain model and is related to site activities.

7.7 UPDATED CSM

Only MC associated with the Rum Point Skeet Range are considered in the CSM exposure pathway analysis. A general description of the CSM exposure pathway analysis was included in Section 10.4.7 of the SAP as follows: "Contaminants at Rum Point Skeet Range may potentially migrate in soil, groundwater, surface water, and sediment. Direct human or biota contact with surficial and subsurface soil is possible if the soil is disturbed. The Rum Point Skeet Range's unnamed tributaries, wetlands, and proximity to Mattawoman Creek provide possible migration routes to surface water. The majority of the range area is sloped toward the wetland area and Mattawoman Creek. Storm water discharges to surface water via overland flow. Groundwater in the shallow water table aquifer also likely flows towards Mattawoman Creek; therefore, MC leaching from soil into shallow groundwater may migrate to surface water. Sediments can act as contaminant repositories, and sediment mixing and dredging can act as migration routes to surface water. MC in surface soil and sediment may migrate via plant/animal uptake. Based on a review of hydrogeological data, it is unlikely that MC in shallow groundwater would migrate to the deeper aquifers used as water supplies. However, shallow groundwater is still considered a potential exposure medium. Potential human receptors include authorized Navy personnel (military and civilian), visitors, contractors, maintenance workers, recreational users, and trespassers. Plant and animal biota are also potential receptors. Examples of ecological receptors include deer, wild turkey, and waterfowl."

Human Health Risk Exposure Summary

The human health CSM summary table is presented as Table 7-5.

In the human health risk screening evaluation, TtNUS evaluated soil data for the Rum Point Skeet Range. TtNUS divided the soil samples for this site into two areas of interest for the risk screening evaluation:

- Composite surface soil samples collected from the firing lines
- Discrete surface soil samples

For the composite surface soil samples collected from the firing lines, antimony was selected as the only COPC for the human health risk screening evaluation. Antimony is not considered to be carcinogenic, so in the evaluation of direct contact exposures to soil in the firing lines, only hazard indices were calculated. The calculated hazard indices for residential and nonresidential land uses were below the USEPA target level of 1. In the evaluation of the soil to groundwater pathway, the maximum concentration of antimony in soil was below the risk-based concentrations using the tap water RSL for both dilution-attenuation factors, but exceeded the risk-based concentrations using the MCL for the dilution-attenuation factor of 1,

but not 20. This exceedance was slight since the maximum detected concentration is 0.42 mg/kg as compared to the MCL-derived risk-based concentration of 0.27 mg/kg. Groundwater from the Rum Point Skeet Range is not used as a source of drinking water, so the groundwater use pathway is currently incomplete.

For the discrete surface soil samples, antimony, lead and a number of PAHs were selected as COPCs for the human health risk screening evaluation. Using the maximum detected concentrations in soil, the calculated risks for direct contact exposures for residential land uses exceeded the USEPA target level of 10^{-4}, but the calculated risks for direct contact exposures for non-residential land uses were below the USEPA target level. The calculated hazard indices for residential and non-residential land uses were well below the USEPA target level of 1. The elevated risks were a result of the presence of potentially carcinogenic PAHs in soil and these PAHs are believed to be associated with the fragments of the clay pigeons used as targets on the skeet range. In the evaluation of direct contact exposures to lead in soil, one sample out of 20 had a lead concentration (616 mg/kg) exceeding the residential direct contact risk-based concentration of 400 mg/kg. This concentration of 616 mg/kg is below the non-residential direct contact risk-based concentration of 800 mg/kg.

The maximum concentrations of a number of PAHs exceeded risk-based concentrations for dilution-attenuation factors of both 1 and 20. All PAHs have relatively low solubility in water, but naphthalene, which is the most water soluble of the COPCs, is readily biodegradable, so if naphthalene leaches from soil into groundwater, there is a good chance that some or all of these chemicals will degrade in groundwater. The PAHs with very low solubility in water have much higher affinity for soil solids over soil water. It could take a long time (years to decades) for these PAHs to leach through the soil and reach groundwater. The PAHs with very low solubility are also susceptible to biodegradation and even a low rate of biodegradation could remove the chemicals from the leachate before it reaches the groundwater. As noted above, groundwater from the Rum Point Skeet Range is not used as a source of drinking water, so the pathway is currently incomplete.

Ecological Risk Exposure Summary:

The Ecological CSM summary table is presented as Table 7-6.

This section presents a summary of the conclusions of the ecological risk assessment that was conducted for the site.

Risks to Terrestrial Plants and Invertebrates

Lead was retained as a COPC for terrestrial plants in surface soil from grab samples because it was detected at concentrations that exceeded its screening level in several samples.

Mammals and Birds

Lead was retained as a COPC for terrestrial wildlife in grab samples because it had EEQs greater than 1.0 in the food chain model and is related to site activities.

CSM Summary

The updated CSM is shown on Figure 7-5 and details the potential exposure sources, pathways, and receptors. The exposure sources appear to be limited to the areas of lead shot accumulation and the presence of clay target fragments. One pathway is runoff from precipitation. Leaching from soil into groundwater has been eliminated as a pathway, since groundwater is not used as the site. Receptors would be trespassers and ecological receptors by ingestion, dermal contact, and inhalation of surface soil, soil, and sediment. Potentially complete exposure pathways exist for both human and ecological receptors under both current and hypothetical future land uses.

7.8 CONCLUSIONS

- Much of the area within the boundary of the range drains to the west via a shallow surface depression that conveys surface water and sediment into a wetland and unnamed tributaries that discharge into Mattawoman Creek.

- MC consisting of metals (primarily lead, and to a lesser extent, antimony) and PAHs (from pitch tar used in the clay pigeon targets, Figure 7-2) are present in site soil [particularly surface soil (the 0-to 1 foot bgs interval)] as a result of military training activities. Lead is assumed to be the primary metal MC of concern in soil because it is the primary constituent of the spent munitions and because of its documented toxicity to human and ecological receptors. These constituents may have also migrated to adjoining surface water and sediment via surface soil run off or the discharge of contaminated shallow groundwater to the surface water of the adjoining tributaries, wetland, and Mattawoman Creek. One elevated concentration of antimony, three elevated concentrations of lead, and three elevated concentrations of PAHs were present onsite (Figure 7-1).

- MC in surface soil may have migrated to subsurface soil and subsequently to underlying groundwater via leaching. These constituents may have also migrated to adjoining surface water and sediment via surface soil run-off or the discharge of contaminated shallow groundwater to the Mattawoman Creek and direct fallout over the river. The extent of potential environmental contamination at the site appears to be limited to immediately to the right of the Right Firing Point (PAHs) and the northwest of the Left Firing Point (lead).

- The CSM (Figure 7-5) indicates that potentially complete exposure pathways exist for both human and ecological receptors under both current and hypothetical future land uses. Potential human and ecological risks have been characterized for receptors exposed to the potentially contaminated environmental media. Unacceptable levels of human and/or ecological risk may exist. However, groundwater is not currently used at the site.

- Antimony was evaluated to be below the background levels for the discrete soil samples. Antimony was slightly above the PAL for the composite sample at the west firing line. Lead exceeded the direct contact residential soil screening value at three discrete surface soil sampling locations. The BAP equivalents exceeded the residential risk-based screening level at three locations for the discrete surface soil samples.

7.8.1 Data Gaps

There were no data gaps.

7.9 RECOMMENDATIONS FOR NEXT PHASE

Based on the results of the SI, further actions are required. These subsequent actions may include a RI for the Rum Point Skeet Range that will meet CERCLA requirements. RI activities should include an interim remedial action to address the limited known areas of surface lead and PAH contamination, the limited removal of lead-contaminated soils and PAH–contaminated soils, or the localized chemical stabilization of lead in soil to reduce the potential threat of lead releases to the environment.

7.9.1 Objectives for Interim Removal Action, Remedial Investigation, or No Further Action Determination

Specific tasks recommended as part of the RI MC investigation include the following:

- Removal of shallow soils in areas with elevated concentration of PAHs and metals. Figure 7-6 illustrates the proposed soil removal areas. Soil is proposed to be excavated to a depth of 2 feet bgs in the area of the clay targets, because of the high exceedances of PAHs. Soil in the areas of lead shot accumulations are proposed to be excavated to a depth of 1 foot bgs. The total amount of soil to be removed is estimated at approximately 503 cubic yards (yd^3). The excavation totals are calculated below:

Location	Dimensions: length x depth x width (ft)	Cubic Feet (ft^3)	Cubic Yards (yd^3)
Right Firing Point	100 x 65 x 2	13,000	480
Left Firing Point	25 x 25 x 1	625	23
Total Proposed Soil Removal	NA	13,625	503

- Confirmation soil sampling should be performed in the excavation areas in one of these scenarios:

1. MIS.
2. Four corners and middle of excavation.
3. Resample at same locations where there were exceedances, but at depths below the excavated material.

In each of these scenarios, the depth sampled at would be at 1 to 2 bgs (pre-excavation depth) in the lead shot excavation accumulation areas, and at 2 to 3 feet bgs (pre-excavation depth) at the clay target excavation area.

TABLE 7-1

MUNITION TYPES AND CHEMICALS
RUM POINT SKEET RANGE (RPSR) - UXO 16
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

MUNITIONS TYPES USED/STORED AT THE FACILITY

.410 gauge shells
28 gauge shells
20 gauge shells
12 gauge shells
5 pound containers of bulk smokeless powder
shot

ASSOCIATED CHEMICAL CONSTITUENTS

Primary:
Lead
PAHs
Nitroglycerin

Secondary:
Antimony
Arsenic
Copper
Nickel
Zinc
Lead Styphnate
Lead Azide

TABLE 7-2a

RUM POINT SKEET RANGE
DISCRETE SURFACE SOIL
BACKGROUND COMPARISON
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Chemical	Site Maximum Detected Concentration	Background Maximum Detected Concentration	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion Site Above Background?	Site Distribution	Background Distribution	Test	Equal Variance?[1]	Test Statistic	P-Value	Quantile Test	Slippage Test	Site Above Background?
Inorganics(mg/kg)																
ANTIMONY	1.6	ND	12/20	0/33	12/53	90	NO									NO
ARSENIC	6.5	18.3	18/20	30/34	48/54	10	SIMILAR		LOGNORMAL	GEHAN		-2.282	0.0112	PASS	PASS	NO
LEAD	616	149	20/20	32/34	52/54	6	YES									YES
1-METHYLNAPHTHALENE	16	ND	6/21	0/23	6/44	86	NO[3]									NO
ANTHRACENE	110	260	15/21	1/23	16/44	64	NO[3]									NO
BENZO(A)ANTHRACENE	2400	480	20/21	1/23	21/44	52	YES[3]									YES
BENO(A)PYRENE	3200	390	18/21	1/23	19/44	57	YES[3]									YES
BENZO(B)FLUORANTHENE	1000	420	18/21	1/23	19/44	57	YES[3]									YES
BENZO(G,H,I)PERYLENE	1500	130	18/21	1/23	19/44	57	YES[3]									YES
BENZO(K)FLUORANTHENE	200	360	14/21	1/23	15/44	34	NO[3]									NO
CHRYSENE	3000	440	21/21	1/23	22/44	50	YES[3]									YES
DIBENZO(A,H)ANTHRACENE	540	ND	15/21	0/23	15/44	66	YES[3]									YES
FLUORANTHENE	210	1100	19/21	2/23	21/44	52	NO[3]									NO
INDENO(1,2,3-CD)PYRENE	260	100	20/21	1/23	21/44	52	NO[3]									NO
PHENANTHRENE	620	1100	16/21	1/23	17/44	61	NO[3]									NO
PYRENE	2000	880	20/21	2/23	22/44	5	YES[3]									YES

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE 7-2b

RUM POINT SKEET RANGE
COMPOSITE SURFACE SOIL
BACKGROUND COMPARISON
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Chemical	Site FOD	Background FOD	Site Maximum	Background Maximum	Background UPL		Site Exceed Background?
Inorganics(mg/kg)							
Antimony	2/2	0/33	0.42	ND	ND		YES
Arsenic	2/2	30/34	4.2	18.3	9.7	95%KM(t)UPL	NO
Lead	2/2	32/34	48.7	149	59.44	95%KM(t)UPL	NO
Benzo(a)anthracene	2/2	1/23	94	480	NA[1]		NO
Benzo(a)pyrene	2/2	1/23	100	390	NA[1]		NO
Chrysene	2/2	1/23	130	440	NA[1]		NO
Dibenzo(a,h)anthracer	2/2	0/23	18	42.8	ND		NO
Pyrene	2/2	1/23	110	880	NA[1]		NO

ND = All background concentrations are non-detect. Conclusion based off comparison of maximum site to maximum background.
1 Only 1 detected background concentration. Conclusion based off comparison of maximum site to maximum background.

TABLE 7-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 16
RUM POINT SKEET RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X16SB001		X16SB002		X16SB003		X16SB004		X16SB005		X16SB006		X16SB007	
nsample		**X16SS0010001**		**X16SS0020001**		**X16SS0030001**		**X16SS0040001**		**X16SS0050001**		**X16SS0060001**		**X16SS0070001**	
sample_dat		20090613		20090613		20090613		20090613		20090613		20090613		20090613	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27					**0.62**	**L**								
ARSENIC	9.7					4									
COPPER	100					6.9									
LEAD	400					13.5									
TIN	0.89					1.1	B								
ZINC	46					19.8									
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000			2.6	L										
2-METHYLNAPHTHALENE	31000			9.3	L										
ACENAPHTHENE	29000			23	UL										
ACENAPHTHYLENE	29000			23	UL										
ANTHRACENE	29000			32	L										
BENZO(A)ANTHRACENE	150			**630**											
BENZO(A)PYRENE	15			**630**											
BENZO(B)FLUORANTHENE	150			**200**	**L**										
BENZO(G,H,I)PERYLENE	1100			260	L										
BENZO(K)FLUORANTHENE	1100			40	L										
CHRYSENE	1100			770											
DIBENZO(A,H)ANTHRACENE	15			**120**	**L**										
FLUORANTHENE	29000			79	L										
FLUORENE	29000			4.2	L										
INDENO(1,2,3-CD)PYRENE	150			78	L										
NAPHTHALENE	330			23	UL										
PHENANTHRENE	29000			140	L										
PYRENE	1100			620											
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	19.667		16.333		17		75.667		20.333		16		75.333	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA					87									
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA			87											

TABLE 7-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 16
RUM POINT SKEET RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X16SB008		X16SB009		X16SB010		X16SB011		X16SB012		X16SB013		X16SB014	
nsample		**X16SS0080001**		**X16SS0090001**		**X16SS0100001**		**X16SS0110001**		**X16SS0120001**		**X16SS0130001**		**X16SS0140001**	
sample_dat		20090613		20090614		20090613		20090613		20090613		20090613		20090614	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	**1**	**L**									**0.55**	**L**		
ARSENIC	9.7	5.1										2			
COPPER	100	10.4	K									11.4	K		
LEAD	400	**616**										38.8			
TIN	0.89	1.9	B									1.2	B		
ZINC	46	30.9										34.9			
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000	23	U	23	UL							24	U	23	U
2-METHYLNAPHTHALENE	31000	23	UL	23	UL							24	U	23	U
ACENAPHTHENE	29000	23	UL	23	UL							24	U	23	U
ACENAPHTHYLENE	29000	23	U	23	UL							24	U	23	U
ANTHRACENE	29000	23	UL	23	UL							1.8	J	7.3	J
BENZO(A)ANTHRACENE	150	6	J	8.8	L							26		100	
BENZO(A)PYRENE	15	7.6	J	8.7	L							**38**		**120**	
BENZO(B)FLUORANTHENE	150	6	J	11	L							16	J	47	
BENZO(G,H,I)PERYLENE	1100	4.6	J	6.2	L							22	J	58	
BENZO(K)FLUORANTHENE	1100	23	U	23	UL							4.3	J	9	J
CHRYSENE	1100	10	J	14	L							41		120	
DIBENZO(A,H)ANTHRACENE	15	23	U	23	UL							6.4	J	**20**	**J**
FLUORANTHENE	29000	8.9	L	8	L							7.4	J	20	J
FLUORENE	29000	23	UL	23	UL							24	U	23	U
INDENO(1,2,3-CD)PYRENE	150	3.4	J	5.9	L							8.1	J	17	J
NAPHTHALENE	330	23	U	23	UL							24	U	23	U
PHENANTHRENE	29000	3.2	L	23	UL							5.3	J	31	
PYRENE	1100	6.1	J	9.5	L							26		110	
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	**975.333**		19.667		47.333		43.333		184.667		28		22	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA	31	K												
Miscellaneous Parameters (s.u.)															
PH	NA	4.7										7.9			
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA	38000										9700			
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	74										82			
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA	87		87								82		85	

TABLE 7-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 16
RUM POINT SKEET RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X16SB015		X16SB016		X16SB017		X16SB018		X16SB019		X16SB020		X16SB021	
nsample		**X16SS0150001**		**X16SS0160001**		**X16SS0170001**		**X16SS0180001**		**X16SS0190001**		**X16SS0200001**		**X16SS0210001**	
sample_dat		20090613		20090613		20090613		20090613		20090614		20090613		20090613	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27					**0.45**	**L**					0.22	L		
ARSENIC	9.7					4.6						1.9	B		
COPPER	100					7.4	K					5.5			
LEAD	400					51.4						51.9			
TIN	0.89					1.5	B					1	B		
ZINC	46					26.2						22			
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000									22	U				
2-METHYLNAPHTHALENE	31000									22	U				
ACENAPHTHENE	29000									22	U				
ACENAPHTHYLENE	29000									22	U				
ANTHRACENE	29000									10	J				
BENZO(A)ANTHRACENE	150									**170**					
BENZO(A)PYRENE	15									**220**					
BENZO(B)FLUORANTHENE	150									79					
BENZO(G,H,I)PERYLENE	1100									110					
BENZO(K)FLUORANTHENE	1100									13	J				
CHRYSENE	1100									210					
DIBENZO(A,H)ANTHRACENE	15									**42**					
FLUORANTHENE	29000									24					
FLUORENE	29000									22	U				
INDENO(1,2,3-CD)PYRENE	150									28					
NAPHTHALENE	330									22	U				
PHENANTHRENE	29000									37					
PYRENE	1100									150					
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	24		83.667		57.667		24.333		22		58		106	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA					82						87			
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA									89					

TABLE 7-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 16
RUM POINT SKEET RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X16SB022		X16SB023		X16SB023		X16SB023		X16SB024		X16SB025		X16SB026	
nsample		**X16SS0220001**		**X16SS0230001**		**X16SS0230001-AVG**		**X16SS0230001-D**		**X16SS0240001**		**X16SS0250001**		**X16SS0260001**	
sample_dat		20090613		20090613		20090613		20090613		20090613		20090613		20090613	
qc_type		NM		NM		NM		FD		NM		NM		NM	
sacode		NORMAL		ORIG		AVG		DUP		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27											0.73	B		
ARSENIC	9.7											4	J		
COPPER	100											8.8	J		
LEAD	400											159	J		
TIN	0.89											1.2	B		
ZINC	46											29.4	J		
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000			28	U	25.5	U	23	U					24	U
2-METHYLNAPHTHALENE	31000			28	UL	25.5	UL	23	UL					24	UL
ACENAPHTHENE	29000			28	UL	25.5	UL	23	UL					24	UL
ACENAPHTHYLENE	29000			28	U	25.5	U	23	U					24	U
ANTHRACENE	29000			12	L	12	L	23	UL					5.5	L
BENZO(A)ANTHRACENE	150			**210**	**J**	107.65	J	5.3	J					81	
BENZO(A)PYRENE	15			**240**	**J**	**123.8**	**J**	7.6	J					**110**	
BENZO(B)FLUORANTHENE	150			89	J	46.4	J	3.8	J					41	
BENZO(G,H,I)PERYLENE	1100			130	J	67.15	J	4.3	J					58	
BENZO(K)FLUORANTHENE	1100			13	J	13	J	23	U					6.6	J
CHRYSENE	1100			240	J	124.4	J	8.8	J					110	
DIBENZO(A,H)ANTHRACENE	15			**41**	**J**	**26.25**	**J**	23	UJ					**21**	**J**
FLUORANTHENE	29000			32	L	17.25	L	2.5	L					17	L
FLUORENE	29000			28	UL	25.5	UL	23	UL					24	UL
INDENO(1,2,3-CD)PYRENE	150			36		19.25	J	2.5	J					18	J
NAPHTHALENE	330			28	U	25.5	U	23	U					24	U
PHENANTHRENE	29000			40	L	25.75	L	23	UL					21	L
PYRENE	1100			160	J	82.3	J	4.6	J					71	
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	25		27.333		27.333				23		155.667		20.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA											85			
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA			72		80		88						83	

TABLE 7-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 16
RUM POINT SKEET RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X16SB027		X16SB028		X16SB029		X16SB030		X16SB031		X16SB032		X16SB032	
nsample		**X16SS0270001**		**X16SS0280001**		**X16SS0290001**		**X16SS0300001**		**X16SS0310001**		**X16SS0320001**		**X16SS0320001-AVG**	
sample_dat		20090613		20090613		20090613		20090613		20090613		20090613		20090613	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		ORIG		AVG	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27											0.14	B	0.14	B
ARSENIC	9.7											4		3.65	
COPPER	100											9.7		8.85	
LEAD	400											13.9		13.45	
TIN	0.89											1.2	B	1.25	B
ZINC	46											31.2		28.8	
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000									24	UL				
2-METHYLNAPHTHALENE	31000									6.4	L				
ACENAPHTHENE	29000									24	UL				
ACENAPHTHYLENE	29000									24	L				
ANTHRACENE	29000									19	L				
BENZO(A)ANTHRACENE	150									**300**	**L**				
BENZO(A)PYRENE	15									**420**					
BENZO(B)FLUORANTHENE	150									120	L				
BENZO(G,H,I)PERYLENE	1100									170	L				
BENZO(K)FLUORANTHENE	1100									20	L				
CHRYSENE	1100									390					
DIBENZO(A,H)ANTHRACENE	15									**58**	**L**				
FLUORANTHENE	29000									48	L				
FLUORENE	29000									24	UL				
INDENO(1,2,3-CD)PYRENE	150									43	L				
NAPHTHALENE	330									24	UL				
PHENANTHRENE	29000									89	L				
PYRENE	1100									280	L				
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	22		14		126		24		214.333		26.667		26.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA											87		86.5	
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA									83					

TABLE 7-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 16
RUM POINT SKEET RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X16SB032		X16SB033		X16SB034		X16SB035		X16SB036		X16SB037		X16SB037	
nsample		**X16SS0320001-D**		**X16SS0330001**		**X16SS0340001**		**X16SS0350001**		**X16SS0360001**		**X16SS0370001**		**X16SS0370001-AVG**	
sample_dat		20090613		20090613		20090613		20090613		20090613		20090613		20090613	
qc_type		FD		NM		NM		NM		NM		NM		NM	
sacode		DUP		NORMAL		NORMAL		NORMAL		NORMAL		ORIG		AVG	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	0.14	B												
ARSENIC	9.7	3.3													
COPPER	100	8													
LEAD	400	13													
TIN	0.89	1.3	B												
ZINC	46	26.4													
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000											22	U	22.5	U
2-METHYLNAPHTHALENE	31000											22	UL	22.5	UL
ACENAPHTHENE	29000											22	UL	22.5	UL
ACENAPHTHYLENE	29000											22	U	22.5	UL
ANTHRACENE	29000											22	UL	22.5	UL
BENZO(A)ANTHRACENE	150											22	U	22.5	U
BENZO(A)PYRENE	15											22	U	22.5	U
BENZO(B)FLUORANTHENE	150											22	U	22.5	U
BENZO(G,H,I)PERYLENE	1100											22	U	22.5	U
BENZO(K)FLUORANTHENE	1100											22	U	22.5	U
CHRYSENE	1100											22	U	3.3	J
DIBENZO(A,H)ANTHRACENE	15											22	U	22.5	U
FLUORANTHENE	29000											22	UL	22.5	UL
FLUORENE	29000											22	UL	22.5	UL
INDENO(1,2,3-CD)PYRENE	150											22	U	2.7	J
NAPHTHALENE	330											22	U	22.5	UL
PHENANTHRENE	29000											22	UL	22.5	UL
PYRENE	1100											22	U	22.5	U
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400			11.667		18.667		14.333		41.333		70.667		70.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	86													
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA											89		87.5	

TABLE 7-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 16
RUM POINT SKEET RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X16SB037		X16SB038		X16SB039		X16SB040		X16SB041		X16SB042		X16SB043	
nsample		**X16SS0370001-D**		**X16SS0380001**		**X16SS0390001**		**X16SS0400001**		**X16SS0410001**		**X16SS0420001**		**X16SS0430001**	
sample_dat		20090613		20090613		20090613		20090613		20090613		20090613		20090613	
qc_type		FD		NM		NM		NM		NM		NM		NM	
sacode		DUP		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27											0.11	B		
ARSENIC	9.7											1.7			
COPPER	100											3.9	K		
LEAD	400											12.1			
TIN	0.89											1	B		
ZINC	46											16.6			
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000	23	U					24	UL			26	U		
2-METHYLNAPHTHALENE	31000	23	UL					24	UL			26	U		
ACENAPHTHENE	29000	23	UL					24	UL			26	U		
ACENAPHTHYLENE	29000	23	UL					24	UL			26	U		
ANTHRACENE	29000	23	U					1.6	L			26	U		
BENZO(A)ANTHRACENE	150	23	U					24	L			3.9	J		
BENZO(A)PYRENE	15	23	U					**29**	**L**			5.8	J		
BENZO(B)FLUORANTHENE	150	23	U					14	L			26	U		
BENZO(G,H,I)PERYLENE	1100	23	U					18	L			3.4	J		
BENZO(K)FLUORANTHENE	1100	23	U					24	UL			26	U		
CHRYSENE	1100	3.3	J					30	L			7.7	J		
DIBENZO(A,H)ANTHRACENE	15	23	U					6.1	L			26	U		
FLUORANTHENE	29000	23	U					8.1	L			26	U		
FLUORENE	29000	23	UL					24	UL			26	U		
INDENO(1,2,3-CD)PYRENE	150	2.7	J					6.9	L			26	U		
NAPHTHALENE	330	23	UL					24	UL			26	U		
PHENANTHRENE	29000	23	UL					6.5	L			26	U		
PYRENE	1100	23	U					24	L			4.6	J		
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400			26.333		20.667		50.333		33.667		67.667		38.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA											7.9			
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA											13000			
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA											64			
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA	86						82				78			

TABLE 7-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 16
RUM POINT SKEET RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X16SB044		X16SB045		X16SB046		X16SB047		X16SB048		X16SB049		X16SB050	
nsample		**X16SS0440001**		**X16SS0450001**		**X16SS0460001**		**X16SS0470001**		**X16SS0480001**		**X16SS0490001**		**X16SS0500001**	
sample_dat		20090613		20090613		20090613		20090613		20090613		20090613		20090613	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27														
ARSENIC	9.7														
COPPER	100														
LEAD	400														
TIN	0.89														
ZINC	46														
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000					24	U								
2-METHYLNAPHTHALENE	31000					24	U								
ACENAPHTHENE	29000					24	U								
ACENAPHTHYLENE	29000					24	U								
ANTHRACENE	29000					24	U								
BENZO(A)ANTHRACENE	150					2.6	J								
BENZO(A)PYRENE	15					24	U								
BENZO(B)FLUORANTHENE	150					3	J								
BENZO(G,H,I)PERYLENE	1100					24	U								
BENZO(K)FLUORANTHENE	1100					24	U								
CHRYSENE	1100					4.3	J								
DIBENZO(A,H)ANTHRACENE	15					24	U								
FLUORANTHENE	29000					5	J								
FLUORENE	29000					24	U								
INDENO(1,2,3-CD)PYRENE	150					3.1	J								
NAPHTHALENE	330					24	U								
PHENANTHRENE	29000					24	U								
PYRENE	1100					3.1	J								
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	32		27		22.333		32.333		94.667		64		37	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA														
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA					82									

TABLE 7-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 16
RUM POINT SKEET RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X16SB051		X16SB052		X16SB053		X16SB054		X16SB055		X16SB056		X16SB057	
nsample		**X16SS0510001**		**X16SS0520001**		**X16SS0530001**		**X16SS0540001**		**X16SS0550001**		**X16SS0560001**		**X16SS0570001**	
sample_dat		20090613		20090614		20090614		20090614		20090614		20090614		20090614	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27							**0.32**	**L**					0.14	B
ARSENIC	9.7							2.4						2.1	
COPPER	100							5.3	K					4.5	K
LEAD	400							35						22.3	
TIN	0.89							1.1	B					1.3	B
ZINC	46							27						21.1	
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000	24	U									5.3	J	26	U
2-METHYLNAPHTHALENE	31000	24	U									25		26	U
ACENAPHTHENE	29000	24	U									3.6	J	26	U
ACENAPHTHYLENE	29000	24	U									24	U	26	U
ANTHRACENE	29000	18	J									75		26	U
BENZO(A)ANTHRACENE	150	**240**										**1700**		2.6	J
BENZO(A)PYRENE	15	**240**										**1900**		26	U
BENZO(B)FLUORANTHENE	150	98										**660**		26	U
BENZO(G,H,I)PERYLENE	1100	82										830		26	U
BENZO(K)FLUORANTHENE	1100	21	J									120		26	U
CHRYSENE	1100	300										**2200**		5.6	J
DIBENZO(A,H)ANTHRACENE	15	**37**										**240**		26	U
FLUORANTHENE	29000	40										180		4.8	J
FLUORENE	29000	24	U									9.4	J	26	U
INDENO(1,2,3-CD)PYRENE	150	26										**220**		3	J
NAPHTHALENE	330	24	U									24	U	26	U
PHENANTHRENE	29000	67										300		26	U
PYRENE	1100	200										**1400**		3.9	J
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	22		31		36.667		195		48.333		49.667		25.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA							86						76	
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA	84										82		78	

TABLE 7-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 16
RUM POINT SKEET RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X16SB058		X16SB059		X16SB060		X16SB061		X16SB062		X16SB063		X16SB064	
nsample		**X16SS0580001**		**X16SS0590001**		**X16SS0600001**		**X16SS0610001**		**X16SS0620001**		**X16SS0630001**		**X16SS0640001**	
sample_dat		20090614		20090614		20090614		20090614		20090614		20090614		20090614	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27							0.2	L						
ARSENIC	9.7							6.5							
COPPER	100							6.5	K						
LEAD	400							23.5							
TIN	0.89							1.8	B						
ZINC	46							24.2							
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000									6.3	J				
2-METHYLNAPHTHALENE	31000									22	J				
ACENAPHTHENE	29000									4.4	J				
ACENAPHTHYLENE	29000									24	U				
ANTHRACENE	29000									68					
BENZO(A)ANTHRACENE	150									**1500**					
BENZO(A)PYRENE	15									**1400**					
BENZO(B)FLUORANTHENE	150									**550**					
BENZO(G,H,I)PERYLENE	1100									550					
BENZO(K)FLUORANTHENE	1100									60					
CHRYSENE	1100									**1800**					
DIBENZO(A,H)ANTHRACENE	15									**200**					
FLUORANTHENE	29000									160					
FLUORENE	29000									11	J				
INDENO(1,2,3-CD)PYRENE	150									140					
NAPHTHALENE	330									3.1	J				
PHENANTHRENE	29000									400					
PYRENE	1100									**1300**					
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	43		30.667		23		150		22.333		19.667		18.333	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA							74							
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA									84					

TABLE 7-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 16
RUM POINT SKEET RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X16SB065		X16SB066		X16SB067		X16SB069		X16SB070		X16SB071		X16SB072	
nsample		**X16SS0650001**		**X16SS0660001**		**X16SS0670001**		**X16SS0690001**		**X16SS0700001**		**X16SS0710001**		**X16SS0720001**	
sample_dat		20090614		20090614		20090614		20090614		20090614		20090614		20090614	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27														
ARSENIC	9.7														
COPPER	100														
LEAD	400														
TIN	0.89														
ZINC	46														
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000											2.4	J		
2-METHYLNAPHTHALENE	31000											10	J		
ACENAPHTHENE	29000											23	U		
ACENAPHTHYLENE	29000											23	U		
ANTHRACENE	29000											17	J		
BENZO(A)ANTHRACENE	150											**420**			
BENZO(A)PYRENE	15											**480**			
BENZO(B)FLUORANTHENE	150											**170**			
BENZO(G,H,I)PERYLENE	1100											190			
BENZO(K)FLUORANTHENE	1100											32			
CHRYSENE	1100											570			
DIBENZO(A,H)ANTHRACENE	15											**59**			
FLUORANTHENE	29000											46			
FLUORENE	29000											23	U		
INDENO(1,2,3-CD)PYRENE	150											48			
NAPHTHALENE	330											23	U		
PHENANTHRENE	29000											86			
PYRENE	1100											380			
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	82.667		31.333		60.667		78		28.333		24.333		18	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA														
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA											86			

TABLE 7-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 16
RUM POINT SKEET RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X16SB073		X16SB074		X16SB075		X16SB076		X16SB077		X16SB078		X16SB079	
nsample		**X16SS0730001**		**X16SS0740001**		**X16SS0750001**		**X16SS0760001**		**X16SS0770001**		**X16SS0780001**		**X16SS0790001**	
sample_dat		20090614		20090614		20090614		20090614		20090614		20090614		20090614	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	**0.92**	**L**											**1.2**	**L**
ARSENIC	9.7	3.1												6.1	
COPPER	100	4.7	K											10.6	K
LEAD	400	40.1												267	
TIN	0.89	1.3	B											1.3	B
ZINC	46	22.6												31.6	
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000	4.8	J					16	L			23	UL		
2-METHYLNAPHTHALENE	31000	17	J					68	L			23	UL		
ACENAPHTHENE	29000	2.4	J					7.7	L			23	UL		
ACENAPHTHYLENE	29000	23	U					23	UL			23	UL		
ANTHRACENE	29000	38						110	L			5.2	L		
BENZO(A)ANTHRACENE	150	**690**	**L**					**2400**				100	L		
BENZO(A)PYRENE	15	**820**	**L**					**3200**				**120**	**L**		
BENZO(B)FLUORANTHENE	150	**220**						**1000**				52	L		
BENZO(G,H,I)PERYLENE	1100	300						**1500**				65	L		
BENZO(K)FLUORANTHENE	1100	40						200	L			10	L		
CHRYSENE	1100	870	L					**3000**				130	L		
DIBENZO(A,H)ANTHRACENE	15	**110**						**540**				**22**	**L**		
FLUORANTHENE	29000	85						210	L			23	L		
FLUORENE	29000	6.2	J					21	J			23	UL		
INDENO(1,2,3-CD)PYRENE	150	78						**260**	**L**			24	L		
NAPHTHALENE	330	23	U					7.2	L			23	UL		
PHENANTHRENE	29000	160						620				22	L		
PYRENE	1100	620	L					**2000**				93	L		
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	42.667		58.667		23.667		28.667		15		16.667		266.667	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA	15	K												
Miscellaneous Parameters (s.u.)															
PH	NA	6.4													
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA	9400													
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	89												74	
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA	87						87				87			

TABLE 7-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 16
RUM POINT SKEET RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X16SB080C		X16SB081C		X16SB082		X16SB083		X16SB084		X16SB085		X16SB086	
nsample		**X16SS080C0001**		**X16SS081C0001**		**X16SS0820001**		**X16SS0830001**		**X16SS0840001**		**X16SS0850001**		**X16SS0860001**	
sample_dat		20090614		20090614		20090616		20090616		20090616		20090616		20090616	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		Y		Y		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	0.14	L	**0.42**	**L**										
ARSENIC	9.7	3		4.2											
COPPER	100	4.8		9.6											
LEAD	400	9.1		48.7											
TIN	0.89	1.2	B	1.1	B										
ZINC	46	18.7		29											
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000	23	U	23	U										
2-METHYLNAPHTHALENE	31000	3.5	J	23	U										
ACENAPHTHENE	29000	23	U	23	U										
ACENAPHTHYLENE	29000	23	U	23	U										
ANTHRACENE	29000	4.1	J	5.6	J										
BENZO(A)ANTHRACENE	150	78		94											
BENZO(A)PYRENE	15	**91**		**100**											
BENZO(B)FLUORANTHENE	150	33		38											
BENZO(G,H,I)PERYLENE	1100	41		50											
BENZO(K)FLUORANTHENE	1100	5.8	J	7.7	J										
CHRYSENE	1100	97		130											
DIBENZO(A,H)ANTHRACENE	15	12	J	**18**	**J**										
FLUORANTHENE	29000	9.8	J	13	J										
FLUORENE	29000	23	U	23	U										
INDENO(1,2,3-CD)PYRENE	150	9.1	J	10	J										
NAPHTHALENE	330	23	U	23	U										
PHENANTHRENE	29000	21	J	24											
PYRENE	1100	92		110											
Explosives (mg/kg)															
NITROGLYCERIN	6.1	1.2	UJ	1.2	UJ										
XRF Field Parameters (mg/kg)															
LEAD	400	21		73.333		135.333		**407**		**409**		159.333		87.333	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	88		89											
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA	88		88											

TABLE 7-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 16
RUM POINT SKEET RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X16SB087		X16SB088		X16SB089		X16SB090		X16SB090		X16SB090		X16SB091	
nsample		**X16SS0870001**		**X16SS0880001**		**X16SS0890001**		**X16SS0900001**		**X16SS0900001-AVG**		**X16SS0900001-D**		**X16SS0910001**	
sample_dat		20090616		20090617		20090617		20090617		20090617		20090617		20090617	
qc_type		NM		NM		NM		NM		NM		FD		NM	
sacode		NORMAL		NORMAL		NORMAL		ORIG		AVG		DUP		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	**0.69**	**L**					0.23	L	**0.915**	**J**	**1.6**	**J**	0.03	B
ARSENIC	9.7	3.8						3.5		2.95		2.4		0.16	U
COPPER	100	5.5	K					5.3	K	5.15	K	5		5.7	K
LEAD	400	90.2						38.8		188.4	J	338	J	12.6	
TIN	0.89	1.2	B					1.1	B	1.1	B	1.1	B	1	B
ZINC	46	21.8						16.6		19.5		22.4		15.3	
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	22000														
2-METHYLNAPHTHALENE	31000														
ACENAPHTHENE	29000														
ACENAPHTHYLENE	29000														
ANTHRACENE	29000														
BENZO(A)ANTHRACENE	150														
BENZO(A)PYRENE	15														
BENZO(B)FLUORANTHENE	150														
BENZO(G,H,I)PERYLENE	1100														
BENZO(K)FLUORANTHENE	1100														
CHRYSENE	1100														
DIBENZO(A,H)ANTHRACENE	15														
FLUORANTHENE	29000														
FLUORENE	29000														
INDENO(1,2,3-CD)PYRENE	150														
NAPHTHALENE	330														
PHENANTHRENE	29000														
PYRENE	1100														
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	375		79		123.333		260.667		260.667				20	
Miscellaneous Parameters (meq/100)															
CATION EXCHANGE CAPACITY	NA														
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	79						84		83.5		83		83	
Miscellaneous Organic Parameters (%)															
TOTAL SOLIDS	NA														

TABLE 7-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 16
RUM POINT SKEET RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X16SB092		X16SB093		X16SB094		X16SB095	
nsample		**X16SS0920001**		**X16SS0930001**		**X16SS0940001**		**X16SS0950001**	
sample_dat		20090617		20090617		20090617		20090617	
qc_type		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO	
top_depth		0		0		0		0	
bottom_dep		1		1		1		1	
depth_unit		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS	
composite		N		N		N		N	
Inorganics (mg/kg)									
ANTIMONY	0.27	**1**	**L**	0.06	B	0.09	B	0.08	B
ARSENIC	9.7	2.4		1.1		1.5		1.9	
COPPER	100	5.7	K	3.3	K	2.4	K	3	K
LEAD	400	143		14.7		6.7		19.2	
TIN	0.89	1.3	B	1	B	0.75	B	0.92	B
ZINC	46	29.3		13.8		9.5		16.4	
PAHs (ug/kg)									
1-METHYLNAPHTHALENE	22000								
2-METHYLNAPHTHALENE	31000								
ACENAPHTHENE	29000								
ACENAPHTHYLENE	29000								
ANTHRACENE	29000								
BENZO(A)ANTHRACENE	150								
BENZO(A)PYRENE	15								
BENZO(B)FLUORANTHENE	150								
BENZO(G,H,I)PERYLENE	1100								
BENZO(K)FLUORANTHENE	1100								
CHRYSENE	1100								
DIBENZO(A,H)ANTHRACENE	15								
FLUORANTHENE	29000								
FLUORENE	29000								
INDENO(1,2,3-CD)PYRENE	150								
NAPHTHALENE	330								
PHENANTHRENE	29000								
PYRENE	1100								
Explosives (mg/kg)									
NITROGLYCERIN	6.1								
XRF Field Parameters (mg/kg)									
LEAD	400	17.333		16		12.667		25.667	
Miscellaneous Parameters (meq/100)									
CATION EXCHANGE CAPACITY	NA								
Miscellaneous Parameters (s.u.)									
PH	NA								
Miscellaneous Parameters (mg/kg)									
TOTAL ORGANIC CARBON	NA								
Miscellaneous Parameters (%)									
TOTAL SOLIDS	NA	79		88		92		83	
Miscellaneous Organic Parameters (%)									
TOTAL SOLIDS	NA								

TABLE 7-4

BENZO(a)PYRENE EQUIVALENT CONCENTRATIONS IN DISCRETE SURFACE SOIL SAMPLES
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGAITON
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

location	X16SB002	X16SB008	X16SB009	X16SB013	X16SB014	X16SB019	X16SB023	X16SB023	X16SB023
nsample	**X16SS0020001**	**X16SS0080001**	**X16SS0090001**	**X16SS0130001**	**X16SS0140001**	**X16SS0190001**	**X16SS0230001**	**X16SS0230001-AVG**	**X16SS0230001-D**
matrix	SO	SO	SO	SO	SO	SO	SO	SO	SO
submatrix	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	AVG	DUP
top_depth	0	0	0	0	0	0	0	0	0
bottom_dep	1	1	1	1	1	1	1	1	1
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	FD
sample_dat	20090613	20090613	20090614	20090613	20090614	20090614	20090613	20090613	20090613
PAH Concentrations (ug/kg)									
BENZO(A)ANTHRACENE	630	6.0 J	8.8 L	26	100	170	210 J	107.65 J	5.3 J
BENZO(A)PYRENE	630	7.6 J	8.7 L	38	120	220	240 J	123.8 J	7.6 J
BENZO(B)FLUORANTHENE	200 L	6.0 J	11 L	16 J	47	79	89 J	46.4 J	3.8 J
BENZO(K)FLUORANTHENE	40 L	23 U	23 UL	4.3 J	9.0 J	13 J	13 J	13 J	23 U
CHRYSENE	770	10 J	14 L	41	120	210	240 J	124.4 J	8.8 J
DIBENZO(A,H)ANTHRACENE	120 L	23 U	23 UL	6.4 J	20 J	42	41 J	26.25 J	23 UJ
INDENO(1,2,3-CD)PYRENE	78 L	3.4 J	5.9 L	8.1 J	17 J	28	36	19.25 J	2.5 J
Benzo(a)pyrene (BaP) Equivalent (ug/kg)									
BAP EQUIVALENT-HALFND	841.97	20.765	22.899	49.494	156.61	290.04	314.87	167.6344	20.3838

PARAMETER	TEF
BENZO(A)ANTHRACENE	0.1
BENZO(A)PYRENE	1
BENZO(B)FLUORANTHENE	0.1
BENZO(K)FLUORANTHENE	0.01
CHRYSENE	0.001
DIBENZO(A,H)ANTHRACENE	1
INDENO(1,2,3-CD)PYRENE	0.1

BaP Screening Levels

Risk Level	1E-06	1E-04
Resid screening level for BaP (ug/kg)	15	1500
Non-resid screening level for BaP (ug/kg)	210	21000

Comparison to Residential Screening Level of 1,500 ug/kg

BAP EQUIVALENT-HALFND	842	21	23	49	157	290	315	168	20

Comparison to Non-Residential Screening Level of 21,000 ug/kg

BAP EQUIVALENT-HALFND	842	21	23	49	157	290	315	168	20

TABLE 7-4

BENZO(a)PYRENE EQUIVALENT CONCENTRATIONS IN DISCRETE SURFACE SOIL SAMPLES
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGAITON
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

location	X16SB026	X16SB031	X16SB037	X16SB037	X16SB037	X16SB040	X16SB042	X16SB046	X16SB051
nsample	**X16SS0260001**	**X16SS0310001**	**X16SS0370001**	**X16SS0370001-AVG**	**X16SS0370001-D**	**X16SS0400001**	**X16SS0420001**	**X16SS0460001**	**X16SS0510001**
matrix	SO	SO	SO	SO	SO	SO	SO	SO	SO
submatrix	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	ORIG	AVG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
top_depth	0	0	0	0	0	0	0	0	0
bottom_dep	1	1	1	1	1	1	1	1	1
qc_type	NM	NM	NM	NM	FD	NM	NM	NM	NM
sample_dat	20090613	20090613	20090613	20090613	20090613	20090613	20090613	20090613	20090613
PAH Concentrations (ug/kg)									
BENZO(A)ANTHRACENE	81	300 L	22 U	22.5 U	23 U	24 L	3.9 J	2.6 J	240
BENZO(A)PYRENE	110	420	22 U	22.5 U	23 U	29 L	5.8 J	24 U	240
BENZO(B)FLUORANTHENE	41	120 L	22 U	22.5 U	23 U	14 L	26 U	3.0 J	98
BENZO(K)FLUORANTHENE	6.6 J	20 L	22 U	22.5 U	23 U	24 UL	26 U	24 U	21 J
CHRYSENE	110	390	22 U	3.3 J	3.3 J	30 L	7.7 J	4.3 J	300
DIBENZO(A,H)ANTHRACENE	21 J	58 L	22 U	22.5 U	23 U	6.1 L	26 U	24 U	37
INDENO(1,2,3-CD)PYRENE	18 J	43 L	22 U	2.7 J	2.7 J	6.9 L	26 U	3.1 J	26
Benzo(a)pyrene (BaP) Equivalent (ug/kg)									
BAP EQUIVALENT-HALFND	145.176	524.89	22 U	25.1358	25.6883	39.74	21.9277	24.9943	313.91

PARAMETER	TEF
BENZO(A)ANTHRACENE	0.1
BENZO(A)PYRENE	1
BENZO(B)FLUORANTHENE	0.1
BENZO(K)FLUORANTHENE	0.01
CHRYSENE	0.001
DIBENZO(A,H)ANTHRACENE	1
INDENO(1,2,3-CD)PYRENE	0.1

BaP Screening Levels

Risk Level	1E-06	1E-04
Resid screening level for BaP (ug/kg)	15	1500
Non-resid screening level for BaP (ug/kg)	210	21000

Comparison to Residential Screening Level of 1,500 ug/kg

BAP EQUIVALENT-HALFND	145	525	22 U	25	26	40	22	25	314

Comparison to Non-Residential Screening Level of 21,000 ug/kg

BAP EQUIVALENT-HALFND	145	525	22 U	25	26	40	22	25	314

TABLE 7-4

BENZO(a)PYRENE EQUIVALENT CONCENTRATIONS IN DISCRETE SURFACE SOIL SAMPLES
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGAITON
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

location	X16SB056	X16SB057	X16SB062	X16SB071	X16SB073	X16SB076	X16SB078	X16SB080C	X16SB081C
nsample	**X16SS0560001**	**X16SS0570001**	**X16SS0620001**	**X16SS0710001**	**X16SS0730001**	**X16SS0760001**	**X16SS0780001**	**X16SS080C0001**	**X16SS081C0001**
matrix	SO	SO	SO	SO	SO	SO	SO	SO	SO
submatrix	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
top_depth	0	0	0	0	0	0	0	0	0
bottom_dep	1	1	1	1	1	1	1	1	1
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	20090614	20090614	20090614	20090614	20090614	20090614	20090614	20090614	20090614
PAH Concentrations (ug/kg)									
BENZO(A)ANTHRACENE	1700	2.6 J	1500	420	690 L	2400	100 L	78	94
BENZO(A)PYRENE	1900	26 U	1400	480	820 L	3200	120 L	91	100
BENZO(B)FLUORANTHENE	660	26 U	550	170	220	1000	52 L	33	38
BENZO(K)FLUORANTHENE	120	26 U	60	32	40	200 L	10 L	5.8 J	7.7 J
CHRYSENE	2200	5.6 J	1800	570	870 L	3000	130 L	97	130
DIBENZO(A,H)ANTHRACENE	240	26 U	200	59	110	540	22 L	12 J	18 J
INDENO(1,2,3-CD)PYRENE	220	3.0 J	140	48	78	260 L	24 L	9.1 J	10 J
Benzo(a)pyrene (BaP) Equivalent (ug/kg)									
BAP EQUIVALENT-HALFND	2401.4	27.9956	1821.4	603.69	1030.07	4111	159.83	115.165	132.407

PARAMETER	TEF
BENZO(A)ANTHRACENE	0.1
BENZO(A)PYRENE	1
BENZO(B)FLUORANTHENE	0.1
BENZO(K)FLUORANTHENE	0.01
CHRYSENE	0.001
DIBENZO(A,H)ANTHRACENE	1
INDENO(1,2,3-CD)PYRENE	0.1

BaP Screening Levels

Risk Level	**1E-06**	**1E-04**
Resid screening level for BaP (ug/kg)	15	1500
Non-resid screening level for BaP (ug/kg)	210	21000

Comparison to Residential Screening Level of 1,500 ug/kg

BAP EQUIVALENT-HALFND	2,401	28	1,821	604	1,030	4,111	160	115	132

Comparison to Non-Residential Screening Level of 21,000 ug/kg

BAP EQUIVALENT-HALFND	2,401	28	1,821	604	1,030	4,111	160	115	132

TABLE 7-5

HUMAN HEALTH CSM SUMMARY
RUM POINT SKEET RANGE (RPSR) - UXO 16
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Pathways Associated with Soil at Rum Point Skeet Range (UXO-16)

	Are Direct Contact Exposures to Soil Acceptable?						Evaluation of Leaching to Groundwater Pathway
	Residential			Non-Residential			
Area of Interest	**Risk**	**Haz. Index**	**Lead**	**Risk**	**Haz. Index**	**Lead**	
Firing Line (Composite Samples)	Yes	Yes	Yes	Yes	Yes	Yes	GW use pathway incomplete (Sb RBC exceedances)
Surface Soil (Discrete Samples)	NO (PAHs)	Yes	NO	Yes	Yes	Yes	GW use pathway incomplete (PAH RBC exceedances)

Notes:
GW = groundwater
RBC = risk-based concentration
Chemicals in parentheses are responsible for 1) unacceptable risks or hazard indices or 2) exceedances of soil to groundwater RBCs
PAHs = polycyclic aromatic hydrocarbons
Sb = antimony

TABLE 7-6

ECOLOGICAL CSM SUMMARY
RUM POINT SKEET RANGE (RPSR) - UXO 16
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

X16 SS

	Soil Invertebrates	Plants	Wildlife
Inorganics			
ANTIMONY	0	0	0
ARSENIC	0	0	0
COPPER	0	0	0
LEAD	0	X	X
ZINC	0	0	0
PAHs			
PAHs	0	0	0

X16 Composite

	Soil Invertebrates	Plants	Wildlife
Inorganics			
ANTIMONY	0	0	0
ARSENIC	0	0	0
COPPER	0	0	0
LEAD	0	0	0
ZINC	0	0	0
PAHs			
PAHs	0	0	0

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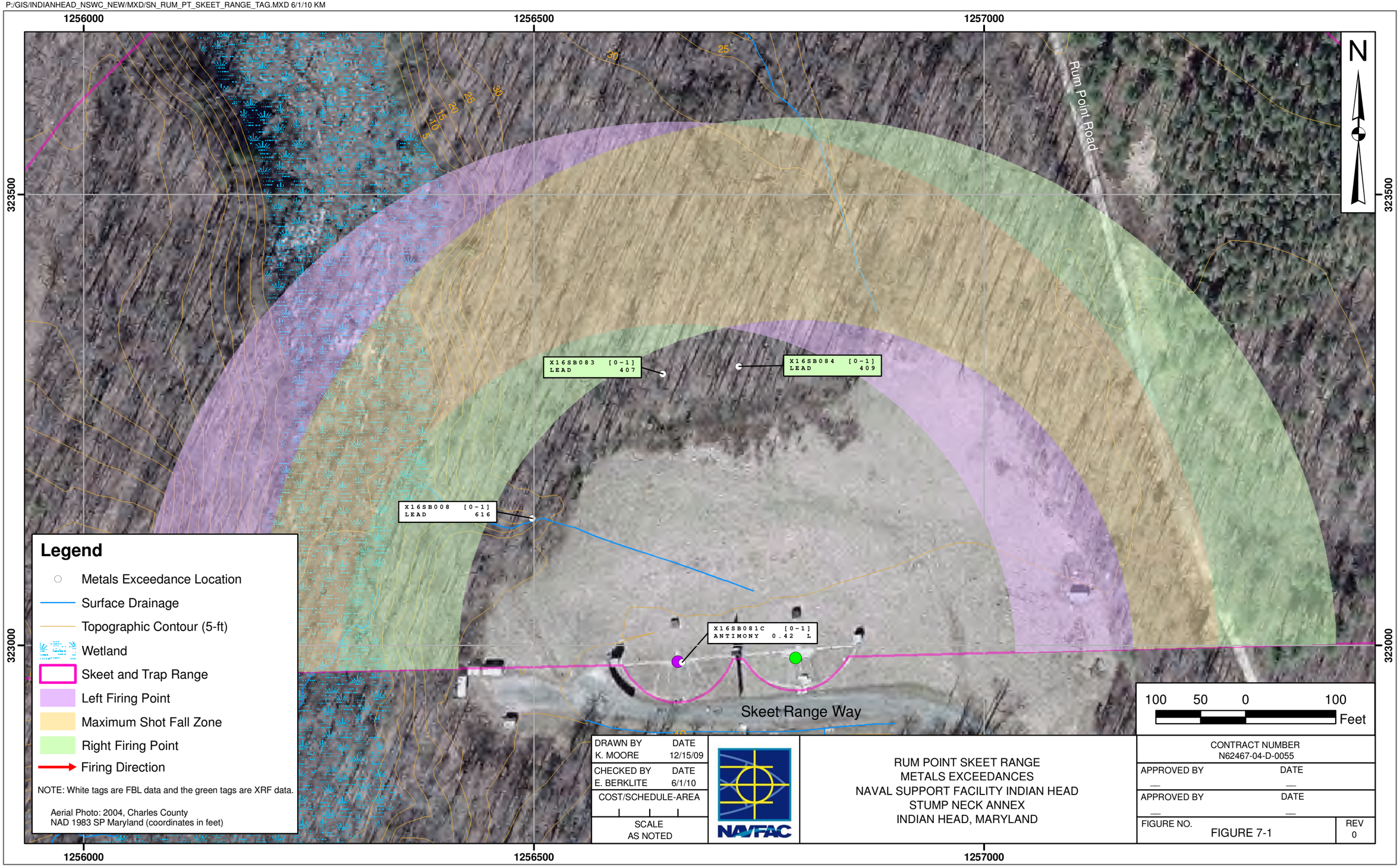

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CHECKED BY: E. BERKLITE	DATE: 6/1/10
COST/SCHEDULE-AREA	
SCALE: AS NOTED	

NAVFAC

RUM POINT SKEET RANGE
METALS EXCEEDANCES
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER: N62467-04-D-0055	
APPROVED BY: —	DATE: —
APPROVED BY: —	DATE: —
FIGURE NO.: FIGURE 7-1	REV: 0

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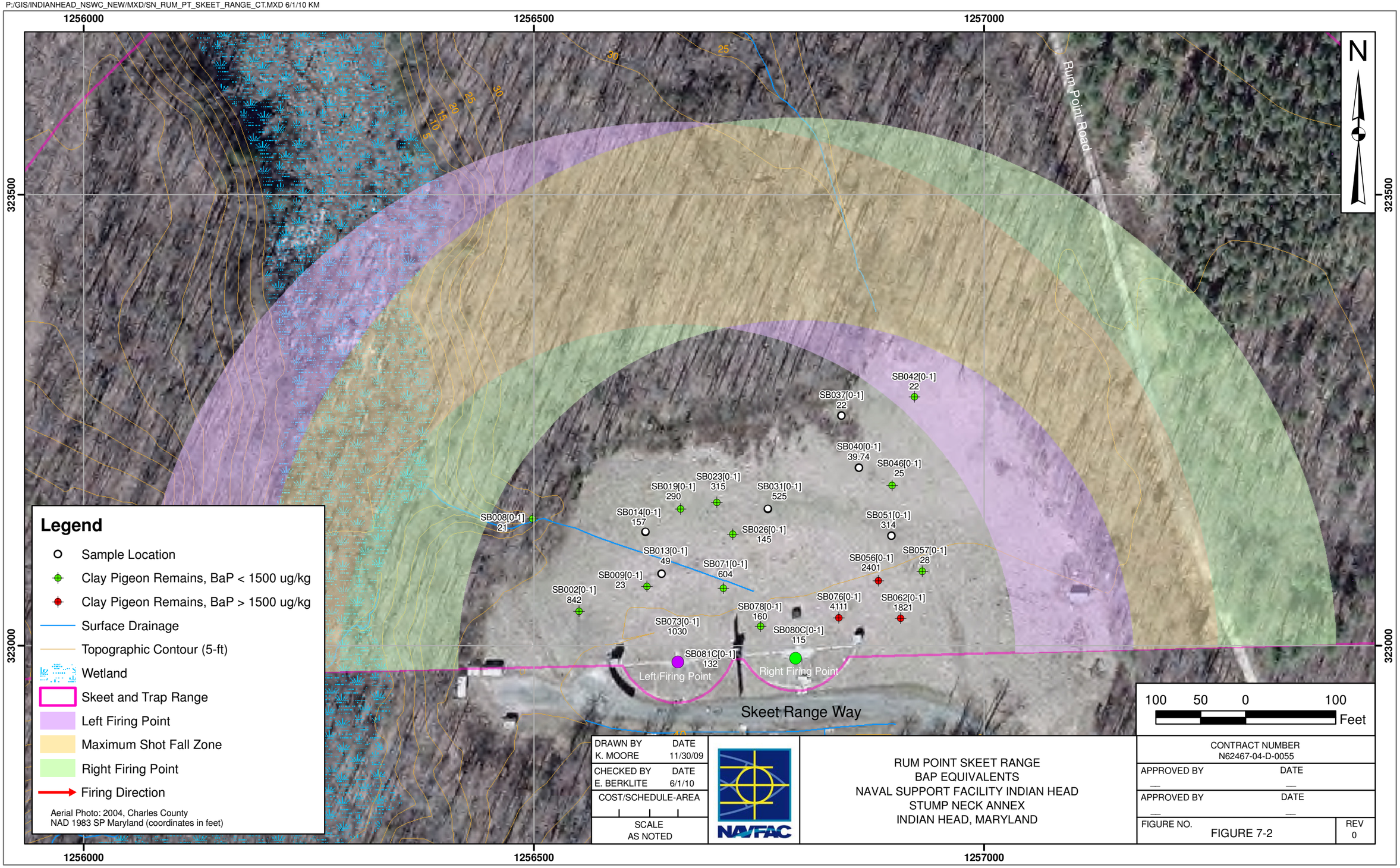

DRAWN BY	DATE
K. MOORE	11/30/09
CHECKED BY	DATE
E. BERKLITE	6/1/10
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

RUM POINT SKEET RANGE
BAP EQUIVALENTS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	
N62467-04-D-0055	
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 7-2	0

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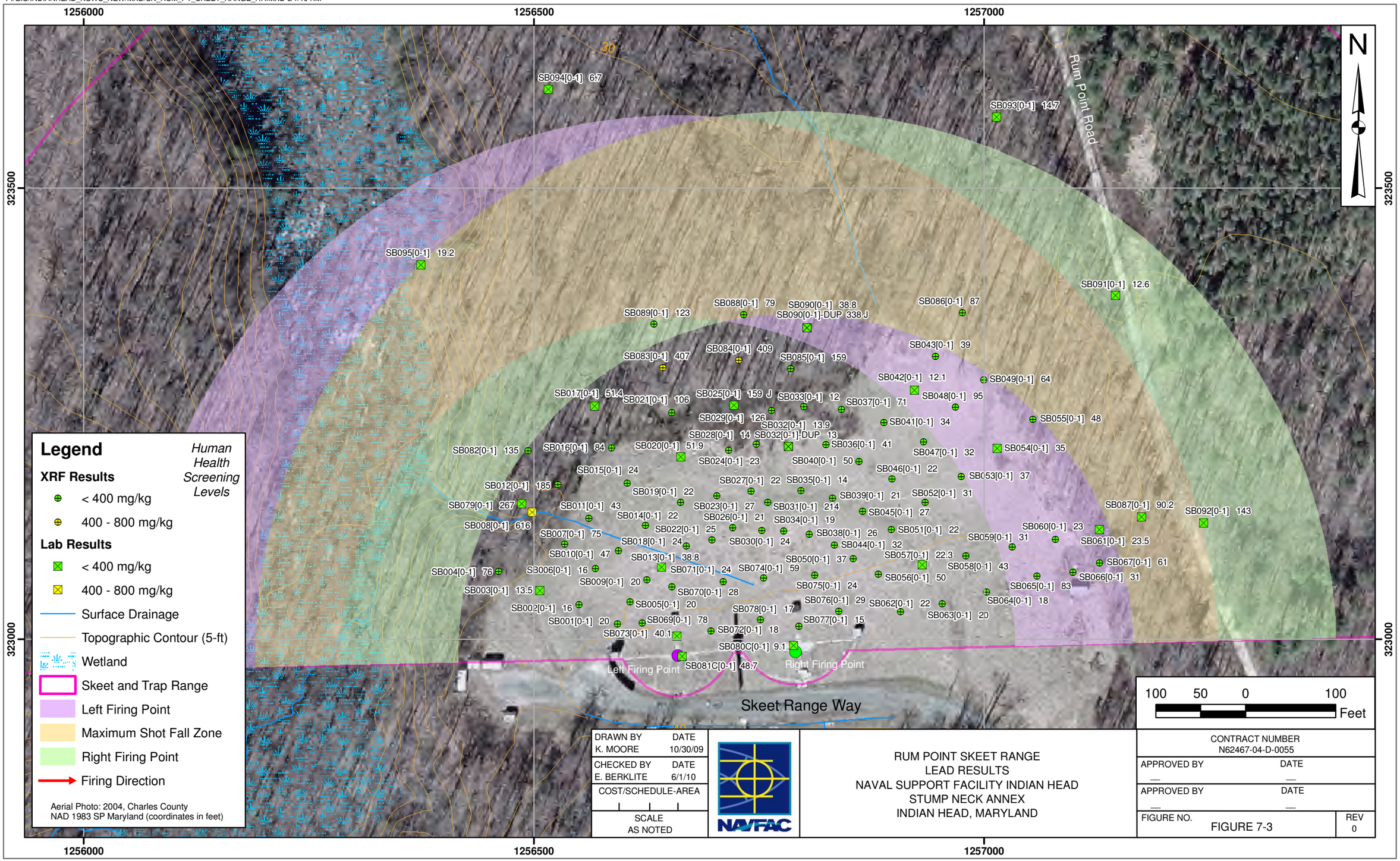

DRAWN BY	DATE
K. MOORE	10/30/09
CHECKED BY	DATE
E. BERKLITE	6/1/10
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

RUM POINT SKEET RANGE
LEAD RESULTS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	
N62467-04-D-0055	
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 7-3	0

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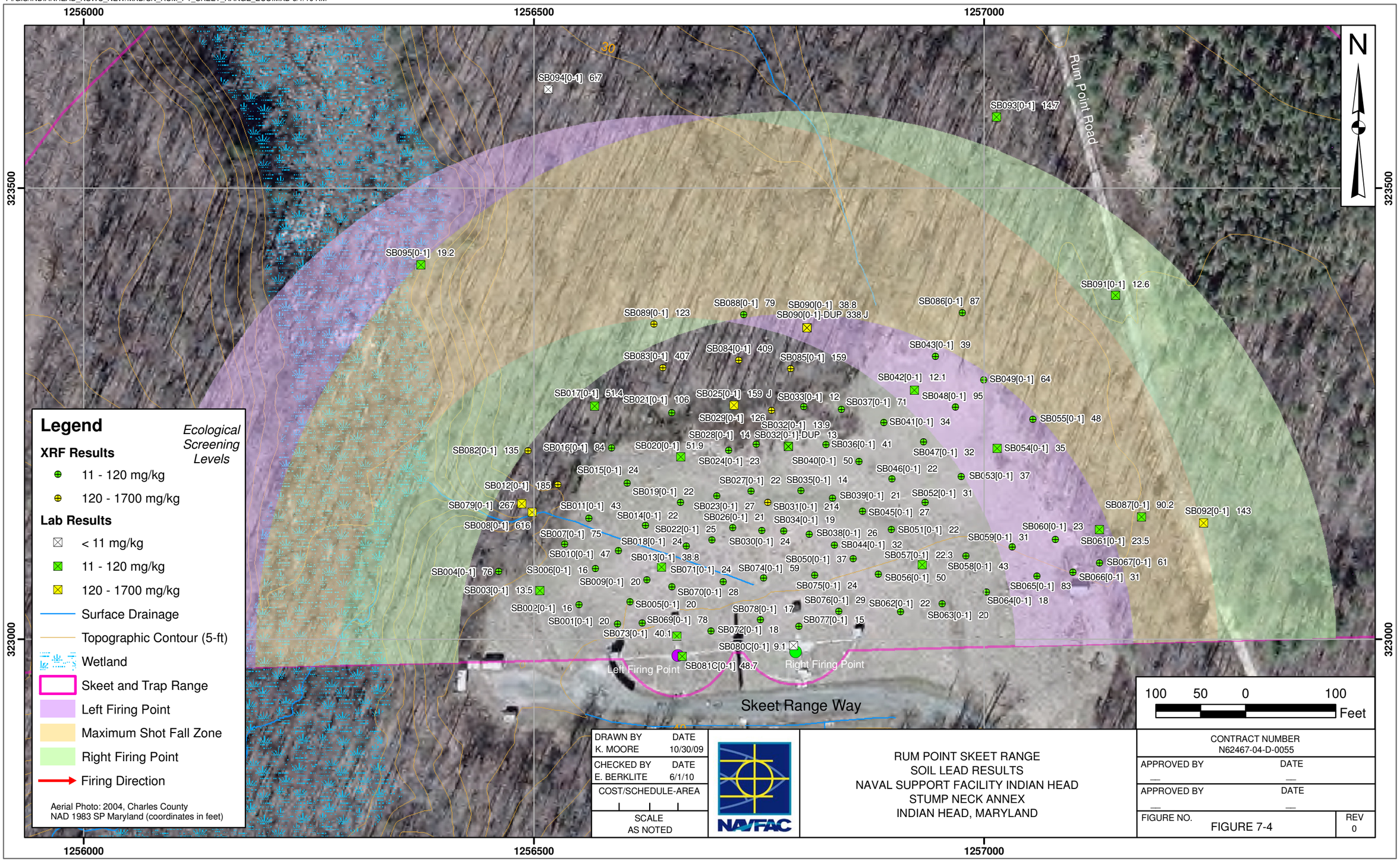

Legend

Ecological Screening Levels

XRF Results

- 11 - 120 mg/kg
- 120 - 1700 mg/kg

Lab Results

- < 11 mg/kg
- 11 - 120 mg/kg
- 120 - 1700 mg/kg
- Surface Drainage
- Topographic Contour (5-ft)
- Wetland
- Skeet and Trap Range
- Left Firing Point
- Maximum Shot Fall Zone
- Right Firing Point
- Firing Direction

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

DRAWN BY	DATE
K. MOORE	10/30/09
CHECKED BY	DATE
E. BERKLITE	6/1/10
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

RUM POINT SKEET RANGE
SOIL LEAD RESULTS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER	N62467-04-D-0055
APPROVED BY	DATE
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APPROVED BY	DATE
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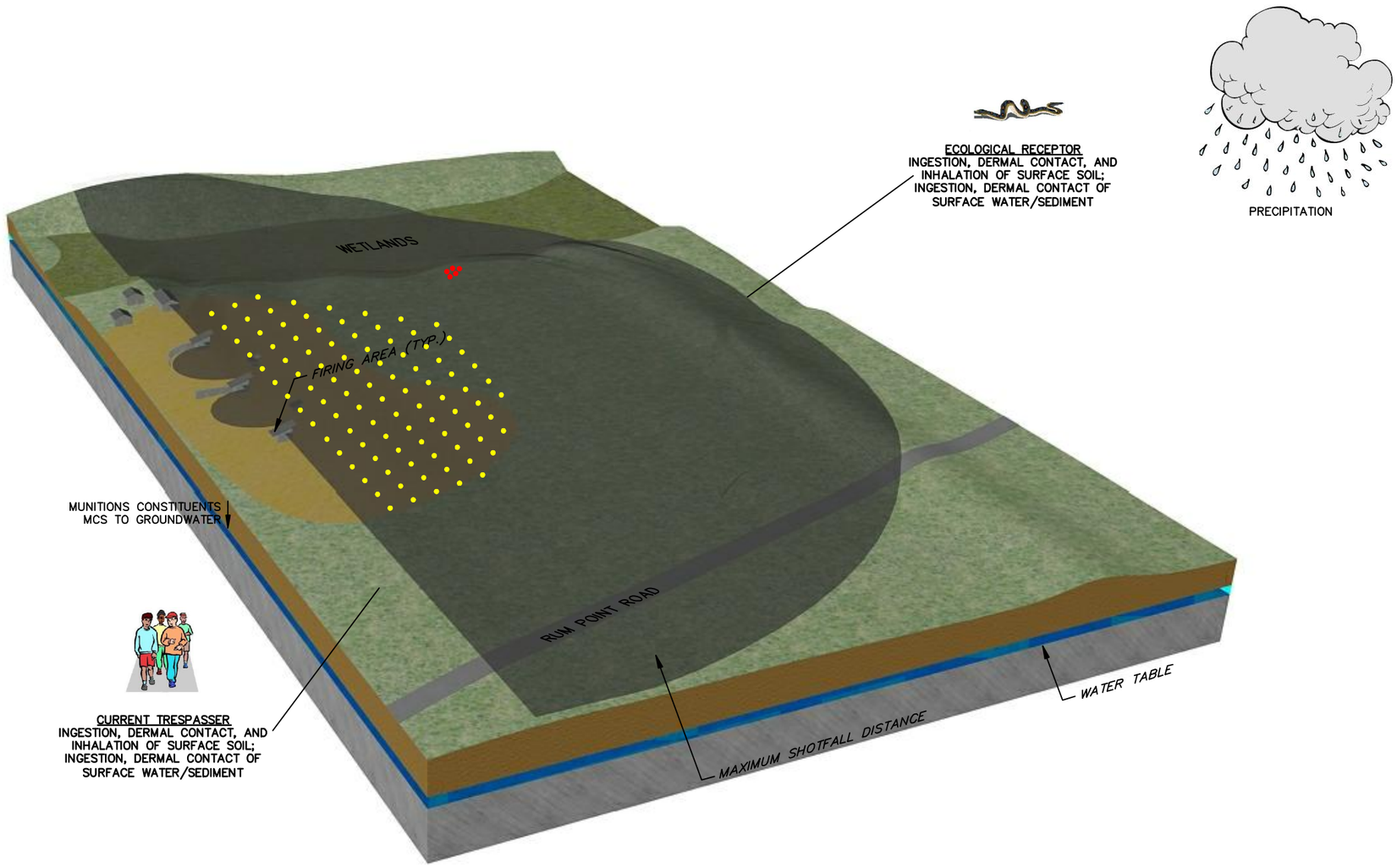
FIGURE NO.	REV
FIGURE 7-4	0



LEGEND

- AREA OF LEAD SHOT ACCUMULATION
- CLAY TARGETS

DRAWN BY BH	DATE 12/8/09	RUM POINT SKEET RANGE CONCEPTUAL SITE MODEL NAVAL SUPPORT FACILITY STUMP NECK ANNEX INDIAN HEAD, MARYLAND
CHECKED BY ---	DATE ---	
REVISED BY ---	DATE ---	
SCALE NOT TO SCALE		

NAVFAC

CONTRACT NO. 1507	
OWNER NO.	
APPROVED BY ---	DATE ---
DRAWING NO. FIGURE 7-5	REV. 0

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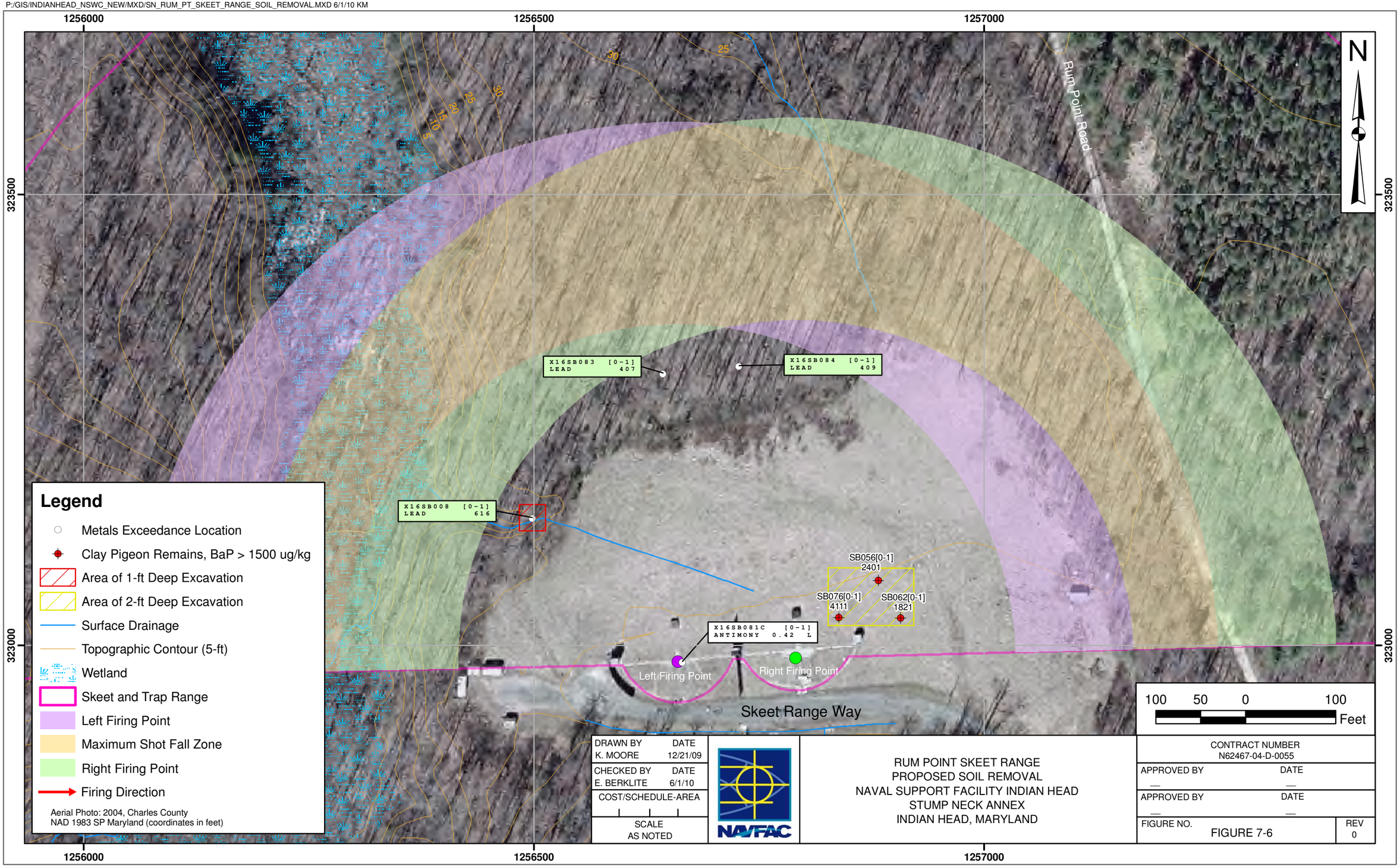

DRAWN BY K. MOORE	DATE 12/21/09
CHECKED BY E. BERKLITE	DATE 6/1/10
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

RUM POINT SKEET RANGE
PROPOSED SOIL REMOVAL
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER N62467-04-D-0055	
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. FIGURE 7-6	REV 0

8.0 ROACH ROAD RIFLE RANGE – UXO 25

8.1 SITE BACKGROUND

8.1.1 Historical Information

The Roach Road Rifle Range is located in the central portion of Stump Neck Annex, immediately west of Roach Road. The 0.3-acre site was used for small arms training from approximately 1967 to 1986. The Roach Road Rifle Range is first referenced in a 1963 memorandum from the Department of Public Works. The 1963 hand-drawn layout for the "new pistol range" includes eight firing stands, six targets constructed of railroad ties, and walkways. The plan indicates that the range is north of Roach Road and approximately 830 feet east of Building 65SN (located at Area 8). According to an interview with Mr. John Bartellson, a retired EOD technician, he participated in the construction of the small arms range in the 1960s. The range is first visible on a 1967 aerial photograph as a cleared area surrounded by dense vegetation, and is still visible on a 1987 aerial photograph. On maps dating from 1967 to 1976, the range is labeled as #2070, a small bore and pistol range. On these maps, #2070 is located immediately north of the 90 degree turn in Roach Road, which corresponds to the aerial photographs from this time period. A cleared area is also visible across Roach Road on the 1972 aerial photograph (possibly a parking lot). The 1982 aerial photograph shows a southern shift in the road to the southern side of the cleared area. On maps dating from 1981 to 1988, the rifle range is shown as a square area just south of the 90 degree turn in Roach Road. The 1987 aerial photograph shows vegetative cover over the range and Roach Road in its current location. Because of the different locations of the range presented in the 1963 memorandum, on the maps from 1967 to 1976, and on the maps from 1981 to 1988, the location of the range was mapped for this SI Report using the aerial photographs. The size of the range was established using the layout presented in the 1963 memorandum. The Roach Road Rifle Range is not identified as a SWMU or IR range.

8.1.2 Munitions Used

This section describes the munitions or munitions-related materials known or suspected to be at the range. This includes both MEC and non-hazardous munitions-related debris (e.g., fragmentation, base plates, inert mortar fins). The Roach Road Rifle Range was used for small arms training, and historical maps and documents state that rifles and pistols were used at the range. Mr. Gordon Miller, a former EOD employee of NSF-IH, also stated that pistols were used at the range. Specific ordnance types used at the range are not known. Lead bullets/fragments are suspected within the target butts. NG from unburned propellants and lead from primers is suspected at the firing points. No munitions-related debris

items were identified at the Roach Road Rifle Range. No bullets or metallic debris were identified in the shovel tests conducted for the Phase I Cultural Resources Survey of Stump Neck Annex and Supplemental Architectural Investigations (Goodwin, R.C. & Associates, 1996. Phase I Cultural Resources Survey of Stump Neck Annex and Supplemental Architectural Investigations, Indian Head Naval Surface Warfare Center, Charles County, Maryland.). Based on the information obtained during the data collection process, the Roach Road Rifle Range is not suspected to contain CWM-filled munitions, electrically fused munitions, or DU-associated munitions. The munitions used and/or stored at the facility and the associated chemical constituents are listed in Table 8-1.

8.1.3 Munitions Constituents

For small arms ammunition, the primary MC of concern are lead from shot. Other associated MC less likely to be of concern may include antimony, arsenic, copper, nickel, and lead styphnate/lead azide. These MC are not consumed when the munitions items function as they are designed. Therefore, these MC may exist at the Roach Road Rifle Range. NG from unburned propellants and lead from primers is suspected at the firing points. There was no record found of environmental sampling at the range.

8.2 SITE FIELDWORK

8.2.1 Site Field Activities

Soil sample locations were selected based on a bias towards areas that were believed to be most likely contaminated by past operations at the site. The total area of the site is 0.27 acres as indicated in Table 3-1. The study area of the site consists of the Range Area which covers approximately 0.23 acres. See Figure 3-5 for all sample locations. Prior to initiating sample collection, all sample locations were marked by colored pin flags bearing the sample location ID number. Proposed sample locations identified in the approved WP were located by global positioning system (GPS) and by measurements from stationary objects (e.g.: roadways, existing buildings). All sample locations were as proposed in the approved WP.

8.2.2 Work Plan Deviations

There were no deviations from the work plan.

8.2.3 Field Data Collection

A total of 36 soil samples were collected during the SI at the RRRR. All soil samples collected were from the surface depth of 0 to 1 foot bgs. No subsurface samples were collected. One composite sample was collected between the firing points at ten aliquots each. Thirty-six samples underwent field XRF analysis for lead, and 33 soil samples were selected for metals analysis at the FBL. No samples were selected for PAH analysis. Four soil samples were selected for TOC analysis. One soil sample was selected for NG analysis. Soil samples were collected via hand auger in accordance with SOP-05. See Figure 3-5 for all sampling locations. A summary of the sample collection methods used are shown on Table 3-6. Soil sample log sheets are included in Appendix A of this document.

8.3 SITE INSPECTION DATA COLLECTION RESULTS

8.3.1 MC Sampling Results

All soil samples collected were compared to the PALs and background sampling results, and a statistical evaluation was done to compare the background data with the site sampling results. The summary table of the site background screening is presented as Table 8-2. The statistical summary and calculations are presented in Appendix G. The MC analytical results are presented in Appendix C, and the data validation reports are presented in Appendix D. Table 8-3 summarizes the results as compared to the calculated screening values for metals. The PAL was the reference limit, unless the background and screening calculations exceeded this value. In Table 8-3, if a parameter had an exceedance at any sampling point, the parameter is highlighted; individual sample exceedances are also highlighted. Figure 8-1 illustrates the metals exceedances in soil at the Roach Road Rifle Range. Screening values used were the PAL limits for the direct contact residential values for soil.

The antimony PAL was exceeded at nine discrete surface soil sampling locations. The copper PAL was exceeded at two discrete surface soil sampling locations. The lead PAL was exceeded at six discrete surface soil sampling locations. The zinc PAL was exceeded at one discrete surface soil sampling location. One composite sample was collected.

Lead was the primary COC for the investigation and all the screening data were based on XRF lead results. Approximately 20 percent of the XRF screened data were shipped to a FBL for lead analysis, along with other parameters determined on a site by site basis. The XRF and FBL data were plotted on Figure 8-2 using the direct contact residential soil screening value of 400 mg/kg. The values were color coded green for less than 400 mg/kg, yellow for 400 to 800 mg/kg, and red for greater than 800 mg/kg. FBL data superceded XRF data when present. The correlation between the XRF and FBL values was

statistically acceptable; subsequently the predicted lab values were used in place of the XRF values. Figures 8-2 illustrates that in the primary impact area there were three soil samples with low level exceedances of lead PALs, and two soil samples with high level exceedances of lead PALs. The Human Health Risk Screening Evaluation is discussed in Section 8.5.

Ecological screening values were 11 mg/kg for wildlife exposure to lead in soil, 120 mg/kg for plant exposure to lead in soil, and 1,700 mg/kg for soil invertebrates exposure to lead in soil. There were several exceedances of the 120 mg/kg for plant exposure, randomly distributed, and one exceedance of the 1,700 mg/kg for soil invertebrates in the primary impact area. The Eco Screening levels for lead in soil are illustrated on Figure 8-3. The Ecological Risk Screening Evaluation is discussed in Section 8.6.

8.4 DATA QUALITY REVIEW/USABILITY

8.4.1 Data Quality Review of Samples at Roach Road Rifle Range

This section summarizes the results of the data review processes used to determine whether analytical laboratory data collected during the sampling field effort for the Roach Road Rifle Range were of acceptable quality for use in decision-making. The DQOs presented in the Munitions Response Program Site Inspections at Five Small Arms/Skeet Ranges QAPP (April 2009) were maintained through the course of the sampling event. The Worksheets #19 and #15 of the QAPP present the analytical methods and compounds analyzed.

8.4.1.1 Data Validation Results

Appendix D, Table 1 presents all the qualified data and the reason for the data qualification. The rejection of data was not necessary for samples collected at the Roach Road Rifle Range and all data are considered valid for their intended purpose.

8.4.1.2 Data Quality Review

Some of the DQIs are generated from analysis of field samples (e.g., field duplicates) and some are generated from the analysis of laboratory samples (e.g., laboratory duplicates). Individually, field and laboratory DQIs provide measures of the performance of the respective investigative operations (field or laboratory). If individual QC results were acceptable, there was no assignment of validation flags to an analytical result; otherwise, there was assignment of a flag indicating the type of QC deficiency to the result.

8.4.1.3 Completeness

The sample collection and laboratory analytical completeness were 100%.

8.4.1.4 Sensitivity

The project quantitation limit goals (PQLGs) are listed in Worksheet #15 in the QAPP (April 2009). Analytical sensitivity was generally satisfactory to meet DQOs presented in the QAPP. However, at the inception of the project, the laboratory could not meet several of the PQLGs. Worksheet #15 highlights the exceedances of the PQLGs.

The amount of sample volume collected also affects the ability of the laboratory to achieve the desired PQLGs. Laboratory or field blank contamination can also elevate a result above the PQLGs, resulting in samples being qualified as non-detected. There are instances where the non-detected sample results exceed the PQLGs either because of the laboratory's inability to meet the PQLG or because of elevated detection limits because of blank contamination. Because of the large quantity of data collected and the limited number of individual chemicals driving risk, the elevated detection limits should have a negligible impact on the assessment of risk and no impact on presence/absence determination.

8.4.1.5 Accuracy

Appendix D, Table 1 shows that several results were qualified because of matrix spike or calibration noncompliances. The noncompliances in general do not show any directional bias with the data except for the case. Antimony had matrix recoveries less than the laboratory quality control limit but greater than 30% indicating a slight low bias. Overall, the laboratory accuracy was acceptable and no data were rejected. There were no quality control deficencies noted for field accuracy.

8.4.1.6 Field and Laboratory Precision

Field duplicate imprecision resulted in the qualification of several antimony, arsenic, and lead results. Despite the data qualifications the data are acceptable for use in risk assessment. Laboratory duplicate precision was acceptable.

8.4.1.7 Comparability

No comparability issues were noted during the data validation process.

8.4.1.8 Representativeness

The QAPP (April 2009) and the use of standardized sampling, sample handling, sample analysis, and data reporting procedures were designed so that the final data would be accurate representations of actual site conditions. Based on field logs indicating the conditions during sample collection and laboratory audits all reported data are adequately representative of site conditions and intended populations.

8.5 HUMAN HEALTH RISK SCREENING EVALUATION

The purpose of the human health risk screening evaluation is to conservatively estimate risks posed to potential human receptors from chemicals present at the Roach Road Rifle Range. The human health risk screening followed the steps described in Section 3.3, which presented the general methodology for the human health risk screening. These steps are:

- Identification of COPCs
- Exposure Assessment
- Risk Characterization
- Uncertainty Analysis

8.5.1 Identification of Chemicals of Potential Concern

Human health COPCs in soil were identified with the following considerations:

- Occurrence and distribution of chemicals in the environmental media
- Chemical toxicity
- Occurrence of chemical in background samples

Soil samples in the Roach Road Rifle Range were divided into two areas of interest for the risk screening evaluation:

- Composite surface soil sample collected from the firing lines
- Discrete surface soil samples

A soil sample was identified as a surface sample if its sampling interval begins at the surface. TtNUS classified any soil sample whose sampling interval begins below the surface as a subsurface soil sample. All soils collected from the Roach Road Rifle Range were classified as surface soil samples.

Using the methodology described in Section 3.3, the maximum concentration of each chemical in soil in each area of interest was compared to up to four risk-based screening levels: two risk-based screening levels based on direct contact exposures to soil and two based on protection of groundwater. If the maximum concentration exceeded any of the risk-based screening levels, the chemical was classified as a possible COPC. These chemicals were subjected to a comparison to background soil data to determine if the soil concentrations in the area of interest are consistent with background soil concentrations. Section 3.3 presents the approach used to determine if the chemicals are present in soil at concentrations consistent with background concentrations. Because the background evaluation is used in both the human health and ecological risk screening, the background evaluation is presented in Appendix G. For chemicals identified as possible COPCs, TtNUS retained the chemical as a COPC for the human health risk screening only if the chemical was present in soil in the area of interest at concentrations above background.

8.5.1.1 Composite Surface Soil Sample

Appendix E, Table 8-1 presents the results of the evaluation of the composite surface soil sample. TtNUS did not identify any chemicals as human health COPCs in the composite surface soil sample.

8.5.1.2 Discrete Surface Soil Samples

Appendix E, Table 8-2 presents the results of the evaluation of discrete surface soil samples. TtNUS identified the following chemicals as human health COPCs in the discrete surface soil samples:

- Antimony
- Copper
- Lead

8.5.2 Exposure Assessment

This section presents the exposure assessment for the Roach Road Rifle Range. This range was used for small arms training (rifles and pistols) from approximately 1963 to 1986. The site is currently undeveloped and covered with shrubs and trees. The site is adjacent to an area used for storage of dirt, gravel, telephone poles, and other road construction supplies. According to installation personnel, there

are no planned changes to activities at the Roach Road Rifle Range. According to the 2003-2004 Stump Neck Annex Hunting Map, the Roach Road Rifle Range is located within an upland hunting area.

No public access is authorized at NSF-IH, Stump Neck Annex. Signs, partial fencing, locked/secured gates, login book/office check-in, and vehicle security patrols are used to control the entire facility. There are no access control features specific to the Roach Road Rifle Range. There are no known land use/development restrictions for the range.

Under the current and predicted future land use patterns for this site, potential human receptors include authorized Navy personnel (military and civilian), visitors, contractors, maintenance workers, recreational users, and trespassers.

In the human health risk screening evaluation, TtNUS analyzed direct contact exposures to surface soil (incidental ingestion of soil, dermal contact with soil, inhalation of chemicals volatilized from soil into outdoor air and inhalation of chemicals in soil emitted into the air as particulates). TtNUS also analyzed the potential for COPCs in soil to leach into groundwater and adversely affect groundwater quality.

TtNUS used the maximum detected concentrations of the COPCs in soil (see Appendix E, Table 8-2) as the EPCs in the risk characterization.

8.5.3 Risk Characterization

This section presents the risk characterization for the Roach Road Rifle Range. The risk characterization involved:

- Calculating risks and hazard indices for direct contact exposures to soil.
- Evaluating direct contact exposures to lead in soil.
- Evaluating the potential for chemicals to leach from soil to groundwater and affect groundwater quality (the soil to groundwater pathway).

8.5.3.1 Evaluation of Direct Contact Exposures Soil

As discussed previously, TtNUS identified COPCs for the human health risk screening evaluation for the discrete surface soil samples. Using the procedures presented in Section 3.3, TtNUS calculated risks and hazard indices for direct contact exposures to these soils. TtNUS also evaluated direct contact exposures to lead in discrete surface soil samples.

Appendix E, Table 8-3 presents the hazard indices for direct contact exposures to COPCs in the discrete surface soil samples. None of the COPCs are considered to be potentially carcinogenic, so cancer risks were not calculated. Appendix E, Table 8-3 presents hazard indices for both residential and non-residential exposures. For residential exposures, the calculated hazard index is 0.51, which is below USEPA's acceptable hazard index of 1. For non-residential exposures, the calculated hazard index is 0.039, which is below USEPA's acceptable hazard index of 1.

Appendix E, Table 8-4 presents the comparison of the maximum lead concentration in the discrete soil samples to residential and non-residential risk-based concentrations. The maximum lead concentration of 3,450 mg/kg exceeded both the residential and non-residential risk-based concentrations for direct contact with soil containing lead. Five samples out of 20 had lead concentrations exceeding the residential direct contact risk-based concentration of 400 mg/kg, and two samples had lead concentrations that exceeded the non-residential direct contact risk-based concentration of 800 mg/kg.

8.5.3.2 Evaluation of the Soil to Groundwater Pathway

Using the procedures presented in Section 3.3, TtNUS evaluated the soil to groundwater pathway for COPCs in the discrete surface soil samples. Appendix E, Table 8-5 presents the comparison of the maximum detected concentration and average concentration to the risk-based concentrations in soil for protection of groundwater. This table presents risk-based concentrations for dilution-attenuation factors of 1 (the conservative default value) and 20. The maximum concentration of antimony in soil exceeds the risk-based concentrations using the tap water RSL for a dilution-attenuation factor of 1 but not 20. However, the maximum concentration of antimony in soil exceeds the risk-based concentrations using the MCL for both dilution-attenuation factors. The maximum concentration of copper exceeds risk-based concentrations for a dilution-attenuation factor of 1 but not 20. Groundwater from the Roach Road Rifle Range is not used as a source of drinking water, so the groundwater use pathway is currently incomplete.

8.5.4 Uncertainty Analysis

Section 3.3.4 provides a detailed discussion of the sources of uncertainty in the human health risk screening evaluation.

8.5.5 Human Health Risk Screening Evaluation Summary

In the human health risk screening evaluation, soil data for the Roach Road Rifle Range was evaluated. The soil samples for this site were divided into two areas of interest for the risk screening evaluation:

- Composite surface soil sample collected from the firing lines
- Discrete surface soil samples

For the composite subsurface soil samples, all chemicals were below human health risk-based screening levels for soil or were present in surface soil at concentrations consistent with background soil concentrations. Consequently, no potential adverse health effects are expected from exposures to surface soil in the vicinity of the firing lines as a result of future residential or non-residential uses of this part of the Roach Road Rifle Range.

For the discrete surface soil samples, antimony, copper and lead were selected as COPCs for the human health risk screening evaluation. For the evaluation of direct contact exposures to soil, none of the COPCs are considered to be carcinogenic, so cancer risks were not calculated when evaluating direct contact exposures to soil. The calculated hazard indices for residential and nonresidential land uses were below the USEPA target level of 1. In the evaluation of direct contact exposures to lead in soil, the maximum detected lead concentration in soil (3,450 mg/kg) was greater than both the residential direct contact screening value of 400 mg/kg and the non-residential direct contact screening value of 800 mg/kg. In the evaluation of the soil to groundwater pathway, the maximum concentration of antimony in soil exceeded the risk-based concentrations using the tap water RSL for a dilution-attenuation factor of 1, but not 20. However, the maximum concentration of antimony in soil exceeded the risk-based concentrations using the MCL for both dilution-attenuation factors. The maximum concentration of copper exceeded the risk-based concentrations for a dilution-attenuation factor of 1 but not 20. Groundwater from the Roach Road Rifle Range is not used as a source of drinking water, so the groundwater use pathway is currently incomplete.

8.6 ECOLOGICAL RISK SCREENING EVALUATION

8.6.1 Site Description

Section 8.1 presents a detailed description of the site location, history, and background of the site.

8.6.2 Potential Ecological Receptors and Exposure Pathways

The contaminated media to which ecological receptors may be exposed include surface soil. These potential ecological receptors and exposure pathways are described in detail in Section 3.4.1.1.

8.6.3 Ecological Screening

The first part of the evaluation is selection of COPCs.

8.6.3.1 COPCs for Terrestrial Invertebrates and Plants

Appendix F, Tables 8-6.3.1 and 8-6.3.2 present the chemicals that were retained as COPCs in surface soil for potential risks to plants and invertebrates for grab samples and the composite sample, respectively. These tables also present the chemicals that were retained for food chain modeling for mammals and birds (discussed further in Section 8.6.3.2).

Terrestrial Invertebrates

Copper and lead were selected as COPCs for terrestrial invertebrates in the grab samples because they were detected at concentrations that exceeded screening levels. Tin was selected as a COPC for terrestrial invertebrates in the composite soil sample because no screening level was available.

Terrestrial Plants

Antimony, arsenic, copper, and lead were selected as COPCs for terrestrial plants in the grab samples because they were detected at concentrations that exceeded screening levels. No COPCs for terrestrial plants were selected in composite soil sample.

8.6.3.2 COPCs for Mammals and Birds

Appendix F, Tables 8-6.3.1 and 8-6.3.2 present the chemicals that were retained for food chain modeling for terrestrial mammals and birds because they were detected at concentrations above screening levels or did not have screening levels for mammals or birds.

Tables 8-6.3.3 and 8-6.3.4 summarize the results of the conservative inputs food chain modeling for terrestrial receptors. Appendix F presents the calculation worksheets. The following summarizes the results of the food chain modeling using maximum concentrations and conservative input parameters:

- Antimony, copper, and lead had EEQs greater than 1.0 in the food chain model for surface soil from grab samples. Copper had EEQs less than 1.0 using the NOAEL as the TRV; therefore, copper was eliminated as a COPC.

- No chemicals had EEQs greater than 1.0 in the food chain model for the composite soil.
- Avian TRVs were not available for antimony.

COPCs were only discussed if there were risks from the less conservative model in step 3A.

8.6.4 Step 3A Refinement

Step 3a consists of a refinement of the conservative exposure assumptions/concentrations to evaluate the potential risks to ecological receptors (i.e., plants, invertebrates, and wildlife receptors). The objective of the Step 3a refinement is to better define those chemicals that contribute to potentially unacceptable levels of ecological risk, and to identify and eliminate from further consideration those COPCs that were retained because of the use of very conservative exposure scenarios. The Step 3a evaluation is designed to eliminate chemicals from further evaluation for certain groups of receptors. For example, a chemical may be eliminated as a COPC in soil based on risks to soil invertebrates and plants, but may be retained for evaluating risks to wildlife.

8.6.4.1 Terrestrial Plants and Invertebrates

Terrestrial Invertebrates

Copper and lead were retained as COPCs for terrestrial invertebrates in the grab samples because they were detected at concentrations that exceeded screening levels in several samples. Also, maximum concentrations of copper and lead in the grab samples exceeded maximum background concentrations. Tin was selected as a COPC for terrestrial invertebrates in the composite soil samples because no screening level was available. No background data were available for tin. However, the maximum concentration of tin from composite soil sample (1.9 mg/kg) was well below the ORNL soil invertebrate toxicological benchmark for tin of 2000 mg/kg (Efroymson et al., 1997a). Therefore, tin is not expected to be toxic to soil invertebrates at the detected concentrations and is not retained as a COPC.

Terrestrial Plants

Antimony, arsenic, copper, and lead were selected as COPCs for terrestrial plants in the grab samples because they were detected at concentrations that exceeded screening levels in several samples and their maximum concentrations exceeded maximum background concentrations. The maximum concentration of arsenic in the grab samples exceeded the screening level; however, it was less than maximum background concentrations. Therefore, arsenic was eliminated as a COPC. No COPCs for terrestrial plants were retained from composite soil samples.

8.6.4.2 Mammals and Birds

The EEQs from the terrestrial food chain modeling were greater than 1.0 for several chemicals using maximum chemical concentrations and conservative exposure assumptions (see Section 8.6.3.2). Therefore, as part of the Step 3a refinement, risks for this pathway were recalculated using average chemical concentrations in surface soil and sediment and less conservative exposure assumptions (i.e., average ingestion rates, average body weights) (see Appendix F, Table 3.4-3).

Tables 8-6.3.5 and 8-6.3.6 summarize the results of the less conservative inputs food chain modeling for terrestrial receptors. Appendix F presents the calculation worksheets. A discussion of the risks to mammal and birds are presented below.

Terrestrial Receptors

Antimony and lead in the grab samples had EEQs greater than 1.0 using the NOAEL as the TRV, but EEQs are less than 1.0 using the LOAEL as the TRV. Maximum concentrations of antimony and lead in grab samples exceeded the maximum background concentrations. Because antimony and lead are related to site activities, they are retained as COPCs.

8.6.5 Ecological Risk Screening Summary

This section presents a summary of the conclusions of the ecological risk assessment that was conducted for the site.

8.6.5.1 Risks to Terrestrial Plants and Invertebrates

Copper and lead were retained as COPCs for terrestrial invertebrates in the grab samples because they were detected at concentrations that exceeded screening levels. Antimony, copper, and lead were retained as COPCs for terrestrial plants in the grab samples because they were detected at concentrations that exceeded screening levels.

8.6.5.2 Mammals and Birds

Antimony and lead were retained as COPCs for terrestrial wildlife in grab samples because they had EEQs greater than 1.0 in the food chain model and are related to site activities.

8.7 UPDATED CSM

Only MC associated with the Roach Road Rifle Range are considered in the CSM exposure pathway analysis. A general description of the CSM exposure pathway analysis was included in Section 10.3.7 of the SAP as follows: "Contaminants at the Roach Road Rifle Range may potentially migrate within soil, groundwater, surface water and sediment. The Roach Road Rifle Range's proximity to Chicamuxen Creek and its unnamed tributaries provides possible migration routes to surface water. Storm water discharges to surface water via overland flow. Groundwater in the shallow water table aquifer also likely flows towards Chicamuxen Creek; therefore, MC leaching from soil into shallow groundwater may migrate to surface water. Sediments can act as contaminant repositories, and sediment mixing and dredging can act as migration routes to surface water. MC in surface soil and sediment may migrate via plant/animal uptake. Direct human or biota contact with surficial and subsurface soil is possible if the soil is disturbed. Based on a review of hydrogeological data, it is unlikely that MC in shallow groundwater would migrate to the deeper aquifers used as water supplies. However, shallow groundwater is still considered a potential exposure medium. Potential human receptors include authorized Navy personnel (military and civilian), visitors, contractors, maintenance workers, recreational users, and trespassers. Plant and animal biota are also potential receptors. Examples of ecological receptors include deer, wild turkey, and waterfowl."

Human Health Risk Exposure Summary

The human health CSM summary table is presented as Table 8-4.

In the human health risk screening evaluation, TtNUS evaluated soil data for the Roach Road Rifle Range. TtNUS divided the soil samples for this site into two areas of interest for the risk screening evaluation:

- Composite surface soil sample collected from the firing lines
- Discrete surface soil samples

For the composite subsurface soil sample, all chemicals were below human health risk-based screening levels for soil or were present in surface soil at concentrations consistent with background soil concentrations. Consequently, no potential adverse health effects are expected from exposures to surface soil in the vicinity of the firing lines as a result of future residential or non-residential uses of this part of the Roach Road Rifle Range.

For the discrete surface soil samples, antimony, copper and lead were selected as COPCs for the human health risk screening evaluation. For the evaluation of direct contact exposures to soil, none of the COPCs are considered to be carcinogenic, so cancer risks were not calculated when evaluating direct contact exposures to soil. The calculated hazard indices for residential and nonresidential land uses were below the USEPA target level of 1. In the evaluation of direct contact exposures to lead in soil, the maximum detected lead concentration in soil (3,450 mg/kg) was greater than both the residential direct contact screening value of 400 mg/kg and the non-residential direct contact screening value of 800 mg/kg. In the evaluation of the soil to groundwater pathway, the maximum concentration of antimony in soil exceeded the risk-based concentrations using the tap water RSL for a dilution-attenuation factor of 1, but not 20. However, the maximum concentration of antimony in soil exceeded the risk-based concentrations using the MCL for both dilution-attenuation factors. The maximum concentration of copper exceeded the risk-based concentrations for a dilution-attenuation factor of 1 but not 20. Groundwater from the Roach Road Rifle Range is not used as a source of drinking water, so the groundwater use pathway is currently incomplete.

Ecological Risk Exposure Summary:

The Ecological CSM summary table is presented as Table 8-5.

Risks to Terrestrial Plants and Invertebrates

Copper and lead were retained as COPCs for terrestrial invertebrates in the grab samples because they were detected at concentrations that exceeded screening levels. Antimony, copper, and lead were retained as COPCs for terrestrial plants in the grab samples because they were detected at concentrations that exceeded screening levels.

Mammals and Birds

Antimony and lead were retained as COPCs for terrestrial wildlife in grab samples because they had EEQs greater than 1.0 in the food chain model and are related to site activities.

CSM Summary

The updated CSM is shown on Figure 8-4 and details the potential exposure sources, pathways, and receptors. The exposure sources appear to be limited to the areas of lead shot accumulation behind the target area and in the primary impact area. One pathway is runoff from precipitation. Leaching from soil into groundwater has been eliminated as a pathway, since groundwater is not used at the site. Receptors

would be trespassers and ecological receptors by ingestion, dermal contact, and inhalation of surface soil, soil, and sediment. Potentially complete exposure pathways exist for both human and ecological receptors under both current and hypothetical future land uses.

8.8 CONCLUSIONS

- Expended bullets were suspected along the range floor and in the earthen embankment to the west behind the former range targets (i.e., the primary impact berm).

- MC consisting of metals (primarily lead and, to a lesser extent, antimony, arsenic, copper, tin, and zinc) are present in site soil [particularly surface soil (the 0- to 1 foot bgs interval)] Lead is assumed to be the primary metal MC of concern because it is the primary constituent in the spent munitions and because of its documented toxicity to both human and ecological receptors. Elevated antimony concentrations were spatially correlated with lead concentrations in all six elevated lead concentration locations. In one of these locations, copper, lead, and zinc also have elevated concentrations. MC may have migrated to subsurface soil and subsequently infiltrated to underlying groundwater. These constituents may have also migrated to the aforementioned adjoining surface water bodies via surface soil runoff or discharge of contaminated shallow groundwater to surface water. The extent of potential environmental contamination at the site appears to be limited to directly behind the target berms in the primary impact area.

- The CSM (Figure 8-4) indicates that potentially complete exposure pathways exist for both human and ecological receptors under both current and hypothetical future land uses. Unacceptable levels of human and/or ecological risk may exist. However groundwater is not currently used at the site.

- The antimony PAL was exceeded at nine discrete surface soil sampling locations. The copper PAL was exceeded at two discrete surface soil sampling locations. The lead PAL was exceeded at six discrete surface soil sampling locations. The zinc PAL was exceeded at one discrete surface soil sampling location. One composite sample was collected.

8.8.1 Data Gaps

There were no data gaps.

8.9 RECOMMENDATIONS FOR NEXT PHASE

Based on the results of the SI, further actions are required. These subsequent actions may include a RI for the Roach Road Rifle Range that will meet CERCLA requirements. RI activities should include an interim remedial action to address the limited known areas of surface soil lead and antimony contamination, the limited removal of lead-contaminated soils, or the localized chemical stabilization of lead in soil to reduce the potential threat of lead releases to the environment.

8.9.1 RI Objectives for Interim Removal Action, Remedial Investigation, or No Further Action Determination

Specific tasks recommended as part of the RI MC investigation include the following:

- Removal of shallow soils in the area with elevated concentration of metals. Figure 8-5 illustrates the proposed soil removal area. Soil is proposed to be excavated to a depth of 1 foot bgs in the earthen embankment to the west behind the former range targets (i.e., the primary impact berm) in the area of bullet accumulations. The total amount of soil to be removed is estimated at approximately 44 cubic yards (yd^3). The excavation totals are calculated as follows:

Location	Dimensions: length x depth x width (ft)	Cubic Feet (ft^3)	Cubic Yards (yd^3)
Primary Impact Area	40 x 30 x 1	1,200	44
Total Proposed Soil Removal	NA	1,200	44

- Confirmation soil sampling should be performed in the excavation areas in one of these scenarios:

  1. MIS.
  2. Four corners and middle of excavation.
  3. Resample at same locations where there were exceedances, but at depths below the excavated material.

In each of these scenarios, the depth sampled at would be at 1 to 2 feet bgs (pre-excavation depth).

TABLE 8-1

MUNITION TYPES AND CHEMICALS
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

MUNITIONS TYPES USED/STORED AT THE FACILITY
.30-caliber ammunition

ASSOCIATED CHEMICAL CONSTITUENTS
Primary:
Lead
Nitroglycerin

Secondary:
Antimony
Arsenic
Copper
Nickel
Lead Styphnate
Lead Azide

TABLE 8-2a

ROACH ROAD RIFLE RANGE
DISCRETE SURFACE SOIL
BACKGROUND COMPARISON
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Chemical	Site Maximum Detected Concentration	Background Maximum Detected Concentration	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion Site Above Background?	Site Distribution	Background Distribution	Test	Equal Variance?[1]	Test Statistic	P-Value	Quantile Test	Slippage Test	Site Above Background?
Inorganics(mg/kg)																
ANTIMONY	12.2	ND	16/20	0/33	16/53	70	YES[3]									YES
ARSENIC	22.6	18.3	17/20	30/34	47/54	13	SIMILAR	NONPARAMETRIC	LOGNORMAL	GEHAN		-2.233	0.0128	PASS	PASS	NO
COPPER	370	19.45	20/20	32/34	52/54	4	YES									YES
LEAD	3450	149	20/20	32/34	52/54	4	YES									YES
ZINC	63.9	42.95	20/20	34/34	54/54	0	YES									YES

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE 8-2b

ROACH ROAD RIFLE RANGE
COMPOSITE SURFACE SOIL
BACKGROUND COMPARISON
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Chemical	Site FOD	Background FOD	Site Maximum	Background Maximum	Background UPL		Site Exceed Background?
Inorganics(mg/kg)							
Arsenic	1/1	30/34	4.3	18.3	9.7	95%KM(t)UPL	NO

TABLE 8-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 25
ROACH ROAD RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X25SB001		X25SB002		X25SB003		X25SB004		X25SB005		X25SB006		X25SB007	
nsample		**X25SS0010001**		**X25SS0020001**		**X25SS0030001**		**X25SS0040001**		**X25SS0050001**		**X25SS0060001**		**X25SS0070001**	
sample_dat		20090615		20090615		20090615		20090615		20090615		20090615		20090615	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		ORIG	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	0.02	B					0.15	B					0.02	B
ARSENIC	9.7	4.9						2.8						2.3	J
COPPER	100	13.1						7.4						10.3	
LEAD	400	6.3						19.5						43.5	
TIN	0.89	0.56	B					0.49	B					0.62	B
ZINC	46	36.4						30.6						27.5	
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	0	U	12.667	U	8.333		29.667		22		8.333		32	
Miscellaneous Parameters (s.u.)															
PH	NA											7.6			
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA											4600			
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	85						92				87		69	

TABLE 8-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 25
ROACH ROAD RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X25SB007		X25SB007		X25SB008		X25SB009		X25SB010		X25SB011		X25SB012	
nsample		**X25SS0070001-AVG**		**X25SS0070001-D**		**X25SS0080001**		**X25SS0090001**		**X25SS0100001**		**X25SS0110001**		**X25SS0120001**	
sample_dat		20090615		20090615		20090615		20090615		20090615		20090615		20090615	
qc_type		NM		FD		NM		NM		NM		NM		NM	
sacode		AVG		DUP		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	0.09	B	0.16	B	0.27	L			**0.48**	**J**				
ARSENIC	9.7	4.05	J	5.8	J	2.4				8.5					
COPPER	100	10.4		10.5		11				14					
LEAD	400	39		34.5		91.4				84	J				
TIN	0.89	0.65	B	0.68	B	0.51	B			1.4	B				
ZINC	46	30.15		32.8		26.6				33.4					
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	32				94.667		12.333		158.667		41		21.667	
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	71.5		74		86				81					

TABLE 8-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 25
ROACH ROAD RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X25SB013		X25SB014		X25SB015		X25SB016		X25SB017		X25SB018		X25SB019	
nsample		**X25SS0130001**		**X25SS0140001**		**X25SS0150001**		**X25SS0160001**		**X25SS0170001**		**X25SS0180001**		**X25SS0190001**	
sample_dat		20090615		20090615		20090615		20090615		20090615		20090615		20090615	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	0.2	J					**0.4**	**L**			**2.4**	**L**	**4.4**	**L**
ARSENIC	9.7	4.4						**22.6**				5.6		2.5	
COPPER	100	9.2						24.8				48.5		**130**	
LEAD	400	19.8	J					88.6				**529**		**1060**	
TIN	0.89	1.2	B					0.52	B			0.55	B	0.43	B
ZINC	46	36.3						43.8				32.4		45.1	
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	12.333		11		36.333		64.667		78.333	U	**1676.333**		**2775**	
Miscellaneous Parameters (s.u.)															
PH	NA	7.4												7.4	
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA	14000												42000	
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	80						84				82		84	

TABLE 8-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 25
ROACH ROAD RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X25SB020		X25SB021		X25SB021		X25SB021		X25SB022		X25SB023		X25SB024	
nsample		**X25SS0200001**		**X25SS0210001**		**X25SS0210001-AVG**		**X25SS0210001-D**		**X25SS0220001**		**X25SS0230001**		**X25SS0240001**	
sample_dat		20090615		20090615		20090615		20090615		20090615		20090615		20090615	
qc_type		NM		NM		NM		FD		NM		NM		NM	
sacode		NORMAL		ORIG		AVG		DUP		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	**12.2**	**L**	**0.3**	**L**	**0.285**	**L**	0.27	L	0.19	L	**1.3**	**L**	**1.7**	**L**
ARSENIC	9.7	5		2.4		2.65		2.9		3.8		2.6		3.2	
COPPER	100	**370**		10.9		10.05		9.2		11		44		50.2	
LEAD	400	**3450**		131		129		127		62.6		**546**		**522**	
TIN	0.89	0.56	B	0.5	B	0.485	B	0.47	B	0.51	B	0.55	B	0.58	B
ZINC	46	**63.9**		26.8		25.85		24.9		23.1		37		40.6	
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	**3877**		177.667		177.667				60		**538.333**		**835.667**	
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	80		80		82.5		85		86		85		82	

TABLE 8-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 25
ROACH ROAD RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X25SB025		X25SB026		X25SB027		X25SB028		X25SB029		X25SB030		X25SB031	
nsample		**X25SS0250001**		**X25SS0260001**		**X25SS0270001**		**X25SS0280001**		**X25SS0290001**		**X25SS0300001**		**X25SS0310001**	
sample_dat		20090615		20090615		20090615		20090615		20090615		20090615		20090615	
qc_type		NM		NM		NM		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1	
depth_unit		FT		FT		FT		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N	
Inorganics (mg/kg)															
ANTIMONY	0.27	0.27	L					0.21	L			0.26	L	**0.53**	**L**
ARSENIC	9.7	3.7						3.6				2.8		2.4	B
COPPER	100	11.5						9.6				11		13.3	
LEAD	400	34.2						17.9				50.3		142	
TIN	0.89	0.5	B					1.5	B			1.7	B	2.3	B
ZINC	46	22						25.2				28.4		30.3	
Explosives (mg/kg)															
NITROGLYCERIN	6.1														
XRF Field Parameters (mg/kg)															
LEAD	400	48		36.667		14.333		25.333		48		64.667		**565**	
Miscellaneous Parameters (s.u.)															
PH	NA														
Miscellaneous Parameters (mg/kg)															
TOTAL ORGANIC CARBON	NA														
Miscellaneous Parameters (%)															
TOTAL SOLIDS	NA	88						85				86		85	

TABLE 8-3

FIXED BASE LABORATORY SOIL MC METALS RESULTS HITS/EXCEEDANCES
UXO 25
ROACH ROAD RIFLE RANGE
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

location		X25SB032		X25SB033		X25SB034C	
nsample		**X25SS0320001**		**X25SS0330001**		**X25SS034C0001**	
sample_dat		20090615		20090615		20090615	
qc_type		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO	
top_depth		0		0		0	
bottom_dep		1		1		1	
depth_unit		FT		FT		FT	
submatrix		SS		SS		SS	
composite		N		N		Y	
Inorganics (mg/kg)							
ANTIMONY	0.27	0.24	L	0.13	B	0.1	L
ARSENIC	9.7	2.1	B	1.9	B	4.3	
COPPER	100	13.4		9.5		8.5	
LEAD	400	60.2		31.1		9.4	
TIN	0.89	1.8	B	1.6	B	1.6	B
ZINC	46	30.8		35.2		30.2	
Explosives (mg/kg)							
NITROGLYCERIN	6.1					1.2	U
XRF Field Parameters (mg/kg)							
LEAD	400	49		40.333		0	U
Miscellaneous Parameters (s.u.)							
PH	NA	7.5					
Miscellaneous Parameters (mg/kg)							
TOTAL ORGANIC CARBON	NA	13000					
Miscellaneous Parameters (%)							
TOTAL SOLIDS	NA	87		86		90	

TABLE 8-4

HUMAN HEALTH CSM SUMMARY
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

Pathways Associated with Soil at Roach Road Rifle Range (UXO-25)

	Are Direct Contact Exposures to Soil Acceptable?						Evaluation of Leaching to Groundwater Pathway
	Residential			Non-Residential			
Area of Interest	Risk	Haz. Index	Lead	Risk	Haz. Index	Lead	
Firing Line (Composite Samples)	Yes	Yes	Yes	Yes	Yes	Yes	GW use pathway incomplete (No RBSL exceedances)
Surface Soil (Discrete Samples)	Yes	Yes	NO	Yes	Yes	NO	GW use pathway incomplete (Sb, Cu RBC exceedances)

Notes:
GW = groundwater
RBC = risk-based concentration
RBSL = risk-based screening level
Chemicals in parentheses are responsible for 1) unacceptable risks or hazard indices or 2) exceedances of soil to groundwater RBCs
Cu = copper
Sb = antimony

TABLE 8-5

ECOLOGICAL CSM SUMMARY
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
NAVAL SUPPORT FACILITY
INDIAN HEAD, MARYLAND

X25 SS

	Soil Invertebrates	Plants	Wildlife
Inorganics			
ANTIMONY	0	X	X
ARSENIC	0	0	0
COPPER	X	X	0
LEAD	X	X	X
ZINC	0	0	0

X25 Composite

	Soil Invertebrates	Plants	Wildlife
Inorganics			
ANTIMONY	0	0	0
ARSENIC	0	0	0
COPPER	0	0	0
LEAD	0	0	0
TIN	0	0	0
ZINC	0	0	0

P:\GIS\INDIANHEAD_NSWC_NEW\MXD\ROACH_RIFLE_RANGE_TAGS.MXD 6/1/10 KM

1249800 1249900 1250000

320700 320600

N

Former Roach Road

X25SB021 [0-1]
ANTIMONY 0.3 L

X25SB020 [0-1]
ANTIMONY 12.2 L
COPPER 370
LEAD 3450
ZINC 64

X25SB023 [0-1]
ANTIMONY 1.3 L
LEAD 546

X25SB024 [0-1]
ANTIMONY 1.7 L
LEAD 522

X25SB016 [0-1]
ANTIMONY 0.4 L

X25SB018 [0-1]
ANTIMONY 2.4 L
LEAD 529

X25SB010 [0-1]
ANTIMONY 0.48 J

X25SB019 [0-1]
ANTIMONY 4.4 L
COPPER 130
LEAD 1060

X25SB031 [0-1]
ANTIMONY 0.53 L
LEAD 565

40 45 50 55 60 65 70 75

Legend

- Metals Exceedance Location
- Firing Stand
- Primary Impact Area
- Range Boundary
- Target Area
- Walkway
- Original Presumed Range Boundary
- Topographic Contour (5-ft)
- Firing Direction

NOTE: All range information came from a hand drawing from 1963.

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

25 12.5 0 25 Feet

DRAWN BY K. MOORE	DATE 12/15/09
CHECKED BY E. BERKLITE	DATE 6/1/10
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

ROACH ROAD RIFLE RANGE
METALS EXCEEDAANCES
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER N62467-04-D-0055	
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. FIGURE 8-1	REV 0

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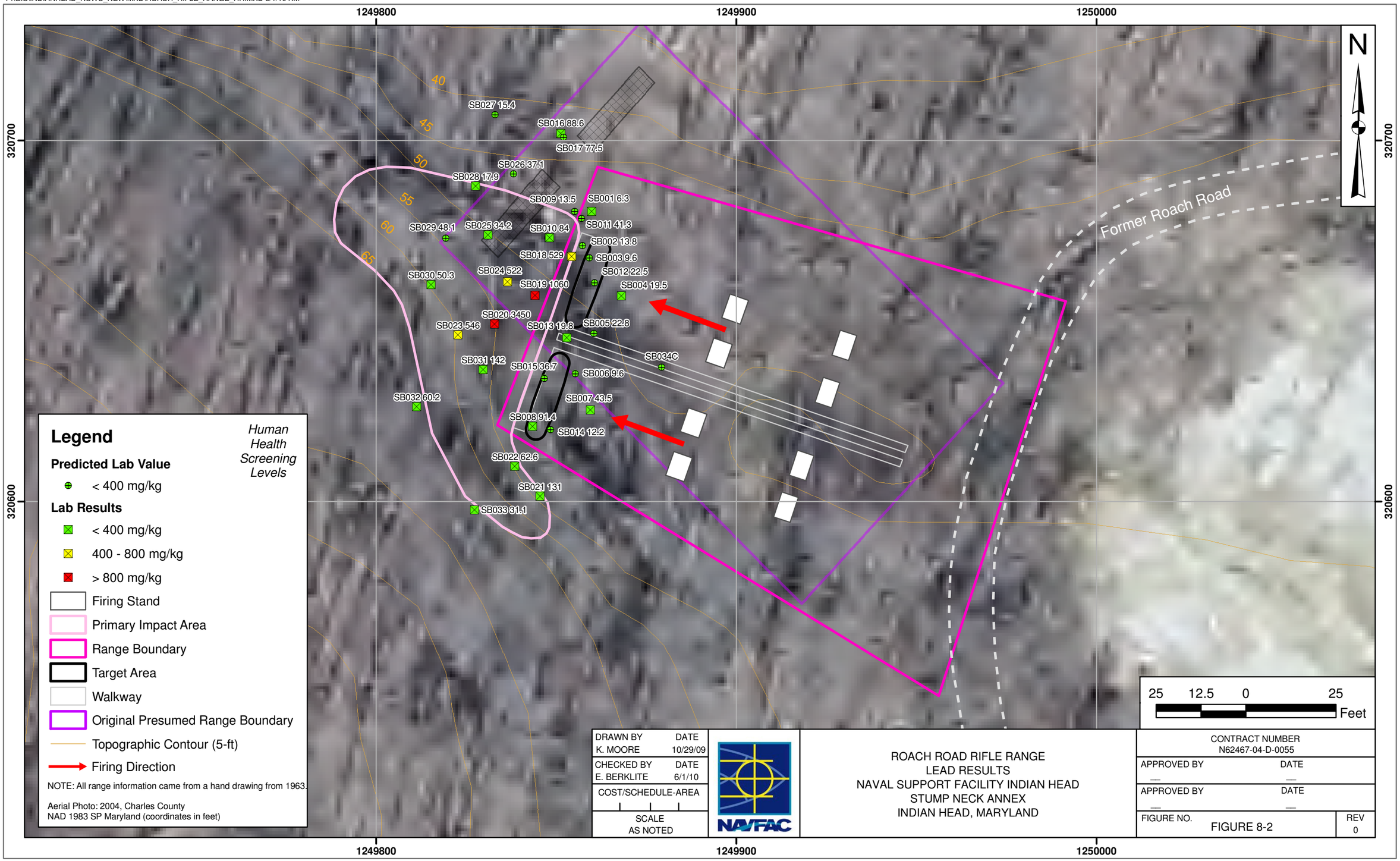


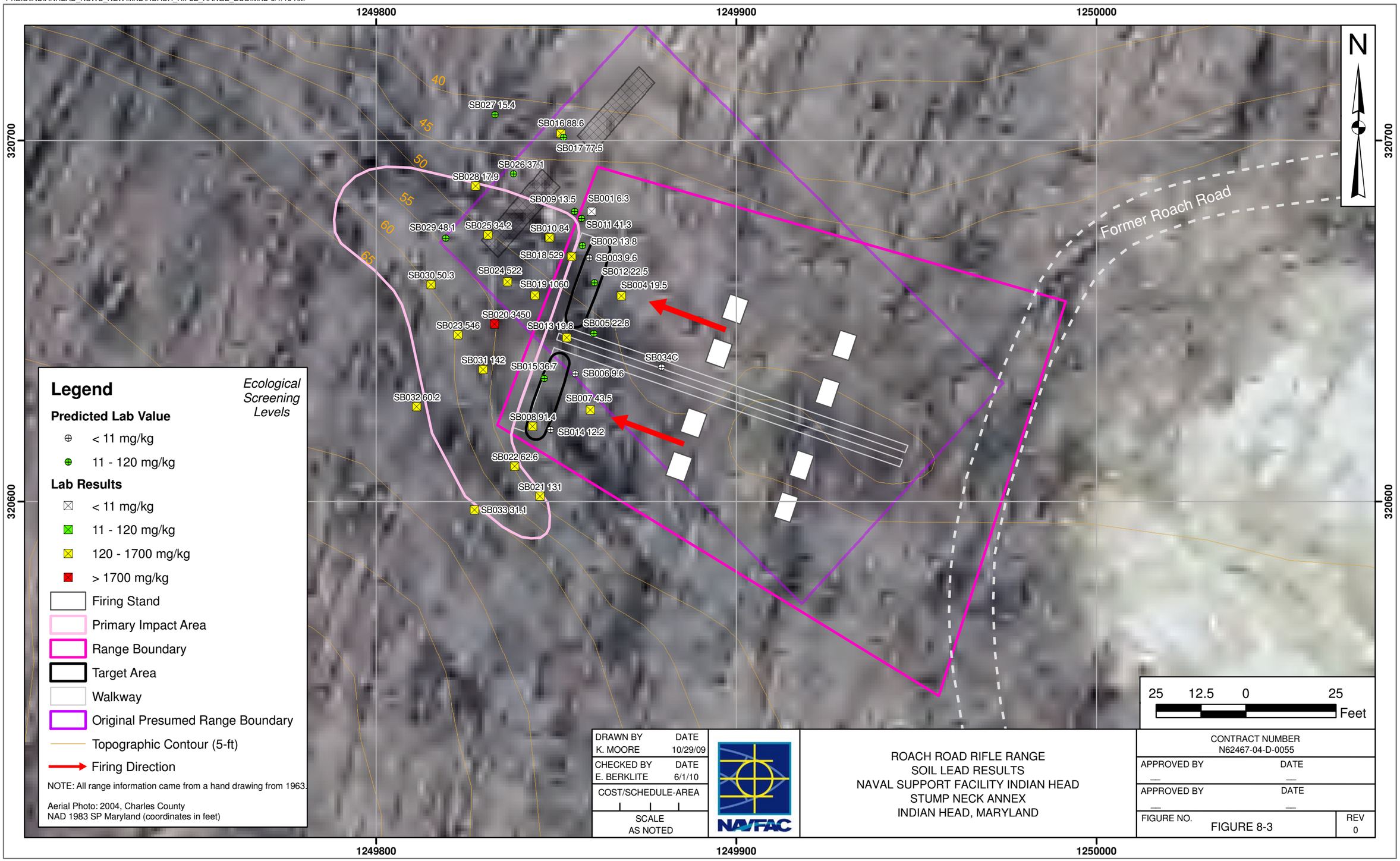
DRAWN BY K. MOORE	DATE 10/29/09
CHECKED BY E. BERKLITE	DATE 6/1/10
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

ROACH ROAD RIFLE RANGE
LEAD RESULTS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER N62467-04-D-0055	
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. FIGURE 8-2	REV 0

P:\GIS\INDIANHEAD_NSWC_NEW\MXD\ROACH_RIFLE_RANGE_ECO.MXD 6/1/10 KM

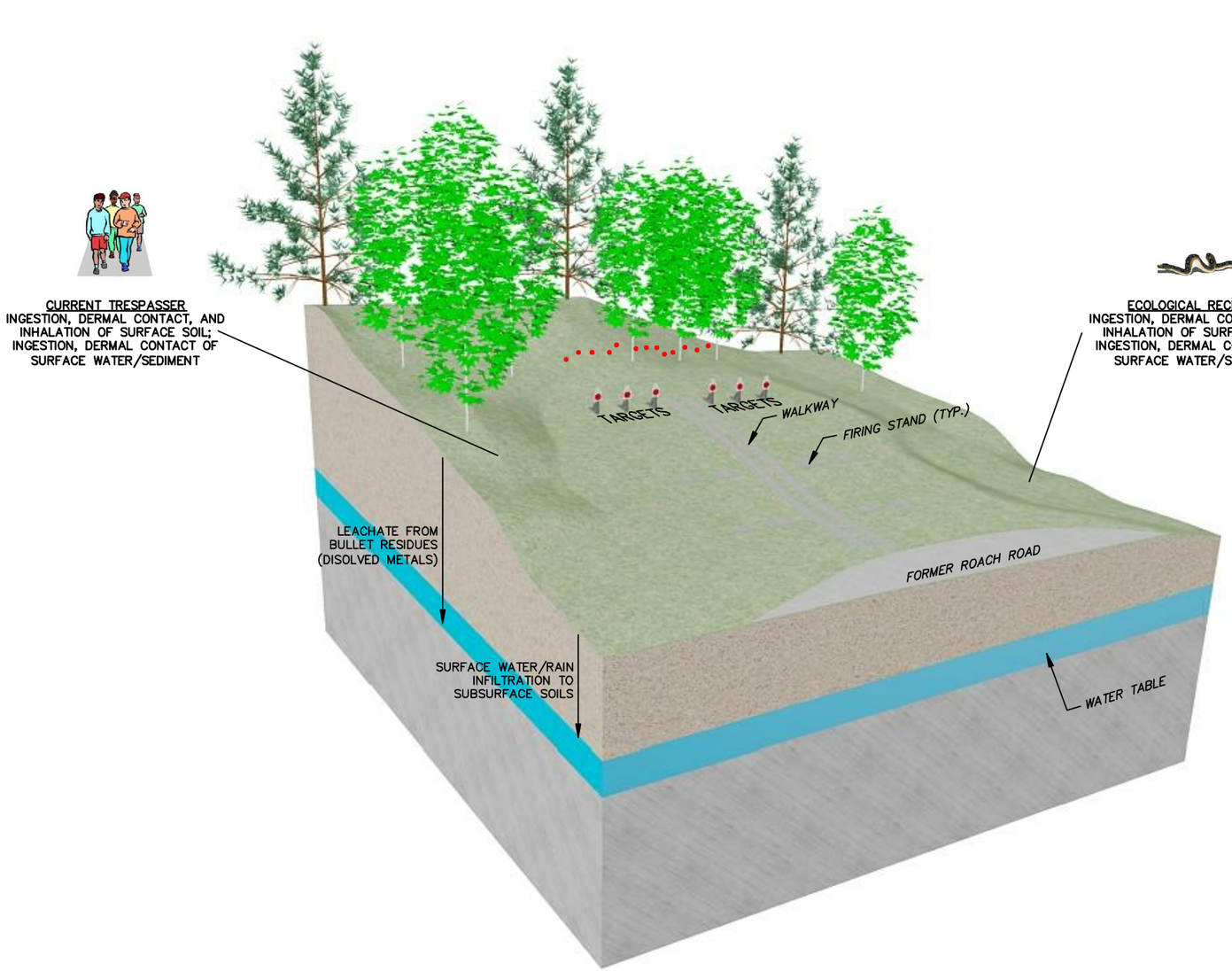


DRAWN BY K. MOORE	DATE 10/29/09
CHECKED BY E. BERKLITE	DATE 6/1/10
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

ROACH ROAD RIFLE RANGE
SOIL LEAD RESULTS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER N62467-04-D-0055	
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. FIGURE 8-3	REV 0



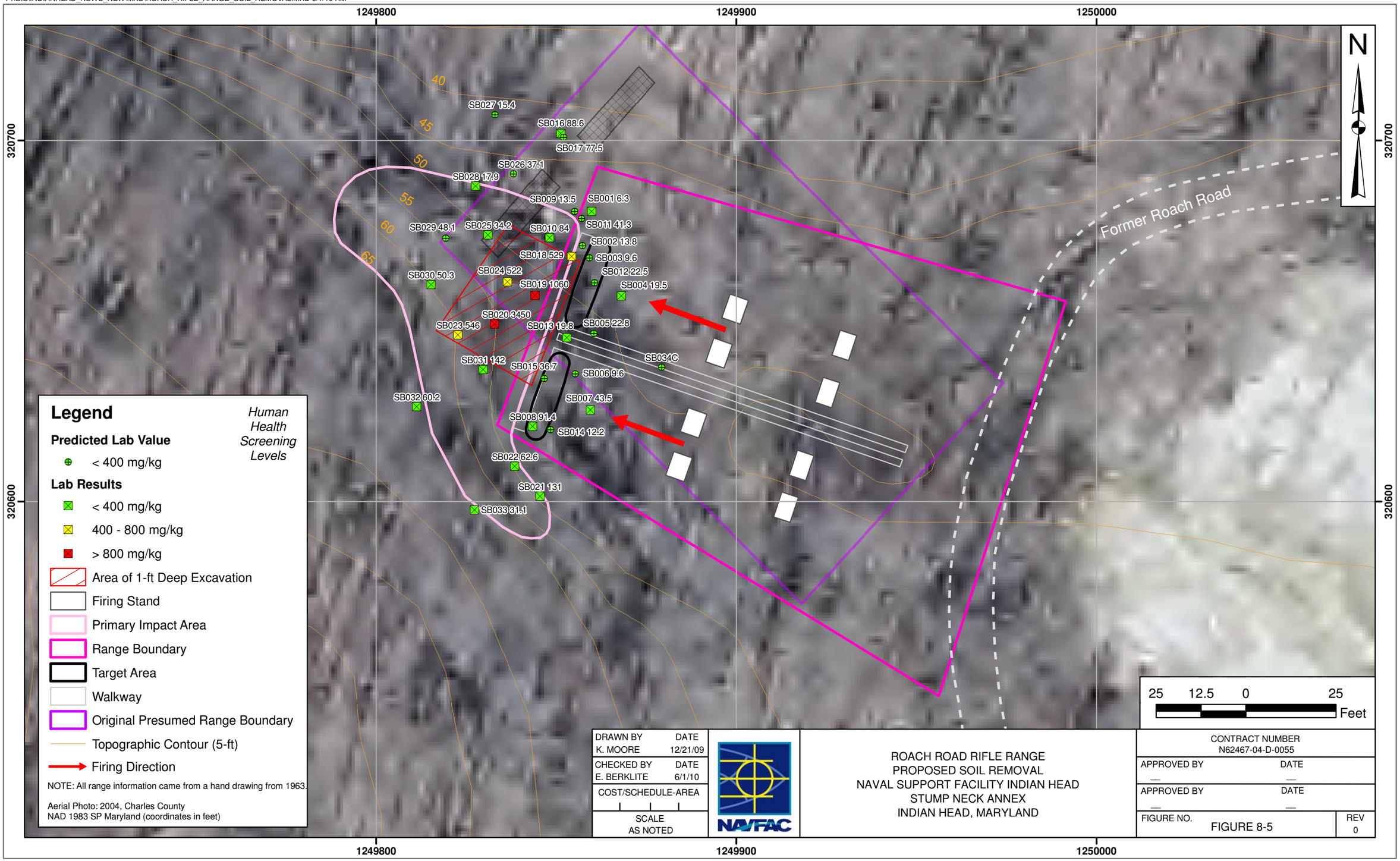
LEGEND

AREA OF BULLET ACCUMULATION

DRAWN BY BH	DATE 12/8/09	ROACH ROAD RIFLE RANGE CONCEPTUAL SITE MODEL NAVAL SUPPORT FACILITY STUMP NECK ANNEX INDIAN HEAD, MARYLAND	CONTRACT NO. 0810
CHECKED BY ---	DATE ---		OWNER NO.
REVISED BY ---	DATE ---		APPROVED BY --- DATE ---
SCALE NOT TO SCALE			DRAWING NO. FIGURE 8-4 REV. 0

R:\0810\Conceptual Site Models\CSM\0810CSM003.dwg PIT CARLY.KRAMER 12/18/2009 10:17:13 AM

P:\GIS\INDIANHEAD_NSWC_NEW\MXD\ROACH_RIFLE_RANGE_SOIL_REMOVAL.MXD 6/1/10 KM



DRAWN BY K. MOORE	DATE 12/21/09
CHECKED BY E. BERKLITE	DATE 6/1/10
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

ROACH ROAD RIFLE RANGE
PROPOSED SOIL REMOVAL
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NUMBER N62467-04-D-0055	
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. FIGURE 8-5	REV 0

APPENDIX A

FIELD FORMS

Tetra Tech NUS, Inc.

BORING LOG

Page 1 of 1

PROJECT NAME: Indian Head / Stump Neck
PROJECT NUMBER: 112G00810
DRILLING COMPANY: Parrat Wolff
DRILLING RIG: Power Probe 9600T

BORING No.: X17-SB001
DATE: 6/11/09
GEOLOGIST: J. Birkett
DRILLER: Josh + Crary

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sample Bkgrd	Borehole**	Driller Bkgrd
X17-SB001-0004	0		1.6/4'		loose	orange/brown	f-c sand w/ some gravel and trace clay		moist				
0850													
X17-SB001-0408	4		3/4'		loose	orange/brown	M-C sand w/some gravel and tr. clay		moist				
0858									↑ ↑ Slough				
			7'										
X17-SB001-0810	8				med stiff	light brown	M-C sand w/some gravel and some clay						
0905	8		2.5/2.5'			orange/brown	↓ ↓		moist				
					stiff	brown	clay tr. sand						
					loose		f-m sand tr. clay						
	10.5				stiff	light brown/brown	clay tr. sand						
				EOB 10.5' bgs									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Indian Head/Stump Neck
PROJECT NUMBER: 112G00810
DRILLING COMPANY: Parrat Wolff
DRILLING RIG: Power Probe 9600T

BORING No.: X17-SB002
DATE: 6/11/09
GEOLOGIST: J. Birkett
DRILLER: Josh + Gary

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density, Consistency, or Rock Hardness	MATERIAL DESCRIPTION: Color	MATERIAL DESCRIPTION: Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Background	Breathing Zone	Drilling Area
X17-SB002-0004	0		12/4'		loose	orange/brown	Sand w/ some gravel tr. clay		Moist				
							2" clay layer at 1'						
X17-SB002-0406	4		4										
	4		4	2.8'/4'	loose	gray/brown	top 2" sand w/ some gravel tr. clay		Moist				
							1' M-C sand tr. clay						
X17-SB002-0608							1.5' sand w/ some gravel and tr. clay						
	8		8										
X17-SB002-0810	8		8	2'/2'	loose	gray/brown	top 1' M-C sand w/ tr clay tr gravel		Moist				
	10		10				bottom 1' M-C sand w/ tr clay some gravel						
				EOB 10' bgs									

0911
0921
0921
0928

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: _____

Drilling Area Background (ppm): _____

Converted to Well: Yes _____ No X Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Indian Head/Stump Neck
PROJECT NUMBER: 112G00810
DRILLING COMPANY: Parrat Wolff
DRILLING RIG: Power Probe 9600T

BORING No.: X17-SB003
DATE: 6/11/09
GEOLOGIST: J. Birkett
DRILLER: Josh+Gary

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	MATERIAL DESCRIPTION: Color	MATERIAL DESCRIPTION: Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Soil/Cuttings	Borehole	Drill Rig BZ
X17-SB003-0004	0		1'/4'		loose	orange/brown	f-c sand some clay some gravel		moist				
	4												
X17-SB003-0406	4		2'/2'		loose	orange/brown	f-c sand tr. clay some gravel		moist				
	6												
X17-SB003-0608	6		4/4'		loose		top 2" f-c sand tr clay + gravel		moist				
					stiff		2" dense clay						
X17-SB003-0810					loose		1' f-c sand tr. clay + gravel						
					med stiff	yellow/brown	2" f sand some silt						
	10				loose	orange/brown	8" f-c sand tr. clay tr. gravel						
				EOB 10' bgs									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): [ ]

Remarks: _____

Converted to Well: Yes ____ No X Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

Page 1 of 1

PROJECT NAME: Indian Head / Stump Neck
PROJECT NUMBER: 112G00810
DRILLING COMPANY: Parratt Wolff
DRILLING RIG: Power Probe 9600T

BORING No.: X-17-SB004
DATE: 6/11/09
GEOLOGIST: J. Birkett
DRILLER: Josh + Gary

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density / Consistency / Moisture / Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sample BZ	Borehole BZ	Driller BZ
X17-SB004-0004	0		1.6'/4'		soft	orange/brown	top 0.4' clay w/some gravel and coarse sand		moist				
					loose		1.2' f-c sand w/ some gravel and tr. clay						
	4												
X17-SB004-0406	4		3'/4'		loose	orange/brown	f-m sand w/ tr. clay and tr. gravel		moist				
X17-SB004-0608	8												
X17-SB004-0810	8		2'/2'		loose	top 1.5'	f-m sand w/ some clay and tr. gravel		moist				
	10					black	0.2' f-m sand tr. clay						
				EOB 10' bgs			0.3' f-m sand some gravel tr. clay						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

Page 1 of 1

PROJECT NAME: Indian Head/Stump Neck
PROJECT NUMBER: 112G00810
DRILLING COMPANY: Parrat Wolff
DRILLING RIG: Power Probe 9600T

BORING No.: X17-SB005
DATE: 6/11/09
GEOLOGIST: J. Birkett
DRILLER: Josh + Gary

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness*	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sample BZ	Borehole BZ	Drilling BZ
X17-SB005-0004	0		2/4'		loose	brown	top 0.5 organics + clay w/ tr f. sand + gravel						
						orange	0.6' f-m sand some clay tr gravel						
1053					stiff	brown	0.2' clay tr. f. sand						
	4				loose		0.7' M-C sand some gravel tr. clay						
X17-SB005-0406	4		3.1'/4'		loose	orange brown	2.4' M-C sand tr clay and gravel						
					stiff		0.1' clay						
1103					loose		0.6' M-C sand tr. gravel and clay						
X17-SB005-0608	8												
X17-SB005-0810	8		1.6'/2'		loose	orange brown	f-c sand tr clay and some gravel						
1110	10												
				EOB 10' bgs									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Indian Head/Stump Neck
PROJECT NUMBER: 112G00810
DRILLING COMPANY: Parrat Wolff
DRILLING RIG: Power Probe 9600T

BORING No.: X17-SB006
DATE: 6/11/09
GEOLOGIST: J. Birkett
DRILLER: Josh + Gary

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density / Consistency or Rock Hardness*	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sample Bz	Borehole	Borehole Bz
	0		1.8/4		med stiff	orange/brown	top 1' clay +silt w/ some f. sand		moist				
1120 X17-SB006-0004					loose		0.8' f-m sand tr. clay some gravel						
	4												
1125 X17-SB006-0406 X17-SB006-0608	4		3.3/4		med stiff		top 0.2' sandy clay		moist				
							0.5' f-m sand tr. clay						
					loose		0.2' f-m sand tr. clay gravelly						
							2.4' f-c sand tr. clay some gravel						
	8												
1130 X17-SB006-0810	8		2/2				top 0.5' f-c sand tr. clay and some gravel		moist				
					med stiff		0.4' sandy clay tr. gravel						
	10				loose		1.1' f-c sand some gravel tr. clay						
				EOB 10' bgs									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes X No Well I.D. #:

Tetra Tech NUS, Inc.

BORING LOG

Page 1 of 1

PROJECT NAME: Indian Head | Stump Neck
PROJECT NUMBER: 112G00810
DRILLING COMPANY: Parrat Wolff
DRILLING RIG: Power Probe 9600T

BORING No.: X17-SB007
DATE: 6/11/09
GEOLOGIST: J. Birkett
DRILLER: Josh + Gary

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sample Edge	Sample Core	Sample Bottom
	0		1.2/4		Mod stiff	orange	top 1' clayey f-m sand some gravel		moist				
1137					loose	brown	0.2' m sand tr. clay and gravel						
X17-SB007-0004	4												
X17-SB007-0406	4		3/4		loose		top 1' m sand tr. clay and gravel		moist				
1141					stiff		0.4' m sand some clay						
X17-SB007-0608					loose		1.6' m sand tr. clay and gravel						
	8												
X17-SB007-0810	8		2/2				top 0.5' f-m sand tr. clay and gravel		moist				
1147							0.4' m-c sand some clay and tr. gravel						
	10						1.1' f-m sand tr. clay and some gravel						
				EOB 10' bgs									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER № 028252

PAGE 1 OF 8

PROJECT NO: 112G00810	FACILITY: Indian Head	PROJECT MANAGER R. Basinski	PHONE NUMBER 4129218308	LABORATORY NAME AND CONTACT: Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE) [signature]		FIELD OPERATIONS LEADER J. Goerdt	PHONE NUMBER 4124430244	ADDRESS 600 Technology Way
		CARRIER/WAYBILL NUMBER Fed Ex / 863138879042		CITY, STATE Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): P | G | G

PRESERVATIVE USED: HNO3 | 4oC | 4oC

TYPE OF ANALYSIS: TAL metals SW846 6020 3010 | PAH SW846 8270 | Metals SW846 6020A/3050B

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TAL metals SW846 6020 3010	PAH SW846 8270	Metals SW846 6020A/3050B						COMMENTS
6/17	1400	RB06170901	QC	-	-	QC	G	3	1	2							Rinsate
6/16	1245	SB06160901	QC	-	-	QC	G	2	1	1							Source
6/17	1400	IDW06170901	QC	-	-	QC	G	3	1	2							IDW
6/15	1140	X25SS0010001	001	0	1	SO	G	1			1						
↓	1300	" 0040001	004	↓	↓	↓	↓	1			1						
	1535	" 0080001	008					1			1						
	1405	" 0100001	010					3			3						ms/msd
	1305	" 0130001	013					1			1						
	1155	" 0160001	016					1			1						
	1255	" 0180001	018					1			1						
	1255	" 0190001	019					1			1						
	1313	" 0200001	020					1			1						
	1327	" 0210001	021					1			1						

1. RELINQUISHED BY [signature]	DATE 6-18-09	TIME 1700	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No. 028254 | PAGE 2 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	India Head	R. Budinski	4129218308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goerdt	4129430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		FedEx/863138879042		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ]
[ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE (YEAR 2009)	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS: Explosives 8330 / VOCs 8260 / SVOCs 8270 / 6020/3050B / 4oC	COMMENTS
									G			
6/15	1345	X2555007 0001	007	0	1	SO	G	1	1			
	1325	" 022 0001	022					1	1			
	1310	" 023 0001	023					1	1			
	1250	" 024 0001	024					1	1			
	1230	" 025 0001	025					1	1			
	0000	FD06150901	QC					1	1			
	0000	FD06150902	QC					1	1			
6/16	950	X1455130 0001	130					1	1			
	950	" 131 0001	131					1	1			
	935	" 132 0001	132					1	1			
	1035	" 134 0001	134					1	1			
	1030	" 135 0001	135					1	1			
	1100	" 138 0001	138					1	1			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER Nº 028255 | PAGE 3 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	4129218308	Katahdin Labs / Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		FedEx/863138879042		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: Metals SW846 6020B/3050B

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS									COMMENTS
6/16	1005	X145513900001	139	0	1	SO	G	1	1								
↓	1010	" 140 0001	140	↓	↓	↓	↓	1	1								
↓	1015	" 141 0001	141	↓	↓	↓	↓	1	1								
6/10	1517	X15SD033 0006	033	0	.5	SD	G	1	1								
6/10	1355	X15SD030 0006	030	0	.5	SD	G	1	1								
6/17	910	X145S142 0001	142	0	1	SO	G	1	1								
6/17	905	X145B102 0203	102	2	3			1	1								
6/16	1125	X145B111 0102	111	1	2			1	1								
6/17	920	X145S143 0001	143	0	1			1	1								
6/16	1110	X145B084 0102	084	1	2			1	1								
6/16	0000	FD06160901	QC	—	—			1	1								
6/14	1500	X175B014 0102	014	1	2			1	1								
6/11	1525	X175S016 0001	016	0	1	↓	↓	1	1								

1. RELINQUISHED BY	DATE 6-18-09	TIME 1700	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No. 028256 | PAGE 4 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bajnski	4129218308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		Fed Ex / 863138879042		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ]
[ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)								COMMENTS
										G	G						
PRESERVATIVE USED										4°C	4°C						
TYPE OF ANALYSIS										Metals SW846 6020 / 8151	PAHs SW846 8270						
6/11	1500	X175501900001	019	0	1	SO	G	3	3								MS/MSD
6/11	1530	" 0220001	022					1	1								
6/11	1545	" 0240001	024					1	1								
6/12	1020	" 0250001	025	↓	↓			1	1								
6/14	1440	X175B0250102	025	1	2			1	1								
6/12	1040	X175502700001	027	0	1			1	1								
6/12	1050	X175502850001	028	0	1			1	1								
6/11	0000	FD0611090 1	QC					1	1								
6/13	1515	X165501300001	042					1	1								
6/14	900	" 0540001	054					1	1								
	855	" 0570001	057					1	1								
	930	" 0610001	061					1	1								
↓	1040	" 0730001	073	↓	↓	↓	↓	1	1								

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. — CHAIN OF CUSTODY — NUMBER № 028258 — PAGE 6 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bawinski	4129218308	Katahdin Labs / Andrea Colby

SAMPLERS (SIGNATURE): [signature]

FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
J. Goerdt	4124430244	600 Technology Way

CARRIER/WAYBILL NUMBER	CITY, STATE
Fed Ex / 863138879042	Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G, G
PRESERVATIVE USED: 4°C, 4°C
TYPE OF ANALYSIS: M 8015 / 546 6020A / 3050B PH TOC LCL; PAH

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	M 8015 / 546 6020A / 3050B PH TOC LCL	PAH							COMMENTS
6/13	1140	X1655008 0001	008	0	1	SO	G	1	1								
↓	1315	" 0130001	013	↓	↓	↓	↓	1	1								
↓	1245	" 0170001	017	↓	↓	↓	↓	1	1								
↓	1255	" 0200001	020	↓	↓	↓	↓	1	1								
↓	1345	" 0250001	025	↓	↓	↓	↓	3	3								ms/msd
↓	1425	" 0320001	032	↓	↓	↓	↓	1	1								
	0000	FD06130901	QC	0	1	SO	G	1	1								
6/15	1355	X2555032 0001	032	↓	↓	↓	↓	2		2							
↓	1255	" 0190001	019	↓	↓	↓	↓	2		2							
↓	1305	" 0130001	013	↓	↓	↓	↓	2		2							
↓	1335	" 0060001	006	↓	↓	↓	↓	~~6~~ 2		2	(6) PAH TOC						
~~6/11~~	~~1500~~	~~X1755019 0001~~	~~019~~	↓	↓	↓	↓	~~6~~ 2		~~6~~	~~6~~						~~ms/msd~~
~~6/15~~	~~0000~~	~~FD06150903~~	~~QC~~	↓	↓	↓	↓	2		~~2~~	2						

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
[signature]	6-18-09	1700			
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: X1755019 0001 - ms/MSD 6 jars (2.5oz)

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. — CHAIN OF COSTODY

CHAIN OF CUSTODY | NUMBER № 028259 | PAGE 7 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bozinski	4129218308	Katahdin Labs / Andrea Colby

SAMPLERS (SIGNATURE): [signature]

FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
J. Goerdt	4124430244	600 Technology Way / ~~34 Dogwood Ln~~

CARRIER/WAYBILL NUMBER	CITY, STATE
Fed Ex / 863138879042	Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G, G
PRESERVATIVE USED: 4°C, 4°C
TYPE OF ANALYSIS: Metals 6020A/7470A... (846 6020A/3050B); pH TOC CEC; PAH

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	Metals	pH TOC CEC	PAH						COMMENTS
6/13	0000	FD06130902	QC	0	1	SO	G	2			2						
6/13	1450	X16SS0370001	037	↓	↓			~~8~~ 2			~~8~~ 2						~~MS/MSD~~
6/13	1325	" 0230001	023	↓	↓			2			2						
6/13	0000	FD06130903	QC	↓	↓			2			2						
6/14	1450	X17SB0110102	011	1	2			1	1								
6/14	1450	" 0130102	013	1	2			1	1								
6/11	1314	X17SS0140001	014	0	1			1	1								
6/11	1053	X17SB0050004	005	0	4			3	3								MS/MSD
6/11	1110	X17SB0050810	005	8	10			1	1								
6/11	1120	X17SB0070004	007	0	4			1	1								
6/11	1120	X17SB0060406	006	4	6			1	1								
6/15	1320	X25SS0330001	033	0	1			1	1								
6/11	840	X17SB0010004	001	0	4			1	1								

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
[signature]	6-18-09	1500			
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No. 028260 | PAGE 8 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	4129218308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		Fed Ex / 863138879042		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: TCL SVOCs 8270C/3550B; TAL Metals 6010B/7471A

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS									COMMENTS
6/11	917	X175B00020406	002	4	6	SO	G	1	1								
↓	951	" 0030608	003	6	8	↓	↓	1	1								
	1010	" 0040004	004	0	4			1	1								
↓	1013	" 0040608	004	6	8			1	1								
6/15	1208	X255502800001	028	0	1			3	3								MS/MSD
↓	1245	" 0300001	030	0	1			1	1								
	1305	" 0310001	031	0	1			1	1								
↓	1355	" 0320001	032	0	1	↓	↓	1	1								

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No. 028253 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bawinski	9129218308	Analytical Labs / Sue Baer
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	412443 0244	34 Dogwood Ln
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 863138879053		Middletown, PA 17057

STANDARD TAT [X]
RUSH TAT [ ]
[ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS NG 8046-8330								COMMENTS
									G	4°C									
6/16	1245	SB06160901	QC	-	-	QC	G	1	1										Source
6/17	1400	RB06170901		-	-		G	1	1										Rinsate
6/17	1400	IDW06170901		-	-		G	1	1										Decon

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		
COMMENTS					

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028238 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Rusinski	4129218425	Analytical Lab Serv. / Sue Baer
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goerdt	4124430244	34 Dogwood Ln
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		Fed Ex / 8631 3888 1991		Middleton, PA 17057

STANDARD TAT [X]
RUSH TAT [ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS: TCL VOCs SW-846 8260B	TCL SVOCs SW-846 8270C	Explosives SW-846 8330	4°C					COMMENTS
									G										
5/29	1215	X1455001SB001X	001	0	1	SO	C	1	1										
	1205	X1455002SB001X	002					1	1										
	1310	X1455003SB001X	003					1	1										
	1315	X1455004SB001X	004					1	1										No associated bo gage
	1420	X1455005SB001X	005					1	1										
	1404	X1455006SB001X	006					1	1										
	1451	X1455007SB001X	007					3	3										MS/MSD No bagge
	0000	FD05290901	QC					1	1										
6/1	1030	X1455008SB001X	008					1	1										
6/1	1110	X1455009SB001X	009					1	1										
6/1	~~1407~~	~~X1455059SB001X~~	~~059~~	~~0~~	~~1~~	~~SO~~	~~C~~	~~1~~	~~1~~		QBB 6/11/09								
6/1	~~1421~~	~~X1455060SB001X~~	~~060~~	~~0~~	~~1~~	~~SO~~	~~C~~	~~1~~	~~1~~		QBB 6/11/09								

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	~~6-1-09~~ 6-2-09	1730	1. RECEIVED BY		
2. RELINQUISHED BY	6-2-09		2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS: No associated sample baggie for 4C or 7C.

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No. 028239 | PAGE 1 OF 2

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Ewinski	4129218308	Katahdin Labs / Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goeydt	4129218425	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 863138882005		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G
PRESERVATIVE USED: 4°C 4°C

TYPE OF ANALYSIS: SW8463050B/6020A; SW8463546 8270 (PAH)

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS			COMMENTS
03 5/28	1240	X1555001 0001	001	0	1	SO	G	1	1		
	1248	X1555002 0001	002						1		
	1254	X1555003 0001	003						1		
	1315	X1555011 0001	011						1		
	1357	X1555015 0001	015						1		
	1400	X1555019 0001	019					3	3		MS/MSD
	1431	X1555021 0001	021						1		
	1512	X1555028 0001	028						1		
	1452	X1555029 0001	029						1		
5/28	0900	X1555031 0001	031						1		
	0855	X1555032 0001	032						1		
	0914	X1555035 0001	035						1		
	0930	X1555038 0001	038						1		

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY:	6-1-09	1730	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER Nº 028241 | PAGE 2 OF 2

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	4129218308	Katahdin Labs/ Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER: J. Goerdt	PHONE NUMBER: 4129218425	ADDRESS: 600 Technology Way
		CARRIER/WAYBILL NUMBER: Fed Ex/863138882005		CITY, STATE: Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	TYPE OF ANALYSIS: SW846 8270 (PAH)	PRESERVATIVE USED: 4°C								COMMENTS
									G										
5/28	934	X15550490001	049	0	1	SO	G	1	1										
5/28	910	X15550500001	050	↓	↓	↓	↓	1	1										
5/20	1415	X15550520001	052					1	1										
↓	1404	X15550530001	053					1	1										
↓	1250	X15550540001	054	↓	↓	↓	↓	1	1										

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-1-09	1730	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No. 028243 | PAGE 2 OF 2

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Babinski	4129218308	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4129218425	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex 8631 3888 1947		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: SW 846 8260B / 6020A Pb Sn Zn

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS									COMMENTS
5/28	914	X1555035(0001	035	0	1	SO	G	1	1								
5/28	901	X1555037(0001	037					1	1								
6/2	808	X1555061(0001	061					1	1								
	814	X1555064(0001	064					3	3								MS/MSD
	825	X1555066(0001	066					1	1								
	845	X1555068(0001	068					1	1								
	905	X1555070(0001	070					1	1								
	920	X1555071(0001	071					1	1								
	901	X1555072(0001	072					1	1								
	847	X1555073(0001	073					1	1								
↓	1430	X1555076(0001	076	↓	↓	↓	↓	1	1								
6/3	0000	FD060309 01	QC	—	—	SO	G	1	1								

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-3-09	1230	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No. 028242 | PAGE 1 OF 2

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Badinski	4129218308	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goerdt	4129218425	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		Fed Ex / 8631 3888 1947		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: SW846 8050B/6020A Sb As Cu Pb Sn Zn

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS									COMMENTS
5/29	1215	X1455001C0001	001	0	1	SO	C	1	1								
	1205	X1455002C0001	002					1	1								
	1310	X1455003C0001	003					1	1								
	1315	X1455004C0001	004					1	1								
	1420	X1455005C0001	005					1	1								
	1404	X1455006C0001	006					1	1								
	1451	X1455007C0001	007					1	1								
6/1	1030	X1455008C0001	008					1	1								
6/1	1110	X1455009C0001	009					1	1								
5/27	1312	X1555005 0001	005				G	1	1								
5/27	1326	X155007 0001	13007				G	1	1								
6/2	801	X155B0050102	005	1	2		G	1	1								
5/27	1410	X1555018 0001	018	0	1		G	1	1								

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-3-09	1200	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER № 028244

PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Businski	4129218308	Analytical Lab Serv / Sue Baer
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
[signature]		J. Goerdt	4124430244	34 Dogwood Ln
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 8631 3888 2027		Middletown, PA 17057

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): P

PRESERVATIVE USED: 4°C

TYPE OF ANALYSIS: Nitroglycerin SW846 8330B

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	Nitroglycerin SW846 8330B							COMMENTS
6/9	1100	X15SS077C0001	077	0	1	SO	C	1	1							
6/9	1030	X15SS078C0001	078	0	1	↓	↓	1	1							
6/11	1220	X17SS008C0001	008	0	1	↓	↓	1	1							
6/11	1330	X17SS009C0001	009	0	1	↓	↓	1	1							
6/11	1400	X17SS010C0001	010	0	1	↓	↓	1	1							

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	6-11-09	1800	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No. 028246 | PAGE 1 OF 1

PROJECT NO: 112G00810	FACILITY: Indian Head	PROJECT MANAGER R. Brzinski	PHONE NUMBER 4129218308	LABORATORY NAME AND CONTACT: Analytical Lab Serv. / Sue Baer
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER J. Goerdt	PHONE NUMBER 4124430244	ADDRESS 34 Dogwood Ln
		CARRIER/WAYBILL NUMBER Fed Ex / 863138882049		CITY, STATE Middletown, PA 17057

STANDARD TAT [X]
RUSH TAT [ ]
[ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G): P	PRESERVATIVE USED: 4°C	TYPE OF ANALYSIS: Arsenic 6010B	COMMENTS
6/15	1500	X25550340001	034	0	1	SO	C	1	1			
6/14	1245	X16550800001	080	↓	↓	↓	↓	1	1			
6/14	1250	X16550810001	081	↓	↓	↓	↓	1	1			

1. RELINQUISHED BY	DATE 6/15/09	TIME 1730	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME
COMMENTS					

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER Nº 028245 | PAGE 1 OF 5

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G008 10	Indian Head	R. Basinski	4129218038	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goodall	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FedEx / 863138882016		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE (YEAR 2009)	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS: SW 8463050B/6030A Sb As Cr Pb Se Zn	4oC	COMMENTS
									G				
6/10	1100	X150776<0001 (SS)	077	0	1	SO	C	1	1				
6/10	1030	X155507B<0001	078	0	1	SO	C	1	1				
6/11	1220	X1755008<0001	008	0	1			1	1				
6/11	1330	X1755009<0001	009	0	1			1	1				
6/11	1400	X1755010<0001	010	0	1		↓	1	1				
6/2	1200	X1455022 0001	022	0	1		G	1	1				
6/2	1243	X1455033 0001	033	0	1		G	1	1				
6/2	1252	X1455035 0001	035	0	1		G	1	1				
6/2	1306	X1455039 0001	039	0	1		G	1	1				
6/2	1329	X1455043 0001	043	0	1		G	1	1				
6/3	1426	X1455048 0001	048	0	1		G	1	1				
6/3	1103	X1455058 0001	058	0	1		G	1	1				
6/3	1303	X1455062 0001	062	0	1	↓	G	1	1				

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-15-09	1530	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER № 028250

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	412 921 8308	Katahdin / Andrea Colby

SAMPLERS (SIGNATURE): [signature]

FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
J. Goerdt	412 443 0244	600 Technology Way

CARRIER/WAYBILL NUMBER	CITY, STATE
Fed Ex / 8631 3888 2016	Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G, G, G

PRESERVATIVE USED: 4°C, 4°C, 4°C

TYPE OF ANALYSIS: pH, TEC, TOC / SW846 8270 PAH / SW846 3050B/6020A Sb As Cr Pb Sn Zn

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	pH, TEC, TOC	SW846 8270 PAH	SW846 3050B/6020A Sb As Cr Pb Sn Zn						COMMENTS
6/3	1103	X14SS0580001	058	0	1	SO	G	3	3								MS/MSD
6/4	1435	X14SS1170001	117					1	1								
5/27	1510	X15SS0330001	033					1	1								
5/28	1014	X15SS0480001	048					1	1								
6/10	1252	X15SD0230006	023		.5	SD		1	1								
6/13	1400	X16SS0310001	031		1	SO		1	~~1~~	1							
6/13	1500	X16SS0400001	040					1		1							
6/15	1500	X25SS034C0001	034				C	1			1						
6/14	1245	X16SS080C0001	080				C	1			1						
6/14	1250	X16SS081C0001	081				C	1			1						
6/4	1130	X14SS0940001	094				G	1			1						
6/9	1248	X14SS1260001	126				G	1			1						
6/4	1250	X14SS0870001	087				G	1			1						

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
[signature]	6-15-09	1530			
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No. 028249 | PAGE 4 OF 5

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bujnski	4129218308	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 863138882016		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)										COMMENTS
									G	G									
									PRESERVATIVE USED										
									4°C	4°C									
									TYPE OF ANALYSIS										
									SW8468270 PAH										
									pH, TOC, CEC										
6/13	1555	X1655051 0001	051	0	1	SO	G	1	1										
6/14	0845	X1655056 0001	056					1	1										
6/14	0855	X1655057 0001	057					1	1										
6/13	1105	X1655002 0001	002		↓	↓		1	1										
6/10	1252	X155D023 0006	023		.5	SD		1	1										
6/1	900	X155D003 0006	003					1	1										
6/1	912	X155D005 0006	005					1	1										
6/1	900	X155D003 0006	003		↓	↓		1		1									
6/4	1250	X1455087 0001	087		1	SO		1		1									
~~6/3~~	~~1103~~	~~X1455058 0001~~	~~058~~					1		1									e-mail to Andrea asking to discuss this one (it is a duplicate)
6/13	1140	X1655008 0001	008					1		1									
6/14	1040	X1655073 0001	073					1		1									
6/2	1200	X1455022 0001	022	↓	↓	↓	↓	1		1									

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-15-09	1530	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

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FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER № 028251 | PAGE 5 OF 5

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bodinski	412 921 8308	Katahdin / Andrea Colby

SAMPLERS (SIGNATURE)	FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
[signature]	J. Goeddel	412 443 0244	600 Technology Way
	CARRIER/WAYBILL NUMBER		CITY, STATE
	Fed Ex / 8631 3888 2016		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G, G
PRESERVATIVE USED: 4°C, 4°C
TYPE OF ANALYSIS: SW846 3050B/6020A SO A3 Cu Pb Sb Zn; SW846 8270 PAH

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	SW846 3050B/6020A SO A3 Cu Pb Sb Zn	SW846 8270 PAH							COMMENTS
6/10	1252	X15SD0230006	023	0	.5	SD	G	1	1								
6/10	1115	X15SD0180006	018	↓	↓	↓	↓	1	1								
6/10	1050	X15SD0130006	013	↓	↓	↓	↓	1	1								
6/1	0912	X15SD0050006	005	↓	↓	↓	↓	1	1								
6/1	0900	X15SD0030006	003	↓	↓	↓	↓	1	1								
6/4	1323	X14SS1080001	108	↓	1	SO	↓	1	1								
6/4	1435	X14SS1170001	117	↓	↓	↓	↓	1	1								
6/3	1307	X14SS0630001	063	↓	↓	↓	↓	1	1								
6/3	1439	X14SS0720001	072	↓	↓	↓	↓	1	1								
6/13	1110	X16SS0030001	003	↓	↓	↓	↓	1	1								
6/13	1325	X16SS0260001	026	↓	↓	↓	↓	1		1							
6/13	1140	X16SS0080001	008	↓	↓	↓	↓	1		1							

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	6-15-09	1530	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER № 028261 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bassuski	4129218308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goeckel	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		Fed Ex / 8631 3888 1969		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)		PRESERVATIVE USED		TYPE OF ANALYSIS								COMMENTS
									G	G	4°C	4°C									
6/4	1428	X145S120 0001	120	0	1	SO	G	3	3												MS/MSD
6/17	0000	FD061709 01	QC	0	1	SO	G	1	1												
~~6/13~~	~~1350~~	~~X165S028 0001~~	~~028~~	~~0~~	~~1~~	~~SO~~	~~G~~	~~2~~	~~2~~	~~2~~											~~MS/MSD~~
6/15	0000	FD06150904	QC	0	1	SO	G	2	2	2											

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-19-09	1000	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No. 028257 | PAGE 5 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	4129218308	Katahdin Labs / Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		Fed Ex / 863138879042		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)									COMMENTS
									G	G								
									PRESERVATIVE USED									
									4°C	4°C								
									TYPE OF ANALYSIS									
									RW TOC	LEC								
									MCKAS									
									SW8466020/3520B									
6/13	1315	X16550130001	013	0	1	SO	G	1	1									
6/13	1515	X16550420001	042	↓	↓	↓	↓	1	1									
6/11	840	X175$001000 (4)	001					1	1									
6/14	1450	X17550130001	013					1	1									
6/12	1050	X17550280001	028					1	1									
6/17	1055	X16550790001	079					1	93	1								
6/16	1350	" 0870001	087					1		1								
6/17	1020	" 0900001	090					1		1								
	1530	" 0910001	091					1		1								
	1515	" 0920001	092					1		1								
	1500	" 0930001	093					1		1								
	1440	" 0940001	094					1		1								
↓	1440	" 0950001	095	↓	↓	↓	↓	1		1								

1. RELINQUISHED BY	DATE 6-18-09	TIME 1700	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS:

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No. 028248 | PAGE 3 OF 5

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	4129218308	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Gorrell	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FedEx / 8631 3888 2016		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ]
[ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: SW 8260 B, 8270 C

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS		COMMENTS
6/14	1015	X165S0780001	078	0	1	SO	G	1	1	
6/14	1245	X165S080C0001	080				C	1	1	
	1250	X165S081C0001	081				C	1	1	
	1100 1245	X165S0710001	071				G	1	1	
	925	X165S0620001	062					1	1	
	1040	X165S0730001	073					1	1	
	955	X165S0760001	076					3	3	MS/MSD
	1130	X165S0090001	009					1	1	
	1350 1385	X165S0140001	014					1	1	
	1250	X165S0190001	019					1	1	
6/13	1315	X165S0130001	013					1	1	
	1515	X165S0420001	042					1	1	
	1525	X165S0460001	046					1	1	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-15-09	1530	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

May 26, 2009 — Jake Birkett

0830	JB arrive @ Enterprise
0900	Leave Williamsburg for Waldorf, MD
1145	Arrive @ Holiday Inn
	Call Jim Goerdt (JG)
1500	Meet JG, head to Pass Office
	@ Indian Head
1530	Pass Office closed for Day
	Head back to hotel

JBB 5/26/09

May 27, 2009 — Jake Birkett
Cloudy Humid High around 70 — Jim Goerdt

0715	Meet Jim in Lobby load up truck
0745	Get Passes
	Meet contact
0845	Head to Stump Neck
0850	@ Stump Neck Meet UXO tech
0900	lay out sample grid @ X15 site
1145	Break For Lunch
1215	Prep for Hand Augering
1225	Hand Auger @ Site X15
1545	
1600	Head over to storage building
	w/ Ron (UXO Tech)
1700	Leave Stump Neck For home depot
	For buckets
	4 bought 5
1740	Leave for hotel

JBB 5/27/09

May 28, 2009 — Jake Birkett
Morning Cloudy Foggy Calm — Ron Coleman
Afternoon Cloudy few Showers Late 80° — Jim Goerdt

0700 Leave hotel For Stump Neck
0730 Arrive at Stump Neck staging Area
Old Potomac River Gun Club
Meet up with Ron
0800 Meet with JG
0845 At Site X-15 Start Hand augering
1030 start GPS at collection Points
Leave X15 to Potomac River Gun Club (PRGC)
1100-1130 Lunch
1130 Leave For Site X15 to GPS rest of points
@ X15-050 GPS Froze; hard restart
· X15-050 might be in meters instead of feet
· collect X15-050, -051, -052, -053, 054, -056, -057C, and -058C
1400 Leave Site X15 for PRGC
1600 Leave site get 300 gallon bags
1700 @ Hotel

JBB 5/28/09

May 29, 2009 — Jake Birkett
Morning Clear Hazy Calm 70° — Ron Coleman
Sunny Partly Cloudy 80° — Jim Goerdt

0700 Leave hotel
0730 Arrive at PRGC
0800 At Marine Rifle Range (X14)
Pinpoint sample locations w/ pinflags
1100 Leave X14 for PRGC
Lunch
1130 start sampling firing lines (composite)
@ Marine Rifle Range X14
1530 Sampled Firing lines 10-17 (7 total)
Dump Purge Water
1630 Leave Stump Neck for rental place
1700 Arrive @ hotel

JBB 5/29/09

June 1, 2009
70's mostly sunny

Jake Birkett (JB)
Jim Groerdt (JG)
Ron Coleman (RC)

0645 Leave house
0925 Arrive @ Stump Neck
- Finished last two firing line composites X14-008C and X14-009C @ Marine Rifle Range
- Collect 5 base samples at first (closest) berm X14-010 through X14-014
- Clear access to sampling areas on berm
- Collect X15-059C and X15-060C @ Skeet range (few clay pigeons in front of junipers)
- Pack up coolers with specified PAH samples and Ship to Katahdin Analytical Services

1850 Arrive @ hotel

JBB 6/1/09

June 2, 2009
High 80's sunny humid

Jake Birkett
Jim Groerdt
Ron Coleman

0700 Leave hotel
0730 Arrive on site
Collect step outs @ Skeet Range X15
For SB05, SB07, SB13, SB41
and 1'-2' samples
CPS in new step out points and sediment samples
Collect berm samples @ Marine rifle range X14
RC 30 total
Clear path to samples
Pack and ship two sample coolers
1650 arrive @ hotel

JBB 6/2/09

June 3, 2009 — Jake Birkett
mid 80 and humid — Ron Coleman
heavy rain + lightning last night trees down — Jim Goerdt

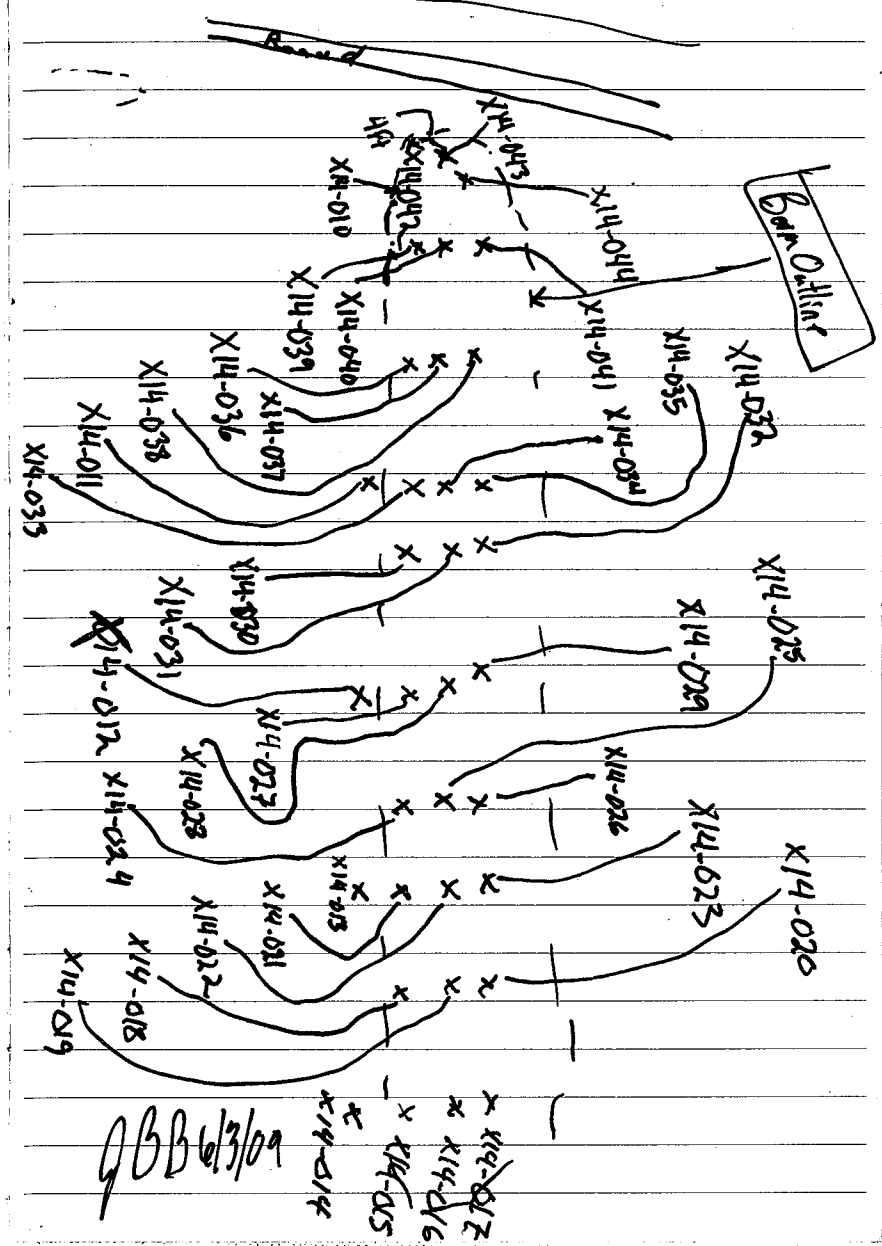
0700 leave hotel
0730 Arrive @ site JBD rental company for weed eater
0800 on site
- Collected all 35 samples @ 2nd berm on Marine Rifle Range
- Bullets found in a few of the samples collected in middle of berm (copper jacket w/ lead core)
- 2nd berm well preserved w/ concrete wall holding up back slope (most berm ~ 6-8 Ft)
- 1st berm is a set of two w/ a ditch in between
  - poorly preserved w/ the height ranging from 7-3 ft
  - no bullets found

1600 finish 2nd berm, RC drop off samples and dump decon water in drum
JB GPS in points @ 1st berm
- GPS freeze shut down but memory wiped call Jim, see what happens tomorrow
- can't get into TerraSync bc don't know serial # for program

1730 Leave site
1800 @ hotel

JBB 6/3/09

First Berm Marine Rifle Range R-14



June 4, 2009 — Jake Birkett, Ron Coleman

High 60s overcast humid w/ few drizzle

0700 Leave hotel

0730 @ site

- Prep to sample bullet impact hillside for Marine Rifle Range (45 samples total)
- During sampling noticed in the middle a slump had occured (when is uncertain) but might expose clean deeper soil while soil w/ bullet frags slide down hill
- Bullets frags not found in cores but seen on surface some ever downhill of 1st line (10-12 feet) above road
- Vegetation not keeping soil in place well alot of erosion w/ rounded pebbles littering most hillside
- Finish hill side look a Roach Road Range, not certain the location, call Jim Grocott tomorrow JBB
- Clean up site dump purge water in ~~bucket~~ drum

1630 Leave site

1700 @ hotel

JBB 6/4/09

June 5, 2009 — Jake Birkett, Ron Coleman

70° Heavy Rain

0700 Leave hotel

0730 @ Site

- Walk Roach Road Pistol Range
- Not sure what the orientation of the site is (No hillslope behind perceived firing direction)
- Call Jim Groecott to talk about Roach Rd. Roach Rd
- Not Figured out wait till June 8 to shoot

1200 Pack up site and leave for home

1500 Leave Indian Head Arrive @ home

JBB 6/5/09

June 8, 2009

Jacob Birkett
Ron Coleman
Jim Gossett

Mid 80°s sunny

1000 Leave Home for Indian Head
1230 Pick up w/ Ron generator and leave for Stump Neck
1300 Arrive @ Stump Neck
- Prep for week
- GPS in 1st berm samples X14-10 through 44
- ~~Check subcontra~~ JBB
- Survey Roach Rd Rifle Range w/RC+JG
  - Sampling locations uncertain even w/ GPS points which seem to far from the road (Hold off on sampling site)

1800 Leave Stump Neck
1830 At hotel

JBB 6/8/09

Jake Birkett
Ron Coleman
Jim Gossett

June 9, 2009

Thunderstorms early (7:30) and late (1800); sunny/cloudy high 80°s

0700 leave hotel
0730 @ Stump Neck
0800 Leave S.N. to Indian Head to check
- subcontrators pass status w/RC
- GPS in 2nd berm X14-45 through 79
- Collect composite sample X15-77C + X15-78C @ Skeet Range
- Collect 5 base samples @ Marine Rifle Range impact hillside bc bullets Found in sloping/eroded material
- ~~Lu~~

1800 Leave Stump Neck
1830 At hotel

JBB 6/9/09

June 10, 2009 — Jake Birkett, Jim Croedt, Ron Coleman, Jamie Shaffer

Mid 80's overcast in afternoon humid

0700 leave hotel

0730 @ Stump Neck

0800 Meet Jamie Shaffer (Normandeau) and drive over to boat dock

0845 Start Sediment Sampling in Potomac
- Areas of ~~lots~~ JBB lots of river rock near shore. switch from small dredge to large dredge. Still difficult
- Use auger where there is shallow water and rocks are prevalent or clam shells (works really well)
- when used hand auger (noted on sample)
- ~~Deep~~ JBB Samples further from shore full of clams and mud/organics
- makes sampling sed. tough due to sediment (mud/organics) being in between clams

1600 Finish sampling

1630 ~~GRS~~ JBB Drop samples off w/ Jim
Leave site

1700 @ hotel Read workplan for tomorrow's drilling until 1800

JBB 6/10/09

June 11, 2009 — Jake Birkett, Jim Croedt, Ron Coleman, Parrat Wolff

Mid ~~High~~ 80's overcast humid

0700 leave hotel

0730 @ Stump Neck

0800 Safety meeting w/ drillers

0810 Walk site w/ drillers ~~talk~~ talk about sampling points @ Small Arms (Pistol) Range UXO-17

0830 Start DPT (tractor pulled)
X17-SB001 through X17-SB007
- 10' penetration
- 0-4' poor ~~pen.~~ JBB recovery generally 1-2' be of large river rock

Sample Bag Interval
- 0-4'
- 4-6'
- 6-8'
- 8-10'

See boring logs for lithology

1300 Finish drilling
Start sampling rest of UXO-17
3 composite from firing lines (SB008-SB010) and samples SB011 - SB024

1600 GPS in most of Impact Hillside at Marine Rifle Range UXO-14

1730 Leave to drop of samples @ Fedex

1815 @ hotel

1845 Go to target to get supplies for tomorrow

JBB 6/11/09

6/11/09 continued

1900 Catch up on paperwork before leaving project tomorrow

2020 Stop work

JBB 6/11/09

6/12/09

mid 80s partly cloudy humid

Jake Birkett
Jim Goerdt
Ron Coleman

0700 Leave hotel

0730 Arrive @ Stump Neck
Get gate open

0800 ~~Call Jim~~ JBB GPS in the rest of the impact hillside @ Marine Rifle Range

0930 Lay out step outs X17-25 - X17-28 at Small Arms Range
· GPS in points @ Small Arms Range

6/13/09

JIM GERDT
RON Coleman
John KING

83° Cloudy, Humid, Possible Thunderstorms
0700 - J. KING leave Hotel
0730 - J. KING ON Site
0800 - Start LAYout OF GRID
1030 - Start Soil Sampling
1615 - END Soil Sampling FOR Day
1730 - OFF Site

6/14/09

John KING
RON Coleman
JIM GERDT

81° Cloudy, Humid 40% chance OF RAIN
0700 - J. KING ON Site
0830 - Start Soil Sampling
1600 - Start GPS - X-16
1830 - OFF Site

J. KING
R. Coleman
J. GOERDT

10-15-09

0700 - J. KING to WAL-MART to Buy Supplies

0800 - J. KING ON Site

0900 - J. KING PASS HAS EXPIRED will HAVE to get NEW PASS to go ON Site

0930 - START to Put Soil IN JARS FOR shipment

1500 - START PACKING COOLERS FOR SHIPMENT

1800 - DROP COOLERS OF @ FED-EX FOR SHIPMENT.

J. KING
R. COLEMAN
J. GOERDT

10-16

0700 - Leave Hotel

0730 - Get NEW PASS FOR the week

0815 - ON Site

0930 - START Soil Borings ON Site X-14

1500 - @ LOWES to get SAND

1545 - LEFT LOWES to go to Hotel

22

J. King
R. Coleman
J. Goerdt

6-17-09

-0730 - Left Hotel
-0800 - On Site
-0900 - Start sampling Site X-14
-1030 - Start Filing in Holes @ Site X-17
-1500 - Start Sampling Site X-16
-1730 - OFF Site

J. King
J. Goerdt

23

6-18-09

7:30 - Left Hotel
8:00 - On Site
8:30 - Started Removing Pin Flags From Sites
1100 - Started to Fill Sample JARS
1630 - To WalMart for Ice cooler and pack coolers
1800 - Left FedEx

Indian Head - Stump Neck Annex

5) Small Arms Ranges

5-26-09 through

Water (Reagent Grade)
Lot 0412169
Exp 4/10

TABLE OF CONTENTS	PAGE NO.

Jim Goerdt (JG) - FOL

Ron Coleman (RC) - USO Tech, Sampler

Jake Birkett (JB) - sampler

MRR = Maine Rifle Range

OSTR = Old Skeet & Trap Range

RR RR = Roach Road Rifle Range

RPSR = Rum Point Skeet Range

SAR = Small Arms (Pistol) Range

John King (JK) - sampler

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

ork continued from Page —

5-26-09

- AM Spent traveling from PGH to Indian Head.

1400 - Arrived at hotel. Checked equipment & bottle ware that had had been shipped to the hotel.

1500 - Met w/ Jake Birkett (JB) in hotel lobby. Enroute to Base.

1535 - Arrived at visitor center which had closed at 1530. Called Nick Carros, he did not yet have key to B-2153 at the Old Gun Club. He indicated that he was expecting it sometime today. Departed Base enroute to Lowe's & Wal Mart for field supplies.

Work continued to Page —

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SIGNATURE [signature] DATE 5-26-09

WITNESS DATE

TITLE

PROJECT NO.

BOOK NO.

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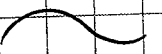

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DATE

WITNESS

DATE

TITLE Stump Neck Annex

PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page -

5-27-09

AM - Fog/Clouds low 60's

PM - PC low 80's

0715 - Met w/ Jake in hotel lobby. He loaded some of the equipment into the vehicle while I tried to access e-mail, which was unsuccessful. Proceeded to the Base. I had spoken to Ron Coleman (RC) the prior day and he was able to get a 55-gallon drum which he dropped off at B-2153.

0750 - Arrived at Visitor Pass office with JB. Obtained pass and went to Nick Carros office to pick up key for B-2153. Nick did not have key, but was expecting it within 24 hrs.

0845 - Arrived at the Old Trap & Skeet Range. RK on site. Ron provided a brief safety meeting and all present completed the

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Work continued to Page 4

SIGNATURE

DATE 5-27-09

WITNESS

DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 3

medical data sheet. Began laying out sample locations.

~1030 - Susan Yates stopped by to see if we needed anything. Told her we did have a 55-gallon drum for decon water containment & that Nick was going to construct a holding area out at B-2153.

1200 - Showed Jake & Ron the procedures for collecting a soil sample via hand auger. Jake & I began collecting samples while Ron cleared all locations w/ Shonstadt?. Once cleared - Ron sampled

1330 - Called Ed Sallmyer regarding lab. Asked that I contact Andrea Colby at Katahdin Labs regarding bottle ware.

1340 - Phoned Nick to check

Work continued to Page 5

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WITNESS

DATE 5-27-09

DATE

TITLE Stump Neck Annex PROJECT NO. 112G00810

BOOK NO. 2657

Work continued from Page 4

on status of key for B-2153. He said he did not yet have it and would call as soon as he did.

1345 - Rcvd voice message from Nick that he just retrieved the key.

1415 - Stopped by Nick's office & picked up key to B-2153. He said the electricity should be on as well. Also said he had put in a "ticket" to have the Plum Point Skeet Range mowed.

1430 - Stopped at Stump Neck Security to let them know I would be at B-2153. Guard indicated gate was open

1435 - Arrived at B-2153. No electricity in building or area of skeet range had not been mowed. Unloaded

Work continued to Page 6

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SIGNATURE [signature] DATE 5-28-09

WITNESS DATE 27 MAY

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 5

equipment & supplies into building.

1545 - RC & JB arrived at B-2153. They had collected approximately 35 samples from the Old Skeet & Trap Range. Decon water was transferred into Drum.

1630 - Notified Security we were all out of the Rum Point area. En route to hotel. JB en route to Home Depot. (Phil's)

Note: Door to B-2153 does not completely lock. Door knob locks, but door does not completely latch.

Work continued to Page —

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SIGNATURE

WITNESS

DATE 5-27-09

DATE 27

6

TITLE Stump Neck Annex

PROJECT NO. 112G00810

BOOK NO. 2657

Work continued from Page -

5-28-09

AM: PC mid 60's
PM: Cloudy/lt. rain mid 80's

0700 - Hampton Inn parking lot using wireless to try and access e-mail - unsuccessful. Enroute to Base. Left vm for Denise Toth

0750 - Arrived at B-2153. RC & JB on site. Instructed them to finish sampling at the Old Trap & Skeet Range. Instructed Ron on how to use the GPS. Once sampling is complete, all locations to be logged w/ GPS. I remained at B-2153 to finish setting up XRF, etc. Tried to run oven off of car inverter, but would not work. Kept overloading & tripping fuse.

0925 - Phoned Val Plachy & informed her to go ahead &

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Work continued to Page 8

SIGNATURE [signature] DATE 5-28-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 1126080810

BOOK NO. 2657

Work continued from Page 7

have the reagent water sent back to VWR. They had mistakenly sent it to the office instead of the hotel.

0940 - Left voice mail for John Wright asking if he had sent me the Dymo label writer.

0945 - Setting up spreadsheets for XRF & logging in samples collected.

QS 1140 - JB & RC returned to B-2153 w/ remaining samples from the Old Skeet & Trap Range.

QS 1143 - Phoned Nick re: power. Said he had not heard anything but would follow-up on the ticket. In the meantime he indicated we should look into a generator. No permit would be required. RC is familiar w/ a

Work continued to Page 9

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WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 8

local rental company to will look into getting a generator today. JB will finish GPS at the OSTR.

1300 - Called Andrea at Katahdin Labs. She is going to send remaining jars to the house to be picked up between 4 & 5.

1312 - Called Analytical Services regarding NG analyses. They will be shipping (1) liter sample bottles to the hotel. They will only be analyzing for NG. All lead samples will go to Katahdin.

1330 RC ~~pre~~ rented a local generator. Just as we unloaded it from the truck, Bobs personell showed up about power. They said if we needed power to the building then that needed to be done by So. Maryland Electric

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Work continued to Page 10

SIGNATURE J. Bennett DATE 5-28-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 9

They indicated they would contact them. The generator we rented was not strong enough to run the touch-screen. RV to return it & get bigger one.

1415 - JB completed collection of GPS points at OSTR. As indicated the unit froze up on him while collecting the last 8 locations. The unit reset itself to degrees (lat/lon) instead of State plane. GPS map screen looked fine, but will download the data and send to PGH for correction to make sure it looks right on the site map. If for some reason it doesn't then points will be re-collected.

1515 - JB to return to OSTR to pick up decon water for transfer to 55-gal drum.

Work continued to Page 11

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SIGNATURE [signature] DATE 5-28-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112G00810

BOOK NO. 2657

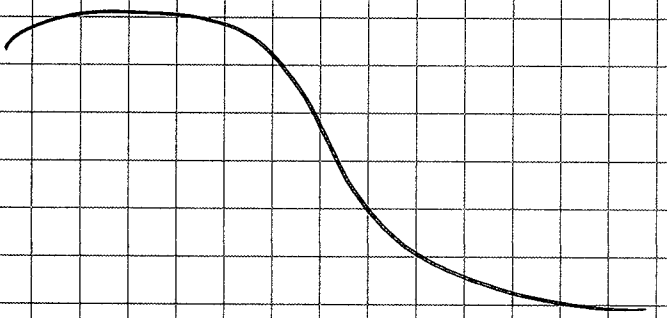
Work continued from Page 10

1520 - Very heavy rain.

1540 - RC back w/ new generator - works great!

1550 - J. Coffman stopped by B-2153. Indicated he should be done w/ utility clearance tomorrow.

1610 - Stopped by Security to let them know we are done from the Rum Point area. Enroute to hotel. JB to call Mark to pick up 1-gal ziplocs which make mixing of samples much easier.



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DATE 5/28/09

WITNESS

DATE

TITLE

PROJECT NO.

BOOK NO.

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DATE

TITLE Stump Neck Annex PROJECT NO. 1126008.10

BOOK NO. 2657

Work continued from Page —

5-29-09

AM: PC low 70's

PM: Cloudy mid 80's (very humid)

0830 - Met up w/ Jim Coffman at the SAR. He was finishing checking for Utilities & then was to check the RPSR near the roadway.

0845 - At B-2153 to begin processing samples for XRF. PC & JB at MRR setting out sample locations.

1030 - Joe Rail stopped by B-2153. I explained the XRF process & the plans for the week.

1100 - Rcvd call from Nick Carnes, he indicated power would most likely not be turned on at B-2153. I informed him that we had gone out & rented

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Work continued to Page 14

SIGNATURE [signature] DATE 5-29-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 13

One. I asked about gold the RPSB mowed & he said he would continue to follow up on that ticket.

1110 - JB & RC have located sample areas at the MRR.

1135 JB & RC back to MRR to begin sample collection at the firing lanes.

Std & XRF prior to use = 234

3102a Blank = ND <10

2709 Low = ND <14

2711 Med = 1127

2710 High = 5446

NIST

* All XRF samples were analyzed for one minute. End concentration is average of 3 runs per sample.

Work continued to Page 15

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SIGNATURE

WITNESS

DATE 5-29-04

DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 14

1235 - Changed out battery on XRF between readings 59 & 60. Std = 237

1240 - Nick & Sean (intern) stopped by to ~~construct~~ assess secondary containment for around the 55-gallon Decon water drum.

1330 - Nick returned and secondarily contained the drum.

15

1350 - JB & RC returned from the MRR. They collected ~~samples~~ from 7 of the 9 composite samples from the mixing lines. Decon water was placed inside the 55-gallon drum.

16

1405 - JB & RC to generator rental place to secure generator until next Wednesday. RC to stop at Stump Neck Marina & to make sure we have access

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Work continued to Page 16

SIGNATURE [signature] DATE 5-29-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810 BOOK NO. 2657

Work continued from Page 15

over the weekend. RC then phoned me to say no request was received by Security & we would not be allowed on base Sat/Sun. We would have access to Rum Point.

1606 - No answer at Nicks office. Reached him on his cell phone & explained situation, he said they should have received the request. He had just left the office, but would go back & check. If he doubted there would be anything he could do at this point due to lateness of the day on a Friday. I asked that he let me know what happens.

1625 - Rcvd call from Nick & he said the request had been lost somehow & that we would not have access to the Base until Monday.

Work continued to Page 17

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SIGNATURE [signature] DATE 3-29-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 16

1630 - Relayed this info to Ralph Basinski. Told him if we had access to Rum Point we would be OK for the weekend. I will double check on the way out.

1715 - Stopped at Stump Neck Annex Security to ask about access to Rum Point over the weekend. They said if not on the approved list then no access will be permitted. I explained situation and was given phone number for Lt. Hubbleston who is in supervisor capacity. I phoned Lt. and she re-iterated that access would not be granted.

1730 - Spoke w/ R. Basinski & decided that I would work out of hotel over the weekend & RC & JB would be done until Monday morning. I returned to B-2153 to get everything

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Work continued to Page 18

SIGNATURE J. Bardt DATE 5-29-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

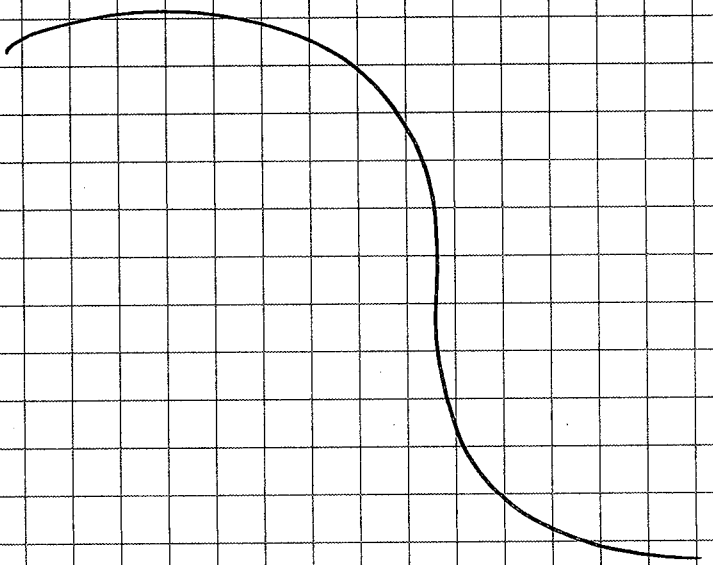
BOOK NO. 2657

Work continued from Page 17

needed for working at the hotel.

1850 - Phoned John Wright who indicated the label printer should be at the Holiday Inn.

1830 - Stopped at Holiday Inn & picked up box (label printer).



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SIGNATURE [signature] DATE 5-29-08

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page —

5-30-09

Weather not applicable.

0800 - Catching up on Daily activity log & daily summar e-mail. Hooking up label printer

1200 - Fueled vehicle and stopped over at Holiday Inn for Analytical Services sample bottles - Fed Ex had not yet delivered to hotel. Will stop back tomorrow.

XRF analysis completed on remainder of samples at the OSTR. Completed XRF analysis on the 7 composite samples collected at the MRR.

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Work continued to Page

SIGNATURE [signature] DATE 5-30-09

WITNESS DATE

TITLE

PROJECT NO.

BOOK NO.

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SCIENTIFICBINDERY88YRS.COM

Work continued to Page

SIGNATURE

DATE

WITNESS

DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page – 5-31-09

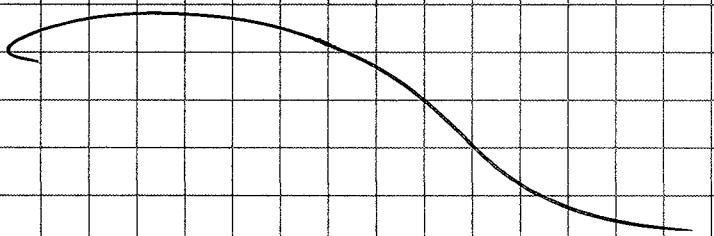
Weather not applicable

1000 - Stopped at Holiday Inn to pick up sample bottles from Analytical Services Lab (2 coolers).

1130 - Filling sample jars w/ composite samples. Completing COCs.

(NG) X1455007C0001 = MS/MSD
(NG) FD05290901 = X1455007C0001

1400 - Filling 2.5 oz jars for metals. Electronic labels. E-mailed XRF data for OSTR to Kevin Moore (GIS) in PGH.



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SIGNATURE [signature] DATE 5-31-09

WITNESS DATE

TITLE

PROJECT NO.

BOOK NO.

Work continued from Page

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Page

SCIENTIFICBINDERY88YRS.COM

Work continued to Page

SIGNATURE

DATE

WITNESS

DATE

TITLE Stump Neck Annex PROJECT NO. 112G00810

BOOK NO. 2657

Work continued from Page –

6-1-09

AM: Clear low 60's
PM: Clear mid 70's

0725 - Arrived at Stump Neck Security and requested Rum Point gate be opened. Arrived at B-2153 and unloaded the equipment.

0740 - RC arrived on site.

0810 - JG & RC to OSTR to collect shallow sediment samples (SD001-009).

0930 - Completed sampling the shoreline at the OSTR. Back at B-2153 to begin processing the samples. JB arrived on site. JB & RC to continue sampling at the MRR.

1110 - One portion of the baggie for sample X153D003 had a high hit for lead (962 mg/kg) while the other two portions

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Work continued to Page 24

SIGNATURE [signature] DATE 6-1-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 23

were at 83 & 10 (mg/kg). Separated the high portion & looked very closely at the sample. Removed what is to believe 4 small pieces of lead shot. Before removing I did reanalyze that portion of the baggie & had 2,686 mg/kg. Then removed lead shot. Ran the lead shot through the XRF & had 72,638 mg/kg. Re-analyzed that same portion w/o the lead shot & result was 14 mg/kg.

1135 - Changed XRF battery after reading #20. Standardized at 236.

1400 - JB returned w/ the 2 composite samples from the MRR. Sent him to OSJR to collect the 2 composite samples RC & MRR marking sample locations at berms

Work continued to Page 25

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SIGNATURE Liz Doedt DATE 6-1-09

WITNESS DATE

TITLE Stump Neck Annex

PROJECT NO. 112G00810

BOOK NO. 2657

Work continued from Page 24

1510 - JB back w/ 2 composite samples from OSTR. Each sample was made up of 5 aliquots & clay target remnants were found in each.

1800 - JB left site enroute to Fed Ex w/ samples for Katahdin (PAHs). Airbill 8631 3888 2005

1830 - JG leaves site enroute to Wal-Mart for field supplies. Stump Neck Security entrance gate is closed. Phoned dispatch to let them know we are done for the day & the Rum Point gate can be locked.

2100 - email to Katahdin Labs re: Sample Shipment.

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Work continued to Page

SIGNATURE [signature] DATE 6-1-09

WITNESS DATE

TITLE

PROJECT NO.

BOOK NO.

Work continued from Page

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SCIENTIFICBINDERY88YRS.COM

Work continued to Page

SIGNATURE

DATE

WITNESS

DATE

TITLE Stump Neck Annex

PROJECT NO. 112G00810

BOOK NO. 2657

Work continued from Page –

6-2-09

AM: Cloudy upper 60's very humid
PM: Cloudy mid 80's

0726 - Arrived at Stump Neck. Layed out additional sample points at OSTR around the 4 hot locations as described below:

X15SB005: SB061, 062, 063, 064
X15SB007: SB065, 066, 067, 068
X15SB013: SB069, 070, 071
- Did not place a step-out sample to the NW of sample X15SB013 due to its proximity to the beach where a sediment sample was located.
X15SB041: SB072, 073, 074, 075

RC & JB collecting these samples. JB to GPS the new SB locations along w/ the 9 shoreline sediment samples collected on 6-1-09.

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Work continued to Page 28

SIGNATURE J. Swedt DATE 6.2.09

WITNESS DATE

27

TITLE Stump Neck Annex PROJECT NO. 1126008.10

BOOK NO. 2657

Work continued from Page 27

0920 - Began XRF analysis on samples collected yesterday at MRR.

0945 - RC dropped off step-out samples from OSTR.

0958 - RC called to say that security informed him that we do not have the required authority to ask security to open the Rum Point gate each morning. This either has to be done by Environmental or Security needs a clearance letter stating we have this authority.

1002 - Phone & Nick Carros and relayed this information. He said he would look into it.

1205 - Went to purchase gas for generator.

Work continued to Page 29

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SIGNATURE

WITNESS

DATE 6/2/09

DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 28

1215 - Call from R. Basinski informing that remaining soil in 1-gallon baggies accompany the original composite samples. Samples will be sent in baggies w/ labels affixed to them.

1420 - RC & JB returned w/ samples from MRR. They have completed sampling the 1st berm. RC to rent weed whacker tomorrow for clearing second berm.

1435 - RC to purchase ice for shipping while JB to OSTR to collect additional step-out samples. 1500 - RC off-site.

1605 - JB taking samples to Fed Ex.

1645 - Leaving site.

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Work continued to Page —

SIGNATURE [signature] DATE 6/2/09

WITNESS DATE

TITLE

PROJECT NO.

BOOK NO.

Work continued from Page

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Work continued to Page

SIGNATURE

DATE

WITNESS

DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page —

6-3-09

AM: PC upper 60's

0750 - Picking up ice for shipping.

0805 - Arrived at Rum Point. RC on site. He said JB had gone to locate a fuel can for the weed whacker.

0835 - RC & JB to MRR to continue w/ sampling activities. IG processing samples for shipment.

0935 - Call from R. Babinski w/ list of sample for metals analysis at the FBL.

1100 - En route to Fed Ex, then back to PGH.

1200 Received call from Jake saying the GPS was not working right. I told him we would talk in

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Work continued to Page 32

SIGNATURE [signature] DATE 6-3-09

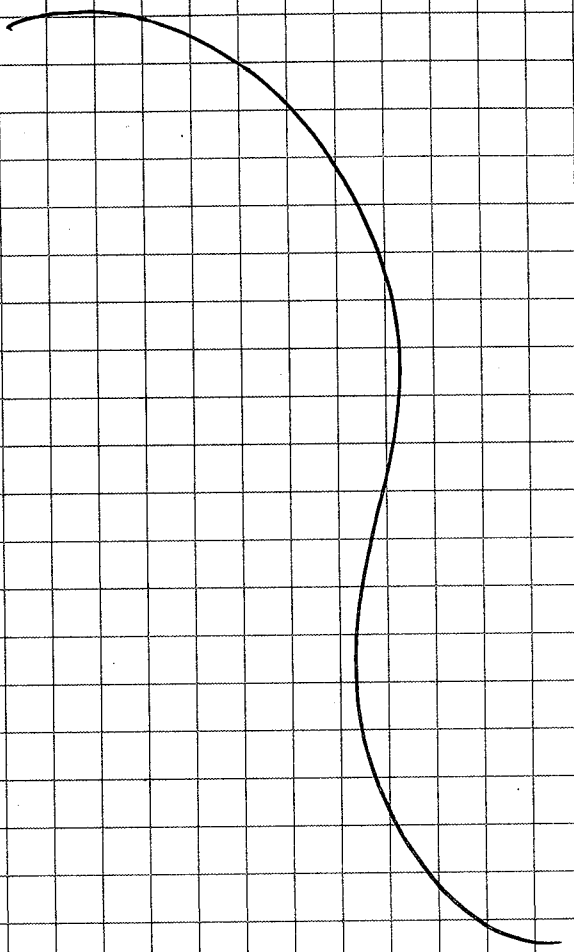
WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112G00810

BOOK NO. 2657

Work continued from Page 31

the morning to I could get
to assistance for him.



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WITNESS

DATE 6/3/09

DATE

TITLE Stump Neck Annex

PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page —

6-4-09

JG back in PGH. RB & JB remain on site collecting samples at MRR.

1200 - Rcvd a call from JB saying he couldn't get the GPS to work. I gave him phone # to Field Environmental & told him to talk to Tech Services.

1230 - JB called back to say Field Environmental told him the unit was probably going bad. They are to send a replacement overnight. RC & JB to continue collecting samples at MRR.

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SIGNATURE

DATE 6-4-09

WITNESS

DATE

TITLE

PROJECT NO.

BOOK NO.

Work continued from Page

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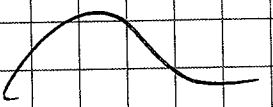

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SIGNATURE

DATE

WITNESS

DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page —

6-5-09

806 - Rcvd call from Nick Carosa asking date & time when we were informed by Stump Neck Annex that we could not request gate to Rum Point be opened. 6-2-09 9:58.

835 - Call from JB/RC indicating they were not 100% sure where samples at RRRR are to be collected. RC indicated they could measure to at least 0.1 the range outlined. I told them to call hotel & see when GPS arrives & go by coordinates provided by GPS. H will conduct them a bit later in the day. Generator also to be returned today.

Work continued to Page —

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SIGNATURE

DATE 6-5-09

WITNESS

DATE

Work continued from Page

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Work continued to Page

SIGNATURE DATE

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page

6-6-09
6-7-09 } OFF Site

6-8-09

AM: Sun upper 60's
PM: PC upper 80's

AM: Travel from PGH to Stump Neck.

1445 - Fed Ex

1515 - RRRR looking at potential sample locations. Wish don't look right. Will contact GIS to get additional GPS points to make sure we are in right location.

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Work continued to Page 38

SIGNATURE [signature]

DATE 6-8-09

WITNESS

DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page - 6-9-09

AM: Strong thunderstorms / lightning early. Upper 60's

PM: PC upper 80's

0718 - Rcvd call from RC. It was decided to hold off on mower rental due to heavy rains.

0800 - Arrived at Rum Point. RC & JB on site. Talked about activities yet to be done.

0830 - RC & JB to main side to check on visitor passes for subcontractors & to check on access for TtNUS personnel this weekend. I began w/ XRF analysis.

0913 - RC called to say had Visitor Passes ready for Parratt-Wolff, but not Normandeau since no I-9 on file. It submitted to Environmental by noon today then

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Work continued to Page 40

SIGNATURE [signature] DATE 6-9-09

WITNESS DATE

TITLE Stump Neck Annex

PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 39

pass will be ready tomorrow.

0921 - Passed the above info onto Normandeau who will follow-up.

Spoke w/ Ralph Rabinski re: John King out of PGH office. He will plan to arrive on Friday.

Spoke to John King who said he talked to Marilyn Duffy about the F-9 going to Ralph. Ralph will have id submitted to Seth Berry. 301-744-2273

0930 - Mowing subcontractors have arrived on site & began clearing the Skeet Range.

0940 - RC & JB to OSTR to collect composite samples (2).

One lead bullet found in X14550280001.

Work continued to Page 41

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SIGNATURE

WITNESS

DATE 6/9/09

DATE

TITLE Stump Neck Annex PROJECT NO. 112G00810

BOOK NO. 2657

Work continued from Page 40

1116 - Left VM for Seth Berry asking that he return my call so I can be assured that paperwork for Normandeau employee has been submitted.

1129 - Rcvd call from Rich Kling w/ Normandeau who said he talked to Seth & pass will be ready tomorrow.

1145 - Rcvd call from Seth indicating pass for Normandeau will be ready in the morning. Gave him the names of 3 NBS employees requiring weekend access.

1555776000 1 - Northern rectangle
1555786000 1 - Southern rectangle

Additional samples (X1455825-129) were collected at the MRR hillside where bullets were observed. JB indicated this should area probably reaches all the way

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Work continued to Page 42

SIGNATURE [signature] DATE 6-9-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 41

to the road (Roach Road).

1410 - RC & JB to mark out sample locations at the SAR @ Rum Point.

1600 - JB to collect GPS coordinates @ MRR (Berm #2).

1615 - Called Kevin Moore to see if he could get me GPS coordinates for all the sediment sample locations at the OSTR.

1730 - Contact @ Stump Neck Dispatch to lock gate @ Rum Point.

56 samples were analyzed w/ the XRF today.

1800 - Met up with JB to get GPS to download coordinates.

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Work continued to Page

SIGNATURE C. Downs DATE 6-9-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page -

6-10-09

AM: Clear - upper 60's.
PM: Cloudy - upper 80's.

0700 - Hotel business center printing out GPS coordinates for sediment samples at the OSTR.

0720 - Call from Jayme Schaffer w/ Normandeau. He was just pulling up to Visitor Center at Main side. Told him to go in and pick up pass & I would send someone over to lead him to Stump Neck. Phoned RC to go meet w/ Jayme & bring him over to Stump Neck.

0810 - Brief safety meeting was held & overview of the day's goals. Precautions to be taken while on the water.

0815 - Phoned Kevin Moore at GLS (Pgh) & left a VM requesting

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Work continued to Page 44

SIGNATURE [signature] DATE 6-10-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 43

coordinates for X155D010-014 which were left off the spread-sheet e-mailed to me yesterday.

0825 - RC & JB to assist w/ sediment sampling.

0830 - Began processing samples for ART analysis.

0845 - Call from Kevin Moore w/ GPS coordinates which I passed along to Jake.

0940 - Phoned Parrish-Wolff to let them know their visitor passes are ready. They will mob this evening & then call me once they get their passes in the morning. Phone for Josh Ellingsworth 336-601-7005.

1030 - JB called to report they were able to locate the sediment sample locations w/ GPS, but

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Work continued to Page 45

SIGNATURE [signature] DATE 6-10-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 44

at some of the locations they were having trouble pulling up sample due to substrate being comprised of all pebbles. This is particularly the case in the shallow water. They may try using hand auger since they are only in 5 feet of water. I also suggested moving around in either direction.

1220 - JB returned to R/V B-2153 w/ sediment samples from OSTR. He said they are about half-way complete. Some collected by ponar, others collected by hand auger (some shallower locations). Should be able to complete sampling this afternoon (weather dependent).

1550 - JB & RK returned from collecting all sediment samples at the OTRR. Some of the samples are very wet w/ very fine

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Work continued to Page 46

SIGNATURE [signature] DATE 6-10-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112G00810

BOOK NO. 2657

Work continued from Page 45

sediments. I will contact ECO group at PGH office for advice on "straining" samples.

1620 - JB & RC left site. RC to check w/ Ralph Brooks on getting a second IDW drum since first one is nearing full.

25 sediment samples collected in Mathowoman Creek at the OSTR.

1750 - Completed all XRF analysis on samples from MRR.

1752 - Generator out of gas. No gas on site.

1800 - Composited two samples from aliquots collected at OSTR. Ten aliquots per sample. The aliquots were dumped into a 5 gl large tote w/ a

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Work continued to Page

SIGNATURE C. Boudt DATE 6-10-09

WITNESS DATE

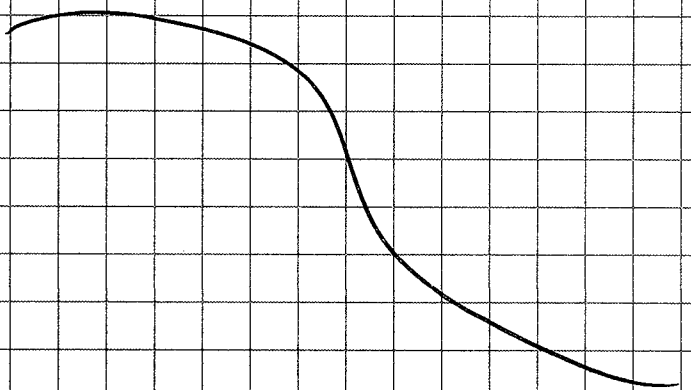
TITLE Stump Neck Annex PROJECT NO. 1126008.10

BOOK NO. 2657

Work continued from Page 46

garbage bag liner. The sample was tossed & turned for several minutes and then enough soil was removed to fill a 1-gallon Ziploc baggie. A 2.5 oz jar was also filled from this soil for metals analysis at the FBL. A sample was also collected for XRF analysis.

1850 - Contacted Stump Neck Security to lock Rum Point access gate. Left base after they arrived. Waiting 45 minutes. Main gate to Stump Neck was closed.



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SIGNATURE [signature] DATE 6-10-09

WITNESS DATE

TITLE

PROJECT NO.

BOOK NO.

Work continued from Page

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SCIENTIFICBINDERY88YRS.COM

Work continued to Page

SIGNATURE

DATE

WITNESS

DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page -

6-10-09

AM: Cloudy, humid low 70's
PM: MC, humid upper 80's

0700 - Rcvd call from Josh w/ Parrish-Wolff. They have their visitor passes. Told them to way of the ferry for the generator and set up a meeting point.

0730 - Met w/ Josh & Gary & led them to Stump Neck Annex. Brief safety meeting led by RC. Equip. check & OPT.

0820 - STA to begin OPT work. Some clearing had to be done for access reasons. OPT was able to reach approx. 20 feet from the base ground, which is 4-5' above surface. VBS logging all holes. Samples are being collected

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Work continued to Page 50

SIGNATURE [signature] DATE 6-10-09

WITNESS DATE 11

TITLE Stump Neck Annex PROJECT NO. 1126050810

BOOK NO. 2657

Work continued from Page 49

from 0-2, 2-4, 4-6, 6-8, 8-10 as appropriate. The first two holes were producing about 1 foot of soil in the 0-4 foot sleeve. Rom compaction & loss.

1020 - Left voice message for Preston Smith.

1025 - Preston called to discuss sediments. Decided best approach was to contact lab & ask what they think. May end up sending these "wet" samples in the 30 oz jars we have.

1035 - Started TRF on 2 composites from DE OSTR, sediments & SAR.

Most sediments actually sifted out pretty good, so will proceed as normal.

Work continued to Page 51

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SIGNATURE [signature]

DATE 11 6-12-09

WITNESS

DATE 9-

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 50

DPT work at SAR finished up around 1200. Parratt-Wolff personell demobilized from the base. RC & JB collecting remaining samples at SAR. Ten aliquots per composite sample at the firing lines.

1500 - Joe Rail stopped by to take some photos of the XRF set up for a presentation he has next week. Asked that I send him a few good shots of the DPT, etc.

1600 - JB wrapped off samples from SAR. JB going out to GPS hillside at MRR.

1615 - RC returned to B-2153. Informed him (2) drums are ready to be picked up at same location as first one.

1645 - RC off site. We will be

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Work continued to Page 52

SIGNATURE [signature] DATE 6-11-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page

Cleaning up the down-hole magnotometer to have it shipped back tomorrow.

1725 - JB back from GPS the hillside at MRR. Said he collected about one-half of the locations.

1730 - JB enroute to Fed Ex to ship composite samples to Analytical Services.
2 composites from OSTR
3 " " SAR.

1740 - Left VM for John King regarding location of Indian Head mainside as well as Stump Neck Annex.

1850 - Potential battery problem w/ XRF while analyzing X17550130001 (which had high lead concentrations). Will re-run the sample tomorrow

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Work continued to Page 53

SIGNATURE

WITNESS

DATE 6-11-09

DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

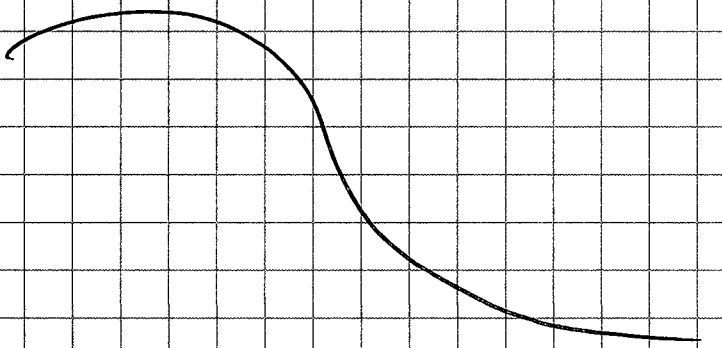
Work continued from Page 52

1945 - Contacted Stump Neck Dispatch to inform them we are done for the day & the gate can be locked.

Completed XRF analysis on samples X1755001 thru 13. Ran out of battery power for XRF.

Samples X1755014-24 are processed and ready for XRF analysis in the morning.

2000 - Left Base



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Work continued to Page

SIGNATURE [signature] DATE 6-11-09

WITNESS DATE

TITLE

PROJECT NO.

BOOK NO.

Work continued from Page

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SCIENTIFICBINDERY88YRS.COM

Work continued to Page

SIGNATURE

DATE

WITNESS

DATE

TITLE Stump Neck Annex PROJECT NO. 112G00810

BOOK NO. 2657

Work continued from Page –

6-12-09

AM: Cloudy mid 70's

PM: Cloudy upper 80's

0800 - JB to finish GPS on hillside at MRR & then SAR.

0835 - RC arrived w/ two drums.

Ran XRF on remaing SAR samples that were processed yesterday.

0945 - JB & RC to collect 46 step-out samples at SAR. Samples will be collected from 1-2 feet bags at X175B011, 013, 014. Two step-out samples around 011 and one step-out sample each for 013 & 014.

1055 - Left VM for Nick Carros asking if he could meet us at the RRRR after lunch to make sure we collect samples in the right place.

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Work continued to Page 56

SIGNATURE C. Dowd DATE 6-12-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 55

1057 - Rcvd call back from Nick & he will meet us at RRRR at 1330.

1105 - JB & RC returned w/ samples from SAR. All GPS points collected as well.

1115 - JB leaving site. (end of shift for him).

1215 - JG & RC to RRRR. Trying to establish boundaries of the range.

1330 - Nick Carros arrived & boundaries of targeted areas were determined based on hillside, field map, & finding two former target brackets in the area. Boundary of range was flagged & logged via GPS; however, satellites were minimal & canopy was heavy.

Work continued to Page 57

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SIGNATURE

WITNESS

DATE 6-12-09

DATE

TITLE Stump Neck Annex PROJECT NO. 112G00810

BOOK NO. 2657

Work continued from Page 56

1400 - Rcvd call from John King. He had picked up his visitor pass & was at B-2153. I gave him directions to the range & asked that he meet us there.

6-13-09

Eighty-eight sample locations layed out at the RPSR. Fifty-one of those samples were collected and 24 were analyzed w/ field XRF.

Four "step-out" samples analyzed from the SAR.

Fifteen sediment samples analyzed from the OSTR.

1956 - Contacted Stump Neck Annex to unlock access gate so I could get out.

1958 - Security officer at gate.

↳ Belongs on page 60 (6-13-09)

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SIGNATURE [signature] DATE 6-12-09

WITNESS DATE

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PROJECT NO.

BOOK NO.

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DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page —

6-13-09

AM: PC low/mid 70's (humid)
PM: PC upper 80's (humid)

0740
0800 - Arrived on site. RC & JK on site. Went over days objectives including safety issues.

0810 - Began laying out sample locations at the RPSR. Noticed large piles of clay target debris in several locations on the range. Pieces of clay targets were observed around & even behind the firing points.

1000 - Finished laying out most of the sample locations in the fan-shaped transects. RC & JK went to get water for decon area at OSTR. It layed out an additional 10 sample points in the area of the firing points.

1030 - RC & JK began sampling at

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Work continued to Page 60

SIGNATURE J. Dorta DATE 6-13-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 1126008101

BOOK NO. 2657

Work continued from Page 59

the RPSR.

1115 - Phoned hotel to see if gloves had arrived. They were to arrive on Thursday. Hotel personnel indicated that no box for me.

1120 - Enroute to Wal-Mart to purchase nitrile gloves, and baking dishes.

1215 - Convenience store to pick up ice & fuel for generator.

1245 - Back on site. Began XRF on 6 sediment samples & then additional samples from STR before starting on samples at RPSR.

See Page 57

Work continued to Page 61

SCIENTIFICBINDERY88YRS.COM

SIGNATURE J. Doerr DATE 6-13-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page –

6-14-09

AM: Clear low 70's - humid

PM:

0745 - Arrived on site. RC + JK on site. Safety briefing. Having trouble getting XRF to standardize. Powered off, changed battery. Standardization successful.

0810 - RC + JK to OSTR to get water for decon & then began collecting samples at RPSR. I continued with XRF analysis. XRF continues to abort tests while running standards. Will shut it down for a while & then re-try.

0845 - Restarting XRF. Was able to run through the standards & all came back good. While analyzing first sample, test kept aborting. Replaced kapton window. Re-standardize OK. (237). XRF now working fine.

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Work continued to Page 62

SIGNATURE

DATE 6-14-09

WITNESS

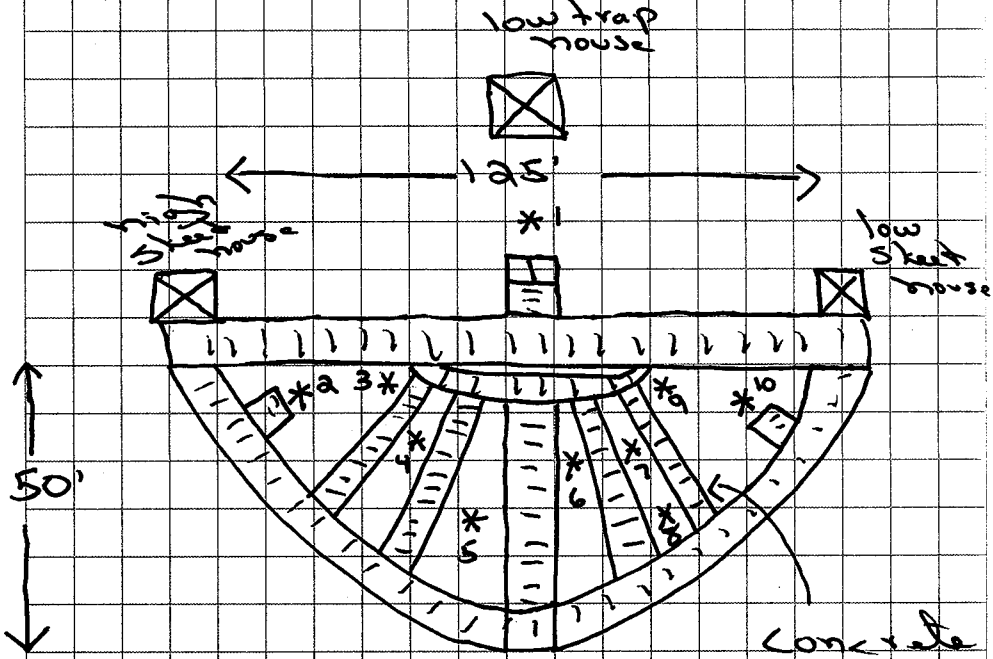
DATE

TITLE Stump Neck Annex PROJECT NO. 11260081O

BOOK NO. 2657

Work continued from Page 61

1100 - I marked out 10 aliquot sample locations and the firing point areas for the composite samples.



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SCIENTIFICBINDERY88YRS.COM

SIGNATURE

WITNESS

DATE 6-14-09

DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 62

1200 - Continue w/ XRF as RC/JK collect aliquots for the two composite samples (80C & 81C).

1330 - RC & JK finished collecting the two composite samples at the RPSR firing points. 10 aliquots per sample. Aliquots were homogenized & represent. active samples collected.

1415 - RC & JK to STR to collect one step-out sample (#29) located north of #25 and to collect samples at 1-2' bgs at #25, 11, 13, & 14. At locations 25 & 13 they went to depths of 20" due to refusal.

1600 - JK & RC collecting GPS coordinates.

1700 - RC off-site. JK continues w/ GPS.

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Work continued to Page 64

SIGNATURE [signature] DATE 6-14-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 1126008.10

BOOK NO. 2657

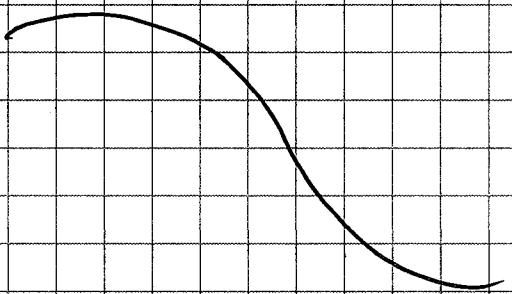
Work continued from Page

1715 - Spoke w/ R. Basinski on the phone. Discussed amount of work completed and amount left to do vs. the amount of time left to do it in. Nothing was finalized.

1800 - JK finished w/ GPS coordinates. Off site ~~@~~ 1830.

1935 - Completed XRF & RPSR & SAR. Photos of RPSR & additional GPS of feature

2020 - Contacted security to secure access gate.



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SIGNATURE

WITNESS

DATE 6-14-09

DATE

64

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page –

6-15-09

AM: MC, low 70's (humid)
PM: PC, mid 80's

0740 - Picked up ice & fuel for the generator.

0750 - Arrived on site. RC on site. JK was to stop for ~~food~~ supplies. JK on site at 0810.

0845 - John King called to say that his pass had expired on 6/14, therefore he is not allowed access.

0850 - Called Seth Berry to see if he could expedite clearance. He called back to say that the woman who authorized had is not in the office & not sure when she would be back. John will fill 4 sample bottles while I help Ron at the RRRR.

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Work continued to Page 66

SIGNATURE

WITNESS

DATE 6-15-09

DATE

65

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 65

0945 - Enroute RRRR.

1520 - Finished sampling w/ RC at RRRR. JK & myself preparing samples for shipping.

1715 - JK off to Fed Ex to ship samples
(1) - Analytical
(2) - Katahdin

No word on visitor pass extension for J.K. I instructed him to go straight to main side in the morning to see if pass is available.

Rcvd call today from Field Environmental regarding issue I had yesterday w/ the ZRF. I asked that they send a replacement kapton window.

1908. Contacted dispatch to lock gate.

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SIGNATURE [signature] DATE 6-15-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page —

6-16-09

AM: PC low 70s
PM: Cloudy low 80s

0730 - Arrived at Rum Point access gate which is locked. RC had called dispatch to get someone down to unlock it.

0740 - Gate opened.

0810 - JK on site w/ new visitor pass. Step-out samples will be collected at MRR & RPSR.

0830 - RC/JK to MRR for step-out samples. JG to RRRR for GPS & photos.

1040 - Finished collecting GPS points at RRRR.

1110 - Fuel/ice.

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Work continued to Page 68

SIGNATURE

WITNESS

DATE 6-16-09

DATE

TITLE Stump Neck Annex PROJECT NO. 112G0080

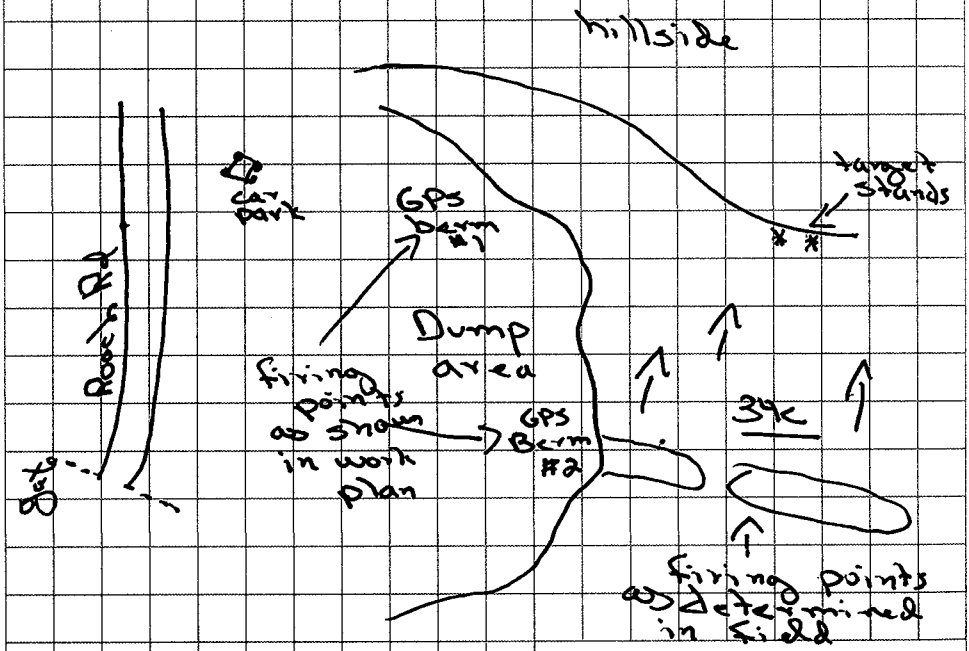
BOOK NO. 2657

Work continued from Page 67

1200 - RC/JK back from MRR. Preparing to sample step-out samples at OSTR.

1410 - RC/JK completed sample collection (step-outs) at the RPSR.

RRRR



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WITNESS DATE

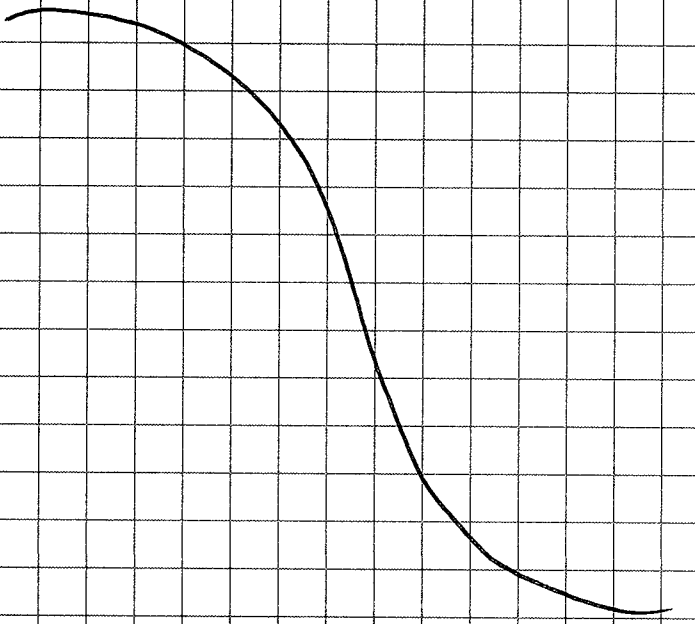
TITLE Stump Neck Annex PROJECT NO. 112G008.10

BOOK NO. 2657

Work continued from Page 68

1945 - RC/JK to purchase sand for filling holes at OSTR. Also, RC to show JK where the generator rental place is at in Waldorf.

1932 - Contacted Stump Neck Dispatch to unlock the access gate to Rum Point.



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DATE 6.16.09

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PROJECT NO.

BOOK NO.

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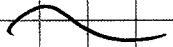

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DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page —

6-17-09

AM: Lt. rain lower 60's

PM:

0720 - Stopped for fuel for the generator.

0800 - Arrived on site. RC & JK on site. Brief safety meeting.

0830 - RC/JK to collect step-out samples at MRR on top of hillside I will collect GPS.

MRR

Step-out samples SB130-132 were collected on the north side of the hillside at the base. These 3 came back clean for lead.

Step-out samples SB133-137 were collected on the west side of Roach Rd near the swamp. There's about 12'-15' between road & swamp. SB133, 135, 136, & 137 were clean

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Work continued to Page 72

SIGNATURE [signature] DATE 6-17-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 71

for lead. SB134 had a lead concentration of 1097 mg/kg. The sloughed area near location SB128 is closer to SB136. Bullets were observed in the sloughed material near SB128.

Step-out samples SB138-141 were collected at or very near the crest of the hill. SB138 was below 300 mg/kg however the others were >300. Two more samples SB142 & 143 were collected on either side of SB141 & are on flat ground at the top of the hill.

A 2-3' sample depth was collected at SB102.

10:30 - RC/JK collecting step-out samples at the RPSR.

Work continued to Page 73

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SIGNATURE [signature] DATE 6-17-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page 72

1030 - RC/JK collect filling sample holes OSSR w/ sand & pulling pin flags.

1135 - Visitors from Stump Neck stopped by inquiring about or used of B-2153. Lead did not give name or card, but did get a card from colleague (Ken Bason) w/ IED/WMD Countermeasures. Didn't seem very happy that we were utilizing the building. Gave him POC at Naiside as Nick Carros.

1145 - Forwarded this info on to Basinski and subsequently Joe Rail (voice mail).

1327 - Went out to mark addl sample locations at RPSR. w/ RC & JK.

1400 - Rcvd call from Joe Rail to discuss visit is earlier in the day.

Work continued to Page 74

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SIGNATURE J. Doud DATE 6-17-09

WITNESS DATE

TITLE Stump Neck Annex PROJECT NO. 112G00810

BOOK NO. 2657

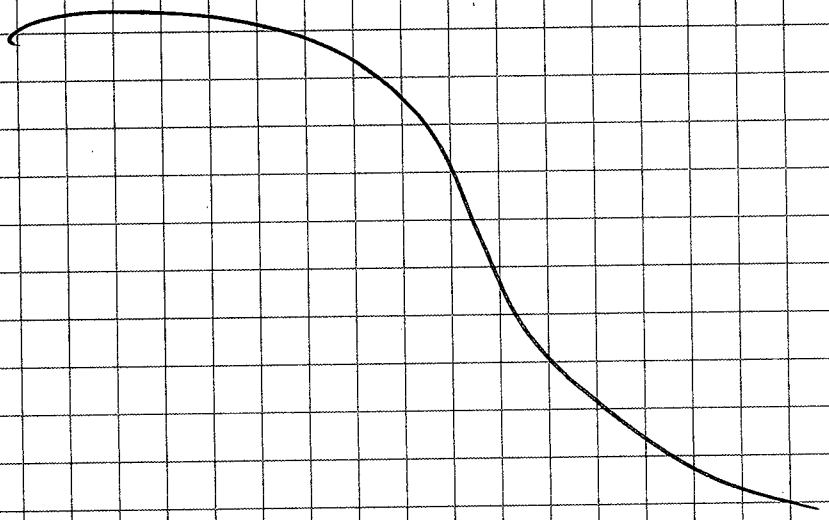
Work continued from Page 73

1600 - Completed the last of the sampling at RPSR. SB091-95 outer band

1615 - Collected Rinsate Blank from hand auger RB06170901 and sample from IDW. IDW06170901.

Analyzing samples w/ XRF.

1730 - Contacted Dispatch to secure Rum Point access gate.



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DATE 6·17·09

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TITLE Stump Neck Annex PROJECT NO. 112600810

BOOK NO. 2657

Work continued from Page —

6-18-09

AM: Lt Rain 70°
PM: Cloudy 80°

0800 - Arrived at Rum Point & contacted dispatch to open access gate.

0815 - Processing samples for shipping & packing equipment & cleaning up work area. Pulling sample flags.

RRRR was being used for testing (gates closed & flagged) so unable to pull those flags.

1630 - Off to Wal Mart to purchase a cooler & then to Fed Ex to ship samples. I am cleaning up B-2153.

1730 - Contacted dispatch to lock the Rum Point gate. Enroute to Wal Mart for shipping cooler

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DATE 6-18-09

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TITLE

PROJECT NO.

BOOK NO.

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WITNESS

DATE

TITLE Stump Neck Annex

PROJECT NO. 112G00810

BOOK NO. 2657

Work continued from Page —

6-19-09

0800 - Stopped for fuel.

0830 - Arrived at Stump Neck & contacted Security for access to Rum Point.

0845 - Loaded generator & equipment into UK truck. Put together the last few samples for shipping.

0915 - Arrived at Nick Carros office to return B-2153 key & to let him know we were finished w/ the work. Samples were left in the building. They will be disposed once all analysis is complete at the FBLs.

1000 - At Fed Ex to drop off remaining samples.

1030 - 1600 - Travel from Waldorf, MD to PGH.

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DATE 6-19-09

WITNESS

DATE

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX	
Tailgate Safety Briefing	
Date: 6-17-2009	**Location:** UXO-16 Area
Time: 0745	**Team #:** Sample

1. Reason for Briefing:

X	**Daily Safety Briefing**		**New Site Procedure**
	Initial Safety Briefing		**New Site Information**
	New Task Briefing		**Review of Site Information**
	Periodic Safety Meeting		**Other: (Specify)**

2. Personnel Attending

Name	Signature	Position
JOHN RYAN KING	John Ryan King	TECHNICIAN
James Goerdt		FOL

Briefing Given By:

Name	Signature	Position
Ron Coleman		UXOSO/TECH III

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)			
	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards		On-Site Injuries/Illness
X	Chemical/~~Biological~~ Hazards (Ticks)		Reporting Procedures
	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
X	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
X	OE Precautions		Other:

4. Remarks:

Intrusive Sample OP's For UXO-16 & 14 Areas

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX

Tailgate Safety Briefing

Date: 6-16-2009 **Location:** UXO-16 Area

Time: 0745 **Team #:** Sample

1. Reason for Briefing:

X	Daily Safety Briefing		New Site Procedure
	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending

Name	Signature	Position
James Goerdt		FOL
John RYAN KING	John Ryan King	TECHNICIAN

Briefing Given By:

Name	Signature	Position
Ron Coleman		UXOSO/Tech III

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)			
	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards		On-Site Injuries/Illness
X	Chemical/Biological Hazards		Reporting Procedures
X	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
X	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
	OE Precautions		Other:

4. Remarks:

Intrusive Samples @ UXO - 14, 16 & 25 Areas

Sections 1 & 7 will be utilized prior to Intrusive

acts.

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX

Tailgate Safety Briefing

Date: 6-16-2009 **Location:** UXO-16 Area

Time: 0745 **Team #:** Sample

1. Reason for Briefing:

X	Daily Safety Briefing		New Site Procedure
	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending

Name	Signature	Position
John RYAN KING	John Ryan King	TECHNICIAN
James Goerdt	[signature]	FOL

Briefing Given By:

Name	Signature	Position
Ron Coleman	[signature]	UXOSO/TECH-III

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)			
	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards		On-Site Injuries/Illness
X	Chemical/Biological Hazards		Reporting Procedures
	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
X	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
	OE Precautions		Other:

4. Remarks:

Intrusive Samplings @ UXO-16, 17 & 14

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX

Tailgate Safety Briefing

Date: 6-14-2009 **Location:** X-16

Time: 0745 **Team #:** Sample

1. Reason for Briefing:

X	Daily Safety Briefing		New Site Procedure
	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending

Name	Signature	Position
John RYAN KING	John Ryan King	TECHNICIAN
James Goerdt	James Goerdt	FOL

Briefing Given By:

Name	Signature	Position
Ron Coleman	Ron Coleman	UXOSO/TECH III

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)			
	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards		On-Site Injuries/Illness
	Chemical/Biological Hazards		Reporting Procedures
X	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
X	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
	OE Precautions		Other:

4. Remarks:

Intrusive Sampleing @ UXO-16 & 17

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX	
Tailgate Safety Briefing	
Date: 6-13-2009	**Location:** UXO-16
Time: 0745	**Team #:** Sample

1. Reason for Briefing:

X	**Daily Safety Briefing**		**New Site Procedure**
	Initial Safety Briefing		**New Site Information**
	New Task Briefing		**Review of Site Information**
	Periodic Safety Meeting		**Other: (Specify)**

2. Personnel Attending

Name	Signature	Position
John RYAN KING	John Ryan King	TECHNICIAN
James Goeckel		FOL

Briefing Given By:

Name	Signature	Position
Ron Coleman		UXOSO/Tech III

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)

	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards	X	On-Site Injuries/Illness
X	Chemical/Biological Hazards	X	Reporting Procedures
X	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
X	Safe Work Practices	X	Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
	OE Precautions		Other:

4. Remarks:

OP's Today - UXO-16 Skeet Range - Intrusive Samples & Brush Cutting

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX

Tailgate Safety Briefing

Date: ~~08000~~ 6/12/09 **Location:** UXO-16

Time: 0800 **Team #:** Sample

1. Reason for Briefing:

X	**Daily Safety Briefing**		**New Site Procedure**
X	**Initial Safety Briefing** For Mr. King		**New Site Information**
	New Task Briefing		**Review of Site Information**
	Periodic Safety Meeting		**Other: (Specify)**

2. Personnel Attending

Name	Signature	Position
Jacob Birkett	Jacob Birkett	Field Geologist
James Goerdt	James Goerdt	FOL
John King	John Ryan King	Technician

Briefing Given By:

Name	Signature	Position
Ron Coleman	Ron Coleman	UXOSO/Tech III

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)

	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards		On-Site Injuries/Illness
	Chemical/Biological Hazards		Reporting Procedures
X	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
	OE Precautions		Other:

4. Remarks:

Intrusive Samplings OP's

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX

Tailgate Safety Briefing

Date: 6/11/09 **Location:** UXO-16

Time: 0745 **Team #:** Sample & DPT

1. Reason for Briefing:

X	Daily Safety Briefing		New Site Procedure
	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending

Name	Signature	Position
Joshua Ellingworth		Driller
Gary Ellingworth		Driller
Jacob Birkett		Field Geologist
James Goerdt		FOL

Briefing Given By:

Name	Signature	Position
Ron Coleman		UXOSO/Tech III

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)

	Site Safety Personnel		Decontamination Procedures
X	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards	X	On-Site Injuries/Illness
X	Chemical/Biological Hazards		Reporting Procedures
	Heat/Cold Stress	X	Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
X	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
X	OE Precautions		Other:

4. Remarks:

Parrat - W0 / F(inc.) Here To Sample @ UXO 17

Pistol Range - Depths To 10'

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX

Tailgate Safety Briefing

Date: 6/10/2009 **Location:** X-16

Time: 0800 **Team #:** Sample

1. Reason for Briefing:

X	Daily Safety Briefing		New Site Procedure
	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending

Name	Signature	Position
James Goerdt	James Goerdt	FOL
Jacob Birkett	Jacob Birkett	Field Geologist
JAYME SCHAEFFER	Jayme Schaeffer	BIOLOGIST

Briefing Given By:

Name	Signature	Position
Ron Coleman	Ron Coleman	UXOSO/Tech III

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)			
	Site Safety Personnel		Decontamination Procedures
X	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards		On-Site Injuries/Illness
	Chemical/Biological Hazards		Reporting Procedures
X	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
X	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
X	OE Precautions		Other:

4. Remarks:

Water Silt Sediment Samples via Boat

Briefed Normandeau Associates

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX

Tailgate Safety Briefing

Date: 6-09-2009 **Location:** X-16 Area

Time: 0800 **Team #:** Sample

1. Reason for Briefing:

X	Daily Safety Briefing		New Site Procedure
	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending

Name	Signature	Position
Jacob Birkett		Field Geologist
Jumas Goard		FOL

Briefing Given By:

Name	Signature	Position
Ron Coleman		UXOSO/Tech III

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)			
	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards	X	On-Site Injuries/Illness
X	Chemical/Biological Hazards		Reporting Procedures
	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
X	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
	OE Precautions		Other:

4. Remarks:

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX

Tailgate Safety Briefing

Date: 6/08/2009 **Location:** X-25 Area

Time: 1300 **Team #:** Sample

1. Reason for Briefing:

X	Daily Safety Briefing		New Site Procedure
	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending

Name	Signature	Position
Jacob Birkett		Field Geologist
James Gourdy		FOL

Briefing Given By:

Name	Signature	Position
Ron Coleman		UXOSO/Tech III

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)			
	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards		On-Site Injuries/Illness
	Chemical/Biological Hazards		Reporting Procedures
X	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
	OE Precautions		Other:

4. Remarks:

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX

Tailgate Safety Briefing

Date: 6/05/2009 **Location:** X-16 Area

Time: 0745 **Team #:** Sample

1. Reason for Briefing:

X	Daily Safety Briefing		New Site Procedure
	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending

Name	Signature	Position
Jacob Birkett	Jacob Birkett	Field Geologist

Briefing Given By:

Name	Signature	Position
Ron Coleman	Ron Coleman	UXOSO/Tech III

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)			
	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards		On-Site Injuries/Illness
	Chemical/Biological Hazards		Reporting Procedures
X	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
	OE Precautions		Other:

4. Remarks:

Intrusive Samples

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX

Tailgate Safety Briefing

Date: 6/04/2009 **Location:** X-16 Area

Time: 0745 **Team #:** Sample

1. Reason for Briefing:

X	Daily Safety Briefing		New Site Procedure
	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending

Name	Signature	Position
Jacob Birkett	Jacob Birkett	Field Geologist

Briefing Given By:

Name	Signature	Position
Ron Coleman	Ron Coleman	UXOSO/Tech III

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)			
	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards		On-Site Injuries/Illness
X	Chemical/Biological Hazards		Reporting Procedures
X	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
	OE Precautions		Other:

4. Remarks:

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX

Tailgate Safety Briefing

Date: 6-03-09 **Location:** X16

Time: 0745 **Team #:** Sample Team

1. Reason for Briefing:

X	Daily Safety Briefing		New Site Procedure
	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending

Name	Signature	Position
Jim Goerdt		FOL
Jacob Birkett		Field Geologist

Briefing Given By:

Name	Signature	Position
Ron Coleman		UXOSO/Tech III

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)

	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards		On-Site Injuries/Illness
	Chemical/Biological Hazards		Reporting Procedures
X	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
X	OE Precautions		Other:

4. Remarks:

Brush Cutting / Intrusive Samples Safe Practices

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX

Tailgate Safety Briefing

Date: 6-02-09 **Location:** UXO-16

Time: 0730 **Team #:** Sample Team

1. Reason for Briefing:

X	Daily Safety Briefing		New Site Procedure
	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending

Name	Signature	Position
Jim Goerdt	Jim Goerdt	FOL
Jacob Birkett	Jacob Birkett	Field Geologist

Briefing Given By:

Name	Signature	Position
Ron Coleman	Ron Coleman	UXOSO/Tech III

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)			
	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards		On-Site Injuries/Illness
X	Chemical/Biological Hazards		Reporting Procedures
X	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
X	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
	OE Precautions		Other:

4. Remarks:

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX

Tailgate Safety Briefing

Date: 6-01-09 **Location:** UXO-16

Time: 0800 **Team #:** Sample Team

1. Reason for Briefing:

X	Daily Safety Briefing		New Site Procedure
	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending

Name	Signature	Position
Jim Goerdt		FOL
Jacob Birkett		Field Geologist

Briefing Given By:

Name	Signature	Position
Ron Coleman		UXOSO/Tech III

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)			
	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards		On-Site Injuries/Illness
X	Chemical/Biological Hazards		Reporting Procedures
	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
X	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
	OE Precautions		Other:

4. Remarks:

Intrusive Sampling Operations

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX

Tailgate Safety Briefing

Date: 5-29-09 **Location:** UXO-16

Time: 0930 **Team #:** Sample Team

1. Reason for Briefing:

X	Daily Safety Briefing		New Site Procedure
	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending

Name	Signature	Position
Jacob Birkett	Jacob Birkett	Field Geologist
James Coffman	James D. Coffman	Geophysicist
James Goard	James Goard	FOL

Briefing Given By:

Name	Signature	Position
Ron Coleman	Ron Coleman	UXOSO/Tech III

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)			
	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards		On-Site Injuries/Illness
X	Chemical/Biological Hazards		Reporting Procedures
X	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
	OE Precautions		Other:

4. Remarks:

Intrusive Sampling & GPS work in Suspect MEC Area

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX

Tailgate Safety Briefing

Date: 5-28-2009 **Location:** UXO-16

Time: 0800 **Team #:** Intrusive Sampling

1. Reason for Briefing:

X	Daily Safety Briefing		New Site Procedure
	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending

Name	Signature	Position
Jim Goerdt		FOL
Jacob Birkett		Field Geologist
James Coffman		Geophysicist

Briefing Given By:

Name	Signature	Position
Ron Coleman		UXOSO/TechIII

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)			
	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards		On-Site Injuries/Illness
X	Chemical/Biological Hazards		Reporting Procedures
X	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
X	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
	OE Precautions		Other:

4. Remarks:

TETRA TECH NUS, INC.

Project: NSFIH STUMP NECK ANNEX

Tailgate Safety Briefing

Date: 5-27-2009 **Location:** UXO-14

Time: _____ **Team #:** _____

1. Reason for Briefing:

	Daily Safety Briefing		New Site Procedure
X	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending

Name	Signature	Position
Jacob Birkett	Jacob Birkett	Geologist
James Coffman	James D. Coffman	Geophysicist
James Goerdt	[signature]	FOL

Briefing Given By:

Name	Signature	Position
Ron Coleman	[signature]	Tech III / UXOSO

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)

X	Site Safety Personnel		Decontamination Procedures
X	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards	X	On-Site Injuries/Illness
	Chemical/Biological Hazards		Reporting Procedures
X	Heat/Cold Stress	X	Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
X	Safe Work Practices	X	Evacuation/Egress Procedures
	Air Monitoring	X	Communications
	Task Training		Confined Spaces
X	OE Precautions		Other:

4. Remarks:

Initial Brief For New Site Personnel & Review of TetraTech Safety policies

TETRA TECH NUS, INC.

Project: ~~MARINE CORPS BASE, QUANTICO, VIRGINIA~~
Naval Support Facility Indian Head / STump Neck

Tailgate Safety Briefing

Date: 5-20-09 **Location:** STump Neck NSWC

Time: 0800 **Team #:** _____

1. Reason for Briefing:

	Daily Safety Briefing		New Site Procedure
X	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending

Name	Signature	Position
Jim Goardt		FOL
Ralph Bascuds		PM
Nicholas Carros		RPM

Briefing Given By:

Name	Signature	Position
Ron Coleman		UXOSO/Tech III

TETRA TECH NUS, INC.

3. Topics: (Check All That Apply)			
X	Site Safety Personnel		Decontamination Procedures
X	Site/Work Area Description		Emergency Response/Equipment
X	Physical Hazards	X	On-Site Injuries/Illness
	Chemical/Biological Hazards	X	Reporting Procedures
	Heat/Cold Stress	X	Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
X	PPE		Medical Monitoring
	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
X	OE Precautions		Other:

4. Remarks:

No Intrusive OP's - Site Visits

APPENDIX A

SOP TABLE OF CONTENTS

SOP-01	Sample Labeling
SOP-02	Sample Identification Nomenclature
SOP-03	Sample Custody and Documentation of Field Activities
SOP-04	Decontamination of Field Sampling Equipment
SOP-05	Soil Coring and Sampling Using Hand Auger Techniques
SOP-06	Borehole Advancement and Soil Coring and Sampling Using Direct-Push Technology
SOP-07	Surface Water Sampling
SOP-08	Sediment Sampling
SOP-09	Management of Investigation-Derived Waste
SOP-10	Borehole and Soil Sample Logging
SOP-11	Sample Preservation, Packaging, and Shipping
SOP-12	Calibration and Care of Water Quality Meter
SOP-13	Use of Field Portable X-Ray Fluorescence Analysis of Soil and Sediment
SOP-14	Large Water Body Sediment Sampling
SOP-15	Composite Sampling for Soil and Sediment

SMALL ARMS (PISTOL) RANGE (UXO 17)

LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TIME	XRF DATE	XRF READING #	XRF TIME	1st	2nd	3rd	AVG	LAB RESULT	FBL (Metals)	FBL (TOC)	FBL (NG)			
Mid-range	X17SB0010004	6/11/2009	840	6/11/2009	21-22-23	1234	ND	ND	13	**4**	9.1	X	X				
Mid-range	X17SB0010408	6/11/2009	845	6/11/2009	24-25-26	1240	14	11	12	**12**	NS						
Mid-range	X17SB0010810	6/11/2009	850	6/11/2009	27-28-29	1245	ND	ND	ND	**0**	NS						
Mid-range	X17SB0020004	6/11/2009	911	6/11/2009	30-31-32	1255	ND	11	ND	**4**	NS						
Mid-range	X17SB0020406	6/11/2009	917	6/11/2009	33-34-35	1359	84	88	84	**85**	8.1	X					
Mid-range	X17SB0020608	6/11/2009	918	6/11/2009	36-37-38	1403	ND	ND	ND	**0**	NS						
Mid-range	X17SB0020810	6/11/2009	920	6/11/2009	39-40-41	1407	17	12	9	**13**	NS						
Mid-range	X17SB0030004	6/11/2009	934	6/11/2009	42-43-44	1427	18	18	13	**16**	NS						
Mid-range	X17SB0030406	6/11/2009	946	6/11/2009	45-46-47	1431	96	87	73	**85**	NS						
Mid-range	X17SB0030608	6/11/2009	951	6/11/2009	48-49-50	1438	170	106	103	**126**	68.2	X					
Mid-range	X17SB0030810	6/11/2009	953	6/11/2009	51-52-53	1443	ND	ND	23	**8**	NS						
Mid-range	X17SB0040004	6/11/2009	1010	6/11/2009	61-62-63	1528	**2991**	**1910**	**1612**	**2171**	589	X					
Mid-range	X17SB0040406	6/11/2009	1012	6/11/2009	54-56-57	1452	**572**	193	**349**	**371**	NS						
Mid-range	X17SB0040608	6/11/2009	1013	6/11/2009	58-59-60	1515	ND	ND	ND	**0**	8.9	X					
Mid-range	X17SB0040810	6/11/2009	1019	6/11/2009	64-65-66	1532	126	224	118	**156**	NS						
Mid-range	X17SB0050004	6/11/2009	1053	6/11/2009	67-68-69	1544	**759**	**880**	**1188**	**942**	620	X			9 mm bullet		
Mid-range	X17SB0050406	6/11/2009	1103	6/11/2009	70-71-72	1548	29	46	35	**37**	NS						
Mid-range	X17SB0050608	6/11/2009	1105	6/11/2009	73-74-75	1553	**301**	**436**	**312**	**350**	NS						
Mid-range	X17SB0050810	6/11/2009	1110	6/11/2009	76-77-78	1558	42	40	42	**41**	32.4	X					
Mid-range	X17SB0060004	6/11/2009	1117	6/11/2009	79-80-81	1619	244	191	255	**230**	NS						
Mid-range	X17SB0060406	6/11/2009	1120	6/11/2009	82-83-84	1631	149	201	223	**191**	132	X					
Mid-range	X17SB0060608	6/11/2009	1125	6/11/2009	85-86-87	1634	ND	14	ND	**5**	NS						
Mid-range	X17SB0060810	6/11/2009	1130	6/11/2009	88-89-90	1651	63	43	60	**55**	NS						
Mid-range	X17SB0070004	6/11/2009	1137	6/11/2009	91-92-93	1726	13	ND	ND	**4**	8.2	X					
Mid-range	X17SB0070406	6/11/2009	1140	6/11/2009	94-95-96	1748	16	27	30	**24**	NS						
Mid-range	X17SB0070608	6/11/2009	1145	6/11/2009	97-98-99	1753	ND	ND	ND	**0**	NS						
Mid-range	X17SB0070810	6/11/2009	1147	6/11/2009	100-101-102	1757	11	9	ND	**7**	NS						
Firing Line	X17SS008C0001	6/11/2009	1220	6/12/2009	42-43-44	1047	91	93	105	**96**	21	X		X	brn/org clayey sand with pepples		
Firing Line	X17SS009C0001	6/11/2009	1330	6/12/2009	45-46-47	1052	56	95	69	**73**	38.7	X		X	brn/org clayey sand with pepples		
Firing Line	X17SS010C0001	6/11/2009	1400	6/12/2009	48-49-50	1059	186	170	113	**156**	200	X		X	brn/org clayey sand with pepples		
Low-range	X17SS0110001	6/11/2009	1440	6/11/2009	103-104-105	1830	**408**	**435**	**372**	**405**	NS				orange clayey sand		
Low-range	X17SB0110102	6/14/2009	1450	6/14/2009	201-202-203	1929	104	92	109	**102**	82.1	X					
Low-range	X17SS0120001	6/11/2009	1455	6/11/2009	106-107-108	1834	ND	16	14	**10**	NS				orange clayey sand		
Low-range	X17SS0130001	6/11/2009	1510	6/11/2009	109-110-111	1838	**3470**	**3467**	**2804**	**3247**	NS				orange clayey sand		
Low-range	X17SB0130102	6/14/2009	1450	6/14/2009	198-199-200	1926	31	33	28	**31**	39.2	X	X		orange clayey sand		20"
Low-range	X17SS0140001	6/11/2009	1314	6/12/2009	9-10-11	844	**1013**	**5290**	**1200**	**2501**	706	X			orange clayey sand		
Low-range	X17SB0140102	6/14/2009	1500	6/14/2009	195-196-197	1917	36	46	40	**41**	77.6	X			orange clayey sand		
Low-range	X17SS0150001	6/11/2009	1520	6/12/2009	12-13-14	849	18	16	20	**18**	NS				orange clayey sand		
Low-range	X17SS0160001	6/11/2009	1525	6/12/2009	15-16-17	853	11	21	9	**14**	12.2 B	X			orange clayey sand		
Low-range	X17SS0170001	6/11/2009	1450	6/12/2009	18-19-20	857	13	16	ND	**10**	NS				orange clayey sand		
High-range	X17SS0180001	6/11/2009	1452	6/12/2009	21-22-23	902	11	10	ND	**7**	NS				orange clayey sand		
High-range	X17SS0190001	6/11/2009	1500	6/12/2009	24-25-26	907	38	40	30	**36**	39.4	X	X		orange clayey sand		
High-range	X17SS0200001	6/11/2009	1506	6/12/2009	27-28-29	911	52	36	29	**39**	NS				orange clayey sand		
High-range	X17SS0210001	6/11/2009	1520	6/12/2009	30-31-32	918	40	31	23	**31**	NS				reddish-orange clayey sand		
High-range	X17SS0220001	6/11/2009	1530	6/12/2009	33-34-35	923	53	14	11	**26**	7.0 B	X			reddish-orange sand		
High-range	X17SS0220001-D	6/11/2009	1530	6/12/2009	33-34-35	923	53	14	11	**26**	7.2	X					
High-range	X17SS0230001	6/11/2009	1536	6/12/2009	36-37-38	930	ND	ND	ND	**0**	NS				reddish-orange sand		
High-range	X17SS0240001	6/11/2009	1545	6/12/2009	39-40-41	935	13	10	11	**11**	10.3 B	X			reddish-orange sand		
Low-range	X17SS0250001	6/12/2009	1020	6/13/2009	24-25-26	1410	**656**	**762**	**777**	**732**	479	X			orange clayey sand	Step out to north for SB11	
Low-range	X17SB0250102	6/14/2009	1440	6/14/2009	192-193-194	1912	80	191	109	**127**	87.5	X			orange clayey sand	Step out to north for SB11	20"
Low-range	X17SS0260001	6/12/2009	1030	6/13/2009	27-28-29	1421	92	103	91	**95**	NS				orange clayey sand	Step out to west for SB12	
Low-range	X17SS0270001	6/12/2009	1040	6/13/2009	30-31-32	1427	87	125	174	**129**	645	X			orange clayey sand	Step out to west for SB13	
Low-range	X17SS0280001	6/12/2009	1050	6/13/2009	33-34-35	1432	38	43	36	**39**	38.9	X	X		orange clayey sand	Step out to west for SB14	
Low-range	X17SS0290001	6/14/2009	1440	6/14/2009	189-190-191	1908	251	232	285	**256**	NS	X			orange clayey sand	Step out to north for SB25	
							TOTALS TO THE LAB					**25**	**4**	**3**			

FBL

6/11/2009

Switched battery on XRF between 54 and 56.

55	Std = 243
112	Blank (SiO2) = ND (<7)
113	NIST 2709 (low) = 10
114	NIST 2711 (med) = 1082
115	NIST 2710 (high) = 5260

6/12/2009

1	Std = 236	6-7-8	838	**3019**	**2991**	**1965**	**2658**	potential low battery (rerun)
2	Blank (SiO2) = ND (<7)							
3	NIST 2709 (low) = 21							
4	NIST 2711 (med) = 1073							
5	NIST 2710 (high) = 5492							
Low-range	X17SS-0130001							

sample_id	parameter	fraction	ourresult	units
X14SB0840102	LEAD	M	6620 J	MG/KG
X14SB0840102-D	LEAD	M	3590 J	MG/KG
X14SB1020203	LEAD	M	1220	MG/KG
X14SB1110102	LEAD	M	2640	MG/KG
X14SS001C0001	LEAD	M	18.4	MG/KG
X14SS002C0001	LEAD	M	17.6	MG/KG
X14SS003C0001	LEAD	M	19.6	MG/KG
X14SS004C0001	LEAD	M	52.5	MG/KG
X14SS005C0001	LEAD	M	12	MG/KG
X14SS006C0001	LEAD	M	36.7	MG/KG
X14SS007C0001	LEAD	M	21.2	MG/KG
X14SS008C0001	LEAD	M	22.3	MG/KG
X14SS009C0001	LEAD	M	20.1	MG/KG
X14SS0220001	LEAD	M	9.6	MG/KG
X14SS0330001	LEAD	M	75.1	MG/KG
X14SS0350001	LEAD	M	543	MG/KG
X14SS0390001	LEAD	M	111	MG/KG
X14SS0430001	LEAD	M	373	MG/KG
X14SS0480001	LEAD	M	85.7	MG/KG
X14SS0580001	LEAD	M	606	MG/KG
X14SS0620001	LEAD	M	278	MG/KG
X14SS0630001	LEAD	M	188	MG/KG
X14SS0720001	LEAD	M	283	MG/KG
X14SS0870001	LEAD	M	108	MG/KG
X14SS0940001	LEAD	M	293	MG/KG
X14SS1080001	LEAD	M	31.3	MG/KG
X14SS1170001	LEAD	M	618	MG/KG
X14SS1200001	LEAD	M	741 J	MG/KG
X14SS1260001	LEAD	M	476	MG/KG
X14SS1300001	LEAD	M	44.7	MG/KG
X14SS1310001	LEAD	M	120	MG/KG
X14SS1320001	LEAD	M	17.9	MG/KG
X14SS1340001	LEAD	M	904	MG/KG
X14SS1350001	LEAD	M	45.1	MG/KG
X14SS1380001	LEAD	M	137	MG/KG
X14SS1390001	LEAD	M	280	MG/KG
X14SS1400001	LEAD	M	676	MG/KG
X14SS1410001	LEAD	M	405	MG/KG
X14SS1420001	LEAD	M	11.0 B	MG/KG
X14SS1430001	LEAD	M	166	MG/KG
X15SB0050102	LEAD	M	12.2	MG/KG
X15SD0030006	LEAD	M	19.6	MG/KG
X15SD0050006	LEAD	M	7.5	MG/KG
X15SD0130006	LEAD	M	14	MG/KG
X15SD0180006	LEAD	M	6.7	MG/KG
X15SD0230006	LEAD	M	7.6	MG/KG
X15SD0300006	LEAD	M	37	MG/KG
X15SD0330006	LEAD	M	5.0 B	MG/KG
X15SS0050001	LEAD	M	252	MG/KG
X15SS0070001	LEAD	M	220	MG/KG
X15SS0180001	LEAD	M	32	MG/KG

X15SS0350001	LEAD	M	81.6	MG/KG
X15SS0370001	LEAD	M	203	MG/KG
X15SS0610001	LEAD	M	74.7	MG/KG
X15SS0640001	LEAD	M	940	MG/KG
X15SS0660001	LEAD	M	33.3	MG/KG
X15SS0680001	LEAD	M	423	MG/KG
X15SS0700001	LEAD	M	754	MG/KG
X15SS0710001	LEAD	M	282	MG/KG
X15SS0710001-D	LEAD	M	187	MG/KG
X15SS0720001	LEAD	M	658	MG/KG
X15SS0730001	LEAD	M	335	MG/KG
X15SS0760001	LEAD	M	238	MG/KG
X15SS077C0001	LEAD	M	66.7	MG/KG
X15SS078C0001	LEAD	M	77.2	MG/KG
X16SS0030001	LEAD	M	13.5	MG/KG
X16SS0080001	LEAD	M	616	MG/KG
X16SS0130001	LEAD	M	38.8	MG/KG
X16SS0170001	LEAD	M	51.4	MG/KG
X16SS0200001	LEAD	M	51.9	MG/KG
X16SS0250001	LEAD	M	159 J	MG/KG
X16SS0320001	LEAD	M	13.9	MG/KG
X16SS0320001-D	LEAD	M	13	MG/KG
X16SS0420001	LEAD	M	12.1	MG/KG
X16SS0540001	LEAD	M	35	MG/KG
X16SS0570001	LEAD	M	22.3	MG/KG
X16SS0610001	LEAD	M	23.5	MG/KG
X16SS0730001	LEAD	M	40.1	MG/KG
X16SS0790001	LEAD	M	267	MG/KG
X16SS080C0001	LEAD	M	9.1	MG/KG
X16SS081C0001	LEAD	M	48.7	MG/KG
X16SS0870001	LEAD	M	90.2	MG/KG
X16SS0900001	LEAD	M	38.8	MG/KG
X16SS0900001-D	LEAD	M	338 J	MG/KG
X16SS0910001	LEAD	M	12.6	MG/KG
X16SS0920001	LEAD	M	143	MG/KG
X16SS0930001	LEAD	M	14.7	MG/KG
X16SS0940001	LEAD	M	6.7	MG/KG
X16SS0950001	LEAD	M	19.2	MG/KG
X17SB0010004	LEAD	M	9.1	MG/KG
X17SB0020406	LEAD	M	8.1	MG/KG
X17SB0030608	LEAD	M	68.2	MG/KG
X17SB0040004	LEAD	M	589	MG/KG
X17SB0040608	LEAD	M	8.9	MG/KG
X17SB0050004	LEAD	M	620	MG/KG
X17SB0050810	LEAD	M	32.4	MG/KG
X17SB0060406	LEAD	M	132	MG/KG
X17SB0070004	LEAD	M	8.2	MG/KG
X17SB0110102	LEAD	M	82.1	MG/KG
X17SB0130102	LEAD	M	39.2	MG/KG
X17SB0140102	LEAD	M	77.6	MG/KG
X17SB0250102	LEAD	M	87.5	MG/KG
X17SS008C0001	LEAD	M	21	MG/KG

X17SS009C0001	LEAD	M	38.7	MG/KG
X17SS010C0001	LEAD	M	200	MG/KG
X17SS0140001	LEAD	M	706	MG/KG
X17SS0160001	LEAD	M	12.2 B	MG/KG
X17SS0190001	LEAD	M	39.4	MG/KG
X17SS0220001	LEAD	M	7.0 B	MG/KG
X17SS0220001-D	LEAD	M	7.2	MG/KG
X17SS0240001	LEAD	M	10.3 B	MG/KG
X17SS0250001	LEAD	M	479	MG/KG
X17SS0270001	LEAD	M	645	MG/KG
X17SS0280001	LEAD	M	38.9	MG/KG
X25SS0010001	LEAD	M	6.3	MG/KG
X25SS0040001	LEAD	M	19.5	MG/KG
X25SS0070001	LEAD	M	43.5	MG/KG
X25SS0070001-D	LEAD	M	34.5	MG/KG
X25SS0080001	LEAD	M	91.4	MG/KG
X25SS0100001	LEAD	M	84.0 J	MG/KG
X25SS0130001	LEAD	M	19.8 J	MG/KG
X25SS0160001	LEAD	M	88.6	MG/KG
X25SS0180001	LEAD	M	529	MG/KG
X25SS0190001	LEAD	M	1060	MG/KG
X25SS0200001	LEAD	M	3450	MG/KG
X25SS0210001	LEAD	M	131	MG/KG
X25SS0210001-D	LEAD	M	127	MG/KG
X25SS0220001	LEAD	M	62.6	MG/KG
X25SS0230001	LEAD	M	546	MG/KG
X25SS0240001	LEAD	M	522	MG/KG
X25SS0250001	LEAD	M	34.2	MG/KG
X25SS0280001	LEAD	M	17.9	MG/KG
X25SS0300001	LEAD	M	50.3	MG/KG
X25SS0310001	LEAD	M	142	MG/KG
X25SS0320001	LEAD	M	60.2	MG/KG
X25SS0330001	LEAD	M	31.1	MG/KG
X25SS034C0001	LEAD	M	9.4	MG/KG

MARINE RIFLE RANGE (UXO 14)

LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TIME	XRF DATE	XRF READING #	XRF TIME	1st	2nd	3rd	AVG	LAB RESULT	FBL (Metals)	FBL (NG)	FBL (TOC)		
Firing Line	X14SS001C0001	5/29/2009	1215	5/30/2009	66-68-69	2242	18	22	19	**20**	18.4	X	X			
Firing Line	X14SS002C0001	5/29/2009	1205	5/30/2009	70-71-72	2254	19	17	19	**18**	17.6	X	X			
Firing Line	X14SS003C0001	5/29/2009	1310	5/30/2009	73-74-75	2301	17	15	15	**16**	19.6	X	X			
Firing Line	X14SS004C0001	5/29/2009	1315	5/30/2009	76-77-78	2310	86	54	107	**82**	52.5	X	X			
Firing Line	X14SS005C0001	5/29/2009	1420	5/30/2009	79-80-81	2314	21	17	12	**17**	12	X	X			
Firing Line	X14SS006C0001	5/29/2009	1404	5/30/2009	85-86-87	2332	20	26	13	**20**	36.7	X	X			
Firing Line	X14SS007C0001	5/29/2009	1451	5/30/2009	82-83-84	2326	13	19	25	**19**	21.2	X	X		MS/MSD for NG	
Firing Line	X14SS008C0001	6/1/2009	1030	6/1/2009	38-39-40	1509	38	22	30	**30**	22.3	X	X			
Firing Line	X14SS009C0001	6/1/2009	1110	6/1/2009	41-42-43	1514	20	24	22	**22**	20.1	X	X			
Berm #1	X14SS0100001	6/1/2009	1505	6/2/2009	6-7-8	934	51	62	60	**58**	NS					
Berm #1	X14SS0110001	6/1/2009	1455	6/2/2009	9-10-11	938	47	40	43	**43**	NS					
Berm #1	X14SS0120001	6/1/2009	1445	6/2/2009	12-13-14	1012	17	29	21	**22**	NS					
Berm #1	X14SS0130001	6/1/2009	1435	6/2/2009	15-16-17	1019	24	19	17	**20**	NS					
Berm #1	X14SS0140001	6/1/2009	1310	6/2/2009	18-19-20	1033	15	11	19	**15**	NS					
Berm #1	X14SS0150001	6/2/2009	1055	6/9/2009	6-7-8	953	19	14	23	**19**	NS				brn sandy soil	
Berm #1	X14SS0160001	6/2/2009	1102	6/9/2009	9-10-11	957	17	14	16	**16**	NS				brn sandy soil	
Berm #1	X14SS0170001	6/2/2009	1110	6/9/2009	12-13-14	1003	21	20	18	**20**	NS				brn sandy soil	
Berm #1	X14SS0180001	6/2/2009	1118	6/9/2009	15-16-17	1008	10	14	11	**12**	NS				brn sandy soil	
Berm #1	X14SS0190001	6/2/2009	1121	6/9/2009	18-19-20	1015	14	14	20	**16**	NS				brn sandy soil w/ some clay	
Berm #1	X14SS0200001	6/2/2009	1127	6/9/2009	21-22-23	1019	21	21	13	**18**	NS				brn sandy soil w/ some clay	
Berm #1	X14SS0210001	6/2/2009	1156	6/9/2009	27-28-29	1029	22	17	29	**23**	NS				brn sandy soil w/ some clay	
Berm #1	X14SS0220001	6/2/2009	1200	6/9/2009	24-25-26	1024	25	27	34	**29**	9.6	X		X	brn sandy soil w/ some clay	
Berm #1	X14SS0230001	6/2/2009	1206	6/9/2009	30-31-32	1034	17	19	12	**16**	NS				brn sandy soil w/ some clay	
Berm #1	X14SS0240001	6/2/2009	1200	6/9/2009	33-34-35	1038	40	43	43	**42**	NS				brn sandy soil w/ some clay	
Berm #1	X14SS0250001	6/2/2009	1210	6/9/2009	36-37-38	1044	56	69	61	**62**	NS				brn sandy soil	
Berm #1	X14SS0260001	6/2/2009	1215	6/9/2009	39-40-41	1049	194	162	166	**174**	NS				brn sandy soil	
Berm #1	X14SS0270001	6/2/2009	1219	6/9/2009	42-43-44	1054	22	24	26	**24**	NS				brn sandy soil	
Berm #1	X14SS0280001	6/2/2009	1224	6/9/2009	45-46-47	1058	103	75	86	**88**	NS				brn sandy soil	45 cal bullet
Berm #1	X14SS0290001	6/2/2009	1228	6/9/2009	48-49-50	1105	217	**529**	226	**324**	NS				brn sandy soil	
Berm #1	X14SS0300001	6/2/2009	1225	6/9/2009	51-52-53	1110	55	54	51	**53**	NS				brn sandy soil	
Berm #1	X14SS0310001	6/2/2009	1235	6/9/2009	54-55-56	1115	82	62	65	**70**	NS				brn sandy soil	
Berm #1	X14SS0320001	6/2/2009	1245	6/9/2009	57-58-59	1124	179	134	132	**148**	NS				brn sandy soil	
Berm #1	X14SS0330001	6/2/2009	1243	6/9/2009	60-61-62	1134	55	52	54	**54**	75.1	X			brn sandy soil	
Berm #1	X14SS0340001	6/2/2009	1247	6/9/2009	63-64-65	1144	205	224	272	**234**	NS				brn sandy soil w/ some clay	
Berm #1	X14SS0350001	6/2/2009	1252	6/9/2009	67-68-69	1206	**494**	**541**	**586**	**540**	543	X			brn sandy soil w/ some clay	
Berm #1	X14SS0360001	6/2/2009	1255	6/9/2009	70-71-72	1210	118	119	114	**117**	NS				brn sandy soil	
Berm #1	X14SS0370001	6/2/2009	1310	6/9/2009	73-74-75	1214	86	110	123	**106**	NS				brn sandy soil	
Berm #1	X14SS0380001	6/2/2009	1315	6/9/2009	76-77-78	1243	**418**	**390**	**402**	**403**	NS				brn sandy soil	
Berm #1	X14SS0390001	6/2/2009	1306	6/9/2009	79-80-81	1251	129	129	127	**128**	111	X			brn sandy soil	
Berm #1	X14SS0400001	6/2/2009	1310	6/9/2009	82-83-84	1257	212	195	198	**202**	NS				brn sandy soil	
Berm #1	X14SS0410001	6/2/2009	1314	6/9/2009	85-86-87	1309	272	**365**	**316**	**318**	NS				brn sandy soil	
Berm #1	X14SS0420001	6/2/2009	1325	6/9/2009	88-89-90	1316	91	74	89	**85**	NS				brn sandy soil	
Berm #1	X14SS0430001	6/2/2009	1329	6/9/2009	91-92-93	1321	**383**	**411**	**373**	**389**	373	X			brn sandy soil	
Berm #1	X14SS0440001	6/2/2009	1323	6/9/2009	94-95-96	1328	215	**528**	247	**330**	NS				brn sandy soil	
Berm #2	X14SS0450001	6/3/2009	1027	6/9/2009	97-98-99	1334	33	36	35	**35**	NS				brn sandy soil	
Berm #2	X14SS0460001	6/3/2009	1242	6/9/2009	100-101-102	1343	15	26	23	**21**	NS				brn sandy soil	
Berm #2	X14SS0470001	6/3/2009	1329	6/9/2009	103-104-105	1412	45	36	30	**37**	NS				brn/tan soil with clay	
Berm #2	X14SS0480001	6/3/2009	1426	6/9/2009	106-107-108	1417	53	49	49	**50**	85.7	X			brn/tan soil with clay	
Berm #2	X14SS0490001	6/3/2009	1522	6/9/2009	109-110-111	1424	26	38	24	**29**	NS				tan clayey soil	
Berm #2	X14SS0500001	6/3/2009	958	6/9/2009	116-117-118	1440	192	215	225	**211**	NS				brn sandy soil	
Berm #2	X14SS0510001	6/3/2009	1003	6/9/2009	119-120-121	1445	**551**	**499**	**584**	**545**	NS				brn sandy soil	30 cal bullet
Berm #2	X14SS0520001	6/3/2009	1010	6/9/2009	122-123-124	1450	60	55	80	**65**	NS				brn sandy soil	30 cal bullet
Berm #2	X14SS0530001	6/3/2009	1032	6/9/2009	125-126-127	1459	141	113	89	**114**	NS				brn sandy soil w/ some clay	
Berm #2	X14SS0540001	6/3/2009	1039	6/9/2009	128-129-130	1503	**376**	**375**	**346**	**366**	NS				brn sandy soil w/ some clay	
Berm #2	X14SS0550001	6/3/2009	1047	6/9/2009	131-132-133	1507	**675**	**702**	**809**	**729**	NS				brn sandy soil w/ some clay	
Berm #2	X14SS0560001	6/3/2009	1052	6/9/2009	134-135-136	1522	108	118	117	**114**	NS				brn sandy soil w/ some clay	
Berm #2	X14SS0570001	6/3/2009	1058	6/9/2009	137-138-139	1527	223	228	233	**228**	NS				sandy soil and clay	
Berm #2	X14SS0580001	6/3/2009	1103	6/9/2009	140-141-142	1530	**712**	**641**	**630**	**661**	606	X		X	sandy soil and clay	45 cal bulle MS/MSD - TOC
Berm #2	X14SS0590001	6/3/2009	1247	6/9/2009	144-145-146	1552	139	156	139	**145**	NS				sandy soil and clay	
Berm #2	X14SS0600001	6/3/2009	1253	6/9/2009	147-148-149	1557	**709**	**696**	**736**	**714**	NS				sandy soil and clay	
Berm #2	X14SS0610001	6/3/2009	1259	6/9/2009	150-151-152	1604	134	137	144	**138**	NS				sandy soil and clay	
Berm #2	X14SS0620001	6/3/2009	1303	6/9/2009	153-154-155	1622	294	285	280	**286**	278	X			sandy soil and clay	
Berm #2	X14SS0630001	6/3/2009	1307	6/9/2009	156-157-158	1627	157	193	168	**173**	188	X			sandy soil and clay	
Berm #2	X14SS0640001	6/3/2009	1313	6/9/2009	159-160-161	1633	**507**	**426**	**533**	**489**	NS				sandy soil and clay	
Berm #2	X14SS0650001	6/3/2009	1334	6/9/2009	162-163-164	1642	239	201	233	**224**	NS				sandy soil and clay	
Berm #2	X14SS0660001	6/3/2009	1340	6/9/2009	165-166-167	1647	**790**	**651**	**910**	**784**	NS				sandy soil and clay	30 cal bullet (2)
Berm #2	X14SS0670001	6/3/2009	1347	6/9/2009	168-169-170	1651	154	148	187	**163**	NS				sandy soil and clay	
Berm #2	X14SS0680001	6/3/2009	1405	6/9/2009	174-175-176	1706	165	160	144	**156**	NS				sandy clay	30 cal bullet
Berm #2	X14SS0690001	6/3/2009	1411	6/9/2009	177-178-179	1710	**701**	**522**	**615**	**613**	NS				sandy clay	30 cal bullet
Berm #2	X14SS0700001	6/3/2009	1417	6/9/2009	171-172-173	1700	**651**	**528**	**628**	**602**	NS				sandy clay	
Berm #2	X14SS0710001	6/3/2009	1432	6/10/2009	6-7-8	959	167	166	173	**169**	NS				sandy clay	

MARINE RIFLE RANGE (UXO 14)

LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TIME	XRF DATE	XRF READING #	XRF TIME	1st	2nd	3rd	AVG	LAB RESULT	FBL (Metals)	FBL (NG)	FBL (TOC)		
Berm #2	X14SS0720001	6/3/2009	1439	6/10/2009	9-10-11	1004	508	408	453	456	283	X			clayey soil	30 cal bullet (2)
Berm #2	X14SS0730001	6/3/2009	1446	6/10/2009	12-13-14	1011	596	393	643	544	NS				sandy clay	
Berm #2	X14SS0740001	6/3/2009	1457	6/10/2009	15-16-17	1038	200	220	240	220	NS				clayey soil	
Berm #2	X14SS0750001	6/3/2009	1504	6/10/2009	18-19-20	1043	459	485	420	455	NS				sandy soil	
Berm #2	X14SS0760001	6/3/2009	1509	6/10/2009	21-22-23	1049	144	156	113	138	NS				clayey soil	
Berm #2	X14SS0770001	6/3/2009	1528	6/10/2009	24-25-26	1055	80	84	72	79	NS				clayey soil	
Berm #2	X14SS0780001	6/3/2009	1533	6/10/2009	27-28-29	1100	352	429	422	401	NS				sandy soil w/ some clay	
Berm #2	X14SS0790001	6/3/2009	1540	6/10/2009	30-31-32	1106	256	328	288	291	NS				clayey soil	
Hillside	X14SS0800001	6/4/2009	1022	6/10/2009	33-34-35	1113	373	365	614	451	NS				soil w/ clay	
Hillside	X14SS0810001	6/4/2009	1027	6/10/2009	36-37-38	1117	5267	5050	5135	5151	NS				sandy soil	
Hillside	X14SS0820001	6/4/2009	1034	6/10/2009	39-40-41	1122	2153	2523	2313	2330	NS				sandy soil	
Hillside	X14SS0830001	6/4/2009	1045	6/10/2009	42-43-44	1129	298	397	274	323	NS				sandy soil w/ clay	
Hillside	X14SS0840001	6/4/2009	1055	6/10/2009	45-46-47	1138	8356	8368	10191	8972	NS				sandy soil w/ clay	
Hillside	X14SB0840102	6/16/2009	1110	6/16/2009	124-125-126	1736	348	330	395	358	6620 J	X				
Hillside	X14SB0840102-D	6/16/2009	1110	6/16/2009	124-125-126	1736	348	330	395	358	3590 J	X				
Hillside	X14SS0850001	6/4/2009	1100	6/10/2009	48-49-50	1143	174	178	173	175	NS				sandy soil	
Hillside	X14SS0860001	6/4/2009	1042	6/10/2009	51-52-53	1206	658	597	541	599	NS				sandy soil w/ clay	
Hillside	X14SS0870001	6/4/2009	1250	6/10/2009	54-56-57	1210	242	362	233	279	108	X		X	clayey soil	
Hillside	X14SS0880001	6/4/2009	1058	6/10/2009	58-59-60	1221	178	194	191	188	NS				sandy soil w/ clay	
Hillside	X14SS0890001	6/4/2009	1107	6/10/2009	61-62-63	1227	1331	1202	1204	1246	NS				sandy soil w/small rocks	bullet fragment
Hillside	X14SS0900001	6/4/2009	1115	6/10/2009	64-65-66	1231	1292	1093	1175	1187	NS				sandy soil w/small rocks	
Hillside	X14SS0910001	6/4/2009	1122	6/10/2009	67-68-69	1239	593	599	590	594	NS				sandy soil w/small rocks	
Hillside	X14SS0920001	6/4/2009	1110	6/10/2009	70-71-72	1316	637	770	719	709	NS				sandy soil w/small rocks	
Hillside	X14SS0930001	6/4/2009	1120	6/10/2009	73-74-75	1321	272	295	228	265	NS				sandy soil w/small rocks	
Hillside	X14SS0940001	6/4/2009	1130	6/10/2009	76-77-78	1326	345	319	347	337	293	X			sandy soil w/small rocks	
Hillside	X14SS0950001	6/4/2009	1131	6/10/2009	79-80-81	1331	2100	1830	2387	2106	NS				sandy soil w/small rocks	
Hillside	X14SS0960001	6/4/2009	1238	6/10/2009	82-83-84	1335	216	313	207	245	NS				sandy soil w/small rocks	
Hillside	X14SS0970001	6/4/2009	1244	6/10/2009	85-86-87	1339	56	43	50	50	NS				sandy soil w/small rocks	
Hillside	X14SS0980001	6/4/2009	1225	6/10/2009	88-89-90	1346	1362	1082	1573	1339	NS				clay with pebbles	
Hillside	X14SS0990001	6/4/2009	1235	6/10/2009	91-92-93	1351	2785	3312	3987	3361	NS				sandy soil	
Hillside	X14SS1000001	6/4/2009	1242	6/10/2009	94-95-96	1355	24	22	24	23	NS				sandy soil	
Hillside	X14SS1010001	6/4/2009	1252	6/10/2009	97-98-99	1403	11283	11107	11632	11341	NS				sandy soil w/ clay & pebbles	
Hillside	X14SS1020001	6/4/2009	1301	6/10/2009	100-101-102	1408	15825	16791	27018	19878	NS				sandy soil w/ clay & pebbles	
Hillside	X14SB1020102	6/16/2009	1110	6/16/2009	130-131-132	1746	7651	9473	9669	8931	NS				bullet fragment	
Hillside	X14SB1020203	6/17/2009	905	6/17/2009	15-16-17	1247	2584	2258	2363	2402	1220				clayey sand w/ pebbles	
Hillside	X14SS1030001	6/4/2009	1306	6/10/2009	103-104-105	1413	772	292	299	454	NS				sandy soil	
Hillside	X14SS1040001	6/4/2009	1255	6/10/2009	110-111-112	1425	1557	1893	1556	1669	NS				clayey sand	
Hillside	X14SS1050001	6/4/2009	1305	6/10/2009	113-114-115	1430	856	411	697	655	NS				sandy soil w/ clay	
Hillside	X14SS1060001	6/4/2009	1320	6/10/2009	116-117-118	1435	438	584	450	491	NS				sandy soil	
Hillside	X14SS1070001	6/4/2009	1315	6/10/2009	119-120-121	1444	1877	3229	3089	2732	NS				clayey soil	
Hillside	X14SS1080001	6/4/2009	1323	6/10/2009	122-123-124	1449	57	58	48	54	31.3	X			clayey soil	
Hillside	X14SS1090001	6/4/2009	1332	6/10/2009	125-126-127	1453	3080	3671	2874	3208	NS				sandy soil w/ some clay	
Hillside	X14SS1100001	6/4/2009	1330	6/10/2009	128-129-130	1507	8164	9560	9634	9119	NS				sandy soil	
Hillside	X14SS1110001	6/4/2009	1350	6/10/2009	131-132-133	1515	17023	9290	8295	11536	NS				sandy soil	
Hillside	X14SB1110102	6/16/2009	1125	6/16/2009	127-128-129	1741	1550	2338	1640	1843	2640					
Hillside	X14SS1120001	6/4/2009	1400	6/10/2009	134-135-136	1518	7630	6321	7378	7110	NS				sandy soil	
Hillside	X14SS1130001	6/4/2009	1350	6/10/2009	138-139-140	1528	13790	5934	9925	9883	NS				clayey soil	
Hillside	X14SS1140001	6/4/2009	1357	6/10/2009	141-142-143	1533	3134	2737	2487	2786	NS				clayey soil	
Hillside	X14SS1150001	6/4/2009	1403	6/10/2009	144-145-146	1538	1886	1440	1560	1629	NS				clayey soil	
Hillside	X14SS1160001	6/4/2009	1420	6/10/2009	147-148-149	1352	656	747	654	686	NS				clayey sand	
Hillside	X14SS1170001	6/4/2009	1435	6/10/2009	150-151-152	1604	687	755	1104	849	618	X		X	clayey sand	
Hillside	X14SS1180001	6/4/2009	1445	6/10/2009	153-154-155	1611	623	589	712	641	NS				clayey sand	
Hillside	X14SS1190001	6/4/2009	1421	6/10/2009	156-157-158	1627	460	470	451	460	NS				clayey sand	
Hillside	X14SS1200001	6/4/2009	1428	6/10/2009	159-160-161	1633	281	257	325	288	741 J				clayey sand	
Hillside	X14SS1210001	6/4/2009	1435	6/10/2009	162-163-164	1638	827	669	797	764	NS				clayey sand	
Hillside	X14SS1220001	6/4/2009	1443	6/10/2009	165-166-167	1651	72	80	75	76	NS				clayey sand	
Hillside	X14SS1230001	6/4/2009	1449	6/10/2009	168-169-170	1655	107	115	97	106	NS				clayey sand	
Hillside	X14SS1240001	6/4/2009	1455	6/10/2009	171-172-173	1659	69	73	76	73	NS				clayey sand	
Hillside	X14SS1250001	6/9/2009	1235	6/10/2009	174-175-176	1710	878	864	986	909	NS				clayey sand (wet)	Discretionary samples based on area where bullets were seen
Hillside	X14SS1260001	6/9/2009	1248	6/10/2009	177-178-179	1714	532	501	504	512	476	X			clayey sand (wet)	Discretionary samples based on area where bullets were seen
Hillside	X14SS1270001	6/9/2009	1259	6/10/2009	180-181-182	1726	991	951	1010	984	NS				clayey sand (wet)	Discretionary samples based on area where bullets were seen
Hillside	X14SS1280001	6/9/2009	1310	6/10/2009	183-184-185	1745	2739	3071	2661	2824	NS				clayey sand (wet)	Discretionary samples based on area where bullets were seen
Hillside	X14SS1290001	6/9/2009	1315	6/10/2009	186-187-188	1736	927	1209	1412	1183	NS				clayey sand (wet)	Discretionary samples based on area where bullets were seen
Hillside	X14SS1300001	6/16/2009	950	6/16/2009	142-143-144	1828	31	30	25	29	44.7				step-out on north side	
Hillside	X14SS1310001	6/16/2009	950	6/16/2009	145-146-147	1832	127	123	116	122	120				step-out on north side	
Hillside	X14SS1320001	6/16/2009	935	6/16/2009	148-149-150	1836	203	46	80	110	17.9	X			step-out on north side	
Hillside	X14SS1330001	6/16/2009	1040	6/16/2009	151-152-153	1846	41	33	36	37	NS				step-out on west side (Roach Road)	
Hillside	X14SS1340001	6/16/2009	1035	6/16/2009	154-155-156	1850	1032	969	1291	1097	904	X			step-out on west side (Roach Road)	
Hillside	X14SS1350001	6/16/2009	1030	6/16/2009	157-158-159	1855	126	63	51	80	45.1	X			step-out on west side (Roach Road)	
Hillside	X14SS1360001	6/16/2009	1025	6/16/2009	160-161-162	1906	63	39	58	53	NS				step-out on west side (Roach Road)	
Hillside	X14SS1370001	6/16/2009	1025	6/16/2009	163-164-165	1911	48	52	69	56	NS				step-out on west side (Roach Road)	
Hillside	X14SS1380001	6/16/2009	1000	6/16/2009	166-167-168	1915	161	161	160	161	137	X			step-out on east side (top of hill)	
Hillside	X14SS1390001	6/16/2009	1005	6/16/2009	133-134-135	1802	289	307	389	328	280				step-out on east side (top of hill)	
Hillside	X14SS1400001	6/16/2009	1010	6/16/2009	136-137-138	1806	844	1121	1128	1031	676				step-out on east side (top of hill)	
Hillside	X14SS1410001	6/16/2009	1015	6/16/2009	139-140-141	1811	303	282	469	351	405				step-out on east side (top of hill)	
Hillside	X14SS1420001	6/17/2009	910	6/17/2009	18-19-20	1252	20	20	18	19	11.0 B	X			step-out on east side (on top of hill)	brn/org clayey sand
Hillside	X14SS1430001	6/17/2009	920	6/17/2009	21-22-23	1256	259	375	235	290	166	X			step-out on east side (on top of hill)	
								TOTALS TO THE LAB				32	9	4		

MARINE RIFLE RANGE (UXO 14)

LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TIME	XRF DATE	XRF READING #	XRF TIME	1st	2nd	3rd	AVG	LAB RESULT	FBL (Metals)	FBL (NG)	FBL (TOC)
	6/1/2009		FBL											
Reading #														
67	Std = 238													
88	Blank (SiO2) = ND (<6)													
89	NIST 2709 (low) = 16													
90	NIST 2711 (med) = 1097													
91	NIST 2710 (high) = 5489													
	6/2/2009													
Reading #														
1	Std = 237													
2	Blank (SiO2) = ND (<7)													
3	NIST 2709 (low) = 18													
4	NIST 2711 (med) = 1156													
5	NIST 2710 (high) = 5561													
	6/8/2009													
Reading #														
1	Std = 238	XRF batteries both low..no samples												
2	Std = 237	analyzed												
	6/9/2009													
Reading #														
1	Std = 237													
2	Blank (SiO2) = ND (<6)													
3	NIST 2709 (low) = 20													
4	NIST 2711 (med) = 1080													
5	NIST 2710 (high) = 5318													
Switched battery on XRF between 65 and 67.														
66	Std = 241													
112	Blank (SiO2) = ND (<6)													
113	NIST 2709 (low) = 20													
114	NIST 2711 (med) = 1091													
115	NIST 2710 (high) = 5324													
Switched battery on XRF between 142 and 144.														
143	Std = 242													
180	Blank (SiO2) = ND (<6)													
181	NIST 2709 (low) = 20													
182	NIST 2711 (med) = 1080													
183	NIST 2710 (high) = 5318													
	6/10/2009													
Reading #														
1	Std = 234													
2	Blank (SiO2) = ND (<7)													
3	NIST 2709 (low) = 26													
4	NIST 2711 (med) = 1098													
5	NIST 2710 (high) = 5404													
Switched battery on XRF between 54 and 56.														
55	Std = 235													
106	Blank (SiO2) = ND (<6)													
107	NIST 2709 (low) = 20													
108	NIST 2711 (med) = 1118													
109	NIST 2710 (high) = 5324													
Switched battery on XRF between 136 and 138.														
189	Std = 245													
190	Blank (SiO2) = ND (<6)													
191	NIST 2709 (low) = 17													
192	NIST 2711 (med) = 1093													
193	NIST 2710 (high) = 5243													
	6/17/2009													
Reading #														
1	Std = 235													
2	Blank (SiO2) = ND (<6)													
3	NIST 2709 (low) = 14													
4	NIST 2711 (med) = 1107													
5	NIST 2710 (high) = 5397													
1	Std = 235													

OLD SKEET AND TRAP RANGE (UXO 15)

SOIL

SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TIME	XRF DATE	XRF READING #	XRF TIME	1st	2nd	3rd	AVG	LAB RESULT		FBL (Metals)	FBL (PAHs)	FBL (TOC)	FBL (NG)	
Range	X15SS0010001	5/27/2009	1240	5/29/2009	45-46-47	1202	50	48	44	**47**	NS	CT		X			
Range	X15SS0020001	5/27/2009	1248	5/29/2009	48-49-50	1207	51	34	38	**41**	NS	CT		X			
Range	X15SS0030001	5/27/2009	1254	5/29/2009	51-52-53	1215	39	28	24	**30**	NS			X			
Range	X15SS0040001	5/27/2009	1302	5/29/2009	54-55-56	1223	212	192	162	**189**	NS						
Range	X15SS0050001	5/27/2009	1312	5/29/2009	57-58-59	1230	**413**	**350**	**340**	**368**	252		X				
Range	X15SB0050102	6/2/2009	801	6/2/2009	21-22-23	1100	13	14	17	**15**	12.2		X				
Range	X15SS0060001	5/27/2009	1319	5/29/2009	61-62-63	1242	113	127	117	**119**	NS						
Range	X15SS0070001	5/27/2009	1326	5/29/2009	64-65-66	1248	**501**	**458**	**449**	**469**	220		X				
Range	X15SB0070102	6/2/2009	800	6/2/2009	30-31-32	1127	82	87	87	**85**	NS						Rerun of possible BBs in sample X15SB0070102 = 92
Range	X15SS0080001	5/27/2009	1333	5/29/2009	42-43-44	1151	**348**	238	271	**286**	NS						
Range	X15SS0090001	5/27/2009	1300	5/29/2009	67-68-69	1256	40	39	37	**39**	NS	CT					
Range	X15SS0100001	5/27/2009	1307	5/29/2009	72-73-74	1410	56	62	32	**50**	NS	CT					
Range	X15SS0110001	5/27/2009	1315	5/29/2009	75-76-77	1417	142	108	89	**113**	NS			X			rerun of X15SS0120001
Range	X15SS0120001	5/27/2009	1325	5/29/2009	27-28-29	1049	164	187	247	**199**	NS						30-31-32 | 1118 | 158 | 196 | 172 | **175**
Range	X15SS0120001RE	5/27/2009	1325	5/29/2009	30-31-32	1118	158	196	172	**175**	NS						
Range	X15SS0130001	5/27/2009	1335	5/29/2009	21-22-23	1022	**703**	**1055**	**758**	**839**	NS						rerun of X15SS0130102
Range	X15SB0130102	6/2/2009	855	6/2/2009	24-25-26	1107	40	38	32	**37**	NS						27-28-29 | 1115 | 38 | 43 | 38 | **40**
Range	X15SB0130102RE	6/2/2009	855	6/2/2009	27-28-29	1115	38	43	38	**40**	NS						
Range	X15SS0140001	5/27/2009	1410	5/29/2009	78-79-80	1422	63	85	84	**77**	NS	CT					
Range	X15SS0150001	5/27/2009	1357	5/29/2009	81-82-83	1427	46	48	42	**45**	NS	CT		X			
Range	X15SS0160001	5/27/2009	1350	5/29/2009	84-85-86	1435	50	49	38	**46**	NS						
Range	X15SS0170001	5/27/2009	1342	5/29/2009	87-88-89	1439	129	112	77	**106**	NS						
Range	X15SS0180001	5/27/2009	1410	5/29/2009	24-25-26	1044	45	43	53	**47**	32	CT	X				
Range	X15SS0190001	5/27/2009	1400	5/29/2009	90-91-92	1448	38	35	33	**35**	NS			X			MS/MSD
Range	X15SS0200001	5/27/2009	1350	5/29/2009	93-94-95	1453	68	77	61	**69**	NS						
Range	X15SS0210001	5/27/2009	1430	5/29/2009	96-97-98	1506	58	60	58	**59**	NS	CT		X			
Range	X15SS0220001	5/27/2009	1440	5/29/2009	99-100-101	1513	81	83	67	**77**	NS						
Range	X15SS0230001	5/27/2009	1446	5/29/2009	39-40-41	1142	119	108	79	**102**	NS						
Range	X15SS0240001	5/27/2009	1425	5/29/2009	6-7-8	940	32	30	31	**31**	NS	CT					
Range	X15SS0250001	5/27/2009	1431	5/29/2009	102-103-104	1548	**369**	109	105	**194**	NS						
Range	X15SS0260001	5/27/2009	1438	5/29/2009	12-13-14	956	62	65	66	**64**	NS						
Range	X15SS0270001	5/28/2009	852	5/30/2009	6-7-8	1746	69	50	82	**67**	NS	CT					
Range	X15SS0280001	5/27/2009	1512	5/29/2009	105-106-107	1555	55	59	53	**56**	NS	CT		X			
Range	X15SS0290001	5/27/2009	1452	5/29/2009	108-109-110	1618	107	91	106	**101**	NS			X			
Range	X15SS0300001	5/27/2009	1446	5/29/2009	111-112-113	1643	246	150	194	**197**	NS						
Range	X15SS0310001	5/28/2009	900	5/30/2009	9-10-11	1749	42	35	27	**35**	NS	CT		X			
Range	X15SS0320001	5/28/2009	855	5/30/2009	12-13-14	1811	51	51	60	**54**	NS			X			
Range	X15SS0330001	5/27/2009	1510	5/29/2009	117-118-119	1703	203	181	194	**193**	NS				X		
Range	X15SS0340001	5/28/2009	921	5/30/2009	15-16-17	1415	37	29	37	**34**	NS	CT					
Range	X15SS0350001	5/28/2009	914	5/30/2009	18-19-20	1835	74	62	73	**70**	81.6	CT	X	X			
Range	X15SS0360001	5/28/2009	907	5/30/2009	21-22-23	1838	33	39	57	**43**	NS						
Range	X15SS0370001	5/28/2009	901	5/30/2009	24-25-26	1920	211	239	293	**248**	203		X				
Range	X15SS0380001	5/28/2009	920	5/30/2009	27-28-29	1923	34	31	34	**33**	NS	CT		X			
Range	X15SS0390001	5/28/2009	940	5/30/2009	30-31-32	1934	47	50	45	**47**	NS						
Range	X15SS0400001	5/28/2009	950	5/30/2009	33-34-35	1938	50	46	46	**47**	NS						
Range	X15SS0410001	5/28/2009	1000	5/30/2009	36-37-38	1949	**742**	**842**	**649**	**744**	NS						
Range	X15SB0410102	6/2/2009	842	6/2/2009	39-40-41	1157	17	21	16	**18**	NS						
Range	X15SS0420001	5/28/2009	1010	5/30/2009	39-40-41	1955	220	239	260	**240**	NS						
Range	X15SS0430001	5/28/2009	940	5/30/2009	42-43-44	2008	29	30	25	**28**	NS						
Range	X15SS0440001	5/28/2009	949	5/30/2009	45-46-47	2013	19	22	20	**20**	NS						
Range	X15SS0450001	5/28/2009	954	5/30/2009	48-49-50	2023	58	55	48	**54**	NS						
Range	X15SS0460001	5/28/2009	1001	5/30/2009	51-52-53	2030	186	220	231	**212**	NS						
Range	X15SS0470001	5/28/2009	1008	5/30/2009	54-55-56	2043	192	186	210	**196**	NS						
Range	X15SS0480001	5/28/2009	1014	5/30/2009	57-58-59	2048	116	173	102	**130**	NS				X		
Range	X15SS0490001	5/28/2009	934	5/30/2009	60-61-62	2106	137	177	140	**151**	NS	CT		X			
Range	X15SS0500001	5/28/2009	910	5/30/2009	63-64-65	2110	69	61	66	**65**	NS	CT		X			
Range	X15SS0510001	5/27/2009	1419	5/29/2009	9-10-11	951	64	60	81	**68**	NS	CT					
Range	X15SS0520001	5/27/2009	1415	5/29/2009	36-37-38	1136	102	81	106	**96**	NS	CT		X			
Range	X15SS0530001	5/27/2009	1404	5/29/2009	114-115-116	1654	57	56	62	**58**	NS	CT		X			
Range	X15SS0540001	5/27/2009	1250	5/29/2009	33-34-35	1131	36	35	27	**33**	NS	CT		X			
Range	X15SS0550001	5/27/2009	1230	5/29/2009	18-19-20	1017	40	36	44	**40**	NS						
Range	X15SS0560001	5/27/2009	1237	5/29/2009	15-16-17	1004	78	82	96	**85**	NS						
Range	X15SS0570001	**SAMPLES NOT COLLECTED**									NS						
Range	X15SS0580001										NS						

OLD SKEET AND TRAP RANGE (UXO 15)

SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TIME	XRF DATE	XRF READING #	XRF TIME	1st	2nd	3rd	AVG	LAB RESULT		FBL (Metals)	FBL (PAHs)	FBL (TOC)	FBL (NG)	
Range	X15SS059C0001	6/1/2009	1407	6/1/2009	44-45-46	1611	57	70	55	**61**	NS	CT					
Range	X15SS060C0001	6/1/2009	1421	6/1/2009	47-48-49	1616	126	118	144	**129**	NS	CT					Not Used
Range	X15SS0610001	6/2/2009	808	6/2/2009	42-43-44	1251	186	178	213	**192**	74.7		X				
Range	X15SS0620001	6/2/2009	826	6/2/2009	45-46-47	1255	167	170	143	**160**	NS						
Range	X15SS0630001	6/2/2009	820	6/2/2009	48-49-50	1313	278	193	**345**	**272**	NS						
Range	X15SS0640001	6/2/2009	814	6/2/2009	51-52-53	1318	**1413**	**1065**	**1230**	**1236**	940		X				MS/MSD
Range	X15SB0640102	6/2/2009	1448	6/2/2009	88-89-90	1602	18	13	16	**16**	NS						
Range	X15SS0650001	6/2/2009	835	6/2/2009	54-55-56	1331	70	70	71	**70**	NS						
Range	X15SS0660001	6/2/2009	825	6/2/2009	57-58-59	1335	146	107	102	**118**	33.3		X				
Range	X15SS0670001	6/2/2009	815	6/2/2009	60-61-62	1352	99	93	69	**87**	NS						
Range	X15SS0680001	6/2/2009	845	6/2/2009	63-64-65	1356	184	172	221	**192**	423		X				
Range	X15SS0690001	6/2/2009	910	6/2/2009	66-67-68	1409	60	102	65	**76**	NS						
Range	X15SS0700001	6/2/2009	905	6/2/2009	69-70-71	1417	**1497**	**473**	**460**	**810**	754		X				
Range	X15SB0700102	6/2/2009	1442	6/2/2009	94-95-96	1622	61	50	46	**52**	NS						
Range	X15SS0710001	6/2/2009	920	6/2/2009	72-73-74	1440	**406**	**382**	**350**	**379**	282		X				FD FD06030901
Range	X15SS0710001-D	6/2/2009	920	6/2/2009	72-73-74	1440	**406**	**382**	**350**	**379**	187		X				
Range	X15SS0720001	6/2/2009	901	6/2/2009	75-76-77	1445	**343**	**323**	**356**	**341**	658		X				
Range	X15SS0730001	6/2/2009	847	6/2/2009	78-80-81	1522	**535**	**471**	**464**	**490**	335		X				
Range	X15SS0740001	6/2/2009	853	6/2/2009	82-83-84	1537	**1217**	**1259**	**1305**	**1260**	NS						
Range	X15SS0750001	6/2/2009	858	6/2/2009	85-86-87	1553	122	163	106	**130**	NS						
Range	X15SS0760001	6/2/2009	1430	6/2/2009	91-92-93	1608	**482**	**513**	**663**	**553**	238		X				
Range	X15SS077C0001	6/9/2009	1100	6/11/2009	6-7-8	1108	66	72	65	**68**	66.7		X			X	
Range	X15SS078C0001	6/9/2009	1030	6/11/2009	9-10-11	1113	69	87	88	**81**	77.2		X			X	
									TOTALS TO THE LAB				**18**	**18**	**2**	**2**	

FBL

Reading #	5/30/2009
1	Std = 234
2	Blank (SiO2) = ND (<10)
3	NIST 2709 (low) = ND (<14)
4	NIST 2711 (med) = 1127
5	NIST 2710 (high) = 5446
60	Std = 237
70	aborted std..no clip
71	Std = 241
120	Blank (SiO2) = ND (<7)
121	NIST 2709 (low) = 21
122	NIST 2711 (med) = 1082
123	NIST 2710 (high) = 5334
	5/31/2009
1	Std = 237
2	Blank (SiO2) = ND (<7)
3	NIST 2709 (low) = 12
4	NIST 2711 (med) = 1092
5	NIST 2710 (high) = 5284
	6/2/2009
34	Std = 241
35	Blank (SiO2) = ND (<6)
36	NIST 2709 (low) = 13
37	NIST 2711 (med) = 1088
38	NIST 2710 (high) = 5564
79	Std = 245
97	Blank (SiO2) = ND (<7)
98	NIST 2709 (low) = 23
99	NIST 2711 (med) = 1076
100	NIST 2710 (high) = 5442

CT = Clay Targets
CP= Clay Pigeons

Battery replaced after run 32

Battery replaced after run 78

OLD SKEET AND TRAP RANGE (UXO 15)

SEDIMENT

SAMPLE LOCATION	SAMPLE ID	SAMPLE DATE	SAMPLE TIME	XRF DATE	XRF READING #	XRF TIME	1st	2nd	3rd	AVG	LAB RESULT		FBL (Metals)	FBL (PAHs)	FBL (TOC)	FBL (NG)	
Shoreline	X15SD0010006	6/1/2009	853	6/1/2009	6-7-8	1031	8	31	13	**17**	NS						
Shoreline	X15SD0020006	6/1/2009	855	6/1/2009	9-10-11	1035	16	ND	9	**8**	NS						
Shoreline	X15SD0030006	6/1/2009	900	6/1/2009	12-13-14-15	1109	462	83	10	**185**	20		X	X	X		X15SD003: Re-analyze (#15) portion of the baggie showing high lead = 2686. Pulled out what appeared to be 3 small lead shot and ran them through XRF = 72,638 (#16). Re-analyzed the portion of baggie with lead shot removed = 14 (#17).
Shoreline	X15SD0040006	6/1/2009	905	6/1/2009	18-19-20	1130	ND	11	10	**7**	NS						
Shoreline	X15SD0050006	6/1/2009	912	6/1/2009	22-23-24	1221	30	32	27	**30**	8		X	X			
Shoreline	X15SD0060006	6/1/2009	918	6/1/2009	26-27-28	1301	ND	ND	10	**3**	NS						
Shoreline	X15SD0070006	6/1/2009	923	6/1/2009	29-30-31	1308	28	24	29	**27**	NS						
Shoreline	X15SD0080006	6/1/2009	929	6/1/2009	32-33-34	1356	10	10	10	**10**	NS						
Shoreline	X15SD0090006	6/1/2009	935	6/1/2009	35-36-37	1400	12	13	17	**14**	NS						Analyzed X15SD005 a 4th time by mistake = 38
Open Water	X15SD0100006	6/10/2009	920	6/11/2009	12-13-14	1139	14	22	17	**18**	NS						PD
Open Water	X15SD0110006	6/10/2009	945	6/11/2009	18-19-20	1207	ND	ND	13	**4**	NS						PD
Open Water	X15SD0120006	6/10/2009	1045	6/11/2009	15-16-17	1159	15	17	15	**16**	NS						PD
Open Water	X15SD0130006	6/10/2009	1050	6/13/2009	6-7-8	1314	20	15	11	**15**	14		X				HA
Open Water	X15SD0140006	6/10/2009	1005	6/13/2009	9-10-11	1321	15	10	11	**12**	NS						PD
Open Water	X15SD0150006	6/10/2009	1101	6/13/2009	12-13-14	1324	ND	ND	8	**3**	NS						HA
Open Water	X15SD0160006	6/10/2009	1105	6/13/2009	15-16-17	1343	10	ND	14	**8**	NS						HA
Open Water	X15SD0170006	6/10/2009	1110	6/13/2009	18-19-20	1351	10	13	11	**11**	NS						HA
Open Water	X15SD0180006	6/10/2009	1115	6/13/2009	21-22-23	1358	11	9	ND	**7**	7		X				HA
Open Water	X15SD0190006	6/10/2009	1120	6/13/2009	36-37-38	1524	10	ND	ND	**3**	NS						HA
Open Water	X15SD0200006	6/10/2009	1132	6/13/2009	39-40-41	1530	ND	11	11	**7**	NS						PD
Open Water	X15SD0210006	6/10/2009	1149	6/13/2009	42-43-44	1534	9	ND	9	**6**	NS						PD
Open Water	X15SD0220006	6/10/2009	1504	6/13/2009	45-46-47	1554	18	31	12	**20**	NS						PD
Open Water	X15SD0230006	6/10/2009	1252	6/13/2009	48-49-50	1601	11	12	10	**11**	8		X	X	X		HA
Open Water	X15SD0240006	6/10/2009	1258	6/13/2009	51-52-53	1607	12	12	12	**12**	NS						HA
Open Water	X15SD0250006	6/10/2009	1310	6/13/2009	54-55-56	1626	8	11	13	**11**	NS						HA
Open Water	X15SD0260006	6/10/2009	1458	6/13/2009	57-58-59	1633	11	14	12	**12**	NS						PD
Open Water	X15SD0270006	6/10/2009	1454	6/13/2009	60-61-62	1638	ND	ND	ND	**0**	NS						PD
Open Water	X15SD0280006	6/10/2009	1418	6/14/2009						**0**	NS						PD
Open Water	X15SD0290006	6/10/2009	1405	6/14/2009						**0**	NS						PD
Open Water	X15SD0300006	6/10/2009	1355	6/14/2009						**0**	37						PD
Open Water	X15SD0310006	6/10/2009	1340	6/14/2009						**0**	NS						PD
Open Water	X15SD0320006	6/10/2009	1327	6/14/2009						**0**	NS						PD
Open Water	X15SD0330006	6/10/2009	1517	6/14/2009						**0**	5.0 B						HA
Open Water	X15SD0340006	6/10/2009	1318	6/14/2009						**0**	NS						HA
										TOTALS TO THE LAB			**7**	**3**	**2**	**0**	

HA = hand auger
PD = ponar dredge

Reading #	**6/1/2001**
1	Std = 233
2	Blank (SiO2) = ND (<6)
3	NIST 2709 (low) = 17
4	NIST 2711 (med) = 1104
5	NIST 2710 (high) = 5620
21	Std = 236
	6/11/2009
1	Std = 235
2	Blank (SiO2) = ND (<7)
3	NIST 2709 (low) = 15
4	NIST 2711 (med) = 1087
5	NIST 2710 (high) = 5413

ROACH ROAD RIFLE RANGE (UXO 25)

SAMPLE ID	SAMPLE DATE	SAMPLE TIME	XRF DATE	XRF READING #	XRF TIME	1st	2nd	3rd	AVG	LAB RESULT	FBL (Metals)	FBL (TOC)	FBL (NG)	
X25SS0010001	6/15/2009	1140	6/16/2009	6-7-8	1218	ND	ND	ND	**0**	6.3	X			brn/org rocky soil
X25SS0020001	6/15/2009	1220	6/16/2009	9-10-11	1223	16	11	11	**13**	NS				brn/org rocky soil
X25SS0030001	6/15/2009	1240	6/16/2009	12-13-14	1229	10	15	ND	**8**	NS				brn/org rocky soil
X25SS0040001	6/15/2009	1300	6/16/2009	15-16-17	1246	24	33	32	**30**	19.5	X			brn rocky soil
X25SS0050001	6/15/2009	1315	6/16/2009	18-19-20	1250	17	23	26	**22**	NS				brn rocky soil
X25SS0060001	6/15/2009	1335	6/16/2009	21-22-23	1301	13	12	ND	**8**	NS		X		org rocky clay
X25SS0070001	6/15/2009	1345	6/16/2009	24-25-26	1313	38	31	27	**32**	43.5	X			dark organic soil
X25SS0070001-D	6/15/2009	1345	6/16/2009	24-25-26	1313	38	31	27	**32**	34.5	X			
X25SS0080001	6/15/2009	1535	6/16/2009	27-28-29	1319	93	87	104	**95**	91.4	X			brn soil
X25SS0090001	6/15/2009	1215	6/16/2009	30-31-32	1323	12	13	12	**12**	NS				org clay
X25SS0100001	6/15/2009	1405	6/16/2009	33-34-35	1345	140	173	163	**159**	84.0 J	X			brn/org rocky soil w/ clay
X25SS0110001	6/15/2009	1230	6/16/2009	36-37-38	1349	37	36	50	**41**	NS				brn/org rocky soil w/ clay
X25SS0120001	6/15/2009	1245	6/16/2009	39-40-41	1355	17	24	24	**22**	NS				brn/org rocky soil w/ clay
X25SS0130001	6/15/2009	1305	6/16/2009	42-43-44	1401	24	ND	13	**12**	19.8 J	X	X		brn sandy soil
X25SS0140001	6/15/2009	1325	6/16/2009	45-46-47	1405	10	13	10	**11**	NS				brn sandy soil
X25SS0150001	6/15/2009	1340	6/16/2009	48-49-50	1411	48	31	30	**36**	NS				org rocky clay
X25SS0160001	6/15/2009	1155	6/16/2009	51-52-53	1427	74	57	63	**65**	88.6	X			brn/org rocky soil w/ clay
X25SS0170001	6/15/2009	1155	6/16/2009	54-55-56	1431	84	73	78	**78**	NS				brn/org rocky soil w/ clay
X25SS0180001	6/15/2009	1255	6/16/2009	57-58-59	1438	**1990**	**1549**	**1490**	**1676**	529	X			brn/org rocky soil w/ clay
X25SS0190001	6/15/2009	1255	6/16/2009	60-61-62	1448	**2722**	**2713**	**2890**	**2775**	1060	X	X		brn/org sandy soil
X25SS0200001	6/15/2009	1313	6/16/2009	63-64-65	1452	**3681**	**4329**	**3621**	**3877**	3450	X			brn/org clayey soil
X25SS0210001	6/15/2009	1327	6/16/2009	66-67-68	1458	180	186	167	**178**	131	X			brn sandy soil
X25SS0210001-D	6/15/2009	1327	6/16/2009	66-67-68	1458	180	186	167	**178**	127	X			
X25SS0220001	6/15/2009	1325	6/16/2009	69-70-71	1517	58	62	60	**60**	62.6	X			brn/org sandy soil
X25SS0230001	6/15/2009	1310	6/16/2009	72-73-74	1522	**505**	**601**	**509**	**538**	546	X			brn/org sandy soil
X25SS0240001	6/15/2009	1250	6/16/2009	75-76-77	1527	**688**	**911**	**908**	**836**	522	X			brn sandy soil
X25SS0250001	6/15/2009	1230	6/16/2009	78-79-80	1540	46	43	55	**48**	34.2	X			org clayey soil
X25SS0260001	6/15/2009	1200	6/16/2009	84-85-86	1549	33	42	35	**37**	NS				org clay
X25SS0270001	6/15/2009	1205	6/16/2009	81-82-83	1545	10	17	16	**14**	NS				org sandy soil
X25SS0280001	6/15/2009	1208	6/16/2009	87-89-90	1604	25	30	21	**25**	17.9	X			org sandy soil
X25SS0290001	6/15/2009	1220	6/16/2009	91-92-93	1614	42	61	41	**48**	NS				brn clayey soil
X25SS0300001	6/15/2009	1245	6/16/2009	94-95-96	1618	62	72	60	**65**	50.3	X			brn clayey soil
X25SS0310001	6/15/2009	1305	6/16/2009	97-98-99	1626	144	167	**1384**	**565**	142	X			brn sandy soil
X25SS0320001	6/15/2009	1355	6/16/2009	100-101-102	1630	44	47	56	**49**	60.2	X	X		brn sandy soil
X25SS0330001	6/15/2009	1320	6/16/2009	103-104-105	1635	40	43	38	**40**	31.1	X			brn sandy soil
X25SS034C0001	6/15/2009	1500							**0**	9.4	X		X	
							TOTALS TO THE LAB				**23**	**4**	**1**	

FBL

6/16/2009

1	Std = 240
2	Blank (SiO2) = ND (<7)
3	NIST 2709 (low) = 12
4	NIST 2711 (med) = 1090
5	NIST 2710 (high) = 5304
88	Std = 239
169	Blank (SiO2) = ND (<7)
170	NIST 2709 (low) = 23
171	NIST 2711 (med) = 1085
172	NIST 2710 (high) = 5232

switched to ac power between 87 and 89

RUM POINT SKEET RANGE (UXO 16)

SAMPLE ID	SAMPLE ID	SAMPLE DATE	SAMPLE TIME	XRF DATE	XRF READING #	XRF TIME	1st	2nd	3rd	AVG	LAB RESULT	FBL (Metals)	FBL (PAHs)	FBL (TOC)	FBL (NG)			
Transect line	X16SS0010001	6/13/2009	1055	6/13/2009	63-64-65	1653	20	18	21	**20**	NS							
Transect line	X16SS0020001	6/13/2009	1105	6/13/2009	66-67-68	1657	16	20	13	**16**	NS		X			minor CP	Brn soil	
Transect line	X16SS0030001	6/13/2009	1110	6/13/2009	69-70-71	1701	24	10	17	**17**	13.5	X					Brn soil	
Transect line (tree)	X16SS0040001	6/13/2009	1120	6/13/2009	73-74-75	1732	86	78	63	**76**	NS						Brn soil	
Transect line	X16SS0050001	6/13/2009	1105	6/13/2009	76-77-78	1737	21	16	24	**20**	NS					minor CP	Brn soil	
Transect line	X16SS0060001	6/13/2009	1115	6/13/2009	79-80-81	1743	20	15	13	**16**	NS					CP	Brn soil	
Transect line	X16SS0070001	6/13/2009	1125	6/13/2009	82-83-84	1748	61	101	64	**75**	NS						Brn soil	
Transect line (tree)	X16SS0080001	6/13/2009	1140	6/13/2009	85-86-87	1752	**854**	**1066**	**1006**	**975**	616	X	X	X		minor CP	clayey soil	Near drainage ditch in NW corner
Transect line	X16SS0090001	6/13/2009	1130	6/13/2009	88-89-90	1756	19	19	21	**20**	NS		X			cp	clayey soil	
Transect line	X16SS0100001	6/13/2009	1145	6/13/2009	91-92-93	1811	42	55	45	**47**	NS					cp	brn soil some clay	
Transect line	X16SS0110001	6/13/2009	1150	6/13/2009	94-95-96	1815	40	36	54	**43**	NS						brn soil	
Transect line (tree)	X16SS0120001	6/13/2009	1200	6/13/2009	97-98-99	1821	140	166	248	**185**	NS						clayey soil	
Transect line	X16SS0130001	6/13/2009	1315	6/13/2009	100-101-102	1830	25	31	28	**28**	38.8	X	X	X			clayey soil	
Transect line	X16SS0140001	6/13/2009	1305	6/13/2009	103-104-105	1834	25	22	19	**22**	NS		X				sandy soil w/ some clay	
Transect line	X16SS0150001	6/13/2009	1255	6/13/2009	106-107-108-	1840	25	24	23	**24**	NS						sandy soil w/ some clay	
Transect line (tree)	X16SS0160001	6/13/2009	1230	6/13/2009	109-110-111	1852	92	97	62	**84**	NS						sandy soil w/ some clay	
Transect line (tree)	X16SS0170001	6/13/2009	1245	6/13/2009	112-113-114	1857	53	52	68	**58**	51.4	X					sandy soil w/ some clay	
Transect line	X16SS0180001	6/13/2009	1255	6/13/2009	115-116-117	1901	25	23	25	**24**	NS						sandy soil w/ some clay	
Transect line	X16SS0190001	6/13/2009	1250	6/13/2009	118-119-120	1909	25	18	23	**22**	NS		X			cp	sandy soil	
Transect line	X16SS0200001	6/13/2009	1255	6/13/2009	121-122-123	1913	47	59	68	**58**	51.9	X				cp	sandy soil w/ some clay	
Transect line (tree)	X16SS0210001	6/13/2009	1305	6/13/2009	124-125-126	1917	140	101	77	**106**	NS						sandy soil w/ some clay	
Transect line	X16SS0220001	6/13/2009	1315	6/13/2009	127-128-129	1931	25	25	25	**25**	NS					cp	sandy soil	
Transect line	X16SS0230001	6/13/2009	1325	6/13/2009	130-131-132	1936	32	27	23	**27**	NS					cp	sandy soil	
Transect line (tree)	X16SS0240001	6/13/2009	1340	6/13/2009	133-134-135	1940	30	18	21	**23**	NS					cp	sandy soil	
Transect line (tree)	X16SS0250001	6/13/2009	1345	6/14/2009	18-19-20	928	162	168	137	**156**	159 J	X					sandy soil	
Transect line	X16SS0260001	6/13/2009	1325	6/14/2009	21-22-23	932	23	20	19	**21**	NS		X			cp/shotgun	sandy soil	
Transect line	X16SS0270001	6/13/2009	1335	6/14/2009	24-25-26	940	22	23	21	**22**	NS						sandy soil	
Transect line	X16SS0280001	6/13/2009	1350	6/14/2009	27-28-29	945	10	14	18	**14**	NS						sandy soil	
Transect line (tree)	X16SS0290001	6/13/2009	1400	6/14/2009	30-31-32	953	176	96	106	**126**	NS						sandy soil	
Transect line	X16SS0300001	6/13/2009	1355	6/14/2009	33-34-35	957	26	24	22	**24**	NS					cp/shotgun	sandy soil	
Transect line	X16SS0310001	6/13/2009	1400	6/14/2009	36-37-38	1008	206	226	211	**214**	NS		X				sandy soil w/ some clay	
Transect line	X16SS0320001	6/13/2009	1425	6/14/2009	39-40-41	1012	28	27	25	**27**	13.9	X				cp	sandy soil	
Transect line	X16SS0320001-D	6/13/2009	1425	6/14/2009	39-40-41	1012	28	27	25	**27**	13	X						
Transect line	X16SS0330001	6/13/2009	1435	6/14/2009	42-43-44	1016	ND	19	16	**12**	NS						sandy soil	
Transect line	X16SS0340001	6/13/2009	1425	6/14/2009	45-46-47	1023	21	19	16	**19**	NS	X					sandy soil	
Transect line	X16SS0350001	6/13/2009	1435	6/14/2009	48-49-50	1028	14	11	18	**14**	NS					cp	sandy soil w/ some clay	
Transect line	X16SS0360001	6/13/2009	1440	6/14/2009	51-52-53	1033	51	33	40	**41**	NS					cp	sandy soil w/ some clay	
Transect line	X16SS0370001	6/13/2009	1450	6/14/2009	54-55-56	1049	78	68	66	**71**	NS						sandy soil	
Transect line	X16SS0380001	6/13/2009	1445	6/14/2009	57-58-59	1207	28	26	25	**26**	NS					cp	sandy soil	
Transect line	X16SS0390001	6/13/2009	1450	6/14/2009	60-61-62	1218	19	25	18	**21**	NS						sandy soil	
Transect line	X16SS0400001	6/13/2009	1500	6/14/2009	63-64-65	1223	42	52	57	**50**	NS		X				sandy soil	
Transect line	X16SS0410001	6/13/2009	1510	6/14/2009	66-67-68	1228	40	32	29	**34**	NS						sandy soil	
Transect line	X16SS0420001	6/13/2009	1515	6/14/2009	69-70-71	1232	39	53	111	**68**	12.1	X	X	X			sandy soil	
Transect line	X16SS0430001	6/13/2009	1525	6/14/2009	72-73-74	1237	35	42	39	**39**	NS						sandy soil w/ some clay	
Transect line	X16SS0440001	6/13/2009	1500	6/14/2009	75-76-77	1241	48	24	24	**32**	NS						sandy soil	
Transect line	X16SS0450001	6/13/2009	1505	6/14/2009	78-79-80	1247	26	27	28	**27**	NS						sandy soil w/ some clay	
Transect line	X16SS0460001	6/13/2009	1525	6/14/2009	85-86-87	1332	23	23	21	**22**	NS		X				sandy soil w/ some clay	
Transect line	X16SS0470001	6/13/2009	1530	6/14/2009	88-89-90	1338	40	28	29	**32**	NS						sandy soil w/ some clay	
Transect line	X16SS0480001	6/13/2009	1540	6/14/2009	91-92-93	1402	95	85	104	**95**	NS						sandy soil w/ some clay	
Transect line	X16SS0490001	6/13/2009	1540	6/14/2009	94-95-96	1409	51	53	88	**64**	NS						clayey soil	
Transect line	X16SS0500001	6/13/2009	1550	6/14/2009	97-98-99	1416	44	38	29	**37**	NS						sandy soil w/ some clay	
Transect line	X16SS0510001	6/13/2009	1555	6/14/2009	100-101-102	1426	23	19	24	**22**	NS		X				sandy soil w/ some clay	
Transect line	X16SS0520001	6/14/2009	845	6/14/2009	103-104-105	1433	27	24	42	**31**	NS						sandy soil w/ some clay	
Transect line	X16SS0530001	6/14/2009	855	6/14/2009	106-107-108	1444	35	37	38	**37**	NS						sandy soil w/ some clay	
Transect line	X16SS0540001	6/14/2009	900	6/14/2009	109-110-111	1455	255	147	183	**195**	35	X					clayey soil	
Transect line	X16SS0550001	6/14/2009	910	6/14/2009	112-113-114	1459	56	50	39	**48**	NS						sandy soil w/ some clay	
Transect line	X16SS0560001	6/14/2009	845	6/14/2009	115-116-117	1507	44	54	51	**50**	NS		X			cp	clayey soil	
Transect line	X16SS0570001	6/14/2009	855	6/14/2009	124-125-126	1551	23	33	21	**26**	22.3	X	X				clay	
Transect line	X16SS0580001	6/14/2009	900	6/14/2009	127-128-129	1613	52	36	41	**43**	NS						clayey soil	
Transect line	X16SS0590001	6/14/2009	910	6/14/2009	130-131-132	1619	37	32	23	**31**	NS						clayey soil	
Transect line	X16SS0600001	6/14/2009	920	6/14/2009	133-134-135	1627	27	23	19	**23**	NS						clayey soil	
Transect line	X16SS0610001	6/14/2009	930	6/14/2009	136-137-138	1632	42	69	**339**	**150**	23.5	X					clay	#139 rerun = 239
Transect line	X16SS0620001	6/14/2009	925	6/14/2009	140-141-142	1639	26	17	24	**22**	NS		X			cp	sandy soil w/ some clay	
Transect line	X16SS0630001	6/14/2009	930	6/14/2009	143-144-145	1655	22	20	17	**20**	NS						clay	
Transect line	X16SS0640001	6/14/2009	940	6/14/2009	146-147-148	1659	18	14	23	**18**	NS						sandy soil w/ some clay	
Transect line	X16SS0650001	6/14/2009	950	6/14/2009	149-151-152	1724	68	90	90	**83**	NS						clay mixed with mulch	
Transect line	X16SS0660001	6/14/2009	1000	6/14/2009	153-154-155	1733	30	25	39	**31**	NS						clayey soil	

RUM POINT SKEET RANGE (UXO 16)

SAMPLE ID	SAMPLE ID	SAMPLE DATE	SAMPLE TIME	XRF DATE	XRF READING #	XRF TIME	1st	2nd	3rd	AVG	LAB RESULT	FBL (Metals)	FBL (PAHs)	FBL (TOC)	FBL (NG)			
Transect line	X16SS0670001	6/14/2009	1005	6/14/2009	156-157-158	1737	57	75	50	**61**	NS						clay	
	X16SS0680001	**SAMPLE NOT COLLECTED**									NS							
Front of firing area	X16SS0690001	6/14/2009	1045	6/14/2009	159-160-161	1751	66	95	73	**78**	NS						sandy soil w/ some clay	
Front of firing area	X16SS0700001	6/14/2009	1050	6/14/2009	162-163-164	1803	31	24	30	**28**	NS					cp	clayey soil	
Front of firing area	X16SS0710001	6/14/2009	1100	6/14/2009	165-166-167	1814	29	21	23	**24**	NS		X			cp	clayey soil	
Front of firing area	X16SS0720001	6/14/2009	1030	6/14/2009	168-169-170	1819	20	15	19	**18**	NS					cp	clayey soil	
Front of firing area	X16SS0730001	6/14/2009	1040	6/14/2009	171-172-173	1832	29	62	37	**43**	40.1	X	X	X			sandy soil w/ some clay	
Front of firing area	X16SS0740001	6/14/2009	1025	6/14/2009	174-175-176	1836	130	18	28	**59**	NS					cp	sandy soil w/ some clay	
Front of firing area	X16SS0750001	6/14/2009	1030	6/14/2009	177-178-179	1840	21	24	26	**24**	NS						sandy soil w/ some clay	
Front of firing area	X16SS0760001	6/14/2009	955	6/14/2009	180-181-182	1853	25	29	32	**29**	NS		X			cp	sandy soil w/ some clay	MS/MSD - PAHs
Front of firing area	X16SS0770001	6/14/2009	1005	6/14/2009	183-184-185	1859	10	16	19	**15**	NS					cp	sandy soil w/ some clay	
Front of firing area	X16SS0780001	6/14/2009	1015	6/14/2009	186-187-188	1904	18	18	14	**17**	NS		X			cp	sandy soil w/ some clay	
Transect line	X16SS0790001	6/14/2009	1055	6/14/2009	81-82-83	1315	**303**	251	246	**267**	267	X				Step out of	clayey drainage	
Firing Points	X16SS080C0001	6/14/2009	1245	6/14/2009	118-119-120	1514	23	22	18	**21**	9.1	X	X		X		sandy soil w/ some clay	
Firing Points	X16SS081C0001	6/14/2009	1315	6/14/2009	121-122-123	1523	75	77	68	**73**	48.7	X	X		X		sandy soil w/ some clay	
Transect line	X16SS0820001	6/16/2009	1330	6/16/2009	106-107-108	1647	146	131	129	**135**	NS					step-out 50' from 012		
Transect line	X16SS0830001	6/16/2009	1345	6/16/2009	109-110-111	1652	**347**	**393**	**481**	**407**	NS					step-out 50' from 021		
Transect line	X16SS0840001	6/16/2009	1325	6/16/2009	112-113-114	1656	**382**	**394**	**451**	**409**	NS					step-out 50' from 025		
Transect line	X16SS0850001	6/16/2009	1325	6/16/2009	115-116-117	1713	141	142	195	**159**	NS					step-out 50' from 029		
Transect line	X16SS0860001	6/16/2009	1330	6/16/2009	118-119-120	1717	78	119	65	**87**	NS					step-out 50' from 043		
Transect line	X16SS0870001	6/16/2009	1350	6/16/2009	121-122-123	1722	**624**	253	248	**375**	90.2	X				step-out 50' from 061		
Transect line	X16SS0880001	6/17/2009	1005	6/17/2009	6-7-8	1123	64	97	76	**79**	NS					step-out 50' from 083	org/brn clayey soil	
Transect line	X16SS0890001	6/17/2009	1015	6/17/2009	9-10-11	1128	150	92	128	**123**	NS					step-out 50' from 084	org/brn clayey soil	
Transect line	X16SS0900001	6/17/2009	1020	6/17/2009	12-13-14	1114	257	298	227	**261**	38.8					step-out 50' from 085	org/brn clayey soil	
Transect line	X16SS0900001-D	6/17/2009	1020	6/17/2009	12-13-14	1114	257	298	227	**261**	338 J							
Outer band	X16SS0910001	6/17/2009	1530	6/17/2009	25-26-27	1641	18	26	16	**20**	12.6					Outermost band	brn sandy soil	
Outer band	X16SS0920001	6/17/2009	1515	6/17/2009	28-29-30	1648	18	17	17	**17**	143					Outermost band	brn sandy soil	
Outer band	X16SS0930001	6/17/2009	1500	6/17/2009	31-32-33	1654	15	17	16	**16**	14.7					Outermost band	brn sandy soil	
Outer band	X16SS0940001	6/17/2009	1440	6/17/2009	34-35-36	1704	11	18	9	**13**	6.7					Outermost band	brn sandy soil	
Outer band	X16SS0950001	6/17/2009	1440	6/17/2009	37-38-39	1711	24	22	31	**26**	19.2					Outermost band	brn sandy soil	
							TOTALS TO THE LAB					25	21	4	2			

FBL

6/13/2009

1	Std = 238	CT = Clay Targets
2	Blank (SiO2) = ND (<6)	CP= Clay Pigeons
3	NIST 2709 (low) = 18	
4	NIST 2711 (med) = 1115	
5	NIST 2710 (high) = 5451	
Switched battery on XRF between 71 and 73.		
72	Std = 240	
136	Blank (SiO2) = ND (<6)	
137	NIST 2709 (low) = 16	
138	NIST 2711 (med) = 1058	
139	NIST 2710 (high) = 5403	

6/14/2009

1	Std = 233	
	Std = 235	2-8 tests kept aborting. Restarted programs.
9	Blank (SiO2) = ND (<6)	
10	NIST 2709 (low) = 10	
11	NIST 2711 (med) = 1077	
12	NIST 2710 (high) = 5323	
13	Std = 237	Replaced kapton window
14	Blank (SiO2) = ND (<6)	
15	NIST 2709 (low) = 10	
16	NIST 2711 (med) = 1102	
17	NIST 2710 (high) = 5118	
84	Std = 238	Battery replaced after run 83
150	Std = 243	On AC power

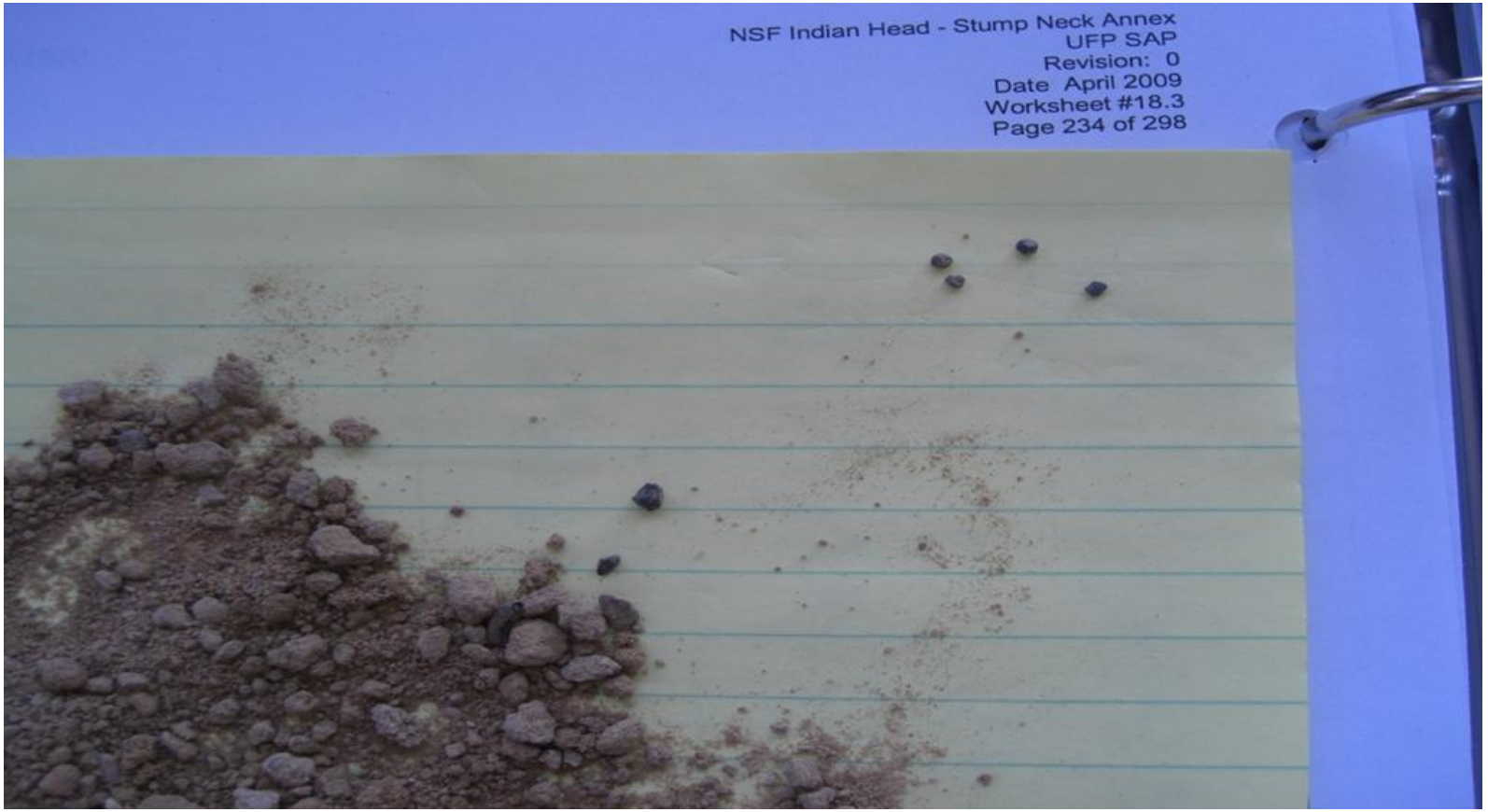
APPENDIX B

SITE PHOTOS

Bullets found at Marine Rifle Range Hillside

DPT at Small Arms Range1

DPT at Small Arms Range2



Lead Shot from Skeet Range

Marine Rifle Range Sample Location

Rum Point Skeet Range

Roach Road Rifle Range Sample Location

APPENDIX C

ANALYTICAL RESULTS (LAB EDD)

UXO 14 Soil Appendix (Part 1)
MARINE RIFLE RANGE

location		X14SB010		X14SB011		X14SB012		X14SB013		X14SB014		X14SB015		X14SB016		X14SB017		X14S
nsample		**X14SS0100001**		**X14SS0110001**		**X14SS0120001**		**X14SS0130001**		**X14SS0140001**		**X14SS0150001**		**X14SS0160001**		**X14SS0170001**		**X14SS0**
sample_dat		20090601		20090601		20090601		20090601		20090601		20090602		20090602		20090602		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		0		0		0
bottom_dep		1		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27																	
ARSENIC	0.39																	
COPPER	100																	
LEAD	11																	
TIN	0.89																	
ZINC	46																	
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11	**57.667**		**43.333**		**22.333**		**20**		**15**		**18.667**		**15.667**		**19.667**		**11.667**
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA																	

UXO 14 Soil Appendix (Part 1)
MARINE RIFLE RANGE

location		B018	X14SB019		X14SB020		X14SB021		X14SB022		X14SB023		X14SB024		X14SB025		X14SB026	
nsample		**)180001**	**X14SS0190001**		**X14SS0200001**		**X14SS0210001**		**X14SS0220001**		**X14SS0230001**		**X14SS0240001**		**X14SS0250001**		**X14SS0260001**	
sample_dat		0602	20090602		20090602		20090602		20090602		20090602		20090602		20090602		20090602	
qc_type		M	NM		NM		NM		NM		NM		NM		NM		NM	
sacode		MAL	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O	SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		0	0		0		0		0		0		0		0		0	
bottom_dep		1	1		1		1		1		1		1		1		1	
depth_unit		T	FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S	SS		SS		SS		SS		SS		SS		SS		SS	
composite		N	N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																		
ANTIMONY	0.27								0.12	L								
ARSENIC	0.39								**4.2**									
COPPER	100								9.2									
LEAD	11								9.6									
TIN	0.89								1.8	B								
ZINC	46								29.8									
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11		**16**		**18.333**		**22.667**		**28.667**		**16**		**42**		**62**		**174**	
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA								20	K								
Miscellaneous Parameters (s.u.)																		
PH	NA								4.8									
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA								15000									
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA								84									

UXO 14 Soil Appendix (Part 1)
MARINE RIFLE RANGE

location		X14SB027		X14SB028		X14SB029		X14SB030		X14SB031		X14SB032		X14SB033		X14SB034		X14S
nsample		**X14SS0270001**		**X14SS0280001**		**X14SS0290001**		**X14SS0300001**		**X14SS0310001**		**X14SS0320001**		**X14SS0330001**		**X14SS0340001**		**X14SS(**
sample_dat		20090602		20090602		20090602		20090602		20090602		20090602		20090602		20090602		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		0		0		(
bottom_dep		1		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27													0.1	L			0.14
ARSENIC	0.39													**2.4**				**2.9**
COPPER	100													24.4				**107**
LEAD	11													**75.1**				**543**
TIN	0.89													2.2	B			**9.1**
ZINC	46													20.4				33.3
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11	**24**		**88**		**324**		**53.333**		**69.667**		**148.333**		**53.667**		**233.667**		**540.333**
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA													86				85

UXO 14 Soil Appendix (Part 1)
MARINE RIFLE RANGE

location		B035	X14SB036		X14SB037		X14SB038		X14SB039		X14SB040		X14SB041		X14SB042		X14SB043	
nsample		**350001**	**X14SS0360001**		**X14SS0370001**		**X14SS0380001**		**X14SS0390001**		**X14SS0400001**		**X14SS0410001**		**X14SS0420001**		**X14SS0430001**	
sample_dat		0602	20090602		20090602		20090602		20090602		20090602		20090602		20090602		20090602	
qc_type		M	NM		NM		NM		NM		NM		NM		NM		NM	
sacode		MAL	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O	SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		0	0		0		0		0		0		0		0		0	
bottom_dep		1	1		1		1		1		1		1		1		1	
depth_unit		FT	FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S	SS		SS		SS		SS		SS		SS		SS		SS	
composite		N	N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																		
ANTIMONY	0.27	L							0.16	L							0.13	L
ARSENIC	0.39								**1.8**								**1.3**	
COPPER	100								41								76.5	
LEAD	11								**111**								**373**	
TIN	0.89								2.9	B							**4.1**	
ZINC	46								23.3								18.6	
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11		**117**		**106.333**		**403.333**		**128.333**		**201.667**		**317.667**		**84.667**		**389**	
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA								84								86	

UXO 14 Soil Appendix (Part 1)
MARINE RIFLE RANGE

location		X14SB044		X14SB045	
nsample		**X14SS0440001**		**X14SS0450001**	
sample_dat		20090602		20090603	
qc_type		NM		NM	
sacode		NORMAL		NORMAL	
matrix	**PALs**	SO		SO	
top_depth		0		0	
bottom_dep		1		1	
depth_unit		FT		FT	
submatrix		SS		SS	
composite		N		N	
Inorganics (mg/kg)					
ANTIMONY	0.27				
ARSENIC	0.39				
COPPER	100				
LEAD	11				
TIN	0.89				
ZINC	46				
Explosives (mg/kg)					
NITROGLYCERIN	6.1				
XRF Field Parameters (mg/kg)					
LEAD	11	**330**		**34.667**	
Miscellaneous Parameters (meq/100)					
CATION EXCHANGE CAPACITY	NA				
Miscellaneous Parameters (s.u.)					
PH	NA				
Miscellaneous Parameters (mg/kg)					
TOTAL ORGANIC CARBON	NA				
Miscellaneous Parameters (%)					
TOTAL SOLIDS	NA				

UXO 14 Soil Appendix (Part 1)
MARINE RIFLE RANGE

location		X14SB046		X14SB047		X14SB048		X14SB049		X14SB050		X14SB051		X14SB052		X14SB053		X14S
nsample		**X14SS0460001**		**X14SS0470001**		**X14SS0480001**		**X14SS0490001**		**X14SS0500001**		**X14SS0510001**		**X14SS0520001**		**X14SS0530001**		**X14SS0**
sample_dat		20090603		20090603		20090603		20090603		20090603		20090603		20090603		20090603		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		0		0		0
bottom_dep		1		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27					0.14	L											
ARSENIC	0.39					**2.7**												
COPPER	100					14.6												
LEAD	11					**85.7**												
TIN	0.89					2	B											
ZINC	46					33.1												
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11	**21.333**		**37**		**50.333**		**29.333**		**210.667**		**544.667**		**65**		**114.333**		**365.667**
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA					71												

UXO 14 Soil Appendix (Part 1)
MARINE RIFLE RANGE

location		B054		X14SB055		X14SB056		X14SB057		X14SB058		X14SB059		X14SB060		X14SB061		X14SB062	
nsample		**540001**		**X14SS0550001**		**X14SS0560001**		**X14SS0570001**		**X14SS0580001**		**X14SS0590001**		**X14SS0600001**		**X14SS0610001**		**X14SS0620001**	
sample_dat		0603		20090603		20090603		20090603		20090603		20090603		20090603		20090603		20090603	
qc_type		M		NM		NM		NM		NM		NM		NM		NM		NM	
sacode		MAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O		SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1		1		1	
depth_unit		T		FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S		SS		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																			
ANTIMONY	0.27									0.15	L							0.17	L
ARSENIC	0.39									**1.6**								**3.1**	
COPPER	100									88.6								29.7	
LEAD	11									**606**								**278**	
TIN	0.89									**10.1**								2	B
ZINC	46									18.2								35.2	
Explosives (mg/kg)																			
NITROGLYCERIN	6.1																		
XRF Field Parameters (mg/kg)																			
LEAD	11		**728.667**			**114.333**		**228**		**661**			**144.667**		**713.667**		**138.333**		**286.333**
Miscellaneous Parameters (meq/100)																			
CATION EXCHANGE CAPACITY	NA									13	K								
Miscellaneous Parameters (s.u.)																			
PH	NA									4.6									
Miscellaneous Parameters (mg/kg)																			
TOTAL ORGANIC CARBON	NA									10000									
Miscellaneous Parameters (%)																			
TOTAL SOLIDS	NA									84								80	

UXO 14 Soil Appendix (Part 1)
MARINE RIFLE RANGE

location		X14SB063		X14SB064		X14SB065		X14SB066		X14SB067		X14SB068		X14SB069		X14SB070		X14S
nsample		**X14SS0630001**		**X14SS0640001**		**X14SS0650001**		**X14SS0660001**		**X14SS0670001**		**X14SS0680001**		**X14SS0690001**		**X14SS0700001**		**X14SS(**
sample_dat		20090603		20090603		20090603		20090603		20090603		20090603		20090603		20090603		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		0		0		(
bottom_dep		1		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27	0.11	B															
ARSENIC	0.39	**2.1**																
COPPER	100	40.8																
LEAD	11	**188**																
TIN	0.89	3	B															
ZINC	46	21.8																
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11	**172.667**		**488.667**		**224.333**		**783.667**		**163**		**156.333**		**612.667**		**602.333**		**168.667**
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA	83																

UXO 14 Soil Appendix (Part 1)
MARINE RIFLE RANGE

location		B071	X14SB072	
nsample		**710001**	**X14SS0720001**	
sample_dat		0603	20090603	
qc_type		M	NM	
sacode		MAL	NORMAL	
matrix	**PALs**	O	SO	
top_depth		0	0	
bottom_dep		1	1	
depth_unit		T	FT	
submatrix		S	SS	
composite		N	N	
Inorganics (mg/kg)				
ANTIMONY	0.27		0.13	L
ARSENIC	0.39		**3.3**	
COPPER	100		85	
LEAD	11		**283**	
TIN	0.89		2.5	B
ZINC	46		34.5	
Explosives (mg/kg)				
NITROGLYCERIN	6.1			
XRF Field Parameters (mg/kg)				
LEAD	11		**456.333**	
Miscellaneous Parameters (meq/100)				
CATION EXCHANGE CAPACITY	NA			
Miscellaneous Parameters (s.u.)				
PH	NA			
Miscellaneous Parameters (mg/kg)				
TOTAL ORGANIC CARBON	NA			
Miscellaneous Parameters (%)				
TOTAL SOLIDS	NA		81	

UXO 14 Soil Appendix (Part 1)
MARINE RIFLE RANGE

location		X14SB001C		X14SB002C		X14SB003C		X14SB004C		X14SB004C		X14SB004C		X14SB005C		X14SB006C		X14SB
nsample		**X14SS001C0001**		**X14SS002C0001**		**X14SS003C0001**		**X14SS004C0001**		**X14SS004C0001-AVG**		**X14SS004C0001-D**		**X14SS005C0001**		**X14SS006C0001**		**X14SS0**
sample_dat		20090529		20090529		20090529		20090529		20090529		20090529		20090529		20090529		2009
qc_type		NM		NM		NM		NM		NM		FD		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		ORIG		AVG		DUP		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		0		0		0
bottom_dep		1		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SS		SS		S
composite		Y		Y		Y		Y		Y		Y		Y		Y		Y
Inorganics (mg/kg)																		
ANTIMONY	0.27	0.15	J	0.19	J	0.18	J	**1.4**	**J**	**1.4**	**J**			0.13	J	0.19	J	0.16
ARSENIC	0.39	**3.2**		**2.8**		**3**		**3.3**		**3.3**				**1.6**		**2**		**3**
COPPER	100	9.5	L	9.3	L	11.9	L	25.5	L	25.5	L			12.7	L	8	L	8.7
LEAD	11	**18.4**		**17.6**		**19.6**		**52.5**		**52.5**				**12**		**36.7**		**21.2**
TIN	0.89	1.2	B	1.2	B	1.3	B	3.2	B	3.2	B			1.2	B	1	B	1.7
ZINC	46	29.6		26.7		36		**66.5**		**66.5**				25.1		**46.4**		31.9
Explosives (mg/kg)																		
NITROGLYCERIN	6.1	1.2	UJ	1.2	UJ	1.2	UJ	1.2	UJ	1.2	UJ	1.2	UJ	1.2	UJ	1.2	UJ	1.2
XRF Field Parameters (mg/kg)																		
LEAD	11	**19.667**		**18.333**		**15.667**		**82.333**		**82.333**				**16.667**		**19.667**		**19**
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA	83		79		76		84		84				86		79		84

UXO 14 Soil Appendix (Part 1)
MARINE RIFLE RANGE

location		8007C	X14SB008C		X14SB009C	
nsample		**07C0001**	**X14SS008C0001**		**X14SS009C0001**	
sample_dat		0529	20090601		20090601	
qc_type		M	NM		NM	
sacode		MAL	NORMAL		NORMAL	
matrix	**PALs**	O	SO		SO	
top_depth		0	0		0	
bottom_dep		1	1		1	
depth_unit		T	FT		FT	
submatrix		S	SS		SS	
composite		Y	Y		Y	
Inorganics (mg/kg)						
ANTIMONY	0.27	J	0.19	J	**0.3**	**J**
ARSENIC	0.39		**2.6**		**2.5**	
COPPER	100	L	52.4	L	12.8	L
LEAD	11		**22.3**		**20.1**	
TIN	0.89	B	1.2	B	1.5	B
ZINC	46		**65.4**		34.5	
Explosives (mg/kg)						
NITROGLYCERIN	6.1	UJ	1.2	U	0.8	J
XRF Field Parameters (mg/kg)						
LEAD	11		**30**		**22**	
Miscellaneous Parameters (meq/100)						
CATION EXCHANGE CAPACITY	NA					
Miscellaneous Parameters (s.u.)						
PH	NA					
Miscellaneous Parameters (mg/kg)						
TOTAL ORGANIC CARBON	NA					
Miscellaneous Parameters (%)						
TOTAL SOLIDS	NA		80		73	

UXO 14 Soil Appendix (Part 2)
MARINE RIFLE RANGE

location		X14SB080		X14SB081		X14SB082		X14SB083		X14SB084		X14SB084		X14SB084		X14SB084		X14S
nsample		**X14SS0800001**		**X14SS0810001**		**X14SS0820001**		**X14SS0830001**		**X14SS0840001**		**X14SB0840102**		**X14SB0840102-AVG**		**X14SB0840102-D**		**X14SS0**
sample_dat		20090604		20090604		20090604		20090604		20090604		20090616		20090616		20090616		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		FD		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		ORIG		AVG		DUP		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		1		1		1		0
bottom_dep		1		1		1		1		1		2		2		2		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SB		SB		SB		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27											0.88	B	0.67	B	0.46	B	
ARSENIC	0.39											**7.8**	**J**	**5.9**	**J**	**4**	**J**	
COPPER	100											**849**	**J**	**641.5**	**J**	**434**	**J**	
LEAD	11											**6620**	**J**	**5105**	**J**	**3590**	**J**	
TIN	0.89											**131**	**J**	**104.3**	**J**	**77.6**	**J**	
ZINC	46											**53.9**		**46.65**		39.4		
Explosives (mg/kg)																		
NITROGLYCERIN																		
XRF Field Parameters (mg/kg)																		
LEAD	11	**450.667**		**5150.667**		**2329.667**		**323**		**8971.667**		**357.667**		**357.667**				**175**
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA											79		78.5		78		

UXO 14 Soil Appendix (Part 2)
MARINE RIFLE RANGE

location		B085		X14SB086		X14SB087		X14SB088		X14SB089		X14SB090		X14SB091		X14SB092		X14SB093	
nsample		**850001**		**X14SS0860001**		**X14SS0870001**		**X14SS0880001**		**X14SS0890001**		**X14SS0900001**		**X14SS0910001**		**X14SS0920001**		**X14SS0930001**	
sample_dat		0604		20090604		20090604		20090604		20090604		20090604		20090604		20090604		20090604	
qc_type		M		NM		NM		NM		NM		NM		NM		NM		NM	
sacode		MAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O		SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1		1		1	
depth_unit		T		FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S		SS		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																			
ANTIMONY	0.27					0.12	L												
ARSENIC	0.39					**3.2**													
COPPER	100					32.6													
LEAD	11					**108**													
TIN	0.89					1.7	B												
ZINC	46					32.9													
Explosives (mg/kg)																			
NITROGLYCERIN																			
XRF Field Parameters (mg/kg)																			
LEAD	11		**598.667**			**279**			**187.667**		**1245.667**		**1186.667**		**594**		**708.667**		**265**
Miscellaneous Parameters (meq/100)																			
CATION EXCHANGE CAPACITY	NA					23	K												
Miscellaneous Parameters (s.u.)																			
PH	NA					4.9													
Miscellaneous Parameters (mg/kg)																			
TOTAL ORGANIC CARBON	NA					15000													
Miscellaneous Parameters (%)																			
TOTAL SOLIDS	NA					85													

UXO 14 Soil Appendix (Part 2)
MARINE RIFLE RANGE

location		X14SB094		X14SB095	X14SB096	X14SB097	X14SB098	X14SB099	X14SB100	X14SB101	X14S
nsample		**X14SS0940001**		**X14SS0950001**	**X14SS0960001**	**X14SS0970001**	**X14SS0980001**	**X14SS0990001**	**X14SS1000001**	**X14SS1010001**	**X14SS1**
sample_dat		20090604		20090604	20090604	20090604	20090604	20090604	20090604	20090604	2009
qc_type		NM		NM	NM	NM	NM	NM	NM	NM	N
sacode		NORMAL		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NOR
matrix	**PALs**	SO		SO	SO	SO	SO	SO	SO	SO	S
top_depth		0		0	0	0	0	0	0	0	
bottom_dep		1		1	1	1	1	1	1	1	
depth_unit		FT		FT	FT	FT	FT	FT	FT	FT	F
submatrix		SS		SS	SS	SS	SS	SS	SS	SS	S
composite		N		N	N	N	N	N	N	N	N
Inorganics (mg/kg)											
ANTIMONY	0.27	0.14	L								
ARSENIC	0.39	**2.4**									
COPPER	100	39.5									
LEAD	11	**293**									
TIN	0.89	**7.1**									
ZINC	46	24.8									
Explosives (mg/kg)											
NITROGLYCERIN											
XRF Field Parameters (mg/kg)											
LEAD	11	**337**		**2105.667**	**245.333**	**49.667**	**1339**	**3361.333**	**23.333**	**11340.67**	**19878**
Miscellaneous Parameters (meq/100)											
CATION EXCHANGE CAPACITY	NA										
Miscellaneous Parameters (s.u.)											
PH	NA										
Miscellaneous Parameters (mg/kg)											
TOTAL ORGANIC CARBON	NA										
Miscellaneous Parameters (%)											
TOTAL SOLIDS	NA	83									

UXO 14 Soil Appendix (Part 2)
MARINE RIFLE RANGE

location		B102	X14SB102	X14SB102		X14SB103		X14SB104		X14SB105		X14SB106		X14SB107		X14SB108	
nsample		**.020001**	**X14SB1020102**	**X14SB1020203**		**X14SS1030001**		**X14SS1040001**		**X14SS1050001**		**X14SS1060001**		**X14SS1070001**		**X14SS1080001**	
sample_dat		0604	20090616	20090617		20090604		20090604		20090604		20090604		20090604		20090604	
qc_type		M	NM	NM		NM		NM		NM		NM		NM		NM	
sacode		MAL	NORMAL	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O	SO	SO		SO		SO		SO		SO		SO		SO	
top_depth		0	1	2		0		0		0		0		0		0	
bottom_dep		1	2	3		1		1		1		1		1		1	
depth_unit		T	FT	FT		FT		FT		FT		FT		FT		FT	
submatrix		S	SB	SB		SS		SS		SS		SS		SS		SS	
composite		N	N	N		N		N		N		N		N		N	
Inorganics (mg/kg)																	
ANTIMONY	0.27			0.18	B											0.14	L
ARSENIC	0.39			**3.9**												**6.9**	
COPPER	100			**113**												21.9	
LEAD	11			**1220**												**31.3**	
TIN	0.89			**29.3**												1.6	B
ZINC	46			25.8												**50.7**	
Explosives (mg/kg)																	
NITROGLYCERIN																	
XRF Field Parameters (mg/kg)																	
LEAD	11		**8931**	**2401.667**		**454.333**		**1668.667**		**654.667**		**490.667**		**2731.667**		**54.333**	
Miscellaneous Parameters (meq/100)																	
CATION EXCHANGE CAPACITY	NA																
Miscellaneous Parameters (s.u.)																	
PH	NA																
Miscellaneous Parameters (mg/kg)																	
TOTAL ORGANIC CARBON	NA																
Miscellaneous Parameters (%)																	
TOTAL SOLIDS	NA			86												81	

UXO 14 Soil Appendix (Part 2)
MARINE RIFLE RANGE

location		X14SB109		X14SB110		X14SB111		X14SB111		X14SB112		X14SB113		X14SB114		X14SB115		X14S
nsample		**X14SS1090001**		**X14SS1100001**		**X14SS1110001**		**X14SB1110102**		**X14SS1120001**		**X14SS1130001**		**X14SS1140001**		**X14SS1150001**		**X14SS1**
sample_dat		20090604		20090604		20090604		20090616		20090604		20090604		20090604		20090604		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		1		0		0		0		0		(
bottom_dep		1		1		1		2		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SB		SS		SS		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27							0.6	B									
ARSENIC	0.39							**2.2**										
COPPER	100							**251**										
LEAD	11							**2640**										
TIN	0.89							**139**										
ZINC	46							9.8										
Explosives (mg/kg)																		
NITROGLYCERIN																		
XRF Field Parameters (mg/kg)																		
LEAD	11	**3208.333**		**9119.333**		**11536**		**1842.667**		**7109.667**		**9883**		**2786**		**1628.667**		**685.667**
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA							84										

UXO 14 Soil Appendix (Part 2)
MARINE RIFLE RANGE

location		B116	X14SB117		X14SB118		X14SB119		X14SB120		X14SB121		X14SB122		X14SB123		X14SB124	
nsample		**160001**	**X14SS1170001**		**X14SS1180001**		**X14SS1190001**		**X14SS1200001**		**X14SS1210001**		**X14SS1220001**		**X14SS1230001**		**X14SS1240001**	
sample_dat		0604	20090604		20090604		20090604		20090604		20090604		20090604		20090604		20090604	
qc_type		M	NM		NM		NM		NM		NM		NM		NM		NM	
sacode		MAL	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O	SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		0	0		0		0		0		0		0		0		0	
bottom_dep		1	1		1		1		1		1		1		1		1	
depth_unit		T	FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S	SS		SS		SS		SS		SS		SS		SS		SS	
composite		N	N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																		
ANTIMONY	0.27		0.07	B					0.14	B								
ARSENIC	0.39		**1.1**						1.6	B								
COPPER	100		**151**						**276**									
LEAD	11		**618**						**741**	**J**								
TIN	0.89		**4.6**						**3.7**									
ZINC	46		7.2						9.3									
Explosives (mg/kg)																		
NITROGLYCERIN																		
XRF Field Parameters (mg/kg)																		
LEAD	11		**848.667**		**641.333**		**460.333**		**287.667**		**764.333**		**75.667**		**106.333**		**72.667**	
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA		15	K														
Miscellaneous Parameters (s.u.)																		
PH	NA		4.6															
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA		28000															
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA		86						79									

UXO 14 Soil Appendix (Part 2)
MARINE RIFLE RANGE

location		X14SB125		X14SB126		X14SB127		X14SB128		X14SB129		X14SB130		X14SB131		X14SB132		X14S
nsample		**X14SS1250001**		**X14SS1260001**		**X14SS1270001**		**X14SS1280001**		**X14SS1290001**		**X14SS1300001**		**X14SS1310001**		**X14SS1320001**		**X14SS1**
sample_dat		20090609		20090609		20090609		20090609		20090609		20090616		20090616		20090616		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		0		0		(
bottom_dep		1		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27			0.07	B							0.02	B	0.02	B	0.22	L	
ARSENIC	0.39			**1.2**								**2.2**		**3.1**		**3.2**		
COPPER	100			53.3								18.8		36.4		8.6		
LEAD	11			**476**								**44.7**		**120**		**17.9**		
TIN	0.89			**29.4**								0.49	B	0.58	B	0.54	B	
ZINC	46			15.3								41.1		**46.2**		**60.3**		
Explosives (mg/kg)																		
NITROGLYCERIN																		
XRF Field Parameters (mg/kg)																		
LEAD	11	**909.333**		**512.333**		**984**		**2823.667**		**1182.667**		**28.667**		**122**		**109.667**		**36.667**
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA			68								86		81		87		

UXO 14 Soil Appendix (Part 2)
MARINE RIFLE RANGE

location		B133	X14SB134		X14SB135		X14SB136		X14SB137		X14SB138		X14SB139		X14SB140		X14SB141	
nsample		**.330001**	**X14SS1340001**		**X14SS1350001**		**X14SS1360001**		**X14SS1370001**		**X14SS1380001**		**X14SS1390001**		**X14SS1400001**		**X14SS1410001**	
sample_dat		0616	20090616		20090616		20090616		20090616		20090616		20090616		20090616		20090616	
qc_type		M	NM		NM		NM		NM		NM		NM		NM		NM	
sacode		MAL	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O	SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		0	0		0		0		0		0		0		0		0	
bottom_dep		1	1		1		1		1		1		1		1		1	
depth_unit		FT	FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S	SS		SS		SS		SS		SS		SS		SS		SS	
composite		N	N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																		
ANTIMONY	0.27		**0.32**	**L**	0.28	B					0.14	B	0.14	B	0.32	B	0.1	B
ARSENIC	0.39		**7.3**		**4.5**						**2.2**		**2.3**		**3**		**1.2**	
COPPER	100		77.9		9.4						28.2		63.4		**141**		13.6	
LEAD	11		**904**		**45.1**						**137**		**280**		**676**		**405**	
TIN	0.89		**32.3**		**1.6**						**2.8**		**4.9**		**81.8**		**3**	
ZINC	46		28.2		30.5						33.8		25.4		20		7	
Explosives (mg/kg)																		
NITROGLYCERIN																		
XRF Field Parameters (mg/kg)																		
LEAD	11		**1097.333**		**80**		**53.333**		**56.333**		**160.667**		**328.333**		**1031**		**351.333**	
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA		88		86						85		84		81		85	

UXO 14 Soil Appendix (Part 2)
MARINE RIFLE RANGE

location		X14SB142		X14SB143	
nsample		**X14SS1420001**		**X14SS1430001**	
sample_dat		20090617		20090617	
qc_type		NM		NM	
sacode		NORMAL		NORMAL	
matrix	**PALs**	SO		SO	
top_depth		0		0	
bottom_dep		1		1	
depth_unit		FT		FT	
submatrix		SS		SS	
composite		N		N	
Inorganics (mg/kg)					
ANTIMONY	0.27	0.14	B	0.14	B
ARSENIC	0.39	**4.8**		**3.8**	
COPPER	100	9.8		20.3	
LEAD	11	11	B	**166**	
TIN	0.89	1.3	B	**1.7**	
ZINC	46	29.2		19.7	
Explosives (mg/kg)					
NITROGLYCERIN					
XRF Field Parameters (mg/kg)					
LEAD	11	**19.333**		**289.667**	
Miscellaneous Parameters (meq/100)					
CATION EXCHANGE CAPACITY	NA				
Miscellaneous Parameters (s.u.)					
PH	NA				
Miscellaneous Parameters (mg/kg)					
TOTAL ORGANIC CARBON	NA				
Miscellaneous Parameters (%)					
TOTAL SOLIDS	NA	86		84	

UXO 15 Sediment Appendix
OLD SKEET TRAP RANGE

location		X15SD010		X15SD011		X15SD012		X15SD013		X15SD014		X15SD015		X15SD016		X15SD017		X15S
nsample		**X15SD0100006**		**X15SD0110006**		**X15SD0120006**		**X15SD0130006**		**X15SD0140006**		**X15SD0150006**		**X15SD0160006**		**X15SD0170006**		**X15SD0**
sample_dat		20090610		20090610		20090610		20090610		20090610		20090610		20090610		20090610		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SD		SD		SD		SD		SD		SD		SD		SD		S
top_depth		0		0		0		0		0		0		0		0		0
bottom_dep		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		NA		NA		NA		NA		NA		NA		NA		NA		N
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27							0.05	B									0.05
ARSENIC	0.39							**0.54**										**0.65**
COPPER	100							2.4										3.3
LEAD	11							**14**										6.7
TIN	0.89							0.9	B									1
ZINC	46							12.2										15.2
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000																	
2-METHYLNAPHTHALENE	31000																	
ACENAPHTHENE	29000																	
ACENAPHTHYLENE	29000																	
ANTHRACENE	29000																	
BENZO(A)ANTHRACENE	150																	
BENZO(A)PYRENE	15																	
BENZO(B)FLUORANTHENE	150																	
BENZO(G,H,I)PERYLENE	1100																	
BENZO(K)FLUORANTHENE	1100																	
CHRYSENE	1100																	
DIBENZO(A,H)ANTHRACENE	15																	
FLUORANTHENE	29000																	
FLUORENE	29000																	
INDENO(1,2,3-CD)PYRENE	150																	
NAPHTHALENE	330																	
PHENANTHRENE	29000																	
PYRENE	1100																	
XRF Field Parameters (mg/kg)																		
LEAD	11	**17.667**		4.333		**15.667**		**15.333**		**12**		2.667		8		**11.333**		6.667
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA							78										78
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA																	

UXO 15 Sediment Appendix
OLD SKEET TRAP RANGE

location		D018		X15SD019		X15SD020		X15SD021		X15SD022		X15SD023		X15SD024		X15SD025		X15SD026	
nsample		**)180006**		**X15SD0190006**		**X15SD0200006**		**X15SD0210006**		**X15SD0220006**		**X15SD0230006**		**X15SD0240006**		**X15SD0250006**		**X15SD0260006**	
sample_dat		0610		20090610		20090610		20090610		20090610		20090610		20090610		20090610		20090610	
qc_type		M		NM		NM		NM		NM		NM		NM		NM		NM	
sacode		MAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	D		SD		SD		SD		SD		SD		SD		SD		SD	
top_depth		)		0		0		0		0		0		0		0		0	
bottom_dep		5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
depth_unit		T		FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		A		NA		NA		NA		NA		NA		NA		NA		NA	
composite		N		N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																			
ANTIMONY	0.27	B										0.06	B						
ARSENIC	0.39											**0.5**							
COPPER	100											3							
LEAD	11											7.6							
TIN	0.89	B										0.87	B						
ZINC	46											12.5							
PAHs (ug/kg)																			
1-METHYLNAPHTHALENE	22000											26	U						
2-METHYLNAPHTHALENE	31000											26	U						
ACENAPHTHENE	29000											26	U						
ACENAPHTHYLENE	29000											26	U						
ANTHRACENE	29000											26	U						
BENZO(A)ANTHRACENE	150											2.9	J						
BENZO(A)PYRENE	15											4.6	J						
BENZO(B)FLUORANTHENE	150											3.4	J						
BENZO(G,H,I)PERYLENE	1100											2.8	J						
BENZO(K)FLUORANTHENE	1100											26	U						
CHRYSENE	1100											5.4	J						
DIBENZO(A,H)ANTHRACENE	15											26	U						
FLUORANTHENE	29000											26	U						
FLUORENE	29000											26	U						
INDENO(1,2,3-CD)PYRENE	150											2.9	J						
NAPHTHALENE	330											26	U						
PHENANTHRENE	29000											26	U						
PYRENE	1100											26	U						
XRF Field Parameters (mg/kg)																			
LEAD	11			3.333		7.333		6		**20.333**		11		**12**		10.667		**12.333**	
Miscellaneous Parameters (meq/100)																			
CATION EXCHANGE CAPACITY	NA											9.5	K						
Miscellaneous Parameters (s.u.)																			
PH	NA											7							
Miscellaneous Parameters (mg/kg)																			
TOTAL ORGANIC CARBON	NA											1300							
Miscellaneous Parameters (%)																			
TOTAL SOLIDS	NA											79							
Miscellaneous Organic Parameters (%)																			
TOTAL SOLIDS	NA											78							

UXO 15 Sediment Appendix
OLD SKEET TRAP RANGE

location		X15SD027		X15SD030		X15SD033	
nsample		**X15SD0270006**		**X15SD0300006**		**X15SD0330006**	
sample_dat		20090610		20090610		20090610	
qc_type		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SD		SD		SD	
top_depth		0		0		0	
bottom_dep		0.5		0.5		0.5	
depth_unit		FT		FT		FT	
submatrix		NA		NA		NA	
composite		N		N		N	
Inorganics (mg/kg)							
ANTIMONY	0.27			0.28	B	0.083	B
ARSENIC	0.39			**5.8**		0.36	
COPPER	100			36.1		2.1	B
LEAD	11			**37**		5	B
TIN	0.89			**3.4**		0.64	B
ZINC	46			**164**		9.3	
PAHs (ug/kg)							
1-METHYLNAPHTHALENE	22000						
2-METHYLNAPHTHALENE	31000						
ACENAPHTHENE	29000						
ACENAPHTHYLENE	29000						
ANTHRACENE	29000						
BENZO(A)ANTHRACENE	150						
BENZO(A)PYRENE	15						
BENZO(B)FLUORANTHENE	150						
BENZO(G,H,I)PERYLENE	1100						
BENZO(K)FLUORANTHENE	1100						
CHRYSENE	1100						
DIBENZO(A,H)ANTHRACENE	15						
FLUORANTHENE	29000						
FLUORENE	29000						
INDENO(1,2,3-CD)PYRENE	150						
NAPHTHALENE	330						
PHENANTHRENE	29000						
PYRENE	1100						
XRF Field Parameters (mg/kg)							
LEAD	11	0	U				
Miscellaneous Parameters (meq/100)							
CATION EXCHANGE CAPACITY	NA						
Miscellaneous Parameters (s.u.)							
PH	NA						
Miscellaneous Parameters (mg/kg)							
TOTAL ORGANIC CARBON	NA						
Miscellaneous Parameters (%)							
TOTAL SOLIDS	NA			41		78	
Miscellaneous Organic Parameters (%)							
TOTAL SOLIDS	NA						

UXO 15 Sediment Appendix
OLD SKEET TRAP RANGE

location		X15SD001		X15SD002		X15SD003		X15SD004		X15SD005		X15SD006		X15SD007		X15SD008		X15S
nsample		**X15SD0010006**		**X15SD0020006**		**X15SD0030006**		**X15SD0040006**		**X15SD0050006**		**X15SD0060006**		**X15SD0070006**		**X15SD0080006**		**X15SD0**
sample_dat		20090601		20090601		20090601		20090601		20090601		20090601		20090601		20090601		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SD		SD		SD		SD		SD		SD		SD		SD		S
top_depth		0		0		0		0		0		0		0		0		0
bottom_dep		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		NA		NA		NA		NA		NA		NA		NA		NA		N
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27					0.09	B			0.04	B							
ARSENIC	0.39					**1.4**				**1.2**								
COPPER	100					2.9				2.8								
LEAD	11					**19.6**				7.5								
TIN	0.89					1.9	B			0.92	B							
ZINC	46					11.4				8.1								
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000					24	UL			25	UL							
2-METHYLNAPHTHALENE	31000					24	UL			25	UL							
ACENAPHTHENE	29000					24	UL			25	UL							
ACENAPHTHYLENE	29000					24	UL			25	UL							
ANTHRACENE	29000					24	UL			25	UL							
BENZO(A)ANTHRACENE	150					24	UL			25	UL							
BENZO(A)PYRENE	15					24	UL			25	UL							
BENZO(B)FLUORANTHENE	150					24	UL			25	UL							
BENZO(G,H,I)PERYLENE	1100					24	UL			25	UL							
BENZO(K)FLUORANTHENE	1100					24	UL			25	UL							
CHRYSENE	1100					3.5	B			25	UL							
DIBENZO(A,H)ANTHRACENE	15					24	UL			25	UL							
FLUORANTHENE	29000					24	UL			25	UL							
FLUORENE	29000					24	UL			25	UL							
INDENO(1,2,3-CD)PYRENE	150					24	UL			25	UL							
NAPHTHALENE	330					24	UL			25	UL							
PHENANTHRENE	29000					24	UL			25	UL							
PYRENE	1100					24	UL			25	UL							
XRF Field Parameters (mg/kg)																		
LEAD	11	**17.333**		8.333		**185**		7		**29.667**		3.333		**27**		10		**14**
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA					13	K											
Miscellaneous Parameters (s.u.)																		
PH	NA					5.6												
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA					740												
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA					84				82								
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA					83				80								

UXO 15 Sediment Appendix
OLD SKEET TRAP RANGE

location		D009
nsample		**)090006**
sample_dat		0601
qc_type		M
sacode		MAL
matrix	**PALs**	D
top_depth		0
bottom_dep		5
depth_unit		T
submatrix		A
composite		N
Inorganics (mg/kg)		
ANTIMONY	0.27	
ARSENIC	0.39	
COPPER	100	
LEAD	11	
TIN	0.89	
ZINC	46	
PAHs (ug/kg)		
1-METHYLNAPHTHALENE	22000	
2-METHYLNAPHTHALENE	31000	
ACENAPHTHENE	29000	
ACENAPHTHYLENE	29000	
ANTHRACENE	29000	
BENZO(A)ANTHRACENE	150	
BENZO(A)PYRENE	15	
BENZO(B)FLUORANTHENE	150	
BENZO(G,H,I)PERYLENE	1100	
BENZO(K)FLUORANTHENE	1100	
CHRYSENE	1100	
DIBENZO(A,H)ANTHRACENE	15	
FLUORANTHENE	29000	
FLUORENE	29000	
INDENO(1,2,3-CD)PYRENE	150	
NAPHTHALENE	330	
PHENANTHRENE	29000	
PYRENE	1100	
XRF Field Parameters (mg/kg)		
LEAD	11	
Miscellaneous Parameters (meq/100)		
CATION EXCHANGE CAPACITY	NA	
Miscellaneous Parameters (s.u.)		
PH	NA	
Miscellaneous Parameters (mg/kg)		
TOTAL ORGANIC CARBON	NA	
Miscellaneous Parameters (%)		
TOTAL SOLIDS	NA	
Miscellaneous Organic Parameters (%)		
TOTAL SOLIDS	NA	

UXO 15 Soil Appendix
OLD SKEET TRAP RANGE

location		X15SB001		X15SB002		X15SB003		X15SB004		X15SB005		X15SB005		X15SB006		X15SB007		X15S
nsample		**X15SS0010001**		**X15SS0020001**		**X15SS0030001**		**X15SS0040001**		**X15SS0050001**		**X15SB0050102**		**X15SS0060001**		**X15SS0070001**		**X15SB0**
sample_dat		20090527		20090527		20090527		20090527		20090527		20090602		20090527		20090527		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		1		0		0		1
bottom_dep		1		1		1		1		1		2		1		1		2
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SB		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27									**0.99**	**J**	0.11	J			**0.83**	**J**	
ARSENIC	0.39									**3.9**		**4.1**				**7.2**		
COPPER	100									10.6	L	10.1	L			12.2	L	
LEAD	11									**252**		**12.2**				**220**		
TIN	0.89									2	B	1.2	B			1.7	B	
ZINC	46									41.2		37.6				27.7		
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000	5.4	J	42	J	24	UJ											
2-METHYLNAPHTHALENE	31000	20	J	64	J	24	UJ											
ACENAPHTHENE	29000	180		690		24	U											
ACENAPHTHYLENE	29000	26	U	24	U	24	U											
ANTHRACENE	29000	330		950		1.9	J											
BENZO(A)ANTHRACENE	150	**1500**		**3000**		20	J											
BENZO(A)PYRENE	15	**1600**		**3900**		**20**	**J**											
BENZO(B)FLUORANTHENE	150	**1700**		**4500**		30												
BENZO(G,H,I)PERYLENE	1100	**1200**		**2400**		13	J											
BENZO(K)FLUORANTHENE	1100	930		**1600**		12	J											
CHRYSENE	1100	**1400**		**3600**		13	J											
DIBENZO(A,H)ANTHRACENE	15	**420**		**620**	**J**	7.8	J											
FLUORANTHENE	29000	2100		5100	J	13	J											
FLUORENE	29000	110		360	J	24	U											
INDENO(1,2,3-CD)PYRENE	150	**1200**		**2500**		12	J											
NAPHTHALENE	330	52		320		24	U											
PHENANTHRENE	29000	1100		3600		5.4	J											
PYRENE	1100	**1600**		**4500**		11	J											
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11	**47.333**		**41**		**30.333**		**188.667**		**367.667**		**14.667**		**119**		**469.333**		**85.333**
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA									86		84				86		
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA	77		84		85												

UXO 15 Soil Appendix
OLD SKEET TRAP RANGE

location		B007	X15SB008		X15SB009		X15SB010		X15SB011		X15SB012		X15SB012		X15SB013		X15SB013	
nsample		**070102**	**X15SS0080001**		**X15SS0090001**		**X15SS0100001**		**X15SS0110001**		**X15SS0120001**		**X15SS0120001RE**		**X15SS0130001**		**X15SB0130102**	
sample_dat		0602	20090527		20090527		20090527		20090527		20090527		20090527		20090527		20090602	
qc_type		M	NM		NM		NM		NM		NM		NM		NM		NM	
sacode		MAL	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O	SO		SO		SO		SO		SO		SO		SO		SO	
top_depth			0		0		0		0		0		0		0		1	
bottom_dep			1		1		1		1		1		1		1		2	
depth_unit		T	FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		B	SS		SS		SS		SS		SS		SS		SS		SB	
composite		N	N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																		
ANTIMONY	0.27																	
ARSENIC	0.39																	
COPPER	100																	
LEAD	11																	
TIN	0.89																	
ZINC	46																	
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000								25	UJ								
2-METHYLNAPHTHALENE	31000								25	UJ								
ACENAPHTHENE	29000								25	U								
ACENAPHTHYLENE	29000								25	U								
ANTHRACENE	29000								25	U								
BENZO(A)ANTHRACENE	150								21	J								
BENZO(A)PYRENE	15								**18**	**J**								
BENZO(B)FLUORANTHENE	150								24	J								
BENZO(G,H,I)PERYLENE	1100								13	J								
BENZO(K)FLUORANTHENE	1100								11	J								
CHRYSENE	1100								15	J								
DIBENZO(A,H)ANTHRACENE	15								9.4	J								
FLUORANTHENE	29000								15	J								
FLUORENE	29000								25	U								
INDENO(1,2,3-CD)PYRENE	150								11	J								
NAPHTHALENE	330								25	U								
PHENANTHRENE	29000								6.2	J								
PYRENE	1100								15	J								
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11		**285.667**		**38.667**		**50**		**113**		**199.333**		**175.333**		**838.667**		**36.667**	
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA																	
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA								79									

UXO 15 Soil Appendix
OLD SKEET TRAP RANGE

location		X15SB013		X15SB014		X15SB015		X15SB016		X15SB017		X15SB018		X15SB019		X15SB020		X15S
nsample		**X15SB0130102RE**		**X15SS0140001**		**X15SS0150001**		**X15SS0160001**		**X15SS0170001**		**X15SS0180001**		**X15SS0190001**		**X15SS0200001**		**X15SS(**
sample_dat		20090602		20090527		20090527		20090527		20090527		20090527		20090527		20090527		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		1		0		0		0		0		0		0		0		(
bottom_dep		2		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SB		SS		SS		SS		SS		SS		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27											**0.69**	**J**					
ARSENIC	0.39											**3.2**						
COPPER	100											8.8	L					
LEAD	11											**32**						
TIN	0.89											1.3	B					
ZINC	46											30.5						
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000					150	J							26	UJ			27
2-METHYLNAPHTHALENE	31000					230								26	UJ			17
ACENAPHTHENE	29000					2000	J							26	U			49
ACENAPHTHYLENE	29000					25	U							26	U			27
ANTHRACENE	29000					2500	J							26	U			93
BENZO(A)ANTHRACENE	150					**17000**								37	J			**3200**
BENZO(A)PYRENE	15					**23000**								**40**	**J**			**2300**
BENZO(B)FLUORANTHENE	150					**21000**								42	J			**1500**
BENZO(G,H,I)PERYLENE	1100					**11000**								27	J			**1200**
BENZO(K)FLUORANTHENE	1100					**8400**								25	J			510
CHRYSENE	1100					**22000**								35	J			**3600**
DIBENZO(A,H)ANTHRACENE	15					**3300**	**J**							13	J			**820**
FLUORANTHENE	29000					16000								30	J			780
FLUORENE	29000					4200	U							26	U			29
INDENO(1,2,3-CD)PYRENE	150					**12000**								24	J			**700**
NAPHTHALENE	330					4200	U							26	U			20
PHENANTHRENE	29000					11000								11	J			500
PYRENE	1100					**23000**								28	J			**1400**
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11	**39.667**		**77.333**		**45.333**		**45.667**		**106**		**47**		**35.333**		**68.667**		**58.667**
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA											87						
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA					79								78				75

UXO 15 Soil Appendix
OLD SKEET TRAP RANGE

location		B021		X15SB022		X15SB023		X15SB024		X15SB025		X15SB026		X15SB027		X15SB028		X15SB029	
nsample		**)210001**		**X15SS0220001**		**X15SS0230001**		**X15SS0240001**		**X15SS0250001**		**X15SS0260001**		**X15SS0270001**		**X15SS0280001**		**X15SS0290001**	
sample_dat		0527		20090527		20090527		20090527		20090527		20090527		20090528		20090527		20090527	
qc_type		M		NM		NM		NM		NM		NM		NM		NM		NM	
sacode		MAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O		SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		)		0		0		0		0		0		0		0		0	
bottom_dep		L		1		1		1		1		1		1		1		1	
depth_unit		T		FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S		SS		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																			
ANTIMONY	0.27																		
ARSENIC	0.39																		
COPPER	100																		
LEAD	11																		
TIN	0.89																		
ZINC	46																		
PAHs (ug/kg)																			
1-METHYLNAPHTHALENE	22000	U														23	UJ	27	UJ
2-METHYLNAPHTHALENE	31000	J														9.2	J	27	UJ
ACENAPHTHENE	29000															12	J	4.2	J
ACENAPHTHYLENE	29000	U														23	U	27	U
ANTHRACENE	29000															26		27	U
BENZO(A)ANTHRACENE	150															**400**		53	
BENZO(A)PYRENE	15															**400**		**58**	
BENZO(B)FLUORANTHENE	150															**240**		66	
BENZO(G,H,I)PERYLENE	1100															230		46	
BENZO(K)FLUORANTHENE	1100															140		28	
CHRYSENE	1100															420		46	
DIBENZO(A,H)ANTHRACENE	15															**91**		**22**	**J**
FLUORANTHENE	29000															200		55	
FLUORENE	29000															8.3	J	27	U
INDENO(1,2,3-CD)PYRENE	150															**170**		36	
NAPHTHALENE	330	J														23	U	27	U
PHENANTHRENE	29000															160		28	
PYRENE	1100															400		47	
Explosives (mg/kg)																			
NITROGLYCERIN	6.1																		
XRF Field Parameters (mg/kg)																			
LEAD	11			**77**		**102**		**31**		**194.333**		**64.333**		**67**		**55.667**		**101.333**	
Miscellaneous Parameters (meq/100)																			
CATION EXCHANGE CAPACITY	NA																		
Miscellaneous Parameters (s.u.)																			
PH	NA																		
Miscellaneous Parameters (mg/kg)																			
TOTAL ORGANIC CARBON	NA																		
Miscellaneous Parameters (%)																			
TOTAL SOLIDS	NA																		
Miscellaneous Organic Parameters (%)																			
TOTAL SOLIDS	NA															85		75	

UXO 15 Soil Appendix
OLD SKEET TRAP RANGE

location		X15SB030		X15SB031		X15SB032		X15SB033		X15SB034		X15SB035		X15SB036		X15SB037		X15S
nsample		**X15SS0300001**		**X15SS0310001**		**X15SS0320001**		**X15SS0330001**		**X15SS0340001**		**X15SS0350001**		**X15SS0360001**		**X15SS0370001**		**X15SS(**
sample_dat		20090527		20090528		20090528		20090527		20090528		20090528		20090528		20090528		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		0		0		(
bottom_dep		1		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27											0.27	J			**0.37**	**J**	
ARSENIC	0.39											**2**				**1.6**		
COPPER	100											9.6	L			7.3	L	
LEAD	11											**81.6**				**203**		
TIN	0.89											3.9	B			1.4	B	
ZINC	46											41				30.2		
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000			7700	U	25	UJ					25	UJ					10000
2-METHYLNAPHTHALENE	31000			7700	U	11	J					19	J					10000
ACENAPHTHENE	29000			2600	J	47						150						5000
ACENAPHTHYLENE	29000			23	U	25	U					25	U					24
ANTHRACENE	29000			3500	J	98						200						7200
BENZO(A)ANTHRACENE	150			**18000**		**410**						**2000**						**27000**
BENZO(A)PYRENE	15			**24000**		**440**						**2900**						**38000**
BENZO(B)FLUORANTHENE	150			**26000**		**410**						**3200**						**38000**
BENZO(G,H,I)PERYLENE	1100			**14000**		270						**1800**						**22000**
BENZO(K)FLUORANTHENE	1100			**11000**		270						1100						**18000**
CHRYSENE	1100			**22000**		290						**2500**						**34000**
DIBENZO(A,H)ANTHRACENE	15			**4100**	**J**	**100**						**460**						**7000**
FLUORANTHENE	29000			22000		620						1900						**38000**
FLUORENE	29000			7700	U	32						60						3100
INDENO(1,2,3-CD)PYRENE	150			**16000**		**290**						**1900**						**27000**
NAPHTHALENE	330			7700	U	8.6	J					56						10000
PHENANTHRENE	29000			14000		350						840						**30000**
PYRENE	1100			**24000**		420						**2500**						**45000**
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11	**196.667**		**34.667**		**54**		**192.667**		**34.333**		**69.667**		**43**		**247.667**		**33**
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA							13	K									
Miscellaneous Parameters (s.u.)																		
PH	NA							5										
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA							8500										
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA			85				88				80				86		
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA			86		80						78						82

UXO 15 Soil Appendix
OLD SKEET TRAP RANGE

location		B038	X15SB039		X15SB040		X15SB041		X15SB041		X15SB042		X15SB043		X15SB044		X15SB045	
nsample		**380001**	**X15SS0390001**		**X15SS0400001**		**X15SS0410001**		**X15SB0410102**		**X15SS0420001**		**X15SS0430001**		**X15SS0440001**		**X15SS0450001**	
sample_dat		0528	20090528		20090528		20090528		20090602		20090528		20090528		20090528		20090528	
qc_type		M	NM		NM		NM		NM		NM		NM		NM		NM	
sacode		MAL	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O	SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		0	0		0		0		1		0		0		0		0	
bottom_dep		1	1		1		1		2		1		1		1		1	
depth_unit		T	FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S	SS		SS		SS		SB		SS		SS		SS		SS	
composite		N	N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																		
ANTIMONY	0.27																	
ARSENIC	0.39																	
COPPER	100																	
LEAD	11																	
TIN	0.89																	
ZINC	46																	
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000	U																
2-METHYLNAPHTHALENE	31000	U																
ACENAPHTHENE	29000	J																
ACENAPHTHYLENE	29000	U																
ANTHRACENE	29000	J																
BENZO(A)ANTHRACENE	150																	
BENZO(A)PYRENE	15																	
BENZO(B)FLUORANTHENE	150																	
BENZO(G,H,I)PERYLENE	1100																	
BENZO(K)FLUORANTHENE	1100																	
CHRYSENE	1100																	
DIBENZO(A,H)ANTHRACENE	15	**J**																
FLUORANTHENE	29000																	
FLUORENE	29000	J																
INDENO(1,2,3-CD)PYRENE	150																	
NAPHTHALENE	330	U																
PHENANTHRENE	29000																	
PYRENE	1100																	
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11		**47.333**		**47.333**		**744.333**		**18**		**239.667**		**28**		**20.333**		**53.667**	
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA																	
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA																	

UXO 15 Soil Appendix
OLD SKEET TRAP RANGE

location		X15SB046		X15SB047		X15SB048		X15SB049		X15SB050		X15SB051		X15SB052		X15SB053		X15S
nsample		**X15SS0460001**		**X15SS0470001**		**X15SS0480001**		**X15SS0490001**		**X15SS0500001**		**X15SS0510001**		**X15SS0520001**		**X15SS0530001**		**X15SS(**
sample_dat		20090528		20090528		20090528		20090528		20090528		20090527		20090527		20090527		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		0		0		(
bottom_dep		1		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27																	
ARSENIC	0.39																	
COPPER	100																	
LEAD	11																	
TIN	0.89																	
ZINC	46																	
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000							150	J	86	J			230	J	10000	U	6.1
2-METHYLNAPHTHALENE	31000							200		120				3800	U	10000	U	20
ACENAPHTHENE	29000							1800	J	1500	J			2600	J	4200	J	160
ACENAPHTHYLENE	29000							24	U	25	U			23	U	25	U	23
ANTHRACENE	29000							2400	J	2000	J			4100		5400	J	230
BENZO(A)ANTHRACENE	150							**10000**		**9700**				**23000**		**33000**		**1800**
BENZO(A)PYRENE	15							**13000**		**12000**				**27000**		**42000**		**2300**
BENZO(B)FLUORANTHENE	150							**14000**		**13000**				**26000**		**41000**		**2000**
BENZO(G,H,I)PERYLENE	1100							**9000**		**8200**				**15000**		**25000**		**1900**
BENZO(K)FLUORANTHENE	1100							**6100**		**5700**				**10000**		**16000**		**1200**
CHRYSENE	1100							**13000**		**14000**				**31000**		**43000**		**2000**
DIBENZO(A,H)ANTHRACENE	15							**2300**	**J**	**2600**	**J**			**5100**		**7600**	**J**	**620**
FLUORANTHENE	29000							14000		12000				23000		**37000**		2200
FLUORENE	29000							1000	J	4200	U			1500	J	10000	U	94
INDENO(1,2,3-CD)PYRENE	150							**10000**		**8900**				**16000**		**27000**		**1700**
NAPHTHALENE	330							4000	U	330				3800	U	10000	U	39
PHENANTHRENE	29000							11000		8200				17000		24000		960
PYRENE	1100							**16000**		**14000**				**26000**		**44000**		**1600**
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11	**212.333**		**196**		**130.333**		**151.333**		**65.333**		**68.333**		**96.333**		**58.333**		**32.667**
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA					21	K											
Miscellaneous Parameters (s.u.)																		
PH	NA					5.5												
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA					12000												
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA					84												
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA							82		78				86		80		86

UXO 15 Soil Appendix
OLD SKEET TRAP RANGE

location		B054		X15SB055		X15SB056		X15SB059C		X15SB060C		X15SB061		X15SB062		X15SB063		X15SB064	
nsample		**540001**		**X15SS0550001**		**X15SS0560001**		**X15SS059C0001**		**X15SS060C0001**		**X15SS0610001**		**X15SS0620001**		**X15SS0630001**		**X15SB0640102**	
sample_dat		0527		20090527		20090527		20090601		20090601		20090602		20090602		20090602		20090602	
qc_type		M		NM		NM		NM		NM		NM		NM		NM		NM	
sacode		MAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O		SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0		0		1	
bottom_dep		1		1		1		1		1		1		1		1		2	
depth_unit		T		FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S		SS		SS		SS		SS		SS		SS		SS		SB	
composite		N		N		N		Y		Y		N		N		N		N	
Inorganics (mg/kg)																			
ANTIMONY	0.27											0.17	J						
ARSENIC	0.39											**2.9**							
COPPER	100											8.2	L						
LEAD	11											**74.7**							
TIN	0.89											1.2	B						
ZINC	46											33.9							
PAHs (ug/kg)																			
1-METHYLNAPHTHALENE	22000	J																	
2-METHYLNAPHTHALENE	31000	J																	
ACENAPHTHENE	29000																		
ACENAPHTHYLENE	29000	U																	
ANTHRACENE	29000																		
BENZO(A)ANTHRACENE	150																		
BENZO(A)PYRENE	15																		
BENZO(B)FLUORANTHENE	150																		
BENZO(G,H,I)PERYLENE	1100																		
BENZO(K)FLUORANTHENE	1100																		
CHRYSENE	1100																		
DIBENZO(A,H)ANTHRACENE	15																		
FLUORANTHENE	29000																		
FLUORENE	29000																		
INDENO(1,2,3-CD)PYRENE	150																		
NAPHTHALENE	330																		
PHENANTHRENE	29000																		
PYRENE	1100																		
Explosives (mg/kg)																			
NITROGLYCERIN	6.1																		
XRF Field Parameters (mg/kg)																			
LEAD	11			**40**		**85.333**		**60.667**		**129.333**		**192.333**		**160**		**272**		**15.667**	
Miscellaneous Parameters (meq/100)																			
CATION EXCHANGE CAPACITY	NA																		
Miscellaneous Parameters (s.u.)																			
PH	NA																		
Miscellaneous Parameters (mg/kg)																			
TOTAL ORGANIC CARBON	NA																		
Miscellaneous Parameters (%)																			
TOTAL SOLIDS	NA											85							
Miscellaneous Organic Parameters (%)																			
TOTAL SOLIDS	NA																		

UXO 15 Soil Appendix
OLD SKEET TRAP RANGE

location		X15SB064		X15SB065		X15SB066		X15SB067		X15SB068		X15SB069		X15SB070		X15SB070		X15S
nsample		**X15SS0640001**		**X15SS0650001**		**X15SS0660001**		**X15SS0670001**		**X15SS0680001**		**X15SS0690001**		**X15SB0700102**		**X15SS0700001**		**X15SS(**
sample_dat		20090602		20090602		20090602		20090602		20090602		20090602		20090602		20090602		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		OF
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		1		0		(
bottom_dep		1		1		1		1		1		1		2		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SB		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27	**4.8**	**J**			0.16	J			0.26	J					**1.9**	**J**	**0.39**
ARSENIC	0.39	**5.8**				**3.8**				**2.3**						**3.2**		**3.5**
COPPER	100	22.2	L			11.5	L			37.6	L					8.8	L	9.4
LEAD	11	**940**				**33.3**				**423**						**754**		**282**
TIN	0.89	2.4	B			1.4	B			2.8	B					1.3	B	1.7
ZINC	46	33				41.6				**53.3**						38.5		33.1
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000																	
2-METHYLNAPHTHALENE	31000																	
ACENAPHTHENE	29000																	
ACENAPHTHYLENE	29000																	
ANTHRACENE	29000																	
BENZO(A)ANTHRACENE	150																	
BENZO(A)PYRENE	15																	
BENZO(B)FLUORANTHENE	150																	
BENZO(G,H,I)PERYLENE	1100																	
BENZO(K)FLUORANTHENE	1100																	
CHRYSENE	1100																	
DIBENZO(A,H)ANTHRACENE	15																	
FLUORANTHENE	29000																	
FLUORENE	29000																	
INDENO(1,2,3-CD)PYRENE	150																	
NAPHTHALENE	330																	
PHENANTHRENE	29000																	
PYRENE	1100																	
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11	**1236**		**70.333**		**118.333**		**87**		**192.333**		**75.667**		**52.333**		**810**		**379.333**
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA	83				81				86						83		87
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA																	

UXO 15 Soil Appendix
OLD SKEET TRAP RANGE

location		B071		X15SB071		X15SB071		X15SB072		X15SB073		X15SB074		X15SB075		X15SB076		X15SB077C	
nsample		**710001**		**X15SS0710001-AVG**		**X15SS0710001-D**		**X15SS0720001**		**X15SS0730001**		**X15SS0740001**		**X15SS0750001**		**X15SS0760001**		**X15SS077C0001**	
sample_dat		0602		20090602		20090603		20090602		20090602		20090602		20090602		20090602		20090610	
qc_type		M		NM		FD		NM		NM		NM		NM		NM		NM	
sacode		IG		AVG		DUP		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O		SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1		1		1	
depth_unit		T		FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S		SS		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N		N		Y	
Inorganics (mg/kg)																			
ANTIMONY	0.27	**L**	**0.335**	**L**	**0.28**	**L**	**0.61**	**L**	**0.5**	**L**					**0.47**	**L**	**0.68**	**L**	
ARSENIC	0.39		**3.4**		**3.3**		**2.1**		**2.2**						**2.7**		**2.6**		
COPPER	100		9.5		9.6		5.4		8.2						26		23.3		
LEAD	11		**234.5**		**187**		**658**		**335**						**238**		**66.7**		
TIN	0.89	B	1.45	B	1.2	B	1.3	B	1.3	B					2.2	B	1.8	B	
ZINC	46		33.05		33		25.1		30.5						37.4		**52.5**		
PAHs (ug/kg)																			
1-METHYLNAPHTHALENE	22000																		
2-METHYLNAPHTHALENE	31000																		
ACENAPHTHENE	29000																		
ACENAPHTHYLENE	29000																		
ANTHRACENE	29000																		
BENZO(A)ANTHRACENE	150																		
BENZO(A)PYRENE	15																		
BENZO(B)FLUORANTHENE	150																		
BENZO(G,H,I)PERYLENE	1100																		
BENZO(K)FLUORANTHENE	1100																		
CHRYSENE	1100																		
DIBENZO(A,H)ANTHRACENE	15																		
FLUORANTHENE	29000																		
FLUORENE	29000																		
INDENO(1,2,3-CD)PYRENE	150																		
NAPHTHALENE	330																		
PHENANTHRENE	29000																		
PYRENE	1100																		
Explosives (mg/kg)																			
NITROGLYCERIN	6.1																3.7	J	
XRF Field Parameters (mg/kg)																			
LEAD	11		**379.333**				**340.667**		**490**		**1260.333**		**130.333**		**552.667**		**67.667**		
Miscellaneous Parameters (meq/100)																			
CATION EXCHANGE CAPACITY	NA																		
Miscellaneous Parameters (s.u.)																			
PH	NA																		
Miscellaneous Parameters (mg/kg)																			
TOTAL ORGANIC CARBON	NA																		
Miscellaneous Parameters (%)																			
TOTAL SOLIDS	NA		87		87		85		84						86		81		
Miscellaneous Organic Parameters (%)																			
TOTAL SOLIDS	NA																		

UXO 15 Soil Appendix
OLD SKEET TRAP RANGE

location		X15SB078C	
nsample		**X15SS078C0001**	
sample_dat		20090610	
qc_type		NM	
sacode		NORMAL	
matrix	**PALs**	SO	
top_depth		0	
bottom_dep		1	
depth_unit		FT	
submatrix		SS	
composite		Y	
Inorganics (mg/kg)			
ANTIMONY	0.27	**0.46**	**L**
ARSENIC	0.39	**2.7**	
COPPER	100	14.8	
LEAD	11	**77.2**	
TIN	0.89	1.7	B
ZINC	46	**54.4**	
PAHs (ug/kg)			
1-METHYLNAPHTHALENE	22000		
2-METHYLNAPHTHALENE	31000		
ACENAPHTHENE	29000		
ACENAPHTHYLENE	29000		
ANTHRACENE	29000		
BENZO(A)ANTHRACENE	150		
BENZO(A)PYRENE	15		
BENZO(B)FLUORANTHENE	150		
BENZO(G,H,I)PERYLENE	1100		
BENZO(K)FLUORANTHENE	1100		
CHRYSENE	1100		
DIBENZO(A,H)ANTHRACENE	15		
FLUORANTHENE	29000		
FLUORENE	29000		
INDENO(1,2,3-CD)PYRENE	150		
NAPHTHALENE	330		
PHENANTHRENE	29000		
PYRENE	1100		
Explosives (mg/kg)			
NITROGLYCERIN	6.1	0.49	J
XRF Field Parameters (mg/kg)			
LEAD	11	**81.333**	
Miscellaneous Parameters (meq/100)			
CATION EXCHANGE CAPACITY	NA		
Miscellaneous Parameters (s.u.)			
PH	NA		
Miscellaneous Parameters (mg/kg)			
TOTAL ORGANIC CARBON	NA		
Miscellaneous Parameters (%)			
TOTAL SOLIDS	NA	82	
Miscellaneous Organic Parameters (%)			
TOTAL SOLIDS	NA		

UXO 16 Soil Appendix
RUM POINT SKEET RANGE

location		X16SB001		X16SB002		X16SB003		X16SB004		X16SB005		X16SB006		X16SB007		X16SB008		X16S
nsample		**X16SS0010001**		**X16SS0020001**		**X16SS0030001**		**X16SS0040001**		**X16SS0050001**		**X16SS0060001**		**X16SS0070001**		**X16SS0080001**		**X16SS0**
sample_dat		20090613		20090613		20090613		20090613		20090613		20090613		20090613		20090613		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		0		0		0
bottom_dep		1		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27					**0.62**	**L**									**1**	**L**	
ARSENIC	9.7					4										5.1		
COPPER	100					6.9										10.4	K	
LEAD	400					13.5										**616**		
TIN	0.89					1.1	B									1.9	B	
ZINC	46					19.8										30.9		
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000			2.6	L											23	U	23
2-METHYLNAPHTHALENE	31000			9.3	L											23	UL	23
ACENAPHTHENE	29000			23	UL											23	UL	23
ACENAPHTHYLENE	29000			23	UL											23	U	23
ANTHRACENE	29000			32	L											23	UL	23
BENZO(A)ANTHRACENE	150			**630**												6	J	8.8
BENZO(A)PYRENE	15			**630**												7.6	J	8.7
BENZO(B)FLUORANTHENE	150			**200**	**L**											6	J	11
BENZO(G,H,I)PERYLENE	1100			260	L											4.6	J	6.2
BENZO(K)FLUORANTHENE	1100			40	L											23	U	23
CHRYSENE	1100			770												10	J	14
DIBENZO(A,H)ANTHRACENE	15			**120**	**L**											23	U	23
FLUORANTHENE	29000			79	L											8.9	L	8
FLUORENE	29000			4.2	L											23	UL	23
INDENO(1,2,3-CD)PYRENE	150			78	L											3.4	J	5.9
NAPHTHALENE	330			23	UL											23	U	23
PHENANTHRENE	29000			140	L											3.2	L	23
PYRENE	1100			620												6.1	J	9.5
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	400	19.667		16.333		17		75.667		20.333		16		75.333		**975.333**		19.667
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA															31	K	
Miscellaneous Parameters (s.u.)																		
PH	NA															4.7		
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA															38000		
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA					87										74		
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA			87												87		87

UXO 16 Soil Appendix
RUM POINT SKEET RANGE

location		B009	X16SB010		X16SB011		X16SB012		X16SB013		X16SB014		X16SB015		X16SB016		X16SB017	
nsample		**090001**	**X16SS0100001**		**X16SS0110001**		**X16SS0120001**		**X16SS0130001**		**X16SS0140001**		**X16SS0150001**		**X16SS0160001**		**X16SS0170001**	
sample_dat		0614	20090613		20090613		20090613		20090613		20090614		20090613		20090613		20090613	
qc_type		M	NM		NM		NM		NM		NM		NM		NM		NM	
sacode		MAL	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O	SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		0	0		0		0		0		0		0		0		0	
bottom_dep		1	1		1		1		1		1		1		1		1	
depth_unit		T	FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S	SS		SS		SS		SS		SS		SS		SS		SS	
composite		N	N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																		
ANTIMONY	0.27								**0.55**	**L**							**0.45**	**L**
ARSENIC	9.7								2								4.6	
COPPER	100								11.4	K							7.4	K
LEAD	400								38.8								51.4	
TIN	0.89								1.2	B							1.5	B
ZINC	46								34.9								26.2	
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000	UL							24	U	23	U						
2-METHYLNAPHTHALENE	31000	UL							24	U	23	U						
ACENAPHTHENE	29000	UL							24	U	23	U						
ACENAPHTHYLENE	29000	UL							24	U	23	U						
ANTHRACENE	29000	UL							1.8	J	7.3	J						
BENZO(A)ANTHRACENE	150	L							26		100							
BENZO(A)PYRENE	15	L							**38**		**120**							
BENZO(B)FLUORANTHENE	150	L							16	J	47							
BENZO(G,H,I)PERYLENE	1100	L							22	J	58							
BENZO(K)FLUORANTHENE	1100	UL							4.3	J	9	J						
CHRYSENE	1100	L							41		120							
DIBENZO(A,H)ANTHRACENE	15	UL							6.4	J	**20**	**J**						
FLUORANTHENE	29000	L							7.4	J	20	J						
FLUORENE	29000	UL							24	U	23	U						
INDENO(1,2,3-CD)PYRENE	150	L							8.1	J	17	J						
NAPHTHALENE	330	UL							24	U	23	U						
PHENANTHRENE	29000	UL							5.3	J	31							
PYRENE	1100	L							26		110							
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	400		47.333		43.333		184.667		28		22		24		83.667		57.667	
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA								7.9									
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA								9700									
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA								82								82	
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA								82		85							

UXO 16 Soil Appendix
RUM POINT SKEET RANGE

location		X16SB018		X16SB019		X16SB020		X16SB021		X16SB022		X16SB023		X16SB023		X16SB023		X16S
nsample		**X16SS0180001**		**X16SS0190001**		**X16SS0200001**		**X16SS0210001**		**X16SS0220001**		**X16SS0230001**		**X16SS0230001-AVG**		**X16SS0230001-D**		**X16SS(**
sample_dat		20090613		20090614		20090613		20090613		20090613		20090613		20090613		20090613		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		FD		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		ORIG		AVG		DUP		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		0		0		(
bottom_dep		1		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27					0.22	L											
ARSENIC	9.7					1.9	B											
COPPER	100					5.5												
LEAD	400					51.9												
TIN	0.89					1	B											
ZINC	46					22												
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000			22	U							28	U	25.5	U	23	U	
2-METHYLNAPHTHALENE	31000			22	U							28	UL	25.5	UL	23	UL	
ACENAPHTHENE	29000			22	U							28	UL	25.5	UL	23	UL	
ACENAPHTHYLENE	29000			22	U							28	U	25.5	U	23	U	
ANTHRACENE	29000			10	J							12	L	12	L	23	UL	
BENZO(A)ANTHRACENE	150			**170**								**210**	**J**	107.65	J	5.3	J	
BENZO(A)PYRENE	15			**220**								**240**	**J**	**123.8**	**J**	7.6	J	
BENZO(B)FLUORANTHENE	150			79								89	J	46.4	J	3.8	J	
BENZO(G,H,I)PERYLENE	1100			110								130	J	67.15	J	4.3	J	
BENZO(K)FLUORANTHENE	1100			13	J							13	J	13	J	23	U	
CHRYSENE	1100			210								240	J	124.4	J	8.8	J	
DIBENZO(A,H)ANTHRACENE	15			**42**								**41**	**J**	**26.25**	**J**	23	UJ	
FLUORANTHENE	29000			24								32	L	17.25	L	2.5	L	
FLUORENE	29000			22	U							28	UL	25.5	UL	23	UL	
INDENO(1,2,3-CD)PYRENE	150			28								36		19.25	J	2.5	J	
NAPHTHALENE	330			22	U							28	U	25.5	U	23	U	
PHENANTHRENE	29000			37								40	L	25.75	L	23	UL	
PYRENE	1100			150								160	J	82.3	J	4.6	J	
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	400	24.333		22		58		106		25		27.333		27.333				23
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA					87												
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA			89								72		80		88		

UXO 16 Soil Appendix
RUM POINT SKEET RANGE

location		B024		X16SB025		X16SB026		X16SB027		X16SB028		X16SB029		X16SB030		X16SB031		X16SB032	
nsample		**240001**		**X16SS0250001**		**X16SS0260001**		**X16SS0270001**		**X16SS0280001**		**X16SS0290001**		**X16SS0300001**		**X16SS0310001**		**X16SS0320001**	
sample_dat		0613		20090613		20090613		20090613		20090613		20090613		20090613		20090613		20090613	
qc_type		M		NM		NM		NM		NM		NM		NM		NM		NM	
sacode		MAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		ORIG	
matrix	**PALs**	O		SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1		1		1	
depth_unit		T		FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S		SS		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																			
ANTIMONY	0.27			0.73	B													0.14	B
ARSENIC	9.7			4	J													4	
COPPER	100			8.8	J													9.7	
LEAD	400			159	J													13.9	
TIN	0.89			1.2	B													1.2	B
ZINC	46			29.4	J													31.2	
PAHs (ug/kg)																			
1-METHYLNAPHTHALENE	22000					24	U									24	UL		
2-METHYLNAPHTHALENE	31000					24	UL									6.4	L		
ACENAPHTHENE	29000					24	UL									24	UL		
ACENAPHTHYLENE	29000					24	U									24	L		
ANTHRACENE	29000					5.5	L									19	L		
BENZO(A)ANTHRACENE	150					81										**300**	**L**		
BENZO(A)PYRENE	15					**110**										**420**			
BENZO(B)FLUORANTHENE	150					41										120	L		
BENZO(G,H,I)PERYLENE	1100					58										170	L		
BENZO(K)FLUORANTHENE	1100					6.6	J									20	L		
CHRYSENE	1100					110										390			
DIBENZO(A,H)ANTHRACENE	15					**21**	**J**									**58**	**L**		
FLUORANTHENE	29000					17	L									48	L		
FLUORENE	29000					24	UL									24	UL		
INDENO(1,2,3-CD)PYRENE	150					18	J									43	L		
NAPHTHALENE	330					24	U									24	UL		
PHENANTHRENE	29000					21	L									89	L		
PYRENE	1100					71										280	L		
Explosives (mg/kg)																			
NITROGLYCERIN	6.1																		
XRF Field Parameters (mg/kg)																			
LEAD	400			155.667		20.667		22		14		126		24		214.333		26.667	
Miscellaneous Parameters (meq/100)																			
CATION EXCHANGE CAPACITY	NA																		
Miscellaneous Parameters (s.u.)																			
PH	NA																		
Miscellaneous Parameters (mg/kg)																			
TOTAL ORGANIC CARBON	NA																		
Miscellaneous Parameters (%)																			
TOTAL SOLIDS	NA			85														87	
Miscellaneous Organic Parameters (%)																			
TOTAL SOLIDS	NA					83										83			

UXO 16 Soil Appendix
RUM POINT SKEET RANGE

location		X16SB032		X16SB032		X16SB033		X16SB034		X16SB035		X16SB036		X16SB037		X16SB037		X16S
nsample		**X16SS0320001-AVG**		**X16SS0320001-D**		**X16SS0330001**		**X16SS0340001**		**X16SS0350001**		**X16SS0360001**		**X16SS0370001**		**X16SS0370001-AVG**		**X16SS03**
sample_dat		20090613		20090613		20090613		20090613		20090613		20090613		20090613		20090613		2009
qc_type		NM		FD		NM		NM		NM		NM		NM		NM		F
sacode		AVG		DUP		NORMAL		NORMAL		NORMAL		NORMAL		ORIG		AVG		DU
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		0		0		(
bottom_dep		1		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27	0.14	B	0.14	B													
ARSENIC	9.7	3.65		3.3														
COPPER	100	8.85		8														
LEAD	400	13.45		13														
TIN	0.89	1.25	B	1.3	B													
ZINC	46	28.8		26.4														
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000													22	U	22.5	U	23
2-METHYLNAPHTHALENE	31000													22	UL	22.5	UL	23
ACENAPHTHENE	29000													22	UL	22.5	UL	23
ACENAPHTHYLENE	29000													22	U	22.5	UL	23
ANTHRACENE	29000													22	UL	22.5	UL	23
BENZO(A)ANTHRACENE	150													22	U	22.5	U	23
BENZO(A)PYRENE	15													22	U	22.5	U	23
BENZO(B)FLUORANTHENE	150													22	U	22.5	U	23
BENZO(G,H,I)PERYLENE	1100													22	U	22.5	U	23
BENZO(K)FLUORANTHENE	1100													22	U	22.5	U	23
CHRYSENE	1100													22	U	3.3	J	3.3
DIBENZO(A,H)ANTHRACENE	15													22	U	22.5	U	23
FLUORANTHENE	29000													22	UL	22.5	UL	23
FLUORENE	29000													22	UL	22.5	UL	23
INDENO(1,2,3-CD)PYRENE	150													22	U	2.7	J	2.7
NAPHTHALENE	330													22	U	22.5	UL	23
PHENANTHRENE	29000													22	UL	22.5	UL	23
PYRENE	1100													22	U	22.5	U	23
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	400	26.667				11.667		18.667		14.333		41.333		70.667		70.667		
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA	86.5		86														
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA													89		87.5		86

UXO 16 Soil Appendix
RUM POINT SKEET RANGE

location		B037	X16SB038		X16SB039		X16SB040		X16SB041		X16SB042		X16SB043		X16SB044		X16SB045	
nsample		**70001-D**	**X16SS0380001**		**X16SS0390001**		**X16SS0400001**		**X16SS0410001**		**X16SS0420001**		**X16SS0430001**		**X16SS0440001**		**X16SS0450001**	
sample_dat		0613	20090613		20090613		20090613		20090613		20090613		20090613		20090613		20090613	
qc_type		D	NM		NM		NM		NM		NM		NM		NM		NM	
sacode		JP	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O	SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		0	0		0		0		0		0		0		0		0	
bottom_dep		1	1		1		1		1		1		1		1		1	
depth_unit		FT	FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S	SS		SS		SS		SS		SS		SS		SS		SS	
composite		N	N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																		
ANTIMONY	0.27										0.11	B						
ARSENIC	9.7										1.7							
COPPER	100										3.9	K						
LEAD	400										12.1							
TIN	0.89										1	B						
ZINC	46										16.6							
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000	U					24	UL			26	U						
2-METHYLNAPHTHALENE	31000	UL					24	UL			26	U						
ACENAPHTHENE	29000	UL					24	UL			26	U						
ACENAPHTHYLENE	29000	UL					24	UL			26	U						
ANTHRACENE	29000	U					1.6	L			26	U						
BENZO(A)ANTHRACENE	150	U					24	L			3.9	J						
BENZO(A)PYRENE	15	U					**29**	**L**			5.8	J						
BENZO(B)FLUORANTHENE	150	U					14	L			26	U						
BENZO(G,H,I)PERYLENE	1100	U					18	L			3.4	J						
BENZO(K)FLUORANTHENE	1100	U					24	UL			26	U						
CHRYSENE	1100	J					30	L			7.7	J						
DIBENZO(A,H)ANTHRACENE	15	U					6.1	L			26	U						
FLUORANTHENE	29000	U					8.1	L			26	U						
FLUORENE	29000	UL					24	UL			26	U						
INDENO(1,2,3-CD)PYRENE	150	J					6.9	L			26	U						
NAPHTHALENE	330	UL					24	UL			26	U						
PHENANTHRENE	29000	UL					6.5	L			26	U						
PYRENE	1100	U					24	L			4.6	J						
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	400		26.333		20.667		50.333		33.667		67.667		38.667		32		27	
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA										7.9							
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA										13000							
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA										64							
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA						82				78							

UXO 16 Soil Appendix
RUM POINT SKEET RANGE

location		X16SB046		X16SB047		X16SB048		X16SB049		X16SB050		X16SB051		X16SB052		X16SB053		X16S
nsample		**X16SS0460001**		**X16SS0470001**		**X16SS0480001**		**X16SS0490001**		**X16SS0500001**		**X16SS0510001**		**X16SS0520001**		**X16SS0530001**		**X16SS(**
sample_dat		20090613		20090613		20090613		20090613		20090613		20090613		20090614		20090614		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		0		0		(
bottom_dep		1		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27																	**0.32**
ARSENIC	9.7																	2.4
COPPER	100																	5.3
LEAD	400																	35
TIN	0.89																	1.1
ZINC	46																	27
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000	24	U									24	U					
2-METHYLNAPHTHALENE	31000	24	U									24	U					
ACENAPHTHENE	29000	24	U									24	U					
ACENAPHTHYLENE	29000	24	U									24	U					
ANTHRACENE	29000	24	U									18	J					
BENZO(A)ANTHRACENE	150	2.6	J									**240**						
BENZO(A)PYRENE	15	24	U									**240**						
BENZO(B)FLUORANTHENE	150	3	J									98						
BENZO(G,H,I)PERYLENE	1100	24	U									82						
BENZO(K)FLUORANTHENE	1100	24	U									21	J					
CHRYSENE	1100	4.3	J									300						
DIBENZO(A,H)ANTHRACENE	15	24	U									**37**						
FLUORANTHENE	29000	5	J									40						
FLUORENE	29000	24	U									24	U					
INDENO(1,2,3-CD)PYRENE	150	3.1	J									26						
NAPHTHALENE	330	24	U									24	U					
PHENANTHRENE	29000	24	U									67						
PYRENE	1100	3.1	J									200						
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	400	22.333		32.333		94.667		64		37		22		31		36.667		195
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA																	86
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA	82										84						

UXO 16 Soil Appendix
RUM POINT SKEET RANGE

location		B054		X16SB055		X16SB056		X16SB057		X16SB058		X16SB059		X16SB060		X16SB061		X16SB062	
nsample		**540001**		**X16SS0550001**		**X16SS0560001**		**X16SS0570001**		**X16SS0580001**		**X16SS0590001**		**X16SS0600001**		**X16SS0610001**		**X16SS0620001**	
sample_dat		0614		20090614		20090614		20090614		20090614		20090614		20090614		20090614		20090614	
qc_type		M		NM		NM		NM		NM		NM		NM		NM		NM	
sacode		MAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O		SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1		1		1	
depth_unit		T		FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S		SS		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																			
ANTIMONY	0.27	**L**						0.14	B							0.2	L		
ARSENIC	9.7							2.1								6.5			
COPPER	100	K						4.5	K							6.5	K		
LEAD	400							22.3								23.5			
TIN	0.89	B						1.3	B							1.8	B		
ZINC	46							21.1								24.2			
PAHs (ug/kg)																			
1-METHYLNAPHTHALENE	22000					5.3	J	26	U									6.3	J
2-METHYLNAPHTHALENE	31000					25		26	U									22	J
ACENAPHTHENE	29000					3.6	J	26	U									4.4	J
ACENAPHTHYLENE	29000					24	U	26	U									24	U
ANTHRACENE	29000					75		26	U									68	
BENZO(A)ANTHRACENE	150					**1700**		2.6	J									**1500**	
BENZO(A)PYRENE	15					**1900**		26	U									**1400**	
BENZO(B)FLUORANTHENE	150					**660**		26	U									**550**	
BENZO(G,H,I)PERYLENE	1100					830		26	U									550	
BENZO(K)FLUORANTHENE	1100					120		26	U									60	
CHRYSENE	1100					**2200**		5.6	J									**1800**	
DIBENZO(A,H)ANTHRACENE	15					**240**		26	U									**200**	
FLUORANTHENE	29000					180		4.8	J									160	
FLUORENE	29000					9.4	J	26	U									11	J
INDENO(1,2,3-CD)PYRENE	150					**220**		3	J									140	
NAPHTHALENE	330					24	U	26	U									3.1	J
PHENANTHRENE	29000					300		26	U									400	
PYRENE	1100					**1400**		3.9	J									**1300**	
Explosives (mg/kg)																			
NITROGLYCERIN	6.1																		
XRF Field Parameters (mg/kg)																			
LEAD	400			48.333		49.667		25.667		43		30.667		23		150		22.333	
Miscellaneous Parameters (meq/100)																			
CATION EXCHANGE CAPACITY	NA																		
Miscellaneous Parameters (s.u.)																			
PH	NA																		
Miscellaneous Parameters (mg/kg)																			
TOTAL ORGANIC CARBON	NA																		
Miscellaneous Parameters (%)																			
TOTAL SOLIDS	NA							76								74			
Miscellaneous Organic Parameters (%)																			
TOTAL SOLIDS	NA					82		78										84	

UXO 16 Soil Appendix
RUM POINT SKEET RANGE

location		X16SB063		X16SB064		X16SB065		X16SB066		X16SB067		X16SB069		X16SB070		X16SB071		X16S
nsample		**X16SS0630001**		**X16SS0640001**		**X16SS0650001**		**X16SS0660001**		**X16SS0670001**		**X16SS0690001**		**X16SS0700001**		**X16SS0710001**		**X16SS(**
sample_dat		20090614		20090614		20090614		20090614		20090614		20090614		20090614		20090614		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		0		0		(
bottom_dep		1		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27																	
ARSENIC	9.7																	
COPPER	100																	
LEAD	400																	
TIN	0.89																	
ZINC	46																	
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000															2.4	J	
2-METHYLNAPHTHALENE	31000															10	J	
ACENAPHTHENE	29000															23	U	
ACENAPHTHYLENE	29000															23	U	
ANTHRACENE	29000															17	J	
BENZO(A)ANTHRACENE	150															**420**		
BENZO(A)PYRENE	15															**480**		
BENZO(B)FLUORANTHENE	150															**170**		
BENZO(G,H,I)PERYLENE	1100															190		
BENZO(K)FLUORANTHENE	1100															32		
CHRYSENE	1100															570		
DIBENZO(A,H)ANTHRACENE	15															**59**		
FLUORANTHENE	29000															46		
FLUORENE	29000															23	U	
INDENO(1,2,3-CD)PYRENE	150															48		
NAPHTHALENE	330															23	U	
PHENANTHRENE	29000															86		
PYRENE	1100															380		
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	400	19.667		18.333		82.667		31.333		60.667		78		28.333		24.333		18
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA																	
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA															86		

UXO 16 Soil Appendix
RUM POINT SKEET RANGE

location		B072	X16SB073		X16SB074		X16SB075		X16SB076		X16SB077		X16SB078		X16SB079		X16SB080C	
nsample		**720001**	**X16SS0730001**		**X16SS0740001**		**X16SS0750001**		**X16SS0760001**		**X16SS0770001**		**X16SS0780001**		**X16SS0790001**		**X16SS080C0001**	
sample_dat		0614	20090614		20090614		20090614		20090614		20090614		20090614		20090614		20090614	
qc_type		M	NM		NM		NM		NM		NM		NM		NM		NM	
sacode		MAL	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O	SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		0	0		0		0		0		0		0		0		0	
bottom_dep		1	1		1		1		1		1		1		1		1	
depth_unit		T	FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S	SS		SS		SS		SS		SS		SS		SS		SS	
composite		N	N		N		N		N		N		N		N		Y	
Inorganics (mg/kg)																		
ANTIMONY	0.27		**0.92**	**L**											**1.2**	**L**	0.14	L
ARSENIC	9.7		3.1												6.1		3	
COPPER	100		4.7	K											10.6	K	4.8	
LEAD	400		40.1												267		9.1	
TIN	0.89		1.3	B											1.3	B	1.2	B
ZINC	46		22.6												31.6		18.7	
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000		4.8	J					16	L			23	UL			23	U
2-METHYLNAPHTHALENE	31000		17	J					68	L			23	UL			3.5	J
ACENAPHTHENE	29000		2.4	J					7.7	L			23	UL			23	U
ACENAPHTHYLENE	29000		23	U					23	UL			23	UL			23	U
ANTHRACENE	29000		38						110	L			5.2	L			4.1	J
BENZO(A)ANTHRACENE	150		**690**	**L**					**2400**				100	L			78	
BENZO(A)PYRENE	15		**820**	**L**					**3200**				**120**	**L**			**91**	
BENZO(B)FLUORANTHENE	150		**220**						**1000**				52	L			33	
BENZO(G,H,I)PERYLENE	1100		300						**1500**				65	L			41	
BENZO(K)FLUORANTHENE	1100		40						200	L			10	L			5.8	J
CHRYSENE	1100		870	L					**3000**				130	L			97	
DIBENZO(A,H)ANTHRACENE	15		**110**						**540**				**22**	**L**			12	J
FLUORANTHENE	29000		85						210	L			23	L			9.8	J
FLUORENE	29000		6.2	J					21	J			23	UL			23	U
INDENO(1,2,3-CD)PYRENE	150		78						**260**	**L**			24	L			9.1	J
NAPHTHALENE	330		23	U					7.2	L			23	UL			23	U
PHENANTHRENE	29000		160						620				22	L			21	J
PYRENE	1100		620	L					**2000**				93	L			92	
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																1.2	UJ
XRF Field Parameters (mg/kg)																		
LEAD	400		42.667		58.667		23.667		28.667		15		16.667		266.667		21	
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA		15	K														
Miscellaneous Parameters (s.u.)																		
PH	NA		6.4															
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA		9400															
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA		89												74		88	
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA		87						87				87				88	

UXO 16 Soil Appendix
RUM POINT SKEET RANGE

location		X16SB081C		X16SB082		X16SB083		X16SB084		X16SB085		X16SB086		X16SB087		X16SB088		X16S
nsample		**X16SS081C0001**		**X16SS0820001**		**X16SS0830001**		**X16SS0840001**		**X16SS0850001**		**X16SS0860001**		**X16SS0870001**		**X16SS0880001**		**X16SS(**
sample_dat		20090614		20090616		20090616		20090616		20090616		20090616		20090616		20090617		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		0		0		(
bottom_dep		1		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SS		SS		S
composite		Y		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27	**0.42**	**L**											**0.69**	**L**			
ARSENIC	9.7	4.2												3.8				
COPPER	100	9.6												5.5	K			
LEAD	400	48.7												90.2				
TIN	0.89	1.1	B											1.2	B			
ZINC	46	29												21.8				
PAHs (ug/kg)																		
1-METHYLNAPHTHALENE	22000	23	U															
2-METHYLNAPHTHALENE	31000	23	U															
ACENAPHTHENE	29000	23	U															
ACENAPHTHYLENE	29000	23	U															
ANTHRACENE	29000	5.6	J															
BENZO(A)ANTHRACENE	150	94																
BENZO(A)PYRENE	15	**100**																
BENZO(B)FLUORANTHENE	150	38																
BENZO(G,H,I)PERYLENE	1100	50																
BENZO(K)FLUORANTHENE	1100	7.7	J															
CHRYSENE	1100	130																
DIBENZO(A,H)ANTHRACENE	15	**18**	**J**															
FLUORANTHENE	29000	13	J															
FLUORENE	29000	23	U															
INDENO(1,2,3-CD)PYRENE	150	10	J															
NAPHTHALENE	330	23	U															
PHENANTHRENE	29000	24																
PYRENE	1100	110																
Explosives (mg/kg)																		
NITROGLYCERIN	6.1	1.2	UJ															
XRF Field Parameters (mg/kg)																		
LEAD	400	73.333		135.333		**407**		**409**		159.333		87.333		375		79		123.333
Miscellaneous Parameters (meq/100)																		
CATION EXCHANGE CAPACITY	NA																	
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA	89												79				
Miscellaneous Organic Parameters (%)																		
TOTAL SOLIDS	NA	88																

UXO 16 Soil Appendix
RUM POINT SKEET RANGE

location		B089		X16SB090		X16SB090		X16SB090		X16SB091		X16SB092		X16SB093		X16SB094		X16SB095	
nsample		**890001**		**X16SS0900001**		**X16SS0900001-AVG**		**X16SS0900001-D**		**X16SS0910001**		**X16SS0920001**		**X16SS0930001**		**X16SS0940001**		**X16SS0950001**	
sample_dat		0617		20090617		20090617		20090617		20090617		20090617		20090617		20090617		20090617	
qc_type		M		NM		NM		FD		NM		NM		NM		NM		NM	
sacode		MAL		ORIG		AVG		DUP		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O		SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1		1		1	
depth_unit		T		FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S		SS		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																			
ANTIMONY	0.27			0.23	L	**0.915**	**J**	**1.6**	**J**	0.03	B	**1**	**L**	0.06	B	0.09	B	0.08	B
ARSENIC	9.7			3.5		2.95		2.4		0.16	U	2.4		1.1		1.5		1.9	
COPPER	100			5.3	K	5.15	K	5		5.7	K	5.7	K	3.3	K	2.4	K	3	K
LEAD	400			38.8		188.4	J	338	J	12.6		143		14.7		6.7		19.2	
TIN	0.89			1.1	B	1.1	B	1.1	B	1	B	1.3	B	1	B	0.75	B	0.92	B
ZINC	46			16.6		19.5		22.4		15.3		29.3		13.8		9.5		16.4	
PAHs (ug/kg)																			
1-METHYLNAPHTHALENE	22000																		
2-METHYLNAPHTHALENE	31000																		
ACENAPHTHENE	29000																		
ACENAPHTHYLENE	29000																		
ANTHRACENE	29000																		
BENZO(A)ANTHRACENE	150																		
BENZO(A)PYRENE	15																		
BENZO(B)FLUORANTHENE	150																		
BENZO(G,H,I)PERYLENE	1100																		
BENZO(K)FLUORANTHENE	1100																		
CHRYSENE	1100																		
DIBENZO(A,H)ANTHRACENE	15																		
FLUORANTHENE	29000																		
FLUORENE	29000																		
INDENO(1,2,3-CD)PYRENE	150																		
NAPHTHALENE	330																		
PHENANTHRENE	29000																		
PYRENE	1100																		
Explosives (mg/kg)																			
NITROGLYCERIN	6.1																		
XRF Field Parameters (mg/kg)																			
LEAD	400			260.667		260.667				20		17.333		16		12.667		25.667	
Miscellaneous Parameters (meq/100)																			
CATION EXCHANGE CAPACITY	NA																		
Miscellaneous Parameters (s.u.)																			
PH	NA																		
Miscellaneous Parameters (mg/kg)																			
TOTAL ORGANIC CARBON	NA																		
Miscellaneous Parameters (%)																			
TOTAL SOLIDS	NA			84		83.5		83		83		79		88		92		83	
Miscellaneous Organic Parameters (%)																			
TOTAL SOLIDS	NA																		

UXO 17 Soil Appendix
SMALL ARMS RANGE (PISTOL)

location		X17SB008C		X17SB009C		X17SB010C	
nsample		**X17SS008C0001**		**X17SS009C0001**		**X17SS010C0001**	
sample_dat		20090611		20090611		20090611	
qc_type		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO	
top_depth		0		0		0	
bottom_dep		1		1		1	
depth_unit		FT		FT		FT	
submatrix		SS		SS		SS	
composite		Y		Y		Y	
Inorganics (mg/kg)							
ANTIMONY	0.27	**0.39**	**L**	**0.43**	**L**	**1.3**	**L**
ARSENIC	0.39	**5**		**4.4**		**6.2**	
COPPER	100	12		11.2		24	
LEAD	11	**21**		**38.7**		**200**	
TIN	0.89	0.92	B	1.4	B	1.3	B
ZINC	46	23.1		19		35.2	
Explosives (mg/kg)							
NITROGLYCERIN	6.1	**20.4**		**9.8**		**13**	
XRF Field Parameters (mg/kg)							
LEAD	11	**96.333**		**73.333**		**156.333**	
Miscellaneous Parameters (s.u.)							
PH	NA						
Miscellaneous Parameters (mg/kg)							
TOTAL ORGANIC CARBON	NA						
Miscellaneous Parameters (%)							
TOTAL SOLIDS	NA	91		91		91	

UXO 17 Soil Appendix
SMALL ARMS RANGE (PISTOL)

location		X17SB018		X17SB019		X17SB020		X17SB021		X17SB022		X17SB022		X17SB022		X17SB023		X17S
nsample		**X17SS0180001**		**X17SS0190001**		**X17SS0200001**		**X17SS0210001**		**X17SS0220001**		**X17SS0220001-AVG**		**X17SS0220001-D**		**X17SS0230001**		**X17SS0**
sample_dat		20090611		20090611		20090611		20090611		20090611		20090611		20090611		20090611		2009
qc_type		NM		NM		NM		NM		NM		NM		FD		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		ORIG		AVG		DUP		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		0		0		0
bottom_dep		1		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27			0.26	L					0.13	B	0.13	B	0.13	B			0.15
ARSENIC	0.39			**8.5**						**3.5**		**3.55**		**3.6**				**3.9**
COPPER	100			12						8.2		8.1	K	8	K			7.2
LEAD	11			**39.4**						7	B	5.35		7.2				10.3
TIN	0.89			0.56	B					1	B	1	B	1	B			1.2
ZINC	46			24						13.7		13.75		13.8				14.8
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11	7		**36**		**39**		**31.333**		**26**		**26**				0	U	**11.333**
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA			85						87		87		87				87

UXO 17 Soil Appendix
SMALL ARMS RANGE (PISTOL)

location		B024
nsample		**)240001**
sample_dat		0611
qc_type		M
sacode		MAL
matrix	**PALs**	O
top_depth		)
bottom_dep		L
depth_unit		T
submatrix		S
composite		N
Inorganics (mg/kg)		
ANTIMONY	0.27	B
ARSENIC	0.39	
COPPER	100	
LEAD	11	B
TIN	0.89	B
ZINC	46	
Explosives (mg/kg)		
NITROGLYCERIN	6.1	
XRF Field Parameters (mg/kg)		
LEAD	11	
Miscellaneous Parameters (s.u.)		
PH	NA	
Miscellaneous Parameters (mg/kg)		
TOTAL ORGANIC CARBON	NA	
Miscellaneous Parameters (%)		
TOTAL SOLIDS	NA	

UXO 17 Soil Appendix
SMALL ARMS RANGE (PISTOL)

location		X17SB011		X17SB011		X17SB012		X17SB013		X17SB013		X17SB014		X17SB014		X17SB015		X17S
nsample		**X17SS0110001**		**X17SB0110102**		**X17SS0120001**		**X17SB0130102**		**X17SS0130001**		**X17SS0140001**		**X17SB0140102**		**X17SS0150001**		**X17SS0**
sample_dat		20090611		20090614		20090611		20090614		20090614		20090611		20090614		20090611		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		1		0		1		0		0		1		0		(
bottom_dep		1		2		1		2		1		1		2		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SB		SS		SB		SS		SS		SB		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27			**0.52**	**L**			**0.42**	**L**			**6**	**L**	0.44	B			0.19
ARSENIC	0.39			**5.1**				**3.7**				**8.7**		**5.5**				**5.1**
COPPER	100			10.7				8.6				36.3		11.8				9.6
LEAD	11			**82.1**				**39.2**				**706**		**77.6**				12.2
TIN	0.89			1.2	B			0.86	B			1.5	B	**1.5**				1.3
ZINC	46			21.8				13.2				23.5		25.4				19.5
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11	**405**		**101.667**		10		**30.667**		**3247**		**2501**		**40.667**		**18**		**13.667**
Miscellaneous Parameters (s.u.)																		
PH	NA									7.3								
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA									10000								
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA			90				93		84		92		90				84

UXO 17 Soil Appendix
SMALL ARMS RANGE (PISTOL)

location		B016			X17SB017		X17SB025		X17SB025		X17SB026		X17SB027		X17SB028		X17SB029	
nsample		**)160001**			**X17SS0170001**		**X17SS0250001**		**X17SB0250102**		**X17SS0260001**		**X17SS0270001**		**X17SS0280001**		**X17SS0290001**	
sample_dat		0611			20090611		20090612		20090614		20090612		20090612		20090612		20090614	
qc_type		M			NM		NM		NM		NM		NM		NM		NM	
sacode		MAL			NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O			SO		SO		SO		SO		SO		SO		SO	
top_depth		)			0		0		1		0		0		0		0	
bottom_dep		L			1		1		2		1		1		1		1	
depth_unit		T			FT		FT		FT		FT		FT		FT		FT	
submatrix		S			SS		SS		SB		SS		SS		SS		SS	
composite		N			N		N		N		N		N		N		N	
Inorganics (mg/kg)																		
ANTIMONY	0.27	B					3.3	B	0.55	B			**2.1**	**L**	**0.5**	**L**		
ARSENIC	0.39						**5.1**		**4.6**				**3.6**		**4**			
COPPER	100						26		10.9				5.6	K	8.1	K		
LEAD	11	B					**479**		**87.5**				**645**		**38.9**			
TIN	0.89	B					0.96	B	1.2	B			0.58	B	1.1	B		
ZINC	46						20		24				10		13.5			
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11		9.667				**731.667**		**126.667**		**95.333**		**128.667**		**39**		**256**	
Miscellaneous Parameters (s.u.)																		
PH	NA														7.8			
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA														3100			
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA						92		91				92		93			

UXO 17 Soil Appendix
SMALL ARMS RANGE (PISTOL)

location		X17SB001		X17SB001		X17SB001		X17SB001		X17SB002		X17SB002		X17SB002		X17SB002		X17S
nsample		**X17SB0010004**		**X17SB0010408**		**X17SB0010810**		**X17SS0010001**		**X17SB0020004**		**X17SB0020406**		**X17SB0020608**		**X17SB0020810**		**X17SB0**
sample_dat		20090611		20090611		20090611		20090611		20090611		20090611		20090611		20090611		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		4		8		0		0		4		6		8		(
bottom_dep		4		8		10		1		4		6		8		10		4
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SB		SB		SB		SS		SB		SB		SB		SB		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27	0.15	L									0.22	L					
ARSENIC	0.39	**4.6**										**7.8**						
COPPER	100	6										8.2						
LEAD	11	9.1										8.1						
TIN	0.89	1.1	B									0.92	B					
ZINC	46	15.6										24.1						
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11	4.333		**12.333**		0	U			3.667		**85.333**		0	U	**12.667**		**16.333**
Miscellaneous Parameters (s.u.)																		
PH	NA							7.3										
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA							660										
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA	92						91				88						

UXO 17 Soil Appendix
SMALL ARMS RANGE (PISTOL)

location		B003		X17SB003		X17SB003		X17SB003		X17SB004		X17SB004		X17SB004		X17SB004		X17SB005	
nsample		**)030004**		**X17SB0030406**		**X17SB0030608**		**X17SB0030810**		**X17SB0040004**		**X17SB0040406**		**X17SB0040608**		**X17SB0040810**		**X17SB0050004**	
sample_dat		0611		20090611		20090611		20090611		20090611		20090611		20090611		20090611		20090611	
qc_type		M		NM		NM		NM		NM		NM		NM		NM		NM	
sacode		MAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O		SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		)		4		6		8		0		4		6		8		0	
bottom_dep		4		6		8		10		4		6		8		10		4	
depth_unit		T		FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		B		SB		SB		SB		SB		SB		SB		SB		SB	
composite		N		N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																			
ANTIMONY	0.27					**0.3**	**L**			**2.2**	**L**			0.13	B			**1.7**	**L**
ARSENIC	0.39					**5.7**				**7**				**4.2**				**5.9**	
COPPER	100					8				37.1				5.3				42	K
LEAD	11					**68.2**				**589**				8.9				**620**	
TIN	0.89					1	B			1.2	B			0.76	B			1.6	B
ZINC	46					17.9				33.2				14.8				23.8	
Explosives (mg/kg)																			
NITROGLYCERIN	6.1																		
XRF Field Parameters (mg/kg)																			
LEAD	11		**85.333**			**126.333**		7.667		**2171**		**371.333**		0	U	**156**		**942.333**	
Miscellaneous Parameters (s.u.)																			
PH	NA																		
Miscellaneous Parameters (mg/kg)																			
TOTAL ORGANIC CARBON	NA																		
Miscellaneous Parameters (%)																			
TOTAL SOLIDS	NA					90				91				91				87	

UXO 17 Soil Appendix
SMALL ARMS RANGE (PISTOL)

location		X17SB005		X17SB005		X17SB005		X17SB006		X17SB006		X17SB006		X17SB006		X17SB007		X17S
nsample		**X17SB0050406**		**X17SB0050608**		**X17SB0050810**		**X17SB0060004**		**X17SB0060406**		**X17SB0060608**		**X17SB0060810**		**X17SB0070004**		**X17SB(**
sample_dat		20090611		20090611		20090611		20090611		20090611		20090611		20090611		20090611		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		4		6		8		0		4		6		8		0		4
bottom_dep		6		8		10		4		6		8		10		4		6
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SB		SB		SB		SB		SB		SB		SB		SB		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27					**0.3**	**L**			**1**	**L**					0.19	L	
ARSENIC	0.39					2.3	B			2.4	B					**4.8**		
COPPER	100					7.8				10						8.3		
LEAD	11					**32.4**				**132**						8.2		
TIN	0.89					0.99	B			1	B					1.3	B	
ZINC	46					14				13.1						17.5		
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11	**36.667**		**349.667**		**41.333**		**230**		**191**		4.667		**55.333**		4.333		**24.333**
Miscellaneous Parameters (s.u.)																		
PH	NA																	
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA																	
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA					89				91						87		

UXO 17 Soil Appendix
SMALL ARMS RANGE (PISTOL)

location		B007	X17SB007		X17SB007	
nsample		**0070406**	**X17SB0070608**		**X17SB0070810**	
sample_dat		0611	20090611		20090611	
qc_type		M	NM		NM	
sacode		MAL	NORMAL		NORMAL	
matrix	**PALs**	O	SO		SO	
top_depth		4	6		8	
bottom_dep		6	8		10	
depth_unit		T	FT		FT	
submatrix		B	SB		SB	
composite		N	N		N	
Inorganics (mg/kg)						
ANTIMONY	0.27					
ARSENIC	0.39					
COPPER	100					
LEAD	11					
TIN	0.89					
ZINC	46					
Explosives (mg/kg)						
NITROGLYCERIN	6.1					
XRF Field Parameters (mg/kg)						
LEAD	11		0	U	6.667	
Miscellaneous Parameters (s.u.)						
PH	NA					
Miscellaneous Parameters (mg/kg)						
TOTAL ORGANIC CARBON	NA					
Miscellaneous Parameters (%)						
TOTAL SOLIDS	NA					

UXO 25 Soil Appendix
ROACH ROAD RIFLE RANGE

location		X25SB001		X25SB002		X25SB003		X25SB004		X25SB005		X25SB006		X25SB007		X25SB007		X25S
nsample		**X25SS0010001**		**X25SS0020001**		**X25SS0030001**		**X25SS0040001**		**X25SS0050001**		**X25SS0060001**		**X25SS0070001**		**X25SS0070001-AVG**		**X25SS00**
sample_dat		20090615		20090615		20090615		20090615		20090615		20090615		20090615		20090615		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		NM		F
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		ORIG		AVG		DU
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		0		0		0
bottom_dep		1		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27	0.02	B					0.15	B					0.02	B	0.09	B	0.16
ARSENIC	0.39	**4.9**						**2.8**						**2.3**	**J**	**4.05**	**J**	**5.8**
COPPER	100	13.1						7.4						10.3		10.4		10.5
LEAD	11	6.3						**19.5**						**43.5**		**39**		**34.5**
TIN	0.89	0.56	B					0.49	B					0.62	B	0.65	B	0.68
ZINC	46	36.4						30.6						27.5		30.15		32.8
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11	0	U	12.667	U	8.333		**29.667**		**22**		8.333		**32**		**32**		
Miscellaneous Parameters (s.u.)																		
PH	NA											7.6						
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA											4600						
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA	85						92				87		69		71.5		74

UXO 25 Soil Appendix
ROACH ROAD RIFLE RANGE

location		B007	X25SB008		X25SB009		X25SB010		X25SB011		X25SB012		X25SB013		X25SB014		X25SB015	
nsample		**970001-D**	**X25SS0080001**		**X25SS0090001**		**X25SS0100001**		**X25SS0110001**		**X25SS0120001**		**X25SS0130001**		**X25SS0140001**		**X25SS0150001**	
sample_dat		0615	20090615		20090615		20090615		20090615		20090615		20090615		20090615		20090615	
qc_type		D	NM		NM		NM		NM		NM		NM		NM		NM	
sacode		UP	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O	SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		0	0		0		0		0		0		0		0		0	
bottom_dep		1	1		1		1		1		1		1		1		1	
depth_unit		FT	FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S	SS		SS		SS		SS		SS		SS		SS		SS	
composite		N	N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																		
ANTIMONY	0.27	B	0.27	L			**0.48**	**J**					0.2	J				
ARSENIC	0.39	**J**	**2.4**				**8.5**						**4.4**					
COPPER	100		11				14						9.2					
LEAD	11		**91.4**				**84**	**J**					**19.8**	**J**				
TIN	0.89	B	0.51	B			1.4	B					1.2	B				
ZINC	46		26.6				33.4						36.3					
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11		**94.667**		**12.333**		**158.667**		**41**		**21.667**		**12.333**		11		**36.333**	
Miscellaneous Parameters (s.u.)																		
PH	NA												7.4					
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA												14000					
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA		86				81						80					

UXO 25 Soil Appendix
ROACH ROAD RIFLE RANGE

location		X25SB016		X25SB017		X25SB018		X25SB019		X25SB020		X25SB021		X25SB021		X25SB021		X25S
nsample		**X25SS0160001**		**X25SS0170001**		**X25SS0180001**		**X25SS0190001**		**X25SS0200001**		**X25SS0210001**		**X25SS0210001-AVG**		**X25SS0210001-D**		**X25SS(**
sample_dat		20090615		20090615		20090615		20090615		20090615		20090615		20090615		20090615		2009
qc_type		NM		NM		NM		NM		NM		NM		NM		FD		N
sacode		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		ORIG		AVG		DUP		NOR
matrix	**PALs**	SO		SO		SO		SO		SO		SO		SO		SO		S
top_depth		0		0		0		0		0		0		0		0		(
bottom_dep		1		1		1		1		1		1		1		1		1
depth_unit		FT		FT		FT		FT		FT		FT		FT		FT		F
submatrix		SS		SS		SS		SS		SS		SS		SS		SS		S
composite		N		N		N		N		N		N		N		N		N
Inorganics (mg/kg)																		
ANTIMONY	0.27	**0.4**	**L**			**2.4**	**L**	**4.4**	**L**	**12.2**	**L**	**0.3**	**L**	**0.285**	**L**	0.27	L	0.19
ARSENIC	0.39	**22.6**				**5.6**		**2.5**		**5**		**2.4**		**2.65**		**2.9**		**3.8**
COPPER	100	24.8				48.5		**130**		**370**		10.9		10.05		9.2		11
LEAD	11	**88.6**				**529**		**1060**		**3450**		**131**		**129**		**127**		**62.6**
TIN	0.89	0.52	B			0.55	B	0.43	B	0.56	B	0.5	B	0.485	B	0.47	B	0.51
ZINC	46	43.8				32.4		45.1		**63.9**		26.8		25.85		24.9		23.1
Explosives (mg/kg)																		
NITROGLYCERIN	6.1																	
XRF Field Parameters (mg/kg)																		
LEAD	11	**64.667**		78.333	U	**1676.333**		**2775**		**3877**		**177.667**		**177.667**				**60**
Miscellaneous Parameters (s.u.)																		
PH	NA							7.4										
Miscellaneous Parameters (mg/kg)																		
TOTAL ORGANIC CARBON	NA							42000										
Miscellaneous Parameters (%)																		
TOTAL SOLIDS	NA	84				82		84		80		80		82.5		85		86

UXO 25 Soil Appendix
ROACH ROAD RIFLE RANGE

location		B022		X25SB023		X25SB024		X25SB025		X25SB026		X25SB027		X25SB028		X25SB029		X25SB030	
nsample		**220001**		**X25SS0230001**		**X25SS0240001**		**X25SS0250001**		**X25SS0260001**		**X25SS0270001**		**X25SS0280001**		**X25SS0290001**		**X25SS0300001**	
sample_dat		0615		20090615		20090615		20090615		20090615		20090615		20090615		20090615		20090615	
qc_type		M		NM		NM		NM		NM		NM		NM		NM		NM	
sacode		MAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	O		SO		SO		SO		SO		SO		SO		SO		SO	
top_depth		0		0		0		0		0		0		0		0		0	
bottom_dep		1		1		1		1		1		1		1		1		1	
depth_unit		T		FT		FT		FT		FT		FT		FT		FT		FT	
submatrix		S		SS		SS		SS		SS		SS		SS		SS		SS	
composite		N		N		N		N		N		N		N		N		N	
Inorganics (mg/kg)																			
ANTIMONY	0.27	L		**1.3**	**L**	**1.7**	**L**	0.27	L					0.21	L			0.26	L
ARSENIC	0.39			**2.6**		**3.2**		**3.7**						**3.6**				**2.8**	
COPPER	100			44		50.2		11.5						9.6				11	
LEAD	11			**546**		**522**		**34.2**						**17.9**				**50.3**	
TIN	0.89	B		0.55	B	0.58	B	0.5	B					1.5	B			1.7	B
ZINC	46			37		40.6		22						25.2				28.4	
Explosives (mg/kg)																			
NITROGLYCERIN	6.1																		
XRF Field Parameters (mg/kg)																			
LEAD	11			**538.333**		**835.667**		**48**		**36.667**		**14.333**		**25.333**		**48**		**64.667**	
Miscellaneous Parameters (s.u.)																			
PH	NA																		
Miscellaneous Parameters (mg/kg)																			
TOTAL ORGANIC CARBON	NA																		
Miscellaneous Parameters (%)																			
TOTAL SOLIDS	NA			85		82		88						85				86	

UXO 25 Soil Appendix
ROACH ROAD RIFLE RANGE

location		X25SB031		X25SB032		X25SB033		X25SB034C	
nsample		**X25SS0310001**		**X25SS0320001**		**X25SS0330001**		**X25SS034C0001**	
sample_dat		20090615		20090615		20090615		20090615	
qc_type		NM		NM		NM		NM	
sacode		NORMAL		NORMAL		NORMAL		NORMAL	
matrix	**PALs**	SO		SO		SO		SO	
top_depth		0		0		0		0	
bottom_dep		1		1		1		1	
depth_unit		FT		FT		FT		FT	
submatrix		SS		SS		SS		SS	
composite		N		N		N		Y	
Inorganics (mg/kg)									
ANTIMONY	0.27	**0.53**	**L**	0.24	L	0.13	B	0.1	L
ARSENIC	0.39	2.4	B	2.1	B	1.9	B	**4.3**	
COPPER	100	13.3		13.4		9.5		8.5	
LEAD	11	**142**		**60.2**		**31.1**		9.4	
TIN	0.89	2.3	B	1.8	B	1.6	B	1.6	B
ZINC	46	30.3		30.8		35.2		30.2	
Explosives (mg/kg)									
NITROGLYCERIN	6.1							1.2	U
XRF Field Parameters (mg/kg)									
LEAD	11	**565**		**49**		**40.333**		0	U
Miscellaneous Parameters (s.u.)									
PH	NA			7.5					
Miscellaneous Parameters (mg/kg)									
TOTAL ORGANIC CARBON	NA			13000					
Miscellaneous Parameters (%)									
TOTAL SOLIDS	NA	85		87		86		90	

APPENDIX D

DATA VALIDATION AND USABILITY ASSESSMENT

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: R. BASINSKI **DATE:** SEPTEMBER 3, 2009

FROM: ANN COGNETTI **COPIES:** DV FILE

SUBJECT: ORGANIC DATA VALIDATION – PAHs, TOTAL SOLIDS
NSF INDIAN HEAD
SAMPLE DELIVERY GROUP (SDG) – CTO423-1

SAMPLES: 18/Soil

X15SS0010001	X15SS0020001	X15SS0030001
X15SS0110001	X15SS0150001	X15SS0190001
X15SS0210001	X15SS0280001	X15SS0290001
X15SS0310001	X15SS0320001	X15SS0350001
X15SS0380001	X15SS0490001	X15SS0500001
X15SS0520001	X15SS0530001	X15SS0540001

Overview

The sample set for NSF Indian Head, SDG CTO423-1, consists of eighteen (18) environmental soil samples. The samples were analyzed for Polycyclic Aromatic Hydrocarbons (PAHs). The samples were collected by Tetra Tech NUS on May 27 and 28, 2009 and analyzed by Katahdin Analytical Services under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. PAH analyses were conducted using SW846 method 8270C. Total solids was determined using ASTM Method D2216-98.

Summary

All compounds were successfully analyzed. The findings offered in this report are based upon a general review of all available data. The data review was based on data completeness, holding times, GC/MS tuning, initial / continuing calibration data, laboratory method/preparation blanks, surrogate spike recoveries, laboratory control sample / laboratory control sample duplicate (LCS / LCSD) results, matrix spike / matrix spike duplicate recoveries, detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems – None.

Minor Problems

- The continuing calibration on June 10, 2009 @ 1025 for instrument GCMS-G had a percent difference (%D) greater than the 50% quality control limit for 1-methylnapthalene and 2-methylnapthalene. The following samples were affected by this non-compliance: X15SS0020001, X15SS0030001, X15SS0190001, X15SS0280001, X15SS0320001, X15SS0350001, X15SS0540001 and X15SS0010001. All positive detections were qualified as estimated (J) and all non-detections were qualified as (UJ) in the affected samples.

- The continuing calibration on June 11, 2009 @ 1149 for instrument GCMS-G had a %D greater than the 25% quality control limit for 1-methylnapthalene. The following samples were affected: X15SS0210001, X15SS0490001, X15SS0500001, X15SS0310001, X15SS0380001, X15SS0150001, X15SS0520001 and X15SS0530001. All positive detections were qualified as estimated (J). No validation action was required for the nondetected results.

- The continuing calibration on June 15, 2009 @ 1040 for instrument GCMS-U had a %D greater than the quality control limit for fluroanthene. This non-compliance only affects sample X15SS0020001DL. The positive detection was qualified (J) due to calibration non-compliance.

- The matrix spike and/or matrix spike duplicate percent recoveries for 2-methylnaphthalene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluroanthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene were outside the laboratory control limits for sample X15SS0190001. Because some of the compounds were out of range in the matrix spike sample and in range for the matrix spike duplicate sample, the relative percent difference (%RPD) exceeded quality control limits. The sample non-homogeneity resulted in the matrix spike high/ low recoveries. Positive and nondetected results for sample X15SS0190001 were qualified as estimated (J) and (UJ) respectively.

Notes

Positive results reported below the reporting limit (RL) but above the method detection limit (MDL) for the organic analyses were qualified as estimated, "J".

The surrogate recovery for sample X15SS0030001 was below the laboratory control limits for fluorene-d10. No validation actions were warranted on this single surrogate slightly low recovery.

All three surrogate recoveries in samples X15SS035001 and X15SS0020001 were less than 10 percent. Samples X15SS0150001, X15SS0310001, X15SS0380001, X15SS0490001, X15SS0500001, X15SS0520001and X15SS0530001 surrogates diluted out. These results were disregarded. The associated samples were analyzed using SIM. The full SCAN analysis of the samples was used for data validation.

All samples with the exception of X15SS0030001, X15SS0110001, X15SS0190001 and X15SS0290001 were analyzed at various dilutions.

Executive Summary

Laboratory Performance: Several continuing calibrations had %D greater than the 25% quality control limit. Surrogate recoveries were outside of quality control range.

Other Factors Affecting Data Quality: Matrix spike/matrix spike duplicate recoveries were outside of quality control limits and warranted qualification of data. Most samples in this SDG were diluted for analysis.

The data for these analyses were reviewed with reference to Region III modifications to the "National Functional guidelines for Organic Data Review", September 1994, and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories "(January 2006).

The text of this report has been formulated to address only those problem areas affecting data quality.

Ann Cognetti

Tetra Tech NUS
Ann Cognetti
Chemist/Data Validator

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Appendix A

Qualified Analytical Results

Data Validation Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (e.g. base-line drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can be any number of issues; e.g. poor chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 00810	NSAMPLE	X15SS0010001			X15SS0010001DL			X15SS0020001			X15SS0020001DL		
SDG: CTO423-1	LAB_ID	SC2797-1			SC2797-1DL			SC2797-2			SC2797-27DL		
FRACTION: PAH	SAMP_DATE	5/27/2009			5/27/2009			5/27/2009			5/27/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	77.3			77.3			83.9			83.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE		5.4	J	CP				42	J	C			
2-METHYLNAPHTHALENE		20	J	CP				64	J	C			
ACENAPHTHENE		180									690		
ACENAPHTHYLENE		26	U					24	U				
ANTHRACENE		330									950		
BENZO(A)ANTHRACENE					1500						3000		
BENZO(A)PYRENE					1600						3900		
BENZO(B)FLUORANTHENE					1700						4500		
BENZO(G,H,I)PERYLENE					1200						2400		
BENZO(K)FLUORANTHENE					930						1600		
CHRYSENE					1400						3600		
DIBENZO(A,H)ANTHRACENE					420						620	J	P
FLUORANTHENE					2100						5100	J	C
FLUORENE		110									360	J	P
INDENO(1,2,3-CD)PYRENE					1200						2500		
NAPHTHALENE		52						320					
PHENANTHRENE					1100						3600		
PYRENE					1600						4500		

PROJ_NO: 00810	NSAMPLE	X15SS0030001			X15SS0110001			X15SS0150001			X15SS0150001DL		
SDG: CTO423-1	LAB_ID	SC2797-3RA			SC2797-4			SC2797-5			SC2797-19DL		
FRACTION: PAH	SAMP_DATE	5/27/2009			5/27/2009			5/27/2009			5/27/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	84.8			79.3			79.1			79.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE		24	UJ	C	25	UJ	C	150	J	C			
2-METHYLNAPHTHALENE		24	UJ	C	25	UJ	C	230					
ACENAPHTHENE		24	U		25	U					2000	J	P
ACENAPHTHYLENE		24	U		25	U		25	U				
ANTHRACENE		1.9	J	P	25	U					2500	J	P
BENZO(A)ANTHRACENE		20	J	P	21	J	P				17000		
BENZO(A)PYRENE		20	J	P	18	J	P				23000		
BENZO(B)FLUORANTHENE		30			24	J	P				21000		
BENZO(G,H,I)PERYLENE		13	J	P	13	J	P				11000		
BENZO(K)FLUORANTHENE		12	J	P	11	J	P				8400		
CHRYSENE		13	J	P	15	J	P				22000		
DIBENZO(A,H)ANTHRACENE		7.8	J	P	9.4	J	P				3300	J	P
FLUORANTHENE		13	J	P	15	J	P				16000		
FLUORENE		24	U		25	U					4200	U	
INDENO(1,2,3-CD)PYRENE		12	J	P	11	J	P				12000		
NAPHTHALENE		24	U		25	U					4200	U	
PHENANTHRENE		5.4	J	P	6.2	J	P				11000		
PYRENE		11	J	P	15	J	P				23000		

PROJ_NO: 00810	NSAMPLE	X15SS0190001			X15SS0210001			X15SS0210001DL			X15SS0280001		
SDG: CTO423-1	LAB_ID	SC2797-6			SC2797-7			SC2797-7DL			SC2797-8		
FRACTION: PAH	SAMP_DATE	5/27/2009			5/27/2009			5/27/2009			5/27/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	78.3			75.1			75.1			85.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE		26	UJ	C	27	U					23	UJ	C
2-METHYLNAPHTHALENE		26	UJ	CD	17	J	P				9.2	J	CP
ACENAPHTHENE		26	U		49						12	J	P
ACENAPHTHYLENE		26	U		27	U					23	U	
ANTHRACENE		26	U		93						26		
BENZO(A)ANTHRACENE		37	J	D				3200					
BENZO(A)PYRENE		40	J	D				2300					
BENZO(B)FLUORANTHENE		42	J	D				1500			240		
BENZO(G,H,I)PERYLENE		27	J	D				1200			230		
BENZO(K)FLUORANTHENE		25	J	DP				510			140		
CHRYSENE		35	J	D				3600					
DIBENZO(A,H)ANTHRACENE		13	J	DP				820			91		
FLUORANTHENE		30	J	D				780			200		
FLUORENE		26	U		29						8.3	J	P
INDENO(1,2,3-CD)PYRENE		24	J	DP				700			170		
NAPHTHALENE		26	U		20	J	P				23	U	
PHENANTHRENE		11	J	DP				500			160		
PYRENE		28	J	D				1400					

PROJ_NO: 00810	NSAMPLE	X15SS0280001DL			X15SS0290001			X15SS0310001			X15SS0310001DL		
SDG: CTO423-1	LAB_ID	SC2797-8DL			SC2797-9			SC2797-10			SC2797-20DL		
FRACTION: PAH	SAMP_DATE	5/27/2009			5/27/2009			5/28/2009			5/28/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	85.1			74.8			85.3			86.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE					27	UJ	C				7700	U	
2-METHYLNAPHTHALENE					27	UJ	C				7700	U	
ACENAPHTHENE					4.2	J	P				2600	J	P
ACENAPHTHYLENE					27	U		23	U				
ANTHRACENE					27	U					3500	J	P
BENZO(A)ANTHRACENE		400			53						18000		
BENZO(A)PYRENE		400			58						24000		
BENZO(B)FLUORANTHENE					66						26000		
BENZO(G,H,I)PERYLENE					46						14000		
BENZO(K)FLUORANTHENE					28						11000		
CHRYSENE		420			46						22000		
DIBENZO(A,H)ANTHRACENE					22	J	P				4100	J	P
FLUORANTHENE					55						22000		
FLUORENE					27	U					7700	U	
INDENO(1,2,3-CD)PYRENE					36						16000		
NAPHTHALENE					27	U					7700	U	
PHENANTHRENE					28						14000		
PYRENE		400			47						24000		

PROJ_NO: 00810	NSAMPLE	X15SS0320001			X15SS0320001DL			X15SS0350001			X15SS0350001DL		
SDG: CTO423-1	LAB_ID	SC2797-11			SC2797-11DL			SC2797-12			SC2797-21		
FRACTION: PAH	SAMP_DATE	5/28/2009			5/28/2009			5/28/2009			5/28/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	80.2			80.2			78.5			78.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE		25	UJ	C				25	UJ	C			
2-METHYLNAPHTHALENE		11	J	CP				19	J	CP			
ACENAPHTHENE		47						150					
ACENAPHTHYLENE		25	U					25	U				
ANTHRACENE		98						200					
BENZO(A)ANTHRACENE					410						2000		
BENZO(A)PYRENE					440						2900		
BENZO(B)FLUORANTHENE					410						3200		
BENZO(G,H,I)PERYLENE		270									1800		
BENZO(K)FLUORANTHENE		270									1100		
CHRYSENE		290									2500		
DIBENZO(A,H)ANTHRACENE		100									460		
FLUORANTHENE					620						1900		
FLUORENE		32						60					
INDENO(1,2,3-CD)PYRENE		290									1900		
NAPHTHALENE		8.6	J	P				56					
PHENANTHRENE					350						840		
PYRENE					420						2500		

PROJ_NO: 00810	NSAMPLE	X15SS0380001			X15SS0380001DL			X15SS0490001			X15SS0490001DL		
SDG: CTO423-1	LAB_ID	SC2797-13			SC2797-22DL			SC2797-14			SC2797-23DL		
FRACTION: PAH	SAMP_DATE	5/28/2009			5/28/2009			5/28/2009			5/28/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	81.8			81.8			82.5			82.5		
	DUP_OF												

PARAMETER	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE				10000	U		150	J	C			
2-METHYLNAPHTHALENE				10000	U		200					
ACENAPHTHENE				5000	J	P				1800	J	P
ACENAPHTHYLENE	24	U					24	U				
ANTHRACENE				7200	J	P				2400	J	P
BENZO(A)ANTHRACENE				27000						10000		
BENZO(A)PYRENE				38000						13000		
BENZO(B)FLUORANTHENE				38000						14000		
BENZO(G,H,I)PERYLENE				22000						9000		
BENZO(K)FLUORANTHENE				18000						6100		
CHRYSENE				34000						13000		
DIBENZO(A,H)ANTHRACENE				7000	J	P				2300	J	P
FLUORANTHENE				38000						14000		
FLUORENE				3100	J	P				1000	J	P
INDENO(1,2,3-CD)PYRENE				27000						10000		
NAPHTHALENE				10000	U					4000	U	
PHENANTHRENE				30000						11000		
PYRENE				45000						16000		

PROJ_NO: 00810	NSAMPLE	X15SS0500001			X15SS0500001DL			X15SS0520001			X15SS0520001DL		
SDG: CTO423-1	LAB_ID	SC2797-15			SC2797-24DL			SC2797-16			SC2797-25DL		
FRACTION: PAH	SAMP_DATE	5/28/2009			5/28/2009			5/27/2009			5/27/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	78.6			78.6			86.6			86.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE		86	J	C				230	J	C			
2-METHYLNAPHTHALENE		120									3800	U	
ACENAPHTHENE					1500	J	P				2600	J	P
ACENAPHTHYLENE		25	U					23	U				
ANTHRACENE					2000	J	P				4100		
BENZO(A)ANTHRACENE					9700						23000		
BENZO(A)PYRENE					12000						27000		
BENZO(B)FLUORANTHENE					13000						26000		
BENZO(G,H,I)PERYLENE					8200						15000		
BENZO(K)FLUORANTHENE					5700						10000		
CHRYSENE					14000						31000		
DIBENZO(A,H)ANTHRACENE					2600	J	P				5100		
FLUORANTHENE					12000						23000		
FLUORENE					4200	U					1500	J	P
INDENO(1,2,3-CD)PYRENE					8900						16000		
NAPHTHALENE		330									3800	U	
PHENANTHRENE					8200						17000		
PYRENE					14000						26000		

PROJ_NO: 00810	NSAMPLE	X15SS0530001			X15SS0530001DL			X15SS0540001			X15SS0540001DL		
SDG: CTO423-1	LAB_ID	SC2797-17			SC2797-26DL			SC2797-18			SC2797-18DL		
FRACTION: PAH	SAMP_DATE	5/27/2009			5/27/2009			5/27/2009			5/27/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	80.1			80.1			86.4			86.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE					10000	U		6.1	J	CP			
2-METHYLNAPHTHALENE					10000	U		20	J	CP			
ACENAPHTHENE					4200	J	P	160					
ACENAPHTHYLENE		25	U					23	U				
ANTHRACENE					5400	J	P	230					
BENZO(A)ANTHRACENE					33000						1800		
BENZO(A)PYRENE					42000						2300		
BENZO(B)FLUORANTHENE					41000						2000		
BENZO(G,H,I)PERYLENE					25000						1900		
BENZO(K)FLUORANTHENE					16000						1200		
CHRYSENE					43000						2000		
DIBENZO(A,H)ANTHRACENE					7600	J	P				620		
FLUORANTHENE					37000						2200		
FLUORENE					10000	U		94					
INDENO(1,2,3-CD)PYRENE					27000						1700		
NAPHTHALENE					10000	U		39					
PHENANTHRENE					24000						960		
PYRENE					44000						1600		

Appendix B

Results as Reported by the Laboratory

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 10-JUN-2009 21:59
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 77.3

Lab ID: SC2797-1
Client ID: X15SS0010001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	J	5.4	1.0	20	26	2.2
91-20-3	Naphthalene		52	1.0	20	26	3.4
91-57-6	2-Methylnaphthalene	J	20	1.0	20	26	2.8
208-96-8	Acenaphthylene	U	26	1.0	20	26	1.6
83-32-9	Acenaphthene		180	1.0	20	26	1.9
86-73-7	Fluorene		110	1.0	20	26	4.1
85-01-8	Phenanthrene	E	1300	1.0	20	26	2.3
120-12-7	Anthracene		330	1.0	20	26	1.6
206-44-0	Fluoranthene	E	2000	1.0	20	26	2.3
129-00-0	Pyrene	E	1400	1.0	20	26	2.7
56-55-3	Benzo(a)anthracene	E	1400	1.0	20	26	2.4
218-01-9	Chrysene	E	1100	1.0	20	26	2.2
205-99-2	Benzo(b)fluoranthene	E	2800	1.0	20	26	3.1
207-08-9	Benzo(k)fluoranthene	E	650	1.0	20	26	4.0
50-32-8	Benzo(a)pyrene	E	1500	1.0	20	26	4.3
193-39-5	Indeno(1,2,3-cd)pyrene	E	1000	1.0	20	26	2.4
53-70-3	Dibenzo(a,h)anthracene	E	360	1.0	20	26	2.3
191-24-2	Benzo(g,h,i)perylene	E	910	1.0	20	26	2.6
321-60-8	2-Methylnaphthalene-D10		57%				
118-79-6	Fluorene-D10		57%				
1718-51-0	Pyrene-D10		56%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 12-JUN-2009 17:11
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 77.3

Lab ID: SC2797-1DL
Client ID: X15SS0010001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	310	12	20	310	26
91-20-3	Naphthalene	U	310	12	20	310	40
91-57-6	2-Methylnaphthalene	U	310	12	20	310	34
208-96-8	Acenaphthylene	U	310	12	20	310	19
83-32-9	Acenaphthene	J	210	12	20	310	23
86-73-7	Fluorene	J	120	12	20	310	50
85-01-8	Phenanthrene		1100	12	20	310	28
120-12-7	Anthracene		480	12	20	310	19
206-44-0	Fluoranthene		2100	12	20	310	28
129-00-0	Pyrene		1600	12	20	310	32
56-55-3	Benzo(a)anthracene		1500	12	20	310	29
218-01-9	Chrysene		1400	12	20	310	26
205-99-2	Benzo(b)fluoranthene		1700	12	20	310	37
207-08-9	Benzo(k)fluoranthene		930	12	20	310	48
50-32-8	Benzo(a)pyrene		1600	12	20	310	51
193-39-5	Indeno(1,2,3-cd)pyrene		1200	12	20	310	29
53-70-3	Dibenzo(a,h)anthracene		420	12	20	310	28
191-24-2	Benzo(g,h,i)perylene		1200	12	20	310	31
321-60-8	2-Methylnaphthalene-D10		D				
118-79-6	Fluorene-D10		D				
1718-51-0	Pyrene-D10		D				

Katahdin Analytical Service A0000005

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 10-JUN-2009 15:24
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 83.9

Lab ID: SC2797-2
Client ID: X15SS0020001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene		42	1.0	20	24	2.0
91-20-3	Naphthalene		320	1.0	20	24	3.1
91-57-6	2-Methylnaphthalene		64	1.0	20	24	2.6
208-96-8	Acenaphthylene	U	24	1.0	20	24	1.4
83-32-9	Acenaphthene	E	680	1.0	20	24	1.8
86-73-7	Fluorene	E	380	1.0	20	24	3.8
85-01-8	Phenanthrene	E	3900	1.0	20	24	2.1
120-12-7	Anthracene	E	820	1.0	20	24	1.4
206-44-0	Fluoranthene	E	4400	1.0	20	24	2.1
129-00-0	Pyrene	E	3400	1.0	20	24	2.5
56-55-3	Benzo(a)anthracene	E	3200	1.0	20	24	2.3
218-01-9	Chrysene	E	2200	1.0	20	24	2.0
205-99-2	Benzo(b)fluoranthene	E	7100	1.0	20	24	2.8
207-08-9	Benzo(k)fluoranthene	E	1800	1.0	20	24	3.7
50-32-8	Benzo(a)pyrene	E	3400	1.0	20	24	3.9
193-39-5	Indeno(1,2,3-cd)pyrene	E	2700	1.0	20	24	2.3
53-70-3	Dibenzo(a,h)anthracene	E	830	1.0	20	24	2.1
191-24-2	Benzo(g,h,i)perylene	E	2200	1.0	20	24	2.4
321-60-8	2-Methylnaphthalene-D10		56%				
118-79-6	Fluorene-D10		56%				
1718-51-0	Pyrene-D10		58%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date:
Analysis Date: 15-JUN-2009 16:30
Report Date: 06/18/2009
Matrix: SOIL
% Solids: 100

Lab ID: SC2797-27DL
Client ID: X15SS0020001
SDG: CTO423-1
Extracted by:
Extraction Method: SW846 3510
Analyst: JCG
Analysis Method: SW846 8270C
Lab Prep Batch: WG64961
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
91-20-3	Naphthalene	J	250	2.0	330	660	170
91-57-6	2-Methylnaphthalene	U	660	2.0	330	660	180
208-96-8	Acenaphthylene	U	660	2.0	330	660	140
83-32-9	Acenaphthene		690	2.0	330	660	130
86-73-7	Fluorene	J	360	2.0	330	660	160
85-01-8	Phenanthrene		3600	2.0	330	660	170
120-12-7	Anthracene		950	2.0	330	660	170
206-44-0	Fluoranthene		5100	2.0	330	660	210
129-00-0	Pyrene		4500	2.0	330	660	200
56-55-3	Benzo(a)anthracene		3000	2.0	330	660	170
218-01-9	Chrysene		3600	2.0	330	660	190
205-99-2	Benzo(b)fluoranthene		4500	2.0	330	660	270
207-08-9	Benzo(k)fluoranthene		1600	2.0	330	660	170
50-32-8	Benzo(a)pyrene		3900	2.0	330	660	190
193-39-5	Indeno(1,2,3-cd)pyrene		2500	2.0	330	660	240
53-70-3	Dibenzo(a,h)anthracene	J	620	2.0	330	660	260
191-24-2	Benzo(g,h,i)perylene		2400	2.0	330	660	210
90-12-0	1-Methylnaphthalene	U	660	2.0	330	660	250
4165-60-0	Nitrobenzene-D5		* 0%				
321-60-8	2-Fluorobiphenyl		* 0%				
1718-51-0	Terphenyl-D14		* 0%				

Katahdin Analytical Service A0000056

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 10-JUN-2009 16:07
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 84.8

Lab ID: SC2797-3RA
Client ID: X15SS0030001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	24	1.0	20	24	2.0
91-20-3	Naphthalene	U	24	1.0	20	24	3.1
91-57-6	2-Methylnaphthalene	U	24	1.0	20	24	2.6
208-96-8	Acenaphthylene	U	24	1.0	20	24	1.4
83-32-9	Acenaphthene	U	24	1.0	20	24	1.8
86-73-7	Fluorene	U	24	1.0	20	24	3.8
85-01-8	Phenanthrene	J	5.4	1.0	20	24	2.1
120-12-7	Anthracene	J	1.9	1.0	20	24	1.4
206-44-0	Fluoranthene	J	13	1.0	20	24	2.1
129-00-0	Pyrene	J	11	1.0	20	24	2.5
56-55-3	Benzo(a)anthracene	J	20	1.0	20	24	2.2
218-01-9	Chrysene	J	13	1.0	20	24	2.0
205-99-2	Benzo(b)fluoranthene		30	1.0	20	24	2.8
207-08-9	Benzo(k)fluoranthene	J	12	1.0	20	24	3.6
50-32-8	Benzo(a)pyrene	J	20	1.0	20	24	3.9
193-39-5	Indeno(1,2,3-cd)pyrene	J	12	1.0	20	24	2.2
53-70-3	Dibenzo(a,h)anthracene	J	7.8	1.0	20	24	2.1
191-24-2	Benzo(g,h,i)perylene	J	13	1.0	20	24	2.4
321-60-8	2-Methylnaphthalene-D10		39%				
118-79-6	Fluorene-D10		* 44%				
1718-51-0	Pyrene-D10		53%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 09-JUN-2009 22:48
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 79.3

Lab ID: SC2797-4
Client ID: X15SS0110001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	25	1.0	20	25	2.1
91-20-3	Naphthalene	U	25	1.0	20	25	3.3
91-57-6	2-Methylnaphthalene	U	25	1.0	20	25	2.8
208-96-8	Acenaphthylene	U	25	1.0	20	25	1.5
83-32-9	Acenaphthene	U	25	1.0	20	25	1.9
86-73-7	Fluorene	U	25	1.0	20	25	4.0
85-01-8	Phenanthrene	J	6.2	1.0	20	25	2.3
120-12-7	Anthracene	U	25	1.0	20	25	1.5
206-44-0	Fluoranthene	J	15	1.0	20	25	2.3
129-00-0	Pyrene	J	15	1.0	20	25	2.6
56-55-3	Benzo(a)anthracene	J	21	1.0	20	25	2.4
218-01-9	Chrysene	J	15	1.0	20	25	2.1
205-99-2	Benzo(b)fluoranthene	J	24	1.0	20	25	3.0
207-08-9	Benzo(k)fluoranthene	J	11	1.0	20	25	3.9
50-32-8	Benzo(a)pyrene	J	18	1.0	20	25	4.2
193-39-5	Indeno(1,2,3-cd)pyrene	J	11	1.0	20	25	2.4
53-70-3	Dibenzo(a,h)anthracene	J	9.4	1.0	20	25	2.3
191-24-2	Benzo(g,h,i)perylene	J	13	1.0	20	25	2.5
321-60-8	2-Methylnaphthalene-D10		48%				
118-79-6	Fluorene-D10		53%				
1718-51-0	Pyrene-D10		52%				

Katahdin Analytical Service A0000008

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 11-JUN-2009 16:16
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 79.1

Lab ID: SC2797-5
Client ID: X15SS0150001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene		150	1.0	20	25	2.1
91-20-3	Naphthalene	E	720	1.0	20	25	3.3
91-57-6	2-Methylnaphthalene		230	1.0	20	25	2.8
208-96-8	Acenaphthylene	U	25	1.0	20	25	1.5
83-32-9	Acenaphthene	E	1500	1.0	20	25	1.9
86-73-7	Fluorene	E	860	1.0	20	25	4.0
85-01-8	Phenanthrene	E	8300	1.0	20	25	2.3
120-12-7	Anthracene	E	1700	1.0	20	25	1.5
206-44-0	Fluoranthene	E	10000	1.0	20	25	2.3
129-00-0	Pyrene	E	8000	1.0	20	25	2.6
56-55-3	Benzo(a)anthracene	E	8600	1.0	20	25	2.4
218-01-9	Chrysene	E	6800	1.0	20	25	2.1
205-99-2	Benzo(b)fluoranthene	E	22000	1.0	20	25	3.0
207-08-9	Benzo(k)fluoranthene	E	2600	1.0	20	25	3.9
50-32-8	Benzo(a)pyrene	E	6600	1.0	20	25	4.2
193-39-5	Indeno(1,2,3-cd)pyrene	E	2900	1.0	20	25	2.4
53-70-3	Dibenzo(a,h)anthracene	E	1800	1.0	20	25	2.3
191-24-2	Benzo(g,h,i)perylene	E	2800	1.0	20	25	2.5
321-60-8	2-Methylnaphthalene-D10		68%				
118-79-6	Fluorene-D10		72%				
1718-51-0	Pyrene-D10		80%				

Katahdin Analytical Service A0000009

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indain Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 12-JUN-2009 14:35
Report Date: 06/16/2009
Matrix: SOIL
% Solids: 79.1

Lab ID: SC2797-19DL
Client ID: X15SS0150001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 8270C
Lab Prep Batch: WG64961
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
91-20-3	Naphthalene	U	4200	10	330	4200	1100
91-57-6	2-Methylnaphthalene	U	4200	10	330	4200	1200
208-96-8	Acenaphthylene	U	4200	10	330	4200	880
83-32-9	Acenaphthene	J	2000	10	330	4200	820
86-73-7	Fluorene	U	4200	10	330	4200	1000
85-01-8	Phenanthrene		11000	10	330	4200	1000
120-12-7	Anthracene	J	2500	10	330	4200	1100
206-44-0	Fluoranthene		16000	10	330	4200	1300
129-00-0	Pyrene		23000	10	330	4200	1300
56-55-3	Benzo(a)anthracene		17000	10	330	4200	1100
218-01-9	Chrysene		22000	10	330	4200	1200
205-99-2	Benzo(b)fluoranthene		21000	10	330	4200	1700
207-08-9	Benzo(k)fluoranthene		8400	10	330	4200	1000
50-32-8	Benzo(a)pyrene		23000	10	330	4200	1200
193-39-5	Indeno(1,2,3-cd)pyrene		12000	10	330	4200	1500
53-70-3	Dibenzo(a,h)anthracene	J	3300	10	330	4200	1600
191-24-2	Benzo(g,h,i)perylene		11000	10	330	4200	1300
90-12-0	1-Methylnaphthalene	U	4200	10	330	4200	1600
4165-60-0	Nitrobenzene-D5		D				
321-60-8	2-Fluorobiphenyl		D				
1718-51-0	Terphenyl-D14		D				

Katahdin Analytical Service A0000048

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 10-JUN-2009 16:49
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 78.3

Lab ID: SC2797-6
Client ID: X15SS0190001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	26	1.0	20	26	2.2
91-20-3	Naphthalene	U	26	1.0	20	26	3.3
91-57-6	2-Methylnaphthalene	U	26	1.0	20	26	2.8
208-96-8	Acenaphthylene	U	26	1.0	20	26	1.5
83-32-9	Acenaphthene	U	26	1.0	20	26	1.9
86-73-7	Fluorene	U	26	1.0	20	26	4.1
85-01-8	Phenanthrene	J	11	1.0	20	26	2.3
120-12-7	Anthracene	U	26	1.0	20	26	1.5
206-44-0	Fluoranthene		30	1.0	20	26	2.3
129-00-0	Pyrene		28	1.0	20	26	2.7
56-55-3	Benzo(a)anthracene		37	1.0	20	26	2.4
218-01-9	Chrysene		35	1.0	20	26	2.2
205-99-2	Benzo(b)fluoranthene		42	1.0	20	26	3.1
207-08-9	Benzo(k)fluoranthene	J	25	1.0	20	26	4.0
50-32-8	Benzo(a)pyrene		40	1.0	20	26	4.2
193-39-5	Indeno(1,2,3-cd)pyrene	J	24	1.0	20	26	2.4
53-70-3	Dibenzo(a,h)anthracene	J	13	1.0	20	26	2.3
191-24-2	Benzo(g,h,i)perylene		27	1.0	20	26	2.6
321-60-8	2-Methylnaphthalene-D10		50%				
118-79-6	Fluorene-D10		53%				
1718-51-0	Pyrene-D10		56%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 11-JUN-2009 12:45
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 75.1

Lab ID: SC2797-7
Client ID: X15SS0210001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	J	0.00	1.0	20	27	2.3
91-20-3	Naphthalene	J	20	1.0	20	27	3.4
91-57-6	2-Methylnaphthalene	J	17	1.0	20	27	2.9
208-96-8	Acenaphthylene	U	27	1.0	20	27	1.6
83-32-9	Acenaphthene		49	1.0	20	27	2.0
86-73-7	Fluorene		29	1.0	20	27	4.2
85-01-8	Phenanthrene	E	570	1.0	20	27	2.4
120-12-7	Anthracene		93	1.0	20	27	1.6
206-44-0	Fluoranthene	E	640	1.0	20	27	2.4
129-00-0	Pyrene	E	1300	1.0	20	27	2.8
56-55-3	Benzo(a)anthracene	E	2400	1.0	20	27	2.5
218-01-9	Chrysene	E	2500	1.0	20	27	2.3
205-99-2	Benzo(b)fluoranthene	E	1100	1.0	20	27	3.2
207-08-9	Benzo(k)fluoranthene	E	370	1.0	20	27	4.1
50-32-8	Benzo(a)pyrene	E	1500	1.0	20	27	4.4
193-39-5	Indeno(1,2,3-cd)pyrene	E	450	1.0	20	27	2.5
53-70-3	Dibenzo(a,h)anthracene	E	510	1.0	20	27	2.4
191-24-2	Benzo(g,h,i)perylene	E	680	1.0	20	27	2.7
321-60-8	2-Methylnaphthalene-D10		63%				
118-79-6	Fluorene-D10		68%				
1718-51-0	Pyrene-D10		73%				

Katahdin Analytical Service A0000011

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 12-JUN-2009 17:53
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 75.1

Lab ID: SC2797-7DL
Client ID: X15SS0210001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	320	12	20	320	27
91-20-3	Naphthalene	U	320	12	20	320	42
91-57-6	2-Methylnaphthalene	U	320	12	20	320	35
208-96-8	Acenaphthylene	U	320	12	20	320	19
83-32-9	Acenaphthene	J	63	12	20	320	24
86-73-7	Fluorene	U	320	12	20	320	51
85-01-8	Phenanthrene		500	12	20	320	29
120-12-7	Anthracene	J	190	12	20	320	19
206-44-0	Fluoranthene		780	12	20	320	29
129-00-0	Pyrene		1400	12	20	320	34
56-55-3	Benzo(a)anthracene		3200	12	20	320	30
218-01-9	Chrysene		3600	12	20	320	27
205-99-2	Benzo(b)fluoranthene		1500	12	20	320	38
207-08-9	Benzo(k)fluoranthene		510	12	20	320	50
50-32-8	Benzo(a)pyrene		2300	12	20	320	53
193-39-5	Indeno(1,2,3-cd)pyrene		700	12	20	320	30
53-70-3	Dibenzo(a,h)anthracene		820	12	20	320	29
191-24-2	Benzo(g,h,i)perylene		1200	12	20	320	32
321-60-8	2-Methylnaphthalene-D10		D				
118-79-6	Fluorene-D10		D				
1718-51-0	Pyrene-D10		D				

Katahdin Analytical Service A0000012

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 10-JUN-2009 18:59
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 85.1

Lab ID: SC2797-8
Client ID: X15SS0280001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	23	1.0	20	23	2.0
91-20-3	Naphthalene	U	23	1.0	20	23	3.0
91-57-6	2-Methylnaphthalene	J	9.2	1.0	20	23	2.6
208-96-8	Acenaphthylene	U	23	1.0	20	23	1.4
83-32-9	Acenaphthene	J	12	1.0	20	23	1.8
86-73-7	Fluorene	J	8.3	1.0	20	23	3.8
85-01-8	Phenanthrene		160	1.0	20	23	2.1
120-12-7	Anthracene		26	1.0	20	23	1.4
206-44-0	Fluoranthene		200	1.0	20	23	2.1
129-00-0	Pyrene	E	370	1.0	20	23	2.5
56-55-3	Benzo(a)anthracene	E	360	1.0	20	23	2.2
218-01-9	Chrysene	E	370	1.0	20	23	2.0
205-99-2	Benzo(b)fluoranthene		240	1.0	20	23	2.8
207-08-9	Benzo(k)fluoranthene		140	1.0	20	23	3.6
50-32-8	Benzo(a)pyrene	E	380	1.0	20	23	3.9
193-39-5	Indeno(1,2,3-cd)pyrene		170	1.0	20	23	2.2
53-70-3	Dibenzo(a,h)anthracene		91	1.0	20	23	2.1
191-24-2	Benzo(g,h,i)perylene		230	1.0	20	23	2.3
321-60-8	2-Methylnaphthalene-D10		57%				
118-79-6	Fluorene-D10		55%				
1718-51-0	Pyrene-D10		57%				

Katahdin Analytical Service A0000013

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 12-JUN-2009 18:36
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 85.1

Lab ID: SC2797-8DL
Client ID: X15SS0280001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	47	2.0	20	47	4.0
91-20-3	Naphthalene	U	47	2.0	20	47	6.1
91-57-6	2-Methylnaphthalene	U	47	2.0	20	47	5.2
208-96-8	Acenaphthylene	U	47	2.0	20	47	2.8
83-32-9	Acenaphthene	J	12	2.0	20	47	3.5
86-73-7	Fluorene	J	8.4	2.0	20	47	7.5
85-01-8	Phenanthrene		150	2.0	20	47	4.2
120-12-7	Anthracene	J	33	2.0	20	47	2.8
206-44-0	Fluoranthene		210	2.0	20	47	4.2
129-00-0	Pyrene		400	2.0	20	47	4.9
56-55-3	Benzo(a)anthracene		400	2.0	20	47	4.5
218-01-9	Chrysene		420	2.0	20	47	4.0
205-99-2	Benzo(b)fluoranthene		280	2.0	20	47	5.6
207-08-9	Benzo(k)fluoranthene		120	2.0	20	47	7.3
50-32-8	Benzo(a)pyrene		400	2.0	20	47	7.8
193-39-5	Indeno(1,2,3-cd)pyrene		180	2.0	20	47	4.5
53-70-3	Dibenzo(a,h)anthracene		110	2.0	20	47	4.2
191-24-2	Benzo(g,h,i)perylene		240	2.0	20	47	4.7
321-60-8	2-Methylnaphthalene-D10		55%				
118-79-6	Fluorene-D10		55%				
1718-51-0	Pyrene-D10		58%				

Katahdin Analytical Service A0000014

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 09-JUN-2009 23:32
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 74.8

Lab ID: SC2797-9
Client ID: X15SS0290001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	27	1.0	20	27	2.3
91-20-3	Naphthalene	U	27	1.0	20	27	3.5
91-57-6	2-Methylnaphthalene	U	27	1.0	20	27	2.9
208-96-8	Acenaphthylene	U	27	1.0	20	27	1.6
83-32-9	Acenaphthene	J	4.2	1.0	20	27	2.0
86-73-7	Fluorene	U	27	1.0	20	27	4.3
85-01-8	Phenanthrene		28	1.0	20	27	2.4
120-12-7	Anthracene	U	27	1.0	20	27	1.6
206-44-0	Fluoranthene		55	1.0	20	27	2.4
129-00-0	Pyrene		47	1.0	20	27	2.8
56-55-3	Benzo(a)anthracene		53	1.0	20	27	2.5
218-01-9	Chrysene		46	1.0	20	27	2.3
205-99-2	Benzo(b)fluoranthene		66	1.0	20	27	3.2
207-08-9	Benzo(k)fluoranthene		28	1.0	20	27	4.1
50-32-8	Benzo(a)pyrene		58	1.0	20	27	4.4
193-39-5	Indeno(1,2,3-cd)pyrene		36	1.0	20	27	2.5
53-70-3	Dibenzo(a,h)anthracene	J	22	1.0	20	27	2.4
191-24-2	Benzo(g,h,i)perylene		46	1.0	20	27	2.7
321-60-8	2-Methylnaphthalene-D10		55%				
118-79-6	Fluorene-D10		55%				
1718-51-0	Pyrene-D10		58%				

Katahdin Analytical Service A0000015

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/28/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 11-JUN-2009 14:52
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 85.3

Lab ID: SC2797-10
Client ID: X15SS0310001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	E	340	1.0	20	23	2.0
91-20-3	Naphthalene	E	1500	1.0	20	23	3.0
91-57-6	2-Methylnaphthalene	E	590	1.0	20	23	2.6
208-96-8	Acenaphthylene	U	23	1.0	20	23	1.4
83-32-9	Acenaphthene	E	1800	1.0	20	23	1.8
86-73-7	Fluorene	E	1200	1.0	20	23	3.8
85-01-8	Phenanthrene	E	9300	1.0	20	23	2.1
120-12-7	Anthracene	E	2100	1.0	20	23	1.4
206-44-0	Fluoranthene	E	12000	1.0	20	23	2.1
129-00-0	Pyrene	E	14000	1.0	20	23	2.5
56-55-3	Benzo(a)anthracene	E	15000	1.0	20	23	2.2
218-01-9	Chrysene	E	10000	1.0	20	23	2.0
205-99-2	Benzo(b)fluoranthene	E	40000	1.0	20	23	2.8
207-08-9	Benzo(k)fluoranthene	E	3300	1.0	20	23	3.6
50-32-8	Benzo(a)pyrene	E	7300	1.0	20	23	3.9
193-39-5	Indeno(1,2,3-cd)pyrene	E	4100	1.0	20	23	2.2
53-70-3	Dibenzo(a,h)anthracene	E	1900	1.0	20	23	2.1
191-24-2	Benzo(g,h,i)perylene	E	3400	1.0	20	23	2.3
321-60-8	2-Methylnaphthalene-D10		61%				
118-79-6	Fluorene-D10		65%				
1718-51-0	Pyrene-D10		101%				

Katahdin Analytical Service A0000016

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indain Head
PO No:
Sample Date: 05/28/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 12-JUN-2009 15:19
Report Date: 06/16/2009
Matrix: SOIL
% Solids: 85.3

Lab ID: SC2797-20DL
Client ID: X15SS0310001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 8270C
Lab Prep Batch: WG64961
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
91-20-3	Naphthalene	U	7700	20	330	7700	2000
91-57-6	2-Methylnaphthalene	U	7700	20	330	7700	2200
208-96-8	Acenaphthylene	U	7700	20	330	7700	1600
83-32-9	Acenaphthene	J	2600	20	330	7700	1500
86-73-7	Fluorene	U	7700	20	330	7700	1900
85-01-8	Phenanthrene		14000	20	330	7700	1900
120-12-7	Anthracene	J	3500	20	330	7700	2000
206-44-0	Fluoranthene		22000	20	330	7700	2500
129-00-0	Pyrene		24000	20	330	7700	2400
56-55-3	Benzo(a)anthracene		18000	20	330	7700	2000
218-01-9	Chrysene		22000	20	330	7700	2200
205-99-2	Benzo(b)fluoranthene		26000	20	330	7700	3100
207-08-9	Benzo(k)fluoranthene		11000	20	330	7700	1900
50-32-8	Benzo(a)pyrene		24000	20	330	7700	2200
193-39-5	Indeno(1,2,3-cd)pyrene		16000	20	330	7700	2900
53-70-3	Dibenzo(a,h)anthracene	J	4100	20	330	7700	3000
191-24-2	Benzo(g,h,i)perylene		14000	20	330	7700	2400
90-12-0	1-Methylnaphthalene	U	7700	20	330	7700	2900
4165-60-0	Nitrobenzene-D5		D				
321-60-8	2-Fluorobiphenyl		D				
1718-51-0	Terphenyl-D14		D				

Katahdin Analytical Service A0000049

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/28/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 10-JUN-2009 19:44
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 80.2

Lab ID: SC2797-11
Client ID: X15SS0320001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	25	1.0	20	25	2.1
91-20-3	Naphthalene	J	8.6	1.0	20	25	3.2
91-57-6	2-Methylnaphthalene	J	11	1.0	20	25	2.7
208-96-8	Acenaphthylene	U	25	1.0	20	25	1.5
83-32-9	Acenaphthene		47	1.0	20	25	1.9
86-73-7	Fluorene		32	1.0	20	25	4.0
85-01-8	Phenanthrene	E	370	1.0	20	25	2.2
120-12-7	Anthracene		98	1.0	20	25	1.5
206-44-0	Fluoranthene	E	570	1.0	20	25	2.2
129-00-0	Pyrene	E	380	1.0	20	25	2.6
56-55-3	Benzo(a)anthracene	E	380	1.0	20	25	2.4
218-01-9	Chrysene		290	1.0	20	25	2.1
205-99-2	Benzo(b)fluoranthene	E	430	1.0	20	25	3.0
207-08-9	Benzo(k)fluoranthene		270	1.0	20	25	3.9
50-32-8	Benzo(a)pyrene	E	420	1.0	20	25	4.1
193-39-5	Indeno(1,2,3-cd)pyrene		290	1.0	20	25	2.4
53-70-3	Dibenzo(a,h)anthracene		100	1.0	20	25	2.2
191-24-2	Benzo(g,h,i)perylene		270	1.0	20	25	2.5
321-60-8	2-Methylnaphthalene-D10		52%				
118-79-6	Fluorene-D10		53%				
1718-51-0	Pyrene-D10		55%				

Katahdin Analytical Service A0000017

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/28/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 12-JUN-2009 19:18
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 80.2

Lab ID: SC2797-11DL
Client ID: X15SS0320001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	75	3.0	20	75	6.4
91-20-3	Naphthalene	U	75	3.0	20	75	9.7
91-57-6	2-Methylnaphthalene	U	75	3.0	20	75	8.2
208-96-8	Acenaphthylene	U	75	3.0	20	75	4.5
83-32-9	Acenaphthene	J	58	3.0	20	75	5.6
86-73-7	Fluorene	J	35	3.0	20	75	12
85-01-8	Phenanthrene		350	3.0	20	75	6.7
120-12-7	Anthracene		130	3.0	20	75	4.5
206-44-0	Fluoranthene		620	3.0	20	75	6.7
129-00-0	Pyrene		420	3.0	20	75	7.8
56-55-3	Benzo(a)anthracene		410	3.0	20	75	7.1
218-01-9	Chrysene		340	3.0	20	75	6.4
205-99-2	Benzo(b)fluoranthene		410	3.0	20	75	9.0
207-08-9	Benzo(k)fluoranthene		270	3.0	20	75	12
50-32-8	Benzo(a)pyrene		440	3.0	20	75	12
193-39-5	Indeno(1,2,3-cd)pyrene		310	3.0	20	75	7.1
53-70-3	Dibenzo(a,h)anthracene		120	3.0	20	75	6.7
191-24-2	Benzo(g,h,i)perylene		310	3.0	20	75	7.5
321-60-8	2-Methylnaphthalene-D10		55%				
118-79-6	Fluorene-D10		56%				
1718-51-0	Pyrene-D10		59%				

Katahdin Analytical Service A0000018

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/28/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 10-JUN-2009 20:29
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 78.5

Lab ID: SC2797-12
Client ID: X15SS0350001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	25	1.0	20	25	2.2
91-20-3	Naphthalene		56	1.0	20	25	3.3
91-57-6	2-Methylnaphthalene	J	19	1.0	20	25	2.8
208-96-8	Acenaphthylene	U	25	1.0	20	25	1.5
83-32-9	Acenaphthene		150	1.0	20	25	1.9
86-73-7	Fluorene		60	1.0	20	25	4.1
85-01-8	Phenanthrene	E	950	1.0	20	25	2.3
120-12-7	Anthracene		200	1.0	20	25	1.5
206-44-0	Fluoranthene	E	2100	1.0	20	25	2.3
129-00-0	Pyrene	E	1800	1.0	20	25	2.7
56-55-3	Benzo(a)anthracene	E	2100	1.0	20	25	2.4
218-01-9	Chrysene	E	1600	1.0	20	25	2.2
205-99-2	Benzo(b)fluoranthene	E	4900	1.0	20	25	3.0
207-08-9	Benzo(k)fluoranthene	E	1000	1.0	20	25	3.9
50-32-8	Benzo(a)pyrene	E	2400	1.0	20	25	4.2
193-39-5	Indeno(1,2,3-cd)pyrene	E	1700	1.0	20	25	2.4
53-70-3	Dibenzo(a,h)anthracene	E	630	1.0	20	25	2.3
191-24-2	Benzo(g,h,i)perylene	E	1500	1.0	20	25	2.5
321-60-8	2-Methylnaphthalene-D10		58%				
118-79-6	Fluorene-D10		61%				
1718-51-0	Pyrene-D10		63%				

Katahdin Analytical Service A0000019

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indain Head
PO No:
Sample Date: 05/28/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 12-JUN-2009 16:03
Report Date: 06/16/2009
Matrix: SOIL
% Solids: 78.5

Lab ID: SC2797-21
Client ID: X15SS0350001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 8270C
Lab Prep Batch: WG64961
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
91-20-3	Naphthalene	U	420	1.0	330	420	110
91-57-6	2-Methylnaphthalene	U	420	1.0	330	420	120
208-96-8	Acenaphthylene	U	420	1.0	330	420	89
83-32-9	Acenaphthene	J	170	1.0	330	420	83
86-73-7	Fluorene	U	420	1.0	330	420	100
85-01-8	Phenanthrene		840	1.0	330	420	100
120-12-7	Anthracene	J	230	1.0	330	420	110
206-44-0	Fluoranthene		1900	1.0	330	420	140
129-00-0	Pyrene		2500	1.0	330	420	130
56-55-3	Benzo(a)anthracene		2000	1.0	330	420	110
218-01-9	Chrysene		2500	1.0	330	420	120
205-99-2	Benzo(b)fluoranthene		3200	1.0	330	420	170
207-08-9	Benzo(k)fluoranthene		1100	1.0	330	420	100
50-32-8	Benzo(a)pyrene		2900	1.0	330	420	120
193-39-5	Indeno(1,2,3-cd)pyrene		1900	1.0	330	420	160
53-70-3	Dibenzo(a,h)anthracene		460	1.0	330	420	160
191-24-2	Benzo(g,h,i)perylene		1800	1.0	330	420	130
90-12-0	1-Methylnaphthalene	U	420	1.0	330	420	160
4165-60-0	Nitrobenzene-D5		* 0%				
321-60-8	2-Fluorobiphenyl		* 0%				
1718-51-0	Terphenyl-D14		* 0%				

Katahdin Analytical Service A0000050

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/28/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 11-JUN-2009 15:34
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 81.8

Lab ID: SC2797-13
Client ID: X15SS0380001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	E	350	1.0	20	24	2.1
91-20-3	Naphthalene	E	1200	1.0	20	24	3.2
91-57-6	2-Methylnaphthalene	E	590	1.0	20	24	2.7
208-96-8	Acenaphthylene	U	24	1.0	20	24	1.5
83-32-9	Acenaphthene	E	3100	1.0	20	24	1.8
86-73-7	Fluorene	E	2400	1.0	20	24	3.9
85-01-8	Phenanthrene	E	17000	1.0	20	24	2.2
120-12-7	Anthracene	E	3700	1.0	20	24	1.5
206-44-0	Fluoranthene	E	20000	1.0	20	24	2.2
129-00-0	Pyrene	E	22000	1.0	20	24	2.6
56-55-3	Benzo(a)anthracene	E	22000	1.0	20	24	2.3
218-01-9	Chrysene	E	14000	1.0	20	24	2.1
205-99-2	Benzo(b)fluoranthene	E	46000	1.0	20	24	2.9
207-08-9	Benzo(k)fluoranthene	E	2800	1.0	20	24	3.8
50-32-8	Benzo(a)pyrene	E	7700	1.0	20	24	4.0
193-39-5	Indeno(1,2,3-cd)pyrene	E	4100	1.0	20	24	2.3
53-70-3	Dibenzo(a,h)anthracene	E	2000	1.0	20	24	2.2
191-24-2	Benzo(g,h,i)perylene	E	3300	1.0	20	24	2.4
321-60-8	2-Methylnaphthalene-D10		62%				
118-79-6	Fluorene-D10		66%				
1718-51-0	Pyrene-D10		90%				

Katahdin Analytical Service A0000020

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indain Head
PO No:
Sample Date: 05/28/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 12-JUN-2009 16:47
Report Date: 06/16/2009
Matrix: SOIL
% Solids: 81.8

Lab ID: SC2797-22DL
Client ID: X15SS0380001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 8270C
Lab Prep Batch: WG64961
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
91-20-3	Naphthalene	U	10000	25	330	10000	2600
91-57-6	2-Methylnaphthalene	U	10000	25	330	10000	2800
208-96-8	Acenaphthylene	U	10000	25	330	10000	2100
83-32-9	Acenaphthene	J	5000	25	330	10000	2000
86-73-7	Fluorene	J	3100	25	330	10000	2500
85-01-8	Phenanthrene		30000	25	330	10000	2500
120-12-7	Anthracene	J	7200	25	330	10000	2600
206-44-0	Fluoranthene		38000	25	330	10000	3200
129-00-0	Pyrene		45000	25	330	10000	3100
56-55-3	Benzo(a)anthracene		27000	25	330	10000	2600
218-01-9	Chrysene		34000	25	330	10000	2900
205-99-2	Benzo(b)fluoranthene		38000	25	330	10000	4100
207-08-9	Benzo(k)fluoranthene		18000	25	330	10000	2500
50-32-8	Benzo(a)pyrene		38000	25	330	10000	2800
193-39-5	Indeno(1,2,3-cd)pyrene		27000	25	330	10000	3700
53-70-3	Dibenzo(a,h)anthracene	J	7000	25	330	10000	3900
191-24-2	Benzo(g,h,i)perylene		22000	25	330	10000	3200
90-12-0	1-Methylnaphthalene	U	10000	25	330	10000	3800
4165-60-0	Nitrobenzene-D5		D				
321-60-8	2-Fluorobiphenyl		D				
1718-51-0	Terphenyl-D14		D				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/28/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 11-JUN-2009 13:27
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 82.5

Lab ID: SC2797-14
Client ID: X15SS0490001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene		150	1.0	20	24	2.0
91-20-3	Naphthalene	E	510	1.0	20	24	3.1
91-57-6	2-Methylnaphthalene		200	1.0	20	24	2.7
208-96-8	Acenaphthylene	U	24	1.0	20	24	1.4
83-32-9	Acenaphthene	E	1400	1.0	20	24	1.8
86-73-7	Fluorene	E	930	1.0	20	24	3.9
85-01-8	Phenanthrene	E	7000	1.0	20	24	2.2
120-12-7	Anthracene	E	1400	1.0	20	24	1.4
206-44-0	Fluoranthene	E	8200	1.0	20	24	2.2
129-00-0	Pyrene	E	7800	1.0	20	24	2.5
56-55-3	Benzo(a)anthracene	E	7600	1.0	20	24	2.3
218-01-9	Chrysene	E	5800	1.0	20	24	2.0
205-99-2	Benzo(b)fluoranthene	E	36000	1.0	20	24	2.9
207-08-9	Benzo(k)fluoranthene	E	2700	1.0	20	24	3.8
50-32-8	Benzo(a)pyrene	E	7300	1.0	20	24	4.0
193-39-5	Indeno(1,2,3-cd)pyrene	E	4200	1.0	20	24	2.3
53-70-3	Dibenzo(a,h)anthracene	E	1800	1.0	20	24	2.2
191-24-2	Benzo(g,h,i)perylene	E	3600	1.0	20	24	2.4
321-60-8	2-Methylnaphthalene-D10		62%				
118-79-6	Fluorene-D10		72%				
1718-51-0	Pyrene-D10		79%				

Katahdin Analytical Service A0000021

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indain Head
PO No:
Sample Date: 05/28/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 12-JUN-2009 17:30
Report Date: 06/16/2009
Matrix: SOIL
% Solids: 82.5

Lab ID: SC2797-23DL
Client ID: X15SS0490001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 8270C
Lab Prep Batch: WG64961
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
91-20-3	Naphthalene	U	4000	10	330	4000	1000
91-57-6	2-Methylnaphthalene	U	4000	10	330	4000	1100
208-96-8	Acenaphthylene	U	4000	10	330	4000	850
83-32-9	Acenaphthene	J	1800	10	330	4000	790
86-73-7	Fluorene	J	1000	10	330	4000	980
85-01-8	Phenanthrene		11000	10	330	4000	1000
120-12-7	Anthracene	J	2400	10	330	4000	1000
206-44-0	Fluoranthene		14000	10	330	4000	1300
129-00-0	Pyrene		16000	10	330	4000	1200
56-55-3	Benzo(a)anthracene		10000	10	330	4000	1000
218-01-9	Chrysene		13000	10	330	4000	1200
205-99-2	Benzo(b)fluoranthene		14000	10	330	4000	1600
207-08-9	Benzo(k)fluoranthene		6100	10	330	4000	1000
50-32-8	Benzo(a)pyrene		13000	10	330	4000	1100
193-39-5	Indeno(1,2,3-cd)pyrene		10000	10	330	4000	1500
53-70-3	Dibenzo(a,h)anthracene	J	2300	10	330	4000	1600
191-24-2	Benzo(g,h,i)perylene		9000	10	330	4000	1200
90-12-0	1-Methylnaphthalene	U	4000	10	330	4000	1500
4165-60-0	Nitrobenzene-D5		D				
321-60-8	2-Fluorobiphenyl		D				
1718-51-0	Terphenyl-D14		D				

Katahdin Analytical Service A0000052

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/28/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 11-JUN-2009 14:09
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 78.6

Lab ID: SC2797-15
Client ID: X15SS0500001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene		86	1.0	20	25	2.2
91-20-3	Naphthalene		330	1.0	20	25	3.3
91-57-6	2-Methylnaphthalene		120	1.0	20	25	2.8
208-96-8	Acenaphthylene	U	25	1.0	20	25	1.5
83-32-9	Acenaphthene	E	1200	1.0	20	25	1.9
86-73-7	Fluorene	E	730	1.0	20	25	4.1
85-01-8	Phenanthrene	E	6300	1.0	20	25	2.3
120-12-7	Anthracene	E	1400	1.0	20	25	1.5
206-44-0	Fluoranthene	E	7800	1.0	20	25	2.3
129-00-0	Pyrene	E	8200	1.0	20	25	2.7
56-55-3	Benzo(a)anthracene	E	8800	1.0	20	25	2.4
218-01-9	Chrysene	E	7100	1.0	20	25	2.2
205-99-2	Benzo(b)fluoranthene	E	29000	1.0	20	25	3.0
207-08-9	Benzo(k)fluoranthene	E	2700	1.0	20	25	3.9
50-32-8	Benzo(a)pyrene	E	6800	1.0	20	25	4.2
193-39-5	Indeno(1,2,3-cd)pyrene	E	3600	1.0	20	25	2.4
53-70-3	Dibenzo(a,h)anthracene	E	1700	1.0	20	25	2.3
191-24-2	Benzo(g,h,i)perylene	E	3200	1.0	20	25	2.5
321-60-8	2-Methylnaphthalene-D10		57%				
118-79-6	Fluorene-D10		64%				
1718-51-0	Pyrene-D10		92%				

Katahdin Analytical Service A0000022

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indain Head
PO No:
Sample Date: 05/28/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 12-JUN-2009 18:14
Report Date: 06/16/2009
Matrix: SOIL
% Solids: 78.6

Lab ID: SC2797-24DL
Client ID: X15SS0500001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 8270C
Lab Prep Batch: WG64961
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
91-20-3	Naphthalene	U	4200	10	330	4200	1100
91-57-6	2-Methylnaphthalene	U	4200	10	330	4200	1200
208-96-8	Acenaphthylene	U	4200	10	330	4200	890
83-32-9	Acenaphthene	J	1500	10	330	4200	830
86-73-7	Fluorene	U	4200	10	330	4200	1000
85-01-8	Phenanthrene		8200	10	330	4200	1000
120-12-7	Anthracene	J	2000	10	330	4200	1100
206-44-0	Fluoranthene		12000	10	330	4200	1300
129-00-0	Pyrene		14000	10	330	4200	1300
56-55-3	Benzo(a)anthracene		9700	10	330	4200	1100
218-01-9	Chrysene		14000	10	330	4200	1200
205-99-2	Benzo(b)fluoranthene		13000	10	330	4200	1700
207-08-9	Benzo(k)fluoranthene		5700	10	330	4200	1000
50-32-8	Benzo(a)pyrene		12000	10	330	4200	1200
193-39-5	Indeno(1,2,3-cd)pyrene		8900	10	330	4200	1600
53-70-3	Dibenzo(a,h)anthracene	J	2600	10	330	4200	1600
191-24-2	Benzo(g,h,i)perylene		8200	10	330	4200	1300
90-12-0	1-Methylnaphthalene	U	4200	10	330	4200	1600
4165-60-0	Nitrobenzene-D5		D				
321-60-8	2-Fluorobiphenyl		D				
1718-51-0	Terphenyl-D14		D				

Katahdin Analytical Service A0000053

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 11-JUN-2009 16:58
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 86.6

Lab ID: SC2797-16
Client ID: X15SS0520001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene		230	1.0	20	23	2.0
91-20-3	Naphthalene	E	760	1.0	20	23	3.0
91-57-6	2-Methylnaphthalene	E	350	1.0	20	23	2.5
208-96-8	Acenaphthylene	U	23	1.0	20	23	1.4
83-32-9	Acenaphthene	E	1900	1.0	20	23	1.7
86-73-7	Fluorene	E	1300	1.0	20	23	3.7
85-01-8	Phenanthrene	E	12000	1.0	20	23	2.1
120-12-7	Anthracene	E	2500	1.0	20	23	1.4
206-44-0	Fluoranthene	E	13000	1.0	20	23	2.1
129-00-0	Pyrene	E	9800	1.0	20	23	2.4
56-55-3	Benzo(a)anthracene	E	11000	1.0	20	23	2.2
218-01-9	Chrysene	E	6900	1.0	20	23	2.0
205-99-2	Benzo(b)fluoranthene	E	29000	1.0	20	23	2.8
207-08-9	Benzo(k)fluoranthene	E	1600	1.0	20	23	3.6
50-32-8	Benzo(a)pyrene	E	5600	1.0	20	23	3.8
193-39-5	Indeno(1,2,3-cd)pyrene	E	2800	1.0	20	23	2.2
53-70-3	Dibenzo(a,h)anthracene	E	1800	1.0	20	23	2.1
191-24-2	Benzo(g,h,i)perylene	E	2600	1.0	20	23	2.3
321-60-8	2-Methylnaphthalene-D10		61%				
118-79-6	Fluorene-D10		66%				
1718-51-0	Pyrene-D10		78%				

Katahdin Analytical Service A0000023

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indain Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 12-JUN-2009 18:58
Report Date: 06/16/2009
Matrix: SOIL
% Solids: 86.6

Lab ID: SC2797-25DL
Client ID: X15SS0520001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 8270C
Lab Prep Batch: WG64961
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
91-20-3	Naphthalene	U	3800	10	330	3800	1000
91-57-6	2-Methylnaphthalene	U	3800	10	330	3800	1100
208-96-8	Acenaphthylene	U	3800	10	330	3800	810
83-32-9	Acenaphthene	J	2600	10	330	3800	750
86-73-7	Fluorene	J	1500	10	330	3800	940
85-01-8	Phenanthrene		17000	10	330	3800	960
120-12-7	Anthracene		4100	10	330	3800	970
206-44-0	Fluoranthene		23000	10	330	3800	1200
129-00-0	Pyrene		26000	10	330	3800	1200
56-55-3	Benzo(a)anthracene		23000	10	330	3800	990
218-01-9	Chrysene		31000	10	330	3800	1100
205-99-2	Benzo(b)fluoranthene		26000	10	330	3800	1500
207-08-9	Benzo(k)fluoranthene		10000	10	330	3800	960
50-32-8	Benzo(a)pyrene		27000	10	330	3800	1100
193-39-5	Indeno(1,2,3-cd)pyrene		16000	10	330	3800	1400
53-70-3	Dibenzo(a,h)anthracene		5100	10	330	3800	1500
191-24-2	Benzo(g,h,i)perylene		15000	10	330	3800	1200
90-12-0	1-Methylnaphthalene	U	3800	10	330	3800	1400
4165-60-0	Nitrobenzene-D5		D				
321-60-8	2-Fluorobiphenyl		D				
1718-51-0	Terphenyl-D14		D				

Katahdin Analytical Service A0000054

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 11-JUN-2009 17:40
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 80.1

Lab ID: SC2797-17
Client ID: X15SS0530001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	E	380	1.0	20	25	2.1
91-20-3	Naphthalene	E	1500	1.0	20	25	3.2
91-57-6	2-Methylnaphthalene	E	610	1.0	20	25	2.7
208-96-8	Acenaphthylene	U	25	1.0	20	25	1.5
83-32-9	Acenaphthene	E	3000	1.0	20	25	1.9
86-73-7	Fluorene	E	1800	1.0	20	25	4.0
85-01-8	Phenanthrene	E	16000	1.0	20	25	2.2
120-12-7	Anthracene	E	3300	1.0	20	25	1.5
206-44-0	Fluoranthene	E	20000	1.0	20	25	2.2
129-00-0	Pyrene	E	8200	1.0	20	25	2.6
56-55-3	Benzo(a)anthracene	E	9000	1.0	20	25	2.4
218-01-9	Chrysene	E	5700	1.0	20	25	2.1
205-99-2	Benzo(b)fluoranthene	E	50000	1.0	20	25	3.0
207-08-9	Benzo(k)fluoranthene	E	2900	1.0	20	25	3.9
50-32-8	Benzo(a)pyrene	E	8200	1.0	20	25	4.1
193-39-5	Indeno(1,2,3-cd)pyrene	E	4500	1.0	20	25	2.4
53-70-3	Dibenzo(a,h)anthracene	E	2600	1.0	20	25	2.2
191-24-2	Benzo(g,h,i)perylene	E	4100	1.0	20	25	2.5
321-60-8	2-Methylnaphthalene-D10		63%				
118-79-6	Fluorene-D10		64%				
1718-51-0	Pyrene-D10		36%				

Katahdin Analytical Service A0000024

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indain Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 12-JUN-2009 19:41
Report Date: 06/16/2009
Matrix: SOIL
% Solids: 80.1

Lab ID: SC2797-26DL
Client ID: X15SS0530001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 8270C
Lab Prep Batch: WG64961
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
91-20-3	Naphthalene	U	10000	25	330	10000	2700
91-57-6	2-Methylnaphthalene	U	10000	25	330	10000	2900
208-96-8	Acenaphthylene	U	10000	25	330	10000	2200
83-32-9	Acenaphthene	J	4200	25	330	10000	2000
86-73-7	Fluorene	U	10000	25	330	10000	2500
85-01-8	Phenanthrene		24000	25	330	10000	2600
120-12-7	Anthracene	J	5400	25	330	10000	2600
206-44-0	Fluoranthene		37000	25	330	10000	3300
129-00-0	Pyrene		44000	25	330	10000	3200
56-55-3	Benzo(a)anthracene		33000	25	330	10000	2700
218-01-9	Chrysene		43000	25	330	10000	3000
205-99-2	Benzo(b)fluoranthene		41000	25	330	10000	4200
207-08-9	Benzo(k)fluoranthene		16000	25	330	10000	2600
50-32-8	Benzo(a)pyrene		42000	25	330	10000	2900
193-39-5	Indeno(1,2,3-cd)pyrene		27000	25	330	10000	3800
53-70-3	Dibenzo(a,h)anthracene	J	7600	25	330	10000	4000
191-24-2	Benzo(g,h,i)perylene		25000	25	330	10000	3200
90-12-0	1-Methylnaphthalene	U	10000	25	330	10000	3900
4165-60-0	Nitrobenzene-D5		D				
321-60-8	2-Fluorobiphenyl		D				
1718-51-0	Terphenyl-D14		D				

Katahdin Analytical Service A0000055

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 10-JUN-2009 21:14
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 86.4

Lab ID: SC2797-18
Client ID: X15SS0540001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	J	6.1	1.0	20	23	2.0
91-20-3	Naphthalene		39	1.0	20	23	3.0
91-57-6	2-Methylnaphthalene	J	20	1.0	20	23	2.5
208-96-8	Acenaphthylene	U	23	1.0	20	23	1.4
83-32-9	Acenaphthene		160	1.0	20	23	1.7
86-73-7	Fluorene		94	1.0	20	23	3.7
85-01-8	Phenanthrene	E	1200	1.0	20	23	2.1
120-12-7	Anthracene		230	1.0	20	23	1.4
206-44-0	Fluoranthene	E	1900	1.0	20	23	2.1
129-00-0	Pyrene	E	1600	1.0	20	23	2.4
56-55-3	Benzo(a)anthracene	E	1800	1.0	20	23	2.2
218-01-9	Chrysene	E	1500	1.0	20	23	2.0
205-99-2	Benzo(b)fluoranthene	E	3100	1.0	20	23	2.8
207-08-9	Benzo(k)fluoranthene	E	930	1.0	20	23	3.6
50-32-8	Benzo(a)pyrene	E	2000	1.0	20	23	3.8
193-39-5	Indeno(1,2,3-cd)pyrene	E	1400	1.0	20	23	2.2
53-70-3	Dibenzo(a,h)anthracene	E	490	1.0	20	23	2.1
191-24-2	Benzo(g,h,i)perylene	E	1500	1.0	20	23	2.3
321-60-8	2-Methylnaphthalene-D10		58%				
118-79-6	Fluorene-D10		65%				
1718-51-0	Pyrene-D10		71%				

Katahdin Analytical Service A0000025

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 12-JUN-2009 20:01
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 86.4

Lab ID: SC2797-18DL
Client ID: X15SS0540001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	460	20	20	460	39
91-20-3	Naphthalene	U	460	20	20	460	60
91-57-6	2-Methylnaphthalene	U	460	20	20	460	51
208-96-8	Acenaphthylene	U	460	20	20	460	28
83-32-9	Acenaphthene	J	210	20	20	460	35
86-73-7	Fluorene	J	120	20	20	460	74
85-01-8	Phenanthrene		960	20	20	460	42
120-12-7	Anthracene		530	20	20	460	28
206-44-0	Fluoranthene		2200	20	20	460	42
129-00-0	Pyrene		1600	20	20	460	49
56-55-3	Benzo(a)anthracene		1800	20	20	460	44
218-01-9	Chrysene		2000	20	20	460	39
205-99-2	Benzo(b)fluoranthene		2000	20	20	460	56
207-08-9	Benzo(k)fluoranthene		1200	20	20	460	72
50-32-8	Benzo(a)pyrene		2300	20	20	460	76
193-39-5	Indeno(1,2,3-cd)pyrene		1700	20	20	460	44
53-70-3	Dibenzo(a,h)anthracene		620	20	20	460	42
191-24-2	Benzo(g,h,i)perylene		1900	20	20	460	46
321-60-8	2-Methylnaphthalene-D10		D				
118-79-6	Fluorene-D10		D				
1718-51-0	Pyrene-D10		D				

Katahdin Analytical Service A0000026

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-1
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0010001	SL	27-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	77. %	1	D2216	WG64552	03-JUN-09 12:30:00	ASTM D2216	02-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-2
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0020001	SL	27-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	84. %	1	D2216	WG64552	03-JUN-09 12:30:00	ASTM D2216	02-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-3
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0030001	SL	27-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	85. %	1	D2216	WG64552	03-JUN-09 12:30:00	ASTM D2216	02-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-4
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0110001	SL	27-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	79. %	1	D2216	WG64552	03-JUN-09 12:51:00	ASTM D2216	02-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-5
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0150001	SL	27-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	79. %	1	D2216	WG64552	03-JUN-09 12:30:00	ASTM D2216	02-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-6
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0190001	SL	27-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	78. %	1	D2216	WG64554	03-JUN-09 13:02:00	ASTM D2216	02-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-7
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0210001	SL	27-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	75. %	1	D2216	WG64554	03-JUN-09 13:04:00	ASTM D2216	02-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-8
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0280001	SL	27-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	85. %	1	D2216	WG64554	03-JUN-09 13:00:00	ASTM D2216	02-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-9
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0290001	SL	27-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	75. %	1	D2216	WG64554	03-JUN-09 13:00:00	ASTM D2216	02-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-10
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0310001	SL	28-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	85. %	1	D2216	WG64554	03-JUN-09 13:07:00	ASTM D2216	02-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-11
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0320001	SL	28-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	80. %	1	D2216	WG64554	03-JUN-09 13:00:00	ASTM D2216	02-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-12
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0350001	SL	28-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	78. %	1	D2216	WG64554	03-JUN-09 13:00:00	ASTM D2216	02-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-13
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0380001	SL	28-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	82. %	1	D2216	WG64554	03-JUN-09 13:00:00	ASTM D2216	02-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-14
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0490001	SL	28-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	82. %	1	D2216	WG64554	03-JUN-09 13:00:00	ASTM D2216	02-JUN-09	JF	

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-15
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0500001	SL	28-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	78. %	1	D2216	WG64554	03-JUN-09 13:00:00	ASTM D2216	02-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-16
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0520001	SL	27-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG64554	03-JUN-09 13:00:00	ASTM D2216	02-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-17
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0530001	SL	27-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	80. %	1	D2216	WG64554	03-JUN-09 13:00:00	ASTM D2216	02-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2797-18
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-1

Sample Description	Matrix	Date Sampled	Date Received
X15SS0540001	SL	27-MAY-09	02-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG64554	03-JUN-09 13:00:00	ASTM D2216	02-JUN-09	JF	

Appendix C

Support Documentation

SC2797

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER № 028239 | PAGE 1 OF 2

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	4129218308	Katahdin Labs/ Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Jacob Burkett (signature)		J. Goerdt	4129218425	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex/863138882005		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G, G
PRESERVATIVE USED: 4°C, 4°C
TYPE OF ANALYSIS: SW8462050B/6020A Sb As Cu Pb Sn Zn; SW8468270 (PAH)

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	SW8462050B/6020A Sb As Cu Pb Sn Zn	SW8468270 (PAH)						COMMENTS
5/27	1240	X1555001 0001	001	0	1	SO	G	1		1						
↓	1248	X1555002 0001	002	↓	↓	↓	↓	↓		1						
	1254	X1555003 0001	003							1						
	1315	X1555011 0001	011							1						
	1357	X1555015 0001	015							1						
	1400	X1555019 0001	019					3		3						ms/msD
	1431	X1555021 0001	021							1						
	1512	X1555028 0001	028							1						
↓	1452	X1555029 0001	029							1						
5/28	0900	X1555031 0001	031							1						
	0855	X1555032 0001	032							1						
	0914	X1555035 0001	035							1						
↓	0920	X1555038 0001	038	↓	↓	↓	↓	↓		1						

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
J. Goerdt (signature)	6-1-09	1730	(signature)	6-2-09	0945
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028241 | PAGE 2 OF 2

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	4129218308	Katahdin Labs/ Andrea Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goerdt	4129218425	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		Fed Ex/863138882005		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G): G	PRESERVATIVE USED: 4°C	TYPE OF ANALYSIS: SW846 8270 (PAH)							COMMENTS
5/26	934	X1555049G0001	049	0	1	SO	G	1	1									
5/28	910	X1555050G0001	050	↓	↓	↓	↓	1	1									
5/27	1415	X1555052G0001	052					1	1									
↓	1404	X1555053G0001	053					1	1									
↓	1250	X1555054G0001	054	↓	↓	↓	↓	1	1									

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-1-09	1730	1. RECEIVED BY	6-2-09	0945
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME
COMMENTS					

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

Katahdin Analytical Services, Inc. **Sample Receipt Condition Report**

Client: Tetra Tech	KAS PM: AC	Sampled By: Client
Project:	KIMS Entry By: AC	Delivered By: Fed-Ex
KAS Work Order#: 5C2797	KIMS Review By: AC	Received By: GN
SDG #:	Cooler: 1 of 1	Date/Time Rec.: 6-2-09 0930

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 0.0
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea				✓	
Soil/Sediment: Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
7. Trip Blank present in cooler?		✓			
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2				✓	
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

0000007

HOLDTIME

SDG CTO423-1

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
TS	%	X15SS0310001	SC2797-20	NM	5/28/2009	6/16/2009	6/17/2009	19.05	1	20.05
TS	%	X15SS0540001	SC2797-18	NM	5/27/2009	6/2/2009	6/3/2009	5.93	1.077	7.007
TS	%	X15SS0010001	SC2797-1	NM	5/27/2009	6/2/2009	6/3/2009	5.848	1.145	6.993
TS	%	X15SS0020001	SC2797-2	NM	5/27/2009	6/2/2009	6/3/2009	5.843	1.144	6.988
TS	%	X15SS0020001	SC2797-27	NM	5/27/2009	6/16/2009	6/17/2009	19.89	1	20.89
TS	%	X15SS0030001	SC2797-3	NM	5/27/2009	6/2/2009	6/3/2009	5.84	1.144	6.983
TS	%	X15SS0110001	SC2797-4	NM	5/27/2009	6/2/2009	6/3/2009	5.826	1.158	6.983
TS	%	X15SS0150001	SC2797-19	NM	5/27/2009	6/16/2009	6/17/2009	19.84	1	20.84
TS	%	X15SS0150001	SC2797-5	NM	5/27/2009	6/2/2009	6/3/2009	5.797	1.142	6.94
TS	%	X15SS0190001	SC2797-6	NM	5/27/2009	6/2/2009	6/3/2009	5.882	1.078	6.96
TS	%	X15SS0210001	SC2797-7	NM	5/27/2009	6/2/2009	6/3/2009	5.861	1.078	6.94
TS	%	X15SS0280001	SC2797-8	NM	5/27/2009	6/2/2009	6/3/2009	5.833	1.075	6.908
TS	%	X15SS0310001	SC2797-10	NM	5/28/2009	6/2/2009	6/3/2009	5.084	1.088	6.172
TS	%	X15SS0490001	SC2797-23	NM	5/28/2009	6/16/2009	6/17/2009	19.03	1	20.03
TS	%	X15SS0530001	SC2797-26	NM	5/27/2009	6/16/2009	6/17/2009	19.84	1	20.84

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
TS	%	X15SS0530001	SC2797-17	NM	5/27/2009	6/2/2009	6/3/2009	5.878	1.078	6.956
TS	%	X15SS0520001	SC2797-25	NM	5/27/2009	6/16/2009	6/17/2009	19.83	1	20.83
TS	%	X15SS0520001	SC2797-16	NM	5/27/2009	6/2/2009	6/3/2009	5.869	1.078	6.948
TS	%	X15SS0290001	SC2797-9	NM	5/27/2009	6/2/2009	6/3/2009	5.848	1.074	6.922
TS	%	X15SS0500001	SC2797-15	NM	5/28/2009	6/2/2009	6/3/2009	5.081	1.079	6.16
TS	%	X15SS0320001	SC2797-11	NM	5/28/2009	6/2/2009	6/3/2009	5.088	1.082	6.170
TS	%	X15SS0490001	SC2797-14	NM	5/28/2009	6/2/2009	6/3/2009	5.063	1.08	6.143
TS	%	X15SS0380001	SC2797-22	NM	5/28/2009	6/16/2009	6/17/2009	19.03	1	20.03
TS	%	X15SS0380001	SC2797-13	NM	5/28/2009	6/2/2009	6/3/2009	5.072	1.081	6.153
TS	%	X15SS0350001	SC2797-21	NM	5/28/2009	6/16/2009	6/17/2009	19.04	1	20.04
TS	%	X15SS0350001	SC2797-12	NM	5/28/2009	6/2/2009	6/3/2009	5.076	1.081	6.157
TS	%	X15SS0500001	SC2797-24	NM	5/28/2009	6/16/2009	6/17/2009	19.04	1	20.04
OS	%	X15SS0500001	SC2797-24DL	NM	5/28/2009	6/3/2009	6/12/2009	5.956	9.422	15.38
OS	%	X15SS0020001	SC2797-27DL	NM	5/27/2009	6/15/2009	6/15/2009	18.81	0.348	19.15
OS	%	X15SS0520001	SC2797-25DL	NM	5/27/2009	6/3/2009	6/12/2009	6.744	9.452	16.2
OS	%	X15SS0530001	SC2797-26DL	NM	5/27/2009	6/3/2009	6/12/2009	6.753	9.481	16.23
OS	%	X15SS0310001	SC2797-20DL	NM	5/28/2009	6/3/2009	6/12/2009	5.96	9.303	15.26
OS	%	X15SS0380001	SC2797-22DL	NM	5/28/2009	6/3/2009	6/12/2009	5.947	9.363	15.31

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
OS	%	X15SS0350001	SC2797-21	NM	5/28/2009	6/3/2009	6/12/2009	5.951	9.333	15.28
OS	%	X15SS0490001	SC2797-23DL	NM	5/28/2009	6/3/2009	6/12/2009	5.938	9.392	15.33
OS	%	X15SS0150001	SC2797-19DL	NM	5/27/2009	6/3/2009	6/12/2009	6.753	9.274	16.03
OS	UG/KG	X15SS0020001	SC2797-27DL	NM	5/27/2009	6/15/2009	6/15/2009	18.81	0.348	19.15
OS	UG/KG	X15SS0530001	SC2797-26DL	NM	5/27/2009	6/3/2009	6/12/2009	6.753	9.481	16.23
OS	UG/KG	X15SS0520001	SC2797-25DL	NM	5/27/2009	6/3/2009	6/12/2009	6.744	9.452	16.2
OS	UG/KG	X15SS0500001	SC2797-24DL	NM	5/28/2009	6/3/2009	6/12/2009	5.956	9.422	15.38
OS	UG/KG	X15SS0380001	SC2797-22DL	NM	5/28/2009	6/3/2009	6/12/2009	5.947	9.363	15.31
OS	UG/KG	X15SS0350001	SC2797-21	NM	5/28/2009	6/3/2009	6/12/2009	5.951	9.333	15.28
OS	UG/KG	X15SS0310001	SC2797-20DL	NM	5/28/2009	6/3/2009	6/12/2009	5.96	9.303	15.26
OS	UG/KG	X15SS0150001	SC2797-19DL	NM	5/27/2009	6/3/2009	6/12/2009	6.753	9.274	16.03
OS	UG/KG	X15SS0490001	SC2797-23DL	NM	5/28/2009	6/3/2009	6/12/2009	5.938	9.392	15.33
SIM	%	X15SS0210001DL	SC2797-7DL	NM	5/27/2009	6/3/2009	6/12/2009	6.742	9.398	16.14
SIM	%	X15SS0320001DL	SC2797-11DL	NM	5/28/2009	6/3/2009	6/12/2009	5.965	9.467	15.43
SIM	%	X15SS0320001	SC2797-11	NM	5/28/2009	6/3/2009	6/10/2009	5.965	7.486	13.45
SIM	%	X15SS0310001	SC2797-10	NM	5/28/2009	6/3/2009	6/11/2009	5.960	8.284	14.24
SIM	%	X15SS0290001	SC2797-9	NM	5/27/2009	6/3/2009	6/9/2009	6.73	6.631	13.36
SIM	%	X15SS0150001	SC2797-5	NM	5/27/2009	6/3/2009	6/11/2009	6.764	8.333	15.1

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
SIM	%	X15SS0280001DL	SC2797-8DL	NM	5/27/2009	6/3/2009	6/12/2009	6.715	9.426	16.14
SIM	%	X15SS0210001	SC2797-7	NM	5/27/2009	6/3/2009	6/11/2009	6.742	8.185	14.93
SIM	%	X15SS0280001	SC2797-8	NM	5/27/2009	6/3/2009	6/10/2009	6.715	7.443	14.16
SIM	%	X15SS0350001	SC2797-12	NM	5/28/2009	6/3/2009	6/10/2009	5.953	7.516	13.47
SIM	%	X15SS0030001	SC2797-3RA	NM	5/27/2009	6/3/2009	6/10/2009	6.806	7.328	14.13
SIM	%	X15SS0190001	SC2797-6	NM	5/27/2009	6/3/2009	6/10/2009	6.762	7.355	14.12
SIM	%	X15SS0380001	SC2797-13	NM	5/28/2009	6/3/2009	6/11/2009	5.949	8.310	14.26
SIM	%	X15SS0490001	SC2797-14	NM	5/28/2009	6/3/2009	6/11/2009	5.940	8.222	14.16
SIM	%	X15SS0500001	SC2797-15	NM	5/28/2009	6/3/2009	6/11/2009	5.958	8.25	14.21
SIM	%	X15SS0520001	SC2797-16	NM	5/27/2009	6/3/2009	6/11/2009	6.747	8.367	15.11
SIM	%	X15SS0530001	SC2797-17	NM	5/27/2009	6/3/2009	6/11/2009	6.755	8.395	15.15
SIM	%	X15SS0540001DL	SC2797-18DL	NM	5/27/2009	6/3/2009	6/12/2009	6.808	9.492	16.3
SIM	%	X15SS0020001	SC2797-2	NM	5/27/2009	6/3/2009	6/10/2009	6.81	7.299	14.11
SIM	%	X15SS0010001DL	SC2797-1DL	NM	5/27/2009	6/3/2009	6/12/2009	6.807	9.381	16.19
SIM	%	X15SS0010001	SC2797-1	NM	5/27/2009	6/3/2009	6/10/2009	6.806	7.582	14.39
SIM	%	X15SS0110001	SC2797-4	NM	5/27/2009	6/3/2009	6/9/2009	6.792	6.606	13.4
SIM	%	X15SS0540001	SC2797-18	NM	5/27/2009	6/3/2009	6/10/2009	6.807	7.543	14.35
SIM	UG/KG	X15SS0150001	SC2797-5	NM	5/27/2009	6/3/2009	6/11/2009	6.764	8.333	15.1

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
SIM	UG/KG	X15SS0310001	SC2797-10	NM	5/28/2009	6/3/2009	6/11/2009	5.960	8.284	14.24
SIM	UG/KG	X15SS0540001DL	SC2797-18DL	NM	5/27/2009	6/3/2009	6/12/2009	6.808	9.492	16.3
SIM	UG/KG	X15SS0540001	SC2797-18	NM	5/27/2009	6/3/2009	6/10/2009	6.807	7.543	14.35
SIM	UG/KG	X15SS0530001	SC2797-17	NM	5/27/2009	6/3/2009	6/11/2009	6.755	8.395	15.15
SIM	UG/KG	X15SS0520001	SC2797-16	NM	5/27/2009	6/3/2009	6/11/2009	6.747	8.367	15.11
SIM	UG/KG	X15SS0500001	SC2797-15	NM	5/28/2009	6/3/2009	6/11/2009	5.958	8.25	14.21
SIM	UG/KG	X15SS0490001	SC2797-14	NM	5/28/2009	6/3/2009	6/11/2009	5.940	8.222	14.16
SIM	UG/KG	X15SS0380001	SC2797-13	NM	5/28/2009	6/3/2009	6/11/2009	5.949	8.310	14.26
SIM	UG/KG	X15SS0350001	SC2797-12	NM	5/28/2009	6/3/2009	6/10/2009	5.953	7.516	13.47
SIM	UG/KG	X15SS0030001	SC2797-3RA	NM	5/27/2009	6/3/2009	6/10/2009	6.806	7.328	14.13
SIM	UG/KG	X15SS0320001	SC2797-11	NM	5/28/2009	6/3/2009	6/10/2009	5.965	7.486	13.45
SIM	UG/KG	X15SS0010001	SC2797-1	NM	5/27/2009	6/3/2009	6/10/2009	6.806	7.582	14.39
SIM	UG/KG	X15SS0290001	SC2797-9	NM	5/27/2009	6/3/2009	6/9/2009	6.73	6.631	13.36
SIM	UG/KG	X15SS0280001DL	SC2797-8DL	NM	5/27/2009	6/3/2009	6/12/2009	6.715	9.426	16.14
SIM	UG/KG	X15SS0280001	SC2797-8	NM	5/27/2009	6/3/2009	6/10/2009	6.715	7.443	14.16
SIM	UG/KG	X15SS0210001DL	SC2797-7DL	NM	5/27/2009	6/3/2009	6/12/2009	6.742	9.398	16.14
SIM	UG/KG	X15SS0210001	SC2797-7	NM	5/27/2009	6/3/2009	6/11/2009	6.742	8.185	14.93
SIM	UG/KG	X15SS0190001	SC2797-6	NM	5/27/2009	6/3/2009	6/10/2009	6.762	7.355	14.12

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
SIM	UG/KG	X15SS0110001	SC2797-4	NM	5/27/2009	6/3/2009	6/9/2009	6.792	6.606	13.4
SIM	UG/KG	X15SS0020001	SC2797-2	NM	5/27/2009	6/3/2009	6/10/2009	6.81	7.299	14.11
SIM	UG/KG	X15SS0010001DL	SC2797-1DL	NM	5/27/2009	6/3/2009	6/12/2009	6.807	9.381	16.19
SIM	UG/KG	X15SS0320001DL	SC2797-11DL	NM	5/28/2009	6/3/2009	6/12/2009	5.965	9.467	15.43

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in this narrative or in the Report of Analysis.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Andrea J. Colby**. This narrative is an integral part of the Report of Analysis.

Organics Laboratory

The samples of SDG CTO423-1 were analyzed in accordance with "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846, 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA, and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA, and/or for the specific methods listed below or on the Report of Analysis. Some manual integrations may have been performed due to split peaks and/or corrected baselines. All have been flagged with an "M" (software-generated) on the pertinent quantitation reports.

8270C SIM Analysis

All samples and associated QC were subjected to the GPC sample clean-up process.

SC2797-6 was used for the Matrix Spike (MS) and Matrix Spike Duplicate (MSD), as per client request.

All samples were manually integrated for various target analytes. The specific reason for the manual integration is indicated on the raw data by the manual integration codes (M1-M11). These codes are further explained in the attachment following this narrative.

The reported percent recovery acceptance limits for the Laboratory Control Samples (LCSs) are statistically derived for the full list of spiked compounds and nominal limits for all additional compounds. The recoveries of the spiked analytes in the LCS, Matrix Spike (MS) and Matrix Spike Duplicate (MSD) are compared to these acceptance limits. Katahdin standard operating procedure is to take corrective action only if the number of spiked analytes in the LCS that are outside of the QC limits is greater than the DoD QSM allowable number of exceedances. If the associated MS/MSD has greater than the allowable number of exceedances, no corrective action is taken, as long the LCS is acceptable.

The MS WG64521-3 had high recoveries for several spiked target analytes and the MSD WG64521-4 had a low recovery for one spiked target analyte that were outside of the laboratory established acceptance limits. Consequently, the analytes with high recoveries in the MS also had RPD's that were high and outside of the laboratory acceptance limits. The concentrations of some of the analytes in the MS were high and outside of the calibration range. The laboratory policy is not to reanalyze MS/MSD's for dilutions. The high concentrations in the MS and the homogeneity of the sample likely contributed to the recoveries of these analytes being outside of the acceptance limits.

There were several samples that needed to be reanalyzed at a dilution in order to bring the high concentration target analytes into the calibration range. Samples SC2797-2, 5, 10 and 12 through 17 required a significant dilution if the samples were to be analyzed by 8270 SIM. Since the concentrations of some analytes were very high, analysis by 8270 SCAN would likely result in a more accurate value. The client was notified and the laboratory proposed analysis of these samples by 8270 SCAN. The client agreed to the proposal and consequently these samples have analytes that are flagged with an "E" qualifier. These samples were relogged in as different sample numbers and were analyzed by 8270 SCAN.

8270C SCAN Analysis

Samples SC2797-2, 5, 10 and 12 through 17 were relogged in as samples SC2797-19 through 27. These samples were then analyzed by 8270 SCAN. Since these samples were not spiked with surrogates for SCAN analysis, there are no surrogate recoveries reported for these samples. The associated method blank WG64961-1 and the LCS WG64961-2 were spiked with the SCAN surrogates because this QC was shared with some other samples that were analyzed by both methods. Therefore, the QC samples have SCAN surrogate recoveries.

Sample SC2797-27DL was manually integrated for the analyte benzo(k)fluoranthene. The specific reason for the manual integration is indicated on the raw data by the manual integration codes (M1-M11). These codes are further explained in the attachment following this narrative.

The calibration verification standard (CV) (file U7347) had a high response for the calibration check compound (CCC) fluoranthene, which resulted in a %D that was outside the method acceptance limit of 20%.

There were no other protocol deviations or observations noted by the organics laboratory staff.

Wet Chemistry

The samples of SDG CTO423-1 were analyzed in accordance with the specific methods listed on the Report of Analysis.

Analyses for total solids were performed according to "Annual Book of ASTM Standards", Method D2216-98 "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass".

All analyses were performed within analytical holding times, and all quality control criteria were met.

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CTO 423 NSF INDIAN HEAD
SDG: CTO423-1
SC2797

Sample Receipt

The following samples were received on June 2, 2009 and were logged in under Katahdin Analytical Services work order numbers SC2797 for a hardcopy due date of June 19, 2009.

KATAHDIN Sample No.	TTNUS Sample Identification
SC2797-1	X15SS0010001
SC2797-2	X15SS0020001
SC2797-3	X15SS0030001
SC2797-4	X15SS0110001
SC2797-5	X15SS0150001
SC2797-6	X15SS0190001
SC2797-7	X15SS0210001
SC2797-8	X15SS0280001
SC2797-9	X15SS0290001
SC2797-10	X15SS0310001
SC2797-11	X15SS0320001
SC2797-12	X15SS0350102
SC2797-13	X15SS0380001
SC2797-14	X15SS0490001
SC2797-15	X15SS0500001
SC2797-16	X15SS0520001
SC2797-17	X15SS0530001
SC2797-18	X15SS0540001
SC2797-19	X15SS0150001
SC2797-20	X15SS0310001
SC2797-21	X15SS0350001
SC2797-22	X15SS0380001
SC2797-23	X15SS0490001
SC2797-24	X15SS0500001
SC2797-25	X15SS0520001
SC2797-26	X15SS0530001
SC2797-27	X15SS0020001

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Operations Manager or the Quality Assurance Officer as verified by the following signature.

Leslie Dimond

Leslie Dimond
Quality Assurance Officer

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG64521-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Lab File ID: G6000 Lab Sample ID: WG64521-1

Instrument ID: GCMS-G Date Extracted: 06/03/09

Matrix: (soil/water) SOIL Date Analyzed: 06/09/09

Level: (low/med) LOW Time Analyzed: 1740

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	X15SS0110001	SC2797-4	G6007	06/09/09	2248
02	X15SS0290001	SC2797-9	G6008	06/09/09	2332
03	WG64521-LCS	WG64521-2RA	G6011	06/10/09	1154
04	X15SS0020001	SC2797-2	G6016	06/10/09	1524
05	X15SS0030001	SC2797-3RA	G6017	06/10/09	1607
06	X15SS0190001	SC2797-6	G6018	06/10/09	1649
07	X15SS0190001MS	WG64521-3	G6019	06/10/09	1731
08	X15SS0190001MSD	WG64521-4	G6020	06/10/09	1814
09	X15SS0280001	SC2797-8	G6021	06/10/09	1859
10	X15SS0320001	SC2797-11	G6022	06/10/09	1944
11	X15SS0350001	SC2797-12	G6023	06/10/09	2029
12	X15SS0540001	SC2797-18	G6024	06/10/09	2114
13	X15SS0010001	SC2797-1	G6025	06/10/09	2159
14	X15SS0210001	SC2797-7	G6028	06/11/09	1245
15	X15SS0490001	SC2797-14	G6029	06/11/09	1327
16	X15SS0500001	SC2797-15	G6030	06/11/09	1409
17	X15SS0310001	SC2797-10	G6031	06/11/09	1452
18	X15SS0380001	SC2797-13	G6032	06/11/09	1534
19	X15SS0150001	SC2797-5	G6033	06/11/09	1616
20	X15SS0520001	SC2797-16	G6034	06/11/09	1658
21	X15SS0530001	SC2797-17	G6035	06/11/09	1740
22	X15SS0010001	SC2797-1DL	G6042	06/12/09	1711
23	X15SS0210001	SC2797-7DL	G6043	06/12/09	1753
24	X15SS0280001	SC2797-8DL	G6044	06/12/09	1836
25	X15SS0320001	SC2797-11DL	G6045	06/12/09	1918
26	X15SS0540001	SC2797-18DL	G6046	06/12/09	2001
27					
28					
29					
30					

COMMENTS:

FORM IVSV

Katahdin Analytical Service A0000031

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client:
Project: CTO 423 NSF Indian Head
PO No:
Sample Date:
Received Date:
Extraction Date: 06/03/09
Analysis Date: 09-JUN-2009 17:40
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 100

Lab ID: WG64521-1
Client ID: WG64521-Blank
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	20	1.0	20	20	1.7
91-20-3	Naphthalene	U	20	1.0	20	20	2.6
91-57-6	2-Methylnaphthalene	U	20	1.0	20	20	2.2
208-96-8	Acenaphthylene	U	20	1.0	20	20	1.2
83-32-9	Acenaphthene	U	20	1.0	20	20	1.5
86-73-7	Fluorene	U	20	1.0	20	20	3.2
85-01-8	Phenanthrene	U	20	1.0	20	20	1.8
120-12-7	Anthracene	U	20	1.0	20	20	1.2
206-44-0	Fluoranthene	U	20	1.0	20	20	1.8
129-00-0	Pyrene	U	20	1.0	20	20	2.1
56-55-3	Benzo(a)anthracene	U	20	1.0	20	20	1.9
218-01-9	Chrysene	U	20	1.0	20	20	1.7
205-99-2	Benzo(b)fluoranthene	U	20	1.0	20	20	2.4
207-08-9	Benzo(k)fluoranthene	U	20	1.0	20	20	3.1
50-32-8	Benzo(a)pyrene	U	20	1.0	20	20	3.3
193-39-5	Indeno(1,2,3-cd)pyrene	U	20	1.0	20	20	1.9
53-70-3	Dibenzo(a,h)anthracene	U	20	1.0	20	20	1.8
191-24-2	Benzo(g,h,i)perylene	U	20	1.0	20	20	2.0
321-60-8	2-Methylnaphthalene-D10		51%				
118-79-6	Fluorene-D10		56%				
1718-51-0	Pyrene-D10		76%				

Katahdin Analytical Service A0000027

KATAHDIN ANALYTICAL SERVICES
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 06/10/09
Report Date: 06/15/2009
Matrix: SOIL

Lab ID: WG64521-3 & WG64521-4
Client ID: X15SS0190001MS & X15SS0190001MSD
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

COMPOUND	MS SPIKE	MSD SPIKE	SAMPLE CONC.	MS CONC.	MSD CONC.	MS %REC.	MSD %REC.	%RPD	%RPD LIMIT	QC. LIMITS
1-Methylnaphthalene	85	85	0.00	64	62	75	73	3	50	36-114
Naphthalene	85	85	0.00	65	55	76	65	16	50	54- 94
2-Methylnaphthalene	85	85	0.00	71	63	83	* 74	11	50	75-132
Acenaphthylene	85	85	0.00	56	52	65	61	6	50	51-103
Acenaphthene	85	85	0.00	81	54	96	64	40	50	56- 97
Fluorene	85	85	0.00	71	60	83	70	17	50	61-103
Phenanthrene	85	85	11	226	82	* 253	83	* 94	50	58-122
Anthracene	85	85	0.00	97	63	* 114	74	43	50	55-113
Fluoranthene	85	85	30	447	107	* 490	91	* 120	50	68-126
Pyrene	85	85	28	344	93	* 371	76	* 110	50	33-133
Benzo(a)anthracene	85	85	37	393	106	* 418	81	* 120	50	50-138
Chrysene	85	85	35	286	93	* 294	68	* 100	50	44-132
Benzo(b)fluoranthene	85	85	42	394	107	* 413	76	* 110	50	44-119
Benzo(k)fluoranthene	85	85	25	269	70	* 286	53	* 120	50	40-120
Benzo(a)pyrene	85	85	40	414	106	* 439	77	* 120	50	52-113
Indeno(1,2,3-cd)pyrene	85	85	24	302	99	* 326	87	* 100	50	32-134
Dibenzo(a,h)anthracene	85	85	13	146	90	* 156	91	47	50	30-134
Benzo(g,h,i)perylene	85	85	27	259	92	* 272	76	* 95	50	43-121

FORM III SV-2

G6019.D & G6020.D

KATAHDIN ANALYTICAL SERVICES
LAB CONTROL SAMPLE

Client:
Project: CTO 423 NSF Indian Head
PO No:
Sample Date:
Received Date:
Extraction Date: 06/03/09
Analysis Date: 06/10/09
Report Date: 06/15/2009
Matrix: SOIL

Lab ID: WG64521-2RA
Client ID: WG64521-LCS
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

COMPOUND	LCS SPIKE	SAMPLE CONC.	LCS CONC.	%REC.	QC. LIMITS
1-Methylnaphthalene	67	NA	57	85	36-114
Naphthalene	67	NA	53	79	54- 94
2-Methylnaphthalene	67	NA	60	90	75-132
Acenaphthylene	67	NA	50	75	51-103
Acenaphthene	67	NA	50	75	56- 97
Fluorene	67	NA	53	80	61-103
Phenanthrene	67	NA	55	82	58-122
Anthracene	67	NA	51	77	55-113
Fluoranthene	67	NA	56	84	68-126
Pyrene	67	NA	50	75	33-133
Benzo(a)anthracene	67	NA	54	81	50-138
Chrysene	67	NA	49	74	44-132
Benzo(b)fluoranthene	67	NA	60	90	44-119
Benzo(k)fluoranthene	67	NA	40	61	40-120
Benzo(a)pyrene	67	NA	50	75	52-113
Indeno(1,2,3-cd)pyrene	67	NA	57	86	32-134
Dibenzo(a,h)anthracene	67	NA	61	91	30-134
Benzo(g,h,i)perylene	67	NA	54	80	43-121

FORM III SV-2

G6011.D

Katahdin Analytical Service A0000030

FORM 2

SOIL SEMIVOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Level:(low/med) LOW

	CLIENT SAMPLE ID	LAB SAMPLE ID	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	WG64521-BLANK	WG64521-1	51	56	76						0
02	X15SS0110001	SC2797-4	48	53	52						0
03	X15SS0290001	SC2797-9	55	55	58						0
04	WG64521-LCS	WG64521-2RA	59	76	73						0
05	X15SS0020001	SC2797-2	56	56	58						0
06	X15SS0030001	SC2797-3RA	39	44*	53						1
07	X15SS0190001	SC2797-6	50	53	56						0
08	X15SS0190001MS	WG64521-3	66	55	64						0
09	X15SS0190001MSD	WG64521-4	65	69	67						0
10	X15SS0280001	SC2797-8	57	55	57						0
11	X15SS0320001	SC2797-11	52	53	55						0
12	X15SS0350001	SC2797-12	58	61	63						0
13	X15SS0540001	SC2797-18	58	65	71						0
14	X15SS0010001	SC2797-1	57	57	56						0
15	X15SS0210001	SC2797-7	63	68	73						0
16	X15SS0490001	SC2797-14	62	72	79						0
17	X15SS0500001	SC2797-15	57	64	92						0
18	X15SS0310001	SC2797-10	61	65	101						0
19	X15SS0380001	SC2797-13	62	66	90						0
20	X15SS0150001	SC2797-5	68	72	80						0
21	X15SS0520001	SC2797-16	61	66	78						0
22	X15SS0530001	SC2797-17	63	64	36						0
23	X15SS0010001	SC2797-1DL	D	D	D						0
24	X15SS0210001	SC2797-7DL	D	D	D						0
25	X15SS0280001	SC2797-8DL	55	55	58						0
26	X15SS0320001	SC2797-11DL	55	56	59						0
27	X15SS0540001	SC2797-18DL	D	D	D						0
28											

		QC LIMITS
S1	= 2-Methylnaphthalene-D1	(33-125)
S2	= Fluorene-D10	(53-136)
S3	= Pyrene-D10	(16-162)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogate diluted out

Katahdin Analytical Service A0000028

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Lab File ID: GD420 DFTPP Injection Date: 06/09/09

Instrument ID: GCMS-G DFTPP Injection Time: 1142

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	33.6
68	Less than 2.0% of mass 69	0.1 (0.3)1
69	Less than 100.0% of mass 198	33.5
70	Less than 2.0% of mass 69	0.2 (0.6)1
127	40.0 - 60.0% of mass 198	50.3
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.7
275	10.0 - 30.0% of mass 198	24.7
365	1.0 - 100.0% of mass 198	3.5
441	0.0 - 100.0% of mass 443	13.5 (75.8)2
442	40.0 - 100.0% of mass 198	94.4
443	17.0 - 23.0% of mass 442	17.8 (18.9)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0609	G5992	06/09/09	1203
02		SSTD8.00G0609	G5993	06/09/09	1246
03		SSTD5.00G0609	G5994	06/09/09	1328
04		SSTD2.00G0609	G5995	06/09/09	1410
05		SSTD0.50G0609	G5997	06/09/09	1534
06		SSTD0.20G0609	G5998	06/09/09	1616
07	WG64521-BLANK	WG64521-1	G6000	06/09/09	1740
08	X15SS0110001	SC2797-4	G6007	06/09/09	2248
09	X15SS0290001	SC2797-9	G6008	06/09/09	2332
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FORM V SV

Katahdin Analytical Service A0000032

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Instrument ID: GCMS-G Calibration Date(s): 06/09/09 06/09/09

Column: DB5-MS ID: 0.25 (mm) Calibration Time(s): 1203 1616

LAB FILE ID: RF0.2: G5998 RF0.5: G5997 RF1: G5992
RF2: G5995 RF5: G5994 RF8: G5993

								COEFFICENTS			%RSD	MAX %RSD
COMPOUND	RF0.2	RF0.5	RF1	RF2	RF5	RF8	CURVE	A0	A1	A2	OR R^2	OR R^2
1-Methylnaphthalene	17279	36511	71839	121860	300990	475290	LINR	-0.3146797	2.34469447		0.99682	0.99000
Naphthalene	9143	42814	95418	181260	465920	730220	LINR	-0.1151042	1.48883112		0.99667	0.99000
2-Methylnaphthalene	4276	19944	61439	125780	384480	576870	2ORDR	0.23327640	1.39911307	8.487e-002	0.99605	0.99000
Acenaphthylene	1.362	1.558	1.452	1.535	1.638	1.570	AVRG		1.51898696		6.416	15.000
Acenaphthene	1.215	1.162	0.983	0.995	1.027	0.967	AVRG		1.05825366		9.846	15.000
Fluorene	1.014	1.091	1.017	1.020	1.080	1.043	AVRG		1.04426953		3.238	15.000
Phenanthrene	0.642	0.730	0.748	0.795	0.885	0.928	AVRG		0.78789915		13.389	15.000
Anthracene	1.128	1.179	1.040	1.060	1.028	1.038	AVRG		1.07879612		5.632	15.000
Fluoranthene	0.692	0.821	0.737	0.744	0.815	0.871	AVRG		0.78027978		8.514	15.000
Pyrene	1.534	1.508	1.340	1.396	1.315	1.253	AVRG		1.39099920		7.981	15.000
Benzo(a)anthracene	2802	11426	33555	52152	201790	398650	LINR	0.21908462	1.24952080		0.99727	0.99000
Chrysene	1.377	1.355	1.141	1.133	1.051	0.937	AVRG		1.16566948		14.722	15.000
Benzo(b)fluoranthene	2155	7085	23292	30079	149300	253530	2ORDR	0.25204381	1.14718159	1.401e-002	0.99231	0.99000
Benzo(k)fluoranthene	2.034	1.893	1.560	1.808	1.516	1.496	AVRG		1.71777032		13.114	15.000
Benzo(a)pyrene	1.140	0.872	0.756	0.861	0.874	0.856	AVRG		0.89322157		14.437	15.000
Indeno(1,2,3-cd)pyrene	0.842	0.770	0.663	0.694	0.742	0.759	AVRG		0.74494716		8.399	15.000
Dibenzo(a,h)anthracene	2765	6954	17852	26338	96958	190310	LINR	0.10207017	1.75307739		0.99848	0.99000
Benzo(g,h,i)perylene	0.910	0.860	0.681	0.746	0.748	0.738	AVRG		0.78071073		11.044	15.000
2-Methylnaphthalene-D10	1.079	1.137	0.964	1.064	1.064	0.979	AVRG		1.04783901		6.224	15.000
Fluorene-D10	0.982	1.100	0.994	0.781	0.894	0.871	AVRG		0.93703168		11.928	15.000
Pyrene-D10	1.017	1.008	0.902	0.927	0.882	0.854	AVRG		0.93163622		7.190	15.000

FORM VI SV

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Lab File ID: GD421 DFTPP Injection Date: 06/10/09

Instrument ID: GCMS-G DFTPP Injection Time: 1006

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	31.4
68	Less than 2.0% of mass 69	0.1 (0.3)1
69	Less than 100.0% of mass 198	33.4
70	Less than 2.0% of mass 69	0.2 (0.6)1
127	40.0 - 60.0% of mass 198	48.9
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.3
275	10.0 - 30.0% of mass 198	24.3
365	1.0 - 100.0% of mass 198	3.8
441	0.0 - 100.0% of mass 443	13.8 (78.7)2
442	40.0 - 100.0% of mass 198	94.9
443	17.0 - 23.0% of mass 442	17.6 (18.5)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0610	G6009	06/10/09	1025
02	WG64521-LCS	WG64521-2RA	G6011	06/10/09	1154
03	X15SS0020001	SC2797-2	G6016	06/10/09	1524
04	X15SS0030001	SC2797-3RA	G6017	06/10/09	1607
05	X15SS0190001	SC2797-6	G6018	06/10/09	1649
06	X15SS0190001MS	WG64521-3	G6019	06/10/09	1731
07	X15SS0190001MSD	WG64521-4	G6020	06/10/09	1814
08	X15SS0280001	SC2797-8	G6021	06/10/09	1859
09	X15SS0320001	SC2797-11	G6022	06/10/09	1944
10	X15SS0350001	SC2797-12	G6023	06/10/09	2029
11	X15SS0540001	SC2797-18	G6024	06/10/09	2114
12	X15SS0010001	SC2797-1	G6025	06/10/09	2159
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FORM V SV

Katahdin Analytical Service A0000033

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Instrument ID: GCMS-G Calibration Date: 06/10/09 Time: 1025

Lab File ID: G6009 Init. Calib. Date(s): 06/09/09 06/09/09

Init. Calib. Times: 1203 1616

GC Column: DB5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE	
1-Methylnaphthalene	2.1068000	1.0000000	1.0059000	0.01	110.68	100.00	LINR	<-
Naphthalene	1.0857000	1.0000000	0.7910700	0.01	-8.57	100.00	LINR	
2-Methylnaphthalene	1.5650000	1.0000000	0.9208600	0.01	56.50	100.00	2RDR	
Acenaphthylene	1.5190000	1.5334000	1.5334000	0.01	0.95	100.00	AVRG	
Acenaphthene	1.0580000	1.0269000	1.0269000	0.01	-2.94	20.00	AVRG	
Fluorene	1.0440000	1.0338000	1.0338000	0.01	-0.98	100.00	AVRG	
Phenanthrene	0.7880000	0.8205100	0.8205100	0.01	4.12	100.00	AVRG	
Anthracene	1.0790000	1.0232000	1.0232000	0.01	-5.17	100.00	AVRG	
Fluoranthene	0.7800000	0.8014600	0.8014600	0.01	2.75	20.00	AVRG	
Pyrene	1.3910000	1.2879000	1.2879000	0.01	-7.41	100.00	AVRG	
Benzo(a)anthracene	1.1087000	1.0000000	0.7470500	0.01	10.87	100.00	LINR	
Chrysene	1.1660000	1.0864000	1.0864000	0.01	-6.83	100.00	AVRG	
Benzo(b)fluoranthene	0.9764200	1.0000000	0.6685500	0.01	-2.36	100.00	2RDR	
Benzo(k)fluoranthene	1.7180000	1.4633000	1.4633000	0.01	-14.82	100.00	AVRG	
Benzo(a)pyrene	0.8930000	0.7790800	0.7790800	0.01	-12.76	20.00	AVRG	
Indeno(1,2,3-cd)pyrene	0.7450000	0.7207200	0.7207200	0.01	-3.26	100.00	AVRG	
Dibenzo(a,h)anthracene	1.0378000	1.0000000	0.5454000	0.01	3.78	100.00	LINR	
Benzo(g,h,i)perylene	0.7800000	0.7113500	0.7113500	0.01	-8.80	100.00	AVRG	
2-Methylnaphthalene-D10	1.0480000	0.9534200	0.9534200	0.01	-9.02	100.00	AVRG	
Fluorene-D10	0.9370000	0.7788500	0.7788500	0.01	-16.88	100.00	AVRG	
Pyrene-D10	0.9320000	0.8538200	0.8538200	0.01	-8.39	100.00	AVRG	

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Lab File ID: GD422 DFTPP Injection Date: 06/11/09

Instrument ID: GCMS-G DFTPP Injection Time: 1127

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	32.1
68	Less than 2.0% of mass 69	0.4 (1.1)1
69	Less than 100.0% of mass 198	33.2
70	Less than 2.0% of mass 69	0.2 (0.5)1
127	40.0 - 60.0% of mass 198	49.5
197	Less than 1.0% of mass 198	0.2
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.2
275	10.0 - 30.0% of mass 198	24.5
365	1.0 - 100.0% of mass 198	3.5
441	0.0 - 100.0% of mass 443	13.8 (75.7)2
442	40.0 - 100.0% of mass 198	93.0
443	17.0 - 23.0% of mass 442	18.3 (19.6)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0611	G6027	06/11/09	1149
02	X15SS0210001	SC2797-7	G6028	06/11/09	1245
03	X15SS0490001	SC2797-14	G6029	06/11/09	1327
04	X15SS0500001	SC2797-15	G6030	06/11/09	1409
05	X15SS0310001	SC2797-10	G6031	06/11/09	1452
06	X15SS0380001	SC2797-13	G6032	06/11/09	1534
07	X15SS0150001	SC2797-5	G6033	06/11/09	1616
08	X15SS0520001	SC2797-16	G6034	06/11/09	1658
09	X15SS0530001	SC2797-17	G6035	06/11/09	1740
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FORM V SV

Katahdin Analytical Service A0000034

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Instrument ID: GCMS-G Calibration Date: 06/11/09 Time: 1149

Lab File ID: G6027 Init. Calib. Date(s): 06/09/09 06/09/09

Init. Calib. Times: 1203 1616

GC Column: DB5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
1-Methylnaphthalene	1.4271000	1.0000000	0.7160300	0.01	42.71	100.00	LINR
Naphthalene	1.0399000	1.0000000	0.7603400	0.01	3.99	100.00	LINR
2-Methylnaphthalene	0.7796400	1.0000000	0.4110400	0.01	-22.04	100.00	2RDR
Acenaphthylene	1.5190000	1.4299000	1.4299000	0.01	-5.86	100.00	AVRG
Acenaphthene	1.0580000	0.9952100	0.9952100	0.01	-5.93	20.00	AVRG
Fluorene	1.0440000	1.0449000	1.0449000	0.01	0.09	100.00	AVRG
Phenanthrene	0.7880000	0.7737600	0.7737600	0.01	-1.81	100.00	AVRG
Anthracene	1.0790000	1.0831000	1.0831000	0.01	0.38	100.00	AVRG
Fluoranthene	0.7800000	0.7772000	0.7772000	0.01	-0.36	20.00	AVRG
Pyrene	1.3910000	1.5030000	1.5030000	0.01	8.05	100.00	AVRG
Benzo(a)anthracene	1.1471000	1.0000000	0.7777300	0.01	14.71	100.00	LINR
Chrysene	1.1660000	1.0518000	1.0518000	0.01	-9.79	100.00	AVRG
Benzo(b)fluoranthene	1.1109000	1.0000000	0.7832100	0.01	11.09	100.00	2RDR
Benzo(k)fluoranthene	1.7180000	1.2960000	1.2960000	0.01	-24.56	100.00	AVRG
Benzo(a)pyrene	0.8930000	0.7792000	0.7792000	0.01	-12.74	20.00	AVRG
Indeno(1,2,3-cd)pyrene	0.7450000	0.6888900	0.6888900	0.01	-7.53	100.00	AVRG
Dibenzo(a,h)anthracene	0.9759100	1.0000000	0.5101000	0.01	-2.41	100.00	LINR
Benzo(g,h,i)perylene	0.7800000	0.6621300	0.6621300	0.01	-15.11	100.00	AVRG
2-Methylnaphthalene-D10	1.0480000	0.9999800	0.9999800	0.01	-4.58	100.00	AVRG
Fluorene-D10	0.9370000	0.7202200	0.7202200	0.01	-23.14	100.00	AVRG
Pyrene-D10	0.9320000	1.0172000	1.0172000	0.01	9.14	100.00	AVRG

FORM VII PEST

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Lab File ID: GD423 DFTPP Injection Date: 06/12/09

Instrument ID: GCMS-G DFTPP Injection Time: 1554

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	34.8
68	Less than 2.0% of mass 69	0.5 (1.4)1
69	Less than 100.0% of mass 198	35.1
70	Less than 2.0% of mass 69	0.2 (0.6)1
127	40.0 - 60.0% of mass 198	52.4
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.6
275	10.0 - 30.0% of mass 198	24.1
365	1.0 - 100.0% of mass 198	3.3
441	0.0 - 100.0% of mass 443	12.2 (74.2)2
442	40.0 - 100.0% of mass 198	85.7
443	17.0 - 23.0% of mass 442	16.5 (19.2)3

1-Value is % mass 69 2-Value is %.mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0612	G6041	06/12/09	1616
02	X15SS0010001	SC2797-1DL	G6042	06/12/09	1711
03	X15SS0210001	SC2797-7DL	G6043	06/12/09	1753
04	X15SS0280001	SC2797-8DL	G6044	06/12/09	1836
05	X15SS0320001	SC2797-11DL	G6045	06/12/09	1918
06	X15SS0540001	SC2797-18DL	G6046	06/12/09	2001
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Katahdin Analytical Service A0000035

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Instrument ID: GCMS-G Calibration Date: 06/12/09 Time: 1616

Lab File ID: G6041 Init. Calib. Date(s): 06/09/09 06/09/09

Init. Calib. Times: 1203 1616

GC Column: DB5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
1-Methylnaphthalene	1.4739000	1.0000000	0.7359700	0.01	(47.39)	100.00	LINR
Naphthalene	1.0573000	1.0000000	0.7720400	0.01	5.73	100.00	LINR
2-Methylnaphthalene	0.7382900	1.0000000	0.3831600	0.01	(26.17)	100.00	2RDR
Acenaphthylene	1.5190000	1.4842000	1.4842000	0.01	-2.29	100.00	AVRG
Acenaphthene	1.0580000	1.0421000	1.0421000	0.01	-1.50	20.00	AVRG
Fluorene	1.0440000	1.1220000	1.1220000	0.01	7.47	100.00	AVRG
Phenanthrene	0.7880000	0.7347400	0.7347400	0.01	-6.76	100.00	AVRG
Anthracene	1.0790000	1.1462000	1.1462000	0.01	6.23	100.00	AVRG
Fluoranthene	0.7800000	0.8169300	0.8169300	0.01	4.73	20.00	AVRG
Pyrene	1.3910000	1.2396000	1.2396000	0.01	-10.88	100.00	AVRG
Benzo(a)anthracene	1.0905000	1.0000000	0.7324600	0.01	9.05	100.00	LINR
Chrysene	1.1660000	1.1001000	1.1001000	0.01	-5.65	100.00	AVRG
Benzo(b)fluoranthene	1.0311000	1.0000000	0.7152800	0.01	3.11	100.00	2RDR
Benzo(k)fluoranthene	1.7180000	1.3562000	1.3562000	0.01	-21.06	100.00	AVRG
Benzo(a)pyrene	0.8930000	0.8419500	0.8419500	0.01	-5.72	20.00	AVRG
Indeno(1,2,3-cd)pyrene	0.7450000	0.7895400	0.7895400	0.01	5.98	100.00	AVRG
Dibenzo(a,h)anthracene	1.0702000	1.0000000	0.5638800	0.01	7.02	100.00	LINR
Benzo(g,h,i)perylene	0.7800000	0.7462100	0.7462100	0.01	-4.33	100.00	AVRG
2-Methylnaphthalene-D10	1.0480000	1.0448000	1.0448000	0.01	-0.30	100.00	AVRG
Fluorene-D10	0.9370000	1.0902000	1.0902000	0.01	16.35	100.00	AVRG
Pyrene-D10	0.9320000	0.7762600	0.7762600	0.01	-16.71	100.00	AVRG

FORM VII PEST

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Lab File ID (Standard): G5992 Date Analyzed: 06/09/09

Instrument ID: GCMS-G Time Analyzed: 1203

		IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
12 HOUR STD		27957	8.59	101146	11.46	45268	15.57
UPPER LIMIT		55914	9.13	202292	12.00	90536	16.11
LOWER LIMIT		13979	8.05	50573	10.92	22634	15.03
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	WG64521-BLANK	WG64521-1	28044	8.58	100008	11.51	42890	15.58
02	X15SS0110001	SC2797-4	24985	8.61	100814	11.54	45550	15.58
03	X15SS0290001	SC2797-9	28069	8.61	107162	11.54	45888	15.58
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IS1 (DCB) = 1,4-Dichlorobenzene-D4
IS2 (NPT) = Naphthalene-D8
IS3 (ANT) = Acenaphthene-D10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

Katahdin Analytical Service A0000040

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Lab File ID (Standard): G5992 Date Analyzed: 06/09/09

Instrument ID: GCMS-G Time Analyzed: 1203

	CLIENT SAMPLE ID	LAB SAMPLE ID	IS4(PHN) AREA #	IS4(PHN) RT #	IS5(CRY) AREA #	IS5(CRY) RT #	IS6(PRY) AREA #	IS6(PRY) RT #
	12 HOUR STD		70021	19.04	43895	25.30	29890	28.46
	UPPER LIMIT		140042	19.58	87790	25.84	59780	29.00
	LOWER LIMIT		35011	18.50	21948	24.76	14945	27.92
01	WG64521-BLANK	WG64521-1	67809	19.07	45885	25.33	30995	28.48
02	X15SS0110001	SC2797-4	77581	19.04	63518	25.28	50383	28.45
03	X15SS0290001	SC2797-9	73028	19.03	53168	25.28	44033	28.43
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IS4 (PHN) = Phenanthrene-D10
IS5 (CRY) = Chrysene-D12
IS6 (PRY) = Perylene-D12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Lab File ID (Standard): G6009 Date Analyzed: 06/10/09

Instrument ID: GCMS-G Time Analyzed: 1025

		IS1(DCB) AREA #	IS1(DCB) RT #	IS2(NPT) AREA #	IS2(NPT) RT #	IS3(ANT) AREA #	IS3(ANT) RT #
12 HOUR STD		25520	8.58	52157	11.43	40854	15.54
UPPER LIMIT		51040	9.12	104314	11.97	81708	16.08
LOWER LIMIT		12760	8.04	26079	10.89	20427	15.00
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	WG64521-LCS	WG64521-2RA	25999	8.59	89754	11.42	34807	15.54
02	X15SS0020001	SC2797-2	27220	8.59	104304	11.42	43094	15.53
03	X15SS0030001	SC2797-3RA	25034	8.61	92072	11.59	42520	15.58
04	X15SS0190001	SC2797-6	24194	8.61	88551	11.54	37796	15.58
05	X15SS0190001MS	WG64521-3	26864	8.59	96938	11.42	40281	15.54
06	X15SS0190001MSD	WG64521-4	24551	8.59	89271	11.43	36437	15.55
07	X15SS0280001	SC2797-8	23522	8.60	89056	11.48	37035	15.55
08	X15SS0320001	SC2797-11	22656	8.61	87009	11.53	39569	15.56
09	X15SS0350001	SC2797-12	24673	8.59	92877	11.45	39194	15.54
10	X15SS0540001	SC2797-18	22221	8.60	91502	11.45	40772	15.54
11	X15SS0010001	SC2797-1	21183	8.61	82559	11.48	36925	15.54
12								
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IS1 (DCB) = 1,4-Dichlorobenzene-D4
IS2 (NPT) = Naphthalene-D8
IS3 (ANT) = Acenaphthene-D10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Lab File ID (Standard): G6009 Date Analyzed: 06/10/09

Instrument ID: GCMS-G Time Analyzed: 1025

		IS4 (PHN) AREA #	RT #	IS5 (CRY) AREA #	RT #	IS6 (PRY) AREA #	RT #
12 HOUR STD		61777	19.01	42852	25.28	32433	28.45
UPPER LIMIT		123554	19.55	85704	25.82	64866	28.99
LOWER LIMIT		30889	18.47	21426	24.74	16217	27.91
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	WG64521-LCS	WG64521-2RA	51807	19.03	34666	25.30	26758	28.46
02	X15SS0020001	SC2797-2	64703	18.98	43895	25.27	38864	28.41
03	X15SS0030001	SC2797-3RA	68569	19.03	47414	25.28	36795	28.43
04	X15SS0190001	SC2797-6	61573	19.04	45662	25.28	35907	28.43
05	X15SS0190001MS	WG64521-3	63635	19.00	46375	25.27	37007	28.41
06	X15SS0190001MSD	WG64521-4	55476	19.01	39454	25.28	32911	28.43
07	X15SS0280001	SC2797-8	57518	19.00	41535	25.27	33586	28.41
08	X15SS0320001	SC2797-11	64227	19.00	48296	25.27	36212	28.41
09	X15SS0350001	SC2797-12	60685	18.98	42670	25.27	35867	28.41
10	X15SS0540001	SC2797-18	66226	18.97	41891	25.27	32128	28.43
11	X15SS0010001	SC2797-1	59623	18.97	47847	25.27	37620	28.41
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IS4 (PHN) = Phenanthrene-D10
IS5 (CRY) = Chrysene-D12
IS6 (PRY) = Perylene-D12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Lab File ID (Standard): G6027 Date Analyzed: 06/11/09

Instrument ID: GCMS-G Time Analyzed: 1149

		IS1(DCB) AREA #	IS1(DCB) RT #	IS2(NPT) AREA #	IS2(NPT) RT #	IS3(ANT) AREA #	IS3(ANT) RT #
12 HOUR STD		26091	8.59	95688	11.45	42329	15.55
UPPER LIMIT		52182	9.13	191376	11.99	84658	16.09
LOWER LIMIT		13046	8.05	47844	10.91	21165	15.01
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	X15SS0210001	SC2797-7	27940	8.58	105129	11.42	45305	15.53
02	X15SS0490001	SC2797-14	25001	8.58	100304	11.41	45454	15.52
03	X15SS0500001	SC2797-15	21949	8.59	88445	11.42	40777	15.52
04	X15SS0310001	SC2797-10	20508	8.58	76490	11.39	37614	15.52
05	X15SS0380001	SC2797-13	22038	8.58	82563	11.40	42285	15.52
06	X15SS0150001	SC2797-5	17811	8.58	72083	11.40	32767	15.53
07	X15SS0520001	SC2797-16	16067	8.58	64087	11.39	32485	15.52
08	X15SS0530001	SC2797-17	15317	8.58	50781	11.40	30061	15.53
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IS1 (DCB) = 1,4-Dichlorobenzene-D4
IS2 (NPT) = Naphthalene-D8
IS3 (ANT) = Acenaphthene-D10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

Katahdin Analytical Service A0000044

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Lab File ID (Standard): G6027 Date Analyzed: 06/11/09

Instrument ID: GCMS-G Time Analyzed: 1149

		IS4(PHN) AREA	#	RT	#	IS5(CRY) AREA	#	RT	#	IS6(PRY) AREA	#	RT	#
12 HOUR STD		64478		19.01		36501		25.28		26727		28.43	
UPPER LIMIT		128956		19.55		73002		25.82		53454		28.97	
LOWER LIMIT		32239		18.47		18251		24.74		13364		27.89	
	CLIENT SAMPLE ID	LAB SAMPLE ID											
01	X15SS0210001	SC2797-7		70678		18.97		48178		25.27		41475	28.45
02	X15SS0490001	SC2797-14		69922		18.98		40233		25.28		34423	28.45
03	X15SS0500001	SC2797-15		66606		18.98		38043		25.30		30477	28.46
04	X15SS0310001	SC2797-10		56099		18.98		25580		25.30		31176	28.46
05	X15SS0380001	SC2797-13		60096		19.00		29104		25.35		43780	28.48
06	X15SS0150001	SC2797-5		52569		18.98		44238		25.33		28746	28.48
07	X15SS0520001	SC2797-16		49779		18.99		42028		25.35		33316	28.53
08	X15SS0530001	SC2797-17		41035		19.00		57392		25.37		26069	28.53
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19													
20													

IS4 (PHN) = Phenanthrene-D10
IS5 (CRY) = Chrysene-D12
IS6 (PRY) = Perylene-D12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Lab File ID (Standard): G6041 Date Analyzed: 06/12/09

Instrument ID: GCMS-G Time Analyzed: 1616

		IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
12 HOUR STD		14684	8.60	59421	11.49	24373	15.55
UPPER LIMIT		29368	9.14	118842	12.03	48746	16.09
LOWER LIMIT		7342	8.06	29711	10.95	12187	15.01
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	X15SS0010001	SC2797-1DL	11881	8.66	45894	11.65	18391	15.60
02	X15SS0210001	SC2797-7DL	13450	8.63	47794	11.65	21030	15.59
03	X15SS0280001	SC2797-8DL	17469	8.63	52579	11.62	26385	15.58
04	X15SS0320001	SC2797-11DL	14909	8.63	50342	11.65	22439	15.59
05	X15SS0540001	SC2797-18DL	13154	8.70	31085	11.72	21165	15.64
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IS1 (DCB) = 1,4-Dichlorobenzene-D4
IS2 (NPT) = Naphthalene-D8
IS3 (ANT) = Acenaphthene-D10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

Katahdin Analytical Service A0000046

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Lab File ID (Standard): G6041 Date Analyzed: 06/12/09

Instrument ID: GCMS-G Time Analyzed: 1616

		IS4 (PHN) AREA	#	RT	#	IS5 (CRY) AREA	#	RT	#	IS6 (PRY) AREA	#	RT	#
12 HOUR STD		41922		19.00		32347		25.28		26014		28.43	
UPPER LIMIT		83844		19.54		64694		25.82		52028		28.97	
LOWER LIMIT		20961		18.46		16174		24.74		13007		27.89	
	CLIENT SAMPLE ID	LAB SAMPLE ID											
01	X15SS0010001	SC2797-1DL		37790		19.00		26231		25.27		24325	28.41
02	X15SS0210001	SC2797-7DL		36598		19.00		31942		25.25		26438	28.41
03	X15SS0280001	SC2797-8DL		41132		18.99		29333		25.25		25689	28.41
04	X15SS0320001	SC2797-11DL		41642		19.00		30511		25.27		27648	28.41
05	X15SS0540001	SC2797-18DL		43275		19.03		35755		25.27		33518	28.41
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IS4 (PHN) = Phenanthrene-D10
IS5 (CRY) = Chrysene-D12
IS6 (PRY) = Perylene-D12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG64961-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDAIN HEAD SDG No.: CTO423-1

Lab File ID: U7353 Lab Sample ID: WG64961-1

Instrument ID: GCMS-U Date Extracted:

Matrix: (soil/water) SOIL Date Analyzed: 06/15/09

Level:(low/med) LOW Time Analyzed: 1503

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	X15SS0150001	SC2797-19DL	U7335	06/12/09	1435
02	X15SS0310001	SC2797-20DL	U7336	06/12/09	1519
03	X15SS0350001	SC2797-21	U7337	06/12/09	1603
04	X15SS0380001	SC2797-22DL	U7338	06/12/09	1647
05	X15SS0490001	SC2797-23DL	U7339	06/12/09	1730
06	X15SS0500001	SC2797-24DL	U7340	06/12/09	1814
07	X15SS0520001	SC2797-25DL	U7341	06/12/09	1858
08	X15SS0530001	SC2797-26DL	U7342	06/12/09	1941
09	WG64961-LCS	WG64961-2	U7354	06/15/09	1546
10	X15SS0020001	SC2797-27DL	U7355	06/15/09	1630
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COMMENTS:

FORM IVSV

Katahdin Analytical Service A0000060

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client:
Project: CTO 423 NSF Indain Head
PO No:
Sample Date:
Received Date:
Extraction Date:
Analysis Date: 15-JUN-2009 15:03
Report Date: 06/16/2009
Matrix: SOIL
% Solids: 100

Lab ID: WG64961-1
Client ID: WG64961-Blank
SDG: CTO423-1
Extracted by:
Extraction Method: SW846 3510
Analyst: JCG
Analysis Method: SW846 8270C
Lab Prep Batch: WG64961
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
91-20-3	Naphthalene	U	330	1.0	330	330	87
91-57-6	2-Methylnaphthalene	U	330	1.0	330	330	92
208-96-8	Acenaphthylene	U	330	1.0	330	330	70
83-32-9	Acenaphthene	U	330	1.0	330	330	65
86-73-7	Fluorene	U	330	1.0	330	330	81
85-01-8	Phenanthrene	U	330	1.0	330	330	83
120-12-7	Anthracene	U	330	1.0	330	330	84
206-44-0	Fluoranthene	U	330	1.0	330	330	110
129-00-0	Pyrene	U	330	1.0	330	330	100
56-55-3	Benzo(a)anthracene	U	330	1.0	330	330	86
218-01-9	Chrysene	U	330	1.0	330	330	95
205-99-2	Benzo(b)fluoranthene	U	330	1.0	330	330	130
207-08-9	Benzo(k)fluoranthene	U	330	1.0	330	330	83
50-32-8	Benzo(a)pyrene	U	330	1.0	330	330	93
193-39-5	Indeno(1,2,3-cd)pyrene	U	330	1.0	330	330	120
53-70-3	Dibenzo(a,h)anthracene	U	330	1.0	330	330	130
191-24-2	Benzo(g,h,i)perylene	U	330	1.0	330	330	100
90-12-0	1-Methylnaphthalene	U	330	1.0	330	330	120
4165-60-0	Nitrobenzene-D5		54%				
321-60-8	2-Fluorobiphenyl		59%				
1718-51-0	Terphenyl-D14		87%				

KATAHDIN ANALYTICAL SERVICES
LAB CONTROL SAMPLE

Client:
Project: CTO 423 NSF Indain Head
PO No:
Sample Date:
Received Date:
Extraction Date:
Analysis Date: 06/15/09
Report Date: 06/16/2009
Matrix: SOIL

Lab ID: WG64961-2
Client ID: WG64961-LCS
SDG: CTO423-1
Extracted by:
Extraction Method: SW846 3510
Analyst: JCG
Analysis Method: SW846 8270C
Lab Prep Batch: WG64961
Units: ug/Kgdrywt

COMPOUND	LCS SPIKE	SAMPLE CONC.	LCS CONC.	%REC.	QC. LIMITS
Naphthalene	1667	NA	1150	69	40- 99
2-Methylnaphthalene	1667	NA	1740	104	43-112
Acenaphthylene	1667	NA	1220	73	47-118
Acenaphthene	1667	NA	1250	75	60-111
Fluorene	1667	NA	1270	76	61-112
Phenanthrene	1667	NA	1320	79	60-120
Anthracene	1667	NA	1350	81	58-118
Fluoranthene	1667	NA	1380	83	61-134
Pyrene	1667	NA	1340	80	63-123
Benzo(a)anthracene	1667	NA	1210	73	64-122
Chrysene	1667	NA	1280	77	61-119
Benzo(b)fluoranthene	1667	NA	1210	73	54-121
Benzo(k)fluoranthene	1667	NA	1340	80	50-126
Benzo(a)pyrene	1667	NA	1240	74	61-124
Indeno(1,2,3-cd)pyrene	1667	NA	929	56	45-153
Dibenzo(a,h)anthracene	1667	NA	1140	68	60-149
Benzo(g,h,i)perylene	1667	NA	1070	64	55-144
1-Methylnaphthalene	1667	NA	1210	73	46- 98

Katahdin Analytical Service A0000059

FORM 2
SOIL SEMIVOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDAIN HEAD SDG No.: CTO423-1

Level:(low/med) LOW

	CLIENT SAMPLE ID	LAB SAMPLE ID	S1 NBZ#	S2 FBP#	S3 TPH#	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	X15SS0150001	SC2797-19DL	D	D	D						0
02	X15SS0310001	SC2797-20DL	D	D	D						0
03	X15SS0350001	SC2797-21	0*	0*	0*						3
04	X15SS0380001	SC2797-22DL	D	D	D						0
05	X15SS0490001	SC2797-23DL	D	D	D						0
06	X15SS0500001	SC2797-24DL	D	D	D						0
07	X15SS0520001	SC2797-25DL	D	D	D						0
08	X15SS0530001	SC2797-26DL	D	D	D						0
09	WG64961-BLANK	WG64961-1	54	59	87						0
10	WG64961-LCS	WG64961-2	69	69	87						0
11	X15SS0020001	SC2797-27DL	0*	0*	0*						3
12											
13											
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28											

	QC LIMITS
S1 (NBZ) = Nitrobenzene-D5	(47-100)
S2 (FBP) = 2-Fluorobiphenyl	(49-114)
S3 (TPH) = Terphenyl-D14	(58-140)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

Katahdin Analytical Service A0000058

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDAIN HEAD SDG No.: CTO423-1

Lab File ID: UD077 DFTPP Injection Date: 05/29/09

Instrument ID: GCMS-U DFTPP Injection Time: 0937

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	33.8
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Less than 100.0% of mass 198	38.7
70	Less than 2.0% of mass 69	0.0 (0.0)1
127	40.0 - 60.0% of mass 198	50.2
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.8
275	10.0 - 30.0% of mass 198	25.4
365	1.0 - 100.0% of mass 198	3.4
441	0.0 - 100.0% of mass 443	13.6 (77.9)2
442	40.0 - 100.0% of mass 198	90.8
443	17.0 - 23.0% of mass 442	17.4 (19.1)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD050U0529	U7146	05/29/09	0956
02		SSTD010U0529	U7147	05/29/09	1040
03		SSTD025U0529	U7148	05/29/09	1124
04		SSTD075U0529	U7149	05/29/09	1207
05		SSTD100U0529	U7150	05/29/09	1251
06		SSTD125U0529	U7151	05/29/09	1335
07					
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Katahdin Analytical Service A0000061

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project CTO 423 NSF INDAIN HEAD SDG No.: CTO423-1

Instrument ID: GCMS-U Calibration Date(s): 05/29/09 05/29/09

Column: DB5-MS ID: 0.25 (mm) Calibration Time(s): 0956 1335

LAB FILE ID: RF10: U7147 RF25: U7148 RF50: U7146
RF75: U7149 RF100: U7150 RF125: U7151

COMPOUND	RF10	RF25	RF50	RF75	RF100	RF125	CURVE	COEFF. A1	%RSD OR R^2	MAX %RSD OR R^2
Naphthalene	0.952	0.970	0.955	0.793	0.833	0.798	AVRG	0.88334600	9.501	15.000
2-Methylnaphthalene	0.774	0.788	0.774	0.631	0.650	0.723	AVRG	0.72357806	9.443	15.000
Acenaphthylene	1.828	1.824	1.842	1.539	1.592	1.477	AVRG	1.68372893	9.861	15.000
Acenaphthene	1.114	1.173	1.066	0.960	1.030	0.982	AVRG	1.05404356	7.650	15.000
Fluorene	1.239	1.239	1.236	1.055	1.086	1.014	AVRG	1.14504008	9.118	15.000
Phenanthrene	1.072	1.119	1.080	0.970	1.006	0.944	AVRG	1.03176421	6.661	15.000
Anthracene	1.054	1.156	1.076	0.887	0.968	0.984	AVRG	1.02075449	9.245	15.000
Fluoranthene	1.057	1.099	1.001	0.859	0.880	0.923	AVRG	0.96985767	10.082	15.000
Pyrene	1.128	1.285	1.215	1.103	1.125	1.116	AVRG	1.16226642	6.192	15.000
Benzo(a)anthracene	0.946	0.951	0.929	0.836	0.956	0.920	AVRG	0.92307095	4.830	15.000
Chrysene	0.949	0.946	0.924	0.774	0.839	0.798	AVRG	0.87176896	8.933	15.000
Benzo(b)fluoranthene	1.006	1.058	0.962	0.847	0.952	0.881	AVRG	0.95116885	8.194	15.000
Benzo(k)fluoranthene	1.073	1.130	1.076	0.864	0.980	0.807	AVRG	0.98843194	13.057	15.000
Benzo(a)pyrene	0.916	0.955	0.945	0.817	0.910	0.824	AVRG	0.89456419	6.683	15.000
Indeno(1,2,3-cd)pyrene	0.601	0.715	0.733	0.678	0.780	0.730	AVRG	0.70632841	8.682	15.000
Dibenzo(a,h)anthracene	0.675	0.784	0.745	0.691	0.772	0.747	AVRG	0.73553159	5.967	15.000
Benzo(g,h,i)perylene	0.676	0.821	0.820	0.724	0.835	0.786	AVRG	0.77710432	8.189	15.000
1-Methylnaphthalene	0.616	0.616	0.608	0.518	0.541	0.523	AVRG	0.57012920	8.386	15.000
Nitrobenzene-D5	0.282	0.314	0.319	0.280	0.312	0.308	AVRG	0.30225690	5.651	15.000
2-Fluorobiphenyl	1.224	1.351	1.269	1.109	1.170	1.054	AVRG	1.19617587	9.033	15.000
Terphenyl-D14	0.767	0.804	0.765	0.693	0.712	0.676	AVRG	0.73638684	6.778	15.000

Average %RSD test result.

Calculate Average %RSD: 9.141575813
Maximum Average %RSD: 15.00000000

Note: Passes Average %RSD Test.

FORM VI SV

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDAIN HEAD SDG No.: CTO423-1

Lab File ID: UD089 DFTPP Injection Date: 06/12/09

Instrument ID: GCMS-U DFTPP Injection Time: 1112

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	35.3
68	Less than 2.0% of mass 69	0.6 (1.4)1
69	Less than 100.0% of mass 198	39.3
70	Less than 2.0% of mass 69	0.2 (0.5)1
127	40.0 - 60.0% of mass 198	51.7
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	7.0
275	10.0 - 30.0% of mass 198	24.1
365	1.0 - 100.0% of mass 198	3.2
441	0.0 - 100.0% of mass 443	13.6 (80.2)2
442	40.0 - 100.0% of mass 198	86.7
443	17.0 - 23.0% of mass 442	16.9 (19.5)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD050U0612	U7331	06/12/09	1131
02	X15SS0150001	SC2797-19DL	U7335	06/12/09	1435
03	X15SS0310001	SC2797-20DL	U7336	06/12/09	1519
04	X15SS0350001	SC2797-21	U7337	06/12/09	1603
05	X15SS0380001	SC2797-22DL	U7338	06/12/09	1647
06	X15SS0490001	SC2797-23DL	U7339	06/12/09	1730
07	X15SS0500001	SC2797-24DL	U7340	06/12/09	1814
08	X15SS0520001	SC2797-25DL	U7341	06/12/09	1858
09	X15SS0530001	SC2797-26DL	U7342	06/12/09	1941
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Katahdin Analytical Service A0000062

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDAIN HEAD SDG No.: CTO423-1

Instrument ID: GCMS-U Calibration Date: 06/12/09 Time: 1131

Lab File ID: U7331 Init. Calib. Date(s): 05/29/09 05/29/09

Init. Calib. Times: 0956 1335

GC Column: DB5-MS ID: 0.25 (mm)

COMPOUND	RRF OR AMOUNT	RRF50.000 OR AMOUNT	MIN RRF	%D OR %DRIFT	MAX %D OR %DRIFT	CURV TYPE
Naphthalene	0.8840000	1.0378000	0.01	17.40	100.00	AVRG
2-Methylnaphthalene	0.7230000	0.8859800	0.01	22.54	100.00	AVRG
Acenaphthylene	1.6840000	1.8594000	0.01	10.42	100.00	AVRG
Acenaphthene	1.0540000	1.1759000	0.01	11.56	20.00	AVRG
Fluorene	1.1450000	1.2495000	0.01	9.13	100.00	AVRG
Phenanthrene	1.0320000	1.1352000	0.01	10.00	100.00	AVRG
Anthracene	1.0210000	1.1454000	0.01	12.18	100.00	AVRG
Fluoranthene	0.9700000	1.0566000	0.01	8.93	20.00	AVRG
Pyrene	1.1620000	1.3924000	0.01	19.83	100.00	AVRG
Benzo(a)anthracene	0.9230000	0.9986900	0.01	8.20	100.00	AVRG
Chrysene	0.8720000	0.9521100	0.01	9.19	100.00	AVRG
Benzo(b)fluoranthene	0.9510000	1.0423000	0.01	9.60	100.00	AVRG
Benzo(k)fluoranthene	0.9880000	1.0196000	0.01	3.20	100.00	AVRG
Benzo(a)pyrene	0.8940000	0.9598100	0.01	7.36	20.00	AVRG
Indeno(1,2,3-cd)pyrene	0.7060000	0.7944100	0.01	12.52	100.00	AVRG
Dibenzo(a,h)anthracene	0.7360000	0.7991000	0.01	8.57	100.00	AVRG
Benzo(g,h,i)perylene	0.7770000	0.8894700	0.01	14.48	100.00	AVRG
1-Methylnaphthalene	0.5700000	0.6818400	0.01	19.62	100.00	AVRG
Nitrobenzene-D5	0.3020000	0.3476300	0.01	15.11	100.00	AVRG
2-Fluorobiphenyl	1.1960000	1.2156000	0.01	1.64	100.00	AVRG
Terphenyl-D14	0.7360000	0.8439600	0.01	14.67	100.00	AVRG

FORM VII PEST

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDAIN HEAD SDG No.: CTO423-1

Lab File ID: UD090 DFTPP Injection Date: 06/15/09

Instrument ID: GCMS-U DFTPP Injection Time: 1021

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	36.4
68	Less than 2.0% of mass 69	0.3 (0.8)1
69	Less than 100.0% of mass 198	41.7
70	Less than 2.0% of mass 69	0.0 (0.0)1
127	40.0 - 60.0% of mass 198	51.9
197	Less than 1.0% of mass 198	0.2
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.8
275	10.0 - 30.0% of mass 198	25.1
365	1.0 - 100.0% of mass 198	3.3
441	0.0 - 100.0% of mass 443	13.4 (80.9)2
442	40.0 - 100.0% of mass 198	88.3
443	17.0 - 23.0% of mass 442	16.6 (18.8)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD050U0615	U7347	06/15/09	1040
02	WG64961-BLANK	WG64961-1	U7353	06/15/09	1503
03	WG64961-LCS	WG64961-2	U7354	06/15/09	1546
04	X15SS0020001	SC2797-27DL	U7355	06/15/09	1630
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19					
20					

Katahdin Analytical Service A0000063

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDAIN HEAD SDG No.: CTO423-1

Instrument ID: GCMS-U Calibration Date: 06/15/09 Time: 1040

Lab File ID: U7347 Init. Calib. Date(s): 05/29/09 05/29/09

Init. Calib. Times: 0956 1335

GC Column: DB5-MS ID: 0.25 (mm)

COMPOUND	RRF OR AMOUNT	RRF50.000 OR AMOUNT	MIN RRF	%D OR %DRIFT	MAX %D OR %DRIFT	CURV TYPE	
Naphthalene	0.8840000	0.9878000	0.01	11.74	100.00	AVRG	
2-Methylnaphthalene	0.7230000	0.8572700	0.01	18.57	100.00	AVRG	
Acenaphthylene	1.6840000	1.9575000	0.01	16.24	100.00	AVRG	
Acenaphthene	1.0540000	1.1875000	0.01	12.67	20.00	AVRG	
Fluorene	1.1450000	1.2418000	0.01	8.45	100.00	AVRG	
Phenanthrene	1.0320000	1.1865000	0.01	14.97	100.00	AVRG	
Anthracene	1.0210000	1.1701000	0.01	14.60	100.00	AVRG	
Fluoranthene	0.9700000	1.1851000	0.01	22.18	20.00	AVRG	<-
Pyrene	1.1620000	1.4178000	0.01	22.01	100.00	AVRG	
Benzo(a)anthracene	0.9230000	1.0477000	0.01	13.51	100.00	AVRG	
Chrysene	0.8720000	0.9807500	0.01	12.47	100.00	AVRG	
Benzo(b)fluoranthene	0.9510000	1.1326000	0.01	19.10	100.00	AVRG	
Benzo(k)fluoranthene	0.9880000	1.2249000	0.01	23.98	100.00	AVRG	
Benzo(a)pyrene	0.8940000	0.9827700	0.01	9.93	20.00	AVRG	
Indeno(1,2,3-cd)pyrene	0.7060000	0.6771500	0.01	-4.09	100.00	AVRG	
Dibenzo(a,h)anthracene	0.7360000	0.8275500	0.01	12.44	100.00	AVRG	
Benzo(g,h,i)perylene	0.7770000	0.7811800	0.01	0.54	100.00	AVRG	
1-Methylnaphthalene	0.5700000	0.6337400	0.01	11.18	100.00	AVRG	
Nitrobenzene-D5	0.3020000	0.3404300	0.01	12.72	100.00	AVRG	
2-Fluorobiphenyl	1.1960000	1.2860000	0.01	7.52	100.00	AVRG	
Terphenyl-D14	0.7360000	0.8892600	0.01	20.82	100.00	AVRG	

FORM VII PEST

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDAIN HEAD SDG No.: CTO423-1

Lab File ID (Standard): U7331 Date Analyzed: 06/12/09

Instrument ID: GCMS-U Time Analyzed: 1131

			IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
12 HOUR STD			317312	8.72	1081398	11.78	586832	16.33
UPPER LIMIT			634624	9.22	2162796	12.28	1173664	16.83
LOWER LIMIT			158656	8.22	540699	11.28	293416	15.83
	CLIENT SAMPLE ID	LAB SAMPLE ID						
01	X15SS0150001	SC2797-19DL	315061	8.72	1186410	11.78	603176	16.34
02	X15SS0310001	SC2797-20DL	298879	8.72	1121509	11.78	548251	16.34
03	X15SS0350001	SC2797-21	334557	8.73	1359502	11.78	701936	16.33
04	X15SS0380001	SC2797-22DL	330016	8.72	1238956	11.78	600277	16.33
05	X15SS0490001	SC2797-23DL	294278	8.72	1117654	11.78	540386	16.33
06	X15SS0500001	SC2797-24DL	325940	8.72	1158456	11.78	585980	16.33
07	X15SS0520001	SC2797-25DL	318538	8.71	1185354	11.78	599334	16.33
08	X15SS0530001	SC2797-26DL	305999	8.72	1159399	11.78	594171	16.33
09								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

IS1 (DCB) = 1,4-Dichlorobenzene-D4
IS2 (NPT) = Naphthalene-D8
IS3 (ANT) = Acenaphthene-D10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

Katahdin Analytical Service A0000067

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDAIN HEAD SDG No.: CTO423-1

Lab File ID (Standard): U7331 Date Analyzed: 06/12/09

Instrument ID: GCMS-U Time Analyzed: 1131

		IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
12 HOUR STD		958808	20.23	771581	27.22	638927	30.71
UPPER LIMIT		1917616	20.73	1543162	27.72	1277854	31.21
LOWER LIMIT		479404	19.73	385791	26.72	319464	30.21
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	X15SS0150001	SC2797-19DL	1018462	20.23	699037	27.22	530962	30.71
02	X15SS0310001	SC2797-20DL	921424	20.23	672411	27.21	552595	30.71
03	X15SS0350001	SC2797-21	1180108	20.23	828432	27.23	681858	30.72
04	X15SS0380001	SC2797-22DL	982987	20.23	661035	27.23	554087	30.71
05	X15SS0490001	SC2797-23DL	852661	20.23	532762	27.21	446496	30.71
06	X15SS0500001	SC2797-24DL	909586	20.23	649385	27.21	542803	30.71
07	X15SS0520001	SC2797-25DL	967379	20.22	753449	27.23	622137	30.72
08	X15SS0530001	SC2797-26DL	974276	20.23	706070	27.22	557848	30.71
09								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

IS4 (PHN) = Phenanthrene-D10
IS5 (CRY) = Chrysene-D12
IS6 (PRY) = Perylene-D12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDAIN HEAD SDG No.: CTO423-1

Lab File ID (Standard): U7347 Date Analyzed: 06/15/09

Instrument ID: GCMS-U Time Analyzed: 1040

		IS1(DCB) AREA #	IS1(DCB) RT #	IS2(NPT) AREA #	IS2(NPT) RT #	IS3(ANT) AREA #	IS3(ANT) RT #
12 HOUR STD		308738	8.72	1142097	11.78	585711	16.33
UPPER LIMIT		617476	9.22	2284194	12.28	1171422	16.83
LOWER LIMIT		154369	8.22	571049	11.28	292856	15.83
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	WG64961-BLANK	WG64961-1	328448	8.72	1230651	11.78	637363	16.35
02	WG64961-LCS	WG64961-2	333958	8.72	1249529	11.78	666335	16.32
03	X15SS0020001	SC2797-27DL	321270	8.72	1189347	11.79	607209	16.33
04								
05								
06								
07								
08								
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12								
13								
14								
15								
16								
17								
18								
19								
20								

IS1 (DCB) = 1,4-Dichlorobenzene-D4
IS2 (NPT) = Naphthalene-D8
IS3 (ANT) = Acenaphthene-D10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

Katahdin Analytical Service A0000069

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDAIN HEAD SDG No.: CTO423-1

Lab File ID (Standard): U7347 Date Analyzed: 06/15/09

Instrument ID: GCMS-U Time Analyzed: 1040

		IS4(PHN) AREA #	IS4(PHN) RT #	IS5(CRY) AREA #	IS5(CRY) RT #	IS6(PRY) AREA #	IS6(PRY) RT #
12 HOUR STD		952397	20.23	805672	27.23	557607	30.71
UPPER LIMIT		1904794	20.73	1611344	27.73	1115214	31.21
LOWER LIMIT		476199	19.73	402836	26.73	278804	30.21
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	WG64961-BLANK	WG64961-1	1049483	20.24	770286	27.23	587090	30.73
02	WG64961-LCS	WG64961-2	1109998	20.23	1003164	27.22	746939	30.71
03	X15SS0020001	SC2797-27DL	997519	20.23	834827	27.22	638474	30.71
04								
05								
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08								
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10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

IS4 (PHN) = Phenanthrene-D10
IS5 (CRY) = Chrysene-D12
IS6 (PRY) = Perylene-D12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

Sample Calculation

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 05/27/09
Received Date: 06/02/09
Extraction Date: 06/03/09
Analysis Date: 10-JUN-2009 21:59
Report Date: 06/15/2009
Matrix: SOIL
% Solids: 77.3

Lab ID: SC2797-1
Client ID: X15SS0010001
SDG: CTO423-1
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG64521
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	J	5.4	1.0	20	26	2.2
91-20-3	Naphthalene		52	1.0	20	26	3.4
91-57-6	2-Methylnaphthalene	J	20	1.0	20	26	2.8
208-96-8	Acenaphthylene	U	26	1.0	20	26	1.6
83-32-9	Acenaphthene		180	1.0	20	26	1.9
86-73-7	Fluorene		110	1.0	20	26	4.1
85-01-8	Phenanthrene	E	1300	1.0	20	26	2.3
120-12-7	Anthracene		330	1.0	20	26	1.6
206-44-0	Fluoranthene	E	2000	1.0	20	26	2.3
129-00-0	Pyrene	E	1400	1.0	20	26	2.7
56-55-3	Benzo(a)anthracene	E	1400	1.0	20	26	2.4
218-01-9	Chrysene	E	1100	1.0	20	26	2.2
205-99-2	Benzo(b)fluoranthene	E	2800	1.0	20	26	3.1
207-08-9	Benzo(k)fluoranthene	E	650	1.0	20	26	4.0
50-32-8	Benzo(a)pyrene	E	1500	1.0	20	26	4.3
193-39-5	Indeno(1,2,3-cd)pyrene	E	1000	1.0	20	26	2.4
53-70-3	Dibenzo(a,h)anthracene	E	360	1.0	20	26	2.3
191-24-2	Benzo(g,h,i)perylene	E	910	1.0	20	26	2.6
321-60-8	2-Methylnaphthalene-D10		57%				
118-79-6	Fluorene-D10		57%				
1718-51-0	Pyrene-D10		56%				

Sample Calculation

Data File: \\Target_server\GG\chem\gcms-g.i\G061009.b\G6025.D
Report Date: 15-Jun-2009 11:34

Katahdin Analytical Services

Data file : \\Target_server\GG\chem\gcms-g.i\G061009.b\G6025.D
Lab Smp Id: SC2797-1 Client Smp ID: X15SS0010001
Inj Date : 10-JUN-2009 21:59 MS Autotune Date: 30-APR-2008 17:47
Operator : JCG Inst ID: gcms-g.i
Smp Info : SC2797-1
Misc Info : SW846 M8270C
Comment :
Method : \\target_server\GG\chem\gcms-g.i\G061009.b\gspsim11.m
Meth Date : 11-Jun-2009 16:32 gcms-g.i Quant Type: ISTD
Cal Date : 09-JUN-2009 16:16 Cal File: G5998.D
Als bottle: 18
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: tetrat423001.sub
Target Version: 4.12

Concentration Formula: Amt * DF * (Vt/Ws*Vi)*(100/(100-M))*1000 * CpndVariab

Name	Value	Description
DF	1.000	Dilution Factor
Vt	0.00100	Volume of final extract (L)
Ws	0.03000	Weight of sample extracted (Kg)
Vi	1.000	Volume injected (uL)
M	22.651	% Moisture
Cpnd Variable		Local Compound Variable

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/ml)	CONCENTRATIONS FINAL (ug/Kgdrywt)	REVIEW
*	6 1,4-Dichlorobenzene-D4	152	8.606	8.583	(1.000)	21183	0.80000		
*	19 Naphthalene-D8	136	11.479	11.434	(1.000)	82559	0.80000		
	20 Naphthalene	128	11.524	11.479	(1.004)	89265	1.19573	51.5	
$	25 2-Methylnaphthalene-D10	152	13.076	13.061	(0.841)	55345	1.14434	49.3	
	26 2-Methylnaphthalene	142	13.151	13.136	(1.146)	20568	0.46969	20.2(a)	
	27 1-Methylnaphthalene	142	13.362	13.347	(1.164)	16555	0.12439	5.36(aM)	M9
*	38 Acenaphthene-D10	164	15.541	15.541	(1.000)	36925	0.80000		
	40 Acenaphthene	153	15.612	15.612	(1.005)	205132	4.19965	181	
$	46 Fluorene-D10	176	16.761	16.761	(1.079)	49393	1.14204	49.2	
	48 Fluorene	166	16.821	16.821	(1.082)	118342	2.45525	106	
*	57 Phenanthrene-D10	188	18.974	19.013	(1.000)	59623	0.80000		
	58 Phenanthrene	178	19.026	19.065	(1.003)	1772453	30.1842	1300(A)	
	59 Anthracene	178	19.142	19.168	(1.009)	608999	7.57449	326	
	62 Fluoranthene	202	21.855	21.868	(1.152)	2720607	46.7834	2020(A)	
$	63 Pyrene-D10	212	22.320	22.333	(0.883)	62894	1.12875	48.6	
	64 Pyrene	202	22.358	22.371	(0.885)	2645787	31.8026	1370(A)	
	66 Benzo(a)anthracene	228	25.213	25.248	(0.998)	1555980	32.6827	1410(A)	
*	67 Chrysene-D12	240	25.265	25.283	(1.000)	47847	0.80000		
	69 Chrysene	228	25.317	25.351	(1.002)	1792095	25.7052	1110(A)	
	72 Benzo(b)fluoranthene	252	27.638	27.673	(0.973)	1702386	64.6868	2790(AQM)	M10
	73 Benzo(k)fluoranthene	252	27.689	27.724	(0.975)	1216320	15.0575	649(AMH)	M1

cm 6-15-09

Data File: \\Target_server\GG\chem\gcms-g.i\G061009.b\G6025.D
Report Date: 15-Jun-2009 11:34

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/ml)	CONCENTRATIONS FINAL (ug/Kgdrywt)	REVIEW
74 Benzo(a)pyrene	252	28.291	28.326	(0.996)	1443741	34.3717	1480(A)	
* 75 Perylene-D12	264	28.412	28.446	(1.000)	37620	0.80000		
76 Indeno(1,2,3-cd)pyrene	276	30.595	30.647	(1.077)	824728	23.5427	1010(A)	
77 Dibenzo(a,h)anthracene	278	30.647	30.699	(1.079)	219244	8.25500	356(AM)	M3
78 Benzo(g,h,i)perylene	276	31.197	31.249	(1.098)	773352	21.0648	908(A)	

cm 6-15-09

QC Flag Legend

a - Target compound detected but, quantitated amount Below Limit Of Quantitation(BLOQ).
A - Target compound detected but, quantitated amount exceeded maximum amount.
Q - Qualifier signal failed the ratio test.
M - Compound response manually integrated.
H - Operator selected an alternate compound hit.

Sample Calculation

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-1

Instrument ID: GCMS-G Calibration Date: 06/10/09 Time: 1025

Lab File ID: G6009 Init. Calib. Date(s): 06/09/09 06/09/09

Init. Calib. Times: 1203 1616

GC Column: DB5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE	
1-Methylnaphthalene	2.1068000	1.0000000	1.0059000	0.01	110.68	100.00	LINR	<-
Naphthalene	1.0857000	1.0000000	0.7910700	0.01	8.57	100.00	LINR	
2-Methylnaphthalene	1.5650000	1.0000000	0.9208600	0.01	56.50	100.00	2RDR	
Acenaphthylene	1.5190000	1.5334000	1.5334000	0.01	0.95	100.00	AVRG	
Acenaphthene	1.0580000	1.0269000	1.0269000	0.01	-2.94	20.00	AVRG	
Fluorene	1.0440000	1.0338000	1.0338000	0.01	-0.98	100.00	AVRG	
Phenanthrene	0.7880000	0.8205100	0.8205100	0.01	4.12	100.00	AVRG	
Anthracene	1.0790000	1.0232000	1.0232000	0.01	-5.17	100.00	AVRG	
Fluoranthene	0.7800000	0.8014600	0.8014600	0.01	2.75	20.00	AVRG	
Pyrene	1.3910000	1.2879000	1.2879000	0.01	-7.41	100.00	AVRG	
Benzo(a)anthracene	1.1087000	1.0000000	0.7470500	0.01	10.87	100.00	LINR	
Chrysene	1.1660000	1.0864000	1.0864000	0.01	-6.83	100.00	AVRG	
Benzo(b)fluoranthene	0.9764200	1.0000000	0.6685500	0.01	-2.36	100.00	2RDR	
Benzo(k)fluoranthene	1.7180000	1.4633000	1.4633000	0.01	-14.82	100.00	AVRG	
Benzo(a)pyrene	0.8930000	0.7790800	0.7790800	0.01	-12.76	20.00	AVRG	
Indeno(1,2,3-cd)pyrene	0.7450000	0.7207200	0.7207200	0.01	-3.26	100.00	AVRG	
Dibenzo(a,h)anthracene	1.0378000	1.0000000	0.5454000	0.01	3.78	100.00	LINR	
Benzo(g,h,i)perylene	0.7800000	0.7113500	0.7113500	0.01	-8.80	100.00	AVRG	
2-Methylnaphthalene-D10	1.0480000	0.9534200	0.9534200	0.01	-9.02	100.00	AVRG	
Fluorene-D10	0.9370000	0.7788500	0.7788500	0.01	-16.88	100.00	AVRG	
Pyrene-D10	0.9320000	0.8538200	0.8538200	0.01	-8.39	100.00	AVRG	

FORM VII PEST

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE _____ OF _____

CLIENT		JOB NUMBER	
NSF INDIAN HEAD		CTO423-1	
SUBJECT			
Sample Calculation			
BASED ON		DRAWING NUMBER	
BY	CHECKED BY	APPROVED BY	DATE
Ann Cognetta			July 1, 2009

Acenaphthene (in Sample X15550010001

$$\frac{205132}{36925} * \frac{0.80}{1.058} * \frac{100}{77.349} * \frac{1}{0.03} = 181.0 \text{ ug/kg}$$

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: R. BASINSKI **DATE:** JULY 9, 2009

FROM: TERRI L. SOLOMON **COPIES:** DV FILE

SUBJECT: **INORGANIC DATA VALIDATION – SELECT METALS**
NSF INDIAN HEAD
SAMPLE DELIVERY GROUP (SDG) – CTO423-2

SAMPLES: 20/Soil/

X14SS001C0001	X14SS002C0001	X14SS003C0001
X14SS004C0001	X14SS005C0001	X14SS006C0001
X14SS007C0001	X14SS008C0001	X14SS009C0001
X15SS0050001	X15SS0070001	X15SS0180001
X15SS0350001	X15SS0370001	X15SS0610001
X15SS0640001	X15SS0660001	X15SS0680001
X15SS0700001	X15SSB0050102	

Overview

The sample set for NSF Indian Head, SDG CTO423-2, consists of twenty (20) soil environmental samples. No field duplicate pairs were included within this SDG.

All samples were analyzed for antimony, arsenic, copper, lead, tin and zinc. The samples were collected by Tetra Tech NUS, Inc. on May 27, 28, 29 and June 1 and 2, 2009 and analyzed by Katahdin Analytical Services under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Metals analyses were conducted using ICP/MS SW-846 method 6020A.

Summary

All analytes were successfully analyzed. The findings offered in this report are based upon a general review of all available data. The data review was based on data completeness, holding times, calibration data, ICP/MS tune, laboratory method/preparation blanks, interference check sample (ICS) results, matrix spike results, laboratory duplicate results, laboratory control sample (LCS) results, ICP serial dilution results, ICP/MS internal standard recoveries, detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems - None

Minor Problems

- The following contaminants were detected in the laboratory method/preparation blanks at the following maximum concentrations:

Analyte	Maximum Concentration	Action Level
Antimony	0.05 ug/L	0.025 mg/kg
Copper[(1)]	0.271 mg/kg	1.355 mg/kg
Lead	0.66 ug/L	0.33 mg/kg
Tin[(1)]	0.767 mg/kg	3.835 mg/kg

(1) Maximum concentration present in a preparation blank.

An action level of 5X the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot and dilution factors, if applicable, were taken into consideration when evaluating for blank contamination. The positive results less than the blank action level reported for tin were qualified "B" as a result of laboratory blank contamination.

- The matrix spike percent recoveries for antimony and copper were < 75% quality control limit. The positive results reported for antimony were qualified as estimated, "J", as a result of conflicting noncompliances. The positive results reported for copper were qualified as biased low, "L".

- The laboratory duplicate imprecision for antimony was > 35%. The positive results reported for antimony were qualified as estimated, "J".

Notes

The Contract Required Detection Limit (CRDL) percent recoveries for arsenic, copper, tin, zinc and lead were outside the 90-110% quality control limit. No validation actions were required as all sample results were either > 2X CRDL or were qualified as a result of blank contamination.

All preparation blank samples were analyzed at a 5X dilution. All environmental samples were analyzed at a minimum dilution of 5X with the exception of mercury.

The ICP/MS tune percent relative standard deviation was > 5% quality control limit for Mg_{24}. No validation actions were warranted as all reported sample results had masses that were > 59 and all other percent relative standard deviations were < 5%.

Executive Summary

Laboratory Performance: Several contaminants were present in the laboratory method / preparation blanks.

Other Factors Affecting Data Quality: The matrix spike percent recoveries for antimony and copper were < 75% quality control limit. The laboratory duplicate imprecision for antimony was > 35%.

The data for these analyses were reviewed with reference to Region III modifications to the "*National Functional Guidelines for Inorganic Data Validation*", April 1993, and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories " (January 2006).

The text of this report has been formulated to address only those problem areas affecting data quality.

Tetra Tech NUS
Terri L. Solomon
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A
QUALIFIED ANALYTICAL RESULTS

Data Validation Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS-GFAA MSA's r < 0.995 / ICP PDS Recovery Noncompliance
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (e.g. base-line drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DOT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient r < 0.995
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 00810	NSAMPLE	X14SS001C0001			X14SS002C0001			X14SS003C0001			X14SS004C0001		
SDG: CTO423-2	LAB_ID	SC2881-001			SC2881-002			SC2881-003			SC2881-004		
FRACTION: M	SAMP_DATE	5/29/2009			5/29/2009			5/29/2009			5/29/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	83.0			79.4			75.7			83.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.15	J	DF	0.19	J	DF	0.18	J	DF	1.4	J	DF
ARSENIC		3.2			2.8			3			3.3		
COPPER		9.5	L	D	9.3	L	D	11.9	L	D	25.5	L	D
LEAD		18.4			17.6			19.6			52.5		
TIN		1.2	B	A	1.2	B	A	1.3	B	A	3.2	B	A
ZINC		29.6			26.7			36			66.5		

PROJ_NO: 00810	NSAMPLE	X14SS005C0001			X14SS006C0001			X14SS007C0001			X14SS008C0001		
SDG: CTO423-2	LAB_ID	SC2881-005			SC2881-006			SC2881-007			SC2881-008		
FRACTION: M	SAMP_DATE	5/29/2009			5/29/2009			5/29/2009			6/1/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	85.9			78.9			83.8			80.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.13	J	DF	0.19	J	DF	0.16	J	DF	0.19	J	DF
ARSENIC		1.6			2			3			2.6		
COPPER		12.7	L	D	8	L	D	8.7	L	D	52.4	L	D
LEAD		12			36.7			21.2			22.3		
TIN		1.2	B	A	1	B	A	1.7	B	A	1.2	B	A
ZINC		25.1			46.4			31.9			65.4		

PROJ_NO: 00810	NSAMPLE	X14SS009C0001			X15SS0050001			X15SS0070001			X15SS0180001		
SDG: CTO423-2	LAB_ID	SC2881-009			SC2881-010			SC2881-011			SC2881-013		
FRACTION: M	SAMP_DATE	6/1/2009			5/27/2009			5/27/2009			5/27/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	73.2			86.1			85.6			87.1		
	DUP_OF												

PARAMETER	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY	0.3	J	DF	0.99	J	DF	0.83	J	DF	0.69	J	DF
ARSENIC	2.5			3.9			7.2			3.2		
COPPER	12.8	L	D	10.6	L	D	12.2	L	D	8.8	L	D
LEAD	20.1			252			220			32		
TIN	1.5	B	A	2	B	A	1.7	B	A	1.3	B	A
ZINC	34.5			41.2			27.7			30.5		

PROJ_NO: 00810	NSAMPLE	X15SS0350001			X15SS0370001			X15SS0610001			X15SS0640001		
SDG: CTO423-2	LAB_ID	SC2881-014			SC2881-015			SC2881-016			SC2881-017		
FRACTION: M	SAMP_DATE	5/28/2009			5/28/2009			6/2/2009			6/2/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	79.9			85.9			84.6			83.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.27	J	DF	0.37	J	DF	0.17	J	DF	4.8	J	DF
ARSENIC		2			1.6			2.9			5.8		
COPPER		9.6	L	D	7.3	L	D	8.2	L	D	22.2	L	D
LEAD		81.6			203			74.7			940		
TIN		3.9	B	A	1.4	B	A	1.2	B	A	2.4	B	A
ZINC		41			30.2			33.9			33		

PROJ_NO: 00810	NSAMPLE	X15SS0660001			X15SS0680001			X15SS0700001			X15SSB0050102		
SDG: CTO423-2	LAB_ID	SC2881-018			SC2881-019			SC2881-020			SC2881-012		
FRACTION: M	SAMP_DATE	6/2/2009			6/2/2009			6/2/2009			6/2/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	81.4			86.5			83.4			84.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.16	J	DF	0.26	J	DF	1.9	J	DF	0.11	J	DF
ARSENIC		3.8			2.3			3.2			4.1		
COPPER		11.5	L	D	37.6	L	D	8.8	L	D	10.1	L	D
LEAD		33.3			423			754			12.2		
TIN		1.4	B	A	2.8	B	A	1.3	B	A	1.2	B	A
ZINC		41.6			53.3			38.5			37.6		

PROJ_NO: 00810	NSAMPLE	X14SS001C0001			X14SS002C0001			X14SS003C0001			X14SS004C0001		
SDG: CTO423-2	LAB_ID	SC2881-1			SC2881-2			SC2881-3			SC2881-4		
FRACTION: MISC	SAMP_DATE	5/29/2009			5/29/2009			5/29/2009			5/29/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	83.0			79.4			75.7			83.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		83			79			76			84		

PROJ_NO: 00810 SDG: CTO423-2 FRACTION: MISC MEDIA: SOIL	NSAMPLE	X14SS005C0001			X14SS006C0001			X14SS007C0001			X14SS008C0001		
	LAB_ID	SC2881-5			SC2881-6			SC2881-7			SC2881-8		
	SAMP_DATE	5/29/2009			5/29/2009			5/29/2009			6/1/2009		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	85.9			78.9			83.8			80.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		86			79			84			80		

PROJ_NO: 00810	NSAMPLE	X14SS009C0001			X15SS0050001			X15SS0070001			X15SS0180001		
SDG: CTO423-2	LAB_ID	SC2881-9			SC2881-10			SC2881-11			SC2881-13		
FRACTION: MISC	SAMP_DATE	6/1/2009			5/27/2009			5/27/2009			5/27/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	73.2			86.1			85.6			87.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		73			86			86			87		

PROJ_NO: 00810 SDG: CTO423-2 FRACTION: MISC MEDIA: SOIL	NSAMPLE	X15SS0350001_052809			X15SS0370001			X15SS0610001			X15SS0640001		
	LAB_ID	SC2881-14			SC2881-15			SC2881-16			SC2881-17		
	SAMP_DATE	5/28/2009			5/28/2009			6/2/2009			6/2/2009		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	79.9			85.9			84.6			83.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		80			86			85			83		

PROJ_NO: 00810 SDG: CTO423-2 FRACTION: MISC MEDIA: SOIL	NSAMPLE	X15SS0660001			X15SS0680001			X15SS0700001			X15SSB0050102		
	LAB_ID	SC2881-18			SC2881-19			SC2881-20			SC2881-12		
	SAMP_DATE	6/2/2009			6/2/2009			6/2/2009			6/2/2009		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	81.4			86.5			83.4			84.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		81			86			83			84		

APPENDIX B
RESULTS AS REPORTED BY THE LABORATORY

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS001C0001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 83.0 **Lab Sample ID:** SC2881-001

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.15		N*	MS	5	0.091	0.02
7440-38-2	ARSENIC, TOTAL	3.2		*	MS	5	0.45	0.14
7440-50-8	COPPER, TOTAL	9.5		N*	MS	5	0.45	0.10
7439-92-1	LEAD, TOTAL	18.4			MS	5	0.091	0.03
7440-31-5	TIN, TOTAL	1.2			MS	5	0.45	0.17
7440-66-6	ZINC, TOTAL	29.6			MS	5	0.91	0.32

Bottle ID: A

Comments:

I

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS002C0001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 79.4 **Lab Sample ID:** SC2881-002

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.19		N*	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	2.8		*	MS	5	0.51	0.15
7440-50-8	COPPER, TOTAL	9.3		N*	MS	5	0.51	0.11
7439-92-1	LEAD, TOTAL	17.6			MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.2			MS	5	0.51	0.19
7440-66-6	ZINC, TOTAL	26.7			MS	5	1.0	0.36

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS003C0001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 75.7 **Lab Sample ID:** SC2881-003

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.18		N*	MS	5	0.097	0.02
7440-38-2	ARSENIC, TOTAL	3.0		*	MS	5	0.48	0.15
7440-50-8	COPPER, TOTAL	11.9		N*	MS	5	0.48	0.11
7439-92-1	LEAD, TOTAL	19.6			MS	5	0.097	0.03
7440-31-5	TIN, TOTAL	1.3			MS	5	0.48	0.18
7440-66-6	ZINC, TOTAL	36.0			MS	5	0.97	0.34

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS004C0001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 83.6 **Lab Sample ID:** SC2881-004

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	1.4		N*	MS	5	0.087	0.02
7440-38-2	ARSENIC, TOTAL	3.3		*	MS	5	0.44	0.13
7440-50-8	COPPER, TOTAL	25.5		N*	MS	5	0.44	0.10
7439-92-1	LEAD, TOTAL	52.5			MS	5	0.087	0.03
7440-31-5	TIN, TOTAL	3.2			MS	5	0.44	0.17
7440-66-6	ZINC, TOTAL	66.5			MS	5	0.87	0.31

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS005C0001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 85.9 **Lab Sample ID:** SC2881-005

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.13		N*	MS	5	0.12	0.02
7440-38-2	ARSENIC, TOTAL	1.6		*	MS	5	0.58	0.17
7440-50-8	COPPER, TOTAL	12.7		N*	MS	5	0.58	0.13
7439-92-1	LEAD, TOTAL	12.0			MS	5	0.12	0.03
7440-31-5	TIN, TOTAL	1.2			MS	5	0.58	0.22
7440-66-6	ZINC, TOTAL	25.1			MS	5	1.2	0.40

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS006C0001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 78.9 **Lab Sample ID:** SC2881-006

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.19		N*	MS	5	0.083	0.02
7440-38-2	ARSENIC, TOTAL	2.0		*	MS	5	0.42	0.13
7440-50-8	COPPER, TOTAL	8.0		N*	MS	5	0.42	0.09
7439-92-1	LEAD, TOTAL	36.7			MS	5	0.083	0.03
7440-31-5	TIN, TOTAL	1.0			MS	5	0.42	0.16
7440-66-6	ZINC, TOTAL	46.4			MS	5	0.83	0.29

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS007C0001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 83.8 **Lab Sample ID:** SC2881-007

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.16		N*	MS	5	0.12	0.02
7440-38-2	ARSENIC, TOTAL	3.0		*	MS	5	0.58	0.17
7440-50-8	COPPER, TOTAL	8.7		N*	MS	5	0.58	0.13
7439-92-1	LEAD, TOTAL	21.2			MS	5	0.12	0.03
7440-31-5	TIN, TOTAL	1.7			MS	5	0.58	0.22
7440-66-6	ZINC, TOTAL	31.9			MS	5	1.2	0.41

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS008C0001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 80.5 **Lab Sample ID:** SC2881-008

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.19		N*	MS	5	0.076	0.02
7440-38-2	ARSENIC, TOTAL	2.6		*	MS	5	0.38	0.11
7440-50-8	COPPER, TOTAL	52.4		N*	MS	5	0.38	0.08
7439-92-1	LEAD, TOTAL	22.3			MS	5	0.076	0.02
7440-31-5	TIN, TOTAL	1.2			MS	5	0.38	0.14
7440-66-6	ZINC, TOTAL	65.4			MS	5	0.76	0.27

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS009C0001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 73.2 **Lab Sample ID:** SC2881-009

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.30		N*	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	2.5		*	MS	5	0.50	0.15
7440-50-8	COPPER, TOTAL	12.8		N*	MS	5	0.50	0.11
7439-92-1	LEAD, TOTAL	20.1			MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.5			MS	5	0.50	0.19
7440-66-6	ZINC, TOTAL	34.5			MS	5	1.0	0.35

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0050001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 86.1 **Lab Sample ID:** SC2881-010

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.99		N*	MS	5	0.099	0.02
7440-38-2	ARSENIC, TOTAL	3.9		*	MS	5	0.50	0.15
7440-50-8	COPPER, TOTAL	10.6		N*	MS	5	0.50	0.11
7439-92-1	LEAD, TOTAL	252			MS	5	0.099	0.03
7440-31-5	TIN, TOTAL	2.0			MS	5	0.50	0.19
7440-66-6	ZINC, TOTAL	41.2			MS	5	0.99	0.35

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0070001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 85.6 **Lab Sample ID:** SC2881-011

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.83		N*	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	7.2		*	MS	5	0.57	0.17
7440-50-8	COPPER, TOTAL	12.2		N*	MS	5	0.57	0.12
7439-92-1	LEAD, TOTAL	220			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.7			MS	5	0.57	0.22
7440-66-6	ZINC, TOTAL	27.7			MS	5	1.1	0.40

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0180001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 87.1 **Lab Sample ID:** SC2881-013

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.69		N*	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	3.2		*	MS	5	0.53	0.16
7440-50-8	COPPER, TOTAL	8.8		N*	MS	5	0.53	0.12
7439-92-1	LEAD, TOTAL	32.0			MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.3			MS	5	0.53	0.20
7440-66-6	ZINC, TOTAL	30.5			MS	5	1.0	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0350001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 79.9 **Lab Sample ID:** SC2881-014

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.27		N*	MS	5	0.097	0.02
7440-38-2	ARSENIC, TOTAL	2.0		*	MS	5	0.48	0.15
7440-50-8	COPPER, TOTAL	9.6		N*	MS	5	0.48	0.11
7439-92-1	LEAD, TOTAL	81.6			MS	5	0.097	0.03
7440-31-5	TIN, TOTAL	3.9			MS	5	0.48	0.18
7440-66-6	ZINC, TOTAL	41.0			MS	5	0.97	0.34

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0370001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 85.9 **Lab Sample ID:** SC2881-015

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.37		N*	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	1.6		*	MS	5	0.54	0.16
7440-50-8	COPPER, TOTAL	7.3		N*	MS	5	0.54	0.12
7439-92-1	LEAD, TOTAL	203			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.4			MS	5	0.54	0.21
7440-66-6	ZINC, TOTAL	30.2			MS	5	1.1	0.38

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0610001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 84.6 **Lab Sample ID:** SC2881-016

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.17		N*	MS	5	0.077	0.02
7440-38-2	ARSENIC, TOTAL	2.9		*	MS	5	0.38	0.12
7440-50-8	COPPER, TOTAL	8.2		N*	MS	5	0.38	0.08
7439-92-1	LEAD, TOTAL	74.7			MS	5	0.077	0.02
7440-31-5	TIN, TOTAL	1.2			MS	5	0.38	0.15
7440-66-6	ZINC, TOTAL	33.9			MS	5	0.77	0.27

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0640001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 83.4 **Lab Sample ID:** SC2881-017

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	4.8		N*	MS	5	0.12	0.02
7440-38-2	ARSENIC, TOTAL	5.8		*	MS	5	0.58	0.17
7440-50-8	COPPER, TOTAL	22.2		N*	MS	5	0.58	0.13
7439-92-1	LEAD, TOTAL	940			MS	10	0.23	0.07
7440-31-5	TIN, TOTAL	2.4			MS	5	0.58	0.22
7440-66-6	ZINC, TOTAL	33.0			MS	5	1.2	0.40

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0660001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 81.4 **Lab Sample ID:** SC2881-018

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.16		N*	MS	5	0.078	0.02
7440-38-2	ARSENIC, TOTAL	3.8		*	MS	5	0.39	0.12
7440-50-8	COPPER, TOTAL	11.5		N*	MS	5	0.39	0.09
7439-92-1	LEAD, TOTAL	33.3			MS	5	0.078	0.02
7440-31-5	TIN, TOTAL	1.4			MS	5	0.39	0.15
7440-66-6	ZINC, TOTAL	41.6			MS	5	0.78	0.27

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X15SS0680001

Matrix: SOIL
SDG Name: CTO423-2

Percent Solids: 86.5
Lab Sample ID: SC2881-019

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.26		N*	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	2.3		*	MS	5	0.54	0.16
7440-50-8	COPPER, TOTAL	37.6		N*	MS	5	0.54	0.12
7439-92-1	LEAD, TOTAL	423			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	2.8			MS	5	0.54	0.20
7440-66-6	ZINC, TOTAL	53.3			MS	5	1.1	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0700001

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 83.4 **Lab Sample ID:** SC2881-020

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	1.9		N*	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	3.2		*	MS	5	0.52	0.15
7440-50-8	COPPER, TOTAL	8.8		N*	MS	5	0.52	0.11
7439-92-1	LEAD, TOTAL	754			MS	10	0.21	0.06
7440-31-5	TIN, TOTAL	1.3			MS	5	0.52	0.20
7440-66-6	ZINC, TOTAL	38.5			MS	5	1.0	0.36

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SSB0050102

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 84.5 **Lab Sample ID:** SC2881-012

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.11		N*	MS	5	0.092	0.02
7440-38-2	ARSENIC, TOTAL	4.1		*	MS	5	0.46	0.14
7440-50-8	COPPER, TOTAL	10.1		N*	MS	5	0.46	0.10
7439-92-1	LEAD, TOTAL	12.2			MS	5	0.092	0.03
7440-31-5	TIN, TOTAL	1.2			MS	5	0.46	0.17
7440-66-6	ZINC, TOTAL	37.6			MS	5	0.92	0.32

Bottle ID: A

Comments:

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-1
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X14SS001C0001	SL	29-MAY-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	83. %	1	D2216	WG64645	05-JUN-09 09:33:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-2
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X14SS002C0001	SL	29-MAY-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	79. %	1	D2216	WG64645	05-JUN-09 09:21:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-3
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X14SS003C0001	SL	29-MAY-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	76. %	1	D2216	WG64645	05-JUN-09 09:21:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-4
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X14SS004C0001	SL	29-MAY-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	84. %	1	D2216	WG64645	05-JUN-09 09:21:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-5
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X14SS005C0001	SL	29-MAY-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG64645	05-JUN-09 09:21:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-6
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X14SS006C0001	SL	29-MAY-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	79. %	1	D2216	WG64645	05-JUN-09 09:21:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-7
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X14SS007C0001	SL	29-MAY-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	84. %	1	D2216	WG64645	05-JUN-09 09:21:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-8
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X14SS008C0001	SL	01-JUN-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	80. %	1	D2216	WG64645	05-JUN-09 09:21:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-9
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X14SS009C0001	SL	01-JUN-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	73. %	1	D2216	WG64645	05-JUN-09 09:21:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-10
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X15SS0050001	SL	27-MAY-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG64645	05-JUN-09 09:21:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-11
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X15SS0070001	SL	27-MAY-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG64645	05-JUN-09 09:21:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-13
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X15SS0180001	SL	27-MAY-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	87. %	1	D2216	WG64648	05-JUN-09 09:28:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-14
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X15SS0350001	SL	28-MAY-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	80. %	1	D2216	WG64648	05-JUN-09 09:28:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-15
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X15SS0370001	SL	28-MAY-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG64648	05-JUN-09 09:28:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-16
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X15SS0610001	SL	02-JUN-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	85. %	1	D2216	WG64648	05-JUN-09 09:28:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-17
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X15SS0640001	SL	02-JUN-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	83. %	1	D2216	WG64648	05-JUN-09 09:28:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-18
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X15SS0660001	SL	02-JUN-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	81. %	1	D2216	WG64648	05-JUN-09 09:28:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-19
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X15SS0680001	SL	02-JUN-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG64648	05-JUN-09 09:28:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-20
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X15SS0700001	SL	02-JUN-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	83. %	1	D2216	WG64648	05-JUN-09 09:28:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2881-12
Report Date: 10-JUN-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-2

Sample Description	Matrix	Date Sampled	Date Received
X15SSB0050102	SL	02-JUN-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	84. %	1	D2216	WG64648	05-JUN-09 09:28:00	ASTM D2216	04-JUN-09	JF	

APPENDIX C
SUPPORT DOCUMENTATION

Katahdin ANALYTICAL SERVICES

nelac Cert No E87604

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CTO 423 NSF INDIAN HEAD
SDG: CTO423-2
SC2881

Sample Receipt

The following samples were received on June 4, 2009 and were logged in under Katahdin Analytical Services work order numbers SC2881 for a hardcopy due date of June 23, 2009.

KATAHDIN Sample No.	TTNUS Sample Identification
SC2881-1	X14SS001C0001
SC2881-2	X14SS002C0001
SC2881-3	X14SS003C0001
SC2881-4	X14SS004C0001
SC2881-5	X14SS005C0001
SC2881-6	X14SS006C0001
SC2881-7	X14SS007C0001
SC2881-8	X14SS008C0001
SC2881-9	X14SS009C0001
SC2881-10	X15SS0050001
SC2881-11	X15SS0070001
SC2881-12	X15SSB0050102
SC2881-13	X15SS0180001
SC2881-14	X15SS0350001
SC2881-15	X15SS0370001
SC2881-16	X15SS0610001
SC2881-17	X15SS0640001
SC2881-18	X15SS0660001
SC2881-19	X15SS0680001
SC2881-20	X15SS0700001

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in this narrative or in the Report of Analysis.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Andrea J. Colby**. This narrative is an integral part of the Report of Analysis.

Metals Analysis

The samples of SDG CTO423-2 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846. 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA.

Inductively-Coupled Plasma Mass Spectrometric Analysis (ICP-MS)

Solid-matrix Katahdin Sample Numbers SC2881-(1-20) were digested for ICP-MS analysis on 06/11/09 (QC Batch ZF11ICS0) in accordance with USEPA Method 3010A. Katahdin Sample Number SC2881-17 was prepared in duplicate and with a matrix-spiked aliquot. The measured tin concentration in the preparation blank in this batch exceeds the laboratory's acceptance limit. Laboratory testing has determined that this tin contamination comes from one of the reagents used in the digestion process.

ICP-MS analyses of SDG CTO423-2 sample digestates were performed using an Agilent 7500 ICP-MS spectrometer in accordance with USEPA Method 6020. Results for all standards and samples are reported using the mean of 3 replicate measurements. All samples were analyzed within holding times and all analytical run QC criteria were met, with the following exceptions:

The measured lead recovery of the PQL standard analyzed at 07:55 in ICP-MS analysis sequence JZF18A exceeds the laboratory's acceptance limits (70-130% recovery). All associated lead results accepted from this portion of the run were below the true value of the PQL or greater than ten times the PQL result and not affected by this high bias.

The measured lead concentrations of the CCBs analyzed at 04:56, 06:30, and 07:30 in ICP-MS analysis sequence JZF18A exceed the laboratory's acceptance limit. All associated lead results accepted from this portion of the run were below the true value of the PQL or greater than ten times the CCB result and not affected by this high bias.

Internal standard recoveries for ICP-MS analyses can be found in the raw data section of the accompanying data package. The following table indicates which analytes are associated with each internal standard element.

Internal Standard Element	Associated Analytes
Lithium	Beryllium
Scandium	Sodium, Magnesium, Aluminum, Potassium, Calcium
Germanium	Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel, Copper, Zinc, Arsenic, Selenium, Silver, Cadmium
Terbium	Antimony, Barium, Tin
Bismuth	Thallium, Lead

Instrument tuning information can also be found in the raw data section in the report labeled "6020 QC Tune Report". The relative standard deviation was determined from 4 replicate measurements. The peak width was measured at 10% of the peak height.

Matrix QC Summary

The measured recoveries of antimony and copper in the matrix-spiked aliquot of Katahdin Sample Number SC2881-17 are outside the laboratory's acceptance criteria (75% - 125% recovery of the added element, if the native concentration is less than four times the amount added). The measure recoveries of these analytes in a post-digestion spike of this sample are within acceptance criteria.

The duplicate analysis of Katahdin Sample Number SC2881-17 is outside the laboratory's acceptance limit (<20% relative difference between duplicate aliquots) for antimony, arsenic, and copper.

The serial dilution analysis of Katahdin Sample Number SC2881-17 is within the laboratory's acceptance limit (<10% relative percent difference, if the concentration in the original sample is greater than 50 times the MDL) for all analytes.

Reporting of Metals Results

Analytical results for client samples, matrix QC samples (duplicates and matrix spikes), and batch QC samples (preparation blanks and laboratory control samples) have been reported down to the laboratory's method detection limits (MDLs). These MDLs have been adjusted for each sample based on the sample amounts used in preparation and analysis. Analytical results that are below the MDLs are flagged with "U" in the C-qualifier column.

Analytical results for instrument run QC samples (ICVs, ICBs, etc.) have been reported down to the laboratory's instrument detection limits (IDLs).

IDLs, MDLs, and PQLs are listed on Form 10 of the accompanying data package.

Wet Chemistry Analysis

The samples of SDG CTO423-2 were analyzed in accordance with the specific methods listed on the Report of Analysis.

Analyses for total solids were performed according to "Annual Book of ASTM Standards", Method D2216-98 "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass".

All analyses were performed within analytical holding times, and all quality control criteria were met.

Katahdin
ANALYTICAL SERVICES

nelac
Cert. No. E87604

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Operations Manager or the Quality Assurance Officer as verified by the following signature.

Leslie Dimond

06.23.09

Leslie Dimond
Quality Assurance Officer

P.O. Box 540, Scarborough, ME 04070 • Tel: (207) 874-2400 • Fax: (207) 775-4029 • 600 Technology Way, Scarborough, ME 04074
www.katahdinlab.com

000005

SC2801 | SC #890

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 128242 | PAGE 1 OF 2

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bosinski	4129218308	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4129218425	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 8631 3888 1947		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS: SW846 8050B/6020A Sb As Cu Pb Sn Zn	4oC	COMMENTS
									G				
5/29	1215	X1455001C0001	001	0	1	SO	C						
	1205	X1455002C0001	002										
	1310	X1455003C0001	003										
	1315	X1455004C0001	004										
	1420	X1455005C0001	005										
	1404	X1455006C0001	006										
	1451	X1455007C0001	007										
6/1	1030	X1455008C0001	008										
6/1	1110	X1455009C0001	009										
5/27	1312	X1555005 0001	005				G						
5/27	1326	X155007 0001	007				G						
6/2	801	X155B005 0102	005	1	2		G						
5/27	1410	X1555018 0001	018	0	1		G						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-3-09	1200	1. RECEIVED BY	6-4-09	0950
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

000007

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER No 128243 | PAGE 2 OF 2

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Badinski	4129218308	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4129218425	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 8631 3888 1947		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: SW846 8050B/6020A Sb As Cu Pb Se Zn

DATE (YEAR 2009)	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS		COMMENTS
5/28	914	X1555035 0001	035	0	1	SO	G	1	1	
5/28	901	X1555037 0001	037					1	1	
6/2	808	X1555061 0001	061					1	1	
	814	X1555064 0001	064					3	3	MS/MSD
	825	X1555066 0001	066					1	1	
	845	X1555068 0001	068					1	1	
	905	X1555070 0001	070					1	1	
	920	X1555071 0001	071					1	1	
	901	X1555072 0001	072					1	1	
	847	X1555073 0001	073					1	1	
↓	1430	X1555076 0001	076	↓	↓	↓	↓	1	1	
6/3	0000	FD06030901	QC	—	—	SO	G	1	1	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-3-09	1230	1. RECEIVED BY	06-04-09	09:50
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

Duplicate

HOLDTIME

SDG CTO423-2

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	X15SS0050001	SC2881-010	NM	5/27/2009	6/11/2009	6/19/2009	14.60	8	22.60
M	MG/KG	X14SS001C0001	SC2881-001	NM	5/29/2009	6/11/2009	6/19/2009	12.56	8	20.56
M	MG/KG	X15SS0680001	SC2881-019	NM	6/2/2009	6/11/2009	6/19/2009	8.918	8	16.92
M	MG/KG	X15SS0660001	SC2881-018	NM	6/2/2009	6/11/2009	6/19/2009	8.926	8	16.93
M	MG/KG	X15SS0640001	SC2881-017	NM	6/2/2009	6/11/2009	6/19/2009	8.874	8	16.87
M	MG/KG	X15SS0640001	SC2881-017	NM	6/2/2009	6/11/2009	6/19/2009	8.868	8	16.87
M	MG/KG	X15SS0610001	SC2881-016	NM	6/2/2009	6/11/2009	6/19/2009	8.849	8	16.85
M	MG/KG	X15SS0370001	SC2881-015	NM	5/28/2009	6/11/2009	6/19/2009	13.81	8	21.81
M	MG/KG	X15SS0350001	SC2881-014	NM	5/28/2009	6/11/2009	6/19/2009	13.79	8	21.79
M	MG/KG	X15SS0700001	SC2881-020	NM	6/2/2009	6/11/2009	6/19/2009	8.916	8	16.92
M	MG/KG	X15SS0070001	SC2881-011	NM	5/27/2009	6/11/2009	6/19/2009	14.6	8	22.6
M	MG/KG	X15SSB0050102	SC2881-012	NM	6/2/2009	6/11/2009	6/19/2009	8.83	8	16.83
M	MG/KG	X14SS009C0001	SC2881-009	NM	6/1/2009	6/11/2009	6/19/2009	9.681	8	17.68
M	MG/KG	X14SS008C0001	SC2881-008	NM	6/1/2009	6/11/2009	6/19/2009	9.702	8	17.70
M	MG/KG	X14SS007C0001	SC2881-007	NM	5/29/2009	6/11/2009	6/19/2009	12.49	8	20.49

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	X14SS006C0001	SC2881-006	NM	5/29/2009	6/11/2009	6/19/2009	12.52	8	20.52
M	MG/KG	X14SS005C0001	SC2881-005	NM	5/29/2009	6/11/2009	6/19/2009	12.50	8	20.50
M	MG/KG	X14SS004C0001	SC2881-004	NM	5/29/2009	6/11/2009	6/19/2009	12.54	8	20.54
M	MG/KG	X14SS003C0001	SC2881-003	NM	5/29/2009	6/11/2009	6/19/2009	12.54	8	20.54
M	MG/KG	X14SS002C0001	SC2881-002	NM	5/29/2009	6/11/2009	6/19/2009	12.58	8	20.58
M	MG/KG	X15SS0180001	SC2881-013	NM	5/27/2009	6/11/2009	6/19/2009	14.58	8	22.58
M	MG/KG	X15SS0700001	SC2881-020	NM	6/2/2009	6/11/2009	6/19/2009	8.910	8	16.91
TS	%	X14SS009C0001	SC2881-9	NM	6/1/2009	6/4/2009	6/5/2009	2.924	1	3.924
TS	%	X15SS0700001	SC2881-20	NM	6/2/2009	6/4/2009	6/5/2009	2.016	1	3.016
TS	%	X15SS0680001	SC2881-19	NM	6/2/2009	6/4/2009	6/5/2009	2.03	1	3.03
TS	%	X15SS0660001	SC2881-18	NM	6/2/2009	6/4/2009	6/5/2009	2.044	1	3.044
TS	%	X15SS0640001	SC2881-17	NM	6/2/2009	6/4/2009	6/5/2009	2.051	1	3.051
TS	%	X15SS0610001	SC2881-16	NM	6/2/2009	6/4/2009	6/5/2009	2.056	1	3.056
TS	%	X15SS0370001	SC2881-15	NM	5/28/2009	6/4/2009	6/5/2009	7.019	1	8.019
TS	%	X15SS0350001	SC2881-14	NM	5/28/2009	6/4/2009	6/5/2009	7.01	1	8.01
TS	%	X15SS0180001	SC2881-13	NM	5/27/2009	6/4/2009	6/5/2009	7.804	1	8.804
TS	%	X15SS0050001	SC2881-10	NM	5/27/2009	6/4/2009	6/5/2009	7.84	1	8.84
TS	%	X15SSB0050102	SC2881-12	NM	6/2/2009	6/4/2009	6/5/2009	2.060	1	3.060

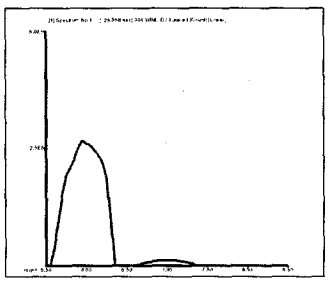
SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
TS	%	X14SS008C0001	SC2881-8	NM	6/1/2009	6/4/2009	6/5/2009	2.952	1	3.952
TS	%	X14SS007C0001	SC2881-7	NM	5/29/2009	6/4/2009	6/5/2009	5.771	1	6.771
TS	%	X14SS006C0001	SC2881-6	NM	5/29/2009	6/4/2009	6/5/2009	5.803	1	6.803
TS	%	X14SS005C0001	SC2881-5	NM	5/29/2009	6/4/2009	6/5/2009	5.792	1	6.792
TS	%	X14SS004C0001	SC2881-4	NM	5/29/2009	6/4/2009	6/5/2009	5.837	1	6.837
TS	%	X14SS003C0001	SC2881-3	NM	5/29/2009	6/4/2009	6/5/2009	5.841	1	6.841
TS	%	X14SS002C0001	SC2881-2	NM	5/29/2009	6/4/2009	6/5/2009	5.886	1	6.886
TS	%	X14SS001C0001	SC2881-1	NM	5/29/2009	6/4/2009	6/5/2009	5.888	1	6.888
TS	%	X15SS0070001	SC2881-11	NM	5/27/2009	6/4/2009	6/5/2009	7.83	1	8.83

6020 QC Tune Report

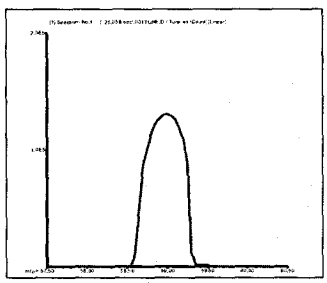
Data File: C:\ICPCHEM\1\DATA\JZF18A.B\001TUNE.D
Date Acquired: Jun 18 2009 04:53 pm
Acq. Method: TN6020.M
Operator: EAM
Sample Name: 6020 Tune
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN6020.M

RSD (%)

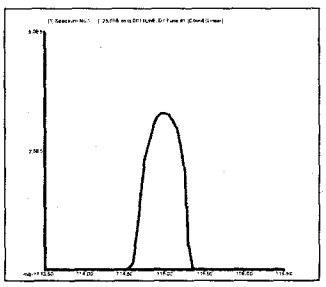
Element	Actual	Required	Flag
7 Li	4.37	5.00	
59 Co	1.68	5.00	
115 In	4.12	5.00	
205 Tl	1.24	5.00	



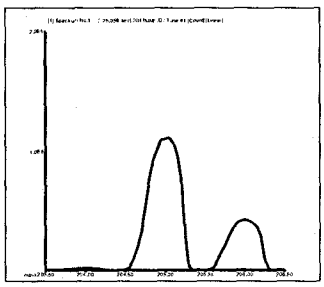
7 Li
Mass Calib.
Actual: 7.00
Required: 6.90 - 7.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.60
Required: 0.90
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



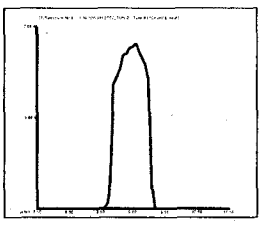
205 Tl
Mass Calib.
Actual: 205.00
Required: 204.90 - 205.10
Flag:
Peak Width
Actual: 0.60
Required: 0.90
Flag:

200.8 QC Tune Report

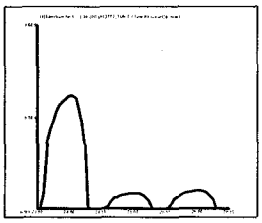
Data File: C:\ICPCHEM\1\DATA\JZF18A.B\002_TUN.D
Date Acquired: Jun 18 2009 04:59 pm
Acq. Method: TN200_8.M
Operator: EAM
Sample Name: 200.8 Tune
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN200_8.M

RSD (%)

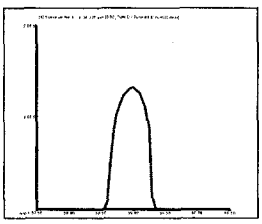
Element	Actual	Required	Flag
9 Be	0.80	5.00	
24 Mg	6.30	5.00	RSDFail
59 Co	1.81	5.00	
115 In	3.38	5.00	
208 Pb	1.16	5.00	



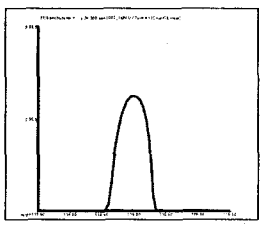
9 Be
Mass Calib.
Actual: 9.00
Required: 8.90 - 9.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



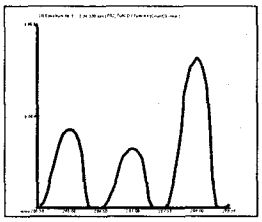
24 Mg
Mass Calib.
Actual: 24.00
Required: 23.90 - 24.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.70
Required: 1.00
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



208 Pb
Mass Calib.
Actual: 208.00
Required: 207.90 - 208.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:

Tune Result: Fail

File:	009CALB.D#	010CALI.D#	011CALI.D#	012CALI.D#	013CALI.D#
Sample:	Cal Blank	Cal Std 1	Cal Std 2	Cal Std 3	Cal Std 4
Date/Time:	6/18/2009 17:58	6/18/2009 18:06	6/18/2009 18:15	6/18/2009 18:23	6/18/2009 18:32
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0000	0.5000	5.0900	24.4300	50.4700
B / 11	0.0000	0.5000	5.2290	25.8400	50.0000
Na / 23	0.0000	100.0000	989.0000	4899.0000	9761.0000
Mg / 25	0.0000	100.0000	1074.0000	4947.0000	9539.0000
Al / 27	0.0000	10.0000	113.8000	471.7000	949.8000
Si / 29	0.0000	10.0000	144.2000	497.9000	972.1000
K / 39	0.0000	100.0000	1080.0000	4894.0000	9850.0000
Ca / 44	0.0000	100.0000	1084.0000	5011.0000	9579.0000
V / 51	0.0000	0.5000	4.2340	23.8900	50.2300
Cr / 52	0.0000	0.5000	5.5520	24.3700	50.1000
Mn / 55	0.0000	0.5000	5.0530	23.8300	50.0700
Fe / 57	0.0000	100.0000	1022.0000	5036.0000	9791.0000
Co / 59	0.0000	0.5000	5.0320	23.7600	50.1900
Ni / 60	0.0000	0.5000	4.9400	23.6000	49.7700
Cu / 65	0.0000	0.5000	5.1900	23.6100	49.9300
Zn / 66	0.0000	0.5000	4.7270	24.3200	49.6000
As / 75	0.0000	0.5000	6.1880	23.4000	50.1600
Se / 82	0.0000	0.5000	5.0760	24.0600	49.3300
Sr / 88	0.0000	0.5000	5.2520	24.6700	49.4400
Mo / 98	0.0000	0.5000	5.2260	23.8300	50.5200
Ag / 107	0.0000	0.5000	4.9890	24.1100	49.4800
Cd / 114	0.0000	0.5000	4.9840	24.0000	49.4500
Sn / 118	0.0000	0.5000	5.5050	24.2300	49.4300
Sb / 123	0.0000	0.5000	5.3590	23.7600	49.8800
Ba / 135	0.0000	0.5000	5.1650	23.9400	49.2000
W / 182	0.0000	0.5000	5.4140	23.7700	52.1200
Tl / 203	0.0000	0.5000	5.1190	25.9800	51.4300
Pb / 208	0.0000	0.5000	5.1370	24.5000	50.0300
Th / 232	0.0000	0.5000	7.0530	40.9400	55.0400
U / 238	0.0000	0.5000	5.1730	24.6000	50.9200
Li / 6	1162040	1162027	1163710	1147248	1128235
Sc / 45	1033791	1075753	1052123	1056123	1065895
Ge / 72	214859.8	217690.9	218100.8	216774.6	215272
Tb / 159	1714756	1754472	1723641	1748470	1742791
Bi / 209	1027424	1048259	1040635	1026589	1006691
Li / 6	100.0	100.0	100.1	98.7	97.1
Sc / 45	100.0	104.1	101.8	102.2	103.1
Ge / 72	100.0	101.3	101.5	100.9	100.2
Tb / 159	100.0	102.3	100.5	102.0	101.6
Bi / 209	100.0	102.0	101.3	99.9	98.0

File:	014SMPL.D#	015_ICV.D#	016_ICB.D#	017_PQL.D#	018ICSA.D#
Sample:	Blank	ICV	ICB	PQL	ICSA
Date/Time:	6/18/2009 18:40	6/18/2009 18:49	6/18/2009 18:57	6/18/2009 19:06	6/18/2009 19:14
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0293	20.2600	0.0161	0.2190	0.0148
B / 11	0.6578	21.9200	0.3057	8.6620	0.6526
Na / 23	12.9100	4129.0000	5.0010	238.0000	97780.0000
Mg / 25	8.5620	4270.0000	4.8780	26.4500	96320.0000
Al / 27	4.5460	437.2000	1.6180	72.3200	97640.0000
Si / 29	1.0670	435.6000	-0.2801	47.1400	58.5600
K / 39	11.4700	4148.0000	6.5440	235.4000	99060.0000
Ca / 44	8.1770	4229.0000	4.5610	28.9100	97070.0000
V / 51	0.0095	20.2100	0.0538	1.0630	0.2448
Cr / 52	-0.1101	20.1200	-0.1458	0.5075	1.7260
Mn / 55	0.3301	20.0000	0.0143	0.2463	1.8760
Fe / 57	8.9210	4101.0000	2.2570	23.9600	91590.0000
Co / 59	0.0288	20.1900	0.0234	0.2200	0.0964
Ni / 60	0.1721	20.3700	0.0170	0.2354	0.9956
Cu / 65	1.2600	20.5900	0.0108	0.2280	0.7635
Zn / 66	0.5870	20.5700	-0.0059	2.4560	0.4712
As / 75	-0.1626	19.4800	-0.0686	1.0200	-0.0981
Se / 82	-0.2318	20.3800	0.0474	1.0870	-0.4368
Sr / 88	0.0360	21.3300	0.0250	0.2363	2.7260
Mo / 98	0.5943	41.7800	0.5349	1.3030	2016.0000
Ag / 107	0.0278	20.5400	0.0168	0.1344	0.0542
Cd / 114	0.0285	20.1500	0.0204	0.2397	0.0491
Sn / 118	0.5292	21.4400	0.0347	0.2591	0.0669
Sb / 123	0.0418	20.3000	0.0256	0.2308	0.1570
Ba / 135	0.0610	20.7000	0.0161	0.2568	1.5230
W / 182	0.6649	24.7700	0.4790	1.4810	0.4344
Tl / 203	0.5354	19.4300	0.3059	0.3188	0.0841
Pb / 208	0.0481	20.0300	0.0180	0.2251	0.1241
Th / 232	0.0332	21.0500	0.0215	0.1020	0.0501
U / 238	0.0284	20.6400	0.0199	0.2314	0.0169
Li / 6	1152196	1134879	1156611	1133207	1010526
Sc / 45	1044291	1030878	1043278	984672.6	1016681
Ge / 72	215437.1	212889.7	216338.1	210261.4	209357.7
Tb / 159	1725417	1700190	1729859	1649849	1647066
Bi / 209	1044758	1011898	1046404	1012012	891979.8
Li / 6	99.2	97.7	99.5	97.5	87.0
Sc / 45	101.0	99.7	100.9	95.2	98.3
Ge / 72	100.3	99.1	100.7	97.9	97.4
Tb / 159	100.6	99.2	100.9	96.2	96.1
Bi / 209	101.7	98.5	101.8	98.5	86.8

File:	019ICSB.D#	020_BLK.D#	021_CCV.D#	022_CCB.D#	023_BLK.D#
Sample:	ICSAB	Blank	CCV	CCB	BLANK
Date/Time:	6/18/2009 19:23	6/18/2009 19:32	6/18/2009 19:40	6/18/2009 19:49	6/18/2009 19:57
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	21.3700	0.0293	11.3300	0.0076	0.0097
B / 11	22.6000	0.4391	27.5600	0.3916	0.3834
Na / 23	96590.0000	137.4000	5382.0000	40.5800	32.2100
Mg / 25	94410.0000	98.3700	5377.0000	29.6700	21.4800
Al / 27	95460.0000	98.8600	573.2000	27.6300	22.4400
Si / 29	512.8000	2.4890	516.8000	-0.0915	0.2265
K / 39	97470.0000	124.2000	5429.0000	44.5900	31.6800
Ca / 44	95490.0000	107.1000	5476.0000	30.2300	24.5100
V / 51	19.6500	0.0199	25.2300	-0.0060	0.0574
Cr / 52	20.6900	0.0376	24.8900	-0.1337	-0.0713
Mn / 55	20.4800	0.3239	24.9100	0.0212	0.3234
Fe / 57	90830.0000	97.3600	5219.0000	28.5000	20.9500
Co / 59	18.7600	0.0245	10.1100	0.0094	0.0050
Ni / 60	19.2000	0.1530	25.6800	0.0270	0.1450
Cu / 65	18.7600	1.2930	25.5700	0.0156	1.2520
Zn / 66	17.5800	0.5663	25.5500	0.0283	0.5429
As / 75	19.1200	0.0828	25.2600	-0.0104	-0.0333
Se / 82	17.8200	-0.0731	25.4100	0.0389	0.0086
Sr / 88	23.1800	0.0342	25.5300	0.0256	0.0191
Mo / 98	2027.0000	15.6200	31.3000	3.2990	2.0510
Ag / 107	17.7700	0.0197	10.1700	0.0061	0.0042
Cd / 114	18.0600	0.0233	10.2000	0.0105	0.0091
Sn / 118	20.6500	0.5321	25.9400	0.0363	0.4764
Sb / 123	19.5300	0.0325	25.9900	0.0243	0.0232
Ba / 135	21.3800	0.0351	25.8800	0.0093	0.0316
W / 182	25.2200	0.1750	24.8000	0.3749	0.2260
Tl / 203	20.0300	0.2732	9.7010	0.1706	0.0777
Pb / 208	20.3700	0.0442	25.4500	0.0162	0.0260
Th / 232	21.4600	0.0196	9.1130	0.0111	0.0089
U / 238	20.9500	0.0226	10.0200	0.0117	0.0082
Li / 6	991225.9	1005403	985727.2	1010848	1021200
Sc / 45	1024541	982603.3	965269.4	989201	999708.2
Ge / 72	210010.7	206484.6	203117.3	205706.3	206796.5
Tb / 159	1659571	1616853	1610440	1647813	1654975
Bi / 209	881322.2	971576.6	953204.1	991426.6	996713.8
Li / 6	85.3	86.5	84.8	87.0	87.9
Sc / 45	99.1	95.0	93.4	95.7	96.7
Ge / 72	97.7	96.1	94.5	95.7	96.2
Tb / 159	96.8	94.3	93.9	96.1	96.5
Bi / 209	85.8	94.6	92.8	96.5	97.0

File:	024_BLK.D#	025_CCV.D#	026_CCB.D#	027SMPL.D#	028SMPL.D#
Sample:	BLANK	CCV	CCB	PBWZF16ICW2	PBWZF15ICW1
Date/Time:	6/18/2009 20:06	6/18/2009 20:14	6/18/2009 20:23	6/18/2009 20:31	6/18/2009 20:40
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0096	10.6000	0.0047	0.0073	0.0037
B / 11	0.3099	26.7900	0.3487	0.7426	0.9007
Na / 23	30.9800	5009.0000	22.7900	52.6000	57.8600
Mg / 25	20.6800	5063.0000	16.1100	40.9300	34.5600
Al / 27	21.8000	515.6000	12.8400	17.9200	14.8100
Si / 29	0.7542	495.2000	-0.8551	44.4500	40.0900
K / 39	27.5600	5045.0000	23.2900	24.4300	19.3800
Ca / 44	23.5600	5078.0000	11.4800	66.6700	63.3200
V / 51	-0.0101	24.9900	0.0518	0.0768	0.0601
Cr / 52	-0.0519	24.7300	-0.1377	-0.0109	-0.0081
Mn / 55	0.3214	24.9900	0.0317	0.4063	0.2419
Fe / 57	20.2800	5077.0000	15.0200	39.0700	13.5800
Co / 59	0.0066	10.0400	0.0060	0.0161	0.0037
Ni / 60	0.1344	25.6100	0.0241	0.1065	0.0899
Cu / 65	1.2180	25.1800	0.0211	5.9870	6.5080
Zn / 66	0.5635	25.8200	0.0063	1.1840	1.4510
As / 75	0.0928	25.1600	-0.0497	-0.1856	0.1323
Se / 82	-0.1090	25.5400	-0.0519	-0.0415	0.1379
Sr / 88	0.0177	25.3300	0.0268	0.2772	0.2697
Mo / 98	1.5200	25.9500	1.0560	0.7582	0.6113
Ag / 107	0.0058	10.1000	0.0048	0.0059	0.0065
Cd / 114	0.0068	10.0800	0.0115	0.0071	0.0086
Sn / 118	0.4875	25.3100	0.0457	0.1072	0.1325
Sb / 123	0.0125	25.0900	0.0253	0.0293	0.0167
Ba / 135	0.0311	25.1600	0.0157	0.3996	0.3870
W / 182	0.1630	23.7400	0.3575	0.2190	0.1523
Tl / 203	0.0378	9.2880	0.1256	0.0150	0.0032
Pb / 208	0.0294	24.8100	0.0226	0.0811	0.1007
Th / 232	0.0059	8.8840	0.0109	0.0084	0.0059
U / 238	0.0104	9.7470	0.0111	0.0089	0.0061
Li / 6	1059184	1060430	1096140	1065685	1076997
Sc / 45	1011554	1034683	1019621	988174.9	990193.2
Ge / 72	209592.8	207543.4	209397.5	206152.6	206786.1
Tb / 159	1662796	1690745	1677699	1633212	1642929
Bi / 209	1011020	986410.9	1008117	990084.1	994493.1
Li / 6	91.1	91.3	94.3	91.7	92.7
Sc / 45	97.8	100.1	98.6	95.6	95.8
Ge / 72	97.5	96.6	97.5	95.9	96.2
Tb / 159	97.0	98.6	97.8	95.2	95.8
Bi / 209	98.4	96.0	98.1	96.4	96.8

File:	029SMPL.D#	030SMPL.D#	031SMPL.D#	032SMPL.D#	033SMPL.D#
Sample:	SC3115-001	SC3144-001R	SC3067-001R	SC3114-001	SC3114-001L
Date/Time:	6/18/2009 20:48	6/18/2009 20:57	6/18/2009 21:05	6/18/2009 21:14	6/18/2009 21:22
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	-0.0004	0.0139	0.0138	0.0144	0.0524
B / 11	3.1390	101.7000	16.8400	7.0740	7.6000
Na / 23	3682.0000	39690.0000	120700.0000	10530.0000	10565.0000
Mg / 25	4964.0000	2756.0000	39.7700	7470.0000	7785.0000
Al / 27	9.1420	24.3500	20.4500	24.8700	95.1500
Si / 29	6121.0000	4095.0000	6704.0000	8140.0000	7645.0000
K / 39	438.0000	3465.0000	1151.0000	564.9000	635.0000
Ca / 44	19720.0000	3330.0000	119.9000	32240.0000	32810.0000
V / 51	0.1844	0.1851	0.2382	0.3183	1.4345
Cr / 52	0.3698	0.2296	0.1189	0.1531	0.1247
Mn / 55	91.6200	10.2600	2.4540	17.8900	18.7350
Fe / 57	102.3000	132.2000	28.2500	132.3000	211.1500
Co / 59	0.0289	0.0457	0.0259	0.0935	0.1312
Ni / 60	0.1479	0.4010	0.3282	0.4295	0.4819
Cu / 65	0.2572	6.4370	3.3490	16.2700	16.4650
Zn / 66	1.0810	1.6340	2.4790	118.1000	139.3000
As / 75	1.1500	22.8600	0.6364	1.5570	2.4565
Se / 82	0.0038	-0.0240	-0.0540	-0.1318	-0.0639
Sr / 88	141.0000	31.8100	0.7530	203.8000	204.7500
Mo / 98	2.1260	7.9530	0.7297	1.7580	3.6250
Ag / 107	0.0017	0.0052	0.0060	0.0144	0.0332
Cd / 114	0.0048	0.0117	0.0097	0.0173	0.0573
Sn / 118	0.0184	0.2123	1.9110	0.1818	0.2662
Sb / 123	0.0222	1.2340	0.0698	0.0369	0.1161
Ba / 135	1.3160	5.6820	0.0741	3.9430	3.9100
W / 182	0.1373	2.1040	0.1317	0.1099	0.3592
Tl / 203	-0.0011	-0.0089	0.0021	0.0024	-0.0269
Pb / 208	0.1366	0.3239	0.1518	0.6895	0.7425
Th / 232	0.0047	0.0134	0.0120	0.0149	0.0546
U / 238	0.1708	0.6577	0.0127	1.4780	1.4500
Li / 6	1070505	999532.3	975216.4	1021753	1114494
Sc / 45	1015246	965126.8	961589.8	982396.9	1028145
Ge / 72	207665.4	197258.5	196207	201618.6	213504.8
Tb / 159	1643996	1572273	1559973	1575549	1698565
Bi / 209	984360.5	920193.1	885869.1	930654.1	1012291
Li / 6	92.1	86.0	83.9	87.9	95.9
Sc / 45	98.2	93.4	93.0	95.0	99.5
Ge / 72	96.7	91.8	91.3	93.8	99.4
Tb / 159	95.9	91.7	91.0	91.9	99.1
Bi / 209	95.8	89.6	86.2	90.6	98.5

File:	034SMPL.D#	035SMPL.D#	036_BLK.D#	037_CCV.D#	038_CCB.D#
Sample:	LCSWZF15ICW1	LCSWZF16ICW2	BLANK	CCV	CCB
Date/Time:	6/18/2009 21:31	6/18/2009 21:39	6/18/2009 21:48	6/18/2009 21:56	6/18/2009 22:05
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	10	10	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	49.6800	49.6700	-0.0008	10.2700	0.0075
B / 11	512.7000	519.7000	0.8950	26.5100	0.5841
Na / 23	7852.0000	8034.0000	25.6400	5291.0000	21.6600
Mg / 25	4747.0000	4845.0000	7.2860	5396.0000	8.7230
Al / 27	2151.0000	2211.0000	5.5870	538.0000	3.4850
Si / 29	5178.0000	5217.0000	3.5690	521.5000	3.6630
K / 39	9903.0000	10160.0000	10.4500	5322.0000	11.5400
Ca / 44	2449.0000	2556.0000	10.6200	5382.0000	11.1900
V / 51	485.4000	489.4000	0.1929	25.3200	0.0775
Cr / 52	192.8000	194.7000	0.0878	25.1300	-0.0893
Mn / 55	487.5000	491.8000	0.0701	25.3000	0.0609
Fe / 57	1072.0000	1038.0000	8.0030	5169.0000	9.7180
Co / 59	485.6000	493.8000	0.0223	10.0600	0.0237
Ni / 60	491.9000	499.0000	0.0719	25.6100	0.0449
Cu / 65	255.4000	261.3000	1.1090	25.5500	0.0362
Zn / 66	498.5000	504.3000	0.2684	25.9500	0.0092
As / 75	481.5000	487.8000	0.1770	25.0900	-0.0764
Se / 82	491.3000	499.8000	-0.0989	25.9100	-0.0338
Sr / 88	510.7000	513.9000	0.0668	25.7100	0.0740
Mo / 98	293.4000	297.7000	0.5314	25.9000	0.5074
Ag / 107	49.4200	50.1500	0.0028	10.2800	0.0051
Cd / 114	247.4000	250.2000	0.0160	10.1700	0.0204
Sn / 118	517.5000	524.0000	0.7659	26.5800	0.0755
Sb / 123	503.0000	508.5000	0.0366	26.1800	0.0412
Ba / 135	1994.0000	2026.0000	0.1303	26.1000	0.1035
W / 182	0.5951	0.5411	0.0493	24.9500	0.3337
Tl / 203	424.2000	451.1000	0.7608	8.4370	0.4591
Pb / 208	486.0000	492.6000	0.0352	25.6400	0.0397
Th / 232	0.0454	0.0429	0.0022	9.1240	0.0087
U / 238	100.8000	104.0000	0.0095	10.1100	0.0127
Li / 6	1134417	1134842	1142420	1088283	1082744
Sc / 45	1064595	1039627	1035971	1005271	1019722
Ge / 72	215952.3	215415.4	216473.4	211027.1	209614.1
Tb / 159	1719796	1711859	1731400	1660489	1691718
Bi / 209	1036435	1019830	1030851	985934.3	1010736
Li / 6	97.6	97.7	98.3	93.7	93.2
Sc / 45	103.0	100.6	100.2	97.2	98.6
Ge / 72	100.5	100.3	100.8	98.2	97.6
Tb / 159	100.3	99.8	101.0	96.8	98.7
Bi / 209	100.9	99.3	100.3	96.0	98.4

File:	039SMPL.D#	040SMPL.D#	041SMPL.D#	042SMPL.D#	043SMPL.D#
Sample:	PBWZF12ICW0	SC3129-001R	SC3026-002	SC3026-002L	SC3026-004
Date/Time:	6/18/2009 22:13	6/18/2009 22:22	6/18/2009 22:31	6/18/2009 22:39	6/18/2009 22:48
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	2	5	25	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0004	0.1438	0.0028	-0.0232	0.0368
B / 11	3.3590	307.6000	1017.5000	1114.7500	732.5000
Na / 23	93.0500	188760.0000	#VALUE!	1736500.0000	#VALUE!
Mg / 25	49.3000	8420.0000	316200.0000	332750.0000	330450.0000
Al / 27	29.4700	1082.2000	60.2000	154.6500	133.8500
Si / 29	78.8500	2396.0000	24465.0000	23237.5000	24635.0000
K / 39	81.4500	35980.0000	74100.0000	76175.0000	81200.0000
Ca / 44	39.4800	57860.0000	153500.0000	162725.0000	157200.0000
V / 51	2.0130	11.0520	6.6100	7.4050	6.0950
Cr / 52	1.6445	10.4040	3.8065	1.7018	8.3400
Mn / 55	1.2445	448.4000	2526.5000	2670.0000	2652.5000
Fe / 57	43.2200	4236.0000	42875.0000	43250.0000	108900.0000
Co / 59	0.0669	9.9140	2.9090	3.0875	2.2755
Ni / 60	0.2696	17.2980	26.0600	29.6750	32.0850
Cu / 65	0.2955	58.8400	1.6050	1.7483	2.5085
Zn / 66	38.5250	440.0000	3.4095	7.8700	-1.4350
As / 75	2.1505	16.4520	49.4750	50.4250	5.5100
Se / 82	-0.5765	1.5124	4.0570	5.6775	0.4964
Sr / 88	0.2234	319.4000	2223.0000	2340.5000	2555.5000
Mo / 98	1.6230	7.6520	5.2050	7.7025	4.5820
Ag / 107	0.0064	0.1946	0.7715	0.7838	10.6000
Cd / 114	0.0510	1.2300	0.0601	0.1508	0.0610
Sn / 118	0.4134	3.3480	0.2896	0.4235	0.3199
Sb / 123	0.1328	6.9920	0.3844	0.5485	0.3181
Ba / 135	0.3046	36.8600	96.6500	99.1000	141.5500
W / 182	1.0380	1.3202	0.5400	1.6110	0.4088
Tl / 203	1.1470	0.2614	0.5620	1.2888	0.3089
Pb / 208	0.0681	35.5200	0.2735	0.5500	0.2278
Th / 232	0.0431	0.0633	0.0544	0.0604	0.0672
U / 238	0.0299	0.4568	2.0545	2.0113	1.2205
Li / 6	1073925	1010983	1040688	1058979	1005558
Sc / 45	947958.1	989260.9	1001440	1055102	960908
Ge / 72	201055.7	201452.5	196107.6	213074.4	194393.7
Tb / 159	1567990	1641939	1581209	1698773	1521330
Bi / 209	946323.9	922420	830104.3	948651.6	799307.6
Li / 6	92.4	87.0	89.6	91.1	86.5
Sc / 45	91.7	95.7	96.9	102.1	92.9
Ge / 72	93.6	93.8	91.3	99.2	90.5
Tb / 159	91.4	95.8	92.2	99.1	88.7
Bi / 209	92.1	89.8	80.8	92.3	77.8

File:	044SMPL.D#	045SMPL.D#	046SMPL.D#	047SMPL.D#	048_BLK.D#
Sample:	SC3026-002S	SC3026-002P	SC3114-001S	SC3114-001P	BLANK
Date/Time:	6/18/2009 22:56	6/18/2009 23:05	6/18/2009 23:14	6/18/2009 23:22	6/18/2009 23:31
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	10	10	10	10	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	52.6000	56.6500	54.3100	52.8800	0.0009
B / 11	1547.0000	1652.0000	589.2000	555.7000	1.9550
Na / 23	1589000.0000	1678000.0000	21400.0000	19540.0000	152.7000
Mg / 25	301400.0000	324100.0000	13020.0000	12020.0000	23.2000
Al / 27	2160.0000	2289.0000	2159.0000	2136.0000	2.6420
Si / 29	26160.0000	27860.0000	12340.0000	12120.0000	4.3840
K / 39	78310.0000	83800.0000	10870.0000	10550.0000	8.7720
Ca / 44	146800.0000	156000.0000	34760.0000	33530.0000	18.3500
V / 51	510.1000	529.0000	477.5000	484.7000	0.0806
Cr / 52	194.3000	201.9000	186.4000	192.5000	0.0060
Mn / 55	2876.0000	3005.0000	495.8000	504.0000	0.2499
Fe / 57	42020.0000	43580.0000	1264.0000	1204.0000	9.3700
Co / 59	478.3000	495.5000	476.6000	486.3000	0.0432
Ni / 60	497.5000	515.3000	486.2000	492.4000	0.1116
Cu / 65	235.6000	243.9000	252.6000	258.1000	1.1050
Zn / 66	437.5000	461.1000	597.1000	598.2000	0.2581
As / 75	511.8000	533.7000	484.1000	479.5000	0.0168
Se / 82	452.5000	471.6000	486.9000	488.2000	-0.0290
Sr / 88	2606.0000	2743.0000	701.4000	691.9000	0.2130
Mo / 98	306.5000	327.4000	297.2000	296.7000	0.4758
Ag / 107	45.4500	48.9000	48.7000	49.1500	0.0041
Cd / 114	225.2000	236.2000	245.8000	243.4000	0.0253
Sn / 118	491.0000	528.9000	524.8000	515.1000	0.7920
Sb / 123	478.9000	506.9000	502.0000	495.9000	0.0658
Ba / 135	2041.0000	2167.0000	1981.0000	2003.0000	0.1940
W / 182	0.6444	0.6251	0.4375	0.4519	0.0321
Tl / 203	425.8000	462.0000	455.9000	460.3000	0.8571
Pb / 208	484.1000	510.3000	489.9000	483.0000	0.0580
Th / 232	0.1384	0.1099	0.0935	0.0365	0.0007
U / 238	109.8000	116.3000	105.5000	103.9000	0.0125
Li / 6	1075957	991808.5	1020693	1034919	1054206
Sc / 45	1102889	1001988	999106.3	996138.3	993181.9
Ge / 72	214238.1	198558.7	205611.7	203809.5	205536.4
Tb / 159	1735462	1588002	1640107	1632168	1644359
Bi / 209	920519.7	858765.7	963177.2	962098.4	978075.3
Li / 6	92.6	85.4	87.8	89.1	90.7
Sc / 45	106.7	96.9	96.6	96.4	96.1
Ge / 72	99.7	92.4	95.7	94.9	95.7
Tb / 159	101.2	92.6	95.6	95.2	95.9
Bi / 209	89.6	83.6	93.7	93.6	95.2

File:	049_CCV.D#	050_CCB.D#	051SMPL.D#	052SMPL.D#	053SMPL.D#
Sample:	CCV	CCB	SC3026-006	SC3068-002	SC3068-004
Date/Time:	6/18/2009 23:39	6/18/2009 23:48	6/18/2009 23:56	6/19/2009 0:05	6/19/2009 0:13
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	5	5	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	10.8700	0.0051	0.0196	0.1169	0.0723
B / 11	27.7800	1.1710	735.0000	572.0000	562.0000
Na / 23	5444.0000	110.2000	#VALUE!	436100.0000	696500.0000
Mg / 25	5382.0000	20.0000	336050.0000	80400.0000	131250.0000
Al / 27	531.0000	1.7850	76.6000	195.4000	155.2500
Si / 29	514.8000	2.0600	25770.0000	18690.0000	26590.0000
K / 39	5344.0000	8.5500	83450.0000	38655.0000	44140.0000
Ca / 44	5407.0000	10.9800	161850.0000	38645.0000	101650.0000
V / 51	25.2400	0.0100	6.4500	5.6700	4.0145
Cr / 52	24.7400	-0.1343	6.8800	16.1100	2.3035
Mn / 55	25.2000	0.1589	2694.0000	806.5000	5970.0000
Fe / 57	5212.0000	8.9860	113050.0000	33450.0000	26160.0000
Co / 59	10.0600	0.0318	2.0520	1.4865	1.0580
Ni / 60	25.7100	0.0702	25.3100	19.7100	7.0900
Cu / 65	25.3900	0.0352	2.4215	2.7170	1.4030
Zn / 66	25.4300	0.0110	-2.6205	4.2750	2.3565
As / 75	25.1400	-0.0457	4.4670	1.5080	2.6210
Se / 82	25.8300	-0.0318	-3.0350	0.2157	0.8560
Sr / 88	25.8200	0.1707	2590.0000	563.5000	968.0000
Mo / 98	25.4300	0.4023	3.4585	1.6585	2.0955
Ag / 107	10.2100	0.0062	7.0550	0.4303	0.6400
Cd / 114	10.1900	0.0257	0.0702	0.0591	0.0613
Sn / 118	25.9500	0.0955	0.7355	0.5375	0.5875
Sb / 123	25.6600	0.0559	0.3727	0.1402	0.2083
Ba / 135	25.9200	0.1323	147.1000	21.4700	32.6800
W / 182	24.1700	0.3102	0.9955	0.5795	0.5270
Tl / 203	9.0030	0.4508	1.5265	0.9220	0.6925
Pb / 208	25.2900	0.0414	0.2792	0.4909	0.2676
Th / 232	9.0290	0.0080	0.1160	0.0531	0.0493
U / 238	9.9210	0.0152	1.2810	0.2453	0.0577
Li / 6	1042722	1065508	964251.8	1014741	1014643
Sc / 45	968518.1	999329.1	899040.1	992025.9	960385.8
Ge / 72	201200.7	205217.9	182979.8	199044.2	196561.9
Tb / 159	1617987	1650826	1437382	1579124	1537412
Bi / 209	953409.7	997368.6	758177.5	874705.3	848596.3
Li / 6	89.7	91.7	83.0	87.3	87.3
Sc / 45	93.7	96.7	87.0	96.0	92.9
Ge / 72	93.6	95.5	85.2	92.6	91.5
Tb / 159	94.4	96.3	83.8	92.1	89.7
Bi / 209	92.8	97.1	73.8	85.1	82.6

File:	054SMPL.D#	055SMPL.D#	056SMPL.D#	057_BLK.D#	058_BLK.D#
Sample:	SC3068-006	SC3068-008	LCSWZF12ICW0	BLANK	BLANK
Date/Time:	6/19/2009 0:22	6/19/2009 0:30	6/19/2009 0:39	6/19/2009 0:48	6/19/2009 0:56
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	5	10	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0159	0.2264	51.2000	0.0022	0.0054
B / 11	399.6000	72.6000	556.9000	1.5260	1.1450
Na / 23	868500.0000	13125.0000	9277.0000	146.5000	199.4000
Mg / 25	143000.0000	6665.0000	4992.0000	24.6500	37.4100
Al / 27	82.8500	237.7500	2149.0000	4.2910	9.7680
Si / 29	18120.0000	8105.0000	5288.0000	5.7250	5.6800
K / 39	46205.0000	1857.0000	10390.0000	10.4100	19.6200
Ca / 44	75400.0000	10725.0000	2541.0000	17.3000	28.1500
V / 51	6.6500	0.7290	493.9000	-0.0113	0.1030
Cr / 52	5.4050	0.7120	196.6000	-0.0325	-0.0399
Mn / 55	1478.0000	13.4600	495.2000	0.3787	0.5016
Fe / 57	48980.0000	209.0500	1103.0000	13.7300	20.5100
Co / 59	0.8965	6.1000	494.2000	0.0290	0.0605
Ni / 60	9.0050	11.6450	499.6000	0.1023	0.1157
Cu / 65	1.6120	2.2360	248.9000	1.1040	1.1460
Zn / 66	1.5260	23.1100	483.3000	0.2094	0.2922
As / 75	7.1550	0.3023	486.5000	-0.1784	-0.0384
Se / 82	0.8215	-0.0149	487.5000	-0.1288	-0.1186
Sr / 88	999.0000	92.5500	517.1000	0.1797	0.2893
Mo / 98	2.7995	1.4730	305.1000	0.3264	0.2971
Ag / 107	0.5705	0.9595	49.7800	0.0039	0.0082
Cd / 114	0.0537	0.1715	247.6000	0.0162	0.0323
Sn / 118	0.4422	0.5830	530.0000	0.7243	0.7240
Sb / 123	0.2859	0.1127	513.1000	0.0393	0.0816
Ba / 135	64.8000	62.8000	2028.0000	0.1649	0.2600
W / 182	0.3947	0.2987	0.4996	0.0429	0.0332
Tl / 203	0.6270	0.4573	448.4000	0.7231	0.2912
Pb / 208	0.1714	0.5900	501.7000	0.0397	0.0709
Th / 232	0.0507	0.0369	0.0286	0.0018	0.0068
U / 238	1.3495	0.2251	103.7000	0.0072	0.0196
Li / 6	997949.7	1059660	1060273	1058916	1075079
Sc / 45	973394.4	987637.5	1006642	991365.7	991921
Ge / 72	194244.6	205144.1	204725.5	206243.8	205574.6
Tb / 159	1540890	1599860	1617089	1623369	1622961
Bi / 209	838249.1	950576.3	949109.6	976695.9	971487.7
Li / 6	85.9	91.2	91.2	91.1	92.5
Sc / 45	94.2	95.5	97.4	95.9	95.9
Ge / 72	90.4	95.5	95.3	96.0	95.7
Tb / 159	89.9	93.3	94.3	94.7	94.6
Bi / 209	81.6	92.5	92.4	95.1	94.6

File:	059_BLK.D#	060_PQL.D#	061_CCV.D#	062_CCB.D#	063SMPL.D#
Sample:	BLANK	PQL	CCV	CCB	PBSZF11ICS0
Date/Time:	6/19/2009 1:05	6/19/2009 1:13	6/19/2009 1:21	6/19/2009 1:30	6/19/2009 1:39
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0058	0.2171	10.5200	0.0061	-0.0050
B / 11	1.0260	9.1810	26.3000	0.7255	3.9830
Na / 23	155.8000	303.8000	5294.0000	81.4600	363.4000
Mg / 25	29.6900	34.2900	5246.0000	16.8900	88.9000
Al / 27	8.9430	67.8900	518.7000	3.1590	37.8200
Si / 29	3.7200	44.2600	505.6000	0.2803	68.8500
K / 39	16.3100	221.0000	5194.0000	9.1600	85.2500
Ca / 44	22.8100	29.4500	5209.0000	11.8700	84.7000
V / 51	-0.0196	1.0310	24.9900	0.0385	0.5795
Cr / 52	-0.0612	0.5300	24.7600	-0.1537	0.8205
Mn / 55	0.3743	0.3626	25.0200	0.1532	1.7010
Fe / 57	15.8000	26.4100	5079.0000	11.9600	120.3500
Co / 59	0.0249	0.2135	9.9610	0.0105	0.0416
Ni / 60	0.0863	0.2326	25.3700	0.0491	0.4904
Cu / 65	1.1390	0.2265	25.3400	0.0287	2.7075
Zn / 66	0.2770	2.2860	25.6700	0.0093	1.9245
As / 75	-0.0732	0.8724	24.8800	-0.1306	-0.0231
Se / 82	-0.0431	0.7377	25.2900	-0.0648	0.0468
Sr / 88	0.1877	0.3176	25.4300	0.1166	0.5475
Mo / 98	0.2412	1.1240	25.1800	0.3358	0.8880
Ag / 107	0.0052	0.1300	10.1100	0.0064	0.0008
Cd / 114	0.0227	0.2179	10.1400	0.0159	0.0593
Sn / 118	0.6749	0.2447	25.5800	0.0727	7.6700
Sb / 123	0.0395	0.2170	25.5100	0.0500	0.1410
Ba / 135	0.1352	0.2592	25.6200	0.0574	0.5750
W / 182	0.0314	1.1550	24.3100	0.3121	0.9890
Tl / 203	0.1777	0.2750	9.0100	0.2527	0.6470
Pb / 208	0.0427	0.2058	24.9900	0.0315	0.2645
Th / 232	0.0063	0.0850	8.9610	0.0086	0.0414
U / 238	0.0113	0.2088	9.7890	0.0130	0.0481
Li / 6	1092555	1062715	1077928	1074890	1037935
Sc / 45	991144.4	972074.3	987720.6	978543.2	918241.8
Ge / 72	206213.8	203711.8	201587.7	202861.7	192753.9
Tb / 159	1640659	1606231	1615285	1626283	1525059
Bi / 209	980375.9	970434.6	957652.6	984003.5	923985
Li / 6	94.0	91.5	92.8	92.5	89.3
Sc / 45	95.9	94.0	95.5	94.7	88.8
Ge / 72	96.0	94.8	93.8	94.4	89.7
Tb / 159	95.7	93.7	94.2	94.8	88.9
Bi / 209	95.4	94.5	93.2	95.8	89.9

File:	064SMPL.D#	065SMPL.D#	066SMPL.D#	067SMPL.D#	068SMPL.D#
Sample:	SC2881-001	SC2881-002	SC2881-003	SC2881-004	SC2881-005
Date/Time:	6/19/2009 1:47	6/19/2009 1:56	6/19/2009 2:04	6/19/2009 2:13	6/19/2009 2:22
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	5	5	5	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	5.4150	4.2860	8.8750	9.5950	4.3945
B / 11	37.7300	30.1650	41.8700	57.1000	53.8000
Na / 23	716.0000	1052.0000	936.0000	697.0000	443.0500
Mg / 25	12090.0000	10025.0000	11830.0000	13040.0000	8755.0000
Al / 27	131850.0000	103100.0000	116850.0000	160500.0000	71300.0000
Si / 29	4549.5000	4108.0000	3934.5000	3564.5000	4282.0000
K / 39	10985.0000	8635.0000	8485.0000	8465.0000	7860.0000
Ca / 44	3518.5000	2735.0000	2485.0000	4279.5000	2408.0000
V / 51	299.2500	234.9000	273.7500	305.3500	174.1000
Cr / 52	177.3000	150.4500	167.9500	190.5000	123.5500
Mn / 55	2037.5000	1681.5000	7095.0000	6530.0000	2094.0000
Fe / 57	146900.0000	129600.0000	151300.0000	150050.0000	77950.0000
Co / 59	89.9000	64.9500	164.6500	109.7500	37.2450
Ni / 60	96.1500	78.3000	90.7000	107.8000	50.1000
Cu / 65	105.1000	91.4000	122.4000	291.9500	110.4500
Zn / 66	326.4000	263.1500	370.2500	761.0000	218.0000
As / 75	35.3100	27.5150	31.1550	37.8200	14.1250
Se / 82	3.5240	3.0045	4.9540	4.0640	2.4730
Sr / 88	63.7000	55.0000	57.3000	81.2500	42.2450
Mo / 98	6.2800	5.5450	6.2300	12.4200	4.0445
Ag / 107	0.2235	0.2009	0.3388	1.0785	0.2475
Cd / 114	0.4171	0.6845	0.5655	1.1890	0.3100
Sn / 118	13.2900	11.6350	13.0550	36.4100	10.6900
Sb / 123	1.6285	1.8535	1.9045	16.2800	1.1405
Ba / 135	531.0000	433.3000	802.5000	1054.0000	420.9500
W / 182	0.9610	0.9220	0.8785	0.7880	0.6320
Tl / 203	1.9200	1.4595	1.6605	1.7255	0.8405
Pb / 208	202.6500	173.5500	201.4000	601.0000	103.7500
Th / 232	37.8900	32.8700	26.8700	35.5650	25.9300
U / 238	7.0350	6.2450	7.8350	9.3900	6.0400
Li / 6	1061013	1052991	1065488	1051065	1088125
Sc / 45	1018282	1000796	990905.8	1002326	1021172
Ge / 72	196599.8	195470.2	196855.6	195543.4	200900.4
Tb / 159	1530941	1534009	1532443	1519775	1593019
Bi / 209	890687.8	886943.8	890399.3	880325.9	930352.1
Li / 6	91.3	90.6	91.7	90.4	93.6
Sc / 45	98.5	96.8	95.9	97.0	98.8
Ge / 72	91.5	91.0	91.6	91.0	93.5
Tb / 159	89.3	89.5	89.4	88.6	92.9
Bi / 209	86.7	86.3	86.7	85.7	90.6

File:	069SMPL.D#	070SMPL.D#	071SMPL.D#	072_BLK.D#	073_CCV.D#
Sample:	SC2881-006	SC2881-007	LCSSZF111CS0	BLANK	CCV
Date/Time:	6/19/2009 2:30	6/19/2009 2:39	6/19/2009 2:47	6/19/2009 2:56	6/19/2009 3:04
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	5	10	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	6.7450	5.7550	835.8000	0.0361	10.2400
B / 11	89.3500	72.8500	601.9000	0.9237	25.5000
Na / 23	1417.0000	586.0000	3113.0000	20.0200	5254.0000
Mg / 25	14045.0000	13450.0000	25000.0000	5.4690	5256.0000
Al / 27	117200.0000	103750.0000	70310.0000	23.1800	531.7000
Si / 29	4471.0000	4365.0000	3965.0000	2.5030	508.6000
K / 39	12870.0000	11275.0000	23280.0000	4.1780	5192.0000
Ca / 44	2783.0000	4841.5000	49550.0000	9.6020	5248.0000
V / 51	279.0500	260.1000	542.6000	0.0993	25.1700
Cr / 52	220.0000	184.2000	655.8000	0.0362	24.9300
Mn / 55	1046.0000	1969.0000	2038.0000	0.6147	25.3300
Fe / 57	126900.0000	119750.0000	106400.0000	31.2800	5115.0000
Co / 59	50.4500	53.3000	599.8000	0.0415	10.1400
Ni / 60	76.3500	68.1500	888.5000	0.0791	25.6500
Cu / 65	96.0500	74.8500	390.2000	0.3732	25.2000
Zn / 66	556.5000	275.9000	1834.0000	0.2696	25.4400
As / 75	24.3050	25.6750	1134.0000	-0.0020	24.8700
Se / 82	2.4470	2.9120	751.7000	-0.1298	25.3400
Sr / 88	67.1500	46.0700	636.8000	0.0626	25.6400
Mo / 98	7.1550	6.1600	586.9000	0.4455	25.4100
Ag / 107	0.5415	0.2979	184.9000	0.0049	10.1400
Cd / 114	1.4175	0.6325	335.0000	0.0189	10.0700
Sn / 118	12.4550	14.4900	919.7000	0.2377	25.6600
Sb / 123	2.2385	1.4185	498.7000	0.0399	25.6600
Ba / 135	664.5000	466.5000	3007.0000	0.2527	25.8100
W / 182	0.6415	0.7355	2.4420	0.0220	24.1300
Tl / 203	1.3655	1.0670	852.0000	0.8725	9.2980
Pb / 208	440.5000	183.2500	1140.0000	0.1135	25.1400
Th / 232	37.7950	28.8000	39.9000	0.0086	9.1190
U / 238	8.8300	7.0750	10.9700	0.0022	9.8100
Li / 6	1030344	1051742	1057740	1076878	1048925
Sc / 45	979018.2	977025.8	986795.9	987727.4	966884.3
Ge / 72	192377.3	194874.5	195868.2	203121.4	198035.8
Tb / 159	1506844	1517807	1533465	1587886	1569441
Bi / 209	869640.8	887637.5	904476.1	941714.4	923018.9
Li / 6	88.7	90.5	91.0	92.7	90.3
Sc / 45	94.7	94.5	95.5	95.5	93.5
Ge / 72	89.5	90.7	91.2	94.5	92.2
Tb / 159	87.9	88.5	89.4	92.6	91.5
Bi / 209	84.6	86.4	88.0	91.7	89.8

File:	074_CCB.D#	075SMPL.D#	076SMPL.D#	077SMPL.D#	078SMPL.D#
Sample:	CCB	SC2881-008	SC2881-009	SC2881-010	SC2881-011
Date/Time:	6/19/2009 3:13	6/19/2009 3:21	6/19/2009 3:30	6/19/2009 3:39	6/19/2009 3:47
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	5	5	5	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0158	7.4600	10.2450	10.9400	5.3200
B / 11	0.5588	138.4000	55.3500	101.2500	38.4750
Na / 23	18.8600	439.7500	520.5000	621.5000	311.5000
Mg / 25	6.5290	17085.0000	13075.0000	17580.0000	8985.0000
Al / 27	10.0300	139900.0000	150550.0000	148350.0000	84750.0000
Si / 29	2.3600	3214.5000	4760.5000	3912.5000	3940.5000
K / 39	7.4150	19490.0000	10520.0000	16665.0000	8110.0000
Ca / 44	6.3480	3968.0000	2861.0000	4325.0000	2305.0000
V / 51	0.0162	344.1500	313.5000	353.5500	213.6500
Cr / 52	-0.0925	275.9000	187.4500	249.1500	143.0500
Mn / 55	0.2617	1684.5000	4535.5000	6075.0000	2456.5000
Fe / 57	16.6000	193850.0000	114500.0000	178400.0000	115800.0000
Co / 59	0.0122	56.9500	69.5000	113.4000	68.5000
Ni / 60	0.0482	86.4000	84.9000	107.5000	75.3000
Cu / 65	0.0299	688.0000	126.9000	106.4000	107.9000
Zn / 66	0.0462	858.5000	341.1000	414.7000	244.5000
As / 75	0.0378	34.5850	24.8950	39.3650	63.7500
Se / 82	0.0382	3.2565	4.5630	4.5250	3.1790
Sr / 88	0.0377	122.2000	75.0000	109.2000	63.2000
Mo / 98	0.3105	9.3000	6.4900	8.1550	6.6750
Ag / 107	0.0069	0.3432	0.5280	0.3015	0.2586
Cd / 114	0.0162	1.2200	0.4132	0.5445	0.4897
Sn / 118	0.0541	15.7100	15.0250	20.4000	14.8950
Sb / 123	0.0364	2.4945	2.9825	9.9750	7.3450
Ba / 135	0.1055	611.5000	928.0000	1057.0000	563.5000
W / 182	0.2698	1.2505	0.9335	0.7845	2.1615
Tl / 203	0.2996	2.0690	2.3920	1.8830	1.5910
Pb / 208	0.0585	292.5000	198.9500	2542.0000	1943.0000
Th / 232	0.0078	43.5900	31.9000	41.3200	25.5900
U / 238	0.0063	9.0000	9.7150	10.1700	5.5500
Li / 6	1057468	1071665	1042101	1027496	1056590
Sc / 45	962810.5	1026660	970197.2	977345.2	1013907
Ge / 72	200413.4	197935.4	192436.6	192932.4	195292.1
Tb / 159	1582832	1542647	1495575	1492899	1522651
Bi / 209	949568.3	886539.1	868411.6	850885.8	881960.9
Li / 6	91.0	92.2	89.7	88.4	90.9
Sc / 45	93.1	99.3	93.8	94.5	98.1
Ge / 72	93.3	92.1	89.6	89.8	90.9
Tb / 159	92.3	90.0	87.2	87.1	88.8
Bi / 209	92.4	86.3	84.5	82.8	85.8

File:	079SMPL.D#	080SMPL.D#	081SMPL.D#	082SMPL.D#	083SMPL.D#
Sample:	SC2881-012	SC2881-013	SC2881-014	SC2881-015	SC2881-016
Date/Time:	6/19/2009 3:56	6/19/2009 4:05	6/19/2009 4:13	6/19/2009 4:22	6/19/2009 4:30
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	5	5	5	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	9.9900	5.9900	10.5600	6.3950	11.2450
B / 11	109.6000	119.6000	48.1650	52.1500	95.8000
Na / 23	579.0000	404.1000	647.5000	482.0500	477.0500
Mg / 25	19815.0000	17930.0000	14865.0000	9460.0000	20135.0000
Al / 27	163250.0000	137600.0000	135150.0000	74650.0000	171850.0000
Si / 29	3041.5000	3933.5000	4869.5000	3787.5000	3308.0000
K / 39	18250.0000	17595.0000	10995.0000	8480.0000	17940.0000
Ca / 44	6095.0000	12665.0000	8060.0000	5455.0000	7340.0000
V / 51	410.6000	336.7000	256.5500	172.2500	410.8000
Cr / 52	312.3000	248.2000	162.6500	125.6500	285.3000
Mn / 55	3740.0000	1479.0000	7875.0000	4332.0000	4469.0000
Fe / 57	234850.0000	168450.0000	102750.0000	80050.0000	210700.0000
Co / 59	94.0500	50.7500	67.6000	41.1900	95.5000
Ni / 60	113.9000	84.6500	94.1500	61.8500	121.6000
Cu / 65	110.5500	83.1500	99.3000	67.3500	106.7000
Zn / 66	409.4500	289.8500	422.1500	278.0500	442.2000
As / 75	44.5050	30.7450	20.4900	15.1700	38.4350
Se / 82	2.2325	1.8090	4.2105	2.0825	3.3160
Sr / 88	138.3000	94.1500	97.0000	94.1000	338.5500
Mo / 98	11.4400	7.7750	4.7735	4.1750	8.9150
Ag / 107	0.2181	0.2890	0.4137	0.2946	0.3264
Cd / 114	0.1893	0.3692	0.8505	0.6550	0.3466
Sn / 118	12.9650	12.5650	39.7950	12.7350	15.0100
Sb / 123	1.1880	6.5450	2.8310	3.4025	2.2715
Ba / 135	845.5000	608.0000	1531.0000	1044.0000	1453.0000
W / 182	0.7610	0.5365	0.9830	2.0670	0.6335
Tl / 203	1.5800	1.4655	1.4450	0.9595	1.6345
Pb / 208	133.3000	303.9000	841.0000	1868.5000	973.5000
Th / 232	53.2500	42.7750	20.6650	20.5000	54.1500
U / 238	10.3300	8.3250	7.8600	5.7400	10.6900
Li / 6	1048148	1030082	1019350	1036827	1031778
Sc / 45	1010027	1006299	913368.8	955625.8	985230.5
Ge / 72	192168.4	190785.4	188061.8	190701.8	189784.3
Tb / 159	1501148	1495241	1438985	1491374	1463337
Bi / 209	853714.4	858794.4	837939.3	864255.7	838047.9
Li / 6	90.2	88.6	87.7	89.2	88.8
Sc / 45	97.7	97.3	88.4	92.4	95.3
Ge / 72	89.4	88.8	87.5	88.8	88.3
Tb / 159	87.5	87.2	83.9	87.0	85.3
Bi / 209	83.1	83.6	81.6	84.1	81.6

File:	084_BLK.D#	085_CCV.D#	086_CCB.D#	087SMPL.D#	088SMPL.D#
Sample:	BLANK	CCV	CCB	SC2881-017	SC2881-017
Date/Time:	6/19/2009 4:39	6/19/2009 4:47	6/19/2009 4:56	6/19/2009 5:04	6/19/2009 5:13
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	5	10
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0051	10.4700	0.0107	6.6400	6.9230
B / 11	0.6346	25.9100	0.4952	49.5850	52.9300
Na / 23	38.3500	5151.0000	27.2000	483.4500	525.6000
Mg / 25	15.0400	5174.0000	11.7300	10630.0000	10110.0000
Al / 27	60.0600	537.3000	28.9000	96200.0000	99760.0000
Si / 29	3.8780	501.0000	0.7124	3706.0000	3856.0000
K / 39	19.2400	5148.0000	16.4200	9075.0000	9404.0000
Ca / 44	14.9000	5168.0000	8.5480	3338.5000	3522.0000
V / 51	0.1155	25.1400	0.0804	252.0000	257.4000
Cr / 52	0.0424	24.7700	-0.0599	152.2000	155.7000
Mn / 55	2.0020	25.8200	0.9331	3592.5000	3729.0000
Fe / 57	72.5300	5128.0000	36.9800	121650.0000	126300.0000
Co / 59	0.0389	10.0300	0.0202	68.3500	69.3400
Ni / 60	0.1998	25.5400	0.0577	78.0500	79.6900
Cu / 65	1.3400	25.3400	0.0540	192.3000	198.3000
Zn / 66	0.7843	25.3800	0.0417	286.3000	300.7000
As / 75	0.0320	24.8100	-0.0030	49.9450	50.4800
Se / 82	-0.1058	25.2300	0.0021	4.0980	4.2670
Sr / 88	0.1180	25.2400	0.0929	70.0000	71.6700
Mo / 98	0.0679	24.8400	0.2610	5.7750	5.5590
Ag / 107	-0.0023	10.0200	0.0048	0.7145	0.6857
Cd / 114	0.0033	9.9230	0.0126	0.4712	0.5011
Sn / 118	0.5018	25.3500	0.0560	20.9000	21.5100
Sb / 123	0.0193	25.3500	0.0399	41.6800	40.8000
Ba / 135	0.4843	25.9200	0.2381	609.5000	614.3000
W / 182	0.0258	23.7000	0.2945	1.2440	1.5030
Tl / 203	0.0176	9.0790	0.1593	1.2180	1.2280
Pb / 208	0.4003	25.0500	0.2196	7925.0000	8156.0000
Th / 232	0.0195	9.2210	0.0139	22.9800	18.9400
U / 238	0.0053	9.7460	0.0140	6.8500	6.8600
Li / 6	1069946	1048375	1046552	1030218	1038573
Sc / 45	966091	965386.1	965640.1	935221.3	945374.6
Ge / 72	198730.5	195222.4	196038.6	186183.2	190457
Tb / 159	1546067	1550899	1556310	1456258	1497378
Bi / 209	917432.9	908190.5	930165	838155.4	868163.5
Li / 6	92.1	90.2	90.1	88.7	89.4
Sc / 45	93.5	93.4	93.4	90.5	91.4
Ge / 72	92.5	90.9	91.2	86.7	88.6
Tb / 159	90.2	90.4	90.8	84.9	87.3
Bi / 209	89.3	88.4	90.5	81.6	84.5

File:	089SMPL.D#	090SMPL.D#	091SMPL.D#	092SMPL.D#	093SMPL.D#
Sample:	SC2881-017L	SC2881-017L	SC2881-017D	SC2881-017D	SC2881-017A
Date/Time:	6/19/2009 5:22	6/19/2009 5:30	6/19/2009 5:39	6/19/2009 5:47	6/19/2009 5:56
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	25	50	5	10	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	6.5450	6.7850	6.6000	6.5230	12.2800
B / 11	52.3000	59.5500	52.8000	57.0100	78.3500
Na / 23	656.5000	2088.0000	594.0000	655.6000	3011.5000
Mg / 25	10190.0000	10885.0000	11130.0000	11450.0000	11290.0000
Al / 27	99900.0000	104500.0000	97500.0000	109700.0000	98600.0000
Si / 29	3860.0000	4034.0000	4326.5000	4872.0000	4794.5000
K / 39	9402.5000	10320.0000	9435.0000	10500.0000	11745.0000
Ca / 44	3525.0000	4087.5000	3066.5000	3450.0000	4420.5000
V / 51	254.7500	262.1000	246.0500	251.9000	280.0000
Cr / 52	153.0250	155.9500	156.7000	160.1000	180.4000
Mn / 55	3842.5000	3920.5000	2800.0000	2901.0000	3685.0000
Fe / 57	130975.0000	132250.0000	107850.0000	115600.0000	124300.0000
Co / 59	70.0000	70.6000	61.5000	63.5600	74.8000
Ni / 60	82.3250	83.8000	78.7500	82.5400	89.7000
Cu / 65	197.8500	209.9000	151.0500	154.4000	219.9000
Zn / 66	303.7500	326.6000	295.5000	311.4000	385.5500
As / 75	48.2500	47.5100	43.4350	42.9400	99.0500
Se / 82	3.4925	-1.6135	3.5155	1.9200	51.4500
Sr / 88	71.8500	76.5500	69.1500	70.9200	75.8000
Mo / 98	5.2925	7.2700	5.5800	5.7740	15.5800
Ag / 107	0.6575	0.8485	0.7390	0.6286	3.2230
Cd / 114	0.5073	1.0040	0.5515	0.4821	2.9115
Sn / 118	21.7925	22.8250	20.1100	21.1900	32.5750
Sb / 123	42.8250	44.2000	24.0600	25.3700	52.6000
Ba / 135	623.5000	645.5000	654.5000	687.7000	644.5000
W / 182	2.5400	3.5405	0.7485	0.9108	12.6150
Tl / 203	1.2390	0.6050	1.2025	1.0670	5.4750
Pb / 208	8127.5000	8195.0000	7355.0000	7663.0000	8115.0000
Th / 232	14.5875	13.8850	23.9350	20.0200	25.0850
U / 238	6.7350	7.2350	6.8100	6.9870	8.1350
Li / 6	1089605	1095035	1036188	1041067	1033334
Sc / 45	971763.6	958713	961134.9	888464.1	945536.1
Ge / 72	195056.9	195752.9	189886.7	188529.3	188798
Tb / 159	1523251	1518903	1461169	1421166	1450719
Bi / 209	902621.1	909070.6	851018.4	853009.9	843758.2
Li / 6	93.8	94.2	89.2	89.6	88.9
Sc / 45	94.0	92.7	93.0	85.9	91.5
Ge / 72	90.8	91.1	88.4	87.7	87.9
Tb / 159	88.8	88.6	85.2	82.9	84.6
Bi / 209	87.9	88.5	82.8	83.0	82.1

File:	094SMPL.D#	095_BLK.D#	096_CCV.D#	097_CCB.D#	098SMPL.D#
Sample:	SC2881-017S	BLANK	CCV	CCB	SC2881-018
Date/Time:	6/19/2009 6:04	6/19/2009 6:13	6/19/2009 6:21	6/19/2009 6:30	6/19/2009 6:38
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	10	1	1	1	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	54.0100	0.0021	10.7600	0.0037	9.8500
B / 11	528.5000	0.8463	26.2400	0.5653	62.7000
Na / 23	7880.0000	17.7200	5667.0000	18.6200	511.5000
Mg / 25	17560.0000	6.1200	5640.0000	6.1460	19425.0000
Al / 27	134000.0000	30.6400	577.0000	12.1300	172800.0000
Si / 29	5068.0000	1.2780	548.5000	2.1840	3610.5000
K / 39	23050.0000	11.9900	5655.0000	21.6400	14715.0000
Ca / 44	5538.0000	7.4250	5607.0000	5.2580	5935.0000
V / 51	741.2000	0.0669	25.5800	0.0653	391.6000
Cr / 52	364.7000	-0.0093	25.3700	-0.0684	251.2500
Mn / 55	3212.0000	1.1290	25.8600	0.3615	4762.0000
Fe / 57	117000.0000	37.3100	5245.0000	16.0400	199600.0000
Co / 59	523.8000	0.0443	10.3700	0.0099	137.8500
Ni / 60	561.2000	0.1806	25.9400	0.0347	138.8000
Cu / 65	389.2000	1.2690	25.8000	0.0504	146.9000
Zn / 66	777.2000	0.6317	25.8300	0.0494	532.0000
As / 75	492.5000	0.0687	25.5700	-0.0701	48.1550
Se / 82	442.8000	-0.0954	26.1300	-0.1928	3.4570
Sr / 88	577.1000	0.0673	25.9000	0.0484	137.8000
Mo / 98	279.1000	0.2148	25.5100	0.2529	8.2950
Ag / 107	47.1300	-0.0008	10.2900	0.0059	0.3725
Cd / 114	228.3000	0.0172	10.2200	0.0136	0.4638
Sn / 118	502.3000	0.5253	26.5900	0.0365	17.2900
Sb / 123	324.9000	0.0390	26.3200	0.0377	2.0345
Ba / 135	2635.0000	0.3136	26.6700	0.1139	1154.0000
W / 182	1.1900	0.0338	24.8800	0.3018	1.7575
Tl / 203	431.0000	0.5299	9.6430	0.2211	2.6835
Pb / 208	8767.0000	1.6760	26.9200	0.6560	425.4500
Th / 232	22.4000	0.0077	9.3480	0.0093	58.9500
U / 238	104.4000	0.0082	10.1500	0.0093	11.5300
Li / 6	1065716	1086793	1004976	1038886	1006629
Sc / 45	960446.6	969267.7	869161.3	893781.8	960897.6
Ge / 72	191787.3	197741.8	187293	191131.9	183453.9
Tb / 159	1496864	1544063	1458057	1500378	1453950
Bi / 209	879620.7	914432.2	860477.3	901851.3	821847.1
Li / 6	91.7	93.5	86.5	89.4	86.6
Sc / 45	92.9	93.8	84.1	86.5	92.9
Ge / 72	89.3	92.0	87.2	89.0	85.4
Tb / 159	87.3	90.0	85.0	87.5	84.8
Bi / 209	85.6	89.0	83.8	87.8	80.0

File:	099SMPL.D#	100SMPL.D#	101SMPL.D#	102_BLK.D#	103_CCV.D#
Sample:	SC2881-019	SC2881-020	SC2881-020	BLANK	CCV
Date/Time:	6/19/2009 6:47	6/19/2009 6:56	6/19/2009 7:04	6/19/2009 7:13	6/19/2009 7:21
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	5	10	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	6.5150	10.3050	10.1000	-0.0046	10.4100
B / 11	46.0750	54.1500	52.7900	0.3326	25.1200
Na / 23	288.5500	304.6000	343.4000	8.9750	5487.0000
Mg / 25	10685.0000	14510.0000	14680.0000	5.6370	5502.0000
Al / 27	89050.0000	121300.0000	122700.0000	46.9500	564.3000
Si / 29	4532.0000	3310.0000	3286.0000	2.3500	527.9000
K / 39	8870.0000	11400.0000	11560.0000	14.5500	5453.0000
Ca / 44	3523.5000	3668.0000	3764.0000	6.4240	5475.0000
V / 51	183.1500	236.3000	237.5000	0.1054	25.3200
Cr / 52	137.6000	177.2500	178.1000	-0.0256	24.9400
Mn / 55	3938.0000	7495.0000	7474.0000	2.4170	26.0600
Fe / 57	95850.0000	119650.0000	123200.0000	50.9500	5160.0000
Co / 59	75.3500	94.9500	96.6700	0.0269	10.0900
Ni / 60	88.7500	95.9500	99.4900	0.0388	25.2900
Cu / 65	351.5500	85.7500	87.0500	0.0613	25.4200
Zn / 66	497.5500	372.5500	382.4000	0.1349	25.3700
As / 75	21.3800	31.0300	32.4300	-0.0619	25.2400
Se / 82	2.6745	4.8410	5.7950	-0.0392	25.5900
Sr / 88	77.4500	72.5500	74.3800	0.0399	25.2200
Mo / 98	4.2670	4.4455	5.2210	-0.0045	24.9600
Ag / 107	0.2768	0.5175	0.5073	-0.0032	10.1200
Cd / 114	0.7110	0.4844	0.5267	0.0022	9.9740
Sn / 118	26.2350	12.4250	12.9800	0.0162	25.8600
Sb / 123	2.3990	18.8600	18.8700	0.0152	25.6500
Ba / 135	905.0000	1365.5000	1369.0000	0.4760	26.1700
W / 182	0.9050	0.8950	1.0310	0.0442	24.0200
Tl / 203	1.2930	1.4020	1.3670	0.0005	9.0880
Pb / 208	3954.0000	7235.0000	7298.0000	2.3210	26.0000
Th / 232	24.0150	22.1700	17.9000	0.0109	9.1570
U / 238	6.3950	6.7650	6.6160	0.0025	9.8000
Li / 6	1010746	1043589	1069671	1079512	1032958
Sc / 45	865298.6	933172.4	957048.8	947212.5	900947.9
Ge / 72	182991.3	186432.9	192627.9	196217.1	190409.8
Tb / 159	1412953	1457346	1509487	1496302	1500934
Bi / 209	823465.6	836390.9	876777.5	900378.8	886149.8
Li / 6	87.0	89.8	92.1	92.9	88.9
Sc / 45	83.7	90.3	92.6	91.6	87.1
Ge / 72	85.2	86.8	89.7	91.3	88.6
Tb / 159	82.4	85.0	88.0	87.3	87.5
Bi / 209	80.1	81.4	85.3	87.6	86.2

File:	104_CCB.D#	105_BLK.D#	106_BLK.D#	107_PQL.D#	108_CCV.D#
Sample:	CCB	Blank	Blank	PQL	CCV
Date/Time:	6/19/2009 7:30	6/19/2009 7:38	6/19/2009 7:47	6/19/2009 7:55	6/19/2009 8:04
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0059	-0.0040	-0.0032	0.1947	10.3400
B / 11	0.4857	0.5726	0.3919	8.1540	25.3500
Na / 23	16.1300	16.0700	13.8500	232.4000	5239.0000
Mg / 25	6.8530	4.7990	3.3670	23.2900	5279.0000
Al / 27	13.3500	12.6700	9.3800	71.1800	527.9000
Si / 29	2.1730	2.6310	1.9310	39.7800	507.5000
K / 39	24.1200	19.5400	14.6000	219.1000	5219.0000
Ca / 44	5.1470	5.5230	6.5300	22.9300	5226.0000
V / 51	0.0436	0.0619	0.0144	1.0870	24.8900
Cr / 52	-0.0656	-0.0186	-0.0219	0.5988	24.6100
Mn / 55	0.5908	0.5842	0.4038	0.4757	25.0300
Fe / 57	21.1600	18.2200	12.8200	28.0200	5091.0000
Co / 59	0.0134	0.0106	0.0052	0.2092	10.0500
Ni / 60	0.0427	0.0764	0.0623	0.2372	25.4800
Cu / 65	0.0489	1.1370	1.1090	0.2144	25.2200
Zn / 66	0.0184	0.2897	0.2834	2.1750	25.3800
As / 75	-0.0310	0.0275	-0.1101	0.9329	24.7600
Se / 82	0.1619	0.0119	-0.1715	1.0300	25.0400
Sr / 88	0.0415	0.0365	0.0242	0.2341	25.3800
Mo / 98	0.2128	0.0651	0.0280	0.9881	24.8100
Ag / 107	0.0051	-0.0025	-0.0007	0.1301	9.9770
Cd / 114	0.0089	0.0041	-0.0013	0.2007	9.9460
Sn / 118	0.0501	0.7000	0.6797	0.2206	25.0300
Sb / 123	0.0373	0.0240	0.0120	0.2191	24.9700
Ba / 135	0.1473	0.1262	0.0987	0.2546	25.0300
W / 182	0.3053	0.1693	0.1086	1.1960	23.5700
Tl / 203	0.1521	0.0485	0.0113	0.1594	9.0170
Pb / 208	0.5846	0.5172	0.3636	0.4599	24.8800
Th / 232	0.0089	0.0076	0.0047	0.0876	8.9500
U / 238	0.0097	0.0055	0.0033	0.1929	9.6900
Li / 6	1032891	1023224	1045642	1070429	1016975
Sc / 45	900796.3	885757.3	902933.8	946236.8	935957.2
Ge / 72	190081.4	188075.8	192115.4	196257	192445.5
Tb / 159	1512150	1482661	1511146	1545384	1544794
Bi / 209	902047.4	892275.1	904298.2	921045.9	897009.1
Li / 6	88.9	88.1	90.0	92.1	87.5
Sc / 45	87.1	85.7	87.3	91.5	90.5
Ge / 72	88.5	87.5	89.4	91.3	89.6
Tb / 159	88.2	86.5	88.1	90.1	90.1
Bi / 209	87.8	86.8	88.0	89.6	87.3

File:	109_CCB.D#
Sample:	CCB
Date/Time:	6/19/2009 8:12
Operator:	EAM
Method:	K10CCV.M
Dilution:	1
Units:	ug/L
Be / 9	-0.0029
B / 11	0.4375
Na / 23	14.7100
Mg / 25	4.8920
Al / 27	6.0440
Si / 29	0.4712
K / 39	14.8400
Ca / 44	3.9190
V / 51	0.0403
Cr / 52	-0.1216
Mn / 55	0.2335
Fe / 57	9.4280
Co / 59	0.0048
Ni / 60	0.0258
Cu / 65	0.0344
Zn / 66	-0.0434
As / 75	-0.1806
Se / 82	-0.0467
Sr / 88	0.0297
Mo / 98	0.2067
Ag / 107	0.0029
Cd / 114	0.0049
Sn / 118	0.0355
Sb / 123	0.0256
Ba / 135	0.0860
W / 182	0.3092
Tl / 203	0.1252
Pb / 208	0.2380
Th / 232	0.0075
U / 238	0.0069
Li / 6	1028724
Sc / 45	924388
Ge / 72	193291.5
Tb / 159	1543962
Bi / 209	909463.1
Li / 6	88.5
Sc / 45	89.4
Ge / 72	90.0
Tb / 159	90.0
Bi / 209	88.5

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-2

Concentration Units: ug/L

SAMPLE: ICV

File: JZF18A Jun 18, 2009 18:49

Analyte	True	Found	%R (1)
ALUMINUM	400.0	437.20	109.3
ANTIMONY	20.0	20.30	101.5
ARSENIC	20.0	19.48	97.4
CALCIUM	4000.0	4229.00	105.7
COPPER	20.0	20.59	103.0
IRON	4000.0	4101.00	102.5
LEAD	20.0	20.03	100.2
MAGNESIUM	4000.0	4270.00	106.7
MOLYBDENUM	40.0	41.78	104.5
POTASSIUM	4000.0	4148.00	103.7
SODIUM	4000.0	4129.00	103.2
TIN	20.0	21.44	107.2
ZINC	20.0	20.57	102.8

SAMPLE: CCV

File: JZF18A Jun 18, 2009 19:40

Analyte	True	Found	%R (1)
ALUMINUM	500.0	573.20	114.6•
ANTIMONY	25.0	25.99	104.0
ARSENIC	25.0	25.26	101.0
CALCIUM	5000.0	5476.00	109.5
COPPER	25.0	25.57	102.3
IRON	5000.0	5219.00	104.4
LEAD	25.0	25.45	101.8
MAGNESIUM	5000.0	5377.00	107.5
MOLYBDENUM	25.0	31.30	125.2•
POTASSIUM	5000.0	5429.00	108.6
SODIUM	5000.0	5382.00	107.6
TIN	25.0	25.94	103.8
ZINC	25.0	25.55	102.2

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-2

Concentration Units: ug/L

SAMPLE: CCV

File: JZF18A Jun 18, 2009 20:14

Analyte	True	Found	%R (1)
ALUMINUM	500.0	515.60	103.1
ANTIMONY	25.0	25.09	100.4
ARSENIC	25.0	25.16	100.6
CALCIUM	5000.0	5078.00	101.6
COPPER	25.0	25.18	100.7
IRON	5000.0	5077.00	101.5
LEAD	25.0	24.81	99.2
MAGNESIUM	5000.0	5063.00	101.3
MOLYBDENUM	25.0	25.95	103.8
POTASSIUM	5000.0	5045.00	100.9
SODIUM	5000.0	5009.00	100.2
TIN	25.0	25.31	101.2
ZINC	25.0	25.82	103.3

SAMPLE: CCV

File: JZF18A Jun 18, 2009 21:56

Analyte	True	Found	%R (1)
ALUMINUM	500.0	538.00	107.6
ANTIMONY	25.0	26.18	104.7
ARSENIC	25.0	25.09	100.4
CALCIUM	5000.0	5382.00	107.6
COPPER	25.0	25.55	102.2
IRON	5000.0	5169.00	103.4
LEAD	25.0	25.64	102.6
MAGNESIUM	5000.0	5396.00	107.9
MOLYBDENUM	25.0	25.90	103.6
POTASSIUM	5000.0	5322.00	106.4
SODIUM	5000.0	5291.00	105.8
TIN	25.0	26.58	106.3
ZINC	25.0	25.95	103.8

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-2

Concentration Units: ug/L

SAMPLE: CCV

File: JZF18A Jun 18, 2009 23:39

Analyte	True	Found	%R (1)
ALUMINUM	500.0	531.00	106.2
ANTIMONY	25.0	25.66	102.6
ARSENIC	25.0	25.14	100.6
CALCIUM	5000.0	5407.00	108.1
COPPER	25.0	25.39	101.6
IRON	5000.0	5212.00	104.2
LEAD	25.0	25.29	101.2
MAGNESIUM	5000.0	5382.00	107.6
MOLYBDENUM	25.0	25.43	101.7
POTASSIUM	5000.0	5344.00	106.9
SODIUM	5000.0	5444.00	108.9
TIN	25.0	25.95	103.8
ZINC	25.0	25.43	101.7

SAMPLE: CCV

File: JZF18A Jun 19, 2009 1:21

Analyte	True	Found	%R (1)
ALUMINUM	500.0	518.70	103.7
ANTIMONY	25.0	25.51	102.0
ARSENIC	25.0	24.88	99.5
CALCIUM	5000.0	5209.00	104.2
COPPER	25.0	25.34	101.4
IRON	5000.0	5079.00	101.6
LEAD	25.0	24.99	100.0
MAGNESIUM	5000.0	5246.00	104.9
MOLYBDENUM	25.0	25.18	100.7
POTASSIUM	5000.0	5194.00	103.9
SODIUM	5000.0	5294.00	105.9
TIN	25.0	25.58	102.3
ZINC	25.0	25.67	102.7

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-2

Concentration Units: ug/L

SAMPLE: CCV

File: JZF18A Jun 19, 2009 3:04

Analyte	True	Found	%R (1)
ALUMINUM	500.0	531.70	106.3
ANTIMONY	25.0	25.66	102.6
ARSENIC	25.0	24.87	99.5
CALCIUM	5000.0	5248.00	105.0
COPPER	25.0	25.20	100.8
IRON	5000.0	5115.00	102.3
LEAD	25.0	25.14	100.6
MAGNESIUM	5000.0	5256.00	105.1
MOLYBDENUM	25.0	25.41	101.6
POTASSIUM	5000.0	5192.00	103.8
SODIUM	5000.0	5254.00	105.1
TIN	25.0	25.66	102.6
ZINC	25.0	25.44	101.8

SAMPLE: CCV

File: JZF18A Jun 19, 2009 4:47

Analyte	True	Found	%R (1)
ALUMINUM	500.0	537.30	107.5
ANTIMONY	25.0	25.35	101.4
ARSENIC	25.0	24.81	99.2
CALCIUM	5000.0	5168.00	103.4
COPPER	25.0	25.34	101.4
IRON	5000.0	5128.00	102.6
LEAD	25.0	25.05	100.2
MAGNESIUM	5000.0	5174.00	103.5
MOLYBDENUM	25.0	24.84	99.4
POTASSIUM	5000.0	5148.00	103.0
SODIUM	5000.0	5151.00	103.0
TIN	25.0	25.35	101.4
ZINC	25.0	25.38	101.5

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-2

Concentration Units: ug/L

SAMPLE: CCV

File: JZF18A Jun 19, 2009 6:21

Analyte	True	Found	%R (1)
ALUMINUM	500.0	577.00	115.4•
ANTIMONY	25.0	26.32	105.3
ARSENIC	25.0	25.57	102.3
CALCIUM	5000.0	5607.00	112.1•
COPPER	25.0	25.80	103.2
IRON	5000.0	5245.00	104.9
LEAD	25.0	26.92	107.7
MAGNESIUM	5000.0	5640.00	112.8•
MOLYBDENUM	25.0	25.51	102.0
POTASSIUM	5000.0	5655.00	113.1•
SODIUM	5000.0	5667.00	113.3•
TIN	25.0	26.59	106.4
ZINC	25.0	25.83	103.3

SAMPLE: CCV

File: JZF18A Jun 19, 2009 7:21

Analyte	True	Found	%R (1)
ALUMINUM	500.0	564.30	112.9•
ANTIMONY	25.0	25.65	102.6
ARSENIC	25.0	25.24	101.0
CALCIUM	5000.0	5475.00	109.5
COPPER	25.0	25.42	101.7
IRON	5000.0	5160.00	103.2
LEAD	25.0	26.00	104.0
MAGNESIUM	5000.0	5502.00	110.0
MOLYBDENUM	25.0	24.96	99.8
POTASSIUM	5000.0	5453.00	109.1
SODIUM	5000.0	5487.00	109.7
TIN	25.0	25.86	103.4
ZINC	25.0	25.37	101.5

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-2

Concentration Units: ug/L

SAMPLE: CCV

File: JZF18A Jun 19, 2009 8:04

Analyte	True	Found	%R (1)
ALUMINUM	500.0	527.90	105.6
ANTIMONY	25.0	24.97	99.9
ARSENIC	25.0	24.76	99.0
CALCIUM	5000.0	5226.00	104.5
COPPER	25.0	25.22	100.9
IRON	5000.0	5091.00	101.8
LEAD	25.0	24.88	99.5
MAGNESIUM	5000.0	5279.00	105.6
MOLYBDENUM	25.0	24.81	99.2
POTASSIUM	5000.0	5219.00	104.4
SODIUM	5000.0	5239.00	104.8
TIN	25.0	25.03	100.1
ZINC	25.0	25.38	101.5

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-2

Concentration Units: ug/L

SAMPLE: PQL

File: JZF18A Jun 18, 2009 19:06

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	72.32	120.5
ANTIMONY	0.2	0.23	115.0
ARSENIC	1.0	1.02	102.0
CALCIUM	20.0	28.91	144.6•
COPPER	0.2	0.23	115.0
IRON	20.0	23.96	119.8
LEAD	0.2	0.23	115.0
MAGNESIUM	20.0	26.45	132.3•
MOLYBDENUM	1.0	1.30	130.0
POTASSIUM	200.0	235.40	117.7
SODIUM	200.0	238.00	119.0
TIN	0.2	0.26	130.0
ZINC	2.0	2.46	123.0

No Samples Affected

SAMPLE: PQL

File: JZF18A Jun 19, 2009 01:13

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	67.89	113.1
ANTIMONY	0.2	0.22	110.0
ARSENIC	1.0	0.87	87.0
CALCIUM	20.0	29.45	147.3•
COPPER	0.2	0.23	115.0
IRON	20.0	26.41	132.1•
LEAD	0.2	0.21	105.0
MAGNESIUM	20.0	34.29	171.4•
MOLYBDENUM	1.0	1.12	112.0
POTASSIUM	200.0	221.00	110.5
SODIUM	200.0	303.80	151.9•
TIN	0.2	0.24	120.0
ZINC	2.0	2.29	114.5

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-2

Concentration Units: ug/L

SAMPLE: PQL

File: JZF18A Jun 19, 2009 07:55

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	71.18	118.6
ANTIMONY	0.2	0.22	110.0
ARSENIC	1.0	0.93	93.0
CALCIUM	20.0	22.93	114.7
COPPER	0.2	0.21	105.0
IRON	20.0	28.02	140.1•
LEAD	0.2	0.46	230.0•
MAGNESIUM	20.0	23.29	116.4
MOLYBDENUM	1.0	0.99	99.0
POTASSIUM	200.0	219.10	109.6
SODIUM	200.0	232.40	116.2
TIN	0.2	0.22	110.0
ZINC	2.0	2.17	108.5

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-2

Concentration Units: ug/L

SAMPLE: ICB
File: JZF18A Jun 18, 2009 18:57

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.03	U
ARSENIC	0.08	U
CALCIUM	4.56	J
COPPER	0.04	U
IRON	3.10	U
LEAD	0.02	U
MAGNESIUM	4.88	J
MOLYBDENUM	0.53	J
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.04	U
ZINC	0.44	U

SAMPLE: CCB
File: JZF18A Jun 18, 2009 19:49

Analyte	Result	C
ALUMINUM	27.63	J
ANTIMONY	0.03	U
ARSENIC	0.08	U
CALCIUM	30.23	
COPPER	0.04	U
IRON	28.50	J
LEAD	0.02	U
MAGNESIUM	29.67	
MOLYBDENUM	3.30	
POTASSIUM	44.59	J
SODIUM	40.58	J
TIN	0.04	U
ZINC	0.44	U

SAMPLE: CCB
File: JZF18A Jun 18, 2009 20:23

Analyte	Result	C
ALUMINUM	12.84	J
ANTIMONY	0.03	U
ARSENIC	0.08	U
CALCIUM	11.48	J
COPPER	0.04	U
IRON	15.02	J
LEAD	0.02	J
MAGNESIUM	16.11	J
MOLYBDENUM	1.06	
POTASSIUM	23.29	J
SODIUM	22.79	J
TIN	0.05	J
ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-2

Concentration Units: ug/L

SAMPLE: CCB
File: JZF18A Jun 18, 2009 22:05

Analyte	Result	C
ALUMINUM	3.48	J
ANTIMONY	0.04	J
ARSENIC	0.08	U
CALCIUM	11.19	J
COPPER	0.04	U
IRON	9.72	J
LEAD	0.04	J
MAGNESIUM	8.72	J
MOLYBDENUM	0.51	J
POTASSIUM	11.54	J
SODIUM	21.66	J
TIN	0.08	J
ZINC	0.44	U

SAMPLE: CCB
File: JZF18A Jun 18, 2009 23:48

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.06	J
ARSENIC	0.08	U
CALCIUM	10.98	J
COPPER	0.04	U
IRON	8.99	J
LEAD	0.04	J
MAGNESIUM	20.00	
MOLYBDENUM	0.40	J
POTASSIUM	8.80	U
SODIUM	110.20	J
TIN	0.10	J
ZINC	0.44	U

SAMPLE: CCB
File: JZF18A Jun 19, 2009 1:30

Analyte	Result	C
ALUMINUM	3.16	J
ANTIMONY	0.05	J
ARSENIC	-0.13	J
CALCIUM	11.87	J
COPPER	0.04	U
IRON	11.96	J
LEAD	0.03	J
MAGNESIUM	16.89	J
MOLYBDENUM	0.34	J
POTASSIUM	9.16	J
SODIUM	81.46	J
TIN	0.07	J
ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-2

Concentration Units: ug/L

SAMPLE: CCB
File: JZF18A Jun 19, 2009 3:13

Analyte	Result	C
ALUMINUM	10.03	J
ANTIMONY	0.04	J
ARSENIC	0.08	U
CALCIUM	6.35	J
COPPER	0.04	U
IRON	16.60	J
LEAD	0.06	J
MAGNESIUM	6.53	J
MOLYBDENUM	0.31	J
POTASSIUM	8.80	U
SODIUM	18.86	J
TIN	0.05	J
ZINC	0.44	U

SAMPLE: CCB
File: JZF18A Jun 19, 2009 4:56

Analyte	Result	C
ALUMINUM	28.90	J
ANTIMONY	0.04	J
ARSENIC	0.08	U
CALCIUM	8.55	J
COPPER	0.05	J
IRON	36.98	J
LEAD	0.22	
MAGNESIUM	11.73	J
MOLYBDENUM	0.26	J
POTASSIUM	16.42	J
SODIUM	27.20	J
TIN	0.06	J
ZINC	0.44	U

SAMPLE: CCB
File: JZF18A Jun 19, 2009 6:30

Analyte	Result	C
ALUMINUM	12.13	J
ANTIMONY	0.04	J
ARSENIC	0.08	U
CALCIUM	5.26	J
COPPER	0.05	J
IRON	16.04	J
LEAD	0.66	
MAGNESIUM	6.15	J
MOLYBDENUM	0.25	J
POTASSIUM	21.64	J
SODIUM	18.62	J
TIN	0.04	U
ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-2

Concentration Units: ug/L

SAMPLE: CCB

File: JZF18A Jun 19, 2009 7:30

Analyte	Result	C
ALUMINUM	13.35	J
ANTIMONY	0.04	J
ARSENIC	0.08	U
CALCIUM	5.15	J
COPPER	0.05	J
IRON	21.16	J
LEAD	0.58	
MAGNESIUM	6.85	J
MOLYBDENUM	0.21	J
POTASSIUM	24.12	J
SODIUM	16.13	J
TIN	0.05	J
ZINC	0.44	U

SAMPLE: CCB

File: JZF18A Jun 19, 2009 8:12

Analyte	Result	C
ALUMINUM	6.04	J
ANTIMONY	0.03	U
ARSENIC	-0.18	J
CALCIUM	3.92	J
COPPER	0.04	U
IRON	9.43	J
LEAD	0.24	
MAGNESIUM	4.89	J
MOLYBDENUM	0.21	J
POTASSIUM	14.84	J
SODIUM	14.71	J
TIN	0.04	U
ZINC	0.44	U

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services **Sample ID:** PBSZF11ICS0

Matrix: SOIL **SDG Name:** CTO423-2

QC Batch ID: ZF11ICS0

Concentration Units : mg/Kgdrywt

Analyte	RESULT	C
ANTIMONY	0.020	U
ARSENIC	0.150	U
COPPER	0.271	J
LEAD	0.030	U
TIN	0.767	
ZINC	0.350	U

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-2

Concentration Units: ug/L

SAMPLE: ICSA

File: JZF18A Jun 18, 2009 19:14

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	97640	97.6
ANTIMONY	0	0	
ARSENIC	0	0	
CALCIUM	100000	97070	97.1
COPPER	0	1	
IRON	100000	91590	91.6
LEAD	0	0	
MAGNESIUM	100000	96320	96.3
MOLYBDENUM	2000	2016	100.8
POTASSIUM	100000	99060	99.1
SODIUM	100000	97780	97.8
TIN	0	0	
ZINC	0	0	

SAMPLE: ICSAB

File: JZF18A Jun 18, 2009 19:23

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	95460	95.5
ANTIMONY	20	20	100.0
ARSENIC	20	19	95.0
CALCIUM	100000	95490	95.5
COPPER	20	19	95.0
IRON	100000	90830	90.8
LEAD	20	20	100.0
MAGNESIUM	100000	94410	94.4
MOLYBDENUM	2000	2027	101.4
POTASSIUM	100000	97470	97.5
SODIUM	100000	96590	96.6
TIN	20	21	105.0
ZINC	21	18	85.7

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services | **Client Field ID:** X15SS0640001S

Matrix: SOIL | **SDG Name:** CTO423-2

Percent Solids: 83.4 | **Lab Sample ID:** SC2881-017S

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	34.7700		4.8036		53.51	56.0	N	75	125	MS
ARSENIC, TOTAL	52.7061		5.7561		53.51	87.7		75	125	MS
COPPER, TOTAL	41.6512		22.1625		26.75	72.9	N	75	125	MS
LEAD, TOTAL	938.2219		939.9753		53.51	-3.3		75	125	MS
TIN, TOTAL	53.7549		2.4087		53.51	96.0		75	125	MS
ZINC, TOTAL	83.1740		32.9959		53.51	93.8		75	125	MS

Comments:

5B

POST DIGEST SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0640001S

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 83.4 **Lab Sample ID:** SC2881-017A

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	10.5200		8.3360		2	109.2		75	125	MS
COPPER, TOTAL	43.9800		38.4600		5	110.4		75	125	MS

Comments:

DUPLICATES

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0640001D

Matrix: SOIL **SDG Name:** CTO423-2

Percent Solids: 83.4 **Lab Sample ID:** SC2881-017D

Concentration Units : mg/Kgdrywt

Analyte	Control Limits	Sample Result	C	Duplicate Result	C	RPD	Q	M
ANTIMONY, TOTAL		4.8036		2.5748		60.4	*	MS
ARSENIC, TOTAL		5.7561		4.6483		21.3	* OK	MS
COPPER, TOTAL		22.1625		16.1650		31.3	* OK	MS
LEAD, TOTAL		939.9753		820.0746		13.6		MS
TIN, TOTAL	0.54	2.4087		2.1521		11.3		MS
ZINC, TOTAL		32.9959		31.6237		4.2		MS

Comments:

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID:** LCSSZF11ICS0

Matrix: SOIL **SDG Name:** CTO423-2

QC Batch ID: ZF11ICS0

Concentration Units : mg/Kgdrywt

Analyte	TRUE	FOUND	% R	LIMITS (%)	
ANTIMONY	126.0	98.79	78.4	50	150
ARSENIC	225.0	224.64	99.8	80	120
COPPER	66.7	77.30	115.9	81	119
LEAD	223.0	225.83	101.3	82	118
TIN	164.0	182.19	111.1	74	126
ZINC	349.0	363.31	104.1	80	120

ICP SERIAL DILUTION

Lab Name: Katahdin Analytical Services

Matrix: SOIL

Client Field ID: X15SS0640001L

SDG Name: CTO423-2

Lab Sample ID: SC2881-017L

Concentration Units: ug/L

Analyte	Sample Result	C	*Dilution* Result	C	% Difference	Q	M
ANTIMONY, TOTAL	8.34		8.57		2.8		MS
ARSENIC, TOTAL	9.99		9.65		3.4		MS
COPPER, TOTAL	38.46		39.57		2.9		MS
LEAD, TOTAL	815.60		819.50		0.5		MS
TIN, TOTAL	4.18		4.36	J	4.3		MS
ZINC, TOTAL	57.26		60.75		6.1		MS

INSTRUMENT DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 3/6/2009

Concentration Units: ug/L

Analyte	CRDL	IDL	M
ALUMINUM	60	2.20	MS
ANTIMONY	0.20	0.03	MS
ARSENIC	1.0	0.08	MS
CALCIUM	20	3.90	MS
COPPER	1.0	0.04	MS
IRON	100	3.10	MS
LEAD	0.20	0.02	MS
MAGNESIUM	20	2.00	MS
MOLYBDENUM	1.0	0.07	MS
POTASSIUM	200	8.80	MS
SODIUM	200	6.50	MS
TIN	1.0	0.04	MS
ZINC	2.0	0.44	MS

METHOD DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code: J**

Instrument Name: AGILENT 7500 ICP-MS **Date:** 3/11/2009

Analyte	MDL	Units	M	EPA Prep./Anal. Method
ANTIMONY	0.01	mg/kg	MS	SW846 3050B / SW846 6020
ARSENIC	0.03	mg/kg	MS	SW846 3050B / SW846 6020
COPPER	0.02	mg/kg	MS	SW846 3050B / SW846 6020
LEAD	0.01	mg/kg	MS	SW846 3050B / SW846 6020
TIN	0.04	mg/kg	MS	SW846 3050B / SW846 6020
ZINC	0.07	mg/kg	MS	SW846 3050B / SW846 6020

ICP LINEAR RANGES

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 1/6/2009

Concentration Units: ug/L

Analyte	Integration Time (sec)	Linear Range	M
ALUMINUM	0.01	100000	MS
ANTIMONY	0.10	1000	MS
ARSENIC	0.30	1000	MS
CALCIUM	0.03	100000	MS
COPPER	0.10	500	MS
IRON	0.03	100000	MS
LEAD	0.10	1000	MS
MAGNESIUM	0.05	100000	MS
MOLYBDENUM	0.10	2000	MS
POTASSIUM	0.01	100000	MS
SODIUM	0.01	100000	MS
TIN	0.10	1000	MS
ZINC	0.10	250	MS

PREPARATION LOG

Lab Name: Katahdin Analytical Services **QC Batch ID:** ZF11ICS0

Matrix: SOIL **SDG Name:** CTO423-2

Method: P **Prep Date:** 06/11/2009

Client ID	Lab Sample ID	Initial (g)	Final (L)
LCSSZF11ICS0	LCSSZF11ICS0	0.5048	0.1
PBSZF11ICS0	PBSZF11ICS0	1	0.1
X14SS001C0001	SC2881-001	1.33	0.1
X14SS002C0001	SC2881-002	1.24	0.1
X14SS003C0001	SC2881-003	1.36	0.1
X14SS004C0001	SC2881-004	1.37	0.1
X14SS005C0001	SC2881-005	1.01	0.1
X14SS006C0001	SC2881-006	1.52	0.1
X14SS007C0001	SC2881-007	1.03	0.1
X14SS008C0001	SC2881-008	1.63	0.1
X14SS009C0001	SC2881-009	1.35	0.1
X15SS0050001	SC2881-010	1.17	0.1
X15SS0070001	SC2881-011	1.03	0.1
X15SSB0050102	SC2881-012	1.29	0.1
X15SS0180001	SC2881-013	1.09	0.1
X15SS0350001	SC2881-014	1.29	0.1
X15SS0370001	SC2881-015	1.07	0.1
X15SS0610001	SC2881-016	1.54	0.1
X15SS0640001	SC2881-017	1.04	0.1
X15SS0640001D	SC2881-017D	1.12	0.1
X15SS0640001S	SC2881-017S	1.12	0.1
X15SS0660001	SC2881-018	1.57	0.1
X15SS0680001	SC2881-019	1.08	0.1
X15SS0700001	SC2881-020	1.16	0.1

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-2

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZF18A

Date: 6/18/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements								
Cal Blank		1	17:58	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
Cal Std 1		1	18:06	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
Cal Std 2		1	18:15	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
Cal Std 3		1	18:23	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
Cal Std 4		1	18:32	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
ZZZZZZ		1	18:40									
ICV		1	18:49	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
ICB		1	18:57	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
PQL ✓		1	19:06	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
ICSA		1	19:14	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
ICSAB		1	19:23	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
Blank		1	19:32	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
CCV		1	19:40	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
CCB		1	19:49	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
BLANK		1	19:57	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
BLANK		1	20:06	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
CCV		1	20:14	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
CCB		1	20:23	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
ZZZZZZ		1	20:31									
ZZZZZZ		1	20:40									
ZZZZZZ		1	20:48									
ZZZZZZ		1	20:57									
ZZZZZZ		1	21:05									
ZZZZZZ		1	21:14									
ZZZZZZ		5	21:22									
ZZZZZZ		10	21:31									
ZZZZZZ		10	21:39									
BLANK		1	21:48	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
CCV		1	21:56	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
CCB		1	22:05	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
ZZZZZZ		5	22:13									
ZZZZZZ		2	22:22									
ZZZZZZ		5	22:31									
ZZZZZZ		25	22:39									
ZZZZZZ		5	22:48									
ZZZZZZ		10	22:56									
ZZZZZZ		10	23:05									
ZZZZZZ		10	23:14									
ZZZZZZ		10	23:22									
BLANK		1	23:31	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
CCV		1	23:39	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
CCB		1	23:48	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
ZZZZZZ		5	23:56									
ZZZZZZ		5	0:05									
ZZZZZZ		5	0:13									
ZZZZZZ		5	0:22									
ZZZZZZ		5	0:30									
ZZZZZZ		10	0:39									
BLANK		1	0:48	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
BLANK		1	0:56	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	

FORM XIV - IN

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-2

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZF18A

Date: 6/19/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements
BLANK		1	1:05	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
PQL ✓		1	1:13	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	1:21	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	1:30	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
PBSZF11ICS0		5	1:39	Sb As Cu Pb Sn Zn
SC2881-001	X14SS001C0001	5	1:47	Sb As Cu Pb Sn Zn
SC2881-002	X14SS002C0001	5	1:56	Sb As Cu Pb Sn Zn
SC2881-003	X14SS003C0001	5	2:04	Sb As Cu Pb Sn Zn
SC2881-004	X14SS004C0001	5	2:13	Sb As Cu Pb Sn Zn
SC2881-005	X14SS005C0001	5	2:22	Sb As Cu Pb Sn Zn
SC2881-006	X14SS006C0001	5	2:30	Sb As Cu Pb Sn Zn
SC2881-007	X14SS007C0001	5	2:39	Sb As Cu Pb Sn Zn
LCSSZF11ICS0		10	2:47	Sb As Cu Pb Sn Zn
BLANK		1	2:56	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	3:04	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	3:13	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
SC2881-008	X14SS008C0001	5	3:21	Sb As Cu Pb Sn Zn
SC2881-009	X14SS009C0001	5	3:30	Sb As Cu Pb Sn Zn
SC2881-010	X15SS0050001	5	3:39	Sb As Cu Pb Sn Zn
SC2881-011	X15SS0070001	5	3:47	Sb As Cu Pb Sn Zn
SC2881-012	X15SSB0050102	5	3:56	Sb As Cu Pb Sn Zn
SC2881-013	X15SS0180001	5	4:05	Sb As Cu Pb Sn Zn
SC2881-014	X15SS0350001	5	4:13	Sb As Cu Pb Sn Zn
SC2881-015	X15SS0370001	5	4:22	Sb As Cu Pb Sn Zn
SC2881-016	X15SS0610001	5	4:30	Sb As Cu Pb Sn Zn
BLANK		1	4:39	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	4:47	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	4:56	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
SC2881-017	X15SS0640001	5	5:04	Sb As Cu Sn Zn
SC2881-017	X15SS0640001	10	5:13	Pb
SC2881-017L	X15SS0640001L	25	5:22	Sb As Cu Sn Zn
SC2881-017L	X15SS0640001L	50	5:30	Pb
SC2881-017D	X15SS0640001D	5	5:39	Sb As Cu Sn Zn
SC2881-017D	X15SS0640001D	10	5:47	Pb
SC2881-017A	X15SS0640001A	5	5:56	Sb As Cu Sn Zn
SC2881-017S	X15SS0640001S	10	6:04	Sb As Cu Pb Sn Zn
BLANK		1	6:13	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	6:21	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	6:30	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
SC2881-018	X15SS0660001	5	6:38	Sb As Cu Pb Sn Zn
SC2881-019	X15SS0680001	5	6:47	Sb As Cu Pb Sn Zn
SC2881-020	X15SS0700001	5	6:56	Sb As Cu Sn Zn
SC2881-020	X15SS0700001	10	7:04	Pb
BLANK		1	7:13	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	7:21	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	7:30	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Blank		1	7:38	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Blank		1	7:47	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
PQL ✓		1	7:55	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	8:04	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	8:12	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn

Quality Control Report

Blank Sample Summary Report

Total Solids

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG64645	ASTM D2216	05-JUN-09	04-JUN-09	U 1 %	1 %
MBLANK	WG64648	ASTM D2216	05-JUN-09	04-JUN-09	U 1 %	1 %

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207)874-2400 Fax:(207) 775-4029
sales@katahdinlab.com

Quality Control Report

Laboratory Control Sample Summary Report

Total Solids

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG64645-2	LCS	WG64645	05-JUN-09	04-JUN-09	%	90	90.	100	80-120	
WG64648-2	LCS	WG64648	05-JUN-09	04-JUN-09	%	90	90.	100	80-120	

Quality Control Report

Duplicate Sample Summary Report

Total Solids

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG64645-4	SC2881-2	WG64645	05-JUN-09	%	79.	79.	1	20
WG64648-3	SC2881-17	WG64648	05-JUN-09	%	83.	84.	1	20

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JZF18A.B\064SMPL.D\064SMPL.D#
Date Acquired: Jun 19 2009 01:47 am
Acq. Method: K10CCV.M
Operator: EAM
Sample Name: SC2881-001
Misc Info: DILUTION - 2/10
Vial Number: 2302
Current Method: C:\ICPCHEM\1\METHODS\K10CCV.M
Calibration File: C:\ICPCHEM\1\CALIB\K10CCV.C
Last Cal. Update: Jun 18 2009 06:34 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

Sample
X14SS001C0001
Arsenic rep. result
3.2 mg/kg

$(7.062)(5) = 35.31$

$(35.31)\left(\frac{100}{1.33g}\right)\left(\frac{1}{.83}\right)\left(\frac{1}{1000}\right) =$
3.199 mg/kg

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
7 Li	68,400.	13,680.	ppb	---	#VALUE!	
9 Be	5.415	1.083	ppb	1.74	1000.	
11 B	37.73	7.546	ppb	5.72	1000.	
23 Na	716.	143.2	ppb	5.62	100000.	
25 Mg	12,090.	2,418.	ppb	1.64	100000.	
27 Al	131,850.	26,370.	ppb	1.03	100000.	
28 Si	4,566.5	913.3	ppb	1.48	#VALUE!	
29 Si	4,549.5	909.9	ppb	2.34	10000.	
39 K	10,985.	2,197.	ppb	0.92	100000.	
43 Ca	3,621.	724.2	ppb	2.96	100000.	
44 Ca	3,518.5	703.7	ppb	1.00	100000.	
51 V	299.25	59.85	ppb	0.27	1000.	
52 Cr	177.3	35.46	ppb	0.55	1000.	
53 Cr	218.05	43.61	ppb	2.03	1000.	
55 Mn	2,037.5	407.5	ppb	1.27	500.	
56 Fe	149,900.	29,980.	ppb	1.28	100000.	
57 Fe	146,900.	29,380.	ppb	1.42	100000.	
59 Co	89.9	17.98	ppb	0.57	500.	
60 Ni	96.15	19.23	ppb	0.95	500.	
63 Cu	105.05	21.01	ppb	0.86	1000.	
65 Cu	105.1	21.02	ppb	1.10	500.	
66 Zn	326.4	65.28	ppb	1.05	500.	
68 Zn	337.9	67.58	ppb	1.02	1000.	
75 As	35.31	7.062	ppb	1.86	1000.	
82 Se	3.524	0.7048	ppb	28.32	500.	
88 Sr	63.7	12.74	ppb	0.30	1000.	
89 Y	----	--------	---	---	#VALUE!	
98 Mo	6.28	1.256	ppb	3.48	1000.	
107 Ag	0.2235	0.0447	ppb	11.93	100.	
109 Ag	0.2495	0.0499	ppb	0.80	200.	
111 Cd	0.703	0.1406	ppb	0.71	200.	
114 Cd	0.4171	0.0834	ppb	16.59	500.	
115 In	----	--------	---	---	#VALUE!	
118 Sn	13.29	2.658	ppb	2.73	1000.	
120 Sn	13.32	2.664	ppb	3.36	1000.	
121 Sb	1.799	0.3598	ppb	3.77	1000.	
123 Sb	1.6285	0.3257	ppb	4.80	1000.	
135 Ba	531.	106.2	ppb	1.97	1000.	
137 Ba	530.	106.	ppb	1.30	#VALUE!	
182 W	0.961	0.1922	ppb	17.16	1000.	
200 Hg	1.834	0.3668	ppb	21.65	#VALUE!	
202 Hg	2.079	0.4158	ppb	41.05	#VALUE!	
203 Tl	1.92	0.384	ppb	2.88	1000.	
205 Tl	1.788	0.3576	ppb	7.09	#VALUE!	
208 Pb	202.65	40.53	ppb	0.30	1000.	
232 Th	37.89	7.578	ppb	3.54	1000.	
238 U	7.035	1.407	ppb	0.38	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1061012.90	2.24	1162039.60	91.3	69.5 - 130.4	
45 Sc	1018281.60	1.08	1033790.70	98.5	69.5 - 130.4	
72 Ge	196599.78	1.04	214859.77	91.5	69.5 - 130.4	
159 Tb	1530940.50	1.93	1714756.40	89.3	69.5 - 130.4	
209 Bi	890687.81	1.14	1027424.30	86.7	69.5 - 130.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JZF18A.B\009CALB.D\009CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: **R. BASINSKI** **DATE:** **SEPTEMBER 4, 2009**

FROM: **LEANNE M. GANSER** **COPIES:** **DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – SELECT METALS AND TOTAL SOLIDS**
NSF INDIAN HEAD
SAMPLE DELIVERY GROUP (SDG) – CTO423-3

SAMPLES: 20/Soil/

FD06030901	X14SS0330001	X14SS0350001
X14SS0390001	X14SS0430001	X14SS0480001
X14SS0620001	X14SS0940001	X15SS0710001
X15SS0720001	X15SS0730001	X15SS0760001
X15SS077C0001	X15SS078C0001	X16SS080C0001
X16SS081C0001	X17SS008C0001	X17SS009C0001
X17SS010C0001	X25SS034C0001	

Overview

The sample set for NSF Indian Head, SDG CTO423-3, consists of twenty (20) soil environmental samples. One field duplicate pair was included within this SDG: X15SS0710001 / FD06030901.

All samples were analyzed for antimony, arsenic, copper, lead, tin, zinc and total solids. The samples were collected by Tetra Tech NUS, Inc. on June 2, 3, 4, 10, 11, 14, and 15, 2009 and analyzed by Katahdin Analytical Services under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Metals analyses were conducted using ICP/MS SW-846 method 6020A.

Summary

All analytes were successfully analyzed. The findings offered in this report are based upon a general review of all available data. The data review was based on data completeness, holding times, calibration data, ICP/MS tune, laboratory method/preparation blanks, interference check sample (ICS) results, matrix spike results, laboratory duplicate results, laboratory control sample (LCS) results, ICP serial dilution results, ICP/MS internal standard recoveries, field duplicate results, detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems - None

Minor Problems

- The following contaminants were detected in the laboratory method/preparation blanks at the following maximum concentrations:

Analyte	Maximum Concentration	Action Level
Arsenic	0.12 ug/l	0.06 mg/kg
Copper[(1)]	0.159 mg/kg	0.795 mg/kg
Lead	0.27 ug/L	0.135 mg/kg
Tin[(1)]	0.617 mg/kg	3.085 mg/kg

[(1)] Maximum concentration present in a preparation blank.

An action level of 5X the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot, dilution factors, and percent solids, if applicable, were taken into consideration when evaluating for blank contamination. Positive results reported for tin were qualified, "B", due to blank contamination.

- The matrix spike and matrix spike duplicate (MS/MSD) percent recoveries for antimony were < 75% quality control limit. The positive results reported for antimony were qualified as biased low, "L".

Notes

The Contract Required Detection Limit (CRDL) percent recoveries for arsenic, copper, lead, and zinc were outside the 90-110% quality control limit. No validation actions were required as all sample results were either > 2X CRDL or were qualified as a result of blank contamination.

The preparation blank samples were analyzed at a 5X dilution. All environmental samples were analyzed at a 5X dilution with the exception of lead in samples X14SS0350001 and X15SS0720001, which was analyzed at a 10X dilution.

Executive Summary

Laboratory Performance: Several contaminants were present in the laboratory method / preparation blanks.

Other Factors Affecting Data Quality: The MS/MSD percent recoveries for antimony were < 75% quality control limit.

The data for these analyses were reviewed with reference to Region III modifications to the "National Functional Guidelines for Inorganic Data Validation", April 1993, and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories " (January 2006).

The text of this report has been formulated to address only those problem areas affecting data quality.

Tetra Tech NUS
Leanne M. Ganser
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A
QUALIFIED ANALYTICAL RESULTS

Data Validation Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS-GFAA MSA's r < 0.995 / ICP PDS Recovery Noncompliance
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (e.g. base-line drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient r < 0.995
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 00810	NSAMPLE	FD06030901			X14SS0330001			X14SS0350001			X14SS0390001		
SDG: CTO423-3	LAB_ID	SC2890-005			SC3170-006			SC3170-007			SC3170-008		
FRACTION: M	SAMP_DATE	6/3/2009			6/2/2009			6/2/2009			6/2/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	87.1			86.5			85.1			84.2		
	DUP_OF	X15SS0710001											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.28	L	D	0.1	L	D	0.14	L	D	0.16	L	D
ARSENIC		3.3			2.4			2.9			1.8		
COPPER		9.6			24.4			107			41		
LEAD		187			75.1			543			111		
TIN		1.2	B	A	2.2	B	A	9.1			2.9	B	A
ZINC		33			20.4			33.3			23.3		

PROJ_NO: 00810	NSAMPLE	X14SS0430001			X14SS0480001			X14SS0620001			X14SS0940001		
SDG: CTO423-3	LAB_ID	SC3170-009			SC3170-010			SC3170-011			SC3170-015		
FRACTION: M	SAMP_DATE	6/2/2009			6/3/2009			6/3/2009			6/4/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	86.5			71.2			79.9			83.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.13	L	D	0.14	L	D	0.17	L	D	0.14	L	D
ARSENIC		1.3			2.7			3.1			2.4		
COPPER		76.5			14.6			29.7			39.5		
LEAD		373			85.7			278			293		
TIN		4.1			2	B	A	2	B	A	7.1		
ZINC		18.6			33.1			35.2			24.8		

PROJ_NO: 00810	NSAMPLE	X15SS0710001			X15SS0720001			X15SS0730001			X15SS0760001		
SDG: CTO423-3	LAB_ID	SC2890-001			SC2890-002			SC2890-003			SC2890-004		
FRACTION: M	SAMP_DATE	6/2/2009			6/2/2009			6/2/2009			6/2/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	87.1			85.1			84.5			86.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.39	L	D	0.61	L	D	0.5	L	D	0.47	L	D
ARSENIC		3.5			2.1			2.2			2.7		
COPPER		9.4			5.4			8.2			26		
LEAD		282			658			335			238		
TIN		1.7	B	A	1.3	B	A	1.3	B	A	2.2	B	A
ZINC		33.1			25.1			30.5			37.4		

PROJ_NO: 00810	NSAMPLE	X15SS077C0001			X15SS078C0001			X16SS080C0001			X16SS081C0001		
SDG: CTO423-3	LAB_ID	SC3170-001			SC3170-002			SC3170-013			SC3170-014		
FRACTION: M	SAMP_DATE	6/10/2009			6/10/2009			6/14/2009			6/14/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	81.5			82.1			87.8			88.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.68	L	D	0.46	L	D	0.14	L	D	0.42	L	D
ARSENIC		2.6			2.7			3			4.2		
COPPER		23.3			14.8			4.8			9.6		
LEAD		66.7			77.2			9.1			48.7		
TIN		1.8	B	A	1.7	B	A	1.2	B	A	1.1	B	A
ZINC		52.5			54.4			18.7			29		

PROJ_NO: 00810	NSAMPLE	X17SS008C0001			X17SS009C0001			X17SS010C0001			X25SS034C0001		
SDG: CTO423-3	LAB_ID	SC3170-003			SC3170-004			SC3170-005			SC3170-012		
FRACTION: M	SAMP_DATE	6/11/2009			6/11/2009			6/11/2009			6/15/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	90.7			91.1			91.1			90.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.39	L	D	0.43	L	D	1.3	L	D	0.1	L	D
ARSENIC		5			4.4			6.2			4.3		
COPPER		12			11.2			24			8.5		
LEAD		21			38.7			200			9.4		
TIN		0.92	B	A	1.4	B	A	1.3	B	A	1.6	B	A
ZINC		23.1			19			35.2			30.2		

PROJ_NO: 00810	NSAMPLE	FD06030901			X14SS0330001			X14SS0350001			X14SS0390001		
SDG: CTO423-3	LAB_ID	SC2890-5			SC3170-6			SC3170-7			SC3170-8		
FRACTION: MISC	SAMP_DATE	6/3/2009			6/2/2009			6/2/2009			6/2/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	87.1			86.5			85.1			84.2		
	DUP_OF	X15SS0710001											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		87			86			85			84		

PROJ_NO: 00810	NSAMPLE	X14SS0430001			X14SS0480001			X14SS0620001			X14SS0940001		
SDG: CTO423-3	LAB_ID	SC3170-9			SC3170-10			SC3170-11			SC3170-15		
FRACTION: MISC	SAMP_DATE	6/2/2009			6/3/2009			6/3/2009			6/4/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	86.5			71.2			79.9			83.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		86			71			80			83		

PROJ_NO: 00810	NSAMPLE	X15SS0710001			X15SS0720001			X15SS0730001			X15SS0760001		
SDG: CTO423-3	LAB_ID	SC2890-1			SC2890-2			SC2890-3			SC2890-4		
FRACTION: MISC	SAMP_DATE	6/2/2009			6/2/2009			6/2/2009			6/2/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	87.1			85.1			84.5			86.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		87			85			84			86		

PROJ_NO: 00810	NSAMPLE	X15SS077C0001			X15SS078C0001			X16SS080C0001			X16SS081C0001		
SDG: CTO423-3	LAB_ID	SC3170-1			SC3170-2			SC3170-13			SC3170-14		
FRACTION: MISC	SAMP_DATE	6/10/2009			6/10/2009			6/14/2009			6/14/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	81.5			82.1			87.8			88.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		81			82			88			89		

PROJ_NO: 00810	NSAMPLE	X17SS008C0001			X17SS009C0001			X17SS010C0001			X25SS034C0001		
SDG: CTO423-3	LAB_ID	SC3170-3			SC3170-4			SC3170-5			SC3170-12		
FRACTION: MISC	SAMP_DATE	6/11/2009			6/11/2009			6/11/2009			6/15/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	90.7			91.1			91.1			90.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		91			91			91			90		

APPENDIX B
RESULTS AS REPORTED BY THE LABORATORY

1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** FD06030901

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 87.1 **Lab Sample ID:** SC2890-005

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.28		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	3.3			MS	5	0.51	0.15
7440-50-8	COPPER, TOTAL	9.6			MS	5	0.51	0.11
7439-92-1	LEAD, TOTAL	187			MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.2			MS	5	0.51	0.19
7440-66-6	ZINC, TOTAL	33.0			MS	5	1.0	0.36

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS0330001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 86.4 **Lab Sample ID:** SC3170-006

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.1		N	MS	5	0.088	0.02
7440-38-2	ARSENIC, TOTAL	2.4			MS	5	0.44	0.13
7440-50-8	COPPER, TOTAL	24.4			MS	5	0.44	0.10
7439-92-1	LEAD, TOTAL	75.1			MS	5	0.088	0.03
7440-31-5	TIN, TOTAL	2.2			MS	5	0.44	0.17
7440-66-6	ZINC, TOTAL	20.4			MS	5	0.88	0.31

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS0350001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 85.1 **Lab Sample ID:** SC3170-007

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.14		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	2.9			MS	5	0.52	0.16
7440-50-8	COPPER, TOTAL	107			MS	5	0.52	0.12
7439-92-1	LEAD, TOTAL	543			MS	10	0.21	0.06
7440-31-5	TIN, TOTAL	9.1			MS	5	0.52	0.20
7440-66-6	ZINC, TOTAL	33.3			MS	5	1.0	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS0390001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 84.2 **Lab Sample ID:** SC3170-008

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.16		N	MS	5	0.087	0.02
7440-38-2	ARSENIC, TOTAL	1.8			MS	5	0.43	0.13
7440-50-8	COPPER, TOTAL	41.0			MS	5	0.43	0.10
7439-92-1	LEAD, TOTAL	111			MS	5	0.087	0.03
7440-31-5	TIN, TOTAL	2.9			MS	5	0.43	0.16
7440-66-6	ZINC, TOTAL	23.3			MS	5	0.87	0.30

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS0430001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 86.5 **Lab Sample ID:** SC3170-009

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.13		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	1.3			MS	5	0.54	0.16
7440-50-8	COPPER, TOTAL	76.5			MS	5	0.54	0.12
7439-92-1	LEAD, TOTAL	373			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	4.1			MS	5	0.54	0.20
7440-66-6	ZINC, TOTAL	18.6			MS	5	1.1	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS0480001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 71.2 **Lab Sample ID:** SC3170-010

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.14		N	MS	5	0.12	0.02
7440-38-2	ARSENIC, TOTAL	2.7			MS	5	0.58	0.17
7440-50-8	COPPER, TOTAL	14.6			MS	5	0.58	0.13
7439-92-1	LEAD, TOTAL	85.7			MS	5	0.12	0.03
7440-31-5	TIN, TOTAL	2.0			MS	5	0.58	0.22
7440-66-6	ZINC, TOTAL	33.1			MS	5	1.2	0.40

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS0620001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 79.9 **Lab Sample ID:** SC3170-011

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.17		N	MS	5	0.096	0.02
7440-38-2	ARSENIC, TOTAL	3.1			MS	5	0.48	0.14
7440-50-8	COPPER, TOTAL	29.7			MS	5	0.48	0.11
7439-92-1	LEAD, TOTAL	278			MS	5	0.096	0.03
7440-31-5	TIN, TOTAL	2.0			MS	5	0.48	0.18
7440-66-6	ZINC, TOTAL	35.2			MS	5	0.96	0.34

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS0940001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 83.2 **Lab Sample ID:** SC3170-015

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.14		N	MS	5	0.098	0.02
7440-38-2	ARSENIC, TOTAL	2.4			MS	5	0.49	0.15
7440-50-8	COPPER, TOTAL	39.5			MS	5	0.49	0.11
7439-92-1	LEAD, TOTAL	293			MS	5	0.098	0.03
7440-31-5	TIN, TOTAL	7.1			MS	5	0.49	0.19
7440-66-6	ZINC, TOTAL	24.8			MS	5	0.98	0.34

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0710001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 87.1 **Lab Sample ID:** SC2890-001

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.39		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	3.5			MS	5	0.55	0.17
7440-50-8	COPPER, TOTAL	9.4			MS	5	0.55	0.12
7439-92-1	LEAD, TOTAL	282			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.7			MS	5	0.55	0.21
7440-66-6	ZINC, TOTAL	33.1			MS	5	1.1	0.39

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0720001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 85.1 **Lab Sample ID:** SC2890-002

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.61		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	2.1			MS	5	0.55	0.17
7440-50-8	COPPER, TOTAL	5.4			MS	5	0.55	0.12
7439-92-1	LEAD, TOTAL	658			MS	10	0.22	0.07
7440-31-5	TIN, TOTAL	1.3			MS	5	0.55	0.21
7440-66-6	ZINC, TOTAL	25.1			MS	5	1.1	0.39

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0730001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 84.5 **Lab Sample ID:** SC2890-003

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.50		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	2.2			MS	5	0.51	0.15
7440-50-8	COPPER, TOTAL	8.2			MS	5	0.51	0.11
7439-92-1	LEAD, TOTAL	335			MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.3			MS	5	0.51	0.20
7440-66-6	ZINC, TOTAL	30.5			MS	5	1.0	0.36

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0760001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 86.5 **Lab Sample ID:** SC2890-004

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.47		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	2.7			MS	5	0.54	0.16
7440-50-8	COPPER, TOTAL	26.0			MS	5	0.54	0.12
7439-92-1	LEAD, TOTAL	238			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	2.2			MS	5	0.54	0.21
7440-66-6	ZINC, TOTAL	37.4			MS	5	1.1	0.38

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS077C0001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 81.5 **Lab Sample ID:** SC3170-001

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.68		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	2.6			MS	5	0.53	0.16
7440-50-8	COPPER, TOTAL	23.3			MS	5	0.53	0.12
7439-92-1	LEAD, TOTAL	66.7			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.8			MS	5	0.53	0.20
7440-66-6	ZINC, TOTAL	52.5			MS	5	1.1	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS078C0001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 82.1 **Lab Sample ID:** SC3170-002

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.46		N	MS	5	0.086	0.02
7440-38-2	ARSENIC, TOTAL	2.7			MS	5	0.43	0.13
7440-50-8	COPPER, TOTAL	14.8			MS	5	0.43	0.09
7439-92-1	LEAD, TOTAL	77.2			MS	5	0.086	0.03
7440-31-5	TIN, TOTAL	1.7			MS	5	0.43	0.16
7440-66-6	ZINC, TOTAL	54.4			MS	5	0.86	0.30

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X16SS080C0001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 87.8 **Lab Sample ID:** SC3170-013

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.14		N	MS	5	0.088	0.02
7440-38-2	ARSENIC, TOTAL	3.0			MS	5	0.44	0.13
7440-50-8	COPPER, TOTAL	4.8			MS	5	0.44	0.10
7439-92-1	LEAD, TOTAL	9.1			MS	5	0.088	0.03
7440-31-5	TIN, TOTAL	1.2			MS	5	0.44	0.17
7440-66-6	ZINC, TOTAL	18.7			MS	5	0.88	0.31

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X16SS081C0001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 88.9 **Lab Sample ID:** SC3170-014

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.42		N	MS	5	0.088	0.02
7440-38-2	ARSENIC, TOTAL	4.2			MS	5	0.44	0.13
7440-50-8	COPPER, TOTAL	9.6			MS	5	0.44	0.10
7439-92-1	LEAD, TOTAL	48.7			MS	5	0.088	0.03
7440-31-5	TIN, TOTAL	1.1			MS	5	0.44	0.17
7440-66-6	ZINC, TOTAL	29.0			MS	5	0.88	0.31

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SS008C0001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 90.7 **Lab Sample ID:** SC3170-003

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.39		N	MS	5	0.099	0.02
7440-38-2	ARSENIC, TOTAL	5.0			MS	5	0.50	0.15
7440-50-8	COPPER, TOTAL	12.0			MS	5	0.50	0.11
7439-92-1	LEAD, TOTAL	21.0			MS	5	0.099	0.03
7440-31-5	TIN, TOTAL	0.92			MS	5	0.50	0.19
7440-66-6	ZINC, TOTAL	23.1			MS	5	0.99	0.35

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SS009C0001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 91.1 **Lab Sample ID:** SC3170-004

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.43		N	MS	5	0.085	0.02
7440-38-2	ARSENIC, TOTAL	4.4			MS	5	0.42	0.13
7440-50-8	COPPER, TOTAL	11.2			MS	5	0.42	0.09
7439-92-1	LEAD, TOTAL	38.7			MS	5	0.085	0.03
7440-31-5	TIN, TOTAL	1.4			MS	5	0.42	0.16
7440-66-6	ZINC, TOTAL	19.0			MS	5	0.85	0.30

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SS010C0001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 91.1 **Lab Sample ID:** SC3170-005

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	1.3		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	6.2			MS	5	0.50	0.15
7440-50-8	COPPER, TOTAL	24.0			MS	5	0.50	0.11
7439-92-1	LEAD, TOTAL	200			MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.3			MS	5	0.50	0.19
7440-66-6	ZINC, TOTAL	35.2			MS	5	1.0	0.35

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS034C0001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 90.3 **Lab Sample ID:** SC3170-012

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.10		N	MS	5	0.095	0.02
7440-38-2	ARSENIC, TOTAL	4.3			MS	5	0.47	0.14
7440-50-8	COPPER, TOTAL	8.5			MS	5	0.47	0.10
7439-92-1	LEAD, TOTAL	9.4			MS	5	0.095	0.03
7440-31-5	TIN, TOTAL	1.6			MS	5	0.47	0.18
7440-66-6	ZINC, TOTAL	30.2			MS	5	0.95	0.33

Bottle ID: A

Comments:

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2890-5
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
FD06030901	SL	03-JUN-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	87. %	1	D2216	WG64648	05-JUN-09 09:28:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3170-6
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X14SS0330001	SL	02-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG65216	19-JUN-09 09:10:00	ASTM D2216	18-JUN-09	CP	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3170-7
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X14SS0350001	SL	02-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	85. %	1	D2216	WG65216	19-JUN-09 09:11:00	ASTM D2216	18-JUN-09	CP	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3170-8
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X14SS0390001	SL	02-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	84. %	1	D2216	WG65216	19-JUN-09 09:12:00	ASTM D2216	18-JUN-09	CP	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3170-9
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X14SS0430001	SL	02-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG65216	19-JUN-09 09:13:00	ASTM D2216	18-JUN-09	CP	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3170-10
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X14SS0480001	SL	03-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	71. %	1	D2216	WG65216	19-JUN-09 09:15:00	ASTM D2216	18-JUN-09	CP	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3170-11
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X14SS0620001	SL	03-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	80. %	1	D2216	WG65216	19-JUN-09 09:16:00	ASTM D2216	18-JUN-09	CP	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3170-15
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X14SS0940001	SL	04-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	83. %	1	D2216	WG65216	19-JUN-09 09:20:00	ASTM D2216	18-JUN-09	CP	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2890-1
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X15SS0710001	SL	02-JUN-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	87. %	1	D2216	WG64648	05-JUN-09 09:28:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2890-2
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X15SS0720001	SL	02-JUN-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	85. %	1	D2216	WG64648	05-JUN-09 09:28:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2890-3
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X15SS0730001	SL	02-JUN-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	84. %	1	D2216	WG64648	05-JUN-09 09:28:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC2890-4
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X15SS0760001	SL	02-JUN-09	04-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG64648	05-JUN-09 09:28:00	ASTM D2216	04-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3170-1
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X15SS077C0001	SL	10-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	81. %	1	D2216	WG65216	19-JUN-09 09:05:00	ASTM D2216	18-JUN-09	CP	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3170-2
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X15SS078C0001	SL	10-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	82. %	1	D2216	WG65216	19-JUN-09 09:06:00	ASTM D2216	18-JUN-09	CP	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3170-13
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X16SS080C0001	SL	14-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	88. %	1	D2216	WG65216	19-JUN-09 09:18:00	ASTM D2216	18-JUN-09	CP	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3170-14
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X16SS081C0001	SL	14-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	89. %	1	D2216	WG65216	19-JUN-09 09:19:00	ASTM D2216	18-JUN-09	CP	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3170-3
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X17SS008C0001	SL	11-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	91. %	1	D2216	WG65216	19-JUN-09 09:07:00	ASTM D2216	18-JUN-09	CP	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3170-4
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X17SS009C0001	SL	11-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	91. %	1	D2216	WG65216	19-JUN-09 09:08:00	ASTM D2216	18-JUN-09	CP	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3170-5
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X17SS010C0001	SL	11-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	91. %	1	D2216	WG65216	19-JUN-09 09:09:00	ASTM D2216	18-JUN-09	CP	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS. Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3170-12
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-3

Sample Description	Matrix	Date Sampled	Date Received
X25SS034C0001	SL	15-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	90. %	1	D2216	WG65216	19-JUN-09 09:17:00	ASTM D2216	18-JUN-09	CP	

APPENDIX C
SUPPORT DOCUMENTATION

HOLDTIME

SDG CTO423-3

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	X14SS0620001	SC3170-011	NM	6/3/2009	6/17/2009	6/26/2009	13.75	9.092	22.85
M	MG/KG	FD06030901	SC2890-005	NM	6/3/2009	6/17/2009	6/27/2009	14.03	10	24.03
M	MG/KG	X15SS078C0001	SC3170-002	NM	6/10/2009	6/17/2009	6/27/2009	6.605	10	16.60
M	MG/KG	X15SS077C0001	SC3170-001	NM	6/10/2009	6/17/2009	6/26/2009	6.839	9.010	15.85
M	MG/KG	X15SS077C0001	SC3170-001	NM	6/10/2009	6/17/2009	6/27/2009	6.578	10	16.58
M	MG/KG	X15SS0760001	SC2890-004	NM	6/2/2009	6/17/2009	6/26/2009	14.69	9	23.69
M	MG/KG	X15SS0760001	SC2890-004	NM	6/2/2009	6/17/2009	6/27/2009	14.42	10	24.42
M	MG/KG	X15SS0730001	SC2890-003	NM	6/2/2009	6/17/2009	6/26/2009	14.92	9	23.92
M	MG/KG	X15SS0730001	SC2890-003	NM	6/2/2009	6/17/2009	6/27/2009	14.65	10	24.65
M	MG/KG	X15SS0720001	SC2890-002	NM	6/2/2009	6/17/2009	6/26/2009	14.91	9	23.91
M	MG/KG	X15SS0720001	SC2890-002	NM	6/2/2009	6/17/2009	6/26/2009	14.90	9	23.90
M	MG/KG	X15SS0720001	SC2890-002	NM	6/2/2009	6/17/2009	6/27/2009	14.64	10	24.64
M	MG/KG	X15SS0710001	SC2890-001	NM	6/2/2009	6/17/2009	6/26/2009	14.90	9.667	24.57
M	MG/KG	X15SS0710001	SC2890-001	NM	6/2/2009	6/17/2009	6/26/2009	14.83	9	23.83
M	MG/KG	X16SS080C0001	SC3170-013	NM	6/14/2009	6/17/2009	6/27/2009	2.613	10	12.61

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	X14SS0390001	SC3170-008	NM	6/2/2009	6/17/2009	6/26/2009	14.76	9.067	23.83
M	MG/KG	FD06030901	SC2890-005	NM	6/3/2009	6/17/2009	6/26/2009	14.3	9.005	23.30
M	MG/KG	X14SS0330001	SC3170-006	NM	6/2/2009	6/17/2009	6/27/2009	14.55	10	24.55
M	MG/KG	X14SS0330001	SC3170-006	NM	6/2/2009	6/17/2009	6/26/2009	14.77	9.051	23.83
M	MG/KG	X14SS0350001	SC3170-007	NM	6/2/2009	6/17/2009	6/27/2009	14.55	10	24.55
M	MG/KG	X14SS0350001	SC3170-007	NM	6/2/2009	6/17/2009	6/26/2009	14.77	9.056	23.82
M	MG/KG	X14SS0940001	SC3170-015	NM	6/4/2009	6/17/2009	6/26/2009	12.82	9.132	21.95
M	MG/KG	X14SS0390001	SC3170-008	NM	6/2/2009	6/17/2009	6/27/2009	14.55	10	24.55
M	MG/KG	X14SS0940001	SC3170-015	NM	6/4/2009	6/17/2009	6/27/2009	12.68	10	22.68
M	MG/KG	X14SS0430001	SC3170-009	NM	6/2/2009	6/17/2009	6/27/2009	14.54	10	24.54
M	MG/KG	X14SS0430001	SC3170-009	NM	6/2/2009	6/17/2009	6/26/2009	14.75	9.072	23.82
M	MG/KG	X14SS0480001	SC3170-010	NM	6/3/2009	6/17/2009	6/27/2009	13.51	10	23.51
M	MG/KG	X14SS0480001	SC3170-010	NM	6/3/2009	6/17/2009	6/26/2009	13.7	9.087	22.78
M	MG/KG	X14SS0620001	SC3170-011	NM	6/3/2009	6/17/2009	6/27/2009	13.57	10	23.57
M	MG/KG	X16SS080C0001	SC3170-013	NM	6/14/2009	6/17/2009	6/26/2009	2.769	9.121	11.89
M	MG/KG	X14SS0350001	SC3170-007	NM	6/2/2009	6/17/2009	6/26/2009	14.77	9.062	23.83
M	MG/KG	X25SS034C0001	SC3170-012	NM	6/15/2009	6/17/2009	6/27/2009	1.513	10	11.51
M	MG/KG	X15SS078C0001	SC3170-002	NM	6/10/2009	6/17/2009	6/26/2009	6.865	9.011	15.88

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	X25SS034C0001	SC3170-012	NM	6/15/2009	6/17/2009	6/26/2009	1.674	9.116	10.79
M	MG/KG	X17SS010C0001	SC3170-005	NM	6/11/2009	6/17/2009	6/26/2009	5.721	9.045	14.77
M	MG/KG	X17SS010C0001	SC3170-005	NM	6/11/2009	6/17/2009	6/27/2009	5.495	10	15.5
M	MG/KG	X17SS009C0001	SC3170-004	NM	6/11/2009	6/17/2009	6/26/2009	5.741	9.04	14.78
M	MG/KG	X17SS009C0001	SC3170-004	NM	6/11/2009	6/17/2009	6/27/2009	5.51	10	15.51
M	MG/KG	X17SS008C0001	SC3170-003	NM	6/11/2009	6/17/2009	6/26/2009	5.789	9.017	14.81
M	MG/KG	X17SS008C0001	SC3170-003	NM	6/11/2009	6/17/2009	6/27/2009	5.535	10	15.53
M	MG/KG	X16SS081C0001	SC3170-014	NM	6/14/2009	6/17/2009	6/26/2009	2.766	9.126	11.89
M	MG/KG	X16SS081C0001	SC3170-014	NM	6/14/2009	6/17/2009	6/27/2009	2.615	10	12.62
TS	%	X14SS0390001	SC3170-8	NM	6/2/2009	6/18/2009	6/19/2009	15.84	1	16.84
TS	%	X15SS0730001	SC2890-3	NM	6/2/2009	6/4/2009	6/5/2009	2.028	1	3.028
TS	%	X17SS009C0001	SC3170-4	NM	6/11/2009	6/18/2009	6/19/2009	6.818	1	7.818
TS	%	X17SS008C0001	SC3170-3	NM	6/11/2009	6/18/2009	6/19/2009	6.866	1	7.866
TS	%	X16SS081C0001	SC3170-14	NM	6/14/2009	6/18/2009	6/19/2009	3.853	1	4.853
TS	%	X16SS080C0001	SC3170-13	NM	6/14/2009	6/18/2009	6/19/2009	3.856	1	4.856
TS	%	X15SS078C0001	SC3170-2	NM	6/10/2009	6/18/2009	6/19/2009	7.942	1	8.942
TS	%	X15SS077C0001	SC3170-1	NM	6/10/2009	6/18/2009	6/19/2009	7.920	1	8.920
TS	%	X15SS0760001	SC2890-4	NM	6/2/2009	6/4/2009	6/5/2009	1.790	1	2.790

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
TS	%	X17SS010C0001	SC3170-5	NM	6/11/2009	6/18/2009	6/19/2009	6.798	1	7.798
TS	%	X15SS0720001	SC2890-2	NM	6/2/2009	6/4/2009	6/5/2009	2.019	1	3.019
TS	%	X15SS0710001	SC2890-1	NM	6/2/2009	6/4/2009	6/5/2009	2.006	1	3.006
TS	%	X14SS0940001	SC3170-15	NM	6/4/2009	6/18/2009	6/19/2009	13.91	1	14.91
TS	%	X14SS0620001	SC3170-11	NM	6/3/2009	6/18/2009	6/19/2009	14.84	1	15.84
TS	%	X14SS0430001	SC3170-9	NM	6/2/2009	6/18/2009	6/19/2009	15.82	1	16.82
TS	%	X25SS034C0001	SC3170-12	NM	6/15/2009	6/18/2009	6/19/2009	2.762	1	3.762
TS	%	X14SS0350001	SC3170-7	NM	6/2/2009	6/18/2009	6/19/2009	15.85	1	16.85
TS	%	X14SS0330001	SC3170-6	NM	6/2/2009	6/18/2009	6/19/2009	15.85	1	16.85
TS	%	FD06030901	SC2890-5	NM	6/3/2009	6/4/2009	6/5/2009	1.394	1	2.394
TS	%	X14SS0480001	SC3170-10	NM	6/3/2009	6/18/2009	6/19/2009	14.78	1	15.78

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CTO 423 NSF INDIAN HEAD
SDG: CTO423-3
SC2890, SC3170

Sample Receipt

The following samples were received on June 4 and 16, 2009 and were logged in under Katahdin Analytical Services work order numbers SC2890 and SC3170 for a hardcopy due date of July 06, 2009.

KATAHDIN Sample No.	TTNUS Sample Identification
SC2890-1	X15SS0710001
SC2890-2	X15SS0720001
SC2890-3	X15SS0730001
SC2890-4	X15SS0760001
SC2890-5	FD06030901
SC3170-1	X15SS077C0001
SC3170-2	X15SS078C0001
SC3170-3	X17SS008C0001
SC3170-4	X17SS009C0001
SC3170-5	X17SS010C0001
SC3170-6	X14SS0330001
SC3170-7	X14SS0350001
SC3170-8	X14SS0390001
SC3170-9	X14SS0430001
SC3170-10	X14SS0480001
SC3170-11	X14SS0620001
SC3170-12	X25SS034C0001
SC3170-13	X16SS080C0001
SC3170-14	X16SS081C0001
SC3170-15	X14SS0940001

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in this narrative or in the Report of Analysis.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Andrea J. Colby**. This narrative is an integral part of the Report of Analysis.

Metals Analysis

The samples of SDG CTO423-3 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846. 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA.

Inductively-Coupled Plasma Mass Spectrometric Analysis (ICP-MS)

Solid-matrix Katahdin Sample Numbers SC2890-(1-5) and SC3170-(1-15) were digested for ICP-MS analysis on 06/17/09 (QC Batch ZF17ICS0) in accordance with USEPA Method 3050B. Katahdin Sample Number SC2890-1 was prepared with duplicate matrix-spiked aliquots. The measured tin concentration in the preparation blank in this batch exceeds the laboratory's acceptance limit. Laboratory testing has determined that this tin contamination comes from one of the reagents used in the digestion process.

ICP-MS analyses of SDG CTO423-3 sample digestates were performed using an Agilent 7500 ICP-MS spectrometer in accordance with USEPA Method 6020. Results for all standards and samples are reported using the mean of 3 replicate measurements. All samples were analyzed within holding times and all analytical run QC criteria were met, with the following exception:

The measured lead concentration of the CCBs analyzed at 10:41 in ICP-MS analysis sequence JZF25A exceeds the laboratory's acceptance limit. All associated lead results accepted from this portion of the run were greater than ten times the CCB result and not affected by this high bias.

Internal standard recoveries for ICP-MS analyses can be found in the raw data section of the accompanying data package. The following table indicates which analytes are associated with each internal standard element.

Internal Standard Element	Associated Analytes
Lithium	Beryllium
Scandium	Sodium, Magnesium, Aluminum, Potassium, Calcium
Germanium	Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel, Copper, Zinc, Arsenic, Selenium, Silver, Cadmium
Terbium	Antimony, Barium, Tin
Bismuth	Thallium, Lead

Instrument tuning information can also be found in the raw data section in the report labeled "6020 QC Tune Report". The relative standard deviation was determined from 4 replicate measurements. The peak width was measured at 10% of the peak height.

Matrix QC Summary

The measured recovery of antimony in the matrix-spiked aliquots of Katahdin Sample Number SC2890-1 is outside the laboratory's acceptance criteria (75% - 125% recovery of the added element, if the native concentration is less than four times the amount added). The measure recovery antimony in a post-digestion spike of this sample is within acceptance criteria.

The matrix spike duplicate analysis of Katahdin Sample Number SC2890-1 is within the laboratory's acceptance limit (<20% relative difference between duplicate matrix-spiked aliquots) for all analytes.

The serial dilution analysis of Katahdin Sample Number SC2890-1 is within the laboratory's acceptance limit (<10% relative percent difference, if the concentration in the original sample is greater than 50 times the MDL) for all analytes.

Reporting of Metals Results

Analytical results for client samples, matrix QC samples (duplicates and matrix spikes), and batch QC samples (preparation blanks and laboratory control samples) have been reported down to the laboratory's method detection limits (MDLs). These MDLs have been adjusted for each sample based on the sample amounts used in preparation and analysis. Analytical results that are below the MDLs are flagged with "U" in the C-qualifier column.

Analytical results for instrument run QC samples (ICVs, ICBs, etc.) have been reported down to the laboratory's instrument detection limits (IDLs).

IDLs, MDLs, and PQLs are listed on Form 10 of the accompanying data package.

Wet Chemistry Analysis

The samples of SDG CTO423-3 were analyzed in accordance with the specific methods listed on the Report of Analysis.

Analyses for total solids were performed according to "Annual Book of ASTM Standards", Method D2216-98 "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass".

All analyses were performed within analytical holding times, and all quality control criteria were met.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Operations Manager or the Quality Assurance Officer as verified by the following signature.

Leslie Dimond

07.06.09

Leslie Dimond
Quality Assurance Officer

Katahdin Analytical Services, Inc.

Sample Receipt Condition Report

Client: Tetra Tech	KAS PM: MC	Sampled By: Client
Project:	KIMS Entry By: AMC	Delivered By: Fed-Ex
KAS Work Order#: SC2881	KIMS Review By: MC	Received By: GN
SDG #:	Cooler: 1 of 1	Date/Time Rec.: 4-6-09 09:50

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 1.0
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea				✓	
Soil/Sediment: Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2				✓	
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

Katahdin Analytical Services, Inc.

Sample Receipt Condition Report

Client:	Tetra Tech	KAS PM:	AJC	Sampled By:	Client
Project:		KIMS Entry By:	DD	Delivered By:	Fed Ex
KAS Work Order#:	SC3166 / SC3170	KIMS Review By:	AC	Received By:	DP
SDG #:	SC3171	Cooler: 1 of 2		Date/Time Rec.:	6-16-09 1005

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 0.1
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea **Soil/Sediment:**				✓	
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓	✓			some PAHs & TOC & EC samples received past holdtime of 14 days Proceed per Ed Sablnyer 6/17/09
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2				✓	
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

0000007

Katahdin Analytical Services, Inc.

Sample Receipt Condition Report

Client:	Tetra Tech	KAS PM:	AJC	Sampled By:	Client
Project:		KIMS Entry By:	DP	Delivered By:	Fed Ex
KAS Work Order#:	SC3166 / SC3170	KIMS Review By:	KL	Received By:	DP
SDG #:	SC3171	Cooler:	2 of 2	Date/Time Rec:	6-16-09 1005

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): -0.1
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea **Soil/Sediment:**				✓	
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol,				✓	
TPO4, N+N, TOC, DRO, TPH – pH <2				✓	
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

SC2881, SC2890

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER № 028242 | PAGE 1 OF 2

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	4129218308	Katahdin / Andrea Colby

SAMPLERS (SIGNATURE): [signature]

FIELD OPERATIONS LEADER: J. Goerdt — PHONE NUMBER: 4129218425 — ADDRESS: 600 Technology Way

CARRIER/WAYBILL NUMBER: Fed Ex / 8631 3888 1947 — CITY, STATE: Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4oC
TYPE OF ANALYSIS: SW846 3050B/6020A; Sb As Cu Pb Sn Zn

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	SW846 3050B/6020A Sb As Cu Pb Sn Zn								COMMENTS
5/29	1215	X1455001C0001	001	0	1	SO	C										
↓	1205	X1455002C0001	002	↓	↓	↓	↓										
	1310	X1455003C0001	003														
	1315	X1455004C0001	004														
	1420	X1455005C0001	005														
	1404	X1455006C0001	006														
↓	1451	X1455007C0001	007														
6/1	1030	X1455008C0001	008														
6/1	1110	X1455009C0001	009				↓										
5/27	1312	X155S005 0001	005				G										
5/27	1326	X155S007 0001	~~15~~ 007	↓	↓		G										
6/2	801	X155B0050102	005	1	2		G										
5/27	1410	X155S0180001	018	0	1	↓	G										

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	6-3-09	1200	1. RECEIVED BY [signature]	6-4-09	0950
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 128243 | PAGE 2 OF 2

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bubinski	4129218308	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4129218425	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex/8631 3888 1947		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: SW846 8050B/6020A Sb, Pb Sn Zn

DATE (YEAR 2009)	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS		COMMENTS
5/28	914	X1555035(000)1	035	0	1	SO	G	1	1	
5/28	901	X1555037(000)1	037					1	1	
6/2	808	X1555061(000)1	061					1	1	
	814	X1555064(000)1	064					3	3	MS/MSD
	825	X1555066(000)1	066					1	1	
	845	X1555068(000)1	068					1	1	
	905	X1555070(000)1	070					1	1	
	920	X1555071(000)1	071					1	1	
	901	X1555072(000)1	072					1	1	
	847	X1555073(000)1	073					1	1	
↓	1430	X1555076(000)1	076	↓	↓	↓	↓	1	1	
6/3	0000	FD06030901	QC	—	—	SO	G	1	1	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-3-09	1230	1. RECEIVED BY	06-04-09	09 50
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TINUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER No 028245 PAGE 1 OF 5

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Budzinski	4129218038	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goard	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FedEx / 863138882016		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: SW 8463050B/6020A Sb As Cr Pb Sn Zn

DATE (YEAR 2009)	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS		COMMENTS
6/10	1100	X150777C0001	077	0	1	SO	C	1	1	
6/10	1030	X155507SC0001	078	0	1	SO	C	1	1	
6/11	1220	X1755008C0001	008	0	1			1	1	
6/11	1330	X1755009C0001	009	0	1			1	1	
6/11	1400	X1755010C0001	010	0	1		↓	1	1	
6/2	1200	X1455022 0001	022	0	1		G	1	1	
6/2	1243	X1455033 0001	033	0	1		G	1	1	
6/2	1252	X1455035 0001	035	0	1		G	1	1	
6/2	1306	X1455039 0001	039	0	1		G	1	1	
6/2	1329	X1455043 0001	043	0	1		G	1	1	
6/3	1426	X1455048 0001	048	0	1		G	1	1	
6/3	1103	X1455058 0001	058	0	1		G	1	1	
6/3	1303	X1455062 0001	062	0	1	↓	G	1	1	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-15-09	1530	1. RECEIVED BY	6/16/09	1005
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER No 028250 PAGE 2 OF 5

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	412 921 8308	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER: J. Goerdt	PHONE NUMBER: 412 443 0244	ADDRESS: 600 Technology Way
		CARRIER/WAYBILL NUMBER: Fed Ex / 8631 3888 2016		CITY, STATE: Scarborough, ME 04074

STANDARD TAT ☒ RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)										COMMENTS
									G	G	G								
									PRESERVATIVE USED			4°C	4°C	4°C					
									TYPE OF ANALYSIS			PCB's, TCL, LOC	SW 846 8270	SW 846 8260A	SW 846 3050B/6020A Pb Sn Zn				
6/3	1103	X1455058 0001	058	0	1	SO	G	3	3										MS/MSD
6/4	1435	X1455117 0001	117					1	1										
5/27	1510	X1555033 0001	033					1	1										
5/28	1014	X1555048 0001	048		↓	↓		1	1										
6/10	1252	X155D023 0006	023		.5	SD		1	1										
6/13	1400	X1655031 0001	031		1	SO		1	X	1									
6/3	1500	X1655040 0001	040				↓	1		1									
6/15	1500	X2555034 0001	034				C	1			1								
6/4	1245	X1655080 0001	080				C	1			1								
6/4	1250	X1655081 0001	081				C	1			1								
6/4	1130	X1455094 0001	094				G	1			1								
6/9	1248	X1455126 0001	126				G	1			1								
6/4	1250	X1455087 0001	087	↓	↓	↓	G	1			1								

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-15-09	1530	1. RECEIVED BY	6/16/09	1005
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

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TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028248 | PAGE 3 OF 5

PROJECT NO: 112G00810	FACILITY: Indian Head	PROJECT MANAGER R. Badinski	PHONE NUMBER 4129218308	LABORATORY NAME AND CONTACT: Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER J. Goerdt	PHONE NUMBER 4124430244	ADDRESS 600 Technology Way
		CARRIER/WAYBILL NUMBER FedEx 863138882016		CITY, STATE Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE (YEAR 2009)	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G): G	PRESERVATIVE USED: 4°C	TYPE OF ANALYSIS: SW 8260 8270	COMMENTS
6/14	1015	X1655078 0001	078	0	1	SO	G	1	1			
6/14	1245	X1655080C0001	080				C	1	1			
	1250	X1655081C0001	081				C	1	1			
	1100 1245	X1655071 0001	071				G	1	1			
	925	X1655062 0001	062					1	1			
	1040	X1655073 0001	073					1	1			
	955	X1655076 0001	076					3	3			MS/MSD
	1130	X1655009 0001	009					1	1			
	1350 1385	X1655014 0001	014					1	1			
	1250	X1655019 0001	019					1	1			
6/13	1315	X1655013 0001	013					1	1			
	1515	X1655042 0001	042					1	1			
	1525	X1655046 0001	046					1	1			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-15-09	1530	1. RECEIVED BY	6/16/09	1005
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028249 | PAGE 4 OF 5

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bwinski	412921 8308	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 863138882016		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE (YEAR 2009)	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS: SW846 8270 PAH, TOC, GEC	COMMENTS
									G	4°C		
6/13	1555	X1655051 0001	051	0	1	SO	G	1	1			
6/14	0845	X1655056 0001	056					1	1			
6/14	0855	X1655057 0001	057					1	1			
6/13	1105	X1655002 0001	002		↓	↓		1	1			
6/10	1252	X155D023 0006	023		.5	SD		1	1			
6/1	900	X155D003 0006	003					1	1			
6/1	912	X155D005 0006	005					1	1			
6/1	900	X155D003 0006	003		↓	↓		1		1		
6/4	1250	X1455087 0001	087		1	SO		1		1		
6/3	1103	X1455058 0001	058					1		1		on page 1 of 5
6/13	1140	X1655008 0001	008					1		1		
6/14	1040	X1655073 0001	073					1		1		
6/2	1200	X1455022 0001	022	↓	↓	↓	↓	1		1		

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-15-09	1530	1. RECEIVED BY	6-16-09	10:05
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

JC5164

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER № 028251

PROJECT NO: 112G00810
FACILITY: Indian Head
PROJECT MANAGER: R. Basinski
PHONE NUMBER: 412 921 8308
LABORATORY NAME AND CONTACT: Katahdin / Andrea Colby
SAMPLERS (SIGNATURE): [signature]
FIELD OPERATIONS LEADER: J. Goerdt
PHONE NUMBER: 412 443 0244
ADDRESS: 600 Technology Way
CARRIER/WAYBILL NUMBER: Fed Ex / 8631 3888 2016
CITY, STATE: Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G, G
PRESERVATIVE USED: 4°C, 4°C
TYPE OF ANALYSIS: SW846 3050B/6020A SO; SW846 8270 PAH

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	SW846 3050B/6020A SO	SW846 8270 PAH							COMMENTS
6/10	1252	X15SD0230006	023	0	.5	SD	G	1	1								
6/10	1115	X15SD0180006	018	↓	↓	↓	↓	1	1								
6/10	1050	X15SD0130006	013					1	1								
6/1	0912	X15SD0050006	005					1	1								
6/1	0900	X15SD0030006	003		↓	↓		1	1								
6/4	1323	X14SS1080001	108		1	SO		1	1								
6/4	1435	X14SS1170001	117					1	1								
6/3	1307	X14SS0630001	063					1	1								
6/3	1439	X14SS0720001	072					1	1								
6/13	1110	X16SS0030001	003					1	1								
6/13	1325	X16SS0260001	026					1		1							
6/13	1140	X16SS0080001	008	↓	↓	↓	↓	1		1							

1. RELINQUISHED BY [signature]	DATE 6-15-09	TIME 1530	1. RECEIVED BY [signature]	DATE 6/16/09	TIME 1005
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZF25A

Date: 6/25/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
Cal Blank		1	18:39	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
Cal Std 1		1	18:48	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
Cal Std 2		1	18:56	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
Cal Std 3		1	19:05	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
Cal Std 4		1	19:13	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
ZZZZZZ		1	19:22							
ICV		1	19:30	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
ICB		1	19:39	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
PQL		1	19:47	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
ICSA		1	19:56	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
ICSAB		1	20:05	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
Blank		1	20:14	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCV		1	20:22	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCB		1	20:31	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
BLANK		1	20:39	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
BLANK		1	20:48	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCV		1	20:57	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCB		1	21:05	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
ZZZZZZ		5	21:14							
ZZZZZZ		1	21:22							
ZZZZZZ		10	21:31							
ZZZZZZ		1	21:39							
ZZZZZZ		1	21:48							
ZZZZZZ		1	21:56							
ZZZZZZ		1	22:05							
ZZZZZZ		1	22:14							
ZZZZZZ		10	22:22							
BLANK		1	22:31	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCV		1	22:39	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCB		1	22:48	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
ZZZZZZ		1	22:57							
ZZZZZZ		5	23:05							
ZZZZZZ		1	23:14							
ZZZZZZ		1	23:22							
ZZZZZZ		1	23:31							
ZZZZZZ		1	23:40							
ZZZZZZ		1	23:48							
ZZZZZZ		1	23:57							
ZZZZZZ		10	0:05							
BLANK		1	0:14	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCV		1	0:22	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCB		1	0:31	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
ZZZZZZ		5	0:40							
ZZZZZZ		1	0:48							
ZZZZZZ		5	0:57							
ZZZZZZ		5	1:05							
ZZZZZZ		5	1:14							
ZZZZZZ		5	1:23							
ZZZZZZ		10	1:31							
ZZZZZZ		10	1:40							

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZF25A

Date: 6/26/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
ZZZZZZ		10	1:48							
BLANK		1	1:57	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCV		1	2:05	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCB		1	2:14	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
ZZZZZZ		5	2:22							
ZZZZZZ		5	2:31							
ZZZZZZ		5	2:40							
ZZZZZZ		25	2:48							
ZZZZZZ		5	2:57							
ZZZZZZ		10	3:05							
ZZZZZZ		10	3:14							
ZZZZZZ		10	3:22							
ZZZZZZ		10	3:31							
BLANK		1	3:40	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCV		1	3:48	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCB		1	3:57	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
BLANK		1	4:05	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
BLANK		1	4:14	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
PQL		1	4:22	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCV		1	4:31	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCB		1	4:40	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
PBSZF17ICS0		5	4:48	Sb As		Pb				Zn
ZZZZZZ		25	4:57							
ZZZZZZ		5	5:05							
ZZZZZZ		5	5:14							
SC2890-001	X15SS0710001	5	5:22	Sb As		Pb				Zn
SC2890-001A	X15SS0710001A	5	5:31	Sb						
SC2890-001S	X15SS0710001S	10	5:40	Sb As		Pb				Zn
SC2890-001P	X15SS0710001P	10	5:48	Sb As		Pb				Zn
LCSSZF17ICS0		10	5:57	Sb As		Pb				Zn
BLANK		1	6:05	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCV		1	6:14	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCB		1	6:23	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
SC2890-001L	X15SS0710001L	25	6:31	Sb As		Pb				Zn
SC2890-002	X15SS0720001	5	6:40	Sb As						Zn
SC2890-002	X15SS0720001	10	6:48			Pb				
SC2890-003	X15SS0730001	5	6:57	Sb As		Pb				Zn
SC2890-004	X15SS0760001	5	7:05	Sb As		Pb				Zn
SC2890-005	FD06030901	5	7:14	Sb As		Pb				Zn
SC3170-001	X15SS077C0001	5	7:23	Sb As		Pb				Zn
SC3170-002	X15SS078C0001	5	7:31	Sb As		Pb				Zn
SC3170-003	X17SS008C0001	5	7:40	Sb As		Pb				Zn
BLANK		1	7:49	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCV		1	7:57	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
CCB		1	8:06	Al Sb As	Ca	Fe Pb Mg	Mo	K	Na	Zn
SC3170-004	X17SS009C0001	5	8:14	Sb As		Pb				Zn
SC3170-005	X17SS010C0001	5	8:23	Sb As		Pb				Zn
SC3170-006	X14SS0330001	5	8:32	Sb As		Pb				Zn
SC3170-007	X14SS0350001	5	8:40	Sb As						Zn
SC3170-007	X14SS0350001	10	8:49			Pb				
SC3170-008	X14SS0390001	5	8:58	Sb As		Pb				Zn

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZF25A

Date: 6/26/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements
SC3170-009	X14SS0430001	5	9:06	Sb As Pb Zn
SC3170-010	X14SS0480001	5	9:15	Sb As Pb Zn
SC3170-011	X14SS0620001	5	9:23	Sb As Pb Zn
BLANK		1	9:32	Al Sb As Ca Fe Pb Mg Mo K Na Zn
CCV		1	9:41	Al Sb As Ca Fe Pb Mg Mo K Na Zn
CCB		1	9:49	Al Sb As Ca Fe Pb Mg Mo K Na Zn
SC3170-012	X25SS034C0001	5	9:58	Sb As Pb Zn
SC3170-013	X16SS080C0001	5	10:06	Sb As Pb Zn
SC3170-014	X16SS081C0001	5	10:15	Sb As Pb Zn
SC3170-015	X14SS0940001	5	10:24	Sb As Pb Zn
CCV		1	10:32	Al Sb As Ca Fe Pb Mg Mo K Na Zn
CCB		1	10:41	Al Sb As Ca Fe Pb Mg Mo K Na Zn

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZF26A

Date: 6/26/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
Cal Blank		1	18:09 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
Cal Std 1		1	18:18 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
Cal Std 2		1	18:26 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
Cal Std 3		1	18:35 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
Cal Std 4		1	18:43 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
ZZZZZZ		1	18:52							
ICV		1	19:00 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
ICB		1	19:09 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
PQL		1	19:18 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
ICSA		1	19:26 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
ICSAB		1	19:35 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
Blank		1	19:44 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
CCV		1	19:52 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
CCB		1	20:01 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
BLANK		1	20:09 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
BLANK		1	20:18 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
CCV		1	20:27 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
CCB		1	20:35 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
ZZZZZZ		5	20:44							
ZZZZZZ		1	20:52							
ZZZZZZ		1	21:01							
ZZZZZZ		1	21:09							
ZZZZZZ		5	21:18							
ZZZZZZ		5	21:27							
ZZZZZZ		5	21:35							
ZZZZZZ		5	21:44							
ZZZZZZ		10	21:52							
BLANK		1	22:01 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
CCV		1	22:09 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
CCB		1	22:18 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
PBSZF17ICS0		5	22:26		Cu					Sn
ZZZZZZ		25	22:35							
ZZZZZZ		5	22:44							
ZZZZZZ		25	22:52							
SC2890-001	X15SS0710001	5	23:01		Cu					Sn
ZZZZZZ		5	23:09							
SC2890-001S	X15SS0710001S	10	23:18		Cu					Sn
SC2890-001P	X15SS0710001P	10	23:27		Cu					Sn
LCSSZF17ICS0		10	23:35		Cu					Sn
BLANK		1	23:44 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
CCV		1	23:52 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
CCB		1	0:01 Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
SC2890-001L	X15SS0710001L	25	0:09		Cu					Sn
SC2890-002	X15SS0720001	5	0:18		Cu					Sn
SC2890-003	X15SS0730001	5	0:27		Cu					Sn
SC2890-004	X15SS0760001	5	0:35		Cu					Sn
SC2890-005	FD06030901	5	0:44		Cu					Sn
SC3170-001	X15SS077C0001	5	0:52		Cu					Sn
SC3170-002	X15SS078C0001	5	1:01		Cu					Sn
SC3170-003	X17SS008C0001	5	1:10		Cu					Sn

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZF26A

Date: 6/27/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time		Elements						
BLANK		1	1:18	Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
CCV		1	1:27	Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
CCB		1	1:35	Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
SC3170-004	X17SS009C0001	5	1:44			Cu					Sn
SC3170-005	X17SS010C0001	5	1:53			Cu					Sn
SC3170-006	X14SS0330001	5	2:01			Cu					Sn
SC3170-007	X14SS0350001	5	2:10			Cu					Sn
SC3170-008	X14SS0390001	5	2:19			Cu					Sn
SC3170-009	X14SS0430001	5	2:27			Cu					Sn
SC3170-010	X14SS0480001	5	2:36			Cu					Sn
SC3170-011	X14SS0620001	5	2:44			Cu					Sn
BLANK		1	2:53	Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
CCV		1	3:02	Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
CCB		1	3:10	Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
SC3170-012	X25SS034C0001	5	3:19			Cu					Sn
SC3170-013	X16SS080C0001	5	3:27			Cu					Sn
SC3170-014	X16SS081C0001	5	3:36			Cu					Sn
SC3170-015	X14SS0940001	5	3:45			Cu					Sn
ZZZZZZ		5	3:53								
BLANK		1	4:02	Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
CCV		1	4:11	Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn
CCB		1	4:19	Al	Ca	Cu Fe	Mg	Mo	K	Na	Sn

PREPARATION LOG

Lab Name: Katahdin Analytical Services **QC Batch ID:** ZF171CS0

Matrix: SOIL **SDG Name:** CTO423-3

Method: P **Prep Date:** 06/17/2009

Client ID	Lab Sample ID	Initial (g)	Final (L)
LCSSZF171CS0	LCSSZF171CS0	0.5077	0.1
PBSZF171CS0	PBSZF171CS0	1	0.1
X15SS0710001	SC2890-001	1.04	0.1
X15SS0710001P	SC2890-001P	1.09	0.1
X15SS0710001S	SC2890-001S	1.11	0.1
X15SS0720001	SC2890-002	1.06	0.1
X15SS0730001	SC2890-003	1.15	0.1
X15SS0760001	SC2890-004	1.06	0.1
FD06030901	SC2890-005	1.13	0.1
X15SS077C0001	SC3170-001	1.15	0.1
X15SS078C0001	SC3170-002	1.42	0.1
X17SS008C0001	SC3170-003	1.11	0.1
X17SS009C0001	SC3170-004	1.29	0.1
X17SS010C0001	SC3170-005	1.1	0.1
X14SS0330001	SC3170-006	1.32	0.1
X14SS0350001	SC3170-007	1.12	0.1
X14SS0390001	SC3170-008	1.37	0.1
X14SS0430001	SC3170-009	1.08	0.1
X14SS0480001	SC3170-010	1.22	0.1
X14SS0620001	SC3170-011	1.3	0.1
X25SS034C0001	SC3170-012	1.17	0.1
X16SS080C0001	SC3170-013	1.29	0.1
X16SS081C0001	SC3170-014	1.27	0.1
X14SS0940001	SC3170-015	1.23	0.1

NSF INDIAN HEAD
SOIL DATA
CTO423-3

FRACTION	CHEMICAL	X15SS0710001	UNITS	FD06030901	RPD	D
M	ANTIMONY	0.39 L	MG/KG	0.28 L	32.84	0.11
M	ARSENIC	3.5	MG/KG	3.3	5.88	0.20
M	COPPER	9.4	MG/KG	9.6	2.11	0.20
M	LEAD	282	MG/KG	187	40.51	95.00
M	TIN	1.7	MG/KG	1.2	34.48	0.50
M	ZINC	33.1	MG/KG	33	0.30	0.10
MISC	TOTAL SOLIDS	87	%	87	0.00	0.00

Current RPD Quality Control Limit: 50 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

Sample Calc.

Sample: X14550330001 lead reported result: 75.1 mg/kg

File:	104SMPL.D#	105SMPL.D#	106SMPL.D#	107SMPL.D#	108SMPL.D#
Sample:	SC3170-004	SC3170-005	SC3170-006	SC3170-007	SC3170-007
Date/Time:	6/26/2009 8:14	6/26/2009 8:23	6/26/2009 8:32	6/26/2009 8:40	6/26/2009 8:49
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	5	5	5	10
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	2.1360	1.7160	5.2050	5.9900	5.7690
B / 11	13.8550	32.8200	170.2500	70.9500	72.2000
Na / 23	92.5000	122.5000	111.8500	164.6000	92.9600
Mg / 25	7655.0000	319000.0000	14780.0000	14105.0000	13540.0000
Al / 27	102450.0000	98650.0000	102950.0000	136250.0000	138300.0000
Si / 29	3351.0000	4540.0000	4458.5000	3890.5000	4018.0000
K / 39	4224.5000	5125.0000	22185.0000	12910.0000	13310.0000
Ca / 44	27100.0000	129450.0000	2942.5000	1586.0000	1226.0000
V / 51	273.5000	216.2000	274.1500	300.3500	296.8000
Cr / 52	288.3000	882.5000	243.6500	196.3500	196.6000
Mn / 55	1267.5000	2596.0000	1934.0000	3125.0000	3186.0000
Fe / 57	173050.0000	181000.0000	148050.0000	143600.0000	146500.0000
Co / 59	55.0000	255.7500	43.2150	66.8000	66.8200
Ni / 60	117.8500	3656.0000	83.5500	159.1000	158.7000
Cu / 65	129.2500	249.8500	271.5000	1004.5000	1022.0000
Zn / 66	223.7000	352.4000	233.4500	317.9500	317.4000
As / 75	52.1500	62.0500	27.6550	27.9700	26.0900
Se / 82	-0.6435	0.2178	1.7055	2.8105	4.3110
Sr / 88	121.6500	361.8000	49.7400	52.0000	51.6200
Mo / 98	10.6250	6.9700	6.6950	6.4750	6.1560
Ag / 107	0.1225	0.1993	0.6905	1.0265	0.9832
Cd / 114	0.3311	0.6495	0.2853	0.1842	0.3128
Sn / 118	10.9400	12.5550	23.1900	87.3000	83.3000
Sb / 123	5.0350	12.7200	1.1015	1.3730	1.4040
Ba / 135	243.6500	284.3000	416.3000	577.5000	566.9000
W / 182	2.4385	1.3280	0.6295	0.6490	0.8524
Tl / 203	0.8445	0.8865	0.8325	1.0665	0.8262
Pb / 208	455.0000	2001.0000	857.0000	5210.0000	5180.0000
Th / 232	26.7100	25.5050	34.1350	38.4300	32.9700
U / 238	6.4100	6.2200	6.5550	7.4650	7.1980
Li / 6	567940.4	548527.6	569141.4	544311.7	542840
Sc / 45	847299.3	783493.3	802105.2	780032.4	761960.9
Ge / 72	164931.6	157883.7	161139.1	157690	157058.7
Tb / 159	1222337	1138664	1151815	1124351	1138220
Bi / 209	620041.7	568505.1	591047.6	574270.1	585430.3
Li / 6	110.1	106.3	110.3	105.5	105.2
Sc / 45	113.6	105.1	107.6	104.6	102.2
Ge / 72	104.2	99.8	101.8	99.6	99.2
Tb / 159	103.7	96.6	97.7	95.4	96.5
Bi / 209	100.1	91.8	95.4	92.7	94.5

$$857\ mg/L \times \frac{0.1\ L}{1.32\ g} \times \frac{1}{0.864} = 75.14\ mg/kg$$

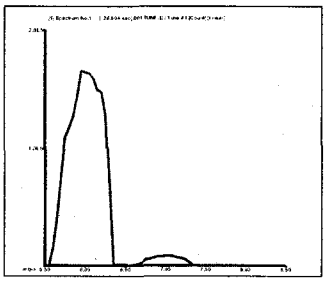
$$\text{result mg/L} \times \frac{\text{final volume}}{\text{initial weight}} \times \frac{1}{\%\ \text{solids}} = \text{result mg/kg}$$

6020 QC Tune Report

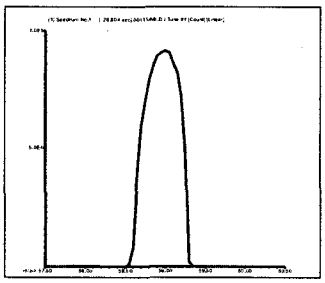
Data File: C:\ICPCHEM\1\DATA\JZF25A.B\001TUNE.D
Date Acquired: Jun 25 2009 05:33 pm
Acq. Method: TN6020.M
Operator: EAM
Sample Name: 6020 Tune
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN6020.M

RSD (%)

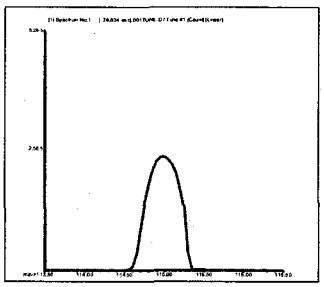
Element	Actual	Required	Flag
7 Li	2.49	5.00	
59 Co	1.16	5.00	
115 In	1.44	5.00	
205 Tl	1.03	5.00	



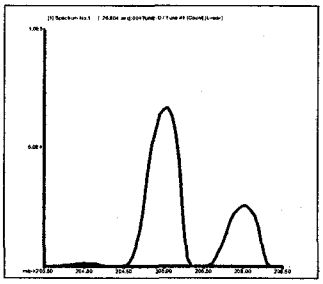
7 Li
Mass Calib.
Actual: 7.00
Required: 6.90 - 7.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.60
Required: 0.90
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



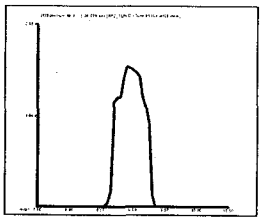
205 Tl
Mass Calib.
Actual: 205.00
Required: 204.90 - 205.10
Flag:
Peak Width
Actual: 0.60
Required: 0.90
Flag:

200.8 QC Tune Report

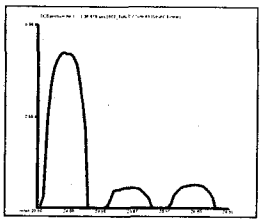
Data File: C:\ICPCHEM\1\DATA\JZF25A.B\002_TUN.D
Date Acquired: Jun 25 2009 05:40 pm
Acq. Method: TN200_8.M
Operator: EAM
Sample Name: 200.8 Tune
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN200_8.M

RSD (%)

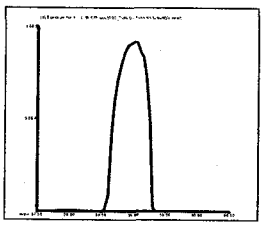
Element	Actual	Required	Flag
9 Be	0.80	5.00	
24 Mg	0.60	5.00	
59 Co	0.66	5.00	
115 In	1.13	5.00	
208 Pb	1.60	5.00	



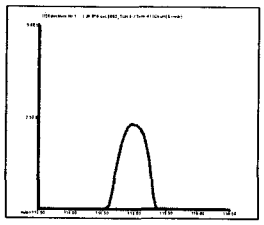
9 Be
Mass Calib.
Actual: 9.00
Required: 8.90 - 9.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



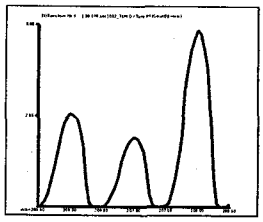
24 Mg
Mass Calib.
Actual: 23.95
Required: 23.90 - 24.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



208 Pb
Mass Calib.
Actual: 208.00
Required: 207.90 - 208.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:

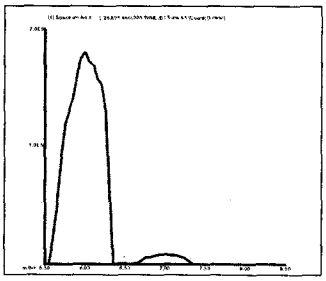
Tune Result: Pass

6020 QC Tune Report

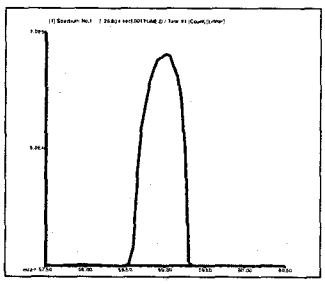
Data File: C:\ICPCHEM\1\DATA\JZF26A.B\001TUNE.D
Date Acquired: Jun 26 2009 05:03 pm
Acq. Method: TN6020.M
Operator: EAM
Sample Name: 6020 Tune
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN6020.M

RSD (%)

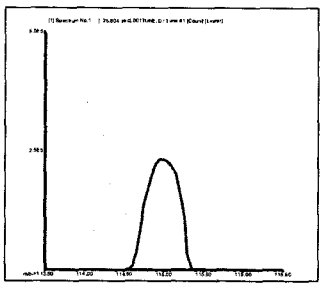
Element	Actual	Required	Flag
7 Li	2.14	5.00	
59 Co	1.26	5.00	
115 In	0.65	5.00	
205 Tl	2.03	5.00	



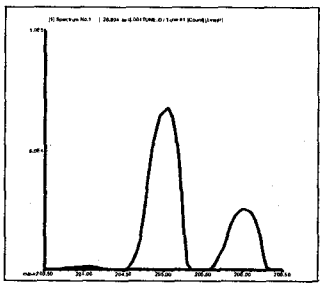
7 Li
Mass Calib.
Actual: 7.00
Required: 6.90 - 7.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.60
Required: 0.90
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



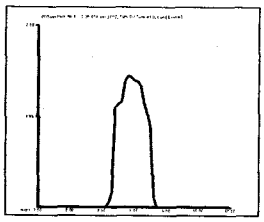
205 Tl
Mass Calib.
Actual: 205.00
Required: 204.90 - 205.10
Flag:
Peak Width
Actual: 0.55
Required: 0.90
Flag:

200.8 QC Tune Report

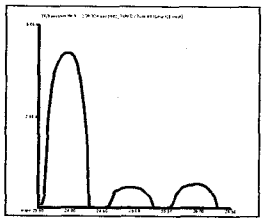
Data File: C:\ICPCHEM\1\DATA\JZF26A.B\002_TUN.D
Date Acquired: Jun 26 2009 05:10 pm
Acq. Method: TN200_8.M
Operator: EAM
Sample Name: 200.8 Tune
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN200_8.M

RSD (%)

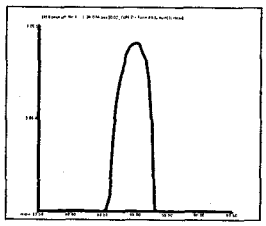
Element	Actual	Required	Flag
9 Be	1.22	5.00	
24 Mg	0.54	5.00	
59 Co	1.09	5.00	
115 In	2.51	5.00	
208 Pb	0.94	5.00	



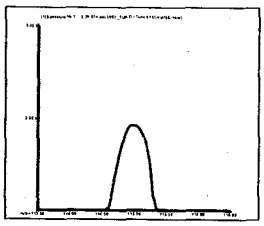
9 Be
Mass Calib.
Actual: 8.95
Required: 8.90 - 9.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



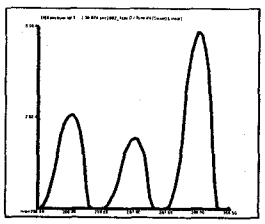
24 Mg
Mass Calib.
Actual: 23.95
Required: 23.90 - 24.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



208 Pb
Mass Calib.
Actual: 208.00
Required: 207.90 - 208.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:

Tune Result: Pass

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: ICV

File: JZF25A Jun 25, 2009 19:30

Analyte	True	Found	%R (1)
ALUMINUM	400.0	419.10	104.8
ANTIMONY	20.0	19.64	98.2
ARSENIC	20.0	19.56	97.8
CALCIUM	4000.0	3908.00	97.7
IRON	4000.0	3967.00	99.2
LEAD	20.0	19.81	99.0
MAGNESIUM	4000.0	4150.00	103.8
MOLYBDENUM	40.0	41.95	104.9
POTASSIUM	4000.0	4045.00	101.1
SODIUM	4000.0	4024.00	100.6
ZINC	20.0	20.00	100.0

SAMPLE: CCV

File: JZF25A Jun 25, 2009 20:22

Analyte	True	Found	%R (1)
ALUMINUM	500.0	567.30	113.5•
ANTIMONY	25.0	25.81	103.2
ARSENIC	25.0	25.33	101.3
CALCIUM	5000.0	5296.00	105.9
IRON	5000.0	5099.00	102.0
LEAD	25.0	25.47	101.9
MAGNESIUM	5000.0	5274.00	105.5
MOLYBDENUM	25.0	28.07	112.3•
POTASSIUM	5000.0	5221.00	104.4
SODIUM	5000.0	5209.00	104.2
ZINC	25.0	25.47	101.9

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: CCV

File: JZF25A Jun 25, 2009 20:57

Analyte	True	Found	%R (1)
ALUMINUM	500.0	518.80	103.8
ANTIMONY	25.0	25.32	101.3
ARSENIC	25.0	24.96	99.8
CALCIUM	5000.0	5137.00	102.7
IRON	5000.0	4990.00	99.8
LEAD	25.0	25.14	100.6
MAGNESIUM	5000.0	5161.00	103.2
MOLYBDENUM	25.0	25.66	102.6
POTASSIUM	5000.0	5162.00	103.2
SODIUM	5000.0	5059.00	101.2
ZINC	25.0	25.32	101.3

SAMPLE: CCV

File: JZF25A Jun 25, 2009 22:39

Analyte	True	Found	%R (1)
ALUMINUM	500.0	509.60	101.9
ANTIMONY	25.0	25.07	100.3
ARSENIC	25.0	25.29	101.2
CALCIUM	5000.0	5103.00	102.1
IRON	5000.0	5134.00	102.7
LEAD	25.0	24.72	98.9
MAGNESIUM	5000.0	5043.00	100.9
MOLYBDENUM	25.0	25.41	101.6
POTASSIUM	5000.0	5066.00	101.3
SODIUM	5000.0	5001.00	100.0
ZINC	25.0	25.68	102.7

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: CCV

File: JZF25A Jun 26, 2009 0:22

Analyte	True	Found	%R (1)
ALUMINUM	500.0	498.10	99.6
ANTIMONY	25.0	23.43	93.7
ARSENIC	25.0	24.52	98.1
CALCIUM	5000.0	4992.00	99.8
IRON	5000.0	5034.00	100.7
LEAD	25.0	24.54	98.2
MAGNESIUM	5000.0	4951.00	99.0
MOLYBDENUM	25.0	24.90	99.6
POTASSIUM	5000.0	4928.00	98.6
SODIUM	5000.0	4775.00	95.5
ZINC	25.0	24.81	99.2

SAMPLE: CCV

File: JZF25A Jun 26, 2009 2:05

Analyte	True	Found	%R (1)
ALUMINUM	500.0	521.10	104.2
ANTIMONY	25.0	24.50	98.0
ARSENIC	25.0	25.09	100.4
CALCIUM	5000.0	5139.00	102.8
IRON	5000.0	5111.00	102.2
LEAD	25.0	25.28	101.1
MAGNESIUM	5000.0	5097.00	101.9
MOLYBDENUM	25.0	25.59	102.4
POTASSIUM	5000.0	5089.00	101.8
SODIUM	5000.0	4951.00	99.0
ZINC	25.0	25.62	102.5

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: CCV

File: JZF25A Jun 26, 2009 3:48

Analyte	True	Found	%R (1)
ALUMINUM	500.0	513.20	102.6
ANTIMONY	25.0	24.02	96.1
ARSENIC	25.0	24.90	99.6
CALCIUM	5000.0	5038.00	100.8
IRON	5000.0	5142.00	102.8
LEAD	25.0	24.85	99.4
MAGNESIUM	5000.0	5047.00	100.9
MOLYBDENUM	25.0	25.22	100.9
POTASSIUM	5000.0	5032.00	100.6
SODIUM	5000.0	4932.00	98.6
ZINC	25.0	25.31	101.2

SAMPLE: CCV

File: JZF25A Jun 26, 2009 4:31

Analyte	True	Found	%R (1)
ALUMINUM	500.0	525.60	105.1
ANTIMONY	25.0	24.88	99.5
ARSENIC	25.0	25.15	100.6
CALCIUM	5000.0	5166.00	103.3
IRON	5000.0	5135.00	102.7
LEAD	25.0	25.15	100.6
MAGNESIUM	5000.0	5160.00	103.2
MOLYBDENUM	25.0	25.39	101.6
POTASSIUM	5000.0	5106.00	102.1
SODIUM	5000.0	5056.00	101.1
ZINC	25.0	25.52	102.1

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: CCV

File: JZF25A Jun 26, 2009 6:14

Analyte	True	Found	%R (1)
ALUMINUM	500.0	523.50	104.7
ANTIMONY	25.0	24.48	97.9
ARSENIC	25.0	24.97	99.9
CALCIUM	5000.0	5120.00	102.4
IRON	5000.0	4982.00	99.6
LEAD	25.0	25.04	100.2
MAGNESIUM	5000.0	5164.00	103.3
MOLYBDENUM	25.0	25.07	100.3
POTASSIUM	5000.0	5037.00	100.7
SODIUM	5000.0	5036.00	100.7
ZINC	25.0	25.78	103.1

SAMPLE: CCV

File: JZF25A Jun 26, 2009 7:57

Analyte	True	Found	%R (1)
ALUMINUM	500.0	527.20	105.4
ANTIMONY	25.0	24.59	98.4
ARSENIC	25.0	24.21	96.8
CALCIUM	5000.0	5011.00	100.2
IRON	5000.0	5083.00	101.7
LEAD	25.0	24.72	98.9
MAGNESIUM	5000.0	5087.00	101.7
MOLYBDENUM	25.0	24.69	98.8
POTASSIUM	5000.0	4966.00	99.3
SODIUM	5000.0	4926.00	98.5
ZINC	25.0	25.13	100.5

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: CCV

File: JZF25A Jun 26, 2009 9:41

Analyte	True	Found	%R (1)
ALUMINUM	500.0	550.50	110.1
ANTIMONY	25.0	25.80	103.2
ARSENIC	25.0	25.47	101.9
CALCIUM	5000.0	5287.00	105.7
IRON	5000.0	5114.00	102.3
LEAD	25.0	25.74	103.0
MAGNESIUM	5000.0	5362.00	107.2
MOLYBDENUM	25.0	25.33	101.3
POTASSIUM	5000.0	5219.00	104.4
SODIUM	5000.0	5208.00	104.2
ZINC	25.0	26.14	104.6

SAMPLE: CCV

File: JZF25A Jun 26, 2009 10:32

Analyte	True	Found	%R (1)
ALUMINUM	500.0	570.00	114.0•
ANTIMONY	25.0	25.05	100.2
ARSENIC	25.0	24.97	99.9
CALCIUM	5000.0	5098.00	102.0
IRON	5000.0	5194.00	103.9
LEAD	25.0	25.39	101.6
MAGNESIUM	5000.0	5195.00	103.9
MOLYBDENUM	25.0	24.79	99.2
POTASSIUM	5000.0	5037.00	100.7
SODIUM	5000.0	5191.00	103.8
ZINC	25.0	25.64	102.6

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: ICV

File: JZF26A Jun 26, 2009 19:00

Analyte	True	Found	%R (1)
ALUMINUM	400.0	428.00	107.0
CALCIUM	4000.0	3884.00	97.1
COPPER	20.0	20.35	101.8
IRON	4000.0	3964.00	99.1
MAGNESIUM	4000.0	4193.00	104.8
MOLYBDENUM	40.0	41.78	104.5
POTASSIUM	4000.0	4063.00	101.6
SODIUM	4000.0	4050.00	101.3
TIN	20.0	21.42	107.1

SAMPLE: CCV

File: JZF26A Jun 26, 2009 19:52

Analyte	True	Found	%R (1)
ALUMINUM	500.0	558.00	111.6•
CALCIUM	5000.0	5120.00	102.4
COPPER	25.0	25.14	100.6
IRON	5000.0	4925.00	98.5
MAGNESIUM	5000.0	5141.00	102.8
MOLYBDENUM	25.0	28.22	112.9•
POTASSIUM	5000.0	5087.00	101.7
SODIUM	5000.0	5085.00	101.7
TIN	25.0	25.02	100.1

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: CCV

File: JZF26A Jun 26, 2009 20:27

Analyte	True	Found	%R (1)
ALUMINUM	500.0	498.60	99.7
CALCIUM	5000.0	4877.00	97.5
COPPER	25.0	24.67	98.7
IRON	5000.0	4860.00	97.2
MAGNESIUM	5000.0	4935.00	98.7
MOLYBDENUM	25.0	25.12	100.5
POTASSIUM	5000.0	4908.00	98.2
SODIUM	5000.0	4838.00	96.8
TIN	25.0	23.74	95.0

SAMPLE: CCV

File: JZF26A Jun 26, 2009 22:09

Analyte	True	Found	%R (1)
ALUMINUM	500.0	525.40	105.1
CALCIUM	5000.0	5148.00	103.0
COPPER	25.0	25.52	102.1
IRON	5000.0	5029.00	100.6
MAGNESIUM	5000.0	5141.00	102.8
MOLYBDENUM	25.0	25.59	102.4
POTASSIUM	5000.0	5105.00	102.1
SODIUM	5000.0	5074.00	101.5
TIN	25.0	25.30	101.2

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: CCV

File: JZF26A Jun 26, 2009 23:52

Analyte	True	Found	%R (1)
ALUMINUM	500.0	519.50	103.9
CALCIUM	5000.0	4946.00	98.9
COPPER	25.0	24.68	98.7
IRON	5000.0	4826.00	96.5
MAGNESIUM	5000.0	5044.00	100.9
MOLYBDENUM	25.0	24.89	99.6
POTASSIUM	5000.0	4961.00	99.2
SODIUM	5000.0	4964.00	99.3
TIN	25.0	24.51	98.0

SAMPLE: CCV

File: JZF26A Jun 27, 2009 1:27

Analyte	True	Found	%R (1)
ALUMINUM	500.0	529.40	105.9
CALCIUM	5000.0	5106.00	102.1
COPPER	25.0	24.93	99.7
IRON	5000.0	4960.00	99.2
MAGNESIUM	5000.0	5083.00	101.7
MOLYBDENUM	25.0	24.85	99.4
POTASSIUM	5000.0	5020.00	100.4
SODIUM	5000.0	5007.00	100.1
TIN	25.0	24.80	99.2

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: CCV

File: JZF26A Jun 27, 2009 3:02

Analyte	True	Found	%R (1)
ALUMINUM	500.0	524.00	104.8
CALCIUM	5000.0	5013.00	100.3
COPPER	25.0	24.94	99.8
IRON	5000.0	4907.00	98.1
MAGNESIUM	5000.0	5077.00	101.5
MOLYBDENUM	25.0	24.69	98.8
POTASSIUM	5000.0	4991.00	99.8
SODIUM	5000.0	4974.00	99.5
TIN	25.0	24.66	98.6

SAMPLE: CCV

File: JZF26A Jun 27, 2009 4:11

Analyte	True	Found	%R (1)
ALUMINUM	500.0	526.70	105.3
CALCIUM	5000.0	5043.00	100.9
COPPER	25.0	24.91	99.6
IRON	5000.0	4854.00	97.1
MAGNESIUM	5000.0	5123.00	102.5
MOLYBDENUM	25.0	24.81	99.2
POTASSIUM	5000.0	4996.00	99.9
SODIUM	5000.0	4997.00	99.9
TIN	25.0	24.47	97.9

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: PQL

File: JZF25A Jun 25, 2009 19:47

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	53.35	88.9
ANTIMONY	0.2	0.21	105.0
ARSENIC	1.0	0.92	92.0
CALCIUM	20.0	-48.44	-242.2 •
IRON	20.0	17.53	87.7
LEAD	0.2	0.17	85.0
MAGNESIUM	20.0	19.05	95.3
MOLYBDENUM	1.0	1.01	101.0
POTASSIUM	200.0	223.60	111.8
SODIUM	200.0	205.00	102.5
ZINC	2.0	1.47	73.5

SAMPLE: PQL

File: JZF25A Jun 26, 2009 04:22

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	53.89	89.8
ANTIMONY	0.2	0.20	100.0
ARSENIC	1.0	0.82	82.0
CALCIUM	20.0	-55.61	-278.1 •
IRON	20.0	17.68	88.4
LEAD	0.2	0.16	80.0
MAGNESIUM	20.0	17.62	88.1
MOLYBDENUM	1.0	1.00	100.0
POTASSIUM	200.0	211.60	105.8
SODIUM	200.0	205.80	102.9
ZINC	2.0	1.41	70.5

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: PQL

File: JZF26A Jun 26, 2009 19:18

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	61.15	101.9
CALCIUM	20.0	16.54	82.7
COPPER	0.2	0.23	115.0
IRON	20.0	19.20	96.0
MAGNESIUM	20.0	20.72	103.6
MOLYBDENUM	1.0	1.10	110.0
POTASSIUM	200.0	219.80	109.9
SODIUM	200.0	212.70	106.3
TIN	0.2	0.22	110.0

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services **Sample ID:** PBSZF17ICS0

Matrix: SOIL **SDG Name:** CTO423-3

QC Batch ID: ZF17ICS0

Concentration Units : mg/Kgdrywt

Analyte	RESULT	C
ANTIMONY	0.020	U
ARSENIC	0.150	U
COPPER	0.159	J
LEAD	0.030	U
TIN	0.617	
ZINC	0.350	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: ICB

File: JZF25A Jun 25, 2009 19:39

Analyte	Result	C
ALUMINUM	-10.54	J
ANTIMONY	0.03	U
ARSENIC	-0.11	J
CALCIUM	-72.08	
IRON	3.10	U
LEAD	-0.02	J
MAGNESIUM	2.00	U
MOLYBDENUM	0.16	J
POTASSIUM	11.06	J
SODIUM	-9.20	J
ZINC	-0.82	J

SAMPLE: CCB

File: JZF25A Jun 25, 2009 20:31

Analyte	Result	C
ALUMINUM	15.99	J
ANTIMONY	0.04	J
ARSENIC	-0.08	J
CALCIUM	-43.84	
IRON	25.01	
LEAD	0.02	U
MAGNESIUM	26.59	
MOLYBDENUM	1.31	
POTASSIUM	81.42	J
SODIUM	27.97	J
ZINC	-0.80	J

SAMPLE: CCB

File: JZF25A Jun 25, 2009 21:05

Analyte	Result	C
ALUMINUM	-3.81	J
ANTIMONY	0.03	U
ARSENIC	-0.23	J
CALCIUM	-64.03	
IRON	6.42	J
LEAD	0.02	U
MAGNESIUM	8.64	J
MOLYBDENUM	0.36	J
POTASSIUM	42.34	J
SODIUM	6.50	U
ZINC	-0.79	J

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: CCB

File: JZF25A Jun 25, 2009 22:48

Analyte	Result	C
ALUMINUM	-8.65	J
ANTIMONY	0.03	U
ARSENIC	0.28	J
CALCIUM	-68.26	
IRON	3.77	J
LEAD	0.02	U
MAGNESIUM	3.62	J
MOLYBDENUM	0.17	J
POTASSIUM	8.80	U
SODIUM	31.82	J
ZINC	-0.63	J

SAMPLE: CCB

File: JZF25A Jun 26, 2009 0:31

Analyte	Result	C
ALUMINUM	-9.25	J
ANTIMONY	0.03	U
ARSENIC	0.08	U
CALCIUM	-71.80	
IRON	3.10	U
LEAD	0.02	U
MAGNESIUM	3.18	J
MOLYBDENUM	0.15	J
POTASSIUM	10.18	J
SODIUM	8.59	J
ZINC	-0.76	J

SAMPLE: CCB

File: JZF25A Jun 26, 2009 2:14

Analyte	Result	C
ALUMINUM	-9.58	J
ANTIMONY	0.03	U
ARSENIC	0.17	J
CALCIUM	-71.01	
IRON	3.10	U
LEAD	0.02	U
MAGNESIUM	3.00	J
MOLYBDENUM	0.13	J
POTASSIUM	8.80	U
SODIUM	7.08	J
ZINC	-0.75	J

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: CCB

File: JZF25A Jun 26, 2009 3:57

Analyte	Result	C
ALUMINUM	-10.10	J
ANTIMONY	0.03	J
ARSENIC	0.08	U
CALCIUM	-72.64	
IRON	3.10	U
LEAD	0.02	U
MAGNESIUM	3.07	J
MOLYBDENUM	0.11	J
POTASSIUM	11.57	J
SODIUM	6.50	U
ZINC	-0.78	J

SAMPLE: CCB

File: JZF25A Jun 26, 2009 4:40

Analyte	Result	C
ALUMINUM	-9.95	J
ANTIMONY	0.03	U
ARSENIC	-0.11	J
CALCIUM	-72.85	
IRON	3.10	U
LEAD	0.02	U
MAGNESIUM	2.88	J
MOLYBDENUM	0.12	J
POTASSIUM	8.80	U
SODIUM	6.50	U
ZINC	-0.79	J

SAMPLE: CCB

File: JZF25A Jun 26, 2009 6:23

Analyte	Result	C
ALUMINUM	-4.68	J
ANTIMONY	0.03	U
ARSENIC	-0.13	J
CALCIUM	-71.30	
IRON	8.72	J
LEAD	0.07	J
MAGNESIUM	3.46	J
MOLYBDENUM	0.15	J
POTASSIUM	13.37	J
SODIUM	6.50	U
ZINC	-0.73	J

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: CCB
File: JZF25A Jun 26, 2009 8:06

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.03	U
ARSENIC	-0.12	J
CALCIUM	-66.76	
IRON	8.03	J
LEAD	0.07	J
MAGNESIUM	2.67	J
MOLYBDENUM	0.09	J
POTASSIUM	8.80	U
SODIUM	-6.89	J
ZINC	-0.73	J

SAMPLE: CCB
File: JZF25A Jun 26, 2009 9:49

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.03	U
ARSENIC	-0.21	J
CALCIUM	-71.39	
IRON	11.84	J
LEAD	0.20	J
MAGNESIUM	3.45	J
MOLYBDENUM	0.09	J
POTASSIUM	36.72	J
SODIUM	6.50	U
ZINC	-0.78	J

SAMPLE: CCB
File: JZF25A Jun 26, 2009 10:41

Analyte	Result	C
ALUMINUM	11.71	J
ANTIMONY	0.03	U
ARSENIC	0.12	J
CALCIUM	-69.27	
IRON	29.03	
LEAD	0.27	
MAGNESIUM	5.51	J
MOLYBDENUM	0.11	J
POTASSIUM	42.83	J
SODIUM	6.50	U
ZINC	-0.75	J

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: ICB

File: JZF26A Jun 26, 2009 19:09

Analyte	Result	C
ALUMINUM	2.20	U
CALCIUM	3.90	U
COPPER	0.04	U
IRON	3.10	U
MAGNESIUM	4.09	J
MOLYBDENUM	0.21	J
POTASSIUM	16.47	J
SODIUM	6.50	U
TIN	0.04	U

SAMPLE: CCB

File: JZF26A Jun 26, 2009 20:01

Analyte	Result	C
ALUMINUM	25.62	J
CALCIUM	23.03	
COPPER	0.04	U
IRON	29.23	
MAGNESIUM	28.97	
MOLYBDENUM	1.52	
POTASSIUM	102.60	J
SODIUM	41.78	J
TIN	0.04	U

SAMPLE: CCB

File: JZF26A Jun 26, 2009 20:35

Analyte	Result	C
ALUMINUM	6.43	J
CALCIUM	3.90	U
COPPER	0.04	U
IRON	9.42	J
MAGNESIUM	10.58	J
MOLYBDENUM	0.39	J
POTASSIUM	53.99	J
SODIUM	16.33	J
TIN	0.04	U

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: CCB

File: JZF26A Jun 26, 2009 22:18

Analyte	Result	C
ALUMINUM	2.20	U
CALCIUM	3.90	U
COPPER	0.04	U
IRON	3.50	J
MAGNESIUM	5.16	J
MOLYBDENUM	0.18	J
POTASSIUM	22.53	J
SODIUM	7.75	J
TIN	0.04	U

SAMPLE: CCB

File: JZF26A Jun 27, 2009 0:01

Analyte	Result	C
ALUMINUM	10.49	J
CALCIUM	3.90	U
COPPER	0.04	U
IRON	17.14	J
MAGNESIUM	8.95	J
MOLYBDENUM	0.24	J
POTASSIUM	39.79	J
SODIUM	9.90	J
TIN	0.06	J

SAMPLE: CCB

File: JZF26A Jun 27, 2009 1:35

Analyte	Result	C
ALUMINUM	11.30	J
CALCIUM	3.90	U
COPPER	0.04	U
IRON	16.50	J
MAGNESIUM	6.90	J
MOLYBDENUM	0.13	J
POTASSIUM	25.33	J
SODIUM	6.50	U
TIN	0.04	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: CCB

File: JZF26A Jun 27, 2009 3:10

Analyte	Result	C
ALUMINUM	25.66	J
CALCIUM	3.90	U
COPPER	0.08	J
IRON	35.41	
MAGNESIUM	13.67	J
MOLYBDENUM	0.14	J
POTASSIUM	43.34	J
SODIUM	6.73	J
TIN	0.04	U

SAMPLE: CCB

File: JZF26A Jun 27, 2009 4:19

Analyte	Result	C
ALUMINUM	6.31	J
CALCIUM	3.90	U
COPPER	0.04	U
IRON	9.05	J
MAGNESIUM	5.47	J
MOLYBDENUM	0.11	J
POTASSIUM	35.83	J
SODIUM	6.50	U
TIN	0.04	U

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: ICSA

File: JZF25A Jun 25, 2009 19:56

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	100200	100.2
ANTIMONY	0	0	
ARSENIC	0	0	
CALCIUM	100000	99750	99.8
IRON	100000	93720	93.7
LEAD	0	0	
MAGNESIUM	100000	97050	97.0
MOLYBDENUM	2000	2021	101.1
POTASSIUM	100000	100000	100.0
SODIUM	100000	98680	98.7
ZINC	0	0	

SAMPLE: ICSAB

File: JZF25A Jun 25, 2009 20:05

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	102100	102.1
ANTIMONY	20	21	105.0
ARSENIC	20	19	95.0
CALCIUM	100000	102200	102.2
IRON	100000	94160	94.2
LEAD	20	21	105.0
MAGNESIUM	100000	99450	99.5
MOLYBDENUM	2000	2039	102.0
POTASSIUM	100000	101900	101.9
SODIUM	100000	100700	100.7
ZINC	21	19	90.5

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-3

Concentration Units: ug/L

SAMPLE: ICSA

File: JZF26A Jun 26, 2009 19:26

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	95660	95.7
CALCIUM	100000	94810	94.8
COPPER	0	1	
IRON	100000	91200	91.2
MAGNESIUM	100000	93490	93.5
MOLYBDENUM	2000	1975	98.8
POTASSIUM	100000	95910	95.9
SODIUM	100000	95110	95.1
TIN	0	0	

SAMPLE: ICSAB

File: JZF26A Jun 26, 2009 19:35

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	97650	97.7
CALCIUM	100000	98420	98.4
COPPER	20	19	95.0
IRON	100000	92400	92.4
MAGNESIUM	100000	96410	96.4
MOLYBDENUM	2000	2028	101.4
POTASSIUM	100000	98870	98.9
SODIUM	100000	98320	98.3
TIN	20	22	110.0

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID:** LCSSZF17ICS0

Matrix: SOIL **SDG Name:** CTO423-3

QC Batch ID: ZF17ICS0

Concentration Units : mg/Kgdrywt

Analyte	TRUE	FOUND	% R	LIMITS (%)	
ANTIMONY	126.0	104.88	83.2	50	150
ARSENIC	225.0	228.09	101.4	80	120
COPPER	66.7	75.20	112.7	81	119
LEAD	223.0	230.45	103.3	82	118
TIN	164.0	188.46	114.9	74	126
ZINC	349.0	379.75	108.8	80	120

5D

SPIKE DUPLICATES

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0710001

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 87.1 **Lab Sample ID:** SC2890-001

Concentration Units : mg/Kgdrywt

Analyte	Control Limits	Spike Result	C	Spike Dup. Result	C	RPD	Q	M
ANTIMONY, TOTAL		24.8961		25.3739		1.9		MS
ARSENIC, TOTAL		48.7789		48.3052		1.0		MS
COPPER, TOTAL		33.3636		33.1019		0.8		MS
LEAD, TOTAL		235.4168		245.8430		4.3		MS
TIN, TOTAL		46.8145		49.4318		5.4		MS
ZINC, TOTAL		84.8100		80.2912		5.5		MS

Comments:

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0710001S

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 87.1 **Lab Sample ID:** SC2890-001P

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	25.3739		0.3916		52.64	47.5	N	75	125	MS
ARSENIC, TOTAL	48.3052		3.5124		52.64	85.1		75	125	MS
COPPER, TOTAL	33.1019		9.4292		26.32	89.9		75	125	MS
LEAD, TOTAL	245.8430		282.2148		52.64	-69.1		75	125	MS
TIN, TOTAL	49.4318		1.6856		52.64	90.7		75	125	MS
ZINC, TOTAL	80.2912		33.1430		52.64	89.6		75	125	MS

Comments:

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Matrix: SOIL

Percent Solids: 87.1

Client Field ID: X15SS0710001S

SDG Name: CTO423-3

Lab Sample ID: SC2890-001S

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	24.8961		0.3916		51.69	47.4	N	75	125	MS
ARSENIC, TOTAL	48.7789		3.5124		51.69	87.6		75	125	MS
COPPER, TOTAL	33.3636		9.4292		25.85	92.6		75	125	MS
LEAD, TOTAL	235.4168		282.2148		51.69	-90.5		75	125	MS
TIN, TOTAL	46.8145		1.6856		51.69	87.3		75	125	MS
ZINC, TOTAL	84.8100		33.1430		51.69	100.0		75	125	MS

Comments:

5B

POST DIGEST SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0710001S

Matrix: SOIL **SDG Name:** CTO423-3

Percent Solids: 87.1 **Lab Sample ID:** SC2890-001A

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	2.6560		0.7098		2	97.3		75	125	MS

Comments:

ICP SERIAL DILUTION

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SS0710001L

Matrix: SOIL **SDG Name:** CTO423-3

Lab Sample ID: SC2890-001L

Concentration Units: ug/L

Analyte	Sample Result	C	Dilution Result	C	% Difference	Q	M
ANTIMONY, TOTAL	0.71		0.74	J	4.2		MS
ARSENIC, TOTAL	6.37		6.51		2.2		MS
COPPER, TOTAL	17.09		17.90		4.7		MS
LEAD, TOTAL	511.50		498.35		2.6		MS
TIN, TOTAL	3.06		3.33	J	8.8		MS
ZINC, TOTAL	60.07		59.50		0.9		MS

File:	009CALB.D#	010CALI.D#	011CALI.D#	012CALI.D#	013CALI.D#
Sample:	Cal Blank	Cal Std 1	Cal Std 2	Cal Std 3	Cal Std 4
Date/Time:	6/25/2009 18:39	6/25/2009 18:48	6/25/2009 18:56	6/25/2009 19:05	6/25/2009 19:13
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0000	0.5000	4.8450	25.2500	51.0800
B / 11	0.0000	0.5000	5.2180	25.4300	52.5400
Na / 23	0.0000	100.0000	1167.0000	4979.0000	10030.0000
Mg / 25	0.0000	100.0000	997.9000	5141.0000	9907.0000
Al / 27	0.0000	10.0000	937.7000	530.7000	1005.0000
Si / 29	0.0000	10.0000	95.0600	491.1000	992.7000
K / 39	0.0000	100.0000	910.0000	4872.0000	9988.0000
Ca / 44	0.0000	100.0000	3159.0000	5388.0000	9999.0000
V / 51	0.0000	0.5000	3.9700	24.5100	51.5700
Cr / 52	0.0000	0.5000	3.8180	23.9900	50.9500
Mn / 55	0.0000	0.5000	9.0400	25.2300	50.9400
Fe / 57	0.0000	100.0000	956.1000	4933.0000	10150.0000
Co / 59	0.0000	0.5000	4.8280	23.8700	50.2000
Ni / 60	0.0000	0.5000	9.7970	24.9100	50.0300
Cu / 65	0.0000	0.5000	5.7690	24.1200	50.2500
Zn / 66	0.0000	0.5000	-19.4500	27.6900	50.5000
As / 75	0.0000	0.5000	4.2040	23.2300	50.6400
Se / 82	0.0000	0.5000	4.0360	23.7700	49.8700
Sr / 88	0.0000	0.5000	5.5950	24.9400	50.1500
Mo / 98	0.0000	0.5000	4.7820	24.3800	51.4600
Ag / 107	0.0000	0.5000	4.8360	24.0200	50.0400
Cd / 114	0.0000	0.5000	4.5990	24.3300	49.6800
Sn / 118	0.0000	0.5000	12.1400	25.7400	50.9300
Sb / 123	0.0000	0.5000	4.7600	24.1400	50.4500
Ba / 135	0.0000	0.5000	5.7160	24.1700	50.9400
W / 182	0.0000	0.5000	5.1850	24.4600	51.1800
Tl / 203	0.0000	0.5000	5.0470	25.7800	51.8700
Pb / 208	0.0000	0.5000	5.0460	24.8100	51.3700
Th / 232	0.0000	0.5000	6.4650	32.9900	55.0700
U / 238	0.0000	0.5000	4.9860	24.6100	51.9400
Li / 6	515800.3	508478.6	506089	499693.9	485712.2
Sc / 45	745795.4	724175.4	726290.4	748291	723864.6
Ge / 72	158259	153406.4	154555.8	160076	153078.7
Tb / 159	1178978	1132355	1128212	1180758	1123957
Bi / 209	619508.4	602760.6	600520.4	615828.6	576571.4
Li / 6	100.0	98.6	98.1	96.9	94.2
Sc / 45	100.0	97.1	97.4	100.3	97.1
Ge / 72	100.0	96.9	97.7	101.1	96.7
Tb / 159	100.0	96.0	95.7	100.2	95.3
Bi / 209	100.0	97.3	96.9	99.4	93.1

File:	014SMPL.D#	015_ICV.D#	016_ICB.D#	017_PQL.D#	018ICSA.D#
Sample:	Blank	ICV	ICB	PQL	ICSA
Date/Time:	6/25/2009 19:22	6/25/2009 19:30	6/25/2009 19:39	6/25/2009 19:47	6/25/2009 19:56
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0247	20.1200	0.0144	0.1967	0.0040
B / 11	0.4924	21.4300	0.2359	8.0540	0.3132
Na / 23	-2.3920	4024.0000	-9.1970	205.0000	98680.0000
Mg / 25	5.1310	4150.0000	1.4320	19.0500	97050.0000
Al / 27	-7.8340	419.1000	-10.5400	53.3500	100200.0000
Si / 29	2.8060	411.5000	-2.0140	42.0300	62.4200
K / 39	32.5300	4045.0000	11.0600	223.6000	100000.0000
Ca / 44	-66.9500	3908.0000	-72.0800	-48.4400	99750.0000
V / 51	0.0437	19.9400	-0.1110	0.8205	0.0477
Cr / 52	-0.0535	20.0500	-0.1571	0.4700	1.6870
Mn / 55	-0.2420	20.0300	-0.3267	-0.1053	1.5640
Fe / 57	7.1470	3967.0000	0.4129	17.5300	93720.0000
Co / 59	0.0150	20.4200	-0.0022	0.1799	0.0826
Ni / 60	-0.1982	20.4600	-0.2506	-0.0637	0.8813
Cu / 65	-0.0528	20.5200	-0.1167	0.0642	0.7520
Zn / 66	-0.5426	20.0000	-0.8200	1.4680	0.0740
As / 75	-0.0571	19.5600	-0.1055	0.9194	-0.2001
Se / 82	0.0472	20.5500	0.1529	0.9541	-1.2620
Sr / 88	-0.0233	21.0500	-0.0445	0.1559	2.6590
Mo / 98	0.1769	41.9500	0.1564	1.0140	2021.0000
Ag / 107	0.0382	20.3300	0.0140	0.2537	0.0441
Cd / 114	0.0307	20.3800	0.0154	0.1988	-0.0176
Sn / 118	0.1215	20.9900	-0.2985	-0.0932	-0.2875
Sb / 123	0.0373	19.6400	0.0296	0.2140	0.1546
Ba / 135	-0.0468	20.1800	-0.0671	0.1125	1.3810
W / 182	0.7543	25.3200	0.4457	1.5000	0.3560
Tl / 203	0.2898	20.5200	0.0674	0.3477	-0.0020
Pb / 208	-0.0006	19.8100	-0.0226	0.1692	0.0732
Th / 232	0.0445	21.2300	0.0243	0.1089	0.0417
U / 238	0.0296	20.5500	0.0129	0.2017	0.0019
Li / 6	487957.9	499157.4	501315	505250	421716.6
Sc / 45	701629.6	735907.1	752695.7	725609.1	725379.4
Ge / 72	150768.9	156030.1	157036.1	156844.8	158031.1
Tb / 159	1102133	1145383	1176978	1140408	1112030
Bi / 209	594365.3	602713.2	624650	613527.1	525781.2
Li / 6	94.6	96.8	97.2	98.0	81.8
Sc / 45	94.1	98.7	100.9	97.3	97.3
Ge / 72	95.3	98.6	99.2	99.1	99.9
Tb / 159	93.5	97.2	99.8	96.7	94.3
Bi / 209	95.9	97.3	100.8	99.0	84.9

File:	019ICSB.D#	020_BLK.D#	021_CCV.D#	022_CCB.D#	023_BLK.D#
Sample:	ICSAB	Blank	CCV	CCB	BLANK
Date/Time:	6/25/2009 20:05	6/25/2009 20:14	6/25/2009 20:22	6/25/2009 20:31	6/25/2009 20:39
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	23.2500	0.0061	11.1700	0.0060	-0.0009
B / 11	24.4800	0.3500	27.2900	0.2921	0.3469
Na / 23	100700.0000	109.6000	5209.0000	27.9700	14.5800
Mg / 25	99450.0000	82.0600	5274.0000	26.5900	15.6200
Al / 27	102100.0000	79.7100	567.3000	15.9900	7.5550
Si / 29	547.2000	1.4030	507.9000	-1.0260	0.2700
K / 39	101900.0000	158.8000	5221.0000	81.4200	60.8300
Ca / 44	102200.0000	15.1600	5296.0000	-43.8400	-53.7100
V / 51	20.1400	-0.0058	25.4500	-0.0615	0.0581
Cr / 52	21.2400	0.1733	25.3700	-0.0988	-0.0260
Mn / 55	21.2300	-0.2754	25.4200	-0.3051	-0.2653
Fe / 57	94160.0000	88.0500	5099.0000	25.0100	12.3500
Co / 59	19.4000	-0.0063	10.4500	-0.0113	-0.0157
Ni / 60	19.4900	-0.2325	25.9700	-0.2537	-0.2375
Cu / 65	19.6100	-0.0681	25.5500	-0.0724	-0.0416
Zn / 66	19.0800	-0.6103	25.4700	-0.8049	-0.5764
As / 75	19.3800	0.2751	25.3300	-0.0833	0.0558
Se / 82	17.8600	0.3618	25.8100	0.0836	0.0648
Sr / 88	23.7000	-0.0453	25.4900	-0.0461	-0.0516
Mo / 98	2039.0000	6.5640	28.0700	1.3080	0.7153
Ag / 107	18.1000	0.0103	10.4600	0.0110	0.0018
Cd / 114	18.2300	0.0084	10.4300	0.0042	0.0030
Sn / 118	21.9200	0.0808	25.1600	-0.2984	0.0881
Sb / 123	21.0600	0.0278	25.8100	0.0394	0.0224
Ba / 135	22.4500	-0.0522	25.7400	-0.0810	-0.0548
W / 182	27.2000	0.1525	25.6900	0.3692	0.2131
Tl / 203	20.9900	0.1246	9.7290	0.0904	0.0124
Pb / 208	21.0600	-0.0228	25.4700	-0.0138	-0.0190
Th / 232	22.4000	0.0115	9.7530	0.0082	0.0046
U / 238	21.7300	0.0078	10.2500	0.0080	0.0004
Li / 6	403381.3	420690.1	424278.5	442138.4	451835.5
Sc / 45	725724.6	694477.8	688706.7	699917.9	696092.4
Ge / 72	159948.4	149508.3	147795.5	152060.4	151611.7
Tb / 159	1102772	1096085	1100733	1119902	1118219
Bi / 209	518419.5	592292.2	586291.7	616561.3	612549.7
Li / 6	78.2	81.6	82.3	85.7	87.6
Sc / 45	97.3	93.1	92.3	93.8	93.3
Ge / 72	101.1	94.5	93.4	96.1	95.8
Tb / 159	93.5	93.0	93.4	95.0	94.8
Bi / 209	83.7	95.6	94.6	99.5	98.9

File:	024_BLK.D#	025_CCV.D#	026_CCB.D#	027SMPL.D#	028SMPL.D#
Sample:	BLANK	CCV	CCB	PBWZF23ICW0	PBWZF22ICW1
Date/Time:	6/25/2009 20:48	6/25/2009 20:57	6/25/2009 21:05	6/25/2009 21:14	6/25/2009 21:22
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	5	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	-0.0069	10.4600	0.0002	-0.0393	-0.0081
B / 11	0.2056	26.1800	0.2462	1.3920	0.6594
Na / 23	4.6830	5059.0000	3.5220	-6.0300	31.4500
Mg / 25	7.7510	5161.0000	8.6440	42.1750	21.1200
Al / 27	0.9687	518.8000	-3.8100	-20.0500	-0.5454
Si / 29	-0.6373	514.3000	-1.5440	45.0100	40.6500
K / 39	43.6800	5162.0000	42.3400	160.3500	28.4800
Ca / 44	-63.6800	5137.0000	-64.0300	-335.2000	-40.9200
V / 51	-0.0288	25.4000	0.0080	0.2337	-0.0929
Cr / 52	0.0011	25.2200	-0.1126	0.6815	-0.1110
Mn / 55	-0.2727	25.2700	-0.3060	-1.4340	-0.1749
Fe / 57	6.3150	4990.0000	6.4180	16.8650	2.5880
Co / 59	-0.0220	10.3500	-0.0138	-0.1024	-0.0254
Ni / 60	-0.2454	25.4200	-0.2427	-1.2705	-0.1940
Cu / 65	-0.0675	25.3600	-0.0973	-0.3655	0.7154
Zn / 66	-0.6370	25.3200	-0.7912	-3.5925	0.4099
As / 75	0.0977	24.9600	-0.2262	0.2150	-0.1483
Se / 82	-0.0357	25.3500	0.2102	-0.4880	-0.0603
Sr / 88	-0.0554	25.3400	-0.0376	-0.2609	0.0254
Mo / 98	0.4615	25.6600	0.3632	1.2385	0.1899
Ag / 107	0.0004	10.3100	0.0063	-0.0053	-0.0061
Cd / 114	-0.0004	10.3300	0.0029	-0.0061	-0.0014
Sn / 118	0.0460	24.9600	-0.2938	-1.3995	-0.2450
Sb / 123	0.0102	25.3200	0.0288	0.1057	0.0069
Ba / 135	-0.0627	25.2500	-0.0684	-0.3288	0.1048
W / 182	0.1230	25.4400	0.3387	1.0110	0.0992
Tl / 203	-0.0058	9.6790	0.0625	-0.0280	-0.0284
Pb / 208	-0.0297	25.1400	-0.0124	-0.0398	0.0115
Th / 232	-0.0003	9.5720	0.0091	0.0387	-0.0016
U / 238	-0.0045	10.0900	0.0058	-0.0187	-0.0023
Li / 6	470476.7	464429.2	478133.1	495916.4	503828.8
Sc / 45	728834.4	716014.3	731068.2	741003.7	778914.1
Ge / 72	155752.1	154127.7	156321.5	155706.3	164659.2
Tb / 159	1190788	1145045	1170467	1184097	1240521
Bi / 209	633407.1	610921.1	633795.2	631126.1	666760.8
Li / 6	91.2	90.0	92.7	96.1	97.7
Sc / 45	97.7	96.0	98.0	99.4	104.4
Ge / 72	98.4	97.4	98.8	98.4	104.0
Tb / 159	101.0	97.1	99.3	100.4	105.2
Bi / 209	102.2	98.6	102.3	101.9	107.6

File:	029SMPL.D#	030SMPL.D#	031SMPL.D#	032SMPL.D#	033SMPL.D#
Sample:	SC3243-001	SC3445-001	SC3445-002	SC3445-003	SC3445-004
Date/Time:	6/25/2009 21:31	6/25/2009 21:39	6/25/2009 21:48	6/25/2009 21:56	6/25/2009 22:05
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	10	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	-0.0457	0.0075	0.0098	0.0129	0.0078
B / 11	18.7200	5.5080	5.5320	6.2390	5.6860
Na / 23	21070.0000	118300.0000	115400.0000	118000.0000	115000.0000
Mg / 25	13310.0000	591.9000	569.6000	618.8000	581.8000
Al / 27	-24.2800	-3.5990	-4.5300	-2.7570	-4.6680
Si / 29	9661.0000	8510.0000	8390.0000	8557.0000	8313.0000
K / 39	7267.0000	391.2000	356.1000	450.1000	385.2000
Ca / 44	40620.0000	5734.0000	5698.0000	6487.0000	5874.0000
V / 51	0.9828	1.1060	1.1330	1.1580	1.2290
Cr / 52	-0.0034	3.8310	3.9510	4.0850	4.0210
Mn / 55	9953.0000	0.9347	0.3384	0.3185	0.1650
Fe / 57	76010.0000	11.3900	11.0400	8.4100	8.9090
Co / 59	6.9540	0.0753	0.0731	0.0751	0.0540
Ni / 60	0.3524	8.6500	6.2700	2.3890	4.5420
Cu / 65	2.7330	209.4000	242.7000	170.8000	193.8000
Zn / 66	-4.6800	736.2000	510.4000	318.7000	445.9000
As / 75	378.6000	0.2986	0.4003	0.4931	0.3028
Se / 82	-0.1907	-0.2998	0.0071	0.0104	0.1194
Sr / 88	218.2000	16.9100	16.9600	19.9400	17.7400
Mo / 98	4.8990	0.2387	0.2071	0.2506	0.2017
Ag / 107	-0.0415	0.0101	0.0115	0.0121	0.0112
Cd / 114	0.5242	0.0397	0.0278	0.0102	0.0062
Sn / 118	-3.0330	-0.2462	-0.1800	-0.0509	-0.2656
Sb / 123	0.1164	0.1125	0.0882	0.0366	0.0299
Ba / 135	8.7200	0.0558	0.0338	0.1369	0.0644
W / 182	0.9254	0.0690	0.0405	0.0343	0.0303
Tl / 203	-0.1001	-0.0360	-0.0283	-0.0282	-0.0286
Pb / 208	0.2304	6.8570	4.7870	1.4710	1.5720
Th / 232	0.0224	0.0013	0.0003	0.0016	-0.0004
U / 238	0.4568	0.4250	0.2271	0.3738	0.2129
Li / 6	492561.8	449088.2	453531.7	449480.6	470701.3
Sc / 45	728095.2	750943	777877.9	761351.7	797785.4
Ge / 72	157229.7	159371.5	162903.2	161198.1	167225.4
Tb / 159	1168106	1138085	1169708	1161586	1218765
Bi / 209	625773.6	563231.6	571484.3	572469.9	595808.7
Li / 6	95.5	87.1	87.9	87.1	91.3
Sc / 45	97.6	100.7	104.3	102.1	107.0
Ge / 72	99.3	100.7	102.9	101.9	105.7
Tb / 159	99.1	96.5	99.2	98.5	103.4
Bi / 209	101.0	90.9	92.2	92.4	96.2

File:	034SMPL.D#	035SMPL.D#	036_BLK.D#	037_CCV.D#	038_CCB.D#
Sample:	SC3445-005	LCSWZF23ICW0	BLANK	CCV	CCB
Date/Time:	6/25/2009 22:14	6/25/2009 22:22	6/25/2009 22:31	6/25/2009 22:39	6/25/2009 22:48
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	10	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0011	50.6400	-0.0061	9.9350	-0.0014
B / 11	6.0130	533.8000	0.6262	25.0700	0.3656
Na / 23	111600.0000	9783.0000	100.2000	5001.0000	31.8200
Mg / 25	574.5000	4697.0000	0.6873	5043.0000	3.6190
Al / 27	-6.2640	2120.0000	-6.9750	509.6000	-8.6510
Si / 29	8313.0000	5618.0000	11.4200	521.8000	2.7360
K / 39	353.8000	10100.0000	-6.6560	5066.0000	8.7820
Ca / 44	5650.0000	1754.0000	-63.7700	5103.0000	-68.2600
V / 51	1.1010	509.1000	0.2164	25.2600	0.2788
Cr / 52	3.9280	207.8000	0.3800	25.5600	0.3328
Mn / 55	0.1117	513.6000	-0.2380	25.3100	-0.2754
Fe / 57	5.6770	1002.0000	-3.2990	5134.0000	3.7690
Co / 59	0.0770	514.3000	0.0089	10.3700	-0.0064
Ni / 60	3.6460	518.6000	-0.2004	25.3200	-0.2496
Cu / 65	175.8000	256.0000	0.2645	25.3200	-0.0513
Zn / 66	563.8000	517.5000	-0.2390	25.6800	-0.6313
As / 75	0.6754	494.5000	0.3887	25.2900	0.2795
Se / 82	-0.0035	495.0000	-0.1606	25.3600	-0.0510
Sr / 88	16.9300	517.3000	-0.0172	25.3800	-0.0320
Mo / 98	0.1750	301.3000	0.1706	25.4100	0.1656
Ag / 107	0.0069	51.6200	-0.0026	10.3900	0.0014
Cd / 114	0.0173	254.7000	0.0039	10.3900	0.0058
Sn / 118	-0.1779	518.9000	-0.1824	24.8100	-0.2974
Sb / 123	0.0298	502.2000	0.0382	25.0700	0.0198
Ba / 135	0.0169	2014.0000	0.0961	24.7700	-0.0407
W / 182	0.0217	0.3476	0.0110	25.2900	0.2904
Tl / 203	-0.0414	453.2000	0.3767	9.5970	0.1268
Pb / 208	1.8440	500.5000	0.0032	24.7200	-0.0137
Th / 232	-0.0034	-0.0005	-0.0050	9.5480	0.0052
U / 238	0.2631	101.0000	0.0000	9.9800	0.0018
Li / 6	475477.1	477950.9	502476.1	491641.2	500361
Sc / 45	831122.1	736142.4	762607.8	747693.2	761785
Ge / 72	170450.1	157674.1	164508.2	160542.6	162132.4
Tb / 159	1289500	1183307	1245660	1206947	1246054
Bi / 209	605682.3	628536.7	670572.5	645022.3	668541
Li / 6	92.2	92.7	97.4	95.3	97.0
Sc / 45	111.4	98.7	102.3	100.3	102.1
Ge / 72	107.7	99.6	103.9	101.4	102.4
Tb / 159	109.4	100.4	105.7	102.4	105.7
Bi / 209	97.8	101.5	108.2	104.1	107.9

File:	039SMPL.D#	040SMPL.D#	041SMPL.D#	042SMPL.D#	043SMPL.D#
Sample:	SC3160-001	SC3160-001L	SC3160-002	SC3160-003	SC3160-004
Date/Time:	6/25/2009 22:57	6/25/2009 23:05	6/25/2009 23:14	6/25/2009 23:22	6/25/2009 23:31
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	5	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0057	-0.0614	-0.0076	-0.0101	-0.0004
B / 11	7.2100	7.6050	117.9000	120.3000	8.6700
Na / 23	16620.0000	17500.0000	91770.0000	91650.0000	18380.0000
Mg / 25	1040.0000	1090.0000	3493.0000	3542.0000	1113.0000
Al / 27	29.1700	-1.2300	473.2000	626.0000	39.9700
Si / 29	1670.0000	1744.5000	4248.0000	4368.0000	1638.0000
K / 39	1068.0000	1162.0000	6989.0000	7308.0000	1138.0000
Ca / 44	5612.0000	5420.0000	18060.0000	18040.0000	6007.0000
V / 51	0.2132	1.1410	0.9286	0.9731	0.1553
Cr / 52	0.5381	1.5310	1.0390	1.1410	0.8501
Mn / 55	15.2300	15.2700	5.5440	9.4660	15.1300
Fe / 57	94.9800	87.8500	66.7800	83.1800	112.9000
Co / 59	0.0669	-0.0457	0.2440	0.2227	0.0581
Ni / 60	1.0080	0.1010	1.8570	1.5870	1.1020
Cu / 65	2.5590	2.4515	6.6150	7.4490	4.5560
Zn / 66	5.3290	2.8400	20.7900	21.9400	5.3650
As / 75	0.6253	2.7830	1.8140	2.1210	0.8083
Se / 82	-0.0959	-0.1616	-0.0207	0.3270	0.0591
Sr / 88	44.8700	47.5300	123.7000	125.1000	48.3000
Mo / 98	0.1383	0.5350	4.1830	1.7780	0.1430
Ag / 107	0.0042	-0.0294	-0.0021	0.0008	0.0059
Cd / 114	0.0544	0.0360	0.0535	0.0481	0.0379
Sn / 118	-0.1849	-1.4345	-0.1008	-0.0717	-0.0762
Sb / 123	0.0724	0.0212	0.2771	0.2729	0.0610
Ba / 135	10.4900	10.2150	4.8240	5.1890	11.2700
W / 182	0.1475	0.4157	0.0532	0.0477	0.0483
Tl / 203	0.0299	-0.0758	-0.0181	-0.0276	-0.0296
Pb / 208	1.2190	1.2600	0.2777	0.3982	1.3270
Th / 232	0.0026	-0.0302	0.0164	0.0189	-0.0018
U / 238	0.0281	-0.0004	-0.0037	-0.0019	0.0582
Li / 6	492659.7	493114.1	445572	433638.9	469027.7
Sc / 45	776542.2	755037.4	749205.1	744540.4	738492.1
Ge / 72	167907.3	162842.7	160928.8	159354.8	160434.4
Tb / 159	1273666	1257158	1192724	1169150	1203890
Bi / 209	665137	662663.9	593214.1	587078.4	641895.8
Li / 6	95.5	95.6	86.4	84.1	90.9
Sc / 45	104.1	101.2	100.5	99.8	99.0
Ge / 72	106.1	102.9	101.7	100.7	101.4
Tb / 159	108.0	106.6	101.2	99.2	102.1
Bi / 209	107.4	107.0	95.8	94.8	103.6

File:	044SMPL.D#	045SMPL.D#	046SMPL.D#	047SMPL.D#	048_BLK.D#
Sample:	SC3160-005	SC3160-006	SC3160-007	LCSWZF22ICW1	BLANK
Date/Time:	6/25/2009 23:40	6/25/2009 23:48	6/25/2009 23:57	6/26/2009 0:05	6/26/2009 0:14
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	10	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	-0.0098	-0.0006	-0.0123	46.9400	-0.0102
B / 11	0.9432	7.5620	1.2260	484.0000	0.7015
Na / 23	118.3000	17620.0000	114.3000	7618.0000	12.2000
Mg / 25	22.4500	1071.0000	28.0600	4666.0000	-0.6197
Al / 27	-2.1090	20.6100	-0.7919	2166.0000	-8.2900
Si / 29	51.4400	1757.0000	75.5700	5525.0000	2.7980
K / 39	10.2500	1113.0000	11.9600	10040.0000	-5.4520
Ca / 44	-12.6100	5796.0000	8.2690	1658.0000	-72.1900
V / 51	0.1590	0.0263	-0.0182	507.3000	0.3256
Cr / 52	0.0607	0.2731	0.1102	203.3000	0.1986
Mn / 55	0.1516	12.9300	0.3945	519.9000	-0.2580
Fe / 57	0.3246	78.1900	4.3000	1006.0000	-5.0790
Co / 59	-0.0245	0.0320	-0.0186	520.0000	0.0063
Ni / 60	0.3991	0.6590	1.8700	522.6000	-0.2143
Cu / 65	5.4390	2.4150	1.6590	261.8000	0.1663
Zn / 66	3.8710	3.8120	1.9180	527.7000	-0.5415
As / 75	0.0179	0.7879	-0.0038	485.5000	0.2260
Se / 82	-0.1017	0.0630	0.0450	496.6000	-0.1124
Sr / 88	0.1623	47.4200	0.2096	528.3000	0.0012
Mo / 98	0.0632	0.1109	0.0562	298.8000	0.1488
Ag / 107	-0.0054	-0.0041	0.0018	51.7700	-0.0038
Cd / 114	-0.0053	0.0366	0.0539	255.8000	0.0103
Sn / 118	-0.2131	-0.1652	-0.1081	505.7000	-0.1816
Sb / 123	-0.0051	0.0496	-0.0056	487.3000	0.0246
Ba / 135	0.1554	10.9000	0.4159	1996.0000	0.0959
W / 182	0.0201	0.0249	0.0133	0.1613	0.0047
Tl / 203	-0.0356	-0.0287	-0.0333	442.7000	0.3808
Pb / 208	0.1442	0.8862	0.1770	493.7000	-0.0030
Th / 232	-0.0046	-0.0044	-0.0045	-0.0591	-0.0060
U / 238	-0.0077	0.0240	-0.0070	103.7000	-0.0016
Li / 6	493966.3	491003.3	499062.7	520738.1	546500.1
Sc / 45	750517.1	759982.9	738865.1	760288.5	790943.8
Ge / 72	162649.4	165519.5	160809	165891.2	171182.2
Tb / 159	1259748	1262103	1244192	1289506	1349989
Bi / 209	672852.1	664286.5	665958.3	686881.1	713461
Li / 6	95.8	95.2	96.8	101.0	106.0
Sc / 45	100.6	101.9	99.1	101.9	106.1
Ge / 72	102.8	104.6	101.6	104.8	108.2
Tb / 159	106.9	107.1	105.5	109.4	114.5
Bi / 209	108.6	107.2	107.5	110.9	115.2

File:	049_CCV.D#	050_CCB.D#	051SMPL.D#	052SMPL.D#	053SMPL.D#
Sample:	CCV	CCB	PBWZF16ICW0	SC3160-008	SC3341-001R
Date/Time:	6/26/2009 0:22	6/26/2009 0:31	6/26/2009 0:40	6/26/2009 0:48	6/26/2009 0:57
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	5	1	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	9.1020	-0.0013	-0.0538	-0.0139	-0.0683
B / 11	23.5300	0.3405	1.9090	1.5420	4742.5000
Na / 23	4775.0000	8.5940	33.5100	20.6500	879000.0000
Mg / 25	4951.0000	3.1800	26.2550	15.6900	12090.0000
Al / 27	498.1000	-9.2480	-36.4100	-3.0340	8.1500
Si / 29	500.5000	0.5841	63.3000	26.3400	3637.5000
K / 39	4928.0000	10.1800	25.2100	-1.5700	28160.0000
Ca / 44	4992.0000	-71.8000	-361.1500	-49.0900	40035.0000
V / 51	24.7500	0.0779	0.9585	-0.0112	-0.6400
Cr / 52	24.7200	-0.0323	1.6985	0.0028	9.2650
Mn / 55	25.0300	-0.2874	-0.9965	0.1410	132.9000
Fe / 57	5034.0000	1.4630	3.4255	-1.4590	7960.0000
Co / 59	10.1200	-0.0123	-0.0979	-0.0256	0.5290
Ni / 60	25.0400	-0.2352	-1.2235	-0.0326	2030.0000
Cu / 65	24.7100	-0.0829	-0.3186	0.7717	11.9050
Zn / 66	24.8100	-0.7593	-2.9330	0.7837	8.1750
As / 75	24.5200	0.0757	1.3200	-0.0995	0.9265
Se / 82	25.1000	0.0138	-1.3010	-0.2201	-1.1845
Sr / 88	25.1100	-0.0262	-0.2279	0.0100	128.8000
Mo / 98	24.9000	0.1515	0.4577	0.0224	4.2375
Ag / 107	10.0800	0.0021	-0.0237	-0.0049	0.0074
Cd / 114	10.1800	0.0084	-0.0137	-0.0105	1.0555
Sn / 118	23.1900	-0.3033	-1.2500	-0.2045	-1.1675
Sb / 123	23.4300	0.0159	-0.0076	-0.0062	6.8400
Ba / 135	23.0900	-0.0231	-0.2582	0.1551	3.5285
W / 182	23.7700	0.2759	0.8100	0.0682	0.8980
Tl / 203	7.7580	0.2907	0.5660	0.0349	0.0732
Pb / 208	24.5400	-0.0131	0.0045	0.0549	1.0200
Th / 232	9.4910	0.0043	0.0227	-0.0053	-0.0087
U / 238	9.9980	0.0044	-0.0281	-0.0068	0.0198
Li / 6	532166.3	535539.8	539074.9	534205.6	461804.3
Sc / 45	775178.7	760403.4	736641.6	768589.8	743463.4
Ge / 72	165330.3	163666	158781.6	164564.9	158500.8
Tb / 159	1320915	1308385	1219837	1287931	1185197
Bi / 209	686766.3	696532	665636.8	694034.4	592157.6
Li / 6	103.2	103.8	104.5	103.6	89.5
Sc / 45	103.9	102.0	98.8	103.1	99.7
Ge / 72	104.5	103.4	100.3	104.0	100.2
Tb / 159	112.0	111.0	103.5	109.2	100.5
Bi / 209	110.9	112.4	107.4	112.0	95.6

File:	054SMPL.D#	055SMPL.D#	056SMPL.D#	057SMPL.D#	058SMPL.D#
Sample:	SC3069-014	SC3139-001	SC3139-002	SC3160-001S	SC3160-001P
Date/Time:	6/26/2009 1:05	6/26/2009 1:14	6/26/2009 1:23	6/26/2009 1:31	6/26/2009 1:40
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	5	5	10	10
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	-0.0644	-0.0651	-0.0756	44.5100	45.0600
B / 11	28.4000	49.5450	43.7950	488.2000	487.8000
Na / 23	905.0000	25440.0000	24785.0000	24340.0000	24010.0000
Mg / 25	33.7750	6705.0000	6565.0000	5636.0000	5543.0000
Al / 27	-30.6700	19.3300	-36.7100	2150.0000	2139.0000
Si / 29	92.1000	11715.0000	11425.0000	7079.0000	7029.0000
K / 39	38.6300	2068.0000	2041.5000	10910.0000	10780.0000
Ca / 44	-312.7000	14685.0000	14400.0000	7102.0000	6977.0000
V / 51	1.4765	2.2870	2.6510	498.1000	493.9000
Cr / 52	1.8290	2.3845	2.6750	200.3000	199.2000
Mn / 55	-1.0775	842.5000	780.5000	525.2000	521.0000
Fe / 57	13.6400	1104.0000	24.5250	1085.0000	1045.0000
Co / 59	-0.1425	0.7800	0.6690	505.0000	498.4000
Ni / 60	0.3409	-0.3548	-0.5800	511.9000	505.2000
Cu / 65	-0.2273	0.3415	-0.0829	256.7000	251.7000
Zn / 66	-2.7940	-2.8750	-3.5140	524.4000	512.3000
As / 75	1.6255	3.3120	4.6810	479.2000	473.7000
Se / 82	0.8660	-0.0334	0.5225	495.9000	488.1000
Sr / 88	-0.1031	106.0500	104.7500	558.1000	550.8000
Mo / 98	0.2084	1.2775	0.7125	291.0000	291.4000
Ag / 107	-0.0299	-0.0336	-0.0572	50.6400	50.1400
Cd / 114	-0.0202	-0.0414	-0.0443	249.7000	248.6000
Sn / 118	-1.4500	-1.4275	-1.4410	489.0000	486.6000
Sb / 123	-0.0231	-0.0134	-0.0477	479.1000	470.2000
Ba / 135	-0.3775	44.4050	38.2250	1934.0000	1904.0000
W / 182	0.2128	0.2044	0.1432	0.1345	0.1907
Tl / 203	0.0037	-0.0541	-0.1362	449.8000	443.6000
Pb / 208	-0.0767	-0.0382	-0.0843	488.5000	484.5000
Th / 232	-0.0236	-0.0301	-0.0244	-0.0440	-0.0181
U / 238	-0.0539	-0.0301	-0.0266	102.4000	101.7000
Li / 6	508563	520612.8	526513.6	537178.8	551721.1
Sc / 45	707448.7	729788.9	732666.9	775687	791906.3
Ge / 72	152642.6	158070.3	159251	167502.5	170502.3
Tb / 159	1152567	1189307	1183735	1307680	1337895
Bi / 209	635321.4	647261.1	649153.1	688611.9	699929.8
Li / 6	98.6	100.9	102.1	104.1	107.0
Sc / 45	94.9	97.9	98.2	104.0	106.2
Ge / 72	96.5	99.9	100.6	105.8	107.7
Tb / 159	97.8	100.9	100.4	110.9	113.5
Bi / 209	102.6	104.5	104.8	111.2	113.0

File:	059SMPL.D#	060_BLK.D#	061_CCV.D#	062_CCB.D#	063SMPL.D#
Sample:	LCSWZF16ICW0	BLANK	CCV	CCB	SC3139-003
Date/Time:	6/26/2009 1:48	6/26/2009 1:57	6/26/2009 2:05	6/26/2009 2:14	6/26/2009 2:22
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	10	1	1	1	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	44.1200	-0.0079	9.0950	-0.0047	-0.0515
B / 11	495.7000	0.9864	23.3300	0.6735	40.4400
Na / 23	8018.0000	11.3200	4951.0000	7.0780	25205.0000
Mg / 25	4807.0000	-0.1111	5097.0000	2.9980	6715.0000
Al / 27	2234.0000	-8.2120	521.1000	-9.5830	25.8750
Si / 29	5530.0000	-0.1253	523.9000	-0.7958	11875.0000
K / 39	10120.0000	-3.8780	5089.0000	4.7290	2093.0000
Ca / 44	2098.0000	-68.4100	5139.0000	-71.0100	14580.0000
V / 51	493.7000	0.2641	25.3100	0.0865	2.5870
Cr / 52	203.0000	0.3301	25.5700	-0.0319	2.5150
Mn / 55	512.2000	-0.1700	25.7600	-0.2831	855.5000
Fe / 57	1058.0000	-2.3840	5111.0000	1.6300	1110.0000
Co / 59	499.7000	0.0349	10.3600	-0.0085	0.7715
Ni / 60	506.8000	-0.1765	25.6100	-0.2194	-0.8365
Cu / 65	380.2000	0.5113	25.4500	-0.0820	0.1563
Zn / 66	547.3000	-0.2211	25.6200	-0.7548	-3.1315
As / 75	487.8000	0.3356	25.0900	0.1724	2.7370
Se / 82	489.4000	-0.0187	25.6100	0.1153	0.2100
Sr / 88	527.9000	0.0241	25.4800	-0.0145	106.9000
Mo / 98	307.2000	0.1786	25.5900	0.1284	0.8910
Ag / 107	49.8900	-0.0029	10.4300	0.0054	-0.0273
Cd / 114	256.3000	0.0223	10.4000	0.0085	-0.0070
Sn / 118	510.9000	-0.2328	24.2400	-0.2825	-1.2710
Sb / 123	489.1000	0.0491	24.5000	0.0273	0.0805
Ba / 135	1927.0000	0.1749	24.7900	-0.0057	44.4050
W / 182	0.1416	0.0056	25.0000	0.2908	0.7515
Tl / 203	429.6000	0.7788	9.1840	0.3118	0.6845
Pb / 208	499.8000	0.0256	25.2800	0.0016	0.0404
Th / 232	-0.0268	-0.0060	9.7160	0.0066	0.0491
U / 238	106.3000	0.0016	10.3100	0.0046	-0.0079
Li / 6	545363.5	552511.1	534581.6	547018.6	537196.7
Sc / 45	760815.4	781702.9	745845.9	758022.4	736319.3
Ge / 72	164004.2	166528.1	161444.4	163113.9	159184.3
Tb / 159	1265453	1316877	1254588	1253100	1203759
Bi / 209	675392.3	698198.8	663061.3	685699.8	653006.3
Li / 6	105.7	107.1	103.6	106.1	104.1
Sc / 45	102.0	104.8	100.0	101.6	98.7
Ge / 72	103.6	105.2	102.0	103.1	100.6
Tb / 159	107.3	111.7	106.4	106.3	102.1
Bi / 209	109.0	112.7	107.0	110.7	105.4

File:	064SMPL.D#	065SMPL.D#	066SMPL.D#	067SMPL.D#	068SMPL.D#
Sample:	SC3139-004	SC3139-005	SC3139-005L	SC3139-006	SC3139-006S
Date/Time:	6/26/2009 2:31	6/26/2009 2:40	6/26/2009 2:48	6/26/2009 2:57	6/26/2009 3:05
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	5	25	5	10
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	-0.0528	-0.0561	-0.3403	-0.0637	43.3100
B / 11	40.7250	42.6350	45.3250	42.0750	503.7000
Na / 23	25165.0000	23525.0000	22425.0000	23350.0000	29100.0000
Mg / 25	6725.0000	5880.0000	5590.0000	5860.0000	10030.0000
Al / 27	-39.8100	148.5000	-42.1250	19.5300	2177.0000
Si / 29	11595.0000	11070.0000	10605.0000	11045.0000	15940.0000
K / 39	2061.0000	2587.0000	2414.5000	2544.0000	12150.0000
Ca / 44	14540.0000	11650.0000	9835.0000	11840.0000	12990.0000
V / 51	2.4455	5.4900	6.2050	3.7055	485.7000
Cr / 52	2.8710	3.3000	5.6750	3.5400	196.8000
Mn / 55	797.0000	842.5000	805.0000	866.0000	1334.0000
Fe / 57	26.6050	954.0000	804.7500	397.1500	1343.0000
Co / 59	0.7005	0.5010	0.0016	0.4370	489.6000
Ni / 60	-0.8650	-0.8530	-5.7500	-0.8340	492.3000
Cu / 65	-0.0572	0.5665	-2.4610	0.1534	243.0000
Zn / 66	-3.2475	-0.2091	-14.0900	-2.8760	482.4000
As / 75	4.1305	1.0775	7.8475	7.2350	474.3000
Se / 82	-0.4749	-0.8400	4.2800	-0.4640	478.5000
Sr / 88	105.8500	90.9500	88.6750	91.5000	595.0000
Mo / 98	0.8125	0.4026	0.3333	0.6420	295.6000
Ag / 107	-0.0278	-0.0406	-0.2239	-0.0384	49.0400
Cd / 114	-0.0196	-0.0354	-0.2026	-0.0500	245.6000
Sn / 118	-1.3285	-1.3670	-7.8150	-1.4130	496.7000
Sb / 123	0.0040	-0.0113	-0.1515	0.0181	474.2000
Ba / 135	39.8100	28.2750	25.4000	26.4450	1903.0000
W / 182	0.5070	0.3098	0.8310	0.1318	0.2114
Tl / 203	0.4488	0.2283	0.4095	0.0576	428.0000
Pb / 208	-0.0485	0.0472	-0.2340	-0.0151	483.2000
Th / 232	-0.0107	-0.0099	-0.1497	-0.0293	-0.0274
U / 238	-0.0280	-0.0178	-0.2066	-0.0425	105.5000
Li / 6	540865.8	540172.6	565945	538114.6	564083.6
Sc / 45	746035.4	737056.4	792026.3	733891.3	780290.4
Ge / 72	160904.5	159061.3	170017.5	158713.3	168099.5
Tb / 159	1200018	1192860	1329783	1190203	1292336
Bi / 209	654600.5	643134.6	700941.4	642100.9	682349.8
Li / 6	104.9	104.7	109.7	104.3	109.4
Sc / 45	100.0	98.8	106.2	98.4	104.6
Ge / 72	101.7	100.5	107.4	100.3	106.2
Tb / 159	101.8	101.2	112.8	101.0	109.6
Bi / 209	105.7	103.8	113.1	103.6	110.1

File:	069SMPL.D#	070SMPL.D#	071SMPL.D#	072_BLK.D#	073_CCV.D#
Sample:	SC3139-006P	SC3139-005P	SC3139-005S	BLANK	CCV
Date/Time:	6/26/2009 3:14	6/26/2009 3:22	6/26/2009 3:31	6/26/2009 3:40	6/26/2009 3:48
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	10	10	10	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	46.3300	45.6300	45.2000	-0.0063	9.2420
B / 11	538.2000	546.6000	535.5000	0.7425	23.4900
Na / 23	30570.0000	30300.0000	30950.0000	-0.3114	4932.0000
Mg / 25	10570.0000	10460.0000	10600.0000	-0.9864	5047.0000
Al / 27	2314.0000	2468.0000	2522.0000	-9.5600	513.2000
Si / 29	16630.0000	16780.0000	17010.0000	2.6110	516.9000
K / 39	12770.0000	12760.0000	12770.0000	-2.8400	5032.0000
Ca / 44	13600.0000	13380.0000	13530.0000	-72.9200	5038.0000
V / 51	520.6000	508.8000	512.1000	0.2850	25.3500
Cr / 52	212.7000	207.1000	209.7000	0.4964	25.2500
Mn / 55	1402.0000	1342.0000	1384.0000	-0.1249	25.3800
Fe / 57	1440.0000	2000.0000	2058.0000	-1.7650	5142.0000
Co / 59	520.3000	508.4000	511.5000	0.0339	10.2500
Ni / 60	525.0000	514.8000	514.0000	-0.1894	25.2500
Cu / 65	258.5000	253.1000	255.8000	-0.0559	25.0400
Zn / 66	515.7000	504.0000	513.6000	-0.4675	25.3100
As / 75	499.8000	494.6000	500.5000	0.4038	24.9000
Se / 82	503.0000	503.5000	498.6000	0.0733	25.0100
Sr / 88	621.9000	623.2000	616.7000	0.0202	25.2800
Mo / 98	313.3000	308.7000	307.5000	0.1609	25.2200
Ag / 107	51.5400	51.0500	50.7000	-0.0011	10.2700
Cd / 114	259.0000	257.8000	256.1000	0.0265	10.3200
Sn / 118	524.5000	515.4000	515.9000	-0.2307	23.9700
Sb / 123	501.7000	493.8000	500.4000	0.0724	24.0200
Ba / 135	2027.0000	1980.0000	1982.0000	0.2029	23.9100
W / 182	0.2571	0.1787	0.1317	0.0093	24.5400
Tl / 203	461.2000	467.6000	461.9000	0.8068	9.4930
Pb / 208	510.9000	510.3000	508.2000	0.0255	24.8500
Th / 232	-0.0512	-0.0542	-0.0416	-0.0071	9.6410
U / 238	113.3000	110.6000	110.8000	0.0033	10.1800
Li / 6	541527.7	545774.4	557229.6	547731.7	539802.4
Sc / 45	750542.8	757421.3	774376.9	747964.9	764557.8
Ge / 72	161021.9	163581.3	164995.2	162858.3	164074.6
Tb / 159	1233549	1259899	1275758	1224355	1279575
Bi / 209	651797.9	657232.9	667830.4	669092.9	664228.1
Li / 6	105.0	105.8	108.0	106.2	104.7
Sc / 45	100.6	101.6	103.8	100.3	102.5
Ge / 72	101.7	103.4	104.3	102.9	103.7
Tb / 159	104.6	106.9	108.2	103.8	108.5
Bi / 209	105.2	106.1	107.8	108.0	107.2

File:	074_CCB.D#	075_BLK.D#	076_BLK.D#	077_PQL.D#	078_CCV.D#
Sample:	CCB	BLANK	BLANK	PQL	CCV
Date/Time:	6/26/2009 3:57	6/26/2009 4:05	6/26/2009 4:14	6/26/2009 4:22	6/26/2009 4:31
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	-0.0026	-0.0098	-0.0115	0.1547	9.0030
B / 11	0.4146	0.2566	0.3175	7.5550	23.5300
Na / 23	0.6364	-3.4370	-4.4190	205.8000	5056.0000
Mg / 25	3.0660	-0.7250	-1.6570	17.6200	5160.0000
Al / 27	-10.1000	-9.5990	-9.7460	53.8900	525.6000
Si / 29	1.1520	-0.6740	0.2851	44.3600	525.0000
K / 39	11.5700	-5.9230	-5.6080	211.6000	5106.0000
Ca / 44	-72.6400	-75.4100	-76.5900	-55.6100	5166.0000
V / 51	0.0573	0.1392	0.2363	1.1770	25.3900
Cr / 52	0.0473	0.1617	0.1686	0.8283	25.2900
Mn / 55	-0.2492	-0.2555	-0.2663	-0.0761	25.5300
Fe / 57	2.1850	-3.1860	-0.8438	17.6800	5135.0000
Co / 59	-0.0051	-0.0171	-0.0162	0.1886	10.2700
Ni / 60	-0.2280	-0.2299	-0.2510	-0.0368	25.8100
Cu / 65	-0.1047	-0.0932	-0.1048	0.0857	25.3000
Zn / 66	-0.7755	-0.5111	-0.4752	1.4110	25.5200
As / 75	0.0169	0.3406	0.5167	0.8195	25.1500
Se / 82	-0.0437	0.1287	0.0115	1.1260	25.0600
Sr / 88	-0.0144	-0.0406	-0.0507	0.1599	25.5400
Mo / 98	0.1138	0.0266	0.0106	1.0040	25.3900
Ag / 107	0.0052	-0.0037	-0.0069	0.2563	10.3300
Cd / 114	0.0085	0.0004	-0.0020	0.1982	10.3800
Sn / 118	-0.2849	-0.3124	-0.3103	-0.1101	24.6600
Sb / 123	0.0341	0.0075	-0.0023	0.1968	24.8800
Ba / 135	-0.0193	-0.0282	-0.0469	0.1318	24.6200
W / 182	0.2983	0.1099	0.0757	1.2330	24.9400
Tl / 203	0.2963	0.1477	0.1057	0.4030	9.4440
Pb / 208	-0.0046	-0.0211	-0.0312	0.1597	25.1500
Th / 232	0.0048	-0.0033	-0.0054	0.0908	9.8060
U / 238	0.0064	-0.0031	-0.0071	0.2042	10.2900
Li / 6	546626.8	575252.9	561686.1	565103.9	542907.2
Sc / 45	734448.5	786342.8	771092.6	770757.9	748033.4
Ge / 72	160633.5	168892.9	165198.7	165166.9	161401.6
Tb / 159	1205148	1327194	1286257	1279930	1234531
Bi / 209	667475.7	706617.9	689529.5	686602.8	657242.8
Li / 6	106.0	111.5	108.9	109.6	105.3
Sc / 45	98.5	105.4	103.4	103.3	100.3
Ge / 72	101.5	106.7	104.4	104.4	102.0
Tb / 159	102.2	112.6	109.1	108.6	104.7
Bi / 209	107.7	114.1	111.3	110.8	106.1

File:	079_CCB.D#	080SMPL.D#	081SMPL.D#	082SMPL.D#	083SMPL.D#
Sample:	CCB	PBSZF17ICS0	SC3139-006L	SC3139-007	SC3139-008
Date/Time:	6/26/2009 4:40	6/26/2009 4:48	6/26/2009 4:57	6/26/2009 5:05	6/26/2009 5:14
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	5	25	5	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	-0.0059	-0.0295	-0.2853	-0.0668	-0.0520
B / 11	0.3172	1.4265	40.9750	1.2030	1.3850
Na / 23	-0.5174	-7.4250	22905.0000	-8.3750	41.3750
Mg / 25	2.8820	18.0100	5817.5000	14.0150	26.2400
Al / 27	-9.9490	-34.9650	-162.2500	-39.3350	-31.4850
Si / 29	0.3137	33.4300	10922.5000	75.2000	82.3000
K / 39	0.4351	1.3360	2542.5000	-19.8800	-6.6600
Ca / 44	-72.8500	-356.4500	10155.0000	-357.6500	-316.1500
V / 51	0.0308	0.9690	4.3450	0.5500	0.7880
Cr / 52	-0.0561	1.2285	2.9025	2.8915	2.9120
Mn / 55	-0.2867	-0.9660	841.7500	-0.9440	0.0809
Fe / 57	1.8350	28.1700	281.7500	-2.9535	5.0350
Co / 59	-0.0149	-0.1031	0.0127	-0.1198	-0.0622
Ni / 60	-0.2335	-1.0660	-5.6975	-1.1315	-1.0030
Cu / 65	-0.1162	1.0095	-2.3098	-0.4528	-0.0692
Zn / 66	-0.7858	-3.1520	-14.7875	-2.7080	-1.1260
As / 75	-0.1139	1.0445	6.9075	2.1815	4.1240
Se / 82	0.1726	-0.5390	0.2755	0.0603	0.7510
Sr / 88	-0.0304	-0.1344	91.8750	-0.2043	-0.0665
Mo / 98	0.1174	0.1146	0.6150	0.3016	0.2414
Ag / 107	0.0036	-0.0077	-0.1865	-0.0363	-0.0208
Cd / 114	0.0056	0.0057	-0.1142	-0.0335	0.0081
Sn / 118	-0.2917	5.1500	-7.0850	-1.3610	-1.3120
Sb / 123	0.0223	0.0045	0.1627	-0.0403	0.0254
Ba / 135	-0.0415	0.0080	24.9800	-0.3378	-0.0907
W / 182	0.3048	0.7340	2.8175	0.3379	0.2660
Tl / 203	0.1593	0.3357	1.0090	0.0887	0.1173
Pb / 208	-0.0144	0.0134	-0.1090	-0.0438	0.0559
Th / 232	0.0052	0.0087	-0.1319	-0.0135	-0.0134
U / 238	0.0017	-0.0298	-0.1946	-0.0404	-0.0245
Li / 6	558219.2	568320.6	572154.4	557713.8	575482.1
Sc / 45	767318.2	768282	782673.7	743268.9	760483.6
Ge / 72	164002.9	163148.8	168082	159779.8	163131
Tb / 159	1283370	1257743	1309691	1207852	1244842
Bi / 209	683985.2	681398.6	695466.3	652272.4	666814
Li / 6	108.2	110.2	110.9	108.1	111.6
Sc / 45	102.9	103.0	104.9	99.7	102.0
Ge / 72	103.6	103.1	106.2	101.0	103.1
Tb / 159	108.9	106.7	111.1	102.4	105.6
Bi / 209	110.4	110.0	112.3	105.3	107.6

File:	084SMPL.D#	085SMPL.D#	086SMPL.D#	087SMPL.D#	088SMPL.D#
Sample:	SC2890-001	SC2890-001A	SC2890-001S	SC2890-001P	LCSSZF17ICS0
Date/Time:	6/26/2009 5:22	6/26/2009 5:31	6/26/2009 5:40	6/26/2009 5:48	6/26/2009 5:57
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	5	10	10	10
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	5.9300	10.9200	51.2600	47.8900	826.8000
B / 11	65.7500	94.9500	563.4000	548.5000	624.3000
Na / 23	266.4500	2649.0000	7484.0000	7283.0000	2811.0000
Mg / 25	14685.0000	14845.0000	23150.0000	21680.0000	24760.0000
Al / 27	120500.0000	118000.0000	185100.0000	168600.0000	71210.0000
Si / 29	3983.0000	4858.0000	4534.0000	4416.0000	3880.0000
K / 39	12425.0000	14590.0000	29840.0000	29240.0000	22820.0000
Ca / 44	4919.5000	5720.0000	7452.0000	7039.0000	48930.0000
V / 51	286.9500	312.1000	837.4000	797.4000	550.2000
Cr / 52	203.6000	228.7000	442.6000	421.8000	695.4000
Mn / 55	2167.5000	2165.0000	2490.0000	2535.0000	2042.0000
Fe / 57	150650.0000	149200.0000	177900.0000	167400.0000	106700.0000
Co / 59	70.9500	75.8500	539.4000	514.6000	635.2000
Ni / 60	85.5500	95.5000	579.7000	553.2000	978.2000
Cu / 65	88.5000	113.3500	332.6000	312.9000	377.9000
Zn / 66	300.3500	397.9500	820.3000	762.6000	1928.0000
As / 75	31.8300	78.8000	471.8000	458.8000	1158.0000
Se / 82	2.4365	51.0000	448.5000	439.5000	774.9000
Sr / 88	84.4500	89.2500	617.0000	585.3000	664.9000
Mo / 98	5.9600	16.0000	276.8000	266.5000	608.1000
Ag / 107	0.2775	2.8355	46.6100	47.2600	193.7000
Cd / 114	0.2914	2.6905	233.3000	223.7000	368.5000
Sn / 118	14.3650	24.6400	478.0000	458.4000	898.6000
Sb / 123	3.5490	13.2800	240.8000	241.0000	532.5000
Ba / 135	648.0000	644.5000	2694.0000	2524.0000	2897.0000
W / 182	0.7195	12.5700	1.2170	0.8328	2.9530
Tl / 203	1.1790	5.4350	427.6000	432.5000	875.5000
Pb / 208	2557.5000	2537.0000	2277.0000	2335.0000	1170.0000
Th / 232	34.9850	37.2800	46.4000	40.4100	44.4700
U / 238	7.8000	8.7150	109.7000	103.0000	10.4800
Li / 6	564030.5	543757.8	542240.4	533018.6	530643.5
Sc / 45	795836	799469.1	798987.4	779931	804645.6
Ge / 72	165013.2	162489.1	163905.6	160860.4	162725.6
Tb / 159	1203611	1198879	1227943	1206856	1258892
Bi / 209	634398.7	620881.1	640521.8	626466.1	651674.1
Li / 6	109.4	105.4	105.1	103.3	102.9
Sc / 45	106.7	107.2	107.1	104.6	107.9
Ge / 72	104.3	102.7	103.6	101.6	102.8
Tb / 159	102.1	101.7	104.2	102.4	106.8
Bi / 209	102.4	100.2	103.4	101.1	105.2

File:	089_BLK.D#	090_CCV.D#	091_CCB.D#	092SMPL.D#	093SMPL.D#
Sample:	BLANK	CCV	CCB	SC2890-001L	SC2890-002
Date/Time:	6/26/2009 6:05	6/26/2009 6:14	6/26/2009 6:23	6/26/2009 6:31	6/26/2009 6:40
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	25	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0534	9.4950	0.0088	6.2900	4.1430
B / 11	0.8414	24.0600	0.3715	75.8750	54.7500
Na / 23	-5.9260	5036.0000	-2.6450	269.2500	175.9000
Mg / 25	1.4380	5164.0000	3.4650	14405.0000	9210.0000
Al / 27	9.2890	523.5000	-4.6820	124975.0000	80050.0000
Si / 29	1.1460	516.3000	1.8150	4007.5000	3994.5000
K / 39	9.2500	5037.0000	13.3700	13062.5000	8995.0000
Ca / 44	-68.2900	5120.0000	-71.3000	3585.0000	2820.0000
V / 51	0.1104	25.4500	0.0317	288.7500	208.8000
Cr / 52	0.1952	25.1600	-0.0685	205.1000	139.1500
Mn / 55	0.0594	25.4100	-0.2064	2186.0000	1636.5000
Fe / 57	21.4900	4982.0000	8.7180	158100.0000	92100.0000
Co / 59	0.0483	10.3200	0.0030	71.7250	29.6850
Ni / 60	-0.1631	25.5900	-0.2026	81.6500	51.6000
Cu / 65	-0.0415	25.1000	-0.1114	88.6500	50.1500
Zn / 66	-0.3720	25.7800	-0.7296	297.5000	226.2500
As / 75	0.2149	24.9700	-0.1284	32.5750	19.2850
Se / 82	0.0453	25.3200	0.1465	3.4475	1.7055
Sr / 88	0.0297	25.5200	-0.0168	85.5000	51.6000
Mo / 98	0.2872	25.0700	0.1486	7.0650	4.4920
Ag / 107	0.0069	10.2400	0.0031	0.2404	0.2213
Cd / 114	0.0302	10.3200	0.0149	0.5678	0.3726
Sn / 118	0.1581	24.0900	-0.2709	8.8650	10.5750
Sb / 123	0.0549	24.4800	0.0192	3.7050	5.5050
Ba / 135	0.3447	24.2500	0.0506	639.2500	540.0000
W / 182	0.0306	24.5500	0.3033	3.8100	0.9345
Tl / 203	0.8164	9.6310	0.2789	4.7125	1.2970
Pb / 208	0.2556	25.0400	0.0691	2491.7500	5840.0000
Th / 232	0.0050	9.8310	0.0038	22.7975	20.1500
U / 238	-0.0008	10.0800	0.0041	7.3725	5.5750
Li / 6	536881.9	519484.8	529469.7	536205.4	554830.3
Sc / 45	756243.6	740907.3	752141.3	765985.6	801469.9
Ge / 72	159986.3	157989.5	158918.7	160873.6	163937.7
Tb / 159	1215960	1220398	1209186	1189199	1240153
Bi / 209	649026.4	635794.5	654474.3	639308.1	637620.9
Li / 6	104.1	100.7	102.7	104.0	107.6
Sc / 45	101.4	99.3	100.9	102.7	107.5
Ge / 72	101.1	99.8	100.4	101.7	103.6
Tb / 159	103.1	103.5	102.6	100.9	105.2
Bi / 209	104.8	102.6	105.6	103.2	102.9

File:	094SMPL.D#	095SMPL.D#	096SMPL.D#	097SMPL.D#	098SMPL.D#
Sample:	SC2890-002	SC2890-003	SC2890-004	SC2890-005	SC3170-001
Date/Time:	6/26/2009 6:48	6/26/2009 6:57	6/26/2009 7:05	6/26/2009 7:14	6/26/2009 7:23
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	10	5	5	5	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	4.1230	6.0700	5.2350	7.0000	6.0100
B / 11	56.2600	53.7000	45.4300	69.5000	49.4000
Na / 23	93.0400	217.6500	210.0000	304.5500	238.1500
Mg / 25	8841.0000	11650.0000	9860.0000	15610.0000	13135.0000
Al / 27	82920.0000	94400.0000	91650.0000	125600.0000	101150.0000
Si / 29	4055.0000	3852.5000	3527.0000	3369.5000	4356.5000
K / 39	9316.0000	9785.0000	8795.0000	12395.0000	9795.0000
Ca / 44	2555.0000	4668.5000	3095.5000	5260.0000	12760.0000
V / 51	211.1000	210.9000	208.0000	304.6500	226.1500
Cr / 52	141.0000	164.6000	151.6000	219.1000	160.5500
Mn / 55	1695.0000	4127.0000	3774.0000	1978.5000	3400.0000
Fe / 57	95890.0000	103100.0000	105750.0000	165350.0000	111150.0000
Co / 59	30.3300	54.8500	94.3000	73.8000	64.2000
Ni / 60	50.2700	68.5500	71.4500	91.1000	84.8500
Cu / 65	49.1000	83.0000	238.7500	97.7000	227.8500
Zn / 66	218.4000	296.1000	342.5500	325.1000	491.7000
As / 75	19.0900	20.9200	25.1800	32.6750	24.6050
Se / 82	0.8719	2.1525	2.9660	2.3365	3.8285
Sr / 88	51.8700	77.2500	78.3000	87.7500	97.2000
Mo / 98	4.1370	4.7845	4.3940	6.7350	4.9550
Ag / 107	0.2098	0.3449	0.2643	0.2312	0.2562
Cd / 114	0.3399	0.5955	0.6520	0.3146	0.9840
Sn / 118	9.3180	11.5650	20.0250	11.6950	16.5050
Sb / 123	5.5400	4.8950	4.3405	2.7875	6.3750
Ba / 135	565.9000	959.5000	752.0000	677.5000	930.5000
W / 182	1.0310	1.2730	0.5525	0.5515	1.0800
Tl / 203	1.4170	1.2190	1.1230	1.3640	1.1120
Pb / 208	5935.0000	3258.5000	2184.5000	1839.0000	625.0000
Th / 232	16.4300	24.3250	25.1000	37.8700	26.2600
U / 238	5.5600	6.6750	6.5550	8.4550	7.1150
Li / 6	534448.6	533050.6	544879.5	520074.7	525012.9
Sc / 45	774955.3	777338.2	802347.6	770326.8	764149.8
Ge / 72	161448.2	159154	162566.2	155379.4	157091.5
Tb / 159	1195767	1169955	1219547	1136679	1149715
Bi / 209	641376.1	611970.1	628352.1	595800.1	603578.4
Li / 6	103.6	103.3	105.6	100.8	101.8
Sc / 45	103.9	104.2	107.6	103.3	102.5
Ge / 72	102.0	100.6	102.7	98.2	99.3
Tb / 159	101.4	99.2	103.4	96.4	97.5
Bi / 209	103.5	98.8	101.4	96.2	97.4

File:	099SMPL.D#	100SMPL.D#	101_BLK.D#	102_CCV.D#	103_CCB.D#
Sample:	SC3170-002	SC3170-003	BLANK	CCV	CCB
Date/Time:	6/26/2009 7:31	6/26/2009 7:40	6/26/2009 7:49	6/26/2009 7:57	6/26/2009 8:06
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	5	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	7.6550	2.3350	-0.0127	8.8540	-0.0075
B / 11	73.8500	19.7550	0.2601	22.7500	0.2391
Na / 23	511.0000	93.3500	-10.3600	4926.0000	-6.8880
Mg / 25	18650.0000	25135.0000	3.6130	5087.0000	2.6730
Al / 27	141100.0000	71650.0000	20.9300	527.2000	-1.2470
Si / 29	4482.5000	4062.5000	1.6510	507.4000	0.5070
K / 39	13345.0000	4584.0000	4.2850	4966.0000	7.6610
Ca / 44	9710.0000	200050.0000	-45.8600	5011.0000	-66.7600
V / 51	324.7500	251.4000	-0.0110	24.6200	-0.0448
Cr / 52	244.1500	374.8000	-0.0500	24.6500	-0.1307
Mn / 55	3876.5000	1099.0000	0.3485	25.2300	-0.1113
Fe / 57	160550.0000	135300.0000	33.4200	5083.0000	8.0300
Co / 59	83.3000	28.7500	-0.0132	10.1300	-0.0233
Ni / 60	136.5000	126.6500	-0.2289	24.9800	-0.2456
Cu / 65	177.7000	123.7500	-0.0569	24.9000	-0.1154
Zn / 66	635.0000	232.7000	-0.5076	25.1300	-0.7251
As / 75	31.2800	50.1500	-0.0463	24.2100	-0.1206
Se / 82	4.0070	1.1775	0.0417	25.0100	0.2009
Sr / 88	101.6500	711.0000	0.0557	24.8900	-0.0205
Mo / 98	6.9150	5.5650	-0.0017	24.6900	0.0888
Ag / 107	0.2981	0.0938	-0.0050	10.0700	-0.0012
Cd / 114	1.4500	0.7405	-0.0048	10.0600	0.0009
Sn / 118	20.2500	8.8300	0.0774	24.0400	-0.3026
Sb / 123	5.4250	3.9685	-0.0110	24.5900	0.0103
Ba / 135	944.0000	194.1000	0.0824	24.3800	-0.0241
W / 182	0.7760	3.1520	0.0201	24.3400	0.2735
Tl / 203	1.4280	0.5045	0.0055	9.1800	0.0830
Pb / 208	900.5000	211.1000	0.2105	24.7200	0.0734
Th / 232	38.6600	15.4850	0.0075	9.6720	0.0033
U / 238	9.3750	5.7150	-0.0073	9.9140	-0.0032
Li / 6	515899.5	498634.2	539250.8	554336.9	532918.4
Sc / 45	769839.8	736417.6	749474.2	769547.1	736357.9
Ge / 72	155699	149715.4	159750.4	164236.4	157869.5
Tb / 159	1158284	1103811	1209846	1244086	1169111
Bi / 209	599244.4	591997.2	650173.6	646311.4	629421.2
Li / 6	100.0	96.7	104.5	107.5	103.3
Sc / 45	103.2	98.7	100.5	103.2	98.7
Ge / 72	98.4	94.6	100.9	103.8	99.8
Tb / 159	98.2	93.6	102.6	105.5	99.2
Bi / 209	96.7	95.6	104.9	104.3	101.6

File:	104SMPL.D#	105SMPL.D#	106SMPL.D#	107SMPL.D#	108SMPL.D#
Sample:	SC3170-004	SC3170-005	SC3170-006	SC3170-007	SC3170-007
Date/Time:	6/26/2009 8:14	6/26/2009 8:23	6/26/2009 8:32	6/26/2009 8:40	6/26/2009 8:49
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	5	5	5	10
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	2.1360	1.7160	5.2050	5.9900	5.7690
B / 11	13.8550	32.8200	170.2500	70.9500	72.2000
Na / 23	92.5000	122.5000	111.8500	164.6000	92.9600
Mg / 25	7655.0000	319000.0000	14780.0000	14105.0000	13540.0000
Al / 27	102450.0000	98650.0000	102950.0000	136250.0000	138300.0000
Si / 29	3351.0000	4540.0000	4458.5000	3890.5000	4018.0000
K / 39	4224.5000	5125.0000	22185.0000	12910.0000	13310.0000
Ca / 44	27100.0000	129450.0000	2942.5000	1586.0000	1226.0000
V / 51	273.5000	216.2000	274.1500	300.3500	296.8000
Cr / 52	288.3000	882.5000	243.6500	196.3500	196.6000
Mn / 55	1267.5000	2596.0000	1934.0000	3125.0000	3186.0000
Fe / 57	173050.0000	181000.0000	148050.0000	143600.0000	146500.0000
Co / 59	55.0000	255.7500	43.2150	66.8000	66.8200
Ni / 60	117.8500	3656.0000	83.5500	159.1000	158.7000
Cu / 65	129.2500	249.8500	271.5000	1004.5000	1022.0000
Zn / 66	223.7000	352.4000	233.4500	317.9500	317.4000
As / 75	52.1500	62.0500	27.6550	27.9700	26.0900
Se / 82	-0.6435	0.2178	1.7055	2.8105	4.3110
Sr / 88	121.6500	361.8000	49.7400	52.0000	51.6200
Mo / 98	10.6250	6.9700	6.6950	6.4750	6.1560
Ag / 107	0.1225	0.1993	0.6905	1.0265	0.9832
Cd / 114	0.3311	0.6495	0.2853	0.1842	0.3128
Sn / 118	10.9400	12.5550	23.1900	87.3000	83.3000
Sb / 123	5.0350	12.7200	1.1015	1.3730	1.4040
Ba / 135	243.6500	284.3000	416.3000	577.5000	566.9000
W / 182	2.4385	1.3280	0.6295	0.6490	0.8524
Tl / 203	0.8445	0.8865	0.8325	1.0665	0.8262
Pb / 208	455.0000	2001.0000	857.0000	5210.0000	5180.0000
Th / 232	26.7100	25.5050	34.1350	38.4300	32.9700
U / 238	6.4100	6.2200	6.5550	7.4650	7.1980
Li / 6	567940.4	548527.6	569141.4	544311.7	542840
Sc / 45	847299.3	783493.3	802105.2	780032.4	761960.9
Ge / 72	164931.6	157883.7	161139.1	157690	157058.7
Tb / 159	1222337	1138664	1151815	1124351	1138220
Bi / 209	620041.7	568505.1	591047.6	574270.1	585430.3
Li / 6	110.1	106.3	110.3	105.5	105.2
Sc / 45	113.6	105.1	107.6	104.6	102.2
Ge / 72	104.2	99.8	101.8	99.6	99.2
Tb / 159	103.7	96.6	97.7	95.4	96.5
Bi / 209	100.1	91.8	95.4	92.7	94.5

File:	109SMPL.D#	110SMPL.D#	111SMPL.D#	112SMPL.D#	113_BLK.D#
Sample:	SC3170-008	SC3170-009	SC3170-010	SC3170-011	BLANK
Date/Time:	6/26/2009 8:58	6/26/2009 9:06	6/26/2009 9:15	6/26/2009 9:23	6/26/2009 9:32
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	5	5	5	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	4.2505	3.4075	5.1300	4.6950	-0.0129
B / 11	99.9500	36.5050	46.9500	117.5000	0.2400
Na / 23	75.0000	51.4500	920.0000	521.0000	-10.9600
Mg / 25	10010.0000	6655.0000	11745.0000	15095.0000	2.2070
Al / 27	69750.0000	63000.0000	107050.0000	120900.0000	21.5700
Si / 29	3011.0000	3771.5000	3432.5000	3716.5000	0.9524
K / 39	13205.0000	6065.0000	8800.0000	17490.0000	30.8000
Ca / 44	2647.0000	1925.0000	2095.0000	2213.5000	-71.0600
V / 51	226.0000	150.9000	251.4000	313.4500	0.0041
Cr / 52	170.8000	113.8500	169.5000	229.3500	0.0244
Mn / 55	2122.0000	1872.0000	1097.0000	1128.5000	0.0952
Fe / 57	103550.0000	69850.0000	111050.0000	152200.0000	36.8900
Co / 59	38.3550	41.8400	65.0500	42.4500	-0.0166
Ni / 60	77.1500	95.4500	79.9500	106.5500	-0.2199
Cu / 65	431.7500	737.5000	123.2500	316.0000	-0.0145
Zn / 66	269.2000	173.9000	287.3500	365.4500	-0.3943
As / 75	20.7800	12.3700	23.1850	32.2350	-0.0595
Se / 82	2.3165	2.8910	3.5275	3.7405	-0.0872
Sr / 88	40.3150	37.4350	55.1500	57.9500	-0.0403
Mo / 98	4.8645	3.2145	6.2400	7.5400	-0.0153
Ag / 107	2.7190	1.3315	0.2841	0.3423	-0.0098
Cd / 114	0.6845	0.7840	0.1691	0.3382	-0.0075
Sn / 118	29.1550	36.7800	14.6100	19.8050	-0.2914
Sb / 123	1.7965	1.1795	1.2480	1.7425	-0.0095
Ba / 135	391.9500	433.2500	433.5000	441.1500	0.0549
W / 182	0.5595	0.5215	0.4832	0.4196	0.0068
Tl / 203	0.5385	0.4918	1.0290	1.0105	-0.0207
Pb / 208	1283.0000	3483.5000	744.5000	2890.0000	0.6156
Th / 232	19.5500	27.1000	27.1650	37.3000	0.0047
U / 238	5.0550	5.9300	7.2900	7.2850	-0.0068
Li / 6	562264.7	546433.6	543754.3	535705.3	534787
Sc / 45	803496.3	760917.3	770073.2	758467.8	728814.2
Ge / 72	162912.7	156643.2	157656.6	153345.8	155554.1
Tb / 159	1213030	1144346	1133685	1113414	1117933
Bi / 209	615646.3	591289.8	587680.7	570279.3	593555.7
Li / 6	109.0	105.9	105.4	103.9	103.7
Sc / 45	107.7	102.0	103.3	101.7	97.7
Ge / 72	102.9	99.0	99.6	96.9	98.3
Tb / 159	102.9	97.1	96.2	94.4	94.8
Bi / 209	99.4	95.4	94.9	92.1	95.8

File:	114_CCV.D#	115_CCB.D#	116SMPL.D#	117SMPL.D#	118SMPL.D#
Sample:	CCV	CCB	SC3170-012	SC3170-013	SC3170-014
Date/Time:	6/26/2009 9:41	6/26/2009 9:49	6/26/2009 9:58	6/26/2009 10:06	6/26/2009 10:15
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	5	5	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	9.2490	-0.0080	6.4850	5.1200	6.5800
B / 11	23.6800	0.2903	15.4650	19.1850	78.7500
Na / 23	5208.0000	-5.9450	47.9100	142.5500	151.5000
Mg / 25	5362.0000	3.4500	4222.0000	7490.0000	13705.0000
Al / 27	550.5000	-0.4313	73350.0000	109350.0000	161750.0000
Si / 29	540.2000	-0.4501	2960.5000	3217.0000	3951.5000
K / 39	5219.0000	36.7200	4947.0000	5485.0000	14315.0000
Ca / 44	5287.0000	-71.3900	4445.0000	3688.5000	4101.5000
V / 51	25.7000	-0.0472	504.5000	288.6500	354.8000
Cr / 52	25.8400	-0.0543	274.2500	238.4500	249.4500
Mn / 55	26.1300	-0.1780	4002.5000	1838.0000	1769.5000
Fe / 57	5114.0000	11.8400	267250.0000	155700.0000	237950.0000
Co / 59	10.5400	-0.0178	140.4000	57.6000	60.3000
Ni / 60	26.0300	-0.2265	129.8500	75.1500	108.1500
Cu / 65	25.8000	-0.0706	88.6000	55.7000	123.0500
Zn / 66	26.1400	-0.7790	318.9500	211.9000	327.3500
As / 75	25.4700	-0.2145	45.2500	34.4250	47.2600
Se / 82	25.5000	-0.1508	2.7655	1.1355	1.9865
Sr / 88	25.5900	-0.0371	63.8000	40.3850	51.9000
Mo / 98	25.3300	0.0919	7.5200	10.4550	11.9000
Ag / 107	10.3100	-0.0005	0.1355	1.2575	0.1409
Cd / 114	10.2900	-0.0002	0.5070	0.1918	0.2522
Sn / 118	25.5100	-0.3074	10.9200	9.2650	12.2250
Sb / 123	25.8000	0.0085	1.1060	1.5800	4.7405
Ba / 135	25.4900	-0.0345	448.0000	489.0500	503.5000
W / 182	25.4600	0.2746	3.3910	1.3935	2.3745
Tl / 203	9.3860	0.0801	0.8985	0.9545	1.4300
Pb / 208	25.7400	0.1955	99.2000	103.0000	550.5000
Th / 232	9.8060	0.0054	25.0600	37.7500	48.6200
U / 238	10.1900	-0.0028	6.1100	7.6150	11.2950
Li / 6	513414.8	520338	542932.7	547095.2	529993.2
Sc / 45	704408.6	703369.3	780656.5	769056	761893.6
Ge / 72	150160.6	151254.2	155458	155420.9	151156.7
Tb / 159	1103679	1103673	1116417	1135748	1081241
Bi / 209	578109.9	593131.7	578907.7	575767.8	548523.9
Li / 6	99.5	100.9	105.3	106.1	102.8
Sc / 45	94.5	94.3	104.7	103.1	102.2
Ge / 72	94.9	95.6	98.2	98.2	95.5
Tb / 159	93.6	93.6	94.7	96.3	91.7
Bi / 209	93.3	95.7	93.4	92.9	88.5

File:	119SMPL.D#	120_CCV.D#	121_CCB.D#	122_BLK.D#	123_BLK.D#
Sample:	SC3170-015	CCV	CCB	Blank	Blank
Date/Time:	6/26/2009 10:24	6/26/2009 10:32	6/26/2009 10:41	6/26/2009 10:50	6/26/2009 10:58
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	4.7345	8.9510	-0.0033	-0.0113	-0.0109
B / 11	22.1300	24.3900	0.2663	0.3787	0.3712
Na / 23	126.7000	5191.0000	-2.7070	-6.1020	-5.7350
Mg / 25	10415.0000	5195.0000	5.5130	1.6770	1.7300
Al / 27	135000.0000	570.0000	11.7100	5.1990	3.8790
Si / 29	3381.5000	517.1000	0.3625	3.4660	3.1590
K / 39	7285.0000	5037.0000	42.8300	27.0100	26.6200
Ca / 44	1450.0000	5098.0000	-69.2700	-70.0400	-69.9100
V / 51	291.9000	25.3600	-0.1051	-0.0443	0.0196
Cr / 52	149.1500	25.4200	-0.0214	0.0624	0.1046
Mn / 55	2029.5000	26.1200	0.0357	-0.0345	-0.0652
Fe / 57	125950.0000	5194.0000	29.0300	17.7500	17.6900
Co / 59	55.5000	10.3400	-0.0028	-0.0156	-0.0164
Ni / 60	107.3000	25.2300	-0.2167	-0.2073	-0.2045
Cu / 65	401.5000	25.5500	0.1777	0.2735	0.3866
Zn / 66	253.6500	25.6400	-0.7512	-0.5144	-0.4422
As / 75	25.0550	24.9700	0.1196	0.0158	0.0069
Se / 82	2.9495	25.1900	0.1185	-0.1388	0.0486
Sr / 88	46.2950	25.1200	-0.0262	-0.0357	-0.0397
Mo / 98	5.5300	24.7900	0.1141	0.0135	0.0034
Ag / 107	0.3673	10.2800	0.0033	-0.0033	-0.0070
Cd / 114	0.1253	10.2500	0.0016	-0.0061	-0.0068
Sn / 118	67.6000	24.6600	-0.2826	-0.2160	-0.2197
Sb / 123	1.4550	25.0500	0.0189	0.0003	0.0000
Ba / 135	471.4000	24.3500	0.0236	0.0979	0.1293
W / 182	0.6405	24.7400	0.2567	0.1393	0.0928
Tl / 203	1.3010	9.1710	0.0738	0.0043	-0.0091
Pb / 208	2995.5000	25.3900	0.2660	0.1703	0.1526
Th / 232	41.9900	9.7690	0.0102	0.0028	-0.0009
U / 238	7.3750	9.9830	0.0056	-0.0039	-0.0062
Li / 6	545367.6	522459.1	518617.8	528715.8	534645.1
Sc / 45	769554.6	728356.5	709274.7	736380.3	722491.3
Ge / 72	156215	153214.3	152866.8	154581.8	154255.7
Tb / 159	1138899	1147938	1116716	1164158	1128027
Bi / 209	574443.1	595264.8	598909	607588.5	602550.2
Li / 6	105.7	101.3	100.5	102.5	103.7
Sc / 45	103.2	97.7	95.1	98.7	96.9
Ge / 72	98.7	96.8	96.6	97.7	97.5
Tb / 159	96.6	97.4	94.7	98.7	95.7
Bi / 209	92.7	96.1	96.7	98.1	97.3

File:	009CALB.D#	010CALI.D#	011CALI.D#	012CALI.D#	013CALI.D#
Sample:	Cal Blank	Cal Std 1	Cal Std 2	Cal Std 3	Cal Std 4
Date/Time:	6/26/2009 18:09	6/26/2009 18:18	6/26/2009 18:26	6/26/2009 18:35	6/26/2009 18:43
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution:	1	1	1	1	1
Be / 9	0.0000	0.5000	4.7250	27.0700	50.8200
B / 11	0.0000	0.5000	4.5740	26.5200	51.4800
Na / 23	0.0000	100.0000	995.7000	5197.0000	10140.0000
Mg / 25	0.0000	100.0000	949.6000	5562.0000	9923.0000
Al / 27	0.0000	10.0000	103.5000	544.9000	976.5000
Si / 29	0.0000	10.0000	85.4000	522.3000	1006.0000
K / 39	0.0000	100.0000	854.7000	5177.0000	10080.0000
Ca / 44	0.0000	100.0000	995.9000	5497.0000	9957.0000
V / 51	0.0000	0.5000	4.2790	24.5500	50.6700
Cr / 52	0.0000	0.5000	3.7690	25.0300	50.6600
Mn / 55	0.0000	0.5000	4.6800	25.5400	50.4800
Fe / 57	0.0000	100.0000	964.6000	5219.0000	10040.0000
Co / 59	0.0000	0.5000	4.6600	25.7300	50.1800
Ni / 60	0.0000	0.5000	4.8400	25.4400	50.1700
Cu / 65	0.0000	0.5000	4.3940	25.1000	50.5100
Zn / 66	0.0000	0.5000	5.7770	26.2500	49.4600
As / 75	0.0000	0.5000	5.0880	25.4500	50.0700
Se / 82	0.0000	0.5000	3.7250	26.7000	48.4400
Sr / 88	0.0000	0.5000	4.7490	25.7900	50.0300
Mo / 98	0.0000	0.5000	4.6500	24.8100	52.3800
Ag / 107	0.0000	0.5000	4.7840	24.9900	49.8800
Cd / 114	0.0000	0.5000	4.6570	25.5500	49.9100
Sn / 118	0.0000	0.5000	5.0580	23.7900	50.5200
Sb / 123	0.0000	0.5000	4.5800	25.9700	50.7000
Ba / 135	0.0000	0.5000	5.0560	25.9900	50.8800
W / 182	0.0000	0.5000	4.4640	26.5000	50.7100
Tl / 203	0.0000	0.5000	4.7440	26.9700	52.3600
Pb / 208	0.0000	0.5000	4.5970	25.7000	51.2000
Th / 232	0.0000	0.5000	6.2710	35.1800	55.8100
U / 238	0.0000	0.5000	4.6270	26.2700	51.8700
Li / 6	100.00	100.78	105.63	98.65	97.22
Sc / 45	100.00	99.34	104.51	102.84	99.92
Ge / 72	100.00	99.81	104.00	103.33	100.43
Tb / 159	100.00	99.52	105.45	103.66	100.08
Bi / 209	100.00	99.60	104.06	102.09	96.44
Li / 6	549778.8	554093.9	580732.2	542382.9	534492.3
Sc / 45	735423.7	730556.8	768615.5	756293.9	734824
Ge / 72	154618.1	154323.8	160808.6	159762.9	155285.3
Tb / 159	1132545	1127081	1194285	1174011	1133479
Bi / 209	605883.2	603441.2	630473.6	618540.2	584341.5

File:	014SMPL.D#	015_ICV.D#	016_ICB.D#	017_PQL.D#	018ICSA.D#
Sample:	Blank	ICV	ICB	PQL	ICSA
Date/Time:	6/26/2009 18:52	6/26/2009 19:00	6/26/2009 19:09	6/26/2009 19:18	6/26/2009 19:26
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution:	1	1	1	1	1
Be / 9	0.0373	20.1000	0.0165	0.2080	0.0136
B / 11	0.4993	21.6600	0.2723	8.1910	0.4757
Na / 23	8.6750	4050.0000	3.3210	212.7000	95110.0000
Mg / 25	7.4400	4193.0000	4.0950	20.7200	93490.0000
Al / 27	0.9918	428.0000	-0.2333	61.1500	95660.0000
Si / 29	1.2330	416.4000	-0.5953	42.1500	56.1500
K / 39	26.5300	4063.0000	16.4700	219.8000	95910.0000
Ca / 44	0.3752	3884.0000	-3.6650	16.5400	94810.0000
V / 51	0.0825	20.1200	0.0064	1.1200	0.2451
Cr / 52	-0.0269	20.2600	-0.0641	0.6009	1.7340
Mn / 55	0.0382	20.1900	-0.0090	0.1957	1.8040
Fe / 57	7.9600	3964.0000	2.0470	19.2000	91200.0000
Co / 59	0.0378	20.4000	0.0165	0.2008	0.1005
Ni / 60	0.0248	20.8200	-0.0112	0.1874	1.0720
Cu / 65	0.0542	20.3500	0.0037	0.2333	0.8293
Zn / 66	0.0491	20.9400	-0.0910	2.1540	0.6016
As / 75	0.0015	19.7300	0.0567	1.0130	0.1113
Se / 82	0.1181	20.4200	0.0298	1.1130	-1.6220
Sr / 88	0.0474	21.3800	0.0204	0.2054	2.6580
Mo / 98	0.2700	41.7800	0.2149	1.0990	1975.0000
Ag / 107	0.0315	20.3800	0.0178	0.2441	0.0439
Cd / 114	0.0392	20.2400	0.0174	0.2147	-0.0379
Sn / 118	0.1906	21.4200	0.0213	0.2248	0.0537
Sb / 123	0.0445	20.1400	0.0181	0.2107	0.1281
Ba / 135	0.0249	20.8000	0.0087	0.1835	1.4480
W / 182	0.7589	25.8000	0.4847	1.4590	0.4068
Tl / 203	0.4347	20.0500	0.1855	0.3944	0.0098
Pb / 208	0.0376	20.1700	0.0133	0.2063	0.1033
Th / 232	0.0425	21.3100	0.0271	0.1104	0.0459
U / 238	0.0332	20.8400	0.0179	0.2137	0.0076
Li / 6	99.93	98.30	100.43	98.91	80.23
Sc / 45	103.10	100.19	103.12	100.21	98.97
Ge / 72	102.03	101.19	102.37	100.49	100.61
Tb / 159	102.95	100.21	105.08	101.83	98.11
Bi / 209	103.15	98.92	103.33	101.15	86.99
Li / 6	549379	540451.6	552162.6	543801.1	441094.3
Sc / 45	758210.5	736836.1	758399.3	736985.1	727869.2
Ge / 72	157756.5	156456.9	158289.4	155381.4	155568.2
Tb / 159	1165976	1134949	1190041	1153291	1111176
Bi / 209	624986.8	599357.7	626079.7	612851.8	527060.3

File:	019ICSB.D#	020_BLK.D#	021_CCV.D#	022_CCB.D#	023_BLK.D#
Sample:	ICSAB	Blank	CCV	CCB	BLANK
Date/Time:	6/26/2009 19:35	6/26/2009 19:44	6/26/2009 19:52	6/26/2009 20:01	6/26/2009 20:09
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution:	1	1	1	1	1
Be / 9	23.5500	0.0142	10.8700	0.0131	0.0081
B / 11	25.5000	0.3670	27.8500	0.3581	0.2959
Na / 23	98320.0000	138.8000	5085.0000	41.7800	28.3000
Mg / 25	96410.0000	92.6800	5141.0000	28.9700	16.8900
Al / 27	97650.0000	99.8100	558.0000	25.6200	15.0200
Si / 29	520.5000	2.6950	495.7000	1.8660	2.3400
K / 39	98870.0000	186.0000	5087.0000	102.6000	81.9200
Ca / 44	98420.0000	91.8200	5120.0000	23.0300	12.4700
V / 51	19.8500	0.1009	25.1500	-0.0177	0.1918
Cr / 52	21.0700	0.2162	24.9800	-0.0111	0.0938
Mn / 55	20.9900	0.0067	25.1100	-0.0116	0.0178
Fe / 57	92400.0000	94.9200	4925.0000	29.2300	16.2600
Co / 59	18.9600	0.0143	10.1000	0.0056	0.0007
Ni / 60	19.5400	0.0341	25.1800	-0.0052	-0.0058
Cu / 65	18.9900	0.0680	25.1400	0.0323	0.0637
Zn / 66	19.0400	-0.0158	26.1500	-0.1320	0.0400
As / 75	19.3900	0.2183	25.0800	-0.0897	0.2652
Se / 82	17.4000	-0.1013	25.4000	-0.1210	-0.1618
Sr / 88	23.6600	0.0212	25.1900	0.0210	0.0166
Mo / 98	2028.0000	9.1730	28.2200	1.5240	0.8087
Ag / 107	17.8100	0.0128	10.2800	0.0133	-0.0011
Cd / 114	18.0900	0.0089	10.1800	0.0048	0.0032
Sn / 118	21.6100	0.1224	25.0200	0.0313	0.1246
Sb / 123	20.0900	0.0317	25.0000	0.0236	0.0211
Ba / 135	21.9100	-0.0016	25.1700	0.0153	0.0017
W / 182	26.8700	0.1472	25.1900	0.3940	0.2104
Tl / 203	20.2500	0.1536	9.6190	0.1228	0.0053
Pb / 208	20.8000	0.0146	25.1100	0.0183	0.0147
Th / 232	21.9200	0.0137	9.5370	0.0119	0.0059
U / 238	21.1600	0.0154	10.0500	0.0076	0.0060
Li / 6	76.43	81.16	83.38	83.68	84.75
Sc / 45	98.37	94.55	93.27	92.10	92.44
Ge / 72	100.79	94.61	94.21	93.71	94.42
Tb / 159	96.04	95.03	95.20	93.44	94.43
Bi / 209	85.27	97.00	95.44	96.35	97.63
Li / 6	420175.5	446216.9	458421.2	460032.7	465920.5
Sc / 45	723422.8	695353.9	685966.4	677335.7	679798.2
Ge / 72	155847.2	146284.6	145663.8	144889.3	145996.1
Tb / 159	1087645	1076247	1078198	1058268	1069488
Bi / 209	516627.3	587687.3	578237.6	583794.5	591496.7

File:	024_BLK.D#	025_CCV.D#	026_CCB.D#	027SMPL.D#	028SMPL.D#
Sample:	BLANK	CCV	CCB	PBWZF16ICW0	SC3465-001
Date/Time:	6/26/2009 20:18	6/26/2009 20:27	6/26/2009 20:35	6/26/2009 20:44	6/26/2009 20:52
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution:	1	1	1	5	1
Be / 9	0.0173	10.3600	0.0136	0.0118	0.0013
B / 11	0.2953	25.9900	0.3699	1.7780	13.0200
Na / 23	23.8400	4838.0000	16.3300	74.3500	2094.0000
Mg / 25	15.8300	4935.0000	10.5800	58.3000	36.8600
Al / 27	13.7600	498.6000	6.4280	39.4700	6.4050
Si / 29	2.3300	485.4000	-0.0734	71.8500	290.6000
K / 39	70.8600	4908.0000	53.9900	265.3500	145.9000
Ca / 44	15.1200	4877.0000	2.0140	20.7350	66.8000
V / 51	0.1401	24.5000	0.0888	1.0490	0.0044
Cr / 52	0.1262	24.4700	-0.0318	1.3185	0.1282
Mn / 55	0.0196	24.5700	0.0232	0.3872	0.0538
Fe / 57	14.5800	4860.0000	9.4230	39.4050	2.7710
Co / 59	0.0128	10.0400	0.0058	-0.0029	0.0015
Ni / 60	0.0068	24.9100	-0.0021	-0.0494	-0.0085
Cu / 65	0.0554	24.6700	0.0339	0.3124	8.8050
Zn / 66	0.0787	25.2400	-0.1271	0.6010	0.9143
As / 75	0.0936	24.7700	0.1352	1.3215	3.9230
Se / 82	0.0480	25.2600	-0.0508	-0.5560	0.0674
Sr / 88	0.0123	24.7500	0.0231	0.0824	0.4290
Mo / 98	0.6397	25.1200	0.3948	1.5250	0.2770
Ag / 107	0.0149	10.1000	0.0057	0.0282	-0.0015
Cd / 114	0.0104	10.1200	0.0112	0.0186	-0.0007
Sn / 118	0.1092	23.7400	0.0219	0.2914	-0.0171
Sb / 123	0.0279	24.0000	0.0377	0.1490	0.0102
Ba / 135	0.0065	23.9900	0.0128	-0.0089	0.0121
W / 182	0.1484	23.8900	0.3753	1.0980	0.2127
Tl / 203	-0.0061	9.1100	0.0708	-0.0844	-0.0358
Pb / 208	0.0207	24.3800	0.0246	0.1814	0.0637
Th / 232	0.0096	9.3910	0.0150	0.0462	0.0007
U / 238	0.0089	9.7710	0.0103	0.0294	0.0483
Li / 6	88.27	89.40	89.78	91.82	88.31
Sc / 45	95.76	98.73	99.41	95.09	95.12
Ge / 72	96.53	98.42	100.12	95.11	96.90
Tb / 159	98.03	102.76	103.47	95.55	97.60
Bi / 209	99.95	100.40	103.72	97.57	100.42
Li / 6	485303.4	491484.2	493606.4	504801.7	485502.1
Sc / 45	704224.8	726055.7	731052.7	699334.4	699522.7
Ge / 72	149260.4	152173.5	154797.3	147061.4	149828
Tb / 159	1110280	1163812	1171843	1082197	1105323
Bi / 209	605552	608321	628412.6	591135	608442

File:	029SMPL.D#	030SMPL.D#	031SMPL.D#	032SMPL.D#	033SMPL.D#
Sample:	SC3465-002	SC3484-001	SC3069-014	SC3139-001	SC3139-002
Date/Time:	6/26/2009 21:01	6/26/2009 21:09	6/26/2009 21:18	6/26/2009 21:27	6/26/2009 21:35
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution:	1	1	5	5	5
Be / 9	0.0121	0.0032	-0.0095	-0.0321	-0.0282
B / 11	35.5100	6.7490	1.6210	40.0750	41.9850
Na / 23	42940.0000	7733.0000	179.3500	24585.0000	24575.0000
Mg / 25	2004.0000	4688.0000	71.5000	6400.0000	6415.0000
Al / 27	11.6200	8.2310	34.8150	75.3000	17.1150
Si / 29	5091.0000	5862.0000	162.1000	11035.0000	10990.0000
K / 39	3019.0000	3412.0000	222.4000	2108.0000	2106.0000
Ca / 44	5061.0000	29460.0000	138.7500	14160.0000	14215.0000
V / 51	0.7661	0.4995	1.9215	2.8085	2.9435
Cr / 52	1.7780	1.4470	2.6035	2.4795	2.7130
Mn / 55	4.0160	0.0943	0.4606	827.0000	757.5000
Fe / 57	14.8700	55.4500	49.9100	1064.5000	67.0000
Co / 59	0.0105	0.0424	-0.0214	0.8410	0.7590
Ni / 60	1.3710	0.2473	-0.0339	0.3483	0.3804
Cu / 65	10.6500	6.9510	0.4867	0.9145	0.5360
Zn / 66	6.7910	2.8090	0.4892	0.4181	-0.1763
As / 75	90.8500	4.4860	1.8615	3.1795	3.8205
Se / 82	-0.0267	0.1981	-0.2491	1.3675	0.4817
Sr / 88	26.0800	144.6000	0.6055	104.3500	102.9500
Mo / 98	1.7380	0.3939	0.6940	1.2650	1.1190
Ag / 107	0.0068	0.0048	-0.0325	-0.0247	-0.0585
Cd / 114	0.0100	0.0007	-0.0078	-0.0508	-0.0417
Sn / 118	0.0272	-0.0040	0.2759	0.1945	0.1883
Sb / 123	0.0896	0.1021	0.0405	0.0318	-0.0176
Ba / 135	0.4182	1.3860	0.0280	44.5800	38.9400
W / 182	2.0780	0.1265	0.4048	0.2883	0.1573
Tl / 203	-0.0440	-0.0591	-0.3449	-0.3364	-0.3613
Pb / 208	0.5451	0.1267	0.0614	0.0710	0.0114
Th / 232	0.0052	0.0013	-0.0103	0.0029	-0.0224
U / 238	1.4000	3.4630	0.0029	-0.0093	-0.0186
Li / 6	84.91	86.51	92.03	93.11	93.05
Sc / 45	99.95	97.09	90.67	95.23	94.80
Ge / 72	100.51	98.27	93.18	95.96	96.19
Tb / 159	100.05	99.03	92.52	97.27	96.92
Bi / 209	97.55	99.87	96.52	99.48	98.42
Li / 6	466830.3	475602	505944.6	511904.6	511576.3
Sc / 45	735051.1	714025.1	666792	700307.4	697171.3
Ge / 72	155407.7	151949.1	144065.6	148364.3	148725.1
Tb / 159	1133113	1121613	1047802	1101629	1097678
Bi / 209	591069.3	605085.7	584806.3	602742.4	596299.1

File:	034SMPL.D#	035SMPL.D#	036_BLK.D#	037_CCV.D#	038_CCB.D#
Sample:	SC3139-005	LCSWZF16ICW0	BLANK	CCV	CCB
Date/Time:	6/26/2009 21:44	6/26/2009 21:52	6/26/2009 22:01	6/26/2009 22:09	6/26/2009 22:18
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution:	5	10	1	1	1
Be / 9	-0.0222	48.2500	-0.0057	10.1100	0.0027
B / 11	45.5250	531.9000	0.6902	26.0300	0.3571
Na / 23	22875.0000	7762.0000	12.4300	5074.0000	7.7520
Mg / 25	5585.0000	4622.0000	3.2470	5141.0000	5.1560
Al / 27	194.5500	2152.0000	5.4420	525.4000	0.5608
Si / 29	10405.0000	5336.0000	4.4360	518.6000	1.6570
K / 39	2534.5000	10050.0000	6.4430	5105.0000	22.5300
Ca / 44	11385.0000	2261.0000	29.0900	5148.0000	-3.4780
V / 51	4.7660	493.2000	0.2761	25.3900	0.0647
Cr / 52	2.8505	201.3000	0.2962	25.3700	-0.0019
Mn / 55	825.0000	499.3000	0.2385	25.6400	0.0232
Fe / 57	929.0000	981.8000	1.7780	5029.0000	3.4970
Co / 59	0.5565	495.9000	0.0272	10.2300	0.0012
Ni / 60	0.1904	504.6000	0.1333	25.6900	-0.0103
Cu / 65	1.0975	248.2000	0.2330	25.5200	0.0108
Zn / 66	3.0800	495.1000	0.9732	25.9800	-0.1333
As / 75	3.4090	494.5000	0.4231	25.7300	0.0550
Se / 82	-0.2328	497.2000	-0.0283	25.8400	0.0418
Sr / 88	89.5000	525.8000	0.0832	25.5800	0.0323
Mo / 98	0.5960	304.5000	0.1977	25.5900	0.1826
Ag / 107	-0.0512	49.2900	-0.0020	10.3800	0.0002
Cd / 114	-0.0460	254.8000	0.0144	10.4600	0.0010
Sn / 118	0.2099	523.4000	0.2507	25.3000	0.0167
Sb / 123	0.0644	498.1000	0.0349	25.3300	0.0192
Ba / 135	28.8500	1985.0000	0.1959	25.5400	0.0404
W / 182	0.2407	0.4223	0.0214	25.8300	0.2965
Tl / 203	-0.3969	451.9000	0.3386	9.6160	0.0889
Pb / 208	0.1185	498.2000	0.0427	25.2100	0.0167
Th / 232	-0.0171	-0.0409	-0.0074	9.7550	0.0051
U / 238	-0.0273	105.8000	0.0033	10.2400	0.0054
Li / 6	95.82	95.39	98.98	92.29	95.16
Sc / 45	97.62	98.27	103.44	95.36	98.67
Ge / 72	98.64	99.51	104.38	97.45	100.38
Tb / 159	99.60	101.08	109.35	98.70	103.73
Bi / 209	101.55	103.37	109.25	100.99	106.56
Li / 6	526772.1	524431.1	544173.4	507382.2	523158.4
Sc / 45	717917.8	722683.8	760755.4	701329.5	725669.9
Ge / 72	152519.3	153866.9	161384.8	150671	155208.9
Tb / 159	1128054	1144754	1238472	1117813	1174771
Bi / 209	615262.9	626317	661943.1	611872.7	645613.3

File:	039SMPL.D#	040SMPL.D#	041SMPL.D#	042SMPL.D#	043SMPL.D#
Sample:	PBSZF17ICS0	SC3139-005L	SC3139-006	SC3139-006L	SC2890-001
Date/Time:	6/26/2009 22:26	6/26/2009 22:35	6/26/2009 22:44	6/26/2009 22:52	6/26/2009 23:01
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution:	5	25	5	25	5
Be / 9	-0.0144	-0.1883	-0.0332	-0.1760	6.2500
B / 11	1.7470	44.6000	43.8200	44.2000	71.1500
Na / 23	34.9950	22965.0000	23090.0000	22757.5000	326.9500
Mg / 25	30.2450	5607.5000	5705.0000	5590.0000	13895.0000
Al / 27	13.8450	221.7750	69.7000	102.2500	111400.0000
Si / 29	46.7300	10532.5000	10500.0000	10407.5000	3979.5000
K / 39	85.9500	2897.5000	2556.0000	2710.0000	11835.0000
Ca / 44	-3.7895	11367.5000	11555.0000	11422.5000	4907.0000
V / 51	1.3405	6.6600	3.8775	7.4550	275.3500
Cr / 52	1.3535	3.2425	2.4925	5.6500	196.0000
Mn / 55	0.5800	804.2500	835.0000	814.2500	2086.5000
Fe / 57	41.5650	1028.0000	376.8000	340.5000	143050.0000
Co / 59	0.0070	0.3963	0.4905	0.1866	68.7500
Ni / 60	0.0367	-0.1684	0.1535	-0.5463	82.7000
Cu / 65	1.5870	1.0718	0.6385	0.6883	85.4500
Zn / 66	0.5700	2.7375	0.0987	-1.4690	294.1000
As / 75	1.6260	8.7450	4.1995	14.7525	31.9550
Se / 82	-0.1020	-0.1357	0.1108	4.2175	2.2045
Sr / 88	0.2164	89.4250	89.2000	89.5750	81.3000
Mo / 98	0.4809	1.3203	0.5515	1.0855	6.2100
Ag / 107	-0.0276	-0.1992	-0.0563	-0.2665	0.3006
Cd / 114	0.0182	-0.1874	-0.0433	-0.1760	0.3124
Sn / 118	6.1650	1.0128	0.3045	0.8575	15.2750
Sb / 123	0.0115	0.1574	0.0510	-0.1166	3.6445
Ba / 135	0.3333	30.1250	26.6750	26.3250	618.0000
W / 182	0.7915	2.2518	0.3836	1.2808	0.7660
Tl / 203	0.0008	-0.9825	-0.2879	-1.7758	0.9010
Pb / 208	0.1775	0.1658	0.0457	0.2335	2478.5000
Th / 232	-0.0014	-0.1386	-0.0152	-0.1936	33.1200
U / 238	-0.0115	-0.1491	-0.0219	-0.1479	7.6450
Li / 6	99.88	96.93	97.55	99.77	99.78
Sc / 45	102.87	99.47	97.01	102.23	105.96
Ge / 72	101.75	101.34	100.10	104.21	101.79
Tb / 159	110.49	103.19	101.13	109.99	102.30
Bi / 209	108.16	105.95	102.50	109.38	100.85
Li / 6	549111.4	532919.6	536309.8	548538.6	548590.1
Sc / 45	756501.9	731542.9	713399.7	751800.9	779283.3
Ge / 72	157331.4	156684.3	154775.7	161125.3	157383
Tb / 159	1251401	1168634	1145316	1245638	1158611
Bi / 209	655310.4	641948.4	621019.6	662710.8	611050.7

File:	044SMPL.D#	045SMPL.D#	046SMPL.D#	047SMPL.D#	048_BLK.D#
Sample:	SC2890-001A	SC2890-001S	SC2890-001P	LCSSZF17ICS0	BLANK
Date/Time:	6/26/2009 23:09	6/26/2009 23:18	6/26/2009 23:27	6/26/2009 23:35	6/26/2009 23:44
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution:	5	10	10	10	1
Be / 9	11.6600	52.2300	51.3800	881.3000	0.0583
B / 11	103.7000	576.3000	593.0000	683.4000	0.9677
Na / 23	2735.0000	7192.0000	7365.0000	3058.0000	8.5270
Mg / 25	15080.0000	21710.0000	21600.0000	25710.0000	5.0550
Al / 27	117300.0000	172400.0000	166000.0000	74040.0000	21.9500
Si / 29	5475.0000	4285.0000	4451.0000	3980.0000	2.6010
K / 39	14665.0000	28460.0000	29280.0000	23770.0000	33.6000
Ca / 44	5925.0000	7544.0000	7655.0000	51460.0000	30.0700
V / 51	308.0000	809.8000	795.8000	555.6000	0.1440
Cr / 52	226.8500	426.3000	420.7000	704.8000	0.2153
Mn / 55	2146.5000	2447.0000	2512.0000	2059.0000	0.4531
Fe / 57	147850.0000	170600.0000	169100.0000	106700.0000	23.2200
Co / 59	74.5000	520.7000	510.0000	640.7000	0.0578
Ni / 60	93.8500	562.2000	549.5000	990.7000	0.1980
Cu / 65	112.5500	322.7000	314.4000	381.8000	0.2472
Zn / 66	400.6500	796.0000	777.6000	1950.0000	1.1290
As / 75	80.3000	461.5000	467.2000	1184.0000	0.2981
Se / 82	49.0700	434.8000	443.3000	792.1000	-0.0468
Sr / 88	87.6000	595.6000	586.7000	672.6000	0.1153
Mo / 98	16.3050	267.2000	267.4000	615.6000	0.3674
Ag / 107	2.6955	45.7500	46.2200	196.3000	0.0110
Cd / 114	2.7205	226.8000	224.3000	372.5000	0.0327
Sn / 118	26.5100	452.8000	469.5000	956.8000	0.3207
Sb / 123	13.6450	225.4000	246.5000	562.5000	0.0591
Ba / 135	655.5000	2533.0000	2600.0000	3082.0000	0.4249
W / 182	12.8400	1.1680	1.0600	3.4500	0.0198
Tl / 203	5.1200	425.0000	441.8000	914.5000	0.6265
Pb / 208	2573.5000	2203.0000	2344.0000	1188.0000	0.2711
Th / 232	37.8050	43.9500	40.2400	43.7400	-0.0010
U / 238	8.7500	104.7000	103.8000	10.7100	-0.0006
Li / 6	94.52	99.34	94.54	92.54	95.28
Sc / 45	101.12	107.98	101.22	98.71	98.53
Ge / 72	98.28	102.97	99.19	97.60	98.58
Tb / 159	96.43	107.62	98.52	97.36	99.80
Bi / 209	95.31	102.88	98.37	98.68	100.84
Li / 6	519647	546141.7	519746.2	508788.7	523847.7
Sc / 45	743657.4	794094.3	744397.4	725909.5	724576.5
Ge / 72	151965.8	159210.1	153371.3	150914.5	152415.9
Tb / 159	1092104	1218807	1115788	1102696	1130246
Bi / 209	577487	623307.8	596008.4	597908.1	610957.1

File:	049_CCV.D#	050_CCB.D#	051SMPL.D#	052SMPL.D#	053SMPL.D#
Sample:	CCV	CCB	SC2890-001L	SC2890-002	SC2890-003
Date/Time:	6/26/2009 23:52	6/27/2009 0:01	6/27/2009 0:09	6/27/2009 0:18	6/27/2009 0:27
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution:	1	1	25	5	5
Be / 9	10.0200	0.0199	6.5550	4.3310	6.3050
B / 11	26.1600	0.5045	83.9750	58.5000	56.7500
Na / 23	4964.0000	9.9000	403.7500	175.1000	232.1500
Mg / 25	5044.0000	8.9510	13885.0000	9010.0000	11205.0000
Al / 27	519.5000	10.4900	119275.0000	77950.0000	90050.0000
Si / 29	496.9000	2.0430	4642.5000	4133.5000	3784.0000
K / 39	4961.0000	39.7900	13097.5000	8960.0000	9550.0000
Ca / 44	4946.0000	2.0390	5075.0000	3003.0000	4732.0000
V / 51	24.6200	0.1182	280.7500	204.4500	206.4000
Cr / 52	24.6000	0.0060	200.7250	137.3500	159.9500
Mn / 55	24.9100	0.1722	2123.2500	1618.0000	3997.0000
Fe / 57	4826.0000	17.1400	152325.0000	90250.0000	100650.0000
Co / 59	10.0700	0.0244	69.6250	29.3450	53.1500
Ni / 60	24.8100	0.0204	87.4000	50.9500	68.5000
Cu / 65	24.6800	0.0238	89.5000	48.4500	79.9500
Zn / 66	25.4400	-0.0426	306.0000	216.7500	285.6000
As / 75	24.6200	0.0024	33.4500	20.5100	22.4100
Se / 82	24.4900	-0.0022	-1.7378	1.9715	3.3370
Sr / 88	24.9700	0.0600	83.7250	51.1500	75.7500
Mo / 98	24.8900	0.2418	7.9075	4.1345	4.4655
Ag / 107	10.0300	0.0088	0.1360	0.2079	0.2917
Cd / 114	10.1100	0.0173	0.4380	0.3677	0.5845
Sn / 118	24.5100	0.0591	16.6750	11.5350	12.6450
Sb / 123	24.5300	0.0444	3.3450	5.5150	4.7630
Ba / 135	25.0400	0.1597	628.5000	544.0000	948.5000
W / 182	24.6200	0.3166	4.2750	0.8690	1.3805
Tl / 203	9.5730	0.1993	2.5050	0.9285	0.8345
Pb / 208	24.6700	0.1573	2432.7500	5905.0000	3225.5000
Th / 232	9.6460	0.0061	21.2375	19.8550	23.6350
U / 238	9.9220	0.0084	7.3625	5.6350	6.4400
Li / 6	92.53	93.70	97.34	96.02	94.90
Sc / 45	96.60	96.31	100.74	101.29	100.92
Ge / 72	97.64	97.42	99.48	98.76	97.68
Tb / 159	98.35	98.02	99.49	100.14	96.94
Bi / 209	98.66	100.87	100.80	97.50	95.86
Li / 6	508704.6	515127.8	535143.5	527903.3	521723.2
Sc / 45	710454.4	708258.4	740880.4	744946.2	742211.6
Ge / 72	150974.9	150634.8	153820.4	152695.9	151036.2
Tb / 159	1113860	1110095	1126726	1134163	1097839
Bi / 209	597770.5	611153.4	610758.6	590711.4	580801.1

File:	054SMPL.D#	055SMPL.D#	056SMPL.D#	057SMPL.D#	058SMPL.D#
Sample:	SC2890-004	SC2890-005	SC3170-001	SC3170-002	SC3170-003
Date/Time:	6/27/2009 0:35	6/27/2009 0:44	6/27/2009 0:52	6/27/2009 1:01	6/27/2009 1:10
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution:	5	5	5	5	5
Be / 9	5.6450	7.0400	6.3350	7.9400	2.3760
B / 11	47.8850	71.3500	52.2500	75.9000	19.7300
Na / 23	212.4000	286.7000	244.0500	439.9500	114.8500
Mg / 25	9860.0000	15005.0000	12585.0000	18275.0000	23905.0000
Al / 27	90200.0000	119300.0000	97300.0000	136750.0000	68250.0000
Si / 29	3863.0000	3171.5000	4195.5000	4358.5000	3882.5000
K / 39	8750.0000	11915.0000	9385.0000	13220.0000	4398.5000
Ca / 44	3306.0000	5155.0000	12305.0000	9585.0000	190650.0000
V / 51	208.7500	291.4000	220.3000	318.0000	244.9000
Cr / 52	151.7500	208.4000	154.4500	239.2000	362.2500
Mn / 55	3774.5000	1872.0000	3248.0000	3800.0000	1068.0000
Fe / 57	106500.0000	157750.0000	108550.0000	157700.0000	132050.0000
Co / 59	93.4500	69.8000	61.4000	81.3000	27.8850
Ni / 60	71.9000	87.4500	83.7500	134.6500	123.3000
Cu / 65	238.0500	94.2500	218.8000	173.2000	121.3000
Zn / 66	335.5000	309.2000	476.0500	614.0000	225.3500
As / 75	25.7450	32.6150	24.7850	30.6300	48.9950
Se / 82	2.8385	1.3645	3.1835	3.4000	1.1875
Sr / 88	78.7000	83.6500	93.8000	98.8000	700.0000
Mo / 98	4.4945	6.9550	4.5275	7.9850	5.9100
Ag / 107	0.2217	0.2447	0.1993	0.2989	0.0768
Cd / 114	0.6030	0.2760	1.0245	1.4380	0.6755
Sn / 118	20.6100	12.0550	16.5250	19.8700	9.2600
Sb / 123	4.1700	2.8125	6.3000	4.9890	3.5555
Ba / 135	764.0000	660.5000	894.0000	931.0000	191.4000
W / 182	0.7290	0.7420	1.0220	0.8130	3.1740
Tl / 203	0.8455	1.0760	0.8675	1.2110	0.2386
Pb / 208	2201.0000	1791.0000	603.0000	886.0000	205.3500
Th / 232	24.4050	36.3300	24.8500	37.9800	15.0350
U / 238	6.5300	8.2250	6.9450	9.2400	5.4750
Li / 6	96.11	96.00	97.76	94.61	93.93
Sc / 45	102.51	102.74	102.58	101.59	101.05
Ge / 72	97.86	98.70	99.71	97.47	96.33
Tb / 159	98.31	97.15	100.23	98.31	96.22
Bi / 209	96.81	95.75	98.37	95.37	96.32
Li / 6	528406.8	527793.9	537452.9	520146.3	516409.5
Sc / 45	753889	755561.3	754431.4	747107.1	743122.1
Ge / 72	151302	152605	154166.3	150709.9	148943.9
Tb / 159	1113380	1100273	1135154	1113430	1089754
Bi / 209	586528.8	580140.3	595985.8	577835.8	583603.9

File:	059_BLK.D#	060_CCV.D#	061_CCB.D#	062SMPL.D#	063SMPL.D#
Sample:	BLANK	CCV	CCB	SC3170-004	SC3170-005
Date/Time:	6/27/2009 1:18	6/27/2009 1:27	6/27/2009 1:35	6/27/2009 1:44	6/27/2009 1:53
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution:	1	1	1	5	5
Be / 9	-0.0061	9.5490	0.0081	2.3615	1.9030
B / 11	0.2542	24.8100	0.3177	16.6500	32.9550
Na / 23	0.5247	5007.0000	4.0460	137.2500	144.9000
Mg / 25	8.3140	5083.0000	6.8990	7410.0000	302850.0000
Al / 27	38.0100	529.4000	11.3000	106050.0000	92500.0000
Si / 29	3.3380	503.2000	1.5830	3397.0000	4170.5000
K / 39	13.4300	5020.0000	25.3300	4455.0000	4901.0000
Ca / 44	28.2900	5106.0000	3.3370	28365.0000	122550.0000
V / 51	0.1040	24.9500	0.0041	279.4000	210.6500
Cr / 52	0.0566	25.0000	-0.0233	295.0500	859.5000
Mn / 55	0.8739	25.5600	0.2609	1300.0000	2506.0000
Fe / 57	50.7500	4960.0000	16.5000	175300.0000	175150.0000
Co / 59	0.0147	10.1200	0.0012	55.3000	244.7500
Ni / 60	0.0400	25.3400	0.0023	119.3000	3535.0000
Cu / 65	0.0657	24.9300	0.0067	131.4000	240.9000
Zn / 66	0.1801	25.6600	-0.1145	228.6500	326.5000
As / 75	-0.0197	25.0900	0.0382	55.1000	61.2000
Se / 82	-0.0382	24.9000	-0.0418	0.6010	0.5365
Sr / 88	0.1278	25.2600	0.0548	124.2500	351.2000
Mo / 98	0.0222	24.8500	0.1335	10.6300	6.6450
Ag / 107	-0.0074	10.1000	0.0018	0.1121	0.1315
Cd / 114	-0.0075	10.0700	-0.0015	0.3445	0.6160
Sn / 118	0.1345	24.8000	0.0180	16.1150	12.7950
Sb / 123	-0.0060	24.5700	0.0202	5.2050	12.4850
Ba / 135	0.1884	25.1600	0.0799	258.0000	272.2000
W / 182	0.0281	24.7300	0.3190	2.7590	1.5055
Tl / 203	-0.0475	9.4980	0.0253	0.7055	0.6125
Pb / 208	0.3867	25.2200	0.1648	466.3000	1942.5000
Th / 232	0.0086	9.7280	0.0048	27.1150	24.3150
U / 238	-0.0019	10.0600	0.0038	6.5500	6.0400
Li / 6	97.93	97.07	99.60	100.13	100.41
Sc / 45	99.98	98.06	101.01	106.18	105.93
Ge / 72	100.20	98.94	101.48	99.67	100.05
Tb / 159	101.77	100.13	102.43	97.89	100.12
Bi / 209	103.01	98.16	103.41	97.36	94.86
Li / 6	538415.4	533681.8	547556.9	550491.7	552036.4
Sc / 45	735270.3	721170.4	742816.1	780879.6	779065
Ge / 72	154930.7	152980.2	156901.7	154114.3	154697.8
Tb / 159	1152625	1134023	1160010	1108700	1133905
Bi / 209	624107.6	594764.3	626568.6	589900.9	574749.8

File:	064SMPL.D#	065SMPL.D#	066SMPL.D#	067SMPL.D#	068SMPL.D#
Sample:	SC3170-006	SC3170-007	SC3170-008	SC3170-009	SC3170-010
Date/Time:	6/27/2009 2:01	6/27/2009 2:10	6/27/2009 2:19	6/27/2009 2:27	6/27/2009 2:36
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution:	5	5	5	5	5
Be / 9	5.8400	6.3750	4.6775	3.6755	5.5100
B / 11	189.1500	77.2000	112.8000	39.6450	53.1000
Na / 23	165.4500	198.4500	136.9500	105.2000	1006.0000
Mg / 25	14905.0000	14160.0000	10295.0000	6335.0000	11900.0000
Al / 27	105400.0000	134250.0000	70350.0000	59650.0000	107750.0000
Si / 29	4491.0000	3842.0000	3052.0000	3506.5000	3362.0000
K / 39	23030.0000	13005.0000	13795.0000	5900.0000	8965.0000
Ca / 44	3346.0000	1919.0000	3036.0000	2164.0000	2387.5000
V / 51	279.5000	300.8500	231.6500	146.3000	252.9500
Cr / 52	248.8000	198.6500	177.2500	110.9500	171.1000
Mn / 55	1980.5000	3150.5000	2197.0000	1851.5000	1093.0000
Fe / 57	149850.0000	144800.0000	105850.0000	66950.0000	112800.0000
Co / 59	45.2150	67.3500	39.6750	40.6300	65.2000
Ni / 60	85.3000	160.3000	80.9000	93.7000	80.9000
Cu / 65	278.0000	1018.5000	472.8500	714.5000	127.0500
Zn / 66	243.5000	322.0500	281.5500	172.9000	293.0000
As / 75	28.9150	28.0700	21.9350	12.5550	23.1850
Se / 82	2.2535	3.1480	3.1035	2.5190	3.7660
Sr / 88	52.1500	53.0500	42.1550	36.0050	56.4500
Mo / 98	7.5300	7.2150	5.6750	3.6205	6.4300
Ag / 107	0.6585	0.9685	2.7050	1.3070	0.2564
Cd / 114	0.3172	0.1340	0.6720	0.7935	0.1647
Sn / 118	25.4550	87.1500	33.1750	38.1100	17.4850
Sb / 123	1.1115	1.4460	1.8920	1.0565	1.3485
Ba / 135	429.3500	575.0000	413.0500	418.3000	437.8500
W / 182	0.7700	0.7705	0.7590	0.5515	0.5500
Tl / 203	0.6660	0.9530	0.3902	0.2657	0.8660
Pb / 208	888.0000	5380.0000	1337.5000	3460.0000	750.0000
Th / 232	35.3850	38.7650	19.9700	26.4100	27.1450
U / 238	6.7950	7.5000	5.3550	5.7050	7.3600
Li / 6	102.33	100.28	101.95	102.74	100.60
Sc / 45	102.94	103.73	104.94	105.15	101.78
Ge / 72	98.78	98.56	100.73	101.32	99.27
Tb / 159	96.86	98.69	101.53	102.52	97.31
Bi / 209	95.42	95.55	100.18	100.14	97.78
Li / 6	562598.8	551342.3	560517.1	564839.5	553089.5
Sc / 45	757016.1	762823.3	771751.3	773305.4	748541.5
Ge / 72	152729.6	152387.6	155753	156651.7	153485.1
Tb / 159	1097017	1117755	1149842	1161121	1102061
Bi / 209	578127.6	578942.9	606982.8	606726.6	592431.9

File:	069SMPL.D#	070_BLK.D#	071_CCV.D#	072_CCB.D#	073SMPL.D#
Sample:	SC3170-011	BLANK	CCV	CCB	SC3170-012
Date/Time:	6/27/2009 2:44	6/27/2009 2:53	6/27/2009 3:02	6/27/2009 3:10	6/27/2009 3:19
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution:	5	1	1	1	5
Be / 9	5.2800	-0.0103	9.7380	0.0086	7.2750
B / 11	127.8000	0.4507	24.8100	0.3293	16.7950
Na / 23	591.0000	8.8300	4974.0000	6.7280	127.8000
Mg / 25	14570.0000	6.6810	5077.0000	13.6700	4231.5000
Al / 27	115850.0000	39.1900	524.0000	25.6600	71700.0000
Si / 29	3521.5000	2.3740	502.1000	1.1210	2896.5000
K / 39	17020.0000	38.5100	4991.0000	43.3400	5065.0000
Ca / 44	2611.0000	67.5600	5013.0000	2.3470	4748.5000
V / 51	302.2500	0.0431	24.6600	0.1554	502.5000
Cr / 52	221.6500	0.0705	24.7000	0.0560	273.2500
Mn / 55	1093.5000	0.6300	25.1600	0.4530	4003.5000
Fe / 57	148250.0000	40.0600	4907.0000	35.4100	267800.0000
Co / 59	41.0500	0.0069	10.0500	0.0158	138.0500
Ni / 60	104.5500	0.1601	25.3200	0.0547	129.4000
Cu / 65	308.8500	0.1807	24.9400	0.0844	89.4500
Zn / 66	376.7000	0.6885	25.5000	-0.0279	327.4500
As / 75	31.4250	0.0037	24.6200	0.0999	45.3650
Se / 82	1.8335	-0.1633	24.5800	0.0330	2.8595
Sr / 88	57.0000	0.0712	24.6300	0.0643	63.9500
Mo / 98	7.6450	-0.0112	24.6900	0.1389	8.0600
Ag / 107	0.3630	-0.0120	10.0700	0.0023	0.1149
Cd / 114	0.4046	-0.0104	10.0600	0.0061	0.4762
Sn / 118	21.0600	0.2987	24.6600	0.0383	16.8450
Sb / 123	1.7805	-0.0093	24.9000	0.0255	1.3390
Ba / 135	437.7500	0.1580	25.0000	0.1268	452.8000
W / 182	0.5075	0.0174	24.9100	0.3259	3.5920
Tl / 203	0.6800	-0.0876	9.3250	0.0252	0.7230
Pb / 208	2860.0000	0.6806	24.8700	0.5119	100.8000
Th / 232	36.4100	0.0075	9.5040	0.0124	24.9700
U / 238	7.2800	-0.0061	9.8880	0.0072	6.3000
Li / 6	100.13	101.39	97.72	99.36	100.74
Sc / 45	103.38	100.72	98.57	100.31	104.63
Ge / 72	99.05	100.44	99.07	100.07	99.13
Tb / 159	97.54	100.80	98.97	101.41	96.07
Bi / 209	96.61	102.54	99.54	102.92	95.44
Li / 6	550466.6	557402.9	537219.5	546249	553868.1
Sc / 45	760277.1	740694.2	724911	737668.2	769495.9
Ge / 72	153147.5	155298	153184.5	154721.5	153266.2
Tb / 159	1104684	1141631	1120877	1148515	1088076
Bi / 209	585341.8	621262.6	603072.3	623580.5	578253.1

File:	074SMPL.D#	075SMPL.D#	076SMPL.D#	077SMPL.D#	078_BLK.D#
Sample:	SC3170-013	SC3170-014	SC3170-015	SC3143-002	BLANK
Date/Time:	6/27/2009 3:27	6/27/2009 3:36	6/27/2009 3:45	6/27/2009 3:53	6/27/2009 4:02
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution:	5	5	5	5	1
Be / 9	5.6000	6.2250	5.1050	0.3457	-0.0110
B / 11	20.8050	79.8000	23.8000	118.4500	0.3036
Na / 23	195.0000	192.1500	195.3000	2425.0000	-0.7246
Mg / 25	7405.0000	12200.0000	10705.0000	10035.0000	3.8780
Al / 27	105500.0000	141300.0000	135650.0000	7780.0000	21.5400
Si / 29	3057.0000	3421.5000	3332.5000	2314.0000	7.5220
K / 39	5485.0000	12900.0000	7405.0000	21360.0000	41.2800
Ca / 44	3851.0000	3950.0000	1838.5000	92500.0000	6.8680
V / 51	283.0000	313.4000	295.3500	11.5350	0.1201
Cr / 52	234.0000	219.2000	150.6500	29.8100	0.0520
Mn / 55	1798.0000	1574.5000	2070.5000	4702.5000	0.9131
Fe / 57	152200.0000	209350.0000	126150.0000	10460.0000	28.2900
Co / 59	56.7000	52.7500	55.5500	4.3250	0.0021
Ni / 60	74.2500	95.0000	110.0500	28.4700	0.0084
Cu / 65	54.8500	108.9000	404.4000	567.0000	0.1230
Zn / 66	213.2500	292.8000	264.7000	1937.5000	0.3580
As / 75	34.4600	45.2800	26.0550	7.0000	-0.0705
Se / 82	2.8125	1.5005	3.4045	4.4275	-0.1186
Sr / 88	40.2950	46.2700	47.5250	535.0000	0.0801
Mo / 98	10.7650	10.8700	5.7650	7.0650	0.0029
Ag / 107	1.2210	0.1165	0.3351	5.5850	-0.0109
Cd / 114	0.1317	0.2455	0.0947	12.1700	-0.0088
Sn / 118	13.7100	12.4450	73.1000	32.1650	0.1420
Sb / 123	1.6415	3.9130	1.5175	1.1700	0.0010
Ba / 135	492.2500	450.2500	489.4000	733.0000	0.1513
W / 182	1.5430	2.2920	0.7735	7.1400	0.0438
Tl / 203	0.6545	0.9170	1.1725	-0.1106	-0.0792
Pb / 208	102.3500	484.8500	3046.0000	45.1700	0.2469
Th / 232	37.2150	42.6600	42.3850	0.3790	0.0013
U / 238	7.4500	10.0050	7.3950	3.0560	-0.0067
Li / 6	103.61	103.19	101.52	96.40	96.36
Sc / 45	105.98	106.67	102.55	95.56	96.39
Ge / 72	100.89	101.43	98.54	95.32	98.23
Tb / 159	99.12	99.31	96.24	95.88	98.51
Bi / 209	97.88	97.68	95.96	104.09	101.30
Li / 6	569625.1	567290.8	558154.1	529993.2	529765.4
Sc / 45	779395.6	784489.1	754141.8	702747.9	708855
Ge / 72	155991.3	156822.8	152364.9	147385.2	151881.3
Tb / 159	1122536	1124674	1089996	1085829	1115655
Bi / 209	593046.6	591803.5	581430.8	630657.1	613731.1

File:	079_CCV.D#	080_CCB.D#	081_BLK.D#	082_BLK.D#	083_PQL.D#
Sample:	CCV	CCB	Blank	Blank	PQL
Date/Time:	6/27/2009 4:11	6/27/2009 4:19	6/27/2009 4:28	6/27/2009 4:36	6/27/2009 4:45
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution:	1	1	1	1	1
Be / 9	9.6090	0.0008	-0.0065	-0.0074	0.1732
B / 11	25.0800	0.2972	0.4190	0.3760	8.1630
Na / 23	4997.0000	2.9220	5.2440	4.5190	206.8000
Mg / 25	5123.0000	5.4710	5.1430	3.6800	20.5900
Al / 27	526.7000	6.3070	14.4700	11.8100	64.0700
Si / 29	500.9000	1.0700	3.6990	4.7220	41.0500
K / 39	4996.0000	35.8300	28.2800	21.5300	218.9000
Ca / 44	5043.0000	-0.2078	30.5100	28.5200	13.6500
V / 51	24.8700	0.0237	0.0307	0.0805	1.1130
Cr / 52	24.9200	-0.0620	0.0231	0.0637	0.5921
Mn / 55	25.5200	0.2379	0.3908	0.3239	0.3108
Fe / 57	4854.0000	9.0450	16.1900	10.2400	25.2100
Co / 59	10.1000	0.0001	0.0054	-0.0019	0.1855
Ni / 60	25.2100	-0.0121	0.1241	0.1078	0.1899
Cu / 65	24.9100	0.0306	0.2341	0.2107	0.1829
Zn / 66	25.8300	-0.0572	1.1170	0.9631	2.1310
As / 75	24.9300	-0.0026	-0.0292	0.0425	0.9097
Se / 82	25.0200	0.0671	0.0854	0.0690	0.8749
Sr / 88	25.0900	0.0408	0.0600	0.0474	0.2338
Mo / 98	24.8100	0.1112	0.0199	-0.0063	0.9657
Ag / 107	10.0400	0.0005	-0.0062	-0.0075	0.2338
Cd / 114	10.0300	-0.0034	-0.0078	-0.0091	0.1855
Sn / 118	24.4700	0.0201	0.2082	0.2050	0.2075
Sb / 123	24.4400	0.0044	-0.0013	-0.0029	0.1789
Ba / 135	24.6100	0.0655	0.1629	0.1248	0.1913
W / 182	24.3700	0.2860	0.1409	0.1167	1.2060
Tl / 203	9.2680	0.0190	-0.0550	-0.0689	0.2479
Pb / 208	24.7700	0.1035	0.1438	0.0978	0.2570
Th / 232	9.5610	0.0013	-0.0025	-0.0042	0.0849
U / 238	10.0200	-0.0018	-0.0045	-0.0031	0.1981
Li / 6	95.97	97.50	99.02	98.66	99.71
Sc / 45	97.87	98.30	99.50	98.67	99.92
Ge / 72	98.42	98.65	99.96	99.38	100.58
Tb / 159	100.14	98.80	100.20	99.59	102.29
Bi / 209	99.16	101.11	102.42	101.66	103.14
Li / 6	527648.3	536032.6	544367	542391.8	548174.3
Sc / 45	719754.4	722932.2	731744.1	725673.4	734841.2
Ge / 72	152181.1	152535.1	154562.1	153655.4	155517.2
Tb / 159	1134103	1118970	1134828	1127954	1158530
Bi / 209	600764.3	612593.3	620527	615913.1	624895.3

INSTRUMENT DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 3/6/2009

Concentration Units: ug/L

Analyte	CRDL	IDL	M
ALUMINUM	60	2.20	MS
ANTIMONY	0.2	0.03	MS
ARSENIC	0.2	0.08	MS
CALCIUM	20	3.90	MS
COPPER	1	0.04	MS
IRON	20	3.10	MS
LEAD	0.2	0.02	MS
MAGNESIUM	20	2.00	MS
MOLYBDENUM	1	0.07	MS
POTASSIUM	200	8.80	MS
SODIUM	200	6.50	MS
TIN	1	0.04	MS
ZINC	2	0.44	MS

METHOD DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 3/11/2009

Analyte	MDL	Units	M	EPA Prep./Anal. Method
ANTIMONY	0.01	mg/kg	MS	SW846 3050B / SW846 6020
ARSENIC	0.03	mg/kg	MS	SW846 3050B / SW846 6020
COPPER	0.02	mg/kg	MS	SW846 3050B / SW846 6020
LEAD	0.01	mg/kg	MS	SW846 3050B / SW846 6020
TIN	0.04	mg/kg	MS	SW846 3050B / SW846 6020
ZINC	0.07	mg/kg	MS	SW846 3050B / SW846 6020

ICP LINEAR RANGES

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 1/6/2009

Concentration Units: ug/L

Analyte	Integration Time (sec)	Linear Range	M
ALUMINUM	0.01	100000	MS
ANTIMONY	0.10	1000	MS
ARSENIC	0.30	1000	MS
CALCIUM	0.03	100000	MS
COPPER	0.10	500	MS
IRON	0.03	100000	MS
LEAD	0.10	1000	MS
MAGNESIUM	0.05	100000	MS
MOLYBDENUM	0.10	2000	MS
POTASSIUM	0.01	100000	MS
SODIUM	0.01	100000	MS
TIN	0.10	1000	MS
ZINC	0.10	250	MS

Quality Control Report

Blank Sample Summary Report

Total Solids

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG64648	ASTM D2216	05-JUN-09	04-JUN-09	U 1 %	1 %

Quality Control Report

Blank Sample Summary Report

Total Solids

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG65216	ASTM D2216	19-JUN-09	18-JUN-09	U 1 %	1 %

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

Quality Control Report

Laboratory Control Sample Summary Report

Total Solids

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG64648-2	LCS	WG64648	05-JUN-09	04-JUN-09	%	90	90.	100	80-120	

Quality Control Report

Laboratory Control Sample Summary Report

Total Solids

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG65216-3	LCSD	WG65216	19-JUN-09	18-JUN-09	%	90	90.	100	80-120	0
WG65216-2	LCS	WG65216	19-JUN-09	18-JUN-09	%	90	90.	100	80-120	

Quality Control Report

Duplicate Sample Summary Report

Total Solids

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG64648-4	SC2890-2	WG64648	05-JUN-09	%	85.	85.	0	20

Quality Control Report

Duplicate Sample Summary Report

Total Solids

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG65216-5	SC3170-9	WG65216	19-JUN-09	%	86.	86.	0	20

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. BASINSKI**	**DATE:**	**SEPTEMBER 14, 2009**
FROM:	**ANN COGNETTI**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION – PAHs**
NSF INDIAN HEAD
SAMPLE DELIVERY GROUP (SDG) – CTO423-4

SAMPLES: 21/Soil

X16SS0020001	X16SS0080001	X16SS0090001
X16SS0130001	X16SS0140001	X16SS0190001
X16SS0260001	X16SS0310001	X16SS0400001
X16SS0420001	X16SS0460001	X16SS0510001
X16SS0560001	X16SS0570001	X16SS0620001
X16SS0710001	X16SS0730001	X16SS0760001
X16SS0780001	X16SS080C0001	X16SS081C0001

3/Sediment

X15SD0030006	X15SD0050006	X15D0230006

Overview

The sample set for NSF Indian Head, SDG CTO423-4, consists of twenty-one (21) environmental soil samples and three (3) environmental sediment samples. The samples were analyzed for Polycyclic Aromatic Hydrocarbons (PAHs). The samples were collected by Tetra Tech NUS on June 1, June 10, June 13 and June 14, 2009 and analyzed by Katahdin Analytical Services under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. PAH analyses were conducted using SW846 method 8270C.

Summary

All compounds were successfully analyzed. The findings offered in this report are based upon a general review of all available data. The data review was based on data completeness, holding times, GC/MS tuning, initial / continuing calibration data, laboratory method/preparation blanks, surrogate spike recoveries, laboratory control sample / laboratory control sample duplicate (LCS / LCSD) results, matrix spike / matrix spike duplicate recoveries, detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems – None.

Minor Problems

- The sample extraction time from sample collection date was exceeded for samples X15SD0030006 and X15SD0050006. Positive detections were qualified (J) and nondetects (UJ), respectively with a qualifier code of (H).

- Blank WG65149 analyzed on June 30, 2009 @19:39 contained the contaminant chrysene at a concentration of 2.7 ug/kg. Action levels for chrysene was set by multiplying the maximum detected concentration by 5. The action level is 13.5 ug/kg. Sample aliquot, percent solids, and

dilution factors were taken into consideration during the application of action limits. Positive results for chyrsene detected at concentrations below the action level were qualified, (B), as a result of blank contamination. This noncompliance affects samples X15SD0030006 and X15SD0050006.

- In the continuing calibration on July 2, 2009 on instrument GCMS-G @ 14:10, fluorene had a percent difference (%D) greater than the 25% quality control limit. This calibration noncompliance affects samples X16SS0310001, X16SS0400001, X16SS0780001, X16SS0020001, X15SD0230006, X16SS0190001, X16SS0260001, X16SS0080001, X16SS0710001-DL, X16SS0620001-DL, X16SS0730001-DL, X16SS0760001-DL, and X16SS0560001-DL. Positive detections for fluorene were qualified (J) due to calibration noncompliance.

- Several samples had surrogate spike recoveries outside of quality control limits. When two of the surrogate recoveries are lower than the lower acceptance limit, the detected targeted compounds were qualified as biased low, (L). For non-detected targeted compounds, the sample is qualified as biased low (UL). Data qualification due to surrogate noncompliance affects samples X15SD0030006, X15SD0050006, X16SS0760001, X16SS0090001, X16SS0310001, X16SS0400001, X16SS0780001, X16SS0020001 and X16SS0730001-DL.

- The lab control sample, WG65149-LCS, had four percent recoveries (%R) outside the lower quality control limit. The low %Rs were for 2-methylnapthalene, acenaphthene, fluorene and fluroanthene. This noncompliance affects samples X15SD003006 and X15SD0050006. Nondetected results were qualified as biased low (UL).

- The lab control sample, WG65295-LCS, had six %R outside the lower quality control limit. The low %Rs were for 2-methylnaphthalene, acenaphthalene, fluorene, phenanthrene, anthracene and fluoranthene. This noncompliance affects samples X16SS0310001, X16SS040001, X16SS0780001, X16SS0260001, X16SS0080001 and X16SS0310001-DL. Positive detections were qualified as biased (L) and nondetects (UL).

Notes

Positive results reported below the reporting limit (RL) but above the method detection limit (MDL) for the organic analyses were qualified as estimated, "J".

In the continuing calibration on July 6, 2009 on instrument GCMS-G @ 12:05 had a %D greater than the quality control limit for 2-methylnaphthalene. This calibration noncompliance affects samples X16SS0570001 and X16SS0020001-DL. No action was taken since there were no positive detections for 2-methylnaphthalene in these two samples.

The matrix spike sample/matrix spike duplicate %R for sample X16SS0760001 had low recoveries for several compounds. These compounds were naphthalene, 2-methylnaphthalene, acenaphthene, fluorene, anthracene and fluoranthene. The lab did not calculate several other compounds % recoveries. The native sample had a higher concentration of analytes than the matrix spike/matrix spike duplicate sample. For example, the native sample concentration of fluoranthene was greater than 2X the matrix spike concentration. The concentrations of some of the analytes were high and outside of calibration range. No action was taken on this noncompliance.

Dilutions were made on several samples due to concentrations exceeding calibration range. These samples included X16SS0020001, X16SS0310001, X16SS0560001, X16SS0620001, X16SS0710001, X16SS0730001 and X16SS0760001.

Executive Summary

Laboratory Performance: Sample extraction time was exceeded for samples X15SD0030006 and X15SD0050006. Blank WG 65149 contained chrysene as a contaminant. Continuing calibration %D for fluorene exceeded the 25% quality control limit. Several surrogate recoveries were outside of the lower quality control limit.

Other Factors Affecting Data Quality: Several samples in this SDG were diluted for analysis.

The data for these analyses were reviewed with reference to Region III modifications to the "National Functional guidelines for Organic Data Review", September 1994, and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories "(January 2006).

The text of this report has been formulated to address only those problem areas affecting data quality.

Ann Cognetti

Tetra Tech NUS
Ann Cognetti
Chemist/Data Validator

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Appendix A

Qualified Analytical Results

Data Validation Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (e.g. base-line drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can be any number of issues; e.g. poor chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 00810	NSAMPLE	X15SD0030006			X15SD0050006			X15SD0230006		
SDG: CTO423-4	LAB_ID	SC3166-21			SC3166-22			SC3166-20RA		
FRACTION: PAH	SAMP_DATE	6/1/2009			6/1/2009			6/10/2009		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	83.2			80.3			78.3		
	DUP_OF									

PARAMETER	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE	24	UL	HR	25	UL	HR	26	U	
2-METHYLNAPHTHALENE	24	UL	HRE	25	UL	HRE	26	U	
ACENAPHTHENE	24	UL	HR	25	UL	HR	26	U	
ACENAPHTHYLENE	24	UL	HRE	25	UL	HRE	26	U	
ANTHRACENE	24	UL	HR	25	UL	HR	26	U	
BENZO(A)ANTHRACENE	24	UL	HR	25	UL	HR	2.9	J	P
BENZO(A)PYRENE	24	UL	HR	25	UL	HR	4.6	J	P
BENZO(B)FLUORANTHENE	24	UL	HR	25	UL	HR	3.4	J	P
BENZO(G,H,I)PERYLENE	24	UL	HR	25	UL	HR	2.8	J	P
BENZO(K)FLUORANTHENE	24	UL	HR	25	UL	HR	26	U	
CHRYSENE	3.5	B	A	25	UL	HR	5.4	J	P
DIBENZO(A,H)ANTHRACENE	24	UL	HR	25	UL	HR	26	U	
FLUORANTHENE	24	UL	HRE	25	UL	HRE	26	U	
FLUORENE	24	UL	HRE	25	UL	HRE	26	U	
INDENO(1,2,3-CD)PYRENE	24	UL	HR	25	UL	HR	2.9	J	P
NAPHTHALENE	24	UL	HR	25	UL	HR	26	U	
PHENANTHRENE	24	UL	HR	25	UL	HR	26	U	
PYRENE	24	UL	HR	25	UL	HR	26	U	

PROJ_NO: 00810	NSAMPLE	X16SS0020001			X16SS0020001DL			X16SS0080001			X16SS0090001		
SDG: CTO423-4	LAB_ID	SC3166-19RA			SC3166-19DL			SC3166-24			SC3166-10		
FRACTION: PAH	SAMP_DATE	6/13/2009			6/13/2009			6/13/2009			6/14/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	87.4			87.4			87.3			86.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE		2.6	L	R				23	U		23	UL	R
2-METHYLNAPHTHALENE		9.3	L	R				23	UL	E	23	UL	R
ACENAPHTHENE		23	UL	R				23	UL	E	23	UL	R
ACENAPHTHYLENE		23	UL	R				23	U		23	UL	R
ANTHRACENE		32	L	R				23	UL	E	23	UL	R
BENZO(A)ANTHRACENE					630			6	J	P	8.8	L	R
BENZO(A)PYRENE					630			7.6	J	P	8.7	L	R
BENZO(B)FLUORANTHENE		200	L	R				6	J	P	11	L	R
BENZO(G,H,I)PERYLENE		260	L	R				4.6	J	P	6.2	L	R
BENZO(K)FLUORANTHENE		40	L	R				23	U		23	UL	R
CHRYSENE					770			10	J	P	14	L	R
DIBENZO(A,H)ANTHRACENE		120	L	R				23	U		23	UL	R
FLUORANTHENE		79	L	R				8.9	L	EP	8	L	R
FLUORENE		4.2	L	CRP				23	UL	E	23	UL	R
INDENO(1,2,3-CD)PYRENE		78	L	R				3.4	J	P	5.9	L	R
NAPHTHALENE		23	UL	R				23	U		23	UL	R
PHENANTHRENE		140	L	R				3.2	L	EP	23	UL	R
PYRENE					620			6.1	J	P	9.5	L	R

PROJ_NO: 00810	NSAMPLE	X16SS0130001			X16SS0140001			X16SS0190001			X16SS0260001		
SDG: CTO423-4	LAB_ID	SC3166-13			SC3166-11			SC3166-12RA			SC3166-23		
FRACTION: PAH	SAMP_DATE	6/13/2009			6/14/2009			6/14/2009			6/13/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	82.5			85.4			89.1			83.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE		24	U		23	U		22	U		24	U	
2-METHYLNAPHTHALENE		24	U		23	U		22	U		24	UL	E
ACENAPHTHENE		24	U		23	U		22	U		24	UL	E
ACENAPHTHYLENE		24	U		23	U		22	U		24	U	
ANTHRACENE		1.8	J	P	7.3	J	P	10	J	P	5.5	L	EP
BENZO(A)ANTHRACENE		26			100			170			81		
BENZO(A)PYRENE		38			120			220			110		
BENZO(B)FLUORANTHENE		16	J	P	47			79			41		
BENZO(G,H,I)PERYLENE		22	J	P	58			110			58		
BENZO(K)FLUORANTHENE		4.3	J	P	9	J	P	13	J	P	6.6	J	P
CHRYSENE		41			120			210			110		
DIBENZO(A,H)ANTHRACENE		6.4	J	P	20	J	P	42			21	J	P
FLUORANTHENE		7.4	J	P	20	J	P	24			17	L	EP
FLUORENE		24	U		23	U		22	U		24	UL	E
INDENO(1,2,3-CD)PYRENE		8.1	J	P	17	J	P	28			18	J	P
NAPHTHALENE		24	U		23	U		22	U		24	U	
PHENANTHRENE		5.3	J	P	31			37			21	L	EP
PYRENE		26			110			150			71		

PROJ_NO: 00810 SDG: CTO423-4 FRACTION: PAH MEDIA: SOIL	NSAMPLE	X16SS0310001			X16SS0310001DL			X16SS0400001			X16SS0420001		
	LAB_ID	SC3166-1			SC3166-1DL			SC3166-2			SC3166-14		
	SAMP_DATE	6/13/2009			6/13/2009			6/13/2009			6/13/2009		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	83.3			83.3			81.6			77.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE		24	UL	R				24	UL	R	26	U	
2-METHYLNAPHTHALENE		6.4	L	EPR				24	UL	ER	26	U	
ACENAPHTHENE		24	UL	ER				24	UL	ER	26	U	
ACENAPHTHYLENE		24	L	R				24	UL	R	26	U	
ANTHRACENE		19	L	ERP				1.6	L	ERP	26	U	
BENZO(A)ANTHRACENE		300	L	R				24	L	RP	3.9	J	P
BENZO(A)PYRENE					420			29	L	R	5.8	J	P
BENZO(B)FLUORANTHENE		120	L	R				14	L	RP	26	U	
BENZO(G,H,I)PERYLENE		170	L	R				18	L	RP	3.4	J	P
BENZO(K)FLUORANTHENE		20	L	RP				24	UL	R	26	U	
CHRYSENE					390			30	L	R	7.7	J	P
DIBENZO(A,H)ANTHRACENE		58	L	R				6.1	L	RP	26	U	
FLUORANTHENE		48	L	ER				8.1	L	ERP	26	U	
FLUORENE		24	UL	ER				24	UL	ER	26	U	
INDENO(1,2,3-CD)PYRENE		43	L	R				6.9	L	RP	26	U	
NAPHTHALENE		24	UL	R				24	UL	R	26	U	
PHENANTHRENE		89	L	ER				6.5	L	ERP	26	U	
PYRENE		280	L	R				24	L	RP	4.6	J	P

PROJ_NO: 00810	NSAMPLE	X16SS0460001			X16SS0510001			X16SS0560001			X16SS0560001DL		
SDG: CTO423-4	LAB_ID	SC3166-15			SC3166-16			SC3166-17			SC3166-17DL		
FRACTION: PAH	SAMP_DATE	6/13/2009			6/13/2009			6/14/2009			6/14/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	82.6			83.9			81.9			81.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE		24	U		24	U		5.3	J	P			
2-METHYLNAPHTHALENE		24	U		24	U		25					
ACENAPHTHENE		24	U		24	U		3.6	J	P			
ACENAPHTHYLENE		24	U		24	U		24	U				
ANTHRACENE		24	U		18	J	P	75					
BENZO(A)ANTHRACENE		2.6	J	P	240						1700		
BENZO(A)PYRENE		24	U		240						1900		
BENZO(B)FLUORANTHENE		3	J	P	98						660		
BENZO(G,H,I)PERYLENE		24	U		82						830		
BENZO(K)FLUORANTHENE		24	U		21	J	P	120					
CHRYSENE		4.3	J	P	300						2200		
DIBENZO(A,H)ANTHRACENE		24	U		37			240					
FLUORANTHENE		5	J	P	40			180					
FLUORENE		24	U		24	U		9.4	J	P			
INDENO(1,2,3-CD)PYRENE		3.1	J	P	26			220					
NAPHTHALENE		24	U		24	U		24	U				
PHENANTHRENE		24	U		67			300					
PYRENE		3.1	J	P	200						1400		

PROJ_NO: 00810	NSAMPLE	X16SS0570001			X16SS0620001			X16SS0620001DL			X16SS0710001		
SDG: CTO423-4	LAB_ID	SC3166-18RA			SC3166-7			SC3166-7DL			SC3166-6		
FRACTION: PAH	SAMP_DATE	6/14/2009			6/14/2009			6/14/2009			6/14/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	78.0			83.8			83.8			86.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE		26	U		6.3	J	P				2.4	J	P
2-METHYLNAPHTHALENE		26	U		22	J	P				10	J	P
ACENAPHTHENE		26	U		4.4	J	P				23	U	
ACENAPHTHYLENE		26	U		24	U					23	U	
ANTHRACENE		26	U		68						17	J	P
BENZO(A)ANTHRACENE		2.6	J	P				1500					
BENZO(A)PYRENE		26	U					1400					
BENZO(B)FLUORANTHENE		26	U					550			170		
BENZO(G,H,I)PERYLENE		26	U					550			190		
BENZO(K)FLUORANTHENE		26	U		60						32		
CHRYSENE		5.6	J	P				1800					
DIBENZO(A,H)ANTHRACENE		26	U		200						59		
FLUORANTHENE		4.8	J	P	160						46		
FLUORENE		26	U		11	J	P				23	U	
INDENO(1,2,3-CD)PYRENE		3	J	P	140						48		
NAPHTHALENE		26	U		3.1	J	P				23	U	
PHENANTHRENE		26	U					400			86		
PYRENE		3.9	J	P				1300					

PROJ_NO: 00810	NSAMPLE	X16SS0710001DL			X16SS0730001			X16SS0730001DL			X16SS0760001		
SDG: CTO423-4	LAB_ID	SC3166-6DL			SC3166-8			SC3166-8DL			SC3166-9		
FRACTION: PAH	SAMP_DATE	6/14/2009			6/14/2009			6/14/2009			6/14/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	86.2			87.4			87.4			87.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE					4.8	J	P				16	L	RP
2-METHYLNAPHTHALENE					17	J	P				68	L	R
ACENAPHTHENE					2.4	J	P				7.7	L	RP
ACENAPHTHYLENE					23	U					23	UL	R
ANTHRACENE					38						110	L	R
BENZO(A)ANTHRACENE		420						690	L	R			
BENZO(A)PYRENE		480						820	L	R			
BENZO(B)FLUORANTHENE					220								
BENZO(G,H,I)PERYLENE					300								
BENZO(K)FLUORANTHENE					40						200	L	R
CHRYSENE		570						870	L	R			
DIBENZO(A,H)ANTHRACENE					110								
FLUORANTHENE					85						210	L	R
FLUORENE					6.2	J	P				21	J	RP
INDENO(1,2,3-CD)PYRENE					78						260	L	R
NAPHTHALENE					23	U					7.2	L	RP
PHENANTHRENE					160								
PYRENE		380						620	L	R			

PROJ_NO: 00810	NSAMPLE	X16SS0760001DL			X16SS0780001			X16SS080C0001			X16SS081C0001		
SDG: CTO423-4	LAB_ID	SC3166-9DL			SC3166-3			SC3166-4			SC3166-5		
FRACTION: PAH	SAMP_DATE	6/14/2009			6/14/2009			6/14/2009			6/14/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	87.0			86.8			87.9			88.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE					23	UL	R	23	U		23	U	
2-METHYLNAPHTHALENE					23	UL	ER	3.5	J	P	23	U	
ACENAPHTHENE					23	UL	ER	23	U		23	U	
ACENAPHTHYLENE					23	UL	R	23	U		23	U	
ANTHRACENE					5.2	L	ERP	4.1	J	P	5.6	J	P
BENZO(A)ANTHRACENE		2400			100	L	R	78			94		
BENZO(A)PYRENE		3200			120	L	R	91			100		
BENZO(B)FLUORANTHENE		1000			52	L	R	33			38		
BENZO(G,H,I)PERYLENE		1500			65	L	R	41			50		
BENZO(K)FLUORANTHENE					10	L	RP	5.8	J	P	7.7	J	P
CHRYSENE		3000			130	L	R	97			130		
DIBENZO(A,H)ANTHRACENE		540			22	L	RP	12	J	P	18	J	P
FLUORANTHENE					23	L	ERP	9.8	J	P	13	J	P
FLUORENE					23	UL	ER	23	U		23	U	
INDENO(1,2,3-CD)PYRENE					24	L	R	9.1	J	P	10	J	P
NAPHTHALENE					23	UL	R	23	U		23	U	
PHENANTHRENE		620			22	L	ERP	21	J	P	24		
PYRENE		2000			93	L	R	92			110		

Appendix B

Results as Reported by the Laboratory

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/16/09
Extraction Date: 06/22/09
Analysis Date: 02-JUL-2009 14:52
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 83.3

Lab ID: SC3166-1
Client ID: X16SS0310001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65295
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	24	1.0	20	24	2.0
91-20-3	Naphthalene	U	24	1.0	20	24	3.1
91-57-6	2-Methylnaphthalene	J	6.4	1.0	20	24	2.6
208-96-8	Acenaphthylene	U	24	1.0	20	24	1.4
83-32-9	Acenaphthene	U	24	1.0	20	24	1.8
86-73-7	Fluorene	U	24	1.0	20	24	3.8
85-01-8	Phenanthrene		89	1.0	20	24	2.2
120-12-7	Anthracene	J	19	1.0	20	24	1.4
206-44-0	Fluoranthene		48	1.0	20	24	2.2
129-00-0	Pyrene		280	1.0	20	24	2.5
56-55-3	Benzo(a)anthracene		300	1.0	20	24	2.3
218-01-9	Chrysene	E	360	1.0	20	24	2.0
205-99-2	Benzo(b)fluoranthene		120	1.0	20	24	2.9
207-08-9	Benzo(k)fluoranthene	J	20	1.0	20	24	3.7
50-32-8	Benzo(a)pyrene	E	370	1.0	20	24	4.0
193-39-5	Indeno(1,2,3-cd)pyrene		43	1.0	20	24	2.3
53-70-3	Dibenzo(a,h)anthracene		58	1.0	20	24	2.2
191-24-2	Benzo(g,h,i)perylene		170	1.0	20	24	2.4
321-60-8	2-Methylnaphthalene-D10		* 30%				
118-79-6	Fluorene-D10		* 48%				
1718-51-0	Pyrene-D10		66%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/16/09
Extraction Date: 06/22/09
Analysis Date: 07-JUL-2009 13:01
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 83.3

Lab ID: SC3166-1DL
Client ID: X16SS0310001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65295
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	48	2.0	20	48	4.1
91-20-3	Naphthalene	U	48	2.0	20	48	6.2
91-57-6	2-Methylnaphthalene	J	6.0	2.0	20	48	5.3
208-96-8	Acenaphthylene	U	48	2.0	20	48	2.9
83-32-9	Acenaphthene	U	48	2.0	20	48	3.6
86-73-7	Fluorene	U	48	2.0	20	48	7.7
85-01-8	Phenanthrene		99	2.0	20	48	4.3
120-12-7	Anthracene	J	31	2.0	20	48	2.9
206-44-0	Fluoranthene		52	2.0	20	48	4.3
129-00-0	Pyrene		420	2.0	20	48	5.0
56-55-3	Benzo(a)anthracene		370	2.0	20	48	4.6
218-01-9	Chrysene		390	2.0	20	48	4.1
205-99-2	Benzo(b)fluoranthene		140	2.0	20	48	5.8
207-08-9	Benzo(k)fluoranthene	J	18	2.0	20	48	7.4
50-32-8	Benzo(a)pyrene		420	2.0	20	48	7.9
193-39-5	Indeno(1,2,3-cd)pyrene		59	2.0	20	48	4.6
53-70-3	Dibenzo(a,h)anthracene		82	2.0	20	48	4.3
191-24-2	Benzo(g,h,i)perylene		200	2.0	20	48	4.8
321-60-8	2-Methylnaphthalene-D10		42%				
118-79-6	Fluorene-D10		53%				
1718-51-0	Pyrene-D10		63%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/16/09
Extraction Date: 06/22/09
Analysis Date: 02-JUL-2009 15:34
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 81.6

Lab ID: SC3166-2
Client ID: X16SS0400001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65295
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	24	1.0	20	24	2.1
91-20-3	Naphthalene	U	24	1.0	20	24	3.2
91-57-6	2-Methylnaphthalene	U	24	1.0	20	24	2.7
208-96-8	Acenaphthylene	U	24	1.0	20	24	1.5
83-32-9	Acenaphthene	U	24	1.0	20	24	1.8
86-73-7	Fluorene	U	24	1.0	20	24	3.9
85-01-8	Phenanthrene	J	6.5	1.0	20	24	2.2
120-12-7	Anthracene	J	1.6	1.0	20	24	1.5
206-44-0	Fluoranthene	J	8.1	1.0	20	24	2.2
129-00-0	Pyrene	J	24	1.0	20	24	2.6
56-55-3	Benzo(a)anthracene	J	24	1.0	20	24	2.3
218-01-9	Chrysene		30	1.0	20	24	2.1
205-99-2	Benzo(b)fluoranthene	J	14	1.0	20	24	2.9
207-08-9	Benzo(k)fluoranthene	U	24	1.0	20	24	3.8
50-32-8	Benzo(a)pyrene		29	1.0	20	24	4.0
193-39-5	Indeno(1,2,3-cd)pyrene	J	6.9	1.0	20	24	2.3
53-70-3	Dibenzo(a,h)anthracene	J	6.1	1.0	20	24	2.2
191-24-2	Benzo(g,h,i)perylene	J	18	1.0	20	24	2.4
321-60-8	2-Methylnaphthalene-D10		* 23%				
118-79-6	Fluorene-D10		* 44%				
1718-51-0	Pyrene-D10		58%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/22/09
Analysis Date: 02-JUL-2009 16:15
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 86.8

Lab ID: SC3166-3
Client ID: X16SS0780001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65295
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	23	1.0	20	23	2.0
91-20-3	Naphthalene	U	23	1.0	20	23	3.0
91-57-6	2-Methylnaphthalene	U	23	1.0	20	23	2.5
208-96-8	Acenaphthylene	U	23	1.0	20	23	1.4
83-32-9	Acenaphthene	U	23	1.0	20	23	1.7
86-73-7	Fluorene	U	23	1.0	20	23	3.7
85-01-8	Phenanthrene	J	22	1.0	20	23	2.1
120-12-7	Anthracene	J	5.2	1.0	20	23	1.4
206-44-0	Fluoranthene	J	23	1.0	20	23	2.1
129-00-0	Pyrene		93	1.0	20	23	2.4
56-55-3	Benzo(a)anthracene		100	1.0	20	23	2.2
218-01-9	Chrysene		130	1.0	20	23	2.0
205-99-2	Benzo(b)fluoranthene		52	1.0	20	23	2.8
207-08-9	Benzo(k)fluoranthene	J	10	1.0	20	23	3.6
50-32-8	Benzo(a)pyrene		120	1.0	20	23	3.8
193-39-5	Indeno(1,2,3-cd)pyrene		24	1.0	20	23	2.2
53-70-3	Dibenzo(a,h)anthracene	J	22	1.0	20	23	2.1
191-24-2	Benzo(g,h,i)perylene		65	1.0	20	23	2.3
321-60-8	2-Methylnaphthalene-D10		* 32%				
118-79-6	Fluorene-D10		* 48%				
1718-51-0	Pyrene-D10		67%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 01-JUL-2009 13:29
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 87.9

Lab ID: SC3166-4
Client ID: X16SS080C0001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	23	1.0	20	23	1.9
91-20-3	Naphthalene	U	23	1.0	20	23	3.0
91-57-6	2-Methylnaphthalene	J	3.5	1.0	20	23	2.5
208-96-8	Acenaphthylene	U	23	1.0	20	23	1.4
83-32-9	Acenaphthene	U	23	1.0	20	23	1.7
86-73-7	Fluorene	U	23	1.0	20	23	3.6
85-01-8	Phenanthrene	J	21	1.0	20	23	2.0
120-12-7	Anthracene	J	4.1	1.0	20	23	1.4
206-44-0	Fluoranthene	J	9.8	1.0	20	23	2.0
129-00-0	Pyrene		92	1.0	20	23	2.4
56-55-3	Benzo(a)anthracene		78	1.0	20	23	2.2
218-01-9	Chrysene		97	1.0	20	23	1.9
205-99-2	Benzo(b)fluoranthene		33	1.0	20	23	2.7
207-08-9	Benzo(k)fluoranthene	J	5.8	1.0	20	23	3.5
50-32-8	Benzo(a)pyrene		91	1.0	20	23	3.8
193-39-5	Indeno(1,2,3-cd)pyrene	J	9.1	1.0	20	23	2.2
53-70-3	Dibenzo(a,h)anthracene	J	12	1.0	20	23	2.0
191-24-2	Benzo(g,h,i)perylene		41	1.0	20	23	2.3
321-60-8	2-Methylnaphthalene-D10		37%				
118-79-6	Fluorene-D10		* 40%				
1718-51-0	Pyrene-D10		64%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 01-JUL-2009 00:42
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 88.2

Lab ID: SC3166-5
Client ID: X16SS081C0001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	23	1.0	20	23	1.9
91-20-3	Naphthalene	U	23	1.0	20	23	2.9
91-57-6	2-Methylnaphthalene	U	23	1.0	20	23	2.5
208-96-8	Acenaphthylene	U	23	1.0	20	23	1.4
83-32-9	Acenaphthene	U	23	1.0	20	23	1.7
86-73-7	Fluorene	U	23	1.0	20	23	3.6
85-01-8	Phenanthrene		24	1.0	20	23	2.0
120-12-7	Anthracene	J	5.6	1.0	20	23	1.4
206-44-0	Fluoranthene	J	13	1.0	20	23	2.0
129-00-0	Pyrene		110	1.0	20	23	2.4
56-55-3	Benzo(a)anthracene		94	1.0	20	23	2.2
218-01-9	Chrysene		130	1.0	20	23	1.9
205-99-2	Benzo(b)fluoranthene		38	1.0	20	23	2.7
207-08-9	Benzo(k)fluoranthene	J	7.7	1.0	20	23	3.5
50-32-8	Benzo(a)pyrene		100	1.0	20	23	3.7
193-39-5	Indeno(1,2,3-cd)pyrene	J	10	1.0	20	23	2.2
53-70-3	Dibenzo(a,h)anthracene	J	18	1.0	20	23	2.0
191-24-2	Benzo(g,h,i)perylene		50	1.0	20	23	2.3
321-60-8	2-Methylnaphthalene-D10		55%				
118-79-6	Fluorene-D10		54%				
1718-51-0	Pyrene-D10		82%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 01-JUL-2009 14:11
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 86.2

Lab ID: SC3166-6
Client ID: X16SS0710001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	J	2.4	1.0	20	23	2.0
91-20-3	Naphthalene	U	23	1.0	20	23	3.0
91-57-6	2-Methylnaphthalene	J	10	1.0	20	23	2.6
208-96-8	Acenaphthylene	U	23	1.0	20	23	1.4
83-32-9	Acenaphthene	U	23	1.0	20	23	1.7
86-73-7	Fluorene	U	23	1.0	20	23	3.7
85-01-8	Phenanthrene		86	1.0	20	23	2.1
120-12-7	Anthracene	J	17	1.0	20	23	1.4
206-44-0	Fluoranthene		46	1.0	20	23	2.1
129-00-0	Pyrene	E	360	1.0	20	23	2.4
56-55-3	Benzo(a)anthracene	E	340	1.0	20	23	2.2
218-01-9	Chrysene	E	420	1.0	20	23	2.0
205-99-2	Benzo(b)fluoranthene		170	1.0	20	23	2.8
207-08-9	Benzo(k)fluoranthene		32	1.0	20	23	3.6
50-32-8	Benzo(a)pyrene	E	400	1.0	20	23	3.8
193-39-5	Indeno(1,2,3-cd)pyrene		48	1.0	20	23	2.2
53-70-3	Dibenzo(a,h)anthracene		59	1.0	20	23	2.1
191-24-2	Benzo(g,h,i)perylene		190	1.0	20	23	2.3
321-60-8	2-Methylnaphthalene-D10		34%				
118-79-6	Fluorene-D10		* 44%				
1718-51-0	Pyrene-D10		78%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 02-JUL-2009 21:52
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 86.2

Lab ID: SC3166-6DL
Client ID: X16SS0710001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	46	2.0	20	46	3.9
91-20-3	Naphthalene	U	46	2.0	20	46	6.0
91-57-6	2-Methylnaphthalene	U	46	2.0	20	46	5.1
208-96-8	Acenaphthylene	U	46	2.0	20	46	2.8
83-32-9	Acenaphthene	U	46	2.0	20	46	3.5
86-73-7	Fluorene	U	46	2.0	20	46	7.4
85-01-8	Phenanthrene		97	2.0	20	46	4.2
120-12-7	Anthracene	J	25	2.0	20	46	2.8
206-44-0	Fluoranthene		67	2.0	20	46	4.2
129-00-0	Pyrene		380	2.0	20	46	4.9
56-55-3	Benzo(a)anthracene		420	2.0	20	46	4.4
218-01-9	Chrysene		570	2.0	20	46	3.9
205-99-2	Benzo(b)fluoranthene		180	2.0	20	46	5.6
207-08-9	Benzo(k)fluoranthene	J	26	2.0	20	46	7.2
50-32-8	Benzo(a)pyrene		480	2.0	20	46	7.6
193-39-5	Indeno(1,2,3-cd)pyrene		74	2.0	20	46	4.4
53-70-3	Dibenzo(a,h)anthracene		94	2.0	20	46	4.2
191-24-2	Benzo(g,h,i)perylene		250	2.0	20	46	4.6
321-60-8	2-Methylnaphthalene-D10		40%				
118-79-6	Fluorene-D10		60%				
1718-51-0	Pyrene-D10		93%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 01-JUL-2009 14:53
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 83.8

Lab ID: SC3166-7
Client ID: X16SS0620001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	J	6.3	1.0	20	24	2.0
91-20-3	Naphthalene	J	3.1	1.0	20	24	3.1
91-57-6	2-Methylnaphthalene	J	22	1.0	20	24	2.6
208-96-8	Acenaphthylene	U	24	1.0	20	24	1.4
83-32-9	Acenaphthene	J	4.4	1.0	20	24	1.8
86-73-7	Fluorene	J	11	1.0	20	24	3.8
85-01-8	Phenanthrene	E	330	1.0	20	24	2.1
120-12-7	Anthracene		68	1.0	20	24	1.4
206-44-0	Fluoranthene		160	1.0	20	24	2.1
129-00-0	Pyrene	E	1200	1.0	20	24	2.5
56-55-3	Benzo(a)anthracene	E	1400	1.0	20	24	2.3
218-01-9	Chrysene	E	1400	1.0	20	24	2.0
205-99-2	Benzo(b)fluoranthene	E	500	1.0	20	24	2.9
207-08-9	Benzo(k)fluoranthene		60	1.0	20	24	3.7
50-32-8	Benzo(a)pyrene	E	1200	1.0	20	24	3.9
193-39-5	Indeno(1,2,3-cd)pyrene		140	1.0	20	24	2.3
53-70-3	Dibenzo(a,h)anthracene		200	1.0	20	24	2.1
191-24-2	Benzo(g,h,i)perylene	E	450	1.0	20	24	2.4
321-60-8	2-Methylnaphthalene-D10		40%				
118-79-6	Fluorene-D10		* 43%				
1718-51-0	Pyrene-D10		83%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 02-JUL-2009 22:35
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 83.8

Lab ID: SC3166-7DL
Client ID: X16SS0620001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	210	9.0	20	210	18
91-20-3	Naphthalene	U	210	9.0	20	210	28
91-57-6	2-Methylnaphthalene	U	210	9.0	20	210	24
208-96-8	Acenaphthylene	U	210	9.0	20	210	13
83-32-9	Acenaphthene	U	210	9.0	20	210	16
86-73-7	Fluorene	U	210	9.0	20	210	34
85-01-8	Phenanthrene		400	9.0	20	210	19
120-12-7	Anthracene	J	100	9.0	20	210	13
206-44-0	Fluoranthene		250	9.0	20	210	19
129-00-0	Pyrene		1300	9.0	20	210	22
56-55-3	Benzo(a)anthracene		1500	9.0	20	210	20
218-01-9	Chrysene		1800	9.0	20	210	18
205-99-2	Benzo(b)fluoranthene		550	9.0	20	210	26
207-08-9	Benzo(k)fluoranthene	J	98	9.0	20	210	33
50-32-8	Benzo(a)pyrene		1400	9.0	20	210	35
193-39-5	Indeno(1,2,3-cd)pyrene	J	180	9.0	20	210	20
53-70-3	Dibenzo(a,h)anthracene		250	9.0	20	210	19
191-24-2	Benzo(g,h,i)perylene		550	9.0	20	210	21
321-60-8	2-Methylnaphthalene-D10		62%				
118-79-6	Fluorene-D10		* 43%				
1718-51-0	Pyrene-D10		83%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 01-JUL-2009 15:35
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 87.4

Lab ID: SC3166-8
Client ID: X16SS0730001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	J	4.8	1.0	20	23	1.9
91-20-3	Naphthalene	U	23	1.0	20	23	3.0
91-57-6	2-Methylnaphthalene	J	17	1.0	20	23	2.5
208-96-8	Acenaphthylene	U	23	1.0	20	23	1.4
83-32-9	Acenaphthene	J	2.4	1.0	20	23	1.7
86-73-7	Fluorene	J	6.2	1.0	20	23	3.7
85-01-8	Phenanthrene		160	1.0	20	23	2.0
120-12-7	Anthracene		38	1.0	20	23	1.4
206-44-0	Fluoranthene		85	1.0	20	23	2.0
129-00-0	Pyrene	E	580	1.0	20	23	2.4
56-55-3	Benzo(a)anthracene	E	740	1.0	20	23	2.2
218-01-9	Chrysene	E	660	1.0	20	23	1.9
205-99-2	Benzo(b)fluoranthene		220	1.0	20	23	2.7
207-08-9	Benzo(k)fluoranthene		40	1.0	20	23	3.5
50-32-8	Benzo(a)pyrene	E	700	1.0	20	23	3.8
193-39-5	Indeno(1,2,3-cd)pyrene		78	1.0	20	23	2.2
53-70-3	Dibenzo(a,h)anthracene		110	1.0	20	23	2.0
191-24-2	Benzo(g,h,i)perylene		300	1.0	20	23	2.3
321-60-8	2-Methylnaphthalene-D10		45%				
118-79-6	Fluorene-D10		* 50%				
1718-51-0	Pyrene-D10		84%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 02-JUL-2009 23:18
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 87.4

Lab ID: SC3166-8DL
Client ID: X16SS0730001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	110	5.0	20	110	9.7
91-20-3	Naphthalene	U	110	5.0	20	110	15
91-57-6	2-Methylnaphthalene	U	110	5.0	20	110	12
208-96-8	Acenaphthylene	U	110	5.0	20	110	6.9
83-32-9	Acenaphthene	U	110	5.0	20	110	8.6
86-73-7	Fluorene	U	110	5.0	20	110	18
85-01-8	Phenanthrene		140	5.0	20	110	10
120-12-7	Anthracene	J	55	5.0	20	110	6.9
206-44-0	Fluoranthene	J	100	5.0	20	110	10
129-00-0	Pyrene		620	5.0	20	110	12
56-55-3	Benzo(a)anthracene		690	5.0	20	110	11
218-01-9	Chrysene		870	5.0	20	110	9.7
205-99-2	Benzo(b)fluoranthene		260	5.0	20	110	14
207-08-9	Benzo(k)fluoranthene	J	44	5.0	20	110	18
50-32-8	Benzo(a)pyrene		820	5.0	20	110	19
193-39-5	Indeno(1,2,3-cd)pyrene	J	96	5.0	20	110	11
53-70-3	Dibenzo(a,h)anthracene		140	5.0	20	110	10
191-24-2	Benzo(g,h,i)perylene		380	5.0	20	110	11
321-60-8	2-Methylnaphthalene-D10		* 28%				
118-79-6	Fluorene-D10		* 51%				
1718-51-0	Pyrene-D10		83%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 01-JUL-2009 16:17
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 87.0

Lab ID: SC3166-9
Client ID: X16SS0760001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	J	16	1.0	20	23	2.0
91-20-3	Naphthalene	J	7.2	1.0	20	23	3.0
91-57-6	2-Methylnaphthalene		68	1.0	20	23	2.5
208-96-8	Acenaphthylene	U	23	1.0	20	23	1.4
83-32-9	Acenaphthene	J	7.7	1.0	20	23	1.7
86-73-7	Fluorene	J	21	1.0	20	23	3.7
85-01-8	Phenanthrene	E	480	1.0	20	23	2.1
120-12-7	Anthracene		110	1.0	20	23	1.4
206-44-0	Fluoranthene		210	1.0	20	23	2.1
129-00-0	Pyrene	E	1600	1.0	20	23	2.4
56-55-3	Benzo(a)anthracene	E	1400	1.0	20	23	2.2
218-01-9	Chrysene	E	1500	1.0	20	23	2.0
205-99-2	Benzo(b)fluoranthene	E	790	1.0	20	23	2.8
207-08-9	Benzo(k)fluoranthene		200	1.0	20	23	3.6
50-32-8	Benzo(a)pyrene	E	2500	1.0	20	23	3.8
193-39-5	Indeno(1,2,3-cd)pyrene		260	1.0	20	23	2.2
53-70-3	Dibenzo(a,h)anthracene	E	390	1.0	20	23	2.1
191-24-2	Benzo(g,h,i)perylene	E	1000	1.0	20	23	2.3
321-60-8	2-Methylnaphthalene-D10		* 22%				
118-79-6	Fluorene-D10		* 42%				
1718-51-0	Pyrene-D10		78%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 03-JUL-2009 00:00
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 87.0

Lab ID: SC3166-9DL
Client ID: X16SS0760001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	340	15	20	340	29
91-20-3	Naphthalene	U	340	15	20	340	45
91-57-6	2-Methylnaphthalene	U	340	15	20	340	38
208-96-8	Acenaphthylene	U	340	15	20	340	21
83-32-9	Acenaphthene	U	340	15	20	340	26
86-73-7	Fluorene	U	340	15	20	340	55
85-01-8	Phenanthrene		620	15	20	340	31
120-12-7	Anthracene	J	220	15	20	340	21
206-44-0	Fluoranthene		410	15	20	340	31
129-00-0	Pyrene		2000	15	20	340	36
56-55-3	Benzo(a)anthracene		2400	15	20	340	33
218-01-9	Chrysene		3000	15	20	340	29
205-99-2	Benzo(b)fluoranthene		1000	15	20	340	41
207-08-9	Benzo(k)fluoranthene	J	170	15	20	340	53
50-32-8	Benzo(a)pyrene		3200	15	20	340	57
193-39-5	Indeno(1,2,3-cd)pyrene		370	15	20	340	33
53-70-3	Dibenzo(a,h)anthracene		540	15	20	340	31
191-24-2	Benzo(g,h,i)perylene		1500	15	20	340	34
321-60-8	2-Methylnaphthalene-D10		D				
118-79-6	Fluorene-D10		D				
1718-51-0	Pyrene-D10		D				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 01-JUL-2009 16:59
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 86.8

Lab ID: SC3166-10
Client ID: X16SS0090001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	23	1.0	20	23	2.0
91-20-3	Naphthalene	U	23	1.0	20	23	3.0
91-57-6	2-Methylnaphthalene	U	23	1.0	20	23	2.5
208-96-8	Acenaphthylene	U	23	1.0	20	23	1.4
83-32-9	Acenaphthene	U	23	1.0	20	23	1.7
86-73-7	Fluorene	U	23	1.0	20	23	3.7
85-01-8	Phenanthrene	U	23	1.0	20	23	2.1
120-12-7	Anthracene	U	23	1.0	20	23	1.4
206-44-0	Fluoranthene	J	8.0	1.0	20	23	2.1
129-00-0	Pyrene	J	9.5	1.0	20	23	2.4
56-55-3	Benzo(a)anthracene	J	8.8	1.0	20	23	2.2
218-01-9	Chrysene	J	14	1.0	20	23	2.0
205-99-2	Benzo(b)fluoranthene	J	11	1.0	20	23	2.8
207-08-9	Benzo(k)fluoranthene	U	23	1.0	20	23	3.6
50-32-8	Benzo(a)pyrene	J	8.7	1.0	20	23	3.8
193-39-5	Indeno(1,2,3-cd)pyrene	J	5.9	1.0	20	23	2.2
53-70-3	Dibenzo(a,h)anthracene	U	23	1.0	20	23	2.1
191-24-2	Benzo(g,h,i)perylene	J	6.2	1.0	20	23	2.3
321-60-8	2-Methylnaphthalene-D10		* 28%				
118-79-6	Fluorene-D10		* 45%				
1718-51-0	Pyrene-D10		77%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 01-JUL-2009 17:41
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 85.4

Lab ID: SC3166-11
Client ID: X16SS0140001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	23	1.0	20	23	2.0
91-20-3	Naphthalene	U	23	1.0	20	23	3.0
91-57-6	2-Methylnaphthalene	U	23	1.0	20	23	2.6
208-96-8	Acenaphthylene	U	23	1.0	20	23	1.4
83-32-9	Acenaphthene	U	23	1.0	20	23	1.8
86-73-7	Fluorene	U	23	1.0	20	23	3.7
85-01-8	Phenanthrene		31	1.0	20	23	2.1
120-12-7	Anthracene	J	7.3	1.0	20	23	1.4
206-44-0	Fluoranthene	J	20	1.0	20	23	2.1
129-00-0	Pyrene		110	1.0	20	23	2.4
56-55-3	Benzo(a)anthracene		100	1.0	20	23	2.2
218-01-9	Chrysene		120	1.0	20	23	2.0
205-99-2	Benzo(b)fluoranthene		47	1.0	20	23	2.8
207-08-9	Benzo(k)fluoranthene	J	9.0	1.0	20	23	3.6
50-32-8	Benzo(a)pyrene		120	1.0	20	23	3.9
193-39-5	Indeno(1,2,3-cd)pyrene	J	17	1.0	20	23	2.2
53-70-3	Dibenzo(a,h)anthracene	J	20	1.0	20	23	2.1
191-24-2	Benzo(g,h,i)perylene		58	1.0	20	23	2.3
321-60-8	2-Methylnaphthalene-D10		* 14%				
118-79-6	Fluorene-D10		58%				
1718-51-0	Pyrene-D10		83%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 02-JUL-2009 18:21
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 89.1

Lab ID: SC3166-12RA
Client ID: X16SS0190001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	22	1.0	20	22	1.9
91-20-3	Naphthalene	U	22	1.0	20	22	2.9
91-57-6	2-Methylnaphthalene	U	22	1.0	20	22	2.5
208-96-8	Acenaphthylene	U	22	1.0	20	22	1.3
83-32-9	Acenaphthene	U	22	1.0	20	22	1.7
86-73-7	Fluorene	U	22	1.0	20	22	3.6
85-01-8	Phenanthrene		37	1.0	20	22	2.0
120-12-7	Anthracene	J	10	1.0	20	22	1.3
206-44-0	Fluoranthene		24	1.0	20	22	2.0
129-00-0	Pyrene		150	1.0	20	22	2.4
56-55-3	Benzo(a)anthracene		170	1.0	20	22	2.1
218-01-9	Chrysene		210	1.0	20	22	1.9
205-99-2	Benzo(b)fluoranthene		79	1.0	20	22	2.7
207-08-9	Benzo(k)fluoranthene	J	13	1.0	20	22	3.5
50-32-8	Benzo(a)pyrene		220	1.0	20	22	3.7
193-39-5	Indeno(1,2,3-cd)pyrene		28	1.0	20	22	2.1
53-70-3	Dibenzo(a,h)anthracene		42	1.0	20	22	2.0
191-24-2	Benzo(g,h,i)perylene		110	1.0	20	22	2.2
321-60-8	2-Methylnaphthalene-D10		* 26%				
118-79-6	Fluorene-D10		53%				
1718-51-0	Pyrene-D10		78%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 01-JUL-2009 19:06
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 82.5

Lab ID: SC3166-13
Client ID: X16SS0130001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	24	1.0	20	24	2.0
91-20-3	Naphthalene	U	24	1.0	20	24	3.2
91-57-6	2-Methylnaphthalene	U	24	1.0	20	24	2.7
208-96-8	Acenaphthylene	U	24	1.0	20	24	1.4
83-32-9	Acenaphthene	U	24	1.0	20	24	1.8
86-73-7	Fluorene	U	24	1.0	20	24	3.9
85-01-8	Phenanthrene	J	5.3	1.0	20	24	2.2
120-12-7	Anthracene	J	1.8	1.0	20	24	1.4
206-44-0	Fluoranthene	J	7.4	1.0	20	24	2.2
129-00-0	Pyrene		26	1.0	20	24	2.5
56-55-3	Benzo(a)anthracene		26	1.0	20	24	2.3
218-01-9	Chrysene		41	1.0	20	24	2.0
205-99-2	Benzo(b)fluoranthene	J	16	1.0	20	24	2.9
207-08-9	Benzo(k)fluoranthene	J	4.3	1.0	20	24	3.8
50-32-8	Benzo(a)pyrene		38	1.0	20	24	4.0
193-39-5	Indeno(1,2,3-cd)pyrene	J	8.1	1.0	20	24	2.3
53-70-3	Dibenzo(a,h)anthracene	J	6.4	1.0	20	24	2.2
191-24-2	Benzo(g,h,i)perylene	J	22	1.0	20	24	2.4
321-60-8	2-Methylnaphthalene-D10		50%				
118-79-6	Fluorene-D10		* 51%				
1718-51-0	Pyrene-D10		68%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 01-JUL-2009 19:48
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 77.8

Lab ID: SC3166-14
Client ID: X16SS0420001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	26	1.0	20	26	2.2
91-20-3	Naphthalene	U	26	1.0	20	26	3.3
91-57-6	2-Methylnaphthalene	U	26	1.0	20	26	2.8
208-96-8	Acenaphthylene	U	26	1.0	20	26	1.5
83-32-9	Acenaphthene	U	26	1.0	20	26	1.9
86-73-7	Fluorene	U	26	1.0	20	26	4.1
85-01-8	Phenanthrene	U	26	1.0	20	26	2.3
120-12-7	Anthracene	U	26	1.0	20	26	1.5
206-44-0	Fluoranthene	U	26	1.0	20	26	2.3
129-00-0	Pyrene	J	4.6	1.0	20	26	2.7
56-55-3	Benzo(a)anthracene	J	3.9	1.0	20	26	2.4
218-01-9	Chrysene	J	7.7	1.0	20	26	2.2
205-99-2	Benzo(b)fluoranthene	U	26	1.0	20	26	3.1
207-08-9	Benzo(k)fluoranthene	U	26	1.0	20	26	4.0
50-32-8	Benzo(a)pyrene	J	5.8	1.0	20	26	4.2
193-39-5	Indeno(1,2,3-cd)pyrene	U	26	1.0	20	26	2.4
53-70-3	Dibenzo(a,h)anthracene	U	26	1.0	20	26	2.3
191-24-2	Benzo(g,h,i)perylene	J	3.4	1.0	20	26	2.6
321-60-8	2-Methylnaphthalene-D10		48%				
118-79-6	Fluorene-D10		* 47%				
1718-51-0	Pyrene-D10		73%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 01-JUL-2009 20:30
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 82.6

Lab ID: SC3166-15
Client ID: X16SS0460001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	24	1.0	20	24	2.0
91-20-3	Naphthalene	U	24	1.0	20	24	3.1
91-57-6	2-Methylnaphthalene	U	24	1.0	20	24	2.7
208-96-8	Acenaphthylene	U	24	1.0	20	24	1.4
83-32-9	Acenaphthene	U	24	1.0	20	24	1.8
86-73-7	Fluorene	U	24	1.0	20	24	3.9
85-01-8	Phenanthrene	U	24	1.0	20	24	2.2
120-12-7	Anthracene	U	24	1.0	20	24	1.4
206-44-0	Fluoranthene	J	5.0	1.0	20	24	2.2
129-00-0	Pyrene	J	3.1	1.0	20	24	2.5
56-55-3	Benzo(a)anthracene	J	2.6	1.0	20	24	2.3
218-01-9	Chrysene	J	4.3	1.0	20	24	2.0
205-99-2	Benzo(b)fluoranthene	J	3.0	1.0	20	24	2.9
207-08-9	Benzo(k)fluoranthene	U	24	1.0	20	24	3.8
50-32-8	Benzo(a)pyrene	U	24	1.0	20	24	4.0
193-39-5	Indeno(1,2,3-cd)pyrene	J	3.1	1.0	20	24	2.3
53-70-3	Dibenzo(a,h)anthracene	U	24	1.0	20	24	2.2
191-24-2	Benzo(g,h,i)perylene	U	24	1.0	20	24	2.4
321-60-8	2-Methylnaphthalene-D10		53%				
118-79-6	Fluorene-D10		53%				
1718-51-0	Pyrene-D10		72%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 01-JUL-2009 21:11
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 83.9

Lab ID: SC3166-16
Client ID: X16SS0510001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	24	1.0	20	24	2.0
91-20-3	Naphthalene	U	24	1.0	20	24	3.1
91-57-6	2-Methylnaphthalene	U	24	1.0	20	24	2.6
208-96-8	Acenaphthylene	U	24	1.0	20	24	1.4
83-32-9	Acenaphthene	U	24	1.0	20	24	1.8
86-73-7	Fluorene	U	24	1.0	20	24	3.8
85-01-8	Phenanthrene		67	1.0	20	24	2.1
120-12-7	Anthracene	J	18	1.0	20	24	1.4
206-44-0	Fluoranthene		40	1.0	20	24	2.1
129-00-0	Pyrene		200	1.0	20	24	2.5
56-55-3	Benzo(a)anthracene		240	1.0	20	24	2.3
218-01-9	Chrysene		300	1.0	20	24	2.0
205-99-2	Benzo(b)fluoranthene		98	1.0	20	24	2.8
207-08-9	Benzo(k)fluoranthene	J	21	1.0	20	24	3.7
50-32-8	Benzo(a)pyrene		240	1.0	20	24	3.9
193-39-5	Indeno(1,2,3-cd)pyrene		26	1.0	20	24	2.3
53-70-3	Dibenzo(a,h)anthracene		37	1.0	20	24	2.1
191-24-2	Benzo(g,h,i)perylene		82	1.0	20	24	2.4
321-60-8	2-Methylnaphthalene-D10		53%				
118-79-6	Fluorene-D10		55%				
1718-51-0	Pyrene-D10		73%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 01-JUL-2009 21:54
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 81.9

Lab ID: SC3166-17
Client ID: X16SS0560001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	J	5.3	1.0	20	24	2.1
91-20-3	Naphthalene	U	24	1.0	20	24	3.2
91-57-6	2-Methylnaphthalene		25	1.0	20	24	2.7
208-96-8	Acenaphthylene	U	24	1.0	20	24	1.5
83-32-9	Acenaphthene	J	3.6	1.0	20	24	1.8
86-73-7	Fluorene	J	9.4	1.0	20	24	3.9
85-01-8	Phenanthrene		300	1.0	20	24	2.2
120-12-7	Anthracene		75	1.0	20	24	1.5
206-44-0	Fluoranthene		180	1.0	20	24	2.2
129-00-0	Pyrene	E	1200	1.0	20	24	2.6
56-55-3	Benzo(a)anthracene	E	1200	1.0	20	24	2.3
218-01-9	Chrysene	E	1300	1.0	20	24	2.1
205-99-2	Benzo(b)fluoranthene	E	540	1.0	20	24	2.9
207-08-9	Benzo(k)fluoranthene		120	1.0	20	24	3.8
50-32-8	Benzo(a)pyrene	E	1500	1.0	20	24	4.0
193-39-5	Indeno(1,2,3-cd)pyrene		220	1.0	20	24	2.3
53-70-3	Dibenzo(a,h)anthracene		240	1.0	20	24	2.2
191-24-2	Benzo(g,h,i)perylene	E	620	1.0	20	24	2.4
321-60-8	2-Methylnaphthalene-D10		44%				
118-79-6	Fluorene-D10		59%				
1718-51-0	Pyrene-D10		85%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 03-JUL-2009 00:43
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 81.9

Lab ID: SC3166-17DL
Client ID: X16SS0560001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	220	9.0	20	220	19
91-20-3	Naphthalene	U	220	9.0	20	220	28
91-57-6	2-Methylnaphthalene	U	220	9.0	20	220	24
208-96-8	Acenaphthylene	U	220	9.0	20	220	13
83-32-9	Acenaphthene	U	220	9.0	20	220	16
86-73-7	Fluorene	U	220	9.0	20	220	35
85-01-8	Phenanthrene		360	9.0	20	220	20
120-12-7	Anthracene	J	96	9.0	20	220	13
206-44-0	Fluoranthene		260	9.0	20	220	20
129-00-0	Pyrene		1400	9.0	20	220	23
56-55-3	Benzo(a)anthracene		1700	9.0	20	220	21
218-01-9	Chrysene		2200	9.0	20	220	19
205-99-2	Benzo(b)fluoranthene		660	9.0	20	220	26
207-08-9	Benzo(k)fluoranthene	J	110	9.0	20	220	34
50-32-8	Benzo(a)pyrene		1900	9.0	20	220	36
193-39-5	Indeno(1,2,3-cd)pyrene		230	9.0	20	220	21
53-70-3	Dibenzo(a,h)anthracene		330	9.0	20	220	20
191-24-2	Benzo(g,h,i)perylene		830	9.0	20	220	22
321-60-8	2-Methylnaphthalene-D10		61%				
118-79-6	Fluorene-D10		62%				
1718-51-0	Pyrene-D10		109%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 06-JUL-2009 10:34
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 78.0

Lab ID: SC3166-18RA
Client ID: X16SS0570001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	26	1.0	20	26	2.2
91-20-3	Naphthalene	U	26	1.0	20	26	3.3
91-57-6	2-Methylnaphthalene	U	26	1.0	20	26	2.8
208-96-8	Acenaphthylene	U	26	1.0	20	26	1.5
83-32-9	Acenaphthene	U	26	1.0	20	26	1.9
86-73-7	Fluorene	U	26	1.0	20	26	4.1
85-01-8	Phenanthrene	U	26	1.0	20	26	2.3
120-12-7	Anthracene	U	26	1.0	20	26	1.5
206-44-0	Fluoranthene	J	4.8	1.0	20	26	2.3
129-00-0	Pyrene	J	3.9	1.0	20	26	2.7
56-55-3	Benzo(a)anthracene	J	2.6	1.0	20	26	2.4
218-01-9	Chrysene	J	5.6	1.0	20	26	2.2
205-99-2	Benzo(b)fluoranthene	U	26	1.0	20	26	3.1
207-08-9	Benzo(k)fluoranthene	U	26	1.0	20	26	4.0
50-32-8	Benzo(a)pyrene	U	26	1.0	20	26	4.2
193-39-5	Indeno(1,2,3-cd)pyrene	J	3.0	1.0	20	26	2.4
53-70-3	Dibenzo(a,h)anthracene	U	26	1.0	20	26	2.3
191-24-2	Benzo(g,h,i)perylene	U	26	1.0	20	26	2.6
321-60-8	2-Methylnaphthalene-D10		35%				
118-79-6	Fluorene-D10		* 49%				
1718-51-0	Pyrene-D10		69%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 02-JUL-2009 16:57
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 87.4

Lab ID: SC3166-19RA
Client ID: X16SS0020001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	J	2.6	1.0	20	23	1.9
91-20-3	Naphthalene	U	23	1.0	20	23	3.0
91-57-6	2-Methylnaphthalene	J	9.3	1.0	20	23	2.5
208-96-8	Acenaphthylene	U	23	1.0	20	23	1.4
83-32-9	Acenaphthene	U	23	1.0	20	23	1.7
86-73-7	Fluorene	J	4.2	1.0	20	23	3.6
85-01-8	Phenanthrene		140	1.0	20	23	2.0
120-12-7	Anthracene		32	1.0	20	23	1.4
206-44-0	Fluoranthene		79	1.0	20	23	2.0
129-00-0	Pyrene	E	440	1.0	20	23	2.4
56-55-3	Benzo(a)anthracene	E	510	1.0	20	23	2.2
218-01-9	Chrysene	E	640	1.0	20	23	1.9
205-99-2	Benzo(b)fluoranthene		200	1.0	20	23	2.7
207-08-9	Benzo(k)fluoranthene		40	1.0	20	23	3.5
50-32-8	Benzo(a)pyrene	E	550	1.0	20	23	3.8
193-39-5	Indeno(1,2,3-cd)pyrene		78	1.0	20	23	2.2
53-70-3	Dibenzo(a,h)anthracene		120	1.0	20	23	2.0
191-24-2	Benzo(g,h,i)perylene		260	1.0	20	23	2.3
321-60-8	2-Methylnaphthalene-D10		* 31%				
118-79-6	Fluorene-D10		* 51%				
1718-51-0	Pyrene-D10		75%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 06-JUL-2009 11:17
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 87.4

Lab ID: SC3166-19DL
Client ID: X16SS0020001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	91	4.0	20	91	7.8
91-20-3	Naphthalene	U	91	4.0	20	91	12
91-57-6	2-Methylnaphthalene	U	91	4.0	20	91	10
208-96-8	Acenaphthylene	U	91	4.0	20	91	5.5
83-32-9	Acenaphthene	U	91	4.0	20	91	6.9
86-73-7	Fluorene	U	91	4.0	20	91	15
85-01-8	Phenanthrene		140	4.0	20	91	8.2
120-12-7	Anthracene	J	46	4.0	20	91	5.5
206-44-0	Fluoranthene	J	89	4.0	20	91	8.2
129-00-0	Pyrene		620	4.0	20	91	9.6
56-55-3	Benzo(a)anthracene		630	4.0	20	91	8.7
218-01-9	Chrysene		770	4.0	20	91	7.8
205-99-2	Benzo(b)fluoranthene		250	4.0	20	91	11
207-08-9	Benzo(k)fluoranthene	J	42	4.0	20	91	14
50-32-8	Benzo(a)pyrene		630	4.0	20	91	15
193-39-5	Indeno(1,2,3-cd)pyrene	J	88	4.0	20	91	8.7
53-70-3	Dibenzo(a,h)anthracene		120	4.0	20	91	8.2
191-24-2	Benzo(g,h,i)perylene		320	4.0	20	91	9.1
321-60-8	2-Methylnaphthalene-D10		48%				
118-79-6	Fluorene-D10		58%				
1718-51-0	Pyrene-D10		92%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/10/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 02-JUL-2009 17:39
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 78.3

Lab ID: SC3166-20RA
Client ID: X15SD0230006
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	26	1.0	20	26	2.2
91-20-3	Naphthalene	U	26	1.0	20	26	3.3
91-57-6	2-Methylnaphthalene	U	26	1.0	20	26	2.8
208-96-8	Acenaphthylene	U	26	1.0	20	26	1.5
83-32-9	Acenaphthene	U	26	1.0	20	26	1.9
86-73-7	Fluorene	U	26	1.0	20	26	4.1
85-01-8	Phenanthrene	U	26	1.0	20	26	2.3
120-12-7	Anthracene	U	26	1.0	20	26	1.5
206-44-0	Fluoranthene	U	26	1.0	20	26	2.3
129-00-0	Pyrene	U	26	1.0	20	26	2.7
56-55-3	Benzo(a)anthracene	J	2.9	1.0	20	26	2.4
218-01-9	Chrysene	J	5.4	1.0	20	26	2.2
205-99-2	Benzo(b)fluoranthene	J	3.4	1.0	20	26	3.1
207-08-9	Benzo(k)fluoranthene	U	26	1.0	20	26	4.0
50-32-8	Benzo(a)pyrene	J	4.6	1.0	20	26	4.2
193-39-5	Indeno(1,2,3-cd)pyrene	J	2.9	1.0	20	26	2.4
53-70-3	Dibenzo(a,h)anthracene	U	26	1.0	20	26	2.3
191-24-2	Benzo(g,h,i)perylene	J	2.8	1.0	20	26	2.6
321-60-8	2-Methylnaphthalene-D10		40%				
118-79-6	Fluorene-D10		* 50%				
1718-51-0	Pyrene-D10		68%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/01/09
Received Date: 06/16/09
Extraction Date: 06/18/09
Analysis Date: 30-JUN-2009 21:05
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 83.2

Lab ID: SC3166-21
Client ID: X15SD0030006
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65149
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	24	1.0	20	24	2.0
91-20-3	Naphthalene	U	24	1.0	20	24	3.1
91-57-6	2-Methylnaphthalene	U	24	1.0	20	24	2.6
208-96-8	Acenaphthylene	U	24	1.0	20	24	1.4
83-32-9	Acenaphthene	U	24	1.0	20	24	1.8
86-73-7	Fluorene	U	24	1.0	20	24	3.8
85-01-8	Phenanthrene	U	24	1.0	20	24	2.2
120-12-7	Anthracene	U	24	1.0	20	24	1.4
206-44-0	Fluoranthene	U	24	1.0	20	24	2.2
129-00-0	Pyrene	U	24	1.0	20	24	2.5
56-55-3	Benzo(a)anthracene	U	24	1.0	20	24	2.3
218-01-9	Chrysene	JB	3.5	1.0	20	24	2.0
205-99-2	Benzo(b)fluoranthene	U	24	1.0	20	24	2.9
207-08-9	Benzo(k)fluoranthene	U	24	1.0	20	24	3.7
50-32-8	Benzo(a)pyrene	U	24	1.0	20	24	4.0
193-39-5	Indeno(1,2,3-cd)pyrene	U	24	1.0	20	24	2.3
53-70-3	Dibenzo(a,h)anthracene	U	24	1.0	20	24	2.2
191-24-2	Benzo(g,h,i)perylene	U	24	1.0	20	24	2.4
321-60-8	2-Methylnaphthalene-D10		* 26%				
118-79-6	Fluorene-D10		* 35%				
1718-51-0	Pyrene-D10		65%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/01/09
Received Date: 06/16/09
Extraction Date: 06/18/09
Analysis Date: 30-JUN-2009 21:49
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 80.3

Lab ID: SC3166-22
Client ID: X15SD0050006
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65149
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	25	1.0	20	25	2.1
91-20-3	Naphthalene	U	25	1.0	20	25	3.2
91-57-6	2-Methylnaphthalene	U	25	1.0	20	25	2.7
208-96-8	Acenaphthylene	U	25	1.0	20	25	1.5
83-32-9	Acenaphthene	U	25	1.0	20	25	1.9
86-73-7	Fluorene	U	25	1.0	20	25	4.0
85-01-8	Phenanthrene	U	25	1.0	20	25	2.2
120-12-7	Anthracene	U	25	1.0	20	25	1.5
206-44-0	Fluoranthene	U	25	1.0	20	25	2.2
129-00-0	Pyrene	U	25	1.0	20	25	2.6
56-55-3	Benzo(a)anthracene	U	25	1.0	20	25	2.4
218-01-9	Chrysene	U	25	1.0	20	25	2.1
205-99-2	Benzo(b)fluoranthene	U	25	1.0	20	25	3.0
207-08-9	Benzo(k)fluoranthene	U	25	1.0	20	25	3.9
50-32-8	Benzo(a)pyrene	U	25	1.0	20	25	4.1
193-39-5	Indeno(1,2,3-cd)pyrene	U	25	1.0	20	25	2.4
53-70-3	Dibenzo(a,h)anthracene	U	25	1.0	20	25	2.2
191-24-2	Benzo(g,h,i)perylene	U	25	1.0	20	25	2.5
321-60-8	2-Methylnaphthalene-D10		* 22%				
118-79-6	Fluorene-D10		* 24%				
1718-51-0	Pyrene-D10		49%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/16/09
Extraction Date: 06/22/09
Analysis Date: 02-JUL-2009 19:03
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 83.1

Lab ID: SC3166-23
Client ID: X16SS0260001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65295
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	24	1.0	20	24	2.0
91-20-3	Naphthalene	U	24	1.0	20	24	3.1
91-57-6	2-Methylnaphthalene	U	24	1.0	20	24	2.6
208-96-8	Acenaphthylene	U	24	1.0	20	24	1.4
83-32-9	Acenaphthene	U	24	1.0	20	24	1.8
86-73-7	Fluorene	U	24	1.0	20	24	3.8
85-01-8	Phenanthrene	J	21	1.0	20	24	2.2
120-12-7	Anthracene	J	5.5	1.0	20	24	1.4
206-44-0	Fluoranthene	J	17	1.0	20	24	2.2
129-00-0	Pyrene		71	1.0	20	24	2.5
56-55-3	Benzo(a)anthracene		81	1.0	20	24	2.3
218-01-9	Chrysene		110	1.0	20	24	2.0
205-99-2	Benzo(b)fluoranthene		41	1.0	20	24	2.9
207-08-9	Benzo(k)fluoranthene	J	6.6	1.0	20	24	3.7
50-32-8	Benzo(a)pyrene		110	1.0	20	24	4.0
193-39-5	Indeno(1,2,3-cd)pyrene	J	18	1.0	20	24	2.3
53-70-3	Dibenzo(a,h)anthracene	J	21	1.0	20	24	2.2
191-24-2	Benzo(g,h,i)perylene		58	1.0	20	24	2.4
321-60-8	2-Methylnaphthalene-D10		53%				
118-79-6	Fluorene-D10		54%				
1718-51-0	Pyrene-D10		71%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/16/09
Extraction Date: 06/22/09
Analysis Date: 02-JUL-2009 19:44
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 87.3

Lab ID: SC3166-24
Client ID: X16SS0080001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65295
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	23	1.0	20	23	1.9
91-20-3	Naphthalene	U	23	1.0	20	23	3.0
91-57-6	2-Methylnaphthalene	U	23	1.0	20	23	2.5
208-96-8	Acenaphthylene	U	23	1.0	20	23	1.4
83-32-9	Acenaphthene	U	23	1.0	20	23	1.7
86-73-7	Fluorene	U	23	1.0	20	23	3.7
85-01-8	Phenanthrene	J	3.2	1.0	20	23	2.1
120-12-7	Anthracene	U	23	1.0	20	23	1.4
206-44-0	Fluoranthene	J	8.9	1.0	20	23	2.1
129-00-0	Pyrene	J	6.1	1.0	20	23	2.4
56-55-3	Benzo(a)anthracene	J	6.0	1.0	20	23	2.2
218-01-9	Chrysene	J	10	1.0	20	23	1.9
205-99-2	Benzo(b)fluoranthene	J	6.0	1.0	20	23	2.7
207-08-9	Benzo(k)fluoranthene	U	23	1.0	20	23	3.5
50-32-8	Benzo(a)pyrene	J	7.6	1.0	20	23	3.8
193-39-5	Indeno(1,2,3-cd)pyrene	J	3.4	1.0	20	23	2.2
53-70-3	Dibenzo(a,h)anthracene	U	23	1.0	20	23	2.1
191-24-2	Benzo(g,h,i)perylene	J	4.6	1.0	20	23	2.3
321-60-8	2-Methylnaphthalene-D10		* 25%				
118-79-6	Fluorene-D10		56%				
1718-51-0	Pyrene-D10		66%				

Appendix C

Support Documentation

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CTO 423 NSF INDIAN HEAD
SDG: CTO423-4
SC3166

Sample Receipt

The following samples were received on June 16, 2009 and were logged in under Katahdin Analytical Services work order numbers SC3171 for a hardcopy due date of July 06, 2009.

KATAHDIN Sample No.	TTNUS Sample Identification
SC3166-1	X16SS0310001
SC3166-2	X16SS0400001
SC3166-3	X16SS0780001
SC3166-4	X16SS080C0001
SC3166-5	X16SS081C0001
SC3166-6	X16SS0710001
SC3166-7	X16SS0620001
SC3166-8	X16SS0730001
SC3166-9	X16SS0760001
SC3166-10	X16SS0090001
SC3166-11	X16SS0140001
SC3166-12	X16SS0190001
SC3166-13	X16SS0130001
SC3166-14	X16SS0420001
SC3166-15	X16SS0460001
SC3166-16	X16SS0510001
SC3166-17	X16SS0560001
SC3166-18	X16SS0570001
SC3166-19	X16SS0020001
SC3166-20	X15SD0230006
SC3166-21	X15SD0030006
SC3166-22	X15SD0050006
SC3166-23	X16SS0260001
SC3166-24	X16SS0080001

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in this narrative or in the Report of Analysis.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Andrea J. Colby**. This narrative is an integral part of the Report of Analysis.

Organics Analysis

The samples of SDG CTO423-4 were analyzed in accordance with "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846, 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA, and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA, and/or for the specific methods listed below or on the Report of Analysis. Some manual integrations may have been performed due to split peaks and/or corrected baselines. All have been flagged with an "M" (software-generated) on the pertinent quantitation reports.

8270C SIM Analysis

All soil samples and associated QC were subjected to the GPC sample clean-up process. Katahdin has begun using a new GPC unit for extract cleanup, which necessitates the generation of new statistical limits for surrogates and spiked analytes.

Sample SC3166-9 was used for the Matrix Spike (MS) and Matrix Spike Duplicate (MSD), as per client request.

All samples, except SC3166-14, 15 and 22, were manually integrated for various target analytes. The specific reason for the manual integration is indicated on the raw data by the manual integration codes (M1-M11). These codes are further explained in the attachment following this narrative.

The target analyte chrysene was detected above the MDL but below the PQL in the method blank WG65149-1. The laboratory policy is not to take corrective action unless the concentration of target analytes is above the PQL. If this analyte was also detected in any of the associated samples, the samples were flagged with a "B" qualifier indicating that the analytes were detected in the method blank analyzed and/or extracted concurrently with the sample.

One or more method blanks, LCS's, and several samples had low recoveries for one or two surrogates, which were outside the laboratory established acceptance limits. The surrogate acceptance limits were based on non-GPC soil extractions that were concentrated to a final volume of 1mL. Since acceptance limits based on a GPC cleanup would likely result in lower acceptance limits, the affected samples were not reextracted.

The LCS's WG65149-2 and WG65295-2 had four and six spiked target analytes, respectively, with recoveries that were low and outside of the laboratory established acceptance limits. The DoD QSM allowable number of exceedances for 18 target analytes is one analyte. These acceptance limits were based on non-GPC soil extractions that were concentrated to a final volume of 1mL. Since acceptance limits based on a GPC cleanup and a lower concentration volume would likely results in lower acceptance limits, the associated samples were not reextracted.

The MS and MSD (WG65271-3 and 4) had four and five target analytes, respectively, with recoveries that were low and outside of the laboratory established acceptance limits. There were also several spiked target analytes with recoveries that were non-calculable (NC) due to the concentration in the native sample being higher than in the MS and MSD. Since the associated LCS was acceptable, the samples were not reextracted. The concentrations of some of the analytes in the MS and MSD were high and outside of the calibration range. The laboratory policy is not to reanalyze MS/MSD's for dilutions. The high concentrations, as well as the homogeneity of the sample, likely contributed to the recoveries of these analytes being outside of the acceptance limits.

There were no other protocol deviations or observations noted by the organics laboratory staff.

Wet Chemistry Analysis

The samples of SDG CTO423-4 were analyzed in accordance with the specific methods listed on the Report of Analysis.

Analyses for total solids were performed according to "Annual Book of ASTM Standards", Method D2216-98 "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass".

All analyses were performed within analytical holding times, and all quality control criteria were met.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Operations Manager or the Quality Assurance Officer as verified by the following signature.

Leslie Dimond

07.09.09

Leslie Dimond
Quality Assurance Officer

HOLDTIME

SDG CTO423-4

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
TS	%	X16SS0090001	SC3166-10	NM	6/14/2009	6/16/2009	6/17/2009	1.961	1	2.961
TS	%	X16SS081C0001	SC3166-5	NM	6/14/2009	6/16/2009	6/17/2009	1.906	1	2.906
TS	%	X15SD0030006	SC3166-21	NM	6/1/2009	6/16/2009	6/17/2009	15.08	1	16.08
TS	%	X15SD0050006	SC3166-22	NM	6/1/2009	6/16/2009	6/17/2009	15.08	1	16.08
TS	%	X15SD0230006	SC3166-20	NM	6/10/2009	6/16/2009	6/17/2009	5.922	1	6.922
TS	%	X16SS0080001	SC3166-24	NM	6/13/2009	6/16/2009	6/17/2009	2.972	1	3.972
TS	%	X16SS0130001	SC3166-13	NM	6/13/2009	6/16/2009	6/17/2009	2.906	1	3.906
TS	%	X16SS0140001	SC3166-11	NM	6/14/2009	6/16/2009	6/17/2009	1.913	1	2.913
TS	%	X16SS0190001	SC3166-12	NM	6/14/2009	6/16/2009	6/17/2009	1.924	1	2.924
TS	%	X16SS0260001	SC3166-23	NM	6/13/2009	6/16/2009	6/17/2009	2.899	1	3.899
TS	%	X16SS0310001	SC3166-1	NM	6/13/2009	6/16/2009	6/17/2009	2.857	1	3.857
TS	%	X16SS0400001	SC3166-2	NM	6/13/2009	6/16/2009	6/17/2009	2.815	1	3.815
TS	%	X16SS080C0001	SC3166-4	NM	6/14/2009	6/16/2009	6/17/2009	1.909	1	2.909
TS	%	X16SS0020001	SC3166-19	NM	6/13/2009	6/16/2009	6/17/2009	2.997	1	3.997
TS	%	X16SS0420001	SC3166-14	NM	6/13/2009	6/16/2009	6/17/2009	2.823	1	3.823

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
TS	%	X16SS0780001	SC3166-3	NM	6/14/2009	6/16/2009	6/17/2009	2.013	1	3.013
TS	%	X16SS0730001	SC3166-8	NM	6/14/2009	6/16/2009	6/17/2009	1.996	1	2.996
TS	%	X16SS0710001	SC3166-6	NM	6/14/2009	6/16/2009	6/17/2009	1.982	1	2.982
TS	%	X16SS0620001	SC3166-7	NM	6/14/2009	6/16/2009	6/17/2009	2.048	1	3.048
TS	%	X16SS0570001	SC3166-18	NM	6/14/2009	6/16/2009	6/17/2009	2.087	1	3.087
TS	%	X16SS0560001	SC3166-17	NM	6/14/2009	6/16/2009	6/17/2009	2.094	1	3.094
TS	%	X16SS0510001	SC3166-16	NM	6/13/2009	6/16/2009	6/17/2009	2.795	1	3.795
TS	%	X16SS0460001	SC3166-15	NM	6/13/2009	6/16/2009	6/17/2009	2.816	1	3.816
TS	%	X16SS0760001	SC3166-9	NM	6/14/2009	6/16/2009	6/17/2009	2.027	1	3.027
SIM	%	X16SS0560001	SC3166-17DL	NM	6/14/2009	6/20/2009	7/3/2009	5.665	13	18.67
SIM	%	X16SS080C0001	SC3166-4	NM	6/14/2009	6/20/2009	7/1/2009	5.812	11.22	17.03
SIM	%	X16SS0710001	SC3166-6	NM	6/14/2009	6/20/2009	7/1/2009	5.886	11.25	17.13
SIM	%	X16SS0570001	SC3166-18RA	NM	6/14/2009	6/20/2009	7/6/2009	5.969	16.1	22.07
SIM	%	X15SD0030006	SC3166-21	NM	6/1/2009	6/18/2009	6/30/2009	17.29	12.21	29.50
SIM	%	X16SS0620001	SC3166-7	NM	6/14/2009	6/20/2009	7/1/2009	5.953	11.27	17.23
SIM	%	X16SS0620001	SC3166-7DL	NM	6/14/2009	6/20/2009	7/2/2009	5.954	12.59	18.55
SIM	%	X16SS0710001	SC3166-6DL	NM	6/14/2009	6/20/2009	7/2/2009	5.887	12.57	18.45
SIM	%	X16SS0730001	SC3166-8	NM	6/14/2009	6/20/2009	7/1/2009	5.903	11.30	17.20

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
SIM	%	X16SS0730001	SC3166-8DL	NM	6/14/2009	6/20/2009	7/2/2009	5.903	12.62	18.53
SIM	%	X16SS0760001	SC3166-9	NM	6/14/2009	6/20/2009	7/1/2009	5.935	11.33	17.27
SIM	%	X16SS0780001	SC3166-3	NM	6/14/2009	6/22/2009	7/2/2009	8.077	10.17	18.25
SIM	%	X16SS0560001	SC3166-17	NM	6/14/2009	6/20/2009	7/1/2009	5.974	11.57	17.55
SIM	%	X16SS0020001	SC3166-19RA	NM	6/13/2009	6/20/2009	7/2/2009	6.879	12.37	19.24
SIM	%	X16SS0760001	SC3166-9DL	NM	6/14/2009	6/20/2009	7/3/2009	5.587	13	18.59
SIM	%	X16SS0190001	SC3166-12RA	NM	6/14/2009	6/20/2009	7/2/2009	5.801	12.43	18.23
SIM	%	X15SD0050006	SC3166-22	NM	6/1/2009	6/18/2009	6/30/2009	17.28	12.24	29.53
SIM	%	X15SD0230006	SC3166-20RA	NM	6/10/2009	6/20/2009	7/2/2009	9.806	12.39	22.2
SIM	%	X16SS0020001	SC3166-19DL	NM	6/13/2009	6/20/2009	7/6/2009	6.88	16.13	23.01
SIM	%	X16SS0080001	SC3166-24	NM	6/13/2009	6/22/2009	7/2/2009	9.017	10.32	19.34
SIM	%	X16SS081C0001	SC3166-5	NM	6/14/2009	6/20/2009	7/1/2009	5.494	11	16.49
SIM	%	X16SS0090001	SC3166-10	NM	6/14/2009	6/20/2009	7/1/2009	5.855	11.37	17.23
SIM	%	X16SS0140001	SC3166-11	NM	6/14/2009	6/20/2009	7/1/2009	5.79	11.40	17.19
SIM	%	X16SS0510001	SC3166-16	NM	6/13/2009	6/20/2009	7/1/2009	6.675	11.54	18.22
SIM	%	X16SS0260001	SC3166-23	NM	6/13/2009	6/22/2009	7/2/2009	8.944	10.29	19.23
SIM	%	X16SS0310001	SC3166-1	NM	6/13/2009	6/22/2009	7/2/2009	8.917	10.12	19.04
SIM	%	X16SS0310001	SC3166-1DL	NM	6/13/2009	6/22/2009	7/7/2009	8.918	15.04	23.96

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
SIM	%	X16SS0400001	SC3166-2	NM	6/13/2009	6/22/2009	7/2/2009	8.877	10.15	19.02
SIM	%	X16SS0420001	SC3166-14	NM	6/13/2009	6/20/2009	7/1/2009	6.701	11.49	18.19
SIM	%	X16SS0460001	SC3166-15	NM	6/13/2009	6/20/2009	7/1/2009	6.695	11.52	18.21
SIM	%	X16SS0130001	SC3166-13	NM	6/13/2009	6/20/2009	7/1/2009	6.784	11.46	18.24
SIM	UG/KG	X16SS0310001	SC3166-1DL	NM	6/13/2009	6/22/2009	7/7/2009	8.918	15.04	23.96
SIM	UG/KG	X16SS0510001	SC3166-16	NM	6/13/2009	6/20/2009	7/1/2009	6.675	11.54	18.22
SIM	UG/KG	X16SS081C0001	SC3166-5	NM	6/14/2009	6/20/2009	7/1/2009	5.494	11	16.49
SIM	UG/KG	X16SS080C0001	SC3166-4	NM	6/14/2009	6/20/2009	7/1/2009	5.812	11.22	17.03
SIM	UG/KG	X16SS0780001	SC3166-3	NM	6/14/2009	6/22/2009	7/2/2009	8.077	10.17	18.25
SIM	UG/KG	X16SS0760001	SC3166-9DL	NM	6/14/2009	6/20/2009	7/3/2009	5.587	13	18.59
SIM	UG/KG	X16SS0760001	SC3166-9	NM	6/14/2009	6/20/2009	7/1/2009	5.935	11.33	17.27
SIM	UG/KG	X16SS0730001	SC3166-8DL	NM	6/14/2009	6/20/2009	7/2/2009	5.903	12.62	18.53
SIM	UG/KG	X16SS0730001	SC3166-8	NM	6/14/2009	6/20/2009	7/1/2009	5.903	11.30	17.20
SIM	UG/KG	X16SS0710001	SC3166-6DL	NM	6/14/2009	6/20/2009	7/2/2009	5.887	12.57	18.45
SIM	UG/KG	X16SS0710001	SC3166-6	NM	6/14/2009	6/20/2009	7/1/2009	5.886	11.25	17.13
SIM	UG/KG	X16SS0620001	SC3166-7DL	NM	6/14/2009	6/20/2009	7/2/2009	5.954	12.59	18.55
SIM	UG/KG	X16SS0620001	SC3166-7	NM	6/14/2009	6/20/2009	7/1/2009	5.953	11.27	17.23
SIM	UG/KG	X16SS0570001	SC3166-18RA	NM	6/14/2009	6/20/2009	7/6/2009	5.969	16.1	22.07

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
SIM	UG/KG	X16SS0260001	SC3166-23	NM	6/13/2009	6/22/2009	7/2/2009	8.944	10.29	19.23
SIM	UG/KG	X16SS0560001	SC3166-17	NM	6/14/2009	6/20/2009	7/1/2009	5.974	11.57	17.55
SIM	UG/KG	X15SD0030006	SC3166-21	NM	6/1/2009	6/18/2009	6/30/2009	17.29	12.21	29.50
SIM	UG/KG	X16SS0460001	SC3166-15	NM	6/13/2009	6/20/2009	7/1/2009	6.695	11.52	18.21
SIM	UG/KG	X16SS0420001	SC3166-14	NM	6/13/2009	6/20/2009	7/1/2009	6.701	11.49	18.19
SIM	UG/KG	X16SS0400001	SC3166-2	NM	6/13/2009	6/22/2009	7/2/2009	8.877	10.15	19.02
SIM	UG/KG	X16SS0310001	SC3166-1	NM	6/13/2009	6/22/2009	7/2/2009	8.917	10.12	19.04
SIM	UG/KG	X16SS0190001	SC3166-12RA	NM	6/14/2009	6/20/2009	7/2/2009	5.801	12.43	18.23
SIM	UG/KG	X16SS0140001	SC3166-11	NM	6/14/2009	6/20/2009	7/1/2009	5.79	11.40	17.19
SIM	UG/KG	X16SS0130001	SC3166-13	NM	6/13/2009	6/20/2009	7/1/2009	6.784	11.46	18.24
SIM	UG/KG	X16SS0090001	SC3166-10	NM	6/14/2009	6/20/2009	7/1/2009	5.855	11.37	17.23
SIM	UG/KG	X16SS0080001	SC3166-24	NM	6/13/2009	6/22/2009	7/2/2009	9.017	10.32	19.34
SIM	UG/KG	X16SS0020001	SC3166-19RA	NM	6/13/2009	6/20/2009	7/2/2009	6.879	12.37	19.24
SIM	UG/KG	X16SS0020001	SC3166-19DL	NM	6/13/2009	6/20/2009	7/6/2009	6.88	16.13	23.01
SIM	UG/KG	X15SD0230006	SC3166-20RA	NM	6/10/2009	6/20/2009	7/2/2009	9.806	12.39	22.2
SIM	UG/KG	X15SD0050006	SC3166-22	NM	6/1/2009	6/18/2009	6/30/2009	17.28	12.24	29.53
SIM	UG/KG	X16SS0560001	SC3166-17DL	NM	6/14/2009	6/20/2009	7/3/2009	5.665	13	18.67

SC5144

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028245 | PAGE 1 OF 5

PROJECT NO: 112G008 10	FACILITY: Indian Head	PROJECT MANAGER R. Businski	PHONE NUMBER 4129218038	LABORATORY NAME AND CONTACT: Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER J. Goard	PHONE NUMBER 4124430244	ADDRESS 600 Technology Way
		CARRIER/WAYBILL NUMBER FedEx / 863138882016		CITY, STATE Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: SW846 8050B/6020A Sb As Cr Pb Sn Zn

DATE (YEAR 2009)	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS		COMMENTS
6/10	1100	X155077C0001	077	0	1	SO	C	1	1	
6/10	1030	X155507 8C0001	078	0	1	SO	C	1	1	
6/11	1220	X1755008C0001	008	0	1			1	1	
6/11	1330	X1755009C0001	009	0	1			1	1	
6/11	1400	X1755010C0001	010	0	1		↓	1	1	
6/2	1200	X1455022 0001	022	0	1		G	1	1	
6/2	1243	X1455033 0001	033	0	1		G	1	1	
6/2	1252	X1455035 0001	035	0	1		G	1	1	
6/2	1306	X1455039 0001	039	0	1		G	1	1	
6/2	1329	X1455043 0001	043	0	1		G	1	1	
6/3	1426	X1455048 0001	048	0	1		G	1	1	
6/3	1103	X1455058 0001	058	0	1		G	1	1	
6/3	1303	X1455062 0001	062	0	1	↓	G	1	1	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-15-09	1530	1. RECEIVED BY	6/16/09	1005
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TINUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 128250 | PAGE 2 OF 5

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	412 921 8308	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	412 443 0244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 8631 3888 2016		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS: TCL, TAL, COC	SW 846 8270	SW 846 8082A	SW 846 3050B/6020A Sb, As, Pb, Sn, Zn	COMMENTS
									G	4°C					
6/3	1103	X1455058G0001	058	0	1	SO	G	3	3						MS/MSD
6/4	1435	X1455117G0001	117					1	1						
5/27	1510	X1555033G0001	033					1	1						
5/28	1014	X1555048G0001	048		↓	↓		1	1						
6/10	1252	X1550230G0006	023		.5	SD		1	1						
6/13	1400	X1655031G0001	031		1	SO		1	X	1					
6/13	1500	X1655040G0001	040				↓	1		1					
6/15	1500	X2555034C0001	034				C	1				1			
6/14	1245	X1655080C0001	080				C	1				1			
6/14	1250	X1655081C0001	081				C	1				1			
6/4	1130	X1455094G0001	094				G	1				1			
6/9	1248	X1455126G0001	126				G	1				1			
6/4	1250	X1455087G0001	087	↓	↓	↓	G	1				1			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-15-09	1530	1. RECEIVED BY	6/16/09	1005
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TINUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028248 | PAGE 3 OF 5

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Babinski	4129218308	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FedEx 863138882016		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: SW 8260B

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS		COMMENTS
6/14	1015	X165507800001	078	0	1	SO	G	1	1	
6/14	1245	X165508000001	080				C	1	1	
	1250	X165508100001	081				C	1	1	
	1245 1100	X165507100001	071				G	1	1	
	925	X165506200001	062					1	1	
	1040	X165507300001	073					1	1	
	955	X165507600001	076					3	3	MS/MSD
	1130	X165500900001	009					1	1	
	1350 1345	X165501400001	014					1	1	
	1250	X165501900001	019					1	1	
6/13	1315	X165501300001	013					1	1	
	1515	X165504200001	042					1	1	
	1525	X165504600001	046					1	1	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-15-09	1530	1. RECEIVED BY	6/16/09	1005
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TINUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028249 | PAGE 4 OF 5

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bujnski	4129218308	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER: J. Goerdt	PHONE NUMBER: 4124430244	ADDRESS: 600 Technology Way
		CARRIER/WAYBILL NUMBER: Fed Ex / 863138882016		CITY, STATE: Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ] ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE (YEAR 2009)	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS SW8560B70 PAH, TOC, LEC								COMMENTS
									G		4°C	4°C							
6/13	1555	X1655051 0001	051	0	1	SO	G	1	1										
6/14	0845	X1655056 0001	056					1	1										
6/14	0855	X1655057 0001	057					1	1										
6/13	1105	X1655002 0001	002		↓	↓		1	1										
6/10	1252	X155D023 0006	023		.5	SD		1	1										
6/1	900	X155D003 0006	003					1	1										
6/1	912	X155D005 0006	005					1	1										
6/1	900	X155D003 0006	003		↓	↓		1		1									
6/4	1250	X1455087 0001	087		1	SO		1		1									
6/3	1103	~~X1455058 0001~~	058					1		1									on page lot 5
6/13	1140	X1655008 0001	008					1		1									
6/14	1040	X1655073 0001	073					1		1									
6/2	1200	X1455022 0001	022	↓	↓	↓	↓	1		1									

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-15-09	1530	1. RECEIVED BY	6-16-09	10:05
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

JC9164

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER № 028251 | PAGE 5 OF 5

PROJECT NO: 112G00810	FACILITY: Indian Head	PROJECT MANAGER: R. Basinski	PHONE NUMBER: 4129218308	LABORATORY NAME AND CONTACT: Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER: J. Goeddel	PHONE NUMBER: 4124430244	ADDRESS: 600 Technology Way
		CARRIER/WAYBILL NUMBER: Fed Ex / 863138882016		CITY, STATE: Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G, G
PRESERVATIVE USED: 4oC, 4oC

TYPE OF ANALYSIS: SW846 3050B/6020A; SO AS UPS? ...; SW846 8270 ...

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	Analysis 1	Analysis 2							COMMENTS
6/10	1252	X15SD0230006	023	0	.5	SD	G	1	1								
6/10	1115	X15SD0180006	018	↓	↓	↓	↓	1	1								
6/10	1050	X15SD0130006	013	↓	↓	↓	↓	1	1								
6/1	0912	X15SD0050006	005	↓	↓	↓	↓	1	1								
6/1	0900	X15SD0030006	003	↓	↓	↓	↓	1	1								
6/4	1323	X14SS1080001	108	↓	1	SO	↓	1	1								
6/4	1435	X14SS1170001	117	↓	↓	↓	↓	1	1								
6/3	1307	X14SS0630001	063	↓	↓	↓	↓	1	1								
6/3	1439	X14SS0720001	072	↓	↓	↓	↓	1	1								
6/13	1110	X16SS0030001	003	↓	↓	↓	↓	1	1								
6/13	1325	X16SS0260001	026	↓	↓	↓	↓	1		1							
6/13	1140	X16SS0080001	008	↓	↓	↓	↓	1		1							

1. RELINQUISHED BY	DATE 6-15-09	TIME 1530	1. RECEIVED BY	DATE 6/16/09	TIME 1005
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG65149-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID: G6214 Lab Sample ID: WG65149-1

Instrument ID: GCMS-G Date Extracted: 06/18/09

Matrix: (soil/water) SOIL Date Analyzed: 06/30/09

Level:(low/med) LOW Time Analyzed: 1939

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	WG65149-LCS	WG65149-2	G6215	06/30/09	2022
02	X15SD0030006	SC3166-21	G6216	06/30/09	2105
03	X15SD0050006	SC3166-22	G6217	06/30/09	2149
04					
05					
06					
07					
08					
09					
10					
11					
12					
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COMMENTS:

FORM IVSV

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client:
Project: CTO 423 NSF Indian Head
PO No:
Sample Date:
Received Date:
Extraction Date: 06/18/09
Analysis Date: 30-JUN-2009 19:39
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 100

Lab ID: WG65149-1
Client ID: WG65149-Blank
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65149
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	20	1.0	20	20	1.7
91-20-3	Naphthalene	U	20	1.0	20	20	2.6
91-57-6	2-Methylnaphthalene	U	20	1.0	20	20	2.2
208-96-8	Acenaphthylene	U	20	1.0	20	20	1.2
83-32-9	Acenaphthene	U	20	1.0	20	20	1.5
86-73-7	Fluorene	U	20	1.0	20	20	3.2
85-01-8	Phenanthrene	U	20	1.0	20	20	1.8
120-12-7	Anthracene	U	20	1.0	20	20	1.2
206-44-0	Fluoranthene	U	20	1.0	20	20	1.8
129-00-0	Pyrene	U	20	1.0	20	20	2.1
56-55-3	Benzo(a)anthracene	U	20	1.0	20	20	1.9
218-01-9	Chrysene	J	2.7	1.0	20	20	1.7
205-99-2	Benzo(b)fluoranthene	U	20	1.0	20	20	2.4
207-08-9	Benzo(k)fluoranthene	U	20	1.0	20	20	3.1
50-32-8	Benzo(a)pyrene	U	20	1.0	20	20	3.3
193-39-5	Indeno(1,2,3-cd)pyrene	U	20	1.0	20	20	1.9
53-70-3	Dibenzo(a,h)anthracene	U	20	1.0	20	20	1.8
191-24-2	Benzo(g,h,i)perylene	U	20	1.0	20	20	2.0
321-60-8	2-Methylnaphthalene-D10		48%				
118-79-6	Fluorene-D10		* 46%				
1718-51-0	Pyrene-D10		73%				

KATAHDIN ANALYTICAL SERVICES
LAB CONTROL SAMPLE

Client:
Project: CTO 423 NSF Indian Head
PO No:
Sample Date:
Received Date:
Extraction Date: 06/18/09
Analysis Date: 06/30/09
Report Date: 07/07/2009
Matrix: SOIL

Lab ID: WG65149-2
Client ID: WG65149-LCS
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65149
Units: ug/Kgdrywt

COMPOUND	LCS SPIKE	SAMPLE CONC.	LCS CONC.	%REC.	QC. LIMITS
1-Methylnaphthalene	67	NA	40	60	36-114
Naphthalene	67	NA	38	57	54- 94
2-Methylnaphthalene	67	NA	42	* 64	75-132
Acenaphthylene	67	NA	35	52	51-103
Acenaphthene	67	NA	34	* 51	56- 97
Fluorene	67	NA	39	* 58	61-103
Phenanthrene	67	NA	40	60	58-122
Anthracene	67	NA	41	61	55-113
Fluoranthene	67	NA	43	* 64	68-126
Pyrene	67	NA	46	68	33-133
Benzo(a)anthracene	67	NA	41	62	50-138
Chrysene	67	NA	48	72	44-132
Benzo(b)fluoranthene	67	NA	40	60	44-119
Benzo(k)fluoranthene	67	NA	48	73	40-120
Benzo(a)pyrene	67	NA	40	61	52-113
Indeno(1,2,3-cd)pyrene	67	NA	36	54	32-134
Dibenzo(a,h)anthracene	67	NA	39	59	30-134
Benzo(g,h,i)perylene	67	NA	44	66	43-121

FORM III SV-2

G6215.D

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG65271-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID: G6218 Lab Sample ID: WG65271-1

Instrument ID: GCMS-G Date Extracted: 06/20/09

Matrix: (soil/water) SOIL Date Analyzed: 06/30/09

Level:(low/med) LOW Time Analyzed: 2233

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	WG65271-LCS	WG65271-2	G6219	06/30/09	2316
02	X16SS081C0001	SC3166-5	G6221	07/01/09	0042
03	X16SS080C0001	SC3166-4	G6226	07/01/09	1329
04	X16SS0710001	SC3166-6	G6227	07/01/09	1411
05	X16SS0620001	SC3166-7	G6228	07/01/09	1453
06	X16SS0730001	SC3166-8	G6229	07/01/09	1535
07	X16SS0760001	SC3166-9	G6230	07/01/09	1617
08	X16SS0090001	SC3166-10	G6231	07/01/09	1659
09	X16SS0140001	SC3166-11	G6232	07/01/09	1741
10	X16SS0130001	SC3166-13	G6234	07/01/09	1906
11	X16SS0420001	SC3166-14	G6235	07/01/09	1948
12	X16SS0460001	SC3166-15	G6236	07/01/09	2030
13	X16SS0510001	SC3166-16	G6237	07/01/09	2111
14	X16SS0560001	SC3166-17	G6238	07/01/09	2154
15	X16SS0020001	SC3166-19RA	G6246	07/02/09	1657
16	X15SD0230006	SC3166-20RA	G6247	07/02/09	1739
17	X16SS0190001	SC3166-12RA	G6248	07/02/09	1821
18	X16SS0760001MS	WG65271-3	G6251	07/02/09	2027
19	X16SS0760001MSD	WG65271-4	G6252	07/02/09	2110
20	X16SS0710001	SC3166-6DL	G6253	07/02/09	2152
21	X16SS0620001	SC3166-7DL	G6254	07/02/09	2235
22	X16SS0730001	SC3166-8DL	G6255	07/02/09	2318
23	X16SS0760001	SC3166-9DL	G6256	07/03/09	0000
24	X16SS0560001	SC3166-17DL	G6257	07/03/09	0043
25	X16SS0570001	SC3166-18RA	G6259	07/06/09	1034
26	X16SS0020001	SC3166-19DL	G6260	07/06/09	1117
27					
28					
29					
30					

COMMENTS:

FORM IVSV

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client:
Project: CTO 423 NSF Indian Head
PO No:
Sample Date:
Received Date:
Extraction Date: 06/20/09
Analysis Date: 30-JUN-2009 22:33
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 100

Lab ID: WG65271-1
Client ID: WG65271-Blank
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	20	1.0	20	20	1.7
91-20-3	Naphthalene	U	20	1.0	20	20	2.6
91-57-6	2-Methylnaphthalene	U	20	1.0	20	20	2.2
208-96-8	Acenaphthylene	U	20	1.0	20	20	1.2
83-32-9	Acenaphthene	U	20	1.0	20	20	1.5
86-73-7	Fluorene	U	20	1.0	20	20	3.2
85-01-8	Phenanthrene	U	20	1.0	20	20	1.8
120-12-7	Anthracene	U	20	1.0	20	20	1.2
206-44-0	Fluoranthene	U	20	1.0	20	20	1.8
129-00-0	Pyrene	U	20	1.0	20	20	2.1
56-55-3	Benzo(a)anthracene	U	20	1.0	20	20	1.9
218-01-9	Chrysene	U	20	1.0	20	20	1.7
205-99-2	Benzo(b)fluoranthene	U	20	1.0	20	20	2.4
207-08-9	Benzo(k)fluoranthene	U	20	1.0	20	20	3.1
50-32-8	Benzo(a)pyrene	U	20	1.0	20	20	3.3
193-39-5	Indeno(1,2,3-cd)pyrene	U	20	1.0	20	20	1.9
53-70-3	Dibenzo(a,h)anthracene	U	20	1.0	20	20	1.8
191-24-2	Benzo(g,h,i)perylene	U	20	1.0	20	20	2.0
321-60-8	2-Methylnaphthalene-D10		53%				
118-79-6	Fluorene-D10		* 49%				
1718-51-0	Pyrene-D10		77%				

KATAHDIN ANALYTICAL SERVICES
LAB CONTROL SAMPLE

Client:
Project: CTO 423 NSF Indian Head
PO No:
Sample Date:
Received Date:
Extraction Date: 06/20/09
Analysis Date: 06/30/09
Report Date: 07/07/2009
Matrix: SOIL

Lab ID: WG65271-2
Client ID: WG65271-LCS
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

COMPOUND	LCS SPIKE	SAMPLE CONC.	LCS CONC.	%REC.	QC. LIMITS
1-Methylnaphthalene	67	NA	49	73	36-114
Naphthalene	67	NA	44	66	54- 94
2-Methylnaphthalene	67	NA	51	76	75-132
Acenaphthylene	67	NA	44	66	51-103
Acenaphthene	67	NA	42	63	56- 97
Fluorene	67	NA	44	66	61-103
Phenanthrene	67	NA	49	74	58-122
Anthracene	67	NA	43	65	55-113
Fluoranthene	67	NA	53	79	68-126
Pyrene	67	NA	49	74	33-133
Benzo(a)anthracene	67	NA	47	71	50-138
Chrysene	67	NA	53	80	44-132
Benzo(b)fluoranthene	67	NA	49	73	44-119
Benzo(k)fluoranthene	67	NA	55	83	40-120
Benzo(a)pyrene	67	NA	51	76	52-113
Indeno(1,2,3-cd)pyrene	67	NA	38	57	32-134
Dibenzo(a,h)anthracene	67	NA	47	70	30-134
Benzo(g,h,i)perylene	67	NA	51	76	43-121

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client:
Project: CTO 423 NSF Indian Head
PO No:
Sample Date:
Received Date:
Extraction Date: 06/22/09
Analysis Date: 01-JUL-2009 12:05
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 100

Lab ID: WG65295-1
Client ID: WG65295-Blank
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65295
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	20	1.0	20	20	1.7
91-20-3	Naphthalene	U	20	1.0	20	20	2.6
91-57-6	2-Methylnaphthalene	U	20	1.0	20	20	2.2
208-96-8	Acenaphthylene	U	20	1.0	20	20	1.2
83-32-9	Acenaphthene	U	20	1.0	20	20	1.5
86-73-7	Fluorene	U	20	1.0	20	20	3.2
85-01-8	Phenanthrene	U	20	1.0	20	20	1.8
120-12-7	Anthracene	U	20	1.0	20	20	1.2
206-44-0	Fluoranthene	U	20	1.0	20	20	1.8
129-00-0	Pyrene	U	20	1.0	20	20	2.1
56-55-3	Benzo(a)anthracene	U	20	1.0	20	20	1.9
218-01-9	Chrysene	U	20	1.0	20	20	1.7
205-99-2	Benzo(b)fluoranthene	U	20	1.0	20	20	2.4
207-08-9	Benzo(k)fluoranthene	U	20	1.0	20	20	3.1
50-32-8	Benzo(a)pyrene	U	20	1.0	20	20	3.3
193-39-5	Indeno(1,2,3-cd)pyrene	U	20	1.0	20	20	1.9
53-70-3	Dibenzo(a,h)anthracene	U	20	1.0	20	20	1.8
191-24-2	Benzo(g,h,i)perylene	U	20	1.0	20	20	2.0
321-60-8	2-Methylnaphthalene-D10		66%				
118-79-6	Fluorene-D10		58%				
1718-51-0	Pyrene-D10		82%				

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID: GD435 DFTPP Injection Date: 06/30/09

Instrument ID: GCMS-G DFTPP Injection Time: 1321

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	46.3
68	Less than 2.0% of mass 69	0.6 (1.5)1
69	Less than 100.0% of mass 198	43.6
70	Less than 2.0% of mass 69	0.2 (0.4)1
127	40.0 - 60.0% of mass 198	55.0
197	Less than 1.0% of mass 198	0.1
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.5
275	10.0 - 30.0% of mass 198	21.3
365	1.0 - 100.0% of mass 198	2.8
441	0.0 - 100.0% of mass 443	9.3 (85.4)2
442	40.0 - 100.0% of mass 198	60.7
443	17.0 - 23.0% of mass 442	10.8 (17.9)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0630	G6206	06/30/09	1341
02		SSTD8.00G0630	G6207	06/30/09	1437
03		SSTD5.00G0630	G6208	06/30/09	1520
04		SSTD2.00G0630	G6209	06/30/09	1603
05		SSTD0.50G0630	G6211	06/30/09	1729
06		SSTD0.20G0630	G6212	06/30/09	1812
07	WG65149-BLANK	WG65149-1	G6214	06/30/09	1939
08	WG65149-LCS	WG65149-2	G6215	06/30/09	2022
09	X15SD0030006	SC3166-21	G6216	06/30/09	2105
10	X15SD0050006	SC3166-22	G6217	06/30/09	2149
11	WG65271-BLANK	WG65271-1	G6218	06/30/09	2233
12	WG65271-LCS	WG65271-2	G6219	06/30/09	2316
13	X16SS081C0001	SC3166-5	G6221	07/01/09	0042
14					
15					
16					
17					
18					
19					
20					

FORM V SV

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID: GD436 DFTPP Injection Date: 07/01/09

Instrument ID: GCMS-G DFTPP Injection Time: 1057

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	45.6
68	Less than 2.0% of mass 69	0.3 (0.7)1
69	Less than 100.0% of mass 198	42.5
70	Less than 2.0% of mass 69	0.2 (0.4)1
127	40.0 - 60.0% of mass 198	52.0
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.7
275	10.0 - 30.0% of mass 198	23.0
365	1.0 - 100.0% of mass 198	3.2
441	0.0 - 100.0% of mass 443	11.0 (83.7)2
442	40.0 - 100.0% of mass 198	70.8
443	17.0 - 23.0% of mass 442	13.1 (18.5)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0701	G6223	07/01/09	1117
02	WG65295-BLANK	WG65295-1	G6224	07/01/09	1205
03	WG65295-LCS	WG65295-2	G6225	07/01/09	1247
04	X16SS080C0001	SC3166-4	G6226	07/01/09	1329
05	X16SS0710001	SC3166-6	G6227	07/01/09	1411
06	X16SS0620001	SC3166-7	G6228	07/01/09	1453
07	X16SS0730001	SC3166-8	G6229	07/01/09	1535
08	X16SS0760001	SC3166-9	G6230	07/01/09	1617
09	X16SS0090001	SC3166-10	G6231	07/01/09	1659
10	X16SS0140001	SC3166-11	G6232	07/01/09	1741
11	X16SS0130001	SC3166-13	G6234	07/01/09	1906
12	X16SS0420001	SC3166-14	G6235	07/01/09	1948
13	X16SS0460001	SC3166-15	G6236	07/01/09	2030
14	X16SS0510001	SC3166-16	G6237	07/01/09	2111
15	X16SS0560001	SC3166-17	G6238	07/01/09	2154
16					
17					
18					
19					
20					

FORM V SV

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID: GD437 DFTPP Injection Date: 07/02/09

Instrument ID: GCMS-G DFTPP Injection Time: 1305

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	49.3
68	Less than 2.0% of mass 69	0.3 (0.6)1
69	Less than 100.0% of mass 198	44.2
70	Less than 2.0% of mass 69	0.3 (0.6)1
127	40.0 - 60.0% of mass 198	55.6
197	Less than 1.0% of mass 198	0.5
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.9
275	10.0 - 30.0% of mass 198	23.4
365	1.0 - 100.0% of mass 198	3.0
441	0.0 - 100.0% of mass 443	10.2 (77.5)2
442	40.0 - 100.0% of mass 198	69.2
443	17.0 - 23.0% of mass 442	13.2 (19.0)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0702	G6242	07/02/09	1410
02	X16SS0310001	SC3166-1	G6243	07/02/09	1452
03	X16SS0400001	SC3166-2	G6244	07/02/09	1534
04	X16SS0780001	SC3166-3	G6245	07/02/09	1615
05	X16SS0020001	SC3166-19RA	G6246	07/02/09	1657
06	X15SD0230006	SC3166-20RA	G6247	07/02/09	1739
07	X16SS0190001	SC3166-12RA	G6248	07/02/09	1821
08	X16SS0260001	SC3166-23	G6249	07/02/09	1903
09	X16SS0080001	SC3166-24	G6250	07/02/09	1944
10	X16SS0760001MS	WG65271-3	G6251	07/02/09	2027
11	X16SS0760001MSD	WG65271-4	G6252	07/02/09	2110
12	X16SS0710001	SC3166-6DL	G6253	07/02/09	2152
13	X16SS0620001	SC3166-7DL	G6254	07/02/09	2235
14	X16SS0730001	SC3166-8DL	G6255	07/02/09	2318
15	X16SS0760001	SC3166-9DL	G6256	07/03/09	0000
16	X16SS0560001	SC3166-17DL	G6257	07/03/09	0043
17					
18					
19					
20					

FORM V SV

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID: GD438 DFTPP Injection Date: 07/06/09

Instrument ID: GCMS-G DFTPP Injection Time: 0930

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	42.6
68	Less than 2.0% of mass 69	0.6 (1.5)1
69	Less than 100.0% of mass 198	41.5
70	Less than 2.0% of mass 69	0.2 (0.6)1
127	40.0 - 60.0% of mass 198	51.7
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.7
275	10.0 - 30.0% of mass 198	22.8
365	1.0 - 100.0% of mass 198	2.9
441	0.0 - 100.0% of mass 443	10.8 (86.5)2
442	40.0 - 100.0% of mass 198	70.4
443	17.0 - 23.0% of mass 442	12.5 (17.7)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0706	G6258	07/06/09	0949
02	X16SS0570001	SC3166-18RA	G6259	07/06/09	1034
03	X16SS0020001	SC3166-19DL	G6260	07/06/09	1117
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

FORM V SV

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID: GD439 DFTPP Injection Date: 07/07/09

Instrument ID: GCMS-G DFTPP Injection Time: 1158

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	46.4
68	Less than 2.0% of mass 69	0.3 (0.7)1
69	Less than 100.0% of mass 198	43.3
70	Less than 2.0% of mass 69	0.3 (0.8)1
127	40.0 - 60.0% of mass 198	52.5
197	Less than 1.0% of mass 198	0.2
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.7
275	10.0 - 30.0% of mass 198	23.6
365	1.0 - 100.0% of mass 198	3.1
441	0.0 - 100.0% of mass 443	9.7 (74.8)2
442	40.0 - 100.0% of mass 198	70.3
443	17.0 - 23.0% of mass 442	13.0 (18.5)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0707	G6275	07/07/09	1219
02	X16SS0310001	SC3166-1DL	G6276	07/07/09	1301
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
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14					
15					
16					
17					
18					
19					
20					

FORM V SV

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG65295-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID: G6224 Lab Sample ID: WG65295-1

Instrument ID: GCMS-G Date Extracted: 06/22/09

Matrix: (soil/water) SOIL Date Analyzed: 07/01/09

Level:(low/med) LOW Time Analyzed: 1205

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	WG65295-LCS	WG65295-2	G6225	07/01/09	1247
02	X16SS0310001	SC3166-1	G6243	07/02/09	1452
03	X16SS0400001	SC3166-2	G6244	07/02/09	1534
04	X16SS0780001	SC3166-3	G6245	07/02/09	1615
05	X16SS0260001	SC3166-23	G6249	07/02/09	1903
06	X16SS0080001	SC3166-24	G6250	07/02/09	1944
07	X16SS0310001	SC3166-1DL	G6276	07/07/09	1301
08					
09					
10					
11					
12					
13					
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29					
30					

COMMENTS:

FORM IVSV

KATAHDIN ANALYTICAL SERVICES
LAB CONTROL SAMPLE

Client:
Project: CTO 423 NSF Indian Head
PO No:
Sample Date:
Received Date:
Extraction Date: 06/22/09
Analysis Date: 07/01/09
Report Date: 07/07/2009
Matrix: SOIL

Lab ID: WG65295-2
Client ID: WG65295-LCS
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65295
Units: ug/Kgdrywt

COMPOUND	LCS SPIKE	SAMPLE CONC.	LCS CONC.		%REC.	QC. LIMITS
1-Methylnaphthalene	67	NA	41		61	36-114
Naphthalene	67	NA	38		57	54- 94
2-Methylnaphthalene	67	NA	44	*	66	75-132
Acenaphthylene	67	NA	36		53	51-103
Acenaphthene	67	NA	33	*	50	56- 97
Fluorene	67	NA	34	*	52	61-103
Phenanthrene	67	NA	35	*	52	58-122
Anthracene	67	NA	35	*	52	55-113
Fluoranthene	67	NA	37	*	55	68-126
Pyrene	67	NA	49		74	33-133
Benzo(a)anthracene	67	NA	48		73	50-138
Chrysene	67	NA	43		65	44-132
Benzo(b)fluoranthene	67	NA	48		72	44-119
Benzo(k)fluoranthene	67	NA	39		58	40-120
Benzo(a)pyrene	67	NA	43		64	52-113
Indeno(1,2,3-cd)pyrene	67	NA	48		71	32-134
Dibenzo(a,h)anthracene	67	NA	46		68	30-134
Benzo(g,h,i)perylene	67	NA	42		62	43-121

FORM III SV-2

G6225.D

KATAHDIN ANALYTICAL SERVICES
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/14/09
Received Date: 06/16/09
Extraction Date: 06/20/09
Analysis Date: 07/02/09
Report Date: 07/07/2009
Matrix: SOIL

Lab ID: WG65271-3 & WG65271-4
Client ID: X16SS0760001MS & X16SS0760001MSD
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65271
Units: ug/Kgdrywt

COMPOUND	MS SPIKE	MSD SPIKE	SAMPLE CONC.	MS CONC.	MSD CONC.	MS %REC.	MSD %REC.	%RPD	%RPD LIMIT	QC. LIMITS
1-Methylnaphthalene	77	77	16	44	52	37	47	17	50	36-114
Naphthalene	77	77	7.2	43	45	* 47	* 50	4	50	54- 94
2-Methylnaphthalene	77	77	68	76	62	* 11	NC	21	50	75-132
Acenaphthylene	77	77	0.00	43	45	56	59	6	50	51-103
Acenaphthene	77	77	7.7	42	45	* 44	* 48	7	50	56- 97
Fluorene	77	77	21	50	54	* 37	* 44	9	50	61-103
Phenanthrene	77	77	481	246	327	NC	NC	28	50	58-122
Anthracene	77	77	111	89	116	NC	* 6	26	50	55-113
Fluoranthene	77	77	207	180	212	NC	* 6	16	50	68-126
Pyrene	77	77	1570	752	925	NC	NC	21	50	33-133
Benzo(a)anthracene	77	77	1380	907	917	NC	NC	1	50	50-138
Chrysene	77	77	1520	962	1060	NC	NC	10	50	44-132
Benzo(b)fluoranthene	77	77	792	453	493	NC	NC	8	50	44-119
Benzo(k)fluoranthene	77	77	198	92	109	NC	NC	17	50	40-120
Benzo(a)pyrene	77	77	2480	1090	1230	NC	NC	12	50	52-113
Indeno(1,2,3-cd)pyrene	77	77	263	208	245	NC	NC	16	50	32-134
Dibenzo(a,h)anthracene	77	77	391	245	283	NC	NC	14	50	30-134
Benzo(g,h,i)perylene	77	77	997	526	582	NC	NC	10	50	43-121

FORM III SV-2

G6251.D & G6252.D

FORM 2
SOIL SEMIVOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Level:(low/med) LOW

	CLIENT SAMPLE ID	LAB SAMPLE ID	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	WG65149-BLANK	WG65149-1	48	46*	73						1
02	WG65149-LCS	WG65149-2	52	54	63						0
03	X15SD0030006	SC3166-21	26*	35*	65						2
04	X15SD0050006	SC3166-22	22*	24*	49						2
05	WG65271-BLANK	WG65271-1	53	49*	77						1
06	WG65271-LCS	WG65271-2	67	65	75						0
07	X16SS081C0001	SC3166-5	55	54	82						0
08	WG65295-BLANK	WG65295-1	66	58	82						0
09	WG65295-LCS	WG65295-2	49	52*	69						1
10	X16SS080C0001	SC3166-4	37	40*	64						1
11	X16SS0710001	SC3166-6	34	44*	78						1
12	X16SS0620001	SC3166-7	40	43*	83						1
13	X16SS0730001	SC3166-8	45	50*	84						1
14	X16SS0760001	SC3166-9	22*	42*	78						2
15	X16SS0090001	SC3166-10	28*	45*	77						2
16	X16SS0140001	SC3166-11	14*	58	83						1
17	X16SS0130001	SC3166-13	50	51*	68						1
18	X16SS0420001	SC3166-14	48	47*	73						1
19	X16SS0460001	SC3166-15	53	53	72						0
20	X16SS0510001	SC3166-16	53	55	73						0
21	X16SS0560001	SC3166-17	44	59	85						0
22	X16SS0310001	SC3166-1	30*	48*	66						2
23	X16SS0400001	SC3166-2	23*	44*	58						2
24	X16SS0780001	SC3166-3	32*	48*	67						2
25	X16SS0020001	SC3166-19RA	31*	51*	75						2
26	X15SD0230006	SC3166-20RA	40	50*	68						1
27	X16SS0190001	SC3166-12RA	26*	53	78						1
28	X16SS0260001	SC3166-23	53	54	71						0

		QC LIMITS
S1	= 2-Methylnaphthalene-D1	(33-125)
S2	= Fluorene-D10	(53-136)
S3	= Pyrene-D10	(16-162)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

FORM 2
SOIL SEMIVOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Level: (low/med) LOW

	CLIENT SAMPLE ID	LAB SAMPLE ID	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	X16SS0080001	SC3166-24	25*	56	66						1
02	X16SS0760001MS	WG65271-3	37	58	81						0
03	X16SS0760001MSD	WG65271-4	34	60	74						0
04	X16SS0710001	SC3166-6DL	40	60	93						0
05	X16SS0620001	SC3166-7DL	62	43*	83						1
06	X16SS0730001	SC3166-8DL	28*	51*	83						2
07	X16SS0760001	SC3166-9DL	D	D	D						0
08	X16SS0560001	SC3166-17DL	61	62	109						0
09	X16SS0570001	SC3166-18RA	35	49*	69						1
10	X16SS0020001	SC3166-19DL	48	58	92						0
11	X16SS0310001	SC3166-1DL	42	53	63						0
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											

		QC LIMITS
S1	= 2-Methylnaphthalene-D1	(33-125)
S2	= Fluorene-D10	(53-136)
S3	= Pyrene-D10	(16-162)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Instrument ID: GCMS-G Calibration Date(s): 06/30/09 06/30/09

Column: RTX5-MS ID: 0.25 (mm) Calibration Time(s): 1341 1812

LAB FILE ID: RF0.2: G6212 RF0.5: G6211 RF1: G6206
RF2: G6209 RF5: G6208 RF8: G6207

COMPOUND	RF0.2	RF0.5	RF1	RF2	RF5	RF8	CURVE	COEFFICENTS A0	COEFFICENTS A1	%RSD OR R^2	MAX %RSD OR R^2	
1-Methylnaphthalene	0.404	0.486	0.473	0.487	0.528	0.526	AVRG		0.48401506	9.386	15.000	
Naphthalene	0.822	0.808	0.771	0.781	0.769	0.774	AVRG		0.78742233	2.773	15.000	
2-Methylnaphthalene	0.464	0.496	0.490	0.506	0.536	0.551	AVRG		0.50730315	6.280	15.000	
Acenaphthylene	1.634	1.650	1.641	1.830	1.939	2.108	AVRG		1.80024737	10.847	15.000	
Acenaphthene	1.521	1.289	1.102	1.198	1.238	1.295	AVRG		1.27383998	11.011	15.000	
Fluorene	1.191	1.191	1.206	1.292	1.309	1.375	AVRG		1.26062907	6.043	15.000	
Phenanthrene	1.059	1.134	1.019	1.123	1.153	1.327	AVRG		1.13563166	9.361	15.000	
Anthracene	0.986	0.934	0.726	0.771	0.850	0.861	AVRG		0.85482025	11.360	15.000	
Fluoranthene	0.857	0.860	0.690	0.774	0.826	0.994	AVRG		0.83347524	12.157	15.000	
Pyrene	1.624	1.561	1.392	1.494	1.437	1.521	AVRG		1.50492808	5.572	15.000	
Benzo(a)anthracene	0.705	0.698	0.789	0.763	0.799	0.928	AVRG		0.78054204	10.725	15.000	
Chrysene	4090	10304	17138	32074	92609	135520	LINR	4.905e-002	0.99862276	0.99512	0.99000	
Benzo(b)fluoranthene	0.762	0.735	0.820	0.810	0.884	1.020	AVRG		0.83862302	12.257	15.000	
Benzo(k)fluoranthene	1.676	1.520	1.091	1.297	1.238	1.395	AVRG		1.36961539	15.224	15.000	<-
Benzo(a)pyrene	1.096	0.943	0.757	0.861	0.892	0.971	AVRG		0.91997024	12.410	15.000	
Indeno(1,2,3-cd)pyrene	0.470	0.408	0.504	0.443	0.509	0.570	AVRG		0.48395274	11.760	15.000	
Dibenzo(a,h)anthracene	0.588	0.508	0.552	0.533	0.577	0.624	AVRG		0.56356256	7.336	15.000	
Benzo(g,h,i)perylene	2379	5204	12771	20294	52710	73696	LINR	-7.99e-003	1.26218652	0.99867	0.99000	
2-Methylnaphthalene-D10	1.264	0.988	1.050	1.154	1.172	1.275	AVRG		1.15044161	9.940	15.000	
Fluorene-D10	0.968	0.979	1.010	1.081	1.117	1.155	AVRG		1.05182614	7.349	15.000	
Pyrene-D10	1.015	0.952	0.733	0.830	0.871	1.066	AVRG		0.91134108	13.553	15.000	

FORM VI SV

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Instrument ID: GCMS-G Calibration Date: 07/01/09 Time: 1117

Lab File ID: G6223 Init. Calib. Date(s): 06/30/09 06/30/09

Init. Calib. Times: 1341 1812

GC Column: RTX5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
1-Methylnaphthalene	0.4840000	0.5438800	0.5438800	0.01	12.37	100.00	AVRG
Naphthalene	0.7880000	0.8010500	0.8010500	0.01	1.66	100.00	AVRG
2-Methylnaphthalene	0.5070000	0.5310800	0.5310800	0.01	4.75	100.00	AVRG
Acenaphthylene	1.8000000	1.7715000	1.7715000	0.01	-1.58	100.00	AVRG
Acenaphthene	1.2740000	1.1363000	1.1363000	0.01	-10.81	20.00	AVRG
Fluorene	1.2610000	1.2163000	1.2163000	0.01	-3.54	100.00	AVRG
Phenanthrene	1.1360000	1.0933000	1.0933000	0.01	-3.76	100.00	AVRG
Anthracene	0.8550000	0.7447800	0.7447800	0.01	-12.89	100.00	AVRG
Fluoranthene	0.8340000	0.7914300	0.7914300	0.01	-5.10	20.00	AVRG
Pyrene	1.5050000	1.4106000	1.4106000	0.01	-6.27	100.00	AVRG
Benzo(a)anthracene	0.7800000	0.8895300	0.8895300	0.01	14.04	100.00	AVRG
Chrysene	0.9915100	1.0000000	0.9535900	0.01	-0.85	100.00	LINR
Benzo(b)fluoranthene	0.8380000	0.9188600	0.9188600	0.01	9.65	100.00	AVRG
Benzo(k)fluoranthene	1.3700000	1.1419000	1.1419000	0.01	-16.65	100.00	AVRG
Benzo(a)pyrene	0.9200000	0.8910800	0.8910800	0.01	-3.14	20.00	AVRG
Indeno(1,2,3-cd)pyrene	0.4840000	0.5132500	0.5132500	0.01	6.04	100.00	AVRG
Dibenzo(a,h)anthracene	0.5640000	0.5452400	0.5452400	0.01	-3.33	100.00	AVRG
Benzo(g,h,i)perylene	0.8461400	1.0000000	0.6754400	0.01	-15.39	100.00	LINR
2-Methylnaphthalene-D10	1.1500000	1.0274000	1.0274000	0.01	-10.66	100.00	AVRG
Fluorene-D10	1.0520000	0.9941900	0.9941900	0.01	-5.50	100.00	AVRG
Pyrene-D10	0.9110000	0.9494800	0.9494800	0.01	4.22	100.00	AVRG

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Instrument ID: GCMS-G Calibration Date: 07/02/09 Time: 1410

Lab File ID: G6242 Init. Calib. Date(s): 06/30/09 06/30/09

Init. Calib. Times: 1341 1812

GC Column: RTX5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
1-Methylnaphthalene	0.4840000	0.4664400	0.4664400	0.01	-3.63	100.00	AVRG
Naphthalene	0.7880000	0.8053200	0.8053200	0.01	2.20	100.00	AVRG
2-Methylnaphthalene	0.5070000	0.4334000	0.4334000	0.01	-14.52	100.00	AVRG
Acenaphthylene	1.8000000	1.7156000	1.7156000	0.01	-4.69	100.00	AVRG
Acenaphthene	1.2740000	1.4701000	1.4701000	0.01	15.39	20.00	AVRG
Fluorene	1.2610000	1.6242000	1.6242000	0.01	28.80	100.00	AVRG
Phenanthrene	1.1360000	1.1473000	1.1473000	0.01	0.99	100.00	AVRG
Anthracene	0.8550000	0.7781700	0.7781700	0.01	-8.99	100.00	AVRG
Fluoranthene	0.8340000	0.9200800	0.9200800	0.01	10.32	20.00	AVRG
Pyrene	1.5050000	1.3039000	1.3039000	0.01	-13.36	100.00	AVRG
Benzo(a)anthracene	0.7800000	0.8246300	0.8246300	0.01	5.72	100.00	AVRG
Chrysene	1.0455000	1.0000000	1.0076000	0.01	4.55	100.00	LINR
Benzo(b)fluoranthene	0.8380000	0.8620500	0.8620500	0.01	2.87	100.00	AVRG
Benzo(k)fluoranthene	1.3700000	1.2749000	1.2749000	0.01	-6.94	100.00	AVRG
Benzo(a)pyrene	0.9200000	0.8783300	0.8783300	0.01	-4.53	20.00	AVRG
Indeno(1,2,3-cd)pyrene	0.4840000	0.6028200	0.6028200	0.01	24.55	100.00	AVRG
Dibenzo(a,h)anthracene	0.5640000	0.6579100	0.6579100	0.01	16.65	100.00	AVRG
Benzo(g,h,i)perylene	0.9472500	1.0000000	0.7555500	0.01	-5.28	100.00	LINR
2-Methylnaphthalene-D10	1.1500000	1.1046000	1.1046000	0.01	-3.95	100.00	AVRG
Fluorene-D10	1.0520000	1.3187000	1.3187000	0.01	25.35	100.00	AVRG
Pyrene-D10	0.9110000	0.9141800	0.9141800	0.01	0.35	100.00	AVRG

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Instrument ID: GCMS-G Calibration Date: 07/06/09 Time: 0949

Lab File ID: G6258 Init. Calib. Date(s): 06/30/09 06/30/09

Init. Calib. Times: 1341 1812

GC Column: RTX5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
1-Methylnaphthalene	0.4840000	0.4290000	0.4290000	0.01	-11.36	100.00	AVRG
Naphthalene	0.7880000	0.7446900	0.7446900	0.01	-5.50	100.00	AVRG
2-Methylnaphthalene	0.5070000	0.3766000	0.3766000	0.01	-25.72	100.00	AVRG
Acenaphthylene	1.8000000	1.7052000	1.7052000	0.01	-5.27	100.00	AVRG
Acenaphthene	1.2740000	1.1259000	1.1259000	0.01	-11.62	20.00	AVRG
Fluorene	1.2610000	1.2843000	1.2843000	0.01	1.85	100.00	AVRG
Phenanthrene	1.1360000	1.0564000	1.0564000	0.01	-7.01	100.00	AVRG
Anthracene	0.8550000	0.9521000	0.9521000	0.01	11.36	100.00	AVRG
Fluoranthene	0.8340000	0.8167800	0.8167800	0.01	-2.06	20.00	AVRG
Pyrene	1.5050000	1.3938000	1.3938000	0.01	-7.39	100.00	AVRG
Benzo(a)anthracene	0.7800000	0.7544200	0.7544200	0.01	-3.28	100.00	AVRG
Chrysene	1.0514000	1.0000000	1.0136000	0.01	5.14	100.00	LINR
Benzo(b)fluoranthene	0.8380000	0.8694600	0.8694600	0.01	3.75	100.00	AVRG
Benzo(k)fluoranthene	1.3700000	1.1255000	1.1255000	0.01	-17.85	100.00	AVRG
Benzo(a)pyrene	0.9200000	0.8779200	0.8779200	0.01	-4.57	20.00	AVRG
Indeno(1,2,3-cd)pyrene	0.4840000	0.5175800	0.5175800	0.01	6.94	100.00	AVRG
Dibenzo(a,h)anthracene	0.5640000	0.6045800	0.6045800	0.01	7.20	100.00	AVRG
Benzo(g,h,i)perylene	0.9081900	1.0000000	0.7246000	0.01	-9.18	100.00	LINR
2-Methylnaphthalene-D10	1.1500000	0.9288300	0.9288300	0.01	-19.23	100.00	AVRG
Fluorene-D10	1.0520000	1.0287000	1.0287000	0.01	-2.21	100.00	AVRG
Pyrene-D10	0.9110000	0.8947300	0.8947300	0.01	-1.78	100.00	AVRG

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Instrument ID: GCMS-G Calibration Date: 07/07/09 Time: 1219

Lab File ID: G6275 Init. Calib. Date(s): 06/30/09 06/30/09

Init. Calib. Times: 1341 1812

GC Column: RTX5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
1-Methylnaphthalene	0.4840000	0.5608000	0.5608000	0.01	15.87	100.00	AVRG
Naphthalene	0.7880000	0.7667100	0.7667100	0.01	-2.70	100.00	AVRG
2-Methylnaphthalene	0.5070000	0.4590200	0.4590200	0.01	-9.46	100.00	AVRG
Acenaphthylene	1.8000000	1.7243000	1.7243000	0.01	-4.20	100.00	AVRG
Acenaphthene	1.2740000	1.0664000	1.0664000	0.01	-16.30	20.00	AVRG
Fluorene	1.2610000	1.1488000	1.1488000	0.01	-8.90	100.00	AVRG
Phenanthrene	1.1360000	0.8534400	0.8534400	0.01	-24.87	100.00	AVRG
Anthracene	0.8550000	1.0250000	1.0250000	0.01	19.88	100.00	AVRG
Fluoranthene	0.8340000	0.8509800	0.8509800	0.01	2.04	20.00	AVRG
Pyrene	1.5050000	1.2734000	1.2734000	0.01	-15.39	100.00	AVRG
Benzo(a)anthracene	0.7800000	0.8088800	0.8088800	0.01	3.70	100.00	AVRG
Chrysene	1.0312000	1.0000000	0.9933100	0.01	3.12	100.00	LINR
Benzo(b)fluoranthene	0.8380000	0.9354900	0.9354900	0.01	11.63	100.00	AVRG
Benzo(k)fluoranthene	1.3700000	1.0492000	1.0492000	0.01	-23.42	100.00	AVRG
Benzo(a)pyrene	0.9200000	0.9124900	0.9124900	0.01	-0.82	20.00	AVRG
Indeno(1,2,3-cd)pyrene	0.4840000	0.5583400	0.5583400	0.01	15.36	100.00	AVRG
Dibenzo(a,h)anthracene	0.5640000	0.5734300	0.5734300	0.01	1.67	100.00	AVRG
Benzo(g,h,i)perylene	0.9499200	1.0000000	0.7576700	0.01	-5.01	100.00	LINR
2-Methylnaphthalene-D10	1.1500000	1.0464000	1.0464000	0.01	-9.01	100.00	AVRG
Fluorene-D10	1.0520000	0.9325600	0.9325600	0.01	-11.35	100.00	AVRG
Pyrene-D10	0.9110000	0.8443400	0.8443400	0.01	-7.32	100.00	AVRG

FORM VII PEST

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID (Standard): G6206 Date Analyzed: 06/30/09

Instrument ID: GCMS-G Time Analyzed: 1341

		IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
12 HOUR STD		11818	8.61	35637	11.39	14339	15.54
UPPER LIMIT		23636	9.15	71274	11.93	28678	16.08
LOWER LIMIT		5909	8.07	17819	10.85	7170	15.00
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	WG65149-BLANK	WG65149-1	11533	8.61	35891	11.41	16064	15.54
02	WG65149-LCS	WG65149-2	10869	8.61	32825	11.39	13503	15.53
03	X15SD0030006	SC3166-21	11401	8.61	30785	11.41	15379	15.53
04	X15SD0050006	SC3166-22	12098	8.61	33319	11.41	16305	15.53
05	WG65271-BLANK	WG65271-1	11980	8.61	37281	11.41	17379	15.54
06	WG65271-LCS	WG65271-2	10964	8.62	35442	11.41	14398	15.53
07	X16SS081C0001	SC3166-5	12375	8.62	39318	11.41	17091	15.53
08								
09								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

IS1 (DCB) = 1,4-Dichlorobenzene-D4
IS2 (NPT) = Naphthalene-D8
IS3 (ANT) = Acenaphthene-D10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID (Standard): G6206 Date Analyzed: 06/30/09

Instrument ID: GCMS-G Time Analyzed: 1341

		IS4(PHN) AREA	#	RT	#	IS5(CRY) AREA	#	RT	#	IS6(PRY) AREA	#	RT	#
12 HOUR STD		25279		19.06		15872		25.35		14068		28.50	
UPPER LIMIT		50558		19.60		31744		25.89		28136		29.04	
LOWER LIMIT		12640		18.52		7936		24.81		7034		27.96	
	CLIENT SAMPLE ID	LAB SAMPLE ID											
01	WG65149-BLANK	WG65149-1		24053		19.06		13039		25.37		9227		28.52	
02	WG65149-LCS	WG65149-2		21449		19.06		13802		25.37		8852		28.52	
03	X15SD0030006	SC3166-21		20950		19.06		13033		25.37		7930		28.52	
04	X15SD0050006	SC3166-22		24436		19.06		13724		25.37		8967		28.52	
05	WG65271-BLANK	WG65271-1		25509		19.06		15374		25.37		10477		28.52	
06	WG65271-LCS	WG65271-2		21447		19.06		14812		25.37		9943		28.52	
07	X16SS081C0001	SC3166-5		26100		19.06		15592		25.37		11807		28.52	
08															
09															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

IS4 (PHN) = Phenanthrene-D10
IS5 (CRY) = Chrysene-D12
IS6 (PRY) = Perylene-D12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID (Standard): G6223 Date Analyzed: 07/01/09

Instrument ID: GCMS-G Time Analyzed: 1117

		IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
12 HOUR STD		12793	8.61	42000	11.39	18526	15.53
UPPER LIMIT		25586	9.15	84000	11.93	37052	16.07
LOWER LIMIT		6397	8.07	21000	10.85	9263	14.99
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	WG65295-BLANK	WG65295-1	12961	8.62	43463	11.41	20561	15.53
02	WG65295-LCS	WG65295-2	13329	8.61	43715	11.39	18989	15.52
03	X16SS080C0001	SC3166-4	11515	8.61	36071	11.39	15910	15.53
04	X16SS0710001	SC3166-6	12594	8.61	38110	11.39	19425	15.53
05	X16SS0620001	SC3166-7	12420	8.61	41749	11.39	20668	15.54
06	X16SS0730001	SC3166-8	12100	8.61	41208	11.39	20833	15.53
07	X16SS0760001	SC3166-9	12268	8.61	39267	11.39	19329	15.53
08	X16SS0090001	SC3166-10	11430	8.61	32710	11.41	18691	15.53
09	X16SS0140001	SC3166-11	11712	8.61	23983	11.39	15019	15.53
10	X16SS0130001	SC3166-13	10864	8.61	37195	11.41	17890	15.54
11	X16SS0420001	SC3166-14	11496	8.61	40096	11.41	17558	15.53
12	X16SS0460001	SC3166-15	11156	8.61	39712	11.41	17621	15.53
13	X16SS0510001	SC3166-16	10238	8.61	35492	11.41	15853	15.53
14	X16SS0560001	SC3166-17	10815	8.61	33479	11.41	19061	15.53
15								
16								
17								
18								
19								
20								

IS1 (DCB) = 1,4-Dichlorobenzene-D4
IS2 (NPT) = Naphthalene-D8
IS3 (ANT) = Acenaphthene-D10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID (Standard): G6223 Date Analyzed: 07/01/09

Instrument ID: GCMS-G Time Analyzed: 1117

		IS4(PHN) AREA	#	RT	#	IS5(CRY) AREA	#	RT	#	IS6(PRY) AREA	#	RT	#
12 HOUR STD		30727		19.06		19444		25.37		15029		28.52	
UPPER LIMIT		61454		19.60		38888		25.91		30058		29.06	
LOWER LIMIT		15364		18.52		9722		24.83		7515		27.98	
	CLIENT SAMPLE ID	LAB SAMPLE ID											
01	WG65295-BLANK	WG65295-1		35022		19.06		21482		25.37		14912		28.52	
02	WG65295-LCS	WG65295-2		31586		19.06		16328		25.37		11441		28.52	
03	X16SS080C0001	SC3166-4		26855		19.06		15411		25.37		12232		28.52	
04	X16SS0710001	SC3166-6		33174		19.06		18527		25.37		12898		28.52	
05	X16SS0620001	SC3166-7		34306		19.06		18085		25.37		12515		28.54	
06	X16SS0730001	SC3166-8		35120		19.06		20961		25.37		14348		28.52	
07	X16SS0760001	SC3166-9		31460		19.06		21164		25.38		9542		28.55	
08	X16SS0090001	SC3166-10		31012		19.06		16793		25.37		11694		28.52	
09	X16SS0140001	SC3166-11		28934		19.06		19360		25.37		13662		28.52	
10	X16SS0130001	SC3166-13		30644		19.06		22111		25.37		17300		28.52	
11	X16SS0420001	SC3166-14		27371		19.09		18860		25.37		14016		28.52	
12	X16SS0460001	SC3166-15		27067		19.09		20206		25.36		15597		28.52	
13	X16SS0510001	SC3166-16		25525		19.06		20064		25.37		12851		28.52	
14	X16SS0560001	SC3166-17		28815		19.06		21366		25.38		11188		28.53	
15															
16															
17															
18															
19															
20															

IS4 (PHN) = Phenanthrene-D10
IS5 (CRY) = Chrysene-D12
IS6 (PRY) = Perylene-D12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID (Standard): G6242 Date Analyzed: 07/02/09

Instrument ID: GCMS-G Time Analyzed: 1410

		IS1(DCB) AREA #	IS1(DCB) RT #	IS2(NPT) AREA #	IS2(NPT) RT #	IS3(ANT) AREA #	IS3(ANT) RT #
12 HOUR STD		9042	8.61	29471	11.39	10018	15.53
UPPER LIMIT		18084	9.15	58942	11.93	20036	16.07
LOWER LIMIT		4521	8.07	14736	10.85	5009	14.99
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	X16SS0310001	SC3166-1	9346	8.61	31638	11.39	16390	15.53
02	X16SS0400001	SC3166-2	9482	8.61	28097	11.39	15552	15.53
03	X16SS0780001	SC3166-3	10634	8.61	38713	11.39	18377	15.54
04	X16SS0020001	SC3166-19RA	8945	8.61	28526	11.39	15127	15.53
05	X15SD0230006	SC3166-20RA	9052	8.61	25942	11.39	15300	15.53
06	X16SS0190001	SC3166-12RA	9452	8.61	29589	11.39	15885	15.54
07	X16SS0260001	SC3166-23	9621	8.61	21226	11.41	15745	15.54
08	X16SS0080001	SC3166-24	8468	8.61	21584	11.39	14450	15.53
09	X16SS0760001MS	WG65271-3	8995	8.61	26751	11.39	16073	15.53
10	X16SS0760001MSD	WG65271-4	8813	8.61	25171	11.39	15070	15.53
11	X16SS0710001	SC3166-6DL	8330	8.61	19048	11.39	10074	15.54
12	X16SS0620001	SC3166-7DL	7575	8.61	22711	11.39	7098	15.53
13	X16SS0730001	SC3166-8DL	7820	8.61	18908	11.39	9301	15.53
14	X16SS0760001	SC3166-9DL	7629	8.61	21657	11.39	8160	15.53
15	X16SS0560001	SC3166-17DL	7569	8.61	22663	11.39	8467	15.53
16								
17								
18								
19								
20								

IS1 (DCB) = 1,4-Dichlorobenzene-D4
IS2 (NPT) = Naphthalene-D8
IS3 (ANT) = Acenaphthene-D10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID (Standard): G6242 Date Analyzed: 07/02/09

Instrument ID: GCMS-G Time Analyzed: 1410

		IS4(PHN) AREA	#	RT	#	IS5(CRY) AREA	#	RT	#	IS6(PRY) AREA	#	RT	#
12 HOUR STD		21772		19.06		16010		25.37		12634		28.52	
UPPER LIMIT		43544		19.60		32020		25.91		25268		29.06	
LOWER LIMIT		10886		18.52		8005		24.83		6317		27.98	
	CLIENT SAMPLE ID	LAB SAMPLE ID											
01	X16SS0310001	SC3166-1		29921	19.06		23896	25.37		16695		28.52	
02	X16SS0400001	SC3166-2		27394	19.06		22529	25.37		19711		28.52	
03	X16SS0780001	SC3166-3		30543	19.06		22796	25.37		17779		28.52	
04	X16SS0020001	SC3166-19RA		27061	19.06		19716	25.37		14214		28.52	
05	X15SD0230006	SC3166-20RA		23951	19.06		20876	25.37		16933		28.52	
06	X16SS0190001	SC3166-12RA		28912	19.06		19328	25.37		15496		28.52	
07	X16SS0260001	SC3166-23		25298	19.06		20825	25.37		15557		28.52	
08	X16SS0080001	SC3166-24		25664	19.06		21433	25.37		17460		28.52	
09	X16SS0760001MS	WG65271-3		26967	19.06		19461	25.37		12951		28.54	
10	X16SS0760001MSD	WG65271-4		24276	19.06		20691	25.38		11965		28.54	
11	X16SS0710001	SC3166-6DL		21593	19.06		15202	25.37		12111		28.52	
12	X16SS0620001	SC3166-7DL		17761	19.06		14601	25.37		11749		28.52	
13	X16SS0730001	SC3166-8DL		22951	19.06		17633	25.37		14233		28.52	
14	X16SS0760001	SC3166-9DL		18860	19.06		17079	25.37		13409		28.52	
15	X16SS0560001	SC3166-17DL		20079	19.06		16002	25.37		12214		28.52	
16													
17													
18													
19													
20													

IS4 (PHN) = Phenanthrene-D10
IS5 (CRY) = Chrysene-D12
IS6 (PRY) = Perylene-D12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID (Standard): G6258 Date Analyzed: 07/06/09

Instrument ID: GCMS-G Time Analyzed: 0949

		IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
12 HOUR STD		12086	8.60	41179	11.39	17753	15.52
UPPER LIMIT		24172	9.14	82358	11.93	35506	16.06
LOWER LIMIT		6043	8.06	20590	10.85	8877	14.98
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	X16SS0570001	SC3166-18RA	12258	8.61	44375	11.39	19979	15.52
02	X16SS0020001	SC3166-19DL	11273	8.60	35082	11.39	16085	15.53
03								
04								
05								
06								
07								
08								
09								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

IS1 (DCB) = 1,4-Dichlorobenzene-D4
IS2 (NPT) = Naphthalene-D8
IS3 (ANT) = Acenaphthene-D10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID (Standard): G6258 Date Analyzed: 07/06/09

Instrument ID: GCMS-G Time Analyzed: 0949

		IS4(PHN) AREA	#	RT	#	IS5(CRY) AREA	#	RT	#	IS6(PRY) AREA	#	RT	#
12 HOUR STD		29081		19.06		19660		25.37		14271		28.52	
UPPER LIMIT		58162		19.60		39320		25.91		28542		29.06	
LOWER LIMIT		14541		18.52		9830		24.83		7136		27.98	
	CLIENT SAMPLE ID	LAB SAMPLE ID											
01	X16SS0570001	SC3166-18RA		29882	19.06		21473	25.37		17252		28.52	
02	X16SS0020001	SC3166-19DL		29968	19.06		20548	25.37		16336		28.52	
03													
04													
05													
06													
07													
08													
09													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

IS4 (PHN) = Phenanthrene-D10
IS5 (CRY) = Chrysene-D12
IS6 (PRY) = Perylene-D12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID (Standard): G6275 Date Analyzed: 07/07/09

Instrument ID: GCMS-G Time Analyzed: 1219

		IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
12 HOUR STD		11022	8.62	39151	11.41	17852	15.55
UPPER LIMIT		22044	9.16	78302	11.95	35704	16.09
LOWER LIMIT		5511	8.08	19576	10.87	8926	15.01
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	X16SS0310001	SC3166-1DL	9384	8.62	31139	11.41	15031	15.55
02								
03								
04								
05								
06								
07								
08								
09								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

IS1 (DCB) = 1,4-Dichlorobenzene-D4
IS2 (NPT) = Naphthalene-D8
IS3 (ANT) = Acenaphthene-D10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID (Standard): G6275 Date Analyzed: 07/07/09

Instrument ID: GCMS-G Time Analyzed: 1219

		IS4(PHN) AREA #	IS4(PHN) RT #	IS5(CRY) AREA #	IS5(CRY) RT #	IS6(PRY) AREA #	IS6(PRY) RT #
12 HOUR STD		27962	19.12	20729	25.42	16592	28.57
UPPER LIMIT		55924	19.66	41458	25.96	33184	29.11
LOWER LIMIT		13981	18.58	10365	24.88	8296	28.03
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	X16SS0310001	SC3166-1DL	18979	19.12	17494	25.40	14241	28.58
02								
03								
04								
05								
06								
07								
08								
09								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

IS4 (PHN) = Phenanthrene-D10
IS5 (CRY) = Chrysene-D12
IS6 (PRY) = Perylene-D12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

Sample Calculation

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/16/09
Extraction Date: 06/22/09
Analysis Date: 02-JUL-2009 14:52
Report Date: 07/07/2009
Matrix: SOIL
% Solids: 83.3

Lab ID: SC3166-1
Client ID: X16SS0310001
SDG: CTO423-4
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65295
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	24	1.0	20	24	2.0
91-20-3	Naphthalene	U	24	1.0	20	24	3.1
91-57-6	2-Methylnaphthalene	J	6.4	1.0	20	24	2.6
208-96-8	Acenaphthylene	U	24	1.0	20	24	1.4
83-32-9	Acenaphthene	U	24	1.0	20	24	1.8
86-73-7	Fluorene	U	24	1.0	20	24	3.8
85-01-8	Phenanthrene		89	1.0	20	24	2.2
120-12-7	Anthracene	J	19	1.0	20	24	1.4
206-44-0	Fluoranthene		48	1.0	20	24	2.2
129-00-0	Pyrene		280	1.0	20	24	2.5
56-55-3	Benzo(a)anthracene		300	1.0	20	24	2.3
218-01-9	Chrysene	E	360	1.0	20	24	2.0
205-99-2	Benzo(b)fluoranthene		120	1.0	20	24	2.9
207-08-9	Benzo(k)fluoranthene	J	20	1.0	20	24	3.7
50-32-8	Benzo(a)pyrene	E	370	1.0	20	24	4.0
193-39-5	Indeno(1,2,3-cd)pyrene		43	1.0	20	24	2.3
53-70-3	Dibenzo(a,h)anthracene		58	1.0	20	24	2.2
191-24-2	Benzo(g,h,i)perylene		170	1.0	20	24	2.4
321-60-8	2-Methylnaphthalene-D10		* 30%				
118-79-6	Fluorene-D10		* 48%				
1718-51-0	Pyrene-D10		66%				

Sample Calculation

Data File: \\target_server\GG\chem\gcms-g.i\G070209.b\G6243.D
Report Date: 07-Jul-2009 11:38

Katahdin Analytical Services

Data file : \\target_server\GG\chem\gcms-g.i\G070209.b\G6243.D
Lab Smp Id: SC3166-1 Client Smp ID: X16SS0310001
Inj Date : 02-JUL-2009 14:52 MS Autotune Date: 30-APR-2008 17:47
Operator : JCG Inst ID: gcms-g.i
Smp Info : SC3166-1
Misc Info : SW846 M8270C
Comment :
Method : \\target_server\GG\chem\gcms-g.i\G070209.b\gspsim15.m
Meth Date : 02-Jul-2009 14:47 cgomez Quant Type: ISTD
Cal Date : 30-JUN-2009 18:12 Cal File: G6212.D
Als bottle: 3
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: tetrat423001.sub
Target Version: 4.12

Concentration Formula: Amt * DF * (Vt/Ws)*(100/(100-M))*1000 * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	0.00100	Volume of final extract (L)
Ws	0.03000	Weight of sample extracted (Kg)
M	16.676	% Moisture
Cpnd Variable		Local Compound Variable

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/ml)	CONCENTRATIONS FINAL (ug/Kgdrywt)	REVIEW
*	2 1,4-Dichlorobenzene-D4	152	8.609	8.610	(1.000)	9346	0.80000		
*	5 Naphthalene-D8	136	11.388	11.388	(1.000)	31638	0.80000		
$	8 2-Methylnaphthalene-D10	152	13.020	13.019	(0.838)	14375	0.60989	24.4(R)	
	9 2-Methylnaphthalene	142	13.084	13.084	(1.149)	3224	0.16070	6.43(a)	
*	14 Acenaphthene-D10	164	15.534	15.534	(1.000)	16390	0.80000		
$	17 Fluorene-D10	176	16.776	16.775	(1.080)	20879	0.96890	38.8(R)	
*	24 Phenanthrene-D10	188	19.062	19.063	(1.000)	29921	0.80000		
	25 Phenanthrene	178	19.118	19.118	(1.003)	94977	2.23612	89.4	
	26 Anthracene	178	19.230	19.230	(1.009)	15344	0.47993	19.2(a)	
	28 Fluoranthene	202	21.961	21.961	(1.152)	37281	1.19594	47.8	
$	29 Pyrene-D10	212	22.435	22.435	(0.885)	35757	1.31354	52.5	
	30 Pyrene	202	22.463	22.463	(0.886)	319787	7.11393	284	
	31 Benzo(a)anthracene	228	25.345	25.345	(0.999)	175039	7.50764	300(Q)	
*	32 Chrysene-D12	240	25.365	25.365	(1.000)	23896	0.80000		
	33 Chrysene	228	25.423	25.423	(1.002)	268035	9.00026	360(A)	
	35 Benzo(b)fluoranthene	252	27.742	27.742	(0.973)	51723	2.95543	118	
	36 Benzo(k)fluoranthene	252	27.800	27.800	(0.975)	14376	0.50297	20.1(aM)	M6
	37 Benzo(a)pyrene	252	28.399	28.399	(0.996)	178567	9.30103	372(A)	
*	38 Perylene-D12	264	28.515	28.515	(1.000)	16695	0.80000		
	39 Indeno(1,2,3-cd)pyrene	276	30.738	30.719	(1.078)	10927	1.08194	43.3	
	40 Dibenzo(a,h)anthracene	278	30.816	30.815	(1.081)	16927	1.43927	57.6(QM)	M3
	41 Benzo(g,h,i)perylene	276	31.357	31.337	(1.100)	69141	4.17540	167(M)	M3

Sample Calculation

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Lab File ID: GD437 DFTPP Injection Date: 07/02/09

Instrument ID: GCMS-G DFTPP Injection Time: 1305

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	49.3
68	Less than 2.0% of mass 69	0.3 (0.6)1
69	Less than 100.0% of mass 198	44.2
70	Less than 2.0% of mass 69	0.3 (0.6)1
127	40.0 - 60.0% of mass 198	55.6
197	Less than 1.0% of mass 198	0.5
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.9
275	10.0 - 30.0% of mass 198	23.4
365	1.0 - 100.0% of mass 198	3.0
441	0.0 - 100.0% of mass 443	10.2 (77.5)2
442	40.0 - 100.0% of mass 198	69.2
443	17.0 - 23.0% of mass 442	13.2 (19.0)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0702	G6242	07/02/09	1410
02	X16SS0310001	SC3166-1	G6243	07/02/09	1452
03	X16SS0400001	SC3166-2	G6244	07/02/09	1534
04	X16SS0780001	SC3166-3	G6245	07/02/09	1615
05	X16SS0020001	SC3166-19RA	G6246	07/02/09	1657
06	X15SD0230006	SC3166-20RA	G6247	07/02/09	1739
07	X16SS0190001	SC3166-12RA	G6248	07/02/09	1821
08	X16SS0260001	SC3166-23	G6249	07/02/09	1903
09	X16SS0080001	SC3166-24	G6250	07/02/09	1944
10	X16SS0760001MS	WG65271-3	G6251	07/02/09	2027
11	X16SS0760001MSD	WG65271-4	G6252	07/02/09	2110
12	X16SS0710001	SC3166-6DL	G6253	07/02/09	2152
13	X16SS0620001	SC3166-7DL	G6254	07/02/09	2235
14	X16SS0730001	SC3166-8DL	G6255	07/02/09	2318
15	X16SS0760001	SC3166-9DL	G6256	07/03/09	0000
16	X16SS0560001	SC3166-17DL	G6257	07/03/09	0043
17					
18					
19					
20					

FORM V SV

Sample Calculation

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-4

Instrument ID: GCMS-G Calibration Date: 07/02/09 Time: 1410

Lab File ID: G6242 Init. Calib. Date(s): 06/30/09 06/30/09

Init. Calib. Times: 1341 1812

GC Column: RTX5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
1-Methylnaphthalene	0.4840000	0.4664400	0.4664400	0.01	-3.63	100.00	AVRG
Naphthalene	0.7880000	0.8053200	0.8053200	0.01	2.20	100.00	AVRG
2-Methylnaphthalene	0.5070000	0.4334000	0.4334000	0.01	-14.52	100.00	AVRG
Acenaphthylene	1.8000000	1.7156000	1.7156000	0.01	-4.69	100.00	AVRG
Acenaphthene	1.2740000	1.4701000	1.4701000	0.01	15.39	20.00	AVRG
Fluorene	1.2610000	1.6242000	1.6242000	0.01	28.80	100.00	AVRG
Phenanthrene	1.1360000	1.1473000	1.1473000	0.01	0.99	100.00	AVRG
Anthracene	0.8550000	0.7781700	0.7781700	0.01	-8.99	100.00	AVRG
Fluoranthene	0.8340000	0.9200800	0.9200800	0.01	10.32	20.00	AVRG
Pyrene	1.5050000	1.3039000	1.3039000	0.01	-13.36	100.00	AVRG
Benzo(a)anthracene	0.7800000	0.8246300	0.8246300	0.01	5.72	100.00	AVRG
Chrysene	1.0455000	1.0000000	1.0076000	0.01	4.55	100.00	LINR
Benzo(b)fluoranthene	0.8380000	0.8620500	0.8620500	0.01	2.87	100.00	AVRG
Benzo(k)fluoranthene	1.3700000	1.2749000	1.2749000	0.01	-6.94	100.00	AVRG
Benzo(a)pyrene	0.9200000	0.8783300	0.8783300	0.01	-4.53	20.00	AVRG
Indeno(1,2,3-cd)pyrene	0.4840000	0.6028200	0.6028200	0.01	24.55	100.00	AVRG
Dibenzo(a,h)anthracene	0.5640000	0.6579100	0.6579100	0.01	16.65	100.00	AVRG
Benzo(g,h,i)perylene	0.9472500	1.0000000	0.7555500	0.01	-5.28	100.00	LINR
2-Methylnaphthalene-D10	1.1500000	1.1046000	1.1046000	0.01	-3.95	100.00	AVRG
Fluorene-D10	1.0520000	1.3187000	1.3187000	0.01	25.35	100.00	AVRG
Pyrene-D10	0.9110000	0.9141800	0.9141800	0.01	0.35	100.00	AVRG

FORM VII PEST

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE _____ OF _____

CLIENT		JOB NUMBER	
NSF Indian Head		CTO423-4	
SUBJECT			
Sample Calculation			
BASED ON		DRAWING NUMBER	
BY	CHECKED BY	APPROVED BY	DATE
Ann Cognetti			7-28-09

Sample Calculation (for X 1655031001, anthracene)

$$\frac{15344}{29921} * \frac{0.001}{0.030} * \frac{100}{(100-16.676)} * 1000 * \frac{0.80}{0.855} = 19.20 \mu g/Kg$$

Tetra Tech NUS

INTERNAL CORRESPONDENCE

TO: R. BASINSKI **DATE:** AUGUST 4, 2009

FROM: LEANNE M. GANSER **COPIES:** DV FILE

SUBJECT: INORGANIC DATA VALIDATION – SELECT METALS, TOTAL SOLIDS, PH, CATION EXCHANGE CAPACITY, AND TOTAL ORGANIC CARBON
NSF INDIAN HEAD
SAMPLE DELIVERY GROUP (SDG) – CTO423-5

SAMPLES: 14/Soil/Metals

X14SS0220001	X14SS0580001	X14SS0630001
X14SS0720001	X14SS0870001	X14SS1080001
X14SS1170001	X14SS1260001	X15SD0030006
X15SD0050006	X15SD0130006	X15SD0180006
X15SD0230006	X16SS0030001	

10/Soil/Misc

X14SS0220001	X14SS0580001	X14SS0870001
X14SS1170001	X15SD0030006	X15SD0230006
X15SS0330001	X15SS0480001	X16SS0080001
X16SS0730001		

Overview

The sample set for NSF Indian Head, SDG CTO423-5, consists of eighteen (18) soil environmental samples. No field duplicate pairs were included within this SDG.

All samples were analyzed for antimony, arsenic, copper, lead, tin, zinc and total solids. Ten samples were analyzed for pH, cation exchange capacity (CEC), and total organic carbon (TOC). The samples were collected by Tetra Tech NUS, Inc. on June 1-4, 9-10, and 13, 2009 and analyzed by Katahdin Analytical Services under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Metals analyses were conducted using ICP/MS SW-846 method 6020A. Analyses were conducted in accordance with ICP/MS SW-846 method 6020A for metals, ASTM method D2216 for total solids, SW-846 method 9081 for CEC, SW-846 method 9045C for pH, and Lloyd Khan for TOC.

Summary

All analytes were successfully analyzed. The findings offered in this report are based upon a general review of all available data. The data review was based on data completeness, holding times, calibration data, ICP/MS tune, laboratory method/preparation blanks, interference check sample (ICS) results, matrix spike results, laboratory duplicate results, laboratory control sample (LCS) results, ICP serial dilution results, ICP/MS internal standard recoveries, field duplicate results, detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems - None

Minor Problems

- The following contaminants were detected in the laboratory method/preparation blanks at the following maximum concentrations:

Analyte	Maximum Concentration	Action Level
Antimony	0.04 ug/L	0.02 mg/kg
Copper	0.06 ug/L	0.03 mg/kg
Lead[(1)]	0.16 ug/L	0.08 mg/kg
Lead[(2)]	0.03 ug/L	0.015 mg/kg
Tin[(3)]	0.692 mg/kg	3.46 mg/kg

(1) Maximum concentration affecting all samples except X14SS0580001 and X14SS1170001.
(2) Maximum concentration affecting samples X14SS0580001 and X14SS1170001.
(3) Maximum concentration present in a preparation blank.

An action level of 5X the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot, dilution factors, and percent solids, if applicable, were taken into consideration when evaluating for blank contamination. Positive results less than the blank action level for antimony and tin were qualified "B" for blank contamination.

- The laboratory control sample (LCS) and LCS duplicate percent recoveries for antimony were < 80% quality control limit. The positive results reported for antimony were qualified as biased low, "L". Several antimony results were previously qualified for blank contamination.

- The matrix spike and matrix spike duplicate (MS/MSD) percent recoveries for antimony were < 75% quality control limit. The positive results reported for antimony were qualified as biased low, "L". Several antimony results were previously qualified for blank contamination.

- The matrix spike and matrix spike duplicate (MS/MSD) percent recoveries for CEC were > 125% quality control limit. The positive results reported for CEC were qualified as biased high, "K".

Notes

The contract required detection limit (CRDL) percent recoveries for tin were > 110% quality control limit affecting samples X14SS0220001, X14SS0580001, X14SS0630001, X14SS0720001, X14SS0870001, X14SS1170001, X14SS1080001, X14SS1260001, and X15SD0030006. Qualifications were not necessary for tin as results were >2X CRDL or were previously qualified for blank contamination.

The preparation blank samples were analyzed at a 5X dilution. All environmental samples were analyzed at a 5X dilution with the exception of copper, lead, tin, and zinc in samples X14SS0580001 and X14SS1170001, which were analyzed at a 10X dilution.

Executive Summary

Laboratory Performance: Several contaminants were present in the laboratory method / preparation blanks. LCS and LCS duplicate percent recoveries for antimony were less than quality control limits.

Other Factors Affecting Data Quality: MS/MSD percent recoveries for antimony and CEC were outside quality control limits.

The data for these analyses were reviewed with reference to Region III modifications to the "National Functional Guidelines for Inorganic Data Validation", April 1993, and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories " (January 2006).

The text of this report has been formulated to address only those problem areas affecting data quality.

Tetra Tech NUS
Leanne M. Ganser
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A
QUALIFIED ANALYTICAL RESULTS

Data Validation Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS-GFAA MSA's r < 0.995 / ICP PDS Recovery Noncompliance
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (e.g. base-line drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient r < 0.995
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 00810	NSAMPLE	X14SS0220001			X14SS0580001			X14SS0630001			X14SS0720001		
SDG: CTO423-5	LAB_ID	SC3171-010			SC3171-001			SC3171-017			SC3171-018		
FRACTION: M	SAMP_DATE	6/2/2009			6/3/2009			6/3/2009			6/3/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	84.2			84.2			82.8			81.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.12	L	DE	0.15	L	DE	0.11	B	A	0.13	L	DE
ARSENIC		4.2			1.6			2.1			3.3		
COPPER		9.2			88.6			40.8			85		
LEAD		9.6			606			188			283		
TIN		1.8	B	A	10.1			3	B	A	2.5	B	A
ZINC		29.8			18.2			21.8			34.5		

PROJ_NO: 00810	NSAMPLE	X14SS0870001			X14SS1080001			X14SS1170001			X14SS1260001		
SDG: CTO423-5	LAB_ID	SC3171-012			SC3171-016			SC3171-002			SC3171-011		
FRACTION: M	SAMP_DATE	6/4/2009			6/4/2009			6/4/2009			6/9/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	79.7			81.0			86.2			67.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.12	L	DE	0.14	L	DE	0.07	B	A	0.07	B	A
ARSENIC		3.2			6.9			1.1			1.2		
COPPER		32.6			21.9			151			53.3		
LEAD		108			31.3			618			476		
TIN		1.7	B	A	1.6	B	A	4.6			29.4		
ZINC		32.9			50.7			7.2			15.3		

PROJ_NO: 00810	NSAMPLE	X15SD0030006			X15SD0050006			X15SD0130006			X15SD0180006		
SDG: CTO423-5	LAB_ID	SC3171-006			SC3171-015			SC3171-014			SC3171-013		
FRACTION: M	SAMP_DATE	6/1/2009			6/1/2009			6/10/2009			6/10/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	84.6			82.2			77.5			77.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.09	B	A	0.04	B	A	0.05	B	A	0.05	B	A
ARSENIC		1.4			1.2			0.54			0.65		
COPPER		2.9			2.8			2.4			3.3		
LEAD		19.6			7.5			14			6.7		
TIN		1.9	B	A	0.92	B	A	0.9	B	A	1	B	A
ZINC		11.4			8.1			12.2			15.2		

PROJ_NO: 00810	NSAMPLE	X15SD0230006			X16SS0030001		
SDG: CTO423-5	LAB_ID	SC3171-005			SC3171-019		
FRACTION: M	SAMP_DATE	6/10/2009			6/13/2009		
MEDIA: SOIL	QC_TYPE	NM			NM		
	UNITS	MG/KG			MG/KG		
	PCT_SOLIDS	78.8			87.0		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.06	B	A	0.62	L	DE
ARSENIC		0.5			4		
COPPER		3			6.9		
LEAD		7.6			13.5		
TIN		0.87	B	A	1.1	B	A
ZINC		12.5			19.8		

PROJ_NO: 00810	NSAMPLE	X14SS0220001											
SDG: CTO423-5	LAB_ID	SC3171-10											
FRACTION: MISC	SAMP_DATE	6/2/2009											
MEDIA: SOIL	QC_TYPE	NM											
	UNITS	%			MEQ/100			S.U.			UG		
	PCT_SOLIDS	84.2			84.2			84.2			84.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
CATION EXCHANGE CAPACITY					20	K	D						
PH								4.8					
TOTAL ORGANIC CARBON											15000		
TOTAL SOLIDS		84											

X14SS0580001												X14SS0630001		
SC3171-1												SC3171-17		
6/3/2009												6/3/2009		
NM												NM		
%			MEQ/100			S.U.			UG			%		
84.2			84.2			84.2			84.2			82.8		
RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
			13	K	D									
						4.6								
									10000					
84												83		

PROJ_NO: 00810	NSAMPLE	X14SS0720001			X14SS0870001								
SDG: CTO423-5	LAB_ID	SC3171-18			SC3171-7								
FRACTION: MISC	SAMP_DATE	6/3/2009			6/4/2009								
MEDIA: SOIL	QC_TYPE	NM			NM								
	UNITS	%			%			MEQ/100			S.U.		
	PCT_SOLIDS	81.4			85.1			85.1			85.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
CATION EXCHANGE CAPACITY								23	K	D			
PH											4.9		
TOTAL ORGANIC CARBON													
TOTAL SOLIDS		81			85								

PROJ_NO: 00810	NSAMPLE	X14SS0870001			X14SS1080001			X14SS1170001					
SDG: CTO423-5	LAB_ID	SC3171-7			SC3171-16			SC3171-2					
FRACTION: MISC	SAMP_DATE	6/4/2009			6/4/2009			6/4/2009					
MEDIA: SOIL	QC_TYPE	NM			NM			NM					
	UNITS	UG			%			%			MEQ/100		
	PCT_SOLIDS	85.1			81.0			86.2			86.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
CATION EXCHANGE CAPACITY											15	K	D
PH													
TOTAL ORGANIC CARBON		15000											
TOTAL SOLIDS					81			86					

PROJ_NO: 00810	NSAMPLE	X14SS1170001						X14SS1260001			X15SD0030006		
SDG: CTO423-5	LAB_ID	SC3171-2						SC3171-11			SC3171-6		
FRACTION: MISC	SAMP_DATE	6/4/2009						6/9/2009			6/1/2009		
MEDIA: SOIL	QC_TYPE	NM						NM			NM		
	UNITS	S.U.			UG			%			%		
	PCT_SOLIDS	86.2			86.2			67.8			84.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
CATION EXCHANGE CAPACITY													
PH		4.6											
TOTAL ORGANIC CARBON					28000								
TOTAL SOLIDS								68			84		

PROJ_NO: 00810	NSAMPLE	X15SD0030006								X15SD0050006		
SDG: CTO423-5	LAB_ID	SC3171-6								SC3171-15		
FRACTION: MISC	SAMP_DATE	6/1/2009								6/1/2009		
MEDIA: SOIL	QC_TYPE	NM								NM		
	UNITS	MEQ/100			S.U.			UG		%		
	PCT_SOLIDS	84.6			84.6			84.6		82.2		
	DUP_OF											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
CATION EXCHANGE CAPACITY		13	K	D									
PH					5.6								
TOTAL ORGANIC CARBON								740					
TOTAL SOLIDS											82		

PROJ_NO: 00810	NSAMPLE	X15SD0130006			X15SD0180006			X15SD0230006					
SDG: CTO423-5	LAB_ID	SC3171-14			SC3171-13			SC3171-5					
FRACTION: MISC	SAMP_DATE	6/10/2009			6/10/2009			6/10/2009					
MEDIA: SOIL	QC_TYPE	NM			NM			NM					
	UNITS	%			%			%			MEQ/100		
	PCT_SOLIDS	77.5			77.9			78.8			78.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
CATION EXCHANGE CAPACITY											9.5	K	D
PH													
TOTAL ORGANIC CARBON													
TOTAL SOLIDS		78			78			79					

PROJ_NO: 00810	NSAMPLE	X15SD0230006						X15SS0330001					
SDG: CTO423-5	LAB_ID	SC3171-5						SC3171-3					
FRACTION: MISC	SAMP_DATE	6/10/2009						5/27/2009					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	S.U.			UG			%			MEQ/100		
	PCT_SOLIDS	78.8			78.8			87.9			87.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
CATION EXCHANGE CAPACITY											13	K	D
PH		7											
TOTAL ORGANIC CARBON					1300								
TOTAL SOLIDS								88					

PROJ_NO: 00810	NSAMPLE	X15SS0330001						X15SS0480001					
SDG: CTO423-5	LAB_ID	SC3171-3						SC3171-4					
FRACTION: MISC	SAMP_DATE	5/27/2009						5/28/2009					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	S.U.			UG			%			MEQ/100		
	PCT_SOLIDS	87.9			87.9			84.5			84.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
CATION EXCHANGE CAPACITY											21	K	D
PH		5											
TOTAL ORGANIC CARBON					8500								
TOTAL SOLIDS								84					

PROJ_NO: 00810	NSAMPLE	X15SS0480001						X16SS0030001			X16SS0080001		
SDG: CTO423-5	LAB_ID	SC3171-4						SC3171-19			SC3171-8		
FRACTION: MISC	SAMP_DATE	5/28/2009						6/13/2009			6/13/2009		
MEDIA: SOIL	QC_TYPE	NM						NM			NM		
	UNITS	S.U.			UG			%			MEQ/100		
	PCT_SOLIDS	84.5			84.5			87.0			73.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
CATION EXCHANGE CAPACITY											31	K	D
PH		5.5											
TOTAL ORGANIC CARBON					12000								
TOTAL SOLIDS								87					

PROJ_NO: 00810	NSAMPLE	X16SS0080001						X16SS0080001-A			X16SS0730001		
SDG: CTO423-5	LAB_ID	SC3171-8						SC3171-8			SC3171-9		
FRACTION: MISC	SAMP_DATE	6/13/2009						6/13/2009			6/14/2009		
MEDIA: SOIL	QC_TYPE	NM						NM			NM		
	UNITS	S.U.			UG			%			MEQ/100		
	PCT_SOLIDS	73.8			73.8			73.8			89.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
CATION EXCHANGE CAPACITY						-					15	K	D
PH		4.7											
TOTAL ORGANIC CARBON					38000								
TOTAL SOLIDS						*		74					

PROJ_NO: 00810	NSAMPLE	X16SS0730001						X16SS0730001-A		
SDG: CTO423-5	LAB_ID	SC3171-9						SC3171-9		
FRACTION: MISC	SAMP_DATE	6/14/2009						6/14/2009		
MEDIA: SOIL	QC_TYPE	NM						NM		
	UNITS	S.U.			UG			%		
	PCT_SOLIDS	89.0			89.0			89.0		
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
CATION EXCHANGE CAPACITY										
PH		6.4								
TOTAL ORGANIC CARBON					9400					
TOTAL SOLIDS								89		

APPENDIX B
RESULTS AS REPORTED BY THE LABORATORY

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X14SS0220001
Matrix: SOIL
SDG Name: CTO423-5
Percent Solids: 84.2
Lab Sample ID: SC3171-010

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.12		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	4.2			MS	5	0.55	0.17
7440-50-8	COPPER, TOTAL	9.2			MS	5	0.55	0.12
7439-92-1	LEAD, TOTAL	9.6			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.8		*	MS	5	0.55	0.21
7440-66-6	ZINC, TOTAL	29.8			MS	5	1.1	0.39

Bottle ID: B

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X14SS0580001

Matrix: SOIL
SDG Name: CTO423-5

Percent Solids: 84.2
Lab Sample ID: SC3171-001

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.15		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	1.6			MS	5	0.50	0.15
7440-50-8	COPPER, TOTAL	88.6			MS	5	0.50	0.11
7439-92-1	LEAD, TOTAL	606			MS	10	0.20	0.06
7440-31-5	TIN, TOTAL	10.1		*	MS	5	0.50	0.19
7440-66-6	ZINC, TOTAL	18.2			MS	5	1.0	0.35

Bottle ID: D

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X14SS0630001

Matrix: SOIL
SDG Name: CTO423-5

Percent Solids: 82.8
Lab Sample ID: SC3171-017

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.11	J	N	MS	5	0.12	0.02
7440-38-2	ARSENIC, TOTAL	2.1			MS	5	0.58	0.17
7440-50-8	COPPER, TOTAL	40.8			MS	5	0.58	0.13
7439-92-1	LEAD, TOTAL	188			MS	5	0.12	0.03
7440-31-5	TIN, TOTAL	3.0		*	MS	5	0.58	0.22
7440-66-6	ZINC, TOTAL	21.8			MS	5	1.2	0.41

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS0720001

Matrix: SOIL **SDG Name:** CTO423-5

Percent Solids: 81.4 **Lab Sample ID:** SC3171-018

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.13		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	3.3			MS	5	0.54	0.16
7440-50-8	COPPER, TOTAL	85.0			MS	5	0.54	0.12
7439-92-1	LEAD, TOTAL	283			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	2.5		*	MS	5	0.54	0.21
7440-66-6	ZINC, TOTAL	34.5			MS	5	1.1	0.38

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X14SS0870001

Matrix: SOIL
SDG Name: CTO423-5

Percent Solids: 79.7
Lab Sample ID: SC3171-012

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.12		N	MS	5	0.094	0.02
7440-38-2	ARSENIC, TOTAL	3.2			MS	5	0.47	0.14
7440-50-8	COPPER, TOTAL	32.6			MS	5	0.47	0.10
7439-92-1	LEAD, TOTAL	108			MS	5	0.094	0.03
7440-31-5	TIN, TOTAL	1.7		*	MS	5	0.47	0.18
7440-66-6	ZINC, TOTAL	32.9			MS	5	0.94	0.33

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X14SS1080001

Matrix: SOIL
SDG Name: CTO423-5

Percent Solids: 81.0
Lab Sample ID: SC3171-016

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.14		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	6.9			MS	5	0.56	0.17
7440-50-8	COPPER, TOTAL	21.9			MS	5	0.56	0.12
7439-92-1	LEAD, TOTAL	31.3			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.6		*	MS	5	0.56	0.21
7440-66-6	ZINC, TOTAL	50.7			MS	5	1.1	0.39

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS1170001

Matrix: SOIL **SDG Name:** CTO423-5

Percent Solids: 86.2 **Lab Sample ID:** SC3171-002

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.07	J	N	MS	5	0.097	0.02
7440-38-2	ARSENIC, TOTAL	1.1			MS	5	0.48	0.15
7440-50-8	COPPER, TOTAL	151			MS	5	0.48	0.11
7439-92-1	LEAD, TOTAL	618			MS	10	0.19	0.06
7440-31-5	TIN, TOTAL	4.6		*	MS	5	0.48	0.18
7440-66-6	ZINC, TOTAL	7.2			MS	5	0.97	0.34

Bottle ID: B

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X14SS1260001
Matrix: SOIL
SDG Name: CTO423-5
Percent Solids: 67.8
Lab Sample ID: SC3171-011

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.07	J	N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	1.2			MS	5	0.54	0.16
7440-50-8	COPPER, TOTAL	53.3			MS	5	0.54	0.12
7439-92-1	LEAD, TOTAL	476			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	29.4		*	MS	5	0.54	0.21
7440-66-6	ZINC, TOTAL	15.3			MS	5	1.1	0.38

Bottle ID: A

Comments:

I

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SD0030006

Matrix: SOIL **SDG Name:** CTO423-5

Percent Solids: 84.6 **Lab Sample ID:** SC3171-006

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.09	J	N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	1.4			MS	5	0.56	0.17
7440-50-8	COPPER, TOTAL	2.9			MS	5	0.56	0.12
7439-92-1	LEAD, TOTAL	19.6			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.9		*	MS	5	0.56	0.21
7440-66-6	ZINC, TOTAL	11.4			MS	5	1.1	0.39

Bottle ID: B

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X15SD0050006
Matrix: SOIL
SDG Name: CTO423-5
Percent Solids: 82.2
Lab Sample ID: SC3171-015

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.04	J	N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	1.2			MS	5	0.55	0.17
7440-50-8	COPPER, TOTAL	2.8			MS	5	0.55	0.12
7439-92-1	LEAD, TOTAL	7.5			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	0.92		*	MS	5	0.55	0.21
7440-66-6	ZINC, TOTAL	8.1			MS	5	1.1	0.39

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X15SD0130006
Matrix: SOIL
SDG Name: CTO423-5
Percent Solids: 77.5
Lab Sample ID: SC3171-014

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.05	J	N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	0.54			MS	5	0.53	0.16
7440-50-8	COPPER, TOTAL	2.4			MS	5	0.53	0.12
7439-92-1	LEAD, TOTAL	14.0			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	0.90		*	MS	5	0.53	0.20
7440-66-6	ZINC, TOTAL	12.2			MS	5	1.1	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X15SD0180006

Matrix: SOIL
SDG Name: CTO423-5

Percent Solids: 77.9
Lab Sample ID: SC3171-013

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.05	J	N	MS	5	0.12	0.02
7440-38-2	ARSENIC, TOTAL	0.65			MS	5	0.58	0.18
7440-50-8	COPPER, TOTAL	3.3			MS	5	0.58	0.13
7439-92-1	LEAD, TOTAL	6.7			MS	5	0.12	0.04
7440-31-5	TIN, TOTAL	1.0		*	MS	5	0.58	0.22
7440-66-6	ZINC, TOTAL	15.2			MS	5	1.2	0.41

Bottle ID: A

Comments:

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INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SD0230006

Matrix: SOIL **SDG Name:** CTO423-5

Percent Solids: 78.8 **Lab Sample ID:** SC3171-005

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.06	J	N	MS	5	0.093	0.02
7440-38-2	ARSENIC, TOTAL	0.50			MS	5	0.47	0.14
7440-50-8	COPPER, TOTAL	3.0			MS	5	0.47	0.10
7439-92-1	LEAD, TOTAL	7.6			MS	5	0.093	0.03
7440-31-5	TIN, TOTAL	0.87		*	MS	5	0.47	0.18
7440-66-6	ZINC, TOTAL	12.5			MS	5	0.93	0.33

Bottle ID: B

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X16SS0030001

Matrix: SOIL **SDG Name:** CTO423-5

Percent Solids: 87.0 **Lab Sample ID:** SC3171-019

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.62		N	MS	5	0.099	0.02
7440-38-2	ARSENIC, TOTAL	4.0			MS	5	0.50	0.15
7440-50-8	COPPER, TOTAL	6.9			MS	5	0.50	0.11
7439-92-1	LEAD, TOTAL	13.5			MS	5	0.099	0.03
7440-31-5	TIN, TOTAL	1.1		*	MS	5	0.50	0.19
7440-66-6	ZINC, TOTAL	19.8			MS	5	0.99	0.35

Bottle ID: A

Comments:

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-10
Report Date: 20-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X14SS0220001	SL	02-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Cation Exchange Capacity	20. meq/100g	.63	SW846 9081	WG66319	02-JUL-09	SW846 9081	01-JUL-09	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-1
Report Date: 20-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X14SS0580001	SL	03-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Cation Exchange Capacity	13. meq/100g	.62	SW846 9081	WG66319	02-JUL-09	SW846 9081	01-JUL-09	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-7
Report Date: 20-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X14SS0870001	SL	04-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Cation Exchange Capacity	23. meq/100g	.58	SW846 9081	WG65999	01-JUL-09	SW846 9081	29-JUN-09	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-2
Report Date: 20-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X14SS1170001	SL	04-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Cation Exchange Capacity	15. meq/100g	.62	SW846 9081	WG66319	02-JUL-09	SW846 9081	01-JUL-09	

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-6
Report Date: 20-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X15SD0030006	SL	01-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Cation Exchange Capacity	13. meq/100g	.63	SW846 9081	WG66319	02-JUL-09	SW846 9081	01-JUL-09	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-5
Report Date: 20-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X15SD0230006	SL	10-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Cation Exchange Capacity	9.5 meq/100g	.61	SW846 9081	WG66319	02-JUL-09	SW846 9081	01-JUL-09	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-3
Report Date: 20-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X15SS0330001	SL	27-MAY-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Cation Exchange Capacity	13. meq/100g	.6	SW846 9081	WG65999	01-JUL-09	SW846 9081	29-JUN-09	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-4
Report Date: 20-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X15SS0480001	SL	28-MAY-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Cation Exchange Capacity	21. meq/100g	.62	SW846 9081	WG65999	01-JUL-09	SW846 9081	29-JUN-09	

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-8
Report Date: 20-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X16SS0080001	SL	13-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Cation Exchange Capacity	31. meq/100g	.72	SW846 9081	WG65999	01-JUL-09	SW846 9081	29-JUN-09	

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http://katahdinlab.com
sales@katahdinlab.com

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-9
Report Date: 20-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X16SS0730001	SL	14-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Cation Exchange Capacity	15. meq/100g	.57	SW846 9081	WG65999	01-JUL-09	SW846 9081	29-JUN-09	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-10
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X14SS0220001	SL	02-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	15000 ug/gdrywt	470	LLOYDKAHN	WG65309	18-JUN-09 14:40:31	N/A	N/A	CP	
Total Solids	84. %	1	D2216	WG65129	17-JUN-09 10:34:00	ASTM D2216	16-JUN-09	JF	
pH(Soil)	4.8 pH	.1	SW846 9045C	WG65291	16-JUN-09 14:22:00	SW846 9045C	16-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-1
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X14SS0580001	SL	03-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	10000 ug/gdrywt	480	LLOYDKAHN	WG65309	18-JUN-09 11:23:04	N/A	N/A	CP	
Total Solids	84. %	1	D2216	WG65129	17-JUN-09 10:34:00	ASTM D2216	16-JUN-09	JF	
pH(Soil)	4.6 pH	.1	SW846 9045C	WG65291	16-JUN-09 14:02:00	SW846 9045C	16-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-17
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X14SS0630001	SL	03-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	83. %	1	D2216	WG65235	18-JUN-09 09:54:00	ASTM D2216	17-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-18
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X14SS0720001	SL	03-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	81. %	1	D2216	WG65235	18-JUN-09 09:54:00	ASTM D2216	17-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS. Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-7
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X14SS0870001	SL	04-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	15000 ug/gdrywt	470	LLOYDKAHN	WG65309	18-JUN-09 14:28:25	N/A	N/A	CP	
Total Solids	85. %	1	D2216	WG65129	17-JUN-09 10:34:00	ASTM D2216	16-JUN-09	JF	
pH(Soil)	4.9 pH	.1	SW846 9045C	WG65291	16-JUN-09 14:16:00	SW846 9045C	16-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-12
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X14SS0870001	SL	04-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	80. %	1	D2216	WG65226	18-JUN-09 09:30:00	ASTM D2216	17-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-16
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X14SS1080001	SL	04-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	81. %	1	D2216	WG65235	18-JUN-09 09:54:00	ASTM D2216	17-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-2
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X14SS1170001	SL	04-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	28000 ug/gdrywt	460	LLOYDKAHN	WG65309	18-JUN-09 13:20:51	N/A	N/A	CP	
Total Solids	86. %	1	D2216	WG65129	17-JUN-09 10:34:00	ASTM D2216	16-JUN-09	JF	
pH(Soil)	4.6 pH	1	SW846 9045C	WG65291	16-JUN-09 14:06:00	SW846 9045C	16-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-11
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X14SS1260001	SL	09-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	68. %	1	D2216	WG65226	18-JUN-09 09:49:00	ASTM D2216	17-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-6
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X15SD0030006	SL	01-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	740 ug/gdrywt	470	LLOYDKAHN	WG65309	18-JUN-09 13:53:44	N/A	N/A	CP	
Total Solids	84. %	1	D2216	WG65129	17-JUN-09 10:34:00	ASTM D2216	16-JUN-09	JF	
pH(Soil)	5.6 pH	.1	SW846 9045C	WG65291	16-JUN-09 14:14:00	SW846 9045C	16-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-15
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X15SD0050006	SL	01-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	82. %	1	D2216	WG65226	18-JUN-09 09:30:00	ASTM D2216	17-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-14
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X15SD0130006	SL	10-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	78. %	1	D2216	WG65226	18-JUN-09 09:30:00	ASTM D2216	17-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-13
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X15SD0180006	SL	10-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	78. %	1	D2216	WG65226	18-JUN-09 09:30:00	ASTM D2216	17-JUN-09	JF	

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-5
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X15SD0230006	SL	10-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	1300 ug/gdrywt	510	LLOYDKAHN	WG65309	18-JUN-09 14:50:13	N/A	N/A	CP	
Total Solids	79. %	1	D2216	WG65129	17-JUN-09 10:34:00	ASTM D2216	16-JUN-09	JF	
pH(Soil)	7.0 pH	1	SW846 9045C	WG65291	16-JUN-09 14:12:00	SW846 9045C	16-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-3
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X15SS0330001	SL	27-MAY-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	8500 ug/gdrywt	460	LLOYDKAHN	WG65309	18-JUN-09 13:31:10	N/A	N/A	CP	
Total Solids	88. %	1	D2216	WG65129	17-JUN-09 10:34:00	ASTM D2216	16-JUN-09	JF	
pH(Soil)	5.0 pH	1	SW846 9045C	WG65291	16-JUN-09 14:08:00	SW846 9045C	16-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-4
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X15SS0480001	SL	28-MAY-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	12000 ug/gdrywt	470	LLOYDKAHN	WG65309	18-JUN-09 13:44:43	N/A	N/A	CP	
Total Solids	84. %	1	D2216	WG65129	17-JUN-09 10:34:00	ASTM D2216	16-JUN-09	JF	
pH(Soil)	5.5 pH	1	SW846 9045C	WG65291	16-JUN-09 14:10:00	SW846 9045C	16-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-19
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X16SS0030001	SL	13-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	87. %	1	D2216	WG65235	18-JUN-09 09:54:00	ASTM D2216	17-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-8
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X16SS0080001	SL	13-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	38000 ug/gdrywt	540	LLOYDKAHN	WG65309	18-JUN-09 15:04:31	N/A	N/A	CP	
Total Solids	74. %	1	D2216	WG65129	17-JUN-09 10:34:00	ASTM D2216	16-JUN-09	JF	
pH(Soil)	4.7 pH	.1	SW846 9045C	WG65291	16-JUN-09 14:18:00	SW846 9045C	16-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
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661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3171-9
Report Date: 06-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-5

Sample Description	Matrix	Date Sampled	Date Received
X16SS0730001	SL	14-JUN-09	16-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	9400 ug/gdrywt	450	LLOYDKAHN	WG65309	18-JUN-09 15:22:59	N/A	N/A	CP	
Total Solids	89. %	1	D2216	WG65129	17-JUN-09 10:34:00	ASTM D2216	16-JUN-09	JF	
pH(Soil)	6.4 pH	.1	SW846 9045C	WG65291	16-JUN-09 14:20:00	SW846 9045C	16-JUN-09	JF	

APPENDIX C
SUPPORT DOCUMENTATION

HOLDTIME

SDG CTO423-5

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	X15SD0180006	SC3171-013	NM	6/10/2009	6/18/2009	6/30/2009	7.869	12.6	20.47
M	MG/KG	X14SS0220001	SC3171-010	NM	6/2/2009	6/18/2009	6/30/2009	15.68	12	27.68
M	MG/KG	X16SS0030001	SC3171-019	NM	6/13/2009	6/18/2009	6/30/2009	4.877	12.61	17.49
M	MG/KG	X16SS0030001	SC3171-019	NM	6/13/2009	6/18/2009	6/30/2009	4.781	12	16.78
M	MG/KG	X15SD0230006	SC3171-005	NM	6/10/2009	6/18/2009	6/30/2009	7.627	12	19.63
M	MG/KG	X15SD0180006	SC3171-013	NM	6/10/2009	6/18/2009	6/30/2009	7.724	12	19.72
M	MG/KG	X15SD0130006	SC3171-014	NM	6/10/2009	6/18/2009	6/30/2009	7.887	12.60	20.49
M	MG/KG	X15SD0130006	SC3171-014	NM	6/10/2009	6/18/2009	6/30/2009	7.748	12	19.75
M	MG/KG	X15SD0050006	SC3171-015	NM	6/1/2009	6/18/2009	6/30/2009	16.96	12.61	29.57
M	MG/KG	X15SD0050006	SC3171-015	NM	6/1/2009	6/18/2009	6/30/2009	16.82	12	28.82
M	MG/KG	X14SS0720001	SC3171-018	NM	6/3/2009	6/18/2009	6/30/2009	14.63	12	26.63
M	MG/KG	X15SD0230006	SC3171-005	NM	6/10/2009	6/18/2009	6/30/2009	7.808	12.59	20.4
M	MG/KG	X15SD0030006	SC3171-006	NM	6/1/2009	6/18/2009	6/30/2009	16.79	12	28.79
M	MG/KG	X14SS0580001	SC3171-001	NM	6/3/2009	6/18/2009	6/30/2009	14.87	12.58	27.45
M	MG/KG	X14SS0630001	SC3171-017	NM	6/3/2009	6/18/2009	6/30/2009	14.69	12	26.69

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	X14SS0580001	SC3171-001	NM	6/3/2009	6/18/2009	6/30/2009	14.64	12	26.64
M	MG/KG	X14SS0870001	SC3171-012	NM	6/4/2009	6/18/2009	6/30/2009	13.65	12	25.65
M	MG/KG	X14SS1080001	SC3171-016	NM	6/4/2009	6/18/2009	6/30/2009	13.65	12	25.65
M	MG/KG	X14SS1170001	SC3171-002	NM	6/4/2009	6/18/2009	6/30/2009	13.50	12	25.50
M	MG/KG	X14SS1170001	SC3171-002	NM	6/4/2009	6/18/2009	6/30/2009	13.74	12.58	26.32
M	MG/KG	X14SS1260001	SC3171-011	NM	6/9/2009	6/18/2009	6/30/2009	8.648	12	20.65
MISC	MEQ/1	X14SS0220001	SC3171-10	NM	6/2/2009	7/1/2009	7/2/2009	29.17	1.003	30.17
MISC	MEQ/1	X15SS0330001	SC3171-3	NM	5/27/2009	6/29/2009	7/1/2009	32.70	2	34.70
MISC	MEQ/1	X16SS0080001	SC3171-8	NM	6/13/2009	6/29/2009	7/1/2009	15.85	2	17.85
MISC	MEQ/1	X15SS0480001	SC3171-4	NM	5/28/2009	6/29/2009	7/1/2009	31.91	2	33.91
MISC	MEQ/1	X16SS0730001	SC3171-9	NM	6/14/2009	6/29/2009	7/1/2009	14.89	2	16.89
MISC	MEQ/1	X15SD0230006	SC3171-5	NM	6/10/2009	7/1/2009	7/2/2009	21.13	1.001	22.13
MISC	MEQ/1	X15SD0030006	SC3171-6	NM	6/1/2009	7/1/2009	7/2/2009	30.3	1.001	31.3
MISC	MEQ/1	X14SS1170001	SC3171-2	NM	6/4/2009	7/1/2009	7/2/2009	27.06	1.002	28.06
MISC	MEQ/1	X14SS0580001	SC3171-1	NM	6/3/2009	7/1/2009	7/2/2009	28.21	1.003	29.21
MISC	MEQ/1	X14SS0870001	SC3171-7	NM	6/4/2009	6/29/2009	7/1/2009	24.8	2	26.8
PH	PH	X14SS1170001	SC3171-2	NM	6/4/2009	6/16/2009	6/16/2009	11.73	0.252	11.98
PH	PH	X14SS0220001	SC3171-10	NM	6/2/2009	6/16/2009	6/16/2009	13.83	0.264	14.1

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
PH	PH	X14SS0580001	SC3171-1	NM	6/3/2009	6/16/2009	6/16/2009	12.87	0.251	13.12
PH	PH	X15SD0030006	SC3171-6	NM	6/1/2009	6/16/2009	6/16/2009	14.96	0.255	15.22
PH	PH	X15SD0230006	SC3171-5	NM	6/10/2009	6/16/2009	6/16/2009	5.801	0.254	6.056
PH	PH	X15SS0330001	SC3171-3	NM	5/27/2009	6/16/2009	6/16/2009	19.70	0.253	19.96
PH	PH	X15SS0480001	SC3171-4	NM	5/28/2009	6/16/2009	6/16/2009	18.91	0.253	19.16
PH	PH	X16SS0080001	SC3171-8	NM	6/13/2009	6/16/2009	6/16/2009	2.853	0.256	3.11
PH	PH	X16SS0730001	SC3171-9	NM	6/14/2009	6/16/2009	6/16/2009	1.896	0.257	2.153
PH	PH	X14SS0870001	SC3171-7	NM	6/4/2009	6/16/2009	6/16/2009	11.80	0.256	12.06
TOC	UG/GD	X15SD0230006	SC3171-5	NM	6/10/2009	6/18/2009	6/18/2009	8.082	0	8.082
TOC	UG/GD	X16SS0730001	SC3171-9	NM	6/14/2009	6/18/2009	6/18/2009	4.196	0	4.196
TOC	UG/GD	X16SS0080001	SC3171-8	NM	6/13/2009	6/18/2009	6/18/2009	5.142	0	5.142
TOC	UG/GD	X15SS0330001	SC3171-3	NM	5/27/2009	6/18/2009	6/18/2009	21.93	0	21.93
TOC	UG/GD	X15SD0030006	SC3171-6	NM	6/1/2009	6/18/2009	6/18/2009	17.20	0	17.20
TOC	UG/GD	X14SS1170001	SC3171-2	NM	6/4/2009	6/18/2009	6/18/2009	13.95	0	13.95
TOC	UG/GD	X14SS0870001	SC3171-7	NM	6/4/2009	6/18/2009	6/18/2009	14.07	0	14.07
TOC	UG/GD	X14SS0580001	SC3171-1	NM	6/3/2009	6/18/2009	6/18/2009	15.01	0	15.01
TOC	UG/GD	X14SS0220001	SC3171-10	NM	6/2/2009	6/18/2009	6/18/2009	16.11	0	16.11
TOC	UG/GD	X15SS0480001	SC3171-4	NM	5/28/2009	6/18/2009	6/18/2009	21.15	0	21.15

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
TS	%	X14SS0220001	SC3171-10	NM	6/2/2009	6/16/2009	6/17/2009	13.94	1	14.94
TS	%	X15SD0050006	SC3171-15	NM	6/1/2009	6/17/2009	6/18/2009	16.01	1	17.01
TS	%	X16SS0080001	SC3171-8	NM	6/13/2009	6/16/2009	6/17/2009	2.954	1	3.954
TS	%	X16SS0030001	SC3171-19	NM	6/13/2009	6/17/2009	6/18/2009	3.947	1	4.947
TS	%	X15SS0480001	SC3171-4	NM	5/28/2009	6/16/2009	6/17/2009	19.01	1	20.01
TS	%	X15SS0330001	SC3171-3	NM	5/27/2009	6/16/2009	6/17/2009	19.81	1	20.81
TS	%	X15SD0230006	SC3171-5	NM	6/10/2009	6/16/2009	6/17/2009	5.904	1	6.904
TS	%	X15SD0180006	SC3171-13	NM	6/10/2009	6/17/2009	6/18/2009	6.927	1	7.927
TS	%	X15SD0130006	SC3171-14	NM	6/10/2009	6/17/2009	6/18/2009	6.944	1	7.944
TS	%	X15SD0030006	SC3171-6	NM	6/1/2009	6/16/2009	6/17/2009	15.07	1	16.07
TS	%	X14SS1260001	SC3171-11	NM	6/9/2009	6/17/2009	6/18/2009	7.876	1	8.876
TS	%	X14SS1170001	SC3171-2	NM	6/4/2009	6/16/2009	6/17/2009	11.83	1	12.83
TS	%	X14SS1080001	SC3171-16	NM	6/4/2009	6/17/2009	6/18/2009	12.85	1	13.85
TS	%	X14SS0870001-A	SC3171-12	NM	6/4/2009	6/17/2009	6/18/2009	12.86	1	13.86
TS	%	X14SS0870001	SC3171-7	NM	6/4/2009	6/16/2009	6/17/2009	11.91	1	12.91
TS	%	X14SS0720001	SC3171-18	NM	6/3/2009	6/17/2009	6/18/2009	13.80	1	14.80
TS	%	X14SS0580001	SC3171-1	NM	6/3/2009	6/16/2009	6/17/2009	12.98	1	13.98
TS	%	X16SS0730001	SC3171-9	NM	6/14/2009	6/16/2009	6/17/2009	1.996	1	2.996

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
TS	%	X14SS0630001	SC3171-17	NM	6/3/2009	6/17/2009	6/18/2009	13.87	1	14.87

Katahdin ANALYTICAL SERVICES

nelac

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CTO 423 NSF INDIAN HEAD
SDG: CTO423-5
SC3171

Sample Receipt

The following samples were received on June 16, 2009 and were logged in under Katahdin Analytical Services work order numbers SC3171 for a hardcopy due date of July 06, 2009.

KATAHDIN Sample No.	TTNUS Sample Identification
SC3171-1	X14SS0580001
SC3171-2	X14SS1170001
SC3171-3	X15SS0330001
SC3171-4	X15SS0480001
SC3171-5	X15SD0230006
SC3171-6	X15SD0030006
SC3171-7	X14SS0870001
SC3171-8	X16SS0080001
SC3171-9	X16SS0730001
SC3171-10	X14SS0220001
SC3171-11	X14SS1260001
SC3171-12	X14SS0870001
SC3171-13	X15SD0180006
SC3171-14	X15SD0130006
SC3171-15	X15SD0050006
SC3171-16	X14SS1080001
SC3171-17	X14SS0630001
SC3171-18	X14SS0720001
SC3171-19	X16SS0030001

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in this narrative or in the Report of Analysis.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Andrea J. Colby**. This narrative is an integral part of the Report of Analysis.

Cation Exchange Capacity Analysis

The samples of SDG CTO423-5 were prepared and analyzed for cation exchange in accordance with "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846.

Katahdin Sample Nos. SC3171-(3, 4, 7,8, 9) were extracted for cation exchange capacity analysis on 06/28/09-06/29/09 in accordance with USEPA Method 9081. Duplicate laboratory control samples were prepared in this batch. Katahdin Sample No. SC3171-3 was prepared in duplicate.

Katahdin Sample Nos. SC3171-(1, 2, 5, 6, 10) were extracted for cation exchange capacity analysis on 07/01/09-07/02/09 in accordance with USEPA Method 9081. Katahdin Sample No. SC3171-1 was prepared with duplicate matrix-spiked aliquots.

Laboratory control samples and matrix spikes for cation exchange capacity analysis were prepared by adding measured weights of Dowex HCR-W2 cation exchange resin, with a known cation exchange capacity of 250 meq / 100 g.

Cation exchange capacity extracts were analyzed for sodium by inductively-coupled plasma (ICP) atomic emission spectrophotometry in accordance with USEPA Method 6010B. All extracts were diluted by a factor of 5 prior to analysis for sodium.

Cation exchange capacities of solid samples were calculated as follows:

$$\text{CEC (meq / 100 g)} = \frac{(A) \times (B) \times 10000}{(C) \times (D) \times 22.99}$$

where:

A = measured sodium concentration of extract in mg/L
B = extract final volume in liters
C = wet weight of sample extracted in grams
D = total solids content of sample in percent

Matrix QC Summary

The precision of duplicate analyses of Katahdin Sample No. SC3171-3 for cation exchange capacity is within the laboratory's acceptance limit (<20% RPD between duplicate results).

The cation exchange capacity recoveries for duplicate matrix spike aliquots of Katahdin Sample No. SC3171-1 are outside the laboratory's acceptance limits (75% - 125% recovery of the added element, if the native concentration is less than four times the amount added).

Metals Analysis

The samples of SDG CTO423-5 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846. 2nd edition,

1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA.

Inductively-Coupled Plasma Mass Spectrometric Analysis (ICP-MS)

Solid-matrix Katahdin Sample Numbers SC3171-(1, 2, 5, 6, and 10-19) were digested for ICP-MS analysis on 06/18/09 (QC Batch ZF18ICS1) in accordance with USEPA Method 3050B. Katahdin Sample Number SC3171-1 was prepared with duplicate matrix-spiked aliquots. Duplicate laboratory control samples were prepared in this batch. The measured tin concentration in the preparation blank in this batch exceeds the laboratory's acceptance limit. Laboratory testing has determined that this tin contamination comes from one of the reagents used in the digestion process.

ICP-MS analyses of SDG CTO423-5 sample digestates were performed using an Agilent 7500 ICP-MS spectrometer in accordance with USEPA Method 6020. Results for all standards and samples are reported using the mean of 3 replicate measurements. All samples were analyzed within holding times and all analytical run QC criteria were met.

Internal standard recoveries for ICP-MS analyses can be found in the raw data section of the accompanying data package. The following table indicates which analytes are associated with each internal standard element.

Internal Standard Element	Associated Analytes
Lithium	Beryllium
Scandium	Sodium, Magnesium, Aluminum, Potassium, Calcium
Germanium	Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel, Copper, Zinc, Arsenic, Selenium, Silver, Cadmium
Terbium	Antimony, Barium, Tin
Bismuth	Thallium, Lead

Instrument tuning information can also be found in the raw data section in the report labeled "6020 QC Tune Report". The relative standard deviation was determined from 4 replicate measurements. The peak width was measured at 10% of the peak height.

Matrix QC Summary

The measured recovery of antimony in the matrix-spiked aliquots of Katahdin Sample Number SC3171-1 is outside the laboratory's acceptance criteria (75% - 125% recovery of the added element, if the native concentration is less than four times the amount added). The measure recovery of antimony in a post-digestion spike of this sample is within acceptance criteria.

The matrix spike duplicate analysis of Katahdin Sample Number SC3171-1 is outside the laboratory's acceptance limit (<20% relative difference between duplicate matrix-spiked aliquots) for tin.

The serial dilution analysis of Katahdin Sample Number SC3171-1 is within the laboratory's

acceptance limit (<10% relative percent difference, if the concentration in the original sample is greater than 50 times the MDL) for all analytes.

Reporting of Metals Results

Analytical results for client samples, matrix QC samples (duplicates and matrix spikes), and batch QC samples (preparation blanks and laboratory control samples) have been reported down to the laboratory's method detection limits (MDLs). These MDLs have been adjusted for each sample based on the sample amounts used in preparation and analysis. Analytical results that are below the MDLs are flagged with "U" in the C-qualifier column.

Analytical results for instrument run QC samples (ICVs, ICBs, etc.) have been reported down to the laboratory's instrument detection limits (IDLs).

IDLs, MDLs, and PQLs are listed on Form 10 of the accompanying data package.

Wet Chemistry Analysis

The samples of SDG CTO423-5 were analyzed in accordance with the specific methods listed on the Report of Analysis.

Analyses for total solids were performed according to "Annual Book of ASTM Standards", Method D2216-98 "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass".

Analyses for total organic carbon in soil were performed according to "Determination of Total Organic Carbon in Sediment", Lloyd Kahn, USEPA Region II, 7/88.

Analyses for pH (soil) were performed according to "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846. 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA,III, IIIA and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA.

All analyses were performed within analytical holding times. All quality control criteria were met.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Operations Manager or the Quality Assurance Officer as verified by the following signature.

Leslie Dimond
07.20.09

Leslie Dimond
Quality Assurance Officer

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER No 028245 PAGE 1 OF 5

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	4129218038	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER: J. Goerdt	PHONE NUMBER: 4124430244	ADDRESS: 600 Technology Way
		CARRIER/WAYBILL NUMBER: FedEx / 863138882016		CITY, STATE: Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE (YEAR 2009)	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G): G	PRESERVATIVE USED: 4°C	TYPE OF ANALYSIS: SW846 8050B/6020A Sb As Cr Pb Se Sn Zn	COMMENTS
6/10	1100	X155077C0001	077	0	1	SO	C	1	1			
6/10	1030	X155078C0001	078	0	1	SO	C	1	1			
6/11	1220	X155008C0001	008	0	1			1	1			
6/11	1330	X155009C0001	009	0	1			1	1			
6/11	1400	X155010C0001	010	0	1		↓	1	1			
6/2	1200	X145502200 01	022	0	1		G	1	1			
6/2	1243	X145503300 01	033	0	1		G	1	1			
6/2	1252	X145503500 01	035	0	1		G	1	1			
6/2	1306	X145503900 01	039	0	1		G	1	1			
6/2	1329	X145504300 01	043	0	1		G	1	1			
6/3	1426	X145504800 01	048	0	1		G	1	1			
6/3	1103	X145505800 01	058	0	1		G	1	1			
6/3	1303	X145506200 01	062	0	1	↓	G	1	1			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-15-09	1530	1. RECEIVED BY	6/16/09	1005
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

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2000000

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER NO 028250 | PAGE 2 OF 5

PROJECT NO: 112G00810	FACILITY: Indian Head	PROJECT MANAGER R. Basinski	PHONE NUMBER 412 921 8308	LABORATORY NAME AND CONTACT: Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER J. Goard	PHONE NUMBER 412 443 0244	ADDRESS 600 Technology Way
		CARRIER/WAYBILL NUMBER Fed Ex / 8631 3888 2016		CITY, STATE Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS: PCB, TEL, LOC	SW 8260B VOA	SW 8270C BNA	SW 8081A/8082 PEST	SW 6010B/7000A/7471A TAL	COMMENTS
									G	4°C						
6/3	1103	X1455058G0001	058	0	1	SO	G	3	3							MS/MSD
6/4	1435	X1455117G0001	117					1	1							
5/27	1510	X1555033G0001	033					1	1							
5/28	1014	X1555048G0001	048					1	1							
6/10	1252	X1550230006	023		.5	SD		1	1							
6/13	1400	X1655031G0001	031		1	SO		1	X	1						
6/13	1500	X1655040G0001	040					1		1						
6/15	1500	X2555034C0001	034				C	1					1			
6/4	1245	X1655080C0001	080				C	1					1			
6/4	1250	X1655081C0001	081				C	1					1			
6/4	1130	X1455094G0001	094				G	1					1			
6/9	1248	X1455126G0001	126				G	1					1			
6/4	1250	X1455087G0001	087				G	1					1			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-15-09	1530	1. RECEIVED BY	6/16/09	1005
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028248 | PAGE 3 OF 5

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Badinski	4129218308	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FedEx 863138882016		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS SW 846 8270 8A	COMMENTS
6/14	1015	X16550780001	078	0	1	SO	G	1	1	
6/14	1245	X16550800001	080				C	1	1	
	1250	X16550810001	081				C	1	1	
	1100 1245	X16550710001	071				G	1	1	
	925	X16550620001	062					1	1	
	1040	X16550730001	073					1	1	
	955	X16550760001	076					3	3	MS/MSD
	1130	X16550090001	009					1	1	
	1350 1285	X16550140001	014					1	1	
	1250	X16550190001	019					1	1	
6/13	1315	X16550130001	013					1	1	
	1515	X16550420001	042					1	1	
	1525	X16550460001	046					1	1	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-15-09	1530	1. RECEIVED BY	6/16/09	1005
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER No 028249 PAGE 4 OF 5

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bujnski	4129218308	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER: J. Goerdt	PHONE NUMBER: 4124430244	ADDRESS: 600 Technology Way
		CARRIER/WAYBILL NUMBER: Fed Ex / 863138882016		CITY, STATE: Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS SW8260B PAH Pest, TOC, TEC	COMMENTS
									G		4°C	
6/13	1555	X1655051 0001	051	0	1	SO	G	1	1			
6/14	0845	X1655056 0001	056					1	1			
6/14	0855	X1655057 0001	057					1	1			
6/13	1105	X1655002 0001	002		↓	↓		1	1			
6/10	1252	X155D023 0006	023		.5	SD		1	1			
6/1	900	X155D003 0006	003					1	1			
6/1	912	X155D005 0006	005					1	1			
6/1	900	X155D003 0006	003		↓	↓		1		1		
6/4	1250	X1455087 0001	087		1	SO		1		1		
6/3	1103	X1455058 0001	058					1		1		on page lot 5
6/13	1140	X1655008 0001	008					1		1		
6/14	1040	X1655073 0001	073					1		1		
6/2	1200	X1455022 0001	022	↓	↓	↓	↓	1		1		

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-15-09	1530	1. RECEIVED BY	6-16-09	10:05
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER No 028251 | PAGE 5 OF 5

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Badinski	412 921 8308	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	412 443 0244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FedEx / 8631 3888 2016		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ]
[ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	G	G								
									PRESERVATIVE USED			4°C	4°C						
									TYPE OF ANALYSIS	SW 8260B/5035A VOCs	SW 8270C SVOCs								COMMENTS
6/10	1252	X155D023 0006	023	0	.5	SD	G	1		1									
6/10	1115	X155D018 0006	018					1		1									
6/10	1050	X155D013 0006	013					1		1									
6/1	0912	X155D005 0006	005					1		1									
6/1	0900	X155D003 0006	003					1		1									
6/4	1323	X145S108 0001	108			SO		1		1									
6/4	1435	X145S117 0001	117					1		1									
6/3	1307	X145S063 0001	063					1		1									
6/3	1439	X145S072 0001	072					1		1									
6/13	1110	X165S003 0001	003					1		1									
6/13	1325	X165S026 0001	026					1			1								
6/13	1140	X165S008 0001	008	↓	↓	↓	↓	1			1								

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-15-09	1530	1. RECEIVED BY	6/16/09	1005
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

Sample Calc

copper reported result: 151 mg/kg

X1455117 0001

File:	068SMPL.D#	069SMPL.D#	070SMPL.D#	071SMPL.D#	072SMPL.D#
Sample:	SC3171-001	SC3171-001L	SC3171-002	SC3171-001A	SC3171-001S
Date/Time:	6/30/2009 2:22	6/30/2009 2:30	6/30/2009 2:39	6/30/2009 2:47	6/30/2009 2:56
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	25	5	5	10
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	4.2740	3.9000	1.2305	9.0400	47.5600
B / 11	55.9500	58.1250	10.0900	78.5500	499.9000
Na / 23	96.3000	-56.6500	95.1000	2366.5000	6965.0000
Mg / 25	8340.0000	7815.0000	2162.5000	8720.0000	13030.0000
Al / 27	68150.0000	68400.0000	42950.0000	68000.0000	87000.0000
Si / 29	3809.5000	3770.0000	3118.5000	4710.5000	5039.0000
K / 39	7895.0000	7895.0000	2764.0000	10210.0000	19570.0000
Ca / 44	1390.5000	1201.7500	385.9000	2248.5000	3763.0000
V / 51	173.4000	169.4250	110.6000	199.1500	643.8000
Cr / 52	133.6000	131.7000	52.7500	158.5000	315.8000
Mn / 55	1956.0000	2014.2500	149.6500	1958.5000	2799.0000
Fe / 57	86150.0000	89775.0000	45835.0000	86900.0000	79630.0000
Co / 59	38.5500	38.9250	21.3400	42.9350	506.7000
Ni / 60	99.1000	100.1250	108.1500	108.2000	558.4000
Cu / 65	879.5000	894.0000	1560.5000	906.5000	968.0000
Zn / 66	180.3000	187.3250	74.6000	271.4500	630.0000
As / 75	15.9800	14.7850	11.3750	63.0000	452.5000
Se / 82	2.0760	3.2200	1.6555	48.8400	444.9000
Sr / 88	36.8700	38.0000	19.1650	42.3200	534.1000
Mo / 98	3.8035	0.3015	2.3875	12.8800	269.6000
Ag / 107	0.4413	0.1824	0.2294	2.8595	46.4100
Cd / 114	0.1331	0.0736	-0.0605	2.4970	231.0000
Sn / 118	100.6000	99.8250	48.1100	111.3500	674.9000
Sb / 123	1.5035	1.3290	0.7180	11.3200	289.8000
Ba / 135	248.6000	249.6250	134.2000	258.6000	2242.0000
W / 182	1.1535	2.9725	0.8580	12.4850	1.2500
Tl / 203	0.6960	0.0795	0.4433	4.9165	444.4000
Pb / 208	5705.0000	5792.5000	6190.0000	5745.0000	5915.0000
Th / 232	24.6800	15.4975	17.9350	27.7900	25.3600
U / 238	5.7550	5.5650	2.6935	6.6950	102.7000
Li / 6	1224372	1256517	1252366	1252994	1242903
Sc / 45	1049428	1059602	1037129	1057265	1048647
Ge / 72	201552.1	205555.5	201611.4	201242	200758
Tb / 159	1443824	1465183	1434191	1427954	1425639
Bi / 209	789650.4	826389.9	793577.8	784346.6	795641.7
Li / 6	109.6	112.4	112.1	112.1	111.2
Sc / 45	109.6	110.7	108.3	110.4	109.5
Ge / 72	106.5	108.6	106.6	106.4	106.1
Tb / 159	102.7	104.2	102.0	101.6	101.4
Bi / 209	99.0	103.6	99.5	98.3	99.7

$$\text{Result } \frac{mg}{L} \otimes \frac{\text{final volume (L)}}{\text{initial weight (g)}} \otimes \frac{1}{\%\text{ solids}} = \text{concentration (mg/kg)}$$

$$1560.5\ mg/L \otimes \frac{0.1\ L}{1.2\ g} \otimes \frac{1}{0.862} = 150.9\ mg/kg$$

Simple calc - Misc -

Cation Exchange Capacity Calculations

Katahdin Sample No.	Measured Na (mg/L)	Initial Wet Wt (g)	Final Vol (L)	Total Solids (%)	Calculated CEC (meq/100 g)	Calculated PQL	Calculated IDL	Spike Added (meq/100 g)	Recovery %
Blank06-29	0.3901	4.00	0.1	100.000	0.04	0.54	0.017		
LCS 06-29	626.7	1.05	0.1	100.000	258.63	2.06	0.066	250	103.4
LCSD 06-29	629.4	1.01	0.1	100.000	271.06	2.15	0.069	250	108.4
SC3171-3	110.9	4.12	0.1	87.868	13.32	0.60	0.019		
SC3171-3D	110.1	4.32	0.1	87.868	12.61	0.57	0.018		
SC3171-4	166.9	4.14	0.1	84.461	20.78	0.62	0.020		
SC3171-7	198.6	4.44	0.1	85.069	22.89	0.58	0.018		
SC3171-8	211.2	4.08	0.1	73.813	30.53	0.72	0.023		
SC3171-9	131.7	4.28	0.1	88.990	15.06	0.57	0.018		

x14550870001

CEC reported result: 23 meq/100 g

SAMPLE	SDG	PARA	FRACTION	RESULT	BLANK Action level(mg/kg)
X14SS0220001	CTO423-5	ANTIMONY	M	0.12	0.11
X14SS0580001	CTO423-5	ANTIMONY	M	0.15	0.10
X14SS0630001	CTO423-5	ANTIMONY	M	0.11	0.12
X14SS0720001	CTO423-5	ANTIMONY	M	0.13	0.11
X14SS0870001	CTO423-5	ANTIMONY	M	0.12	0.09
X14SS1080001	CTO423-5	ANTIMONY	M	0.14	0.11
X14SS1170001	CTO423-5	ANTIMONY	M	0.07	0.10
X14SS1260001	CTO423-5	ANTIMONY	M	0.07	0.11
X15SD0030006	CTO423-5	ANTIMONY	M	0.09	0.11
X15SD0050006	CTO423-5	ANTIMONY	M	0.04	0.11
X15SD0130006	CTO423-5	ANTIMONY	M	0.05	0.11
X15SD0180006	CTO423-5	ANTIMONY	M	0.05	0.12
X15SD0230006	CTO423-5	ANTIMONY	M	0.06	0.09
X16SS0030001	CTO423-5	ANTIMONY	M	0.62	0.10

SAMPLE	SDG	PARA	FRACTION	RESULT	BLANK Action level(mg/kg)
X14SS0220001	CTO423-5	COPPER	M	9.2	0.17
X14SS0580001	CTO423-5	COPPER	M	88.6	0.30
X14SS0630001	CTO423-5	COPPER	M	40.8	0.17
X14SS0720001	CTO423-5	COPPER	M	85.0	0.16
X14SS0870001	CTO423-5	COPPER	M	32.6	0.14
X14SS1080001	CTO423-5	COPPER	M	21.9	0.17
X14SS1170001	CTO423-5	COPPER	M	151	0.29
X14SS1260001	CTO423-5	COPPER	M	53.3	0.16
X15SD0030006	CTO423-5	COPPER	M	2.9	0.17
X15SD0050006	CTO423-5	COPPER	M	2.8	0.17
X15SD0130006	CTO423-5	COPPER	M	2.4	0.16
X15SD0180006	CTO423-5	COPPER	M	3.3	0.18
X15SD0230006	CTO423-5	COPPER	M	3.0	0.14
X16SS0030001	CTO423-5	COPPER	M	6.9	0.15

SAMPLE	SDG	PARA	FRACTION	RESULT	BLANK Action level(mg/kg)
X14SS0220001	CTO423-5	LEAD	M	9.6	0.44
X14SS0580001	CTO423-5	LEAD	M	606	0.15
X14SS0630001	CTO423-5	LEAD	M	188	0.46
X14SS0720001	CTO423-5	LEAD	M	283	0.43
X14SS0870001	CTO423-5	LEAD	M	108	0.37
X14SS1080001	CTO423-5	LEAD	M	31.3	0.44
X14SS1170001	CTO423-5	LEAD	M	618	0.15
X14SS1260001	CTO423-5	LEAD	M	476	0.43
X15SD0030006	CTO423-5	LEAD	M	19.6	0.45
X15SD0050006	CTO423-5	LEAD	M	7.5	0.44
X15SD0130006	CTO423-5	LEAD	M	14.0	0.43
X15SD0180006	CTO423-5	LEAD	M	6.7	0.47
X15SD0230006	CTO423-5	LEAD	M	7.6	0.37
X16SS0030001	CTO423-5	LEAD	M	13.5	0.40

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZF29A

Date: 6/29/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements								
6020 TUNE			16:52									
Cal Blank		1	17:50	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
Cal Std 1		1	17:58	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
Cal Std 2		1	18:07	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
Cal Std 3		1	18:15	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
Cal Std 4		1	18:24	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
ZZZZZZ		1	18:32									
ICV		1	18:41	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
ICB		1	18:49	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
PQL		1	18:58	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
ICSA		1	19:06	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
ICSAB		1	19:15	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
Blank		1	19:24	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
CCV		1	19:32	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
CCB		1	19:41	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
BLANK		1	19:49	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
BLANK		1	19:58	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
CCV		1	20:06	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
CCB		1	20:15	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
ZZZZZZ		5	20:24									
ZZZZZZ		5	20:32									
ZZZZZZ		25	20:41									
ZZZZZZ		5	20:49									
ZZZZZZ		25	20:58									
ZZZZZZ		10	21:06									
ZZZZZZ		10	21:15									
ZZZZZZ		10	21:23									
ZZZZZZ		10	21:32									
BLANK		1	21:40	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
CCV		1	21:49	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
CCB		1	21:57	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
ZZZZZZ		5	22:06									
ZZZZZZ		5	22:14									
ZZZZZZ		5	22:23									
ZZZZZZ		5	22:31									
ZZZZZZ		5	22:40									
ZZZZZZ		5	22:48									
ZZZZZZ		5	22:57									
ZZZZZZ		5	23:05									
ZZZZZZ		5	23:14									
BLANK		1	23:23	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
CCV		1	23:31	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
CCB		1	23:40	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn	
ZZZZZZ		5	23:48									
ZZZZZZ		5	23:57									
ZZZZZZ		5	0:05									
ZZZZZZ		5	0:14									
ZZZZZZ		5	0:22									
ZZZZZZ		5	0:31									
ZZZZZZ		5	0:39									

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZF29A

Date: 6/30/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements
ZZZZZZ		5	0:48	
ZZZZZZ		5	0:56	
BLANK		1	1:05	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	1:14	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	1:22	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Blank		1	1:31	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Blank		1	1:39	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
PQL		1	1:47	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	1:56	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	2:04	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
PBSZF18ICS1		5	2:13	Sb As Cu Pb Zn
SC3171-001	X14SS0580001	5	2:22	Sb As Cu Sn Zn
SC3171-001L	X14SS0580001L	25	2:30	Sb As Cu Sn Zn
SC3171-002	X14SS1170001	5	2:39	Sb As Cu Sn Zn
SC3171-001A	X14SS0580001A	5	2:47	Sb
SC3171-001S	X14SS0580001S	10	2:56	Sb As Cu Pb Sn Zn
SC3171-001P	X14SS0580001P	10	3:04	Sb As Cu Pb Sn Zn
LCSSZF18ICS1		10	3:13	Sb As Cu Pb Sn Zn
LC2SZF18ICS1		10	3:21	Sb As Cu Pb Sn Zn
BLANK		1	3:30	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	3:38	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	3:47	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
SC3171-005	X15SD0230006	5	3:55	Sb As Cu Pb Zn
SC3171-006	X15SD0030006	5	4:04	Sb As Cu Pb Sn Zn
SC3171-010	X14SS0220001	5	4:12	Sb As Cu Pb Sn Zn
SC3171-011	X14SS1260001	5	4:21	Sb As Cu Pb Sn Zn
SC3171-012	X14SS0870001	5	4:30	Sb As Cu Pb Sn Zn
SC3171-013	X15SD0180006	5	4:38	Sb As Cu Pb Zn
SC3171-014	X15SD0130006	5	4:47	Sb As Cu Pb Zn
SC3171-015	X15SD0050006	5	4:55	Sb As Cu Pb Zn
SC3171-016	X14SS1080001	5	5:04	Sb As Cu Pb Sn Zn
BLANK		1	5:12	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	5:21	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	5:29	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
SC3171-017	X14SS0630001	5	5:38	Sb As Cu Pb Sn Zn
SC3171-018	X14SS0720001	5	5:47	Sb As Cu Pb Sn Zn
SC3171-019	X16SS0030001	5	5:55	Sb As Cu Pb Zn
BLANK		1	6:04	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	6:12	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	6:21	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZF30A

Date: 6/30/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements
6020 TUNE			16:34	
Cal Blank		1	17:32	Al Ca Fe Pb Mg Mo K Na Sn
Cal Std 1		1	17:40	Al Ca Fe Pb Mg Mo K Na Sn
Cal Std 2		1	17:49	Al Ca Fe Pb Mg Mo K Na Sn
Cal Std 3		1	17:57	Al Ca Fe Pb Mg Mo K Na Sn
Cal Std 4		1	18:06	Al Ca Fe Pb Mg Mo K Na Sn
ZZZZZZ		1	18:14	
ICV		1	18:23	Al Ca Fe Pb Mg Mo K Na Sn
ICB		1	18:31	Al Ca Fe Pb Mg Mo K Na Sn
PQL		1	18:40	Al Ca Fe Pb Mg Mo K Na Sn
ICSA		1	18:48	Al Ca Fe Pb Mg Mo K Na Sn
ICSAB		1	18:57	Al Ca Fe Pb Mg Mo K Na Sn
Blank		1	19:06	Al Ca Fe Pb Mg Mo K Na Sn
CCV		1	19:14	Al Ca Fe Pb Mg Mo K Na Sn
CCB		1	19:23	Al Ca Fe Pb Mg Mo K Na Sn
BLANK		1	19:31	Al Ca Fe Pb Mg Mo K Na Sn
BLANK		1	19:40	Al Ca Fe Pb Mg Mo K Na Sn
CCV		1	19:49	Al Ca Fe Pb Mg Mo K Na Sn
CCB		1	19:57	Al Ca Fe Pb Mg Mo K Na Sn
ZZZZZZ		5	20:06	
ZZZZZZ		5	20:14	
ZZZZZZ		5	20:23	
ZZZZZZ		5	20:31	
ZZZZZZ		5	20:40	
ZZZZZZ		5	20:48	
ZZZZZZ		5	20:57	
ZZZZZZ		5	21:05	
ZZZZZZ		5	21:14	
BLANK		1	21:22	Al Ca Fe Pb Mg Mo K Na Sn
CCV		1	21:31	Al Ca Fe Pb Mg Mo K Na Sn
CCB		1	21:39	Al Ca Fe Pb Mg Mo K Na Sn
PBSZF18ICS1		5	21:48	Sn
SC3171-001	X14SS0580001	10	21:56	Pb
SC3171-001L	X14SS0580001L	50	22:05	Pb
SC3171-002	X14SS1170001	10	22:13	Pb
SC3171-005	X15SD0230006	5	22:22	Sn
SC3171-013	X15SD0180006	5	22:30	Sn
SC3171-014	X15SD0130006	5	22:39	Sn
SC3171-015	X15SD0050006	5	22:47	Sn
SC3171-019	X16SS0030001	5	22:56	Sn
BLANK		1	23:04	Al Ca Fe Pb Mg Mo K Na Sn
CCV		1	23:13	Al Ca Fe Pb Mg Mo K Na Sn
CCB		1	23:21	Al Ca Fe Pb Mg Mo K Na Sn

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: ICV

File: JZF29A Jun 29, 2009 18:41

Analyte	True	Found	%R (1)
ALUMINUM	400.0	412.10	103.0
ANTIMONY	20.0	20.01	100.1
ARSENIC	20.0	19.49	97.4
CALCIUM	4000.0	3990.00	99.8
COPPER	20.0	20.39	102.0
IRON	4000.0	4089.00	102.2
LEAD	20.0	19.57	97.9
MAGNESIUM	4000.0	4037.00	100.9
MOLYBDENUM	40.0	41.34	103.4
POTASSIUM	4000.0	3950.00	98.8
SODIUM	4000.0	3978.00	99.5
TIN	20.0	20.95	104.7
ZINC	20.0	20.95	104.7

SAMPLE: CCV

File: JZF29A Jun 29, 2009 19:32

Analyte	True	Found	%R (1)
ALUMINUM	500.0	498.10	99.6
ANTIMONY	25.0	24.16	96.6
ARSENIC	25.0	24.55	98.2
CALCIUM	5000.0	4783.00	95.7
COPPER	25.0	24.71	98.8
IRON	5000.0	5034.00	100.7
LEAD	25.0	24.18	96.7
MAGNESIUM	5000.0	4661.00	93.2
MOLYBDENUM	25.0	29.54	118.2•
POTASSIUM	5000.0	4739.00	94.8
SODIUM	5000.0	4713.00	94.3
TIN	25.0	24.27	97.1
ZINC	25.0	25.05	100.2

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: CCV

File: JZF29A Jun 29, 2009 20:06

Analyte	True	Found	%R (1)
ALUMINUM	500.0	477.90	95.6
ANTIMONY	25.0	24.61	98.4
ARSENIC	25.0	24.57	98.3
CALCIUM	5000.0	4798.00	96.0
COPPER	25.0	24.70	98.8
IRON	5000.0	4977.00	99.5
LEAD	25.0	24.16	96.6
MAGNESIUM	5000.0	4664.00	93.3
MOLYBDENUM	25.0	24.95	99.8
POTASSIUM	5000.0	4745.00	94.9
SODIUM	5000.0	4728.00	94.6
TIN	25.0	24.33	97.3
ZINC	25.0	24.85	99.4

SAMPLE: CCV

File: JZF29A Jun 29, 2009 21:49

Analyte	True	Found	%R (1)
ALUMINUM	500.0	475.40	95.1
ANTIMONY	25.0	24.85	99.4
ARSENIC	25.0	24.34	97.4
CALCIUM	5000.0	4846.00	96.9
COPPER	25.0	24.32	97.3
IRON	5000.0	4963.00	99.3
LEAD	25.0	24.24	97.0
MAGNESIUM	5000.0	4737.00	94.7
MOLYBDENUM	25.0	24.64	98.6
POTASSIUM	5000.0	4703.00	94.1
SODIUM	5000.0	4653.00	93.1
TIN	25.0	24.74	99.0
ZINC	25.0	24.78	99.1

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: CCV

File: JZF29A Jun 29, 2009 23:31

Analyte	True	Found	%R (1)
ALUMINUM	500.0	487.20	97.4
ANTIMONY	25.0	25.33	101.3
ARSENIC	25.0	24.20	96.8
CALCIUM	5000.0	4913.00	98.3
COPPER	25.0	24.50	98.0
IRON	5000.0	4988.00	99.8
LEAD	25.0	24.65	98.6
MAGNESIUM	5000.0	4757.00	95.1
MOLYBDENUM	25.0	24.69	98.8
POTASSIUM	5000.0	4833.00	96.7
SODIUM	5000.0	4715.00	94.3
TIN	25.0	25.37	101.5
ZINC	25.0	25.47	101.9

SAMPLE: CCV

File: JZF29A Jun 30, 2009 1:14

Analyte	True	Found	%R (1)
ALUMINUM	500.0	449.60	89.9
ANTIMONY	25.0	23.92	95.7
ARSENIC	25.0	23.37	93.5
CALCIUM	5000.0	4672.00	93.4
COPPER	25.0	23.76	95.0
IRON	5000.0	4842.00	96.8
LEAD	25.0	23.51	94.0
MAGNESIUM	5000.0	4520.00	90.4
MOLYBDENUM	25.0	23.80	95.2
POTASSIUM	5000.0	4573.00	91.5
SODIUM	5000.0	4515.00	90.3
TIN	25.0	23.88	95.5
ZINC	25.0	24.53	98.1

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: CCV

File: JZF29A Jun 30, 2009 1:56

Analyte	True	Found	%R (1)
ALUMINUM	500.0	470.20	94.0
ANTIMONY	25.0	24.24	97.0
ARSENIC	25.0	24.15	96.6
CALCIUM	5000.0	4774.00	95.5
COPPER	25.0	24.14	96.6
IRON	5000.0	4923.00	98.5
LEAD	25.0	24.09	96.4
MAGNESIUM	5000.0	4674.00	93.5
MOLYBDENUM	25.0	24.43	97.7
POTASSIUM	5000.0	4720.00	94.4
SODIUM	5000.0	4670.00	93.4
TIN	25.0	24.37	97.5
ZINC	25.0	24.85	99.4

SAMPLE: CCV

File: JZF29A Jun 30, 2009 3:38

Analyte	True	Found	%R (1)
ALUMINUM	500.0	461.70	92.3
ANTIMONY	25.0	23.81	95.2
ARSENIC	25.0	23.66	94.6
CALCIUM	5000.0	4635.00	92.7
COPPER	25.0	23.96	95.8
IRON	5000.0	4775.00	95.5
LEAD	25.0	23.57	94.3
MAGNESIUM	5000.0	4534.00	90.7
MOLYBDENUM	25.0	23.54	94.2
POTASSIUM	5000.0	4563.00	91.3
SODIUM	5000.0	4519.00	90.4
TIN	25.0	23.90	95.6
ZINC	25.0	23.95	95.8

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: CCV

File: JZF29A Jun 30, 2009 5:21

Analyte	True	Found	%R (1)
ALUMINUM	500.0	501.80	100.4
ANTIMONY	25.0	24.88	99.5
ARSENIC	25.0	24.30	97.2
CALCIUM	5000.0	5002.00	100.0
COPPER	25.0	24.69	98.8
IRON	5000.0	5026.00	100.5
LEAD	25.0	24.27	97.1
MAGNESIUM	5000.0	4925.00	98.5
MOLYBDENUM	25.0	24.30	97.2
POTASSIUM	5000.0	4993.00	99.9
SODIUM	5000.0	4989.00	99.8
TIN	25.0	24.64	98.6
ZINC	25.0	24.90	99.6

SAMPLE: CCV

File: JZF29A Jun 30, 2009 6:12

Analyte	True	Found	%R (1)
ALUMINUM	500.0	474.10	94.8
ANTIMONY	25.0	24.75	99.0
ARSENIC	25.0	23.83	95.3
CALCIUM	5000.0	4794.00	95.9
COPPER	25.0	24.54	98.2
IRON	5000.0	4844.00	96.9
LEAD	25.0	24.10	96.4
MAGNESIUM	5000.0	4666.00	93.3
MOLYBDENUM	25.0	24.07	96.3
POTASSIUM	5000.0	4703.00	94.1
SODIUM	5000.0	4681.00	93.6
TIN	25.0	24.71	98.8
ZINC	25.0	24.64	98.6

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: ICV

File: JZF30A Jun 30, 2009 18:23

Analyte	True	Found	%R (1)
ALUMINUM	400.0	419.00	104.8
CALCIUM	4000.0	4019.00	100.5
IRON	4000.0	4075.00	101.9
LEAD	20.0	19.66	98.3
MAGNESIUM	4000.0	4127.00	103.2
MOLYBDENUM	40.0	40.99	102.5
POTASSIUM	4000.0	4023.00	100.6
SODIUM	4000.0	4007.00	100.2
TIN	20.0	20.85	104.3

SAMPLE: CCV

File: JZF30A Jun 30, 2009 19:14

Analyte	True	Found	%R (1)
ALUMINUM	500.0	564.90	113.0•
CALCIUM	5000.0	5346.00	106.9
IRON	5000.0	5157.00	103.1
LEAD	25.0	25.36	101.4
MAGNESIUM	5000.0	5210.00	104.2
MOLYBDENUM	25.0	31.15	124.6•
POTASSIUM	5000.0	5228.00	104.6
SODIUM	5000.0	5156.00	103.1
TIN	25.0	25.73	102.9

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: CCV

File: JZF30A Jun 30, 2009 19:49

Analyte	True	Found	%R (1)
ALUMINUM	500.0	530.20	106.0
CALCIUM	5000.0	5286.00	105.7
IRON	5000.0	5064.00	101.3
LEAD	25.0	25.02	100.1
MAGNESIUM	5000.0	5240.00	104.8
MOLYBDENUM	25.0	26.35	105.4
POTASSIUM	5000.0	5237.00	104.7
SODIUM	5000.0	5198.00	104.0
TIN	25.0	25.63	102.5

SAMPLE: CCV

File: JZF30A Jun 30, 2009 21:31

Analyte	True	Found	%R (1)
ALUMINUM	500.0	488.70	97.7
CALCIUM	5000.0	5019.00	100.4
IRON	5000.0	5079.00	101.6
LEAD	25.0	24.78	99.1
MAGNESIUM	5000.0	4898.00	98.0
MOLYBDENUM	25.0	25.53	102.1
POTASSIUM	5000.0	4902.00	98.0
SODIUM	5000.0	4803.00	96.1
TIN	25.0	24.77	99.1

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: CCV

File: JZF30A Jun 30, 2009 23:13

Analyte	True	Found	%R (1)
ALUMINUM	500.0	515.40	103.1
CALCIUM	5000.0	5120.00	102.4
IRON	5000.0	5200.00	104.0
LEAD	25.0	25.01	100.0
MAGNESIUM	5000.0	5050.00	101.0
MOLYBDENUM	25.0	25.64	102.6
POTASSIUM	5000.0	5026.00	100.5
SODIUM	5000.0	4897.00	97.9
TIN	25.0	25.50	102.0

(1) Control Limits: Mercury 80-120; Other Metals 90-110

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: PQL

File: JZF29A Jun 29, 2009 18:58

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	62.82	104.7
ANTIMONY	0.2	0.21	105.0
ARSENIC	1.0	1.13	113.0
CALCIUM	20.0	27.37	136.8•
COPPER	0.2	0.22	110.0
IRON	20.0	21.63	108.1
LEAD	0.2	0.20	100.0
MAGNESIUM	20.0	22.31	111.6
MOLYBDENUM	1.0	1.10	110.0
POTASSIUM	200.0	213.80	106.9
SODIUM	200.0	208.30	104.2
TIN	0.2	0.27	135.0•
ZINC	2.0	2.19	109.5

SAMPLE: PQL

File: JZF29A Jun 30, 2009 01:47

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	53.20	88.7
ANTIMONY	0.2	0.20	100.0
ARSENIC	1.0	1.01	101.0
CALCIUM	20.0	13.10	65.5•
COPPER	0.2	0.20	100.0
IRON	20.0	16.62	83.1
LEAD	0.2	0.18	90.0
MAGNESIUM	20.0	16.83	84.1
MOLYBDENUM	1.0	0.82	82.0
POTASSIUM	200.0	191.50	95.8
SODIUM	200.0	192.10	96.0
TIN	0.2	0.25	125.0
ZINC	2.0	2.14	107.0

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: PQL

File: JZF30A Jun 30, 2009 18:40

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	60.49	100.8
CALCIUM	20.0	20.21	101.1
IRON	20.0	22.13	110.7
LEAD	0.2	0.20	100.0
MAGNESIUM	20.0	20.93	104.7
MOLYBDENUM	1.0	1.06	106.0
POTASSIUM	200.0	207.10	103.5
SODIUM	200.0	209.80	104.9
TIN	0.2	0.21	105.0

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services **Sample ID:** PBSZF18ICS1

Matrix: SOIL **SDG Name:** CTO423-5

QC Batch ID: ZF18ICS1

Concentration Units : mg/Kgdrywt

Analyte	RESULT	C
ANTIMONY	0.020	U
ARSENIC	0.150	U
COPPER	0.110	U
LEAD	0.030	U
TIN	0.692	
ZINC	0.350	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: ICB			**SAMPLE: CCB**			**SAMPLE: CCB**		
File: JZF29A	Jun 29, 2009	18:49	File: JZF29A	Jun 29, 2009	19:41	File: JZF29A	Jun 29, 2009	20:15
Analyte	**Result**	**C**	**Analyte**	**Result**	**C**	**Analyte**	**Result**	**C**
ALUMINUM	6.55	J	ALUMINUM	24.86	J	ALUMINUM	9.36	J
ANTIMONY	0.03	U	ANTIMONY	0.04	J	ANTIMONY	0.04	J
ARSENIC	0.08	U	ARSENIC	0.08	U	ARSENIC	0.08	U
CALCIUM	12.76	J	CALCIUM	29.01		CALCIUM	13.12	J
COPPER	0.04	U	COPPER	0.04	U	COPPER	0.05	J
IRON	10.51	J	IRON	23.16		IRON	12.28	J
LEAD	0.02	J	LEAD	0.02	U	LEAD	0.02	J
MAGNESIUM	10.26	J	MAGNESIUM	28.61		MAGNESIUM	14.69	J
MOLYBDENUM	0.49	J	MOLYBDENUM	2.46		MOLYBDENUM	0.71	J
POTASSIUM	20.38	J	POTASSIUM	41.44	J	POTASSIUM	21.24	J
SODIUM	8.57	J	SODIUM	31.25	J	SODIUM	13.75	J
TIN	0.04	J	TIN	0.04	U	TIN	0.06	J
ZINC	0.44	U	ZINC	0.44	U	ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: CCB
File: JZF29A Jun 29, 2009 21:57

Analyte	Result	C
ALUMINUM	-3.05	J
ANTIMONY	0.03	J
ARSENIC	0.08	U
CALCIUM	-6.39	J
COPPER	0.04	U
IRON	3.10	U
LEAD	0.02	U
MAGNESIUM	2.10	J
MOLYBDENUM	0.13	J
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.05	J
ZINC	0.44	U

SAMPLE: CCB
File: JZF29A Jun 29, 2009 23:40

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.03	U
ARSENIC	-0.12	J
CALCIUM	5.36	J
COPPER	0.04	U
IRON	3.10	U
LEAD	0.02	U
MAGNESIUM	6.19	J
MOLYBDENUM	0.09	J
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.05	J
ZINC	0.44	U

SAMPLE: CCB
File: JZF29A Jun 30, 2009 1:22

Analyte	Result	C
ALUMINUM	-3.64	J
ANTIMONY	0.03	U
ARSENIC	0.08	U
CALCIUM	3.90	U
COPPER	0.04	U
IRON	3.10	U
LEAD	0.02	U
MAGNESIUM	3.68	J
MOLYBDENUM	0.07	U
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.04	J
ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: CCB
File: JZF29A Jun 30, 2009 2:04

Analyte	Result	C
ALUMINUM	-3.72	J
ANTIMONY	0.03	U
ARSENIC	-0.21	J
CALCIUM	-6.74	J
COPPER	0.04	U
IRON	3.10	U
LEAD	0.02	U
MAGNESIUM	2.00	U
MOLYBDENUM	0.07	U
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.04	J
ZINC	0.44	U

SAMPLE: CCB
File: JZF29A Jun 30, 2009 3:47

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.04	J
ARSENIC	0.08	U
CALCIUM	-4.84	J
COPPER	0.06	J
IRON	3.10	U
LEAD	0.16	J
MAGNESIUM	2.00	U
MOLYBDENUM	0.08	J
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.09	J
ZINC	0.44	U

SAMPLE: CCB
File: JZF29A Jun 30, 2009 5:29

Analyte	Result	C
ALUMINUM	5.02	J
ANTIMONY	0.03	U
ARSENIC	0.08	U
CALCIUM	-5.02	J
COPPER	0.04	U
IRON	9.69	J
LEAD	0.04	J
MAGNESIUM	2.00	U
MOLYBDENUM	0.07	U
POTASSIUM	8.80	U
SODIUM	-8.25	J
TIN	0.04	J
ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: CCB

File: JZF29A Jun 30, 2009 6:21

Analyte	Result	C
ALUMINUM	4.39	J
ANTIMONY	0.03	U
ARSENIC	-0.08	J
CALCIUM	5.55	J
COPPER	0.04	J
IRON	8.44	J
LEAD	0.10	J
MAGNESIUM	5.52	J
MOLYBDENUM	0.07	U
POTASSIUM	8.80	U
SODIUM	-8.97	J
TIN	0.04	U
ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: ICB

File: JZF30A Jun 30, 2009 18:31

Analyte	Result	C
ALUMINUM	2.20	U
CALCIUM	4.61	J
IRON	5.17	J
LEAD	0.02	U
MAGNESIUM	4.15	J
MOLYBDENUM	0.42	J
POTASSIUM	13.01	J
SODIUM	6.50	U
TIN	0.05	J

SAMPLE: CCB

File: JZF30A Jun 30, 2009 19:23

Analyte	Result	C
ALUMINUM	26.86	J
CALCIUM	29.54	
IRON	30.29	
LEAD	0.02	U
MAGNESIUM	30.19	
MOLYBDENUM	2.74	
POTASSIUM	40.87	J
SODIUM	31.91	J
TIN	0.04	J

SAMPLE: CCB

File: JZF30A Jun 30, 2009 19:57

Analyte	Result	C
ALUMINUM	6.76	J
CALCIUM	9.85	J
IRON	10.42	J
LEAD	0.02	U
MAGNESIUM	10.35	J
MOLYBDENUM	0.75	J
POTASSIUM	20.88	J
SODIUM	12.27	J
TIN	0.04	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: CCB

File: JZF30A Jun 30, 2009 21:39

Analyte	Result	C
ALUMINUM	6.68	J
CALCIUM	18.41	J
IRON	18.68	J
LEAD	0.02	U
MAGNESIUM	14.94	J
MOLYBDENUM	0.38	J
POTASSIUM	20.80	J
SODIUM	20.05	J
TIN	0.04	J

SAMPLE: CCB

File: JZF30A Jun 30, 2009 23:21

Analyte	Result	C
ALUMINUM	5.42	J
CALCIUM	16.55	J
IRON	12.86	J
LEAD	0.03	J
MAGNESIUM	12.00	J
MOLYBDENUM	0.22	J
POTASSIUM	10.57	J
SODIUM	6.50	U
TIN	0.04	U

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: ICSA

File: JZF29A Jun 29, 2009 19:06

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	94240	94.2
ANTIMONY	0	0	
ARSENIC	0	0	
CALCIUM	100000	92550	92.5
COPPER	0	1	
IRON	100000	90350	90.3
LEAD	0	0	
MAGNESIUM	100000	90960	91.0
MOLYBDENUM	2000	1887	94.3
POTASSIUM	100000	95660	95.7
SODIUM	100000	94550	94.5
TIN	0	0	
ZINC	0	0	

SAMPLE: ICSAB

File: JZF29A Jun 29, 2009 19:15

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	91550	91.5
ANTIMONY	20	19	95.0
ARSENIC	20	18	90.0
CALCIUM	100000	90730	90.7
COPPER	20	18	90.0
IRON	100000	89070	89.1
LEAD	20	20	100.0
MAGNESIUM	100000	89520	89.5
MOLYBDENUM	2000	1896	94.8
POTASSIUM	100000	92330	92.3
SODIUM	100000	90930	90.9
TIN	20	20	100.0
ZINC	21	17	81.0

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-5

Concentration Units: ug/L

SAMPLE: ICSA

File: JZF30A Jun 30, 2009 18:48

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	102100	102.1
CALCIUM	100000	100700	100.7
IRON	100000	93570	93.6
LEAD	0	0	
MAGNESIUM	100000	100700	100.7
MOLYBDENUM	2000	1994	99.7
POTASSIUM	100000	103700	103.7
SODIUM	100000	103800	103.8
TIN	0	0	

SAMPLE: ICSAB

File: JZF30A Jun 30, 2009 18:57

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	92620	92.6
CALCIUM	100000	90780	90.8
IRON	100000	89130	89.1
LEAD	20	20	100.0
MAGNESIUM	100000	91500	91.5
MOLYBDENUM	2000	1933	96.7
POTASSIUM	100000	93220	93.2
SODIUM	100000	92360	92.4
TIN	20	20	100.0

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID:** LC2SZF18ICS1

Matrix: SOIL **SDG Name:** CTO423-5

QC Batch ID: ZF18ICS1

Concentration Units : mg/Kgdrywt

Analyte	TRUE	FOUND	% R	LIMITS (%)	
ANTIMONY	126.0	89.89	71.3	50	150
ARSENIC	225.0	203.26	90.3	80	120
COPPER	66.7	63.34	95.0	81	119
LEAD	223.0	204.05	91.5	82	118
TIN	164.0	161.69	98.6	74	126
ZINC	349.0	329.03	94.3	80	120

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID:** LCSSZF18ICS1

Matrix: SOIL **SDG Name:** CTO423-5

QC Batch ID: ZF18ICS1

Concentration Units : mg/Kgdrywt

Analyte	TRUE	FOUND	% R	LIMITS (%)	
ANTIMONY	126.0	94.67	75.1	50	150
ARSENIC	225.0	211.90	94.2	80	120
COPPER	66.7	65.56	98.3	81	119
LEAD	223.0	213.49	95.7	82	118
TIN	164.0	170.08	103.7	74	126
ZINC	349.0	341.82	97.9	80	120

7D

LABORATORY CONTROL SAMPLE DUPLICATES

Lab Name: Katahdin Analytical Services

Matrix: SOIL **SDG Name:** CTO423-5

QC Batch ID: ZF18ICS1 **Lab Sample ID:** LCSSZF18ICS1

Concentration Units: mg/Kgdrywt

Analyte	Control Limit (%)	LCS Result	LCS Dup. Result	RPD(%)	Q
ANTIMONY	20.0	94.67	89.89	5.2	
ARSENIC	20.0	211.90	203.26	4.2	
COPPER	20.0	65.56	63.34	3.4	
LEAD	20.0	213.49	204.05	4.5	
TIN	20.0	170.08	161.69	5.1	
ZINC	20.0	341.82	329.03	3.8	

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Matrix: SOIL

Percent Solids: 84.2

Client Field ID: X14SS0580001S

SDG Name: CTO423-5

Lab Sample ID: SC3171-001P

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	31.1138		0.1514		55.52	55.8	N	75	125	MS
ARSENIC, TOTAL	48.7805		1.6090		55.52	85.0		75	125	MS
COPPER, TOTAL	123.1448		88.5569		27.76	124.6		75	125	MS
LEAD, TOTAL	646.2606		605.8519		55.52	72.8		75	125	MS
TIN, TOTAL	56.7310		10.1294		55.52	83.9		75	125	MS
ZINC, TOTAL	69.9894		18.1544		55.52	93.4		75	125	MS

Comments:

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS0580001S

Matrix: SOIL **SDG Name:** CTO423-5

Percent Solids: 84.2 **Lab Sample ID:** SC3171-001S

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	33.4295		0.1514		57.68	57.7	N	75	125	MS
ARSENIC, TOTAL	52.1975		1.6090		57.68	87.7		75	125	MS
COPPER, TOTAL	111.6623		88.5569		28.84	80.1		75	125	MS
LEAD, TOTAL	682.3167		605.8519		57.68	132.6	k	75	125	MS
TIN, TOTAL	77.8522		10.1294		57.68	117.4		75	125	MS
ZINC, TOTAL	72.6728		18.1544		57.68	94.5		75	125	MS

Comments:

5B

POST DIGEST SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Matrix: SOIL

Percent Solids: 84.2

Client Field ID: X14SS0580001S

SDG Name: CTO423-5

Lab Sample ID: SC3171-001A

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	2.2640		0.3007		2	98.2		75	125	MS

Comments:

5D

SPIKE DUPLICATES

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS0580001

Matrix: SOIL **SDG Name:** CTO423-5

Percent Solids: 84.2 **Lab Sample ID:** SC3171-001

Concentration Units : mg/Kgdrywt

Analyte	Control Limits	Spike Result	C	Spike Dup. Result	C	RPD	Q	M	
ANTIMONY, TOTAL		33.4295		31.1138		7.2		MS	
ARSENIC, TOTAL		52.1975		48.7805		6.8		MS	
COPPER, TOTAL		111.6623		123.1448		9.8		MS	
LEAD, TOTAL		682.3167		646.2606		5.4		MS	
TIN, TOTAL		77.8522		56.7310		31.4	*, <	MS	<35 RPD
ZINC, TOTAL		72.6728		69.9894		3.8		MS	

Comments:

ICP SERIAL DILUTION

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS0580001L

Matrix: SOIL **SDG Name:** CTO423-5

Lab Sample ID: SC3171-001L

Concentration Units: ug/L

Analyte	Sample Result	C	Dilution Result	C	% Difference	Q	M
ANTIMONY, TOTAL	0.30		0.27	J	10.0		MS
ARSENIC, TOTAL	3.20		2.96	J	7.5		MS
COPPER, TOTAL	175.90		178.80		1.6		MS
LEAD, TOTAL	601.70		585.00		2.8		MS
TIN, TOTAL	20.12		19.97		0.7		MS
ZINC, TOTAL	36.06		37.47		3.9		MS

INSTRUMENT DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 3/6/2009

Concentration Units: ug/L

Analyte	CRDL	IDL	M
ALUMINUM	60	2.20	MS
ANTIMONY	0.20	0.03	MS
ARSENIC	1.0	0.08	MS
CALCIUM	20	3.90	MS
COPPER	1.0	0.04	MS
IRON	20	3.10	MS
LEAD	0.20	0.02	MS
MAGNESIUM	20	2.00	MS
MOLYBDENUM	1.0	0.07	MS
POTASSIUM	200	8.80	MS
SODIUM	200	6.50	MS
TIN	1.0	0.04	MS
ZINC	2.0	0.44	MS

METHOD DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 3/11/2009

Analyte	MDL	Units	M	EPA Prep./Anal. Method
ANTIMONY	0.01	mg/kg	MS	SW846 3050B / SW846 6020
ARSENIC	0.03	mg/kg	MS	SW846 3050B / SW846 6020
COPPER	0.02	mg/kg	MS	SW846 3050B / SW846 6020
LEAD	0.01	mg/kg	MS	SW846 3050B / SW846 6020
TIN	0.04	mg/kg	MS	SW846 3050B / SW846 6020
ZINC	0.07	mg/kg	MS	SW846 3050B / SW846 6020

ICP LINEAR RANGES

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 1/6/2009

Concentration Units: ug/L

Analyte	Integration Time (sec)	Linear Range	M
ALUMINUM	0.01	100000	MS
ANTIMONY	0.10	1000	MS
ARSENIC	0.30	1000	MS
CALCIUM	0.03	100000	MS
COPPER	0.10	500	MS
IRON	0.03	100000	MS
LEAD	0.10	1000	MS
MAGNESIUM	0.05	100000	MS
MOLYBDENUM	0.10	2000	MS
POTASSIUM	0.01	100000	MS
SODIUM	0.01	100000	MS
TIN	0.10	1000	MS
ZINC	0.10	250	MS

PREPARATION LOG

Lab Name: Katahdin Analytical Services | **QC Batch ID:** ZF18ICS1

Matrix: SOIL | **SDG Name:** CTO423-5

Method: P | **Prep Date:** 06/18/2009

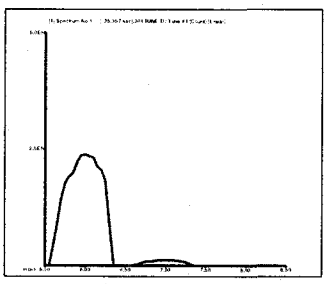
Client ID	Lab Sample ID	Initial (g)	Final (L)
LC2SZF18ICS1	LC2SZF18ICS1	0.5033	0.1
LCSSZF18ICS1	LCSSZF18ICS1	0.5026	0.1
PBSZF18ICS1	PBSZF18ICS1	1	0.1
X14SS0580001	SC3171-001	1.18	0.1
X14SS0580001P	SC3171-001P	1.07	0.1
X14SS0580001S	SC3171-001S	1.03	0.1
X14SS1170001	SC3171-002	1.2	0.1
X15SD0230006	SC3171-005	1.36	0.1
X15SD0030006	SC3171-006	1.05	0.1
X14SS0220001	SC3171-010	1.07	0.1
X14SS1260001	SC3171-011	1.36	0.1
X14SS0870001	SC3171-012	1.34	0.1
X15SD0180006	SC3171-013	1.1	0.1
X15SD0130006	SC3171-014	1.21	0.1
X15SD0050006	SC3171-015	1.1	0.1
X14SS1080001	SC3171-016	1.11	0.1
X14SS0630001	SC3171-017	1.04	0.1
X14SS0720001	SC3171-018	1.13	0.1
X16SS0030001	SC3171-019	1.16	0.1

6020 QC Tune Report

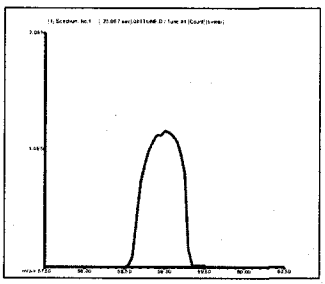
Data File: C:\ICPCHEM\1\DATA\JZF29A.B\001TUNE.D
Date Acquired: Jun 29 2009 04:52 pm
Acq. Method: TN6020.M
Operator: EAM
Sample Name: 6020 Tune
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN6020.M

RSD (%)

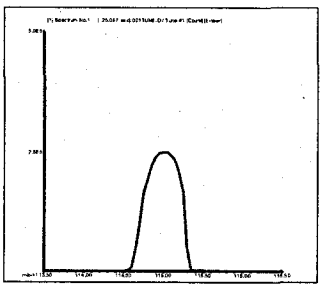
Element	Actual	Required	Flag
7 Li	0.68	5.00	
59 Co	1.67	5.00	
115 In	1.19	5.00	
205 Tl	0.71	5.00	



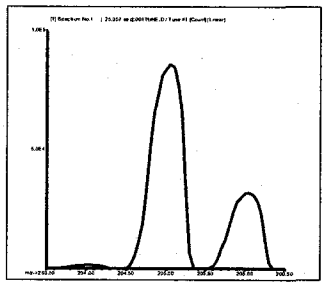
7 Li
Mass Calib.
Actual: 7.00
Required: 6.90 - 7.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



205 Tl
Mass Calib.
Actual: 205.05
Required: 204.90 - 205.10
Flag:
Peak Width
Actual: 0.60
Required: 0.90
Flag:

File:	068SMPL.D#	069SMPL.D#	070SMPL.D#	071SMPL.D#	072SMPL.D#
Sample:	SC3171-001	SC3171-001L	SC3171-002	SC3171-001A	SC3171-001S
Date/Time:	6/30/2009 2:22	6/30/2009 2:30	6/30/2009 2:39	6/30/2009 2:47	6/30/2009 2:56
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	25	5	5	10
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	4.2740	3.9000	1.2305	9.0400	47.5600
B / 11	55.9500	58.1250	10.0900	78.5500	499.9000
Na / 23	96.3000	-56.6500	95.1000	2366.5000	6965.0000
Mg / 25	8340.0000	7815.0000	2162.5000	8720.0000	13030.0000
Al / 27	68150.0000	68400.0000	42950.0000	68000.0000	87000.0000
Si / 29	3809.5000	3770.0000	3118.5000	4710.5000	5039.0000
K / 39	7895.0000	7895.0000	2764.0000	10210.0000	19570.0000
Ca / 44	1390.5000	1201.7500	385.9000	2248.5000	3763.0000
V / 51	173.4000	169.4250	110.6000	199.1500	643.8000
Cr / 52	133.6000	131.7000	52.7500	158.5000	315.8000
Mn / 55	1956.0000	2014.2500	149.6500	1958.5000	2799.0000
Fe / 57	86150.0000	89775.0000	45835.0000	86900.0000	79630.0000
Co / 59	38.5500	38.9250	21.3400	42.9350	506.7000
Ni / 60	99.1000	100.1250	108.1500	108.2000	558.4000
Cu / 65	879.5000	894.0000	1560.5000	906.5000	968.0000
Zn / 66	180.3000	187.3250	74.6000	271.4500	630.0000
As / 75	15.9800	14.7850	11.3750	63.0000	452.5000
Se / 82	2.0760	3.2200	1.6555	48.8400	444.9000
Sr / 88	36.8700	38.0000	19.1650	42.3200	534.1000
Mo / 98	3.8035	0.3015	2.3875	12.8800	269.6000
Ag / 107	0.4413	0.1824	0.2294	2.8595	46.4100
Cd / 114	0.1331	0.0736	-0.0605	2.4970	231.0000
Sn / 118	100.6000	99.8250	48.1100	111.3500	674.9000
Sb / 123	1.5035	1.3290	0.7180	11.3200	289.8000
Ba / 135	248.6000	249.6250	134.2000	258.6000	2242.0000
W / 182	1.1535	2.9725	0.8580	12.4850	1.2500
Tl / 203	0.6960	0.0795	0.4433	4.9165	444.4000
Pb / 208	5705.0000	5792.5000	6190.0000	5745.0000	5915.0000
Th / 232	24.6800	15.4975	17.9350	27.7900	25.3600
U / 238	5.7550	5.5650	2.6935	6.6950	102.7000
Li / 6	1224372	1256517	1252366	1252994	1242903
Sc / 45	1049428	1059602	1037129	1057265	1048647
Ge / 72	201552.1	205555.5	201611.4	201242	200758
Tb / 159	1443824	1465183	1434191	1427954	1425639
Bi / 209	789650.4	826389.9	793577.8	784346.6	795641.7
Li / 6	109.6	112.4	112.1	112.1	111.2
Sc / 45	109.6	110.7	108.3	110.4	109.5
Ge / 72	106.5	108.6	106.6	106.4	106.1
Tb / 159	102.7	104.2	102.0	101.6	101.4
Bi / 209	99.0	103.6	99.5	98.3	99.7

File:	073SMPL.D#	074SMPL.D#	075SMPL.D#	076_BLK.D#	077_CCV.D#
Sample:	SC3171-001P	LCSSZF18ICS1	LC2SZF18ICS1	BLANK	CCV
Date/Time:	6/30/2009 3:04	6/30/2009 3:13	6/30/2009 3:21	6/30/2009 3:30	6/30/2009 3:38
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	10	10	10	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	46.0500	728.4000	691.9000	0.0662	8.6790
B / 11	477.4000	537.7000	506.7000	0.8478	22.0400
Na / 23	6833.0000	2388.0000	2327.0000	-6.9130	4519.0000
Mg / 25	13050.0000	21000.0000	20550.0000	-0.2459	4534.0000
Al / 27	85380.0000	59290.0000	58520.0000	7.9400	461.7000
Si / 29	4566.0000	3469.0000	3436.0000	2.4600	453.0000
K / 39	18950.0000	19810.0000	19610.0000	1.4140	4563.0000
Ca / 44	3526.0000	44630.0000	42580.0000	11.0100	4635.0000
V / 51	633.1000	499.6000	489.8000	-0.0274	24.0800
Cr / 52	315.5000	622.7000	593.9000	0.0891	23.9300
Mn / 55	2597.0000	1855.0000	1894.0000	-0.2140	23.8300
Fe / 57	81030.0000	98840.0000	98520.0000	13.3900	4775.0000
Co / 59	500.2000	562.0000	537.7000	0.0721	9.6890
Ni / 60	567.0000	852.7000	810.3000	0.1192	24.1200
Cu / 65	1109.0000	329.5000	318.8000	0.1768	23.9600
Zn / 66	630.3000	1718.0000	1656.0000	0.9276	23.9500
As / 75	439.3000	1065.0000	1023.0000	0.1051	23.6600
Se / 82	428.8000	699.4000	675.5000	0.0436	23.1400
Sr / 88	523.1000	598.7000	565.5000	0.1003	23.7700
Mo / 98	264.9000	536.6000	512.1000	0.3770	23.5400
Ag / 107	45.5300	174.4000	162.7000	0.0079	9.6380
Cd / 114	225.4000	318.1000	309.2000	0.0338	9.4690
Sn / 118	510.9000	854.8000	813.8000	0.2567	23.9000
Sb / 123	280.2000	475.8000	452.4000	0.0494	23.8100
Ba / 135	2164.0000	2772.0000	2635.0000	0.3686	23.7900
W / 182	1.0320	2.7470	2.7530	0.0475	23.2800
Tl / 203	433.9000	816.8000	785.4000	0.7387	9.4620
Pb / 208	5820.0000	1073.0000	1027.0000	0.4406	23.5700
Th / 232	24.4100	41.2500	46.6000	0.0083	8.9580
U / 238	99.1100	9.2900	9.3020	0.0019	9.2820
Li / 6	1267518	1237104	1238383	1239363	1255411
Sc / 45	1064494	1083394	1048153	1003365	1042113
Ge / 72	204048.4	202404.5	199601.7	198547.1	202009
Tb / 159	1469835	1470841	1470078	1393405	1492379
Bi / 209	809204	818548.5	803553.3	803092.9	817271.6
Li / 6	113.4	110.7	110.8	110.9	112.3
Sc / 45	111.2	113.2	109.5	104.8	108.8
Ge / 72	107.9	107.0	105.5	104.9	106.8
Tb / 159	104.5	104.6	104.5	99.1	106.1
Bi / 209	101.4	102.6	100.7	100.7	102.5

File:	078_CCB.D#	079SMPL.D#	080SMPL.D#	081SMPL.D#	082SMPL.D#
Sample:	CCB	SC3171-005	SC3171-006	SC3171-010	SC3171-011
Date/Time:	6/30/2009 3:47	6/30/2009 3:55	6/30/2009 4:04	6/30/2009 4:12	6/30/2009 4:21
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	5	5	5	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0181	1.0985	2.8670	5.3200	3.2660
B / 11	0.4105	14.6500	127.4500	146.1000	9.9550
Na / 23	-6.4560	142.8500	373.2000	136.6000	39.5500
Mg / 25	1.0630	1923.5000	9235.0000	14310.0000	4139.0000
Al / 27	-1.1740	13595.0000	49640.0000	132400.0000	52350.0000
Si / 29	-0.6690	2645.5000	3486.5000	3581.0000	4394.5000
K / 39	0.4087	2458.0000	15050.0000	19095.0000	4118.0000
Ca / 44	-4.8440	1538.0000	2774.5000	2523.0000	868.5000
V / 51	-0.1830	54.8500	180.1500	336.0000	227.9000
Cr / 52	-0.1490	41.4950	194.9000	252.3000	75.3000
Mn / 55	-0.4929	276.2000	270.7500	984.0000	412.2000
Fe / 57	1.7580	24790.0000	88750.0000	176200.0000	98200.0000
Co / 59	0.0260	16.8400	11.3600	33.7700	33.8700
Ni / 60	0.0359	26.7300	24.0900	75.2500	121.8500
Cu / 65	0.0595	31.7300	25.8150	83.2500	491.4500
Zn / 66	0.0460	134.3000	101.7000	268.3500	140.9500
As / 75	-0.0338	5.3500	12.0850	37.7250	10.6700
Se / 82	0.0406	2.4385	1.1175	3.9565	5.8350
Sr / 88	0.0477	26.1800	35.4000	47.5400	49.8500
Mo / 98	0.0813	1.9810	2.9825	8.3400	1.5815
Ag / 107	-0.0033	0.7225	0.0905	0.2588	0.5490
Cd / 114	0.0151	0.3770	0.0367	0.1938	0.0596
Sn / 118	0.0934	8.9950	17.0050	15.8450	271.3500
Sb / 123	0.0400	0.6080	0.7835	1.1235	0.6485
Ba / 135	0.1210	144.0000	99.3500	433.1500	215.3000
W / 182	0.3175	1.2595	0.7680	0.8715	0.4485
Tl / 203	0.2283	0.7710	0.9030	1.3960	0.8125
Pb / 208	0.1627	81.3500	173.6500	86.4000	4394.0000
Th / 232	0.0063	12.6100	21.2050	38.9950	62.7000
U / 238	0.0066	2.6045	5.5250	7.4050	6.6750
Li / 6	1226222	1218802	1228282	1234754	1238581
Sc / 45	1004210	1032252	1037335	1113151	1096677
Ge / 72	196428.7	194513.6	199229.9	202957.5	200666.6
Tb / 159	1414987	1436474	1429374	1455733	1441648
Bi / 209	823162.1	794807.1	789833.1	788842.8	781030.2
Li / 6	109.7	109.1	109.9	110.5	110.8
Sc / 45	104.9	107.8	108.3	116.3	114.5
Ge / 72	103.8	102.8	105.3	107.3	106.1
Tb / 159	100.6	102.2	101.7	103.5	102.5
Bi / 209	103.2	99.6	99.0	98.9	97.9

File:	083SMPL.D#	084SMPL.D#	085SMPL.D#	086SMPL.D#	087SMPL.D#
Sample:	SC3171-012	SC3171-013	SC3171-014	SC3171-015	SC3171-016
Date/Time:	6/30/2009 4:30	6/30/2009 4:38	6/30/2009 4:47	6/30/2009 4:55	6/30/2009 5:04
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	5	5	5	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	5.5300	1.1775	1.0535	2.5110	7.6800
B / 11	29.1150	15.7000	16.5850	114.1500	24.6250
Na / 23	265.1500	114.3000	134.6000	443.6000	190.0000
Mg / 25	11375.0000	2255.5000	1796.5000	7120.0000	12095.0000
Al / 27	205450.0000	15380.0000	12430.0000	39625.0000	165550.0000
Si / 29	4119.5000	2723.5000	2765.5000	3146.5000	3627.0000
K / 39	12635.0000	2936.0000	2683.5000	13185.0000	13495.0000
Ca / 44	1088.0000	1779.5000	1518.5000	3218.5000	200.3500
V / 51	584.5000	59.8500	51.9500	135.4500	484.0000
Cr / 52	264.9500	42.3250	41.4950	171.7500	262.0500
Mn / 55	489.3500	466.6500	373.5500	268.6500	735.0000
Fe / 57	181250.0000	30545.0000	26215.0000	65850.0000	231350.0000
Co / 59	49.9500	17.8800	14.4500	9.0300	105.0000
Ni / 60	223.2500	26.1400	21.8550	18.2950	233.6000
Cu / 65	348.6000	28.2200	22.3500	25.0450	197.1500
Zn / 66	351.4000	130.1500	114.2500	73.1000	455.8500
As / 75	34.2100	5.5650	5.1050	10.8200	62.2500
Se / 82	3.1640	0.4791	0.9080	1.1360	6.6900
Sr / 88	64.5000	22.3050	19.1100	27.9550	44.4300
Mo / 98	6.4900	0.9445	0.6760	1.5000	7.6550
Ag / 107	0.2827	0.3726	0.3688	0.0418	0.0542
Cd / 114	0.3134	0.3209	0.2751	0.0063	0.3832
Sn / 118	18.2700	9.6100	8.4950	7.8400	14.1500
Sb / 123	1.3190	0.4304	0.4934	0.3764	1.2990
Ba / 135	515.5000	102.4000	86.1500	87.4000	488.7000
W / 182	0.6565	0.4881	0.5035	0.3169	0.4039
Tl / 203	2.2530	0.2615	0.1783	0.2937	1.8830
Pb / 208	1155.5000	57.4000	131.1500	68.2000	281.9500
Th / 232	58.9500	10.6950	9.5150	16.2250	53.3500
U / 238	9.8650	1.9205	2.0115	3.5300	10.5050
Li / 6	1271750	1177153	1194695	1199901	1219958
Sc / 45	1125875	1002657	1003460	1033427	1140135
Ge / 72	199627.6	191492.5	193073.1	196813.7	199970.9
Tb / 159	1429708	1383526	1409230	1436867	1425578
Bi / 209	775595.9	775757.5	790630.1	789885.4	763879.8
Li / 6	113.8	105.3	106.9	107.4	109.2
Sc / 45	117.6	104.7	104.8	107.9	119.1
Ge / 72	105.5	101.2	102.0	104.0	105.7
Tb / 159	101.7	98.4	100.2	102.2	101.4
Bi / 209	97.2	97.2	99.1	99.0	95.8

File:	088_BLK.D#	089_CCV.D#	090_CCB.D#	091SMPL.D#	092SMPL.D#
Sample:	BLANK	CCV	CCB	SC3171-017	SC3171-018
Date/Time:	6/30/2009 5:12	6/30/2009 5:21	6/30/2009 5:29	6/30/2009 5:38	6/30/2009 5:47
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	5	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	-0.0067	9.3570	-0.0042	3.8965	5.5950
B / 11	0.2872	23.1700	0.2856	58.3500	80.8000
Na / 23	-10.8500	4989.0000	-8.2510	91.1000	186.6500
Mg / 25	-0.8096	4925.0000	-0.4472	8755.0000	14105.0000
Al / 27	27.1300	501.8000	5.0210	74600.0000	131900.0000
Si / 29	2.4740	491.0000	-0.6474	3636.0000	3600.5000
K / 39	7.0350	4993.0000	5.4770	8720.0000	13310.0000
Ca / 44	-1.4300	5002.0000	-5.0200	1259.0000	2392.0000
V / 51	-0.1304	24.6300	-0.2061	193.4500	317.3000
Cr / 52	0.0349	24.5000	-0.1247	140.7500	228.4000
Mn / 55	-0.4362	24.5400	-0.5501	1261.0000	1324.0000
Fe / 57	37.6100	5026.0000	9.6950	94350.0000	158900.0000
Co / 59	0.0214	9.9860	0.0081	35.3750	54.3500
Ni / 60	0.0403	24.7500	0.0094	71.7500	157.3000
Cu / 65	0.0783	24.6900	0.0330	351.1500	781.5000
Zn / 66	0.1978	24.9000	0.0390	187.9500	317.5000
As / 75	0.0565	24.3000	-0.0159	17.8200	30.3100
Se / 82	0.0453	24.4900	0.0478	1.7845	4.1305
Sr / 88	0.0133	24.6200	0.0176	33.7350	52.8500
Mo / 98	-0.1761	24.3000	-0.0087	4.3090	7.1200
Ag / 107	-0.0125	9.9090	-0.0119	0.2451	0.2681
Cd / 114	-0.0020	9.7710	0.0063	0.1315	0.3293
Sn / 118	0.0930	24.6400	0.0400	26.1300	23.4200
Sb / 123	-0.0105	24.8800	0.0078	0.9895	1.2115
Ba / 135	0.0873	24.9900	0.0358	280.1500	510.5000
W / 182	0.0350	24.6200	0.3082	1.2000	1.0990
Tl / 203	-0.0157	9.2470	0.0726	0.8950	1.1875
Pb / 208	0.0928	24.2700	0.0440	1619.5000	2606.5000
Th / 232	0.0100	9.2920	0.0068	23.5750	48.0250
U / 238	-0.0010	9.5610	0.0022	5.2950	8.5100
Li / 6	1230580	1169403	1170270	1191841	1213127
Sc / 45	989050.2	934945.9	973428.5	1019290	1060323
Ge / 72	194490.7	189256.7	190671.1	194271.1	197116.6
Tb / 159	1384881	1375018	1383930	1394675	1397857
Bi / 209	792647.4	768719.5	798146.1	772492.9	768383.6
Li / 6	110.1	104.6	104.7	106.6	108.6
Sc / 45	103.3	97.6	101.7	106.5	110.7
Ge / 72	102.8	100.0	100.8	102.7	104.2
Tb / 159	98.5	97.8	98.4	99.2	99.4
Bi / 209	99.4	96.4	100.1	96.8	96.3

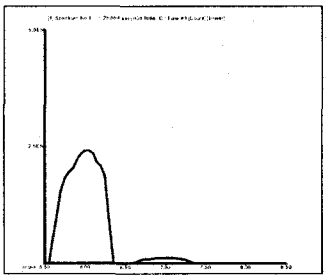
File:	093SMPL.D#	094_BLK.D#	095_CCV.D#	096_CCB.D#	097_BLK.D#
Sample:	SC3171-019	BLANK	CCV	CCB	Blank
Date/Time:	6/30/2009 5:55	6/30/2009 6:04	6/30/2009 6:12	6/30/2009 6:21	6/30/2009 6:29
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	4.7615	-0.0044	8.9990	-0.0042	-0.0041
B / 11	55.5000	0.3235	22.3400	0.2579	0.4111
Na / 23	510.5000	-11.1900	4681.0000	-8.9660	-7.3210
Mg / 25	167700.0000	21.2200	4666.0000	5.5230	2.5350
Al / 27	91800.0000	23.8900	474.1000	4.3870	5.9200
Si / 29	3368.0000	-1.9480	459.0000	-0.9642	1.7430
K / 39	9675.0000	-5.7220	4703.0000	-0.7875	-2.9820
Ca / 44	287800.0000	28.4200	4794.0000	5.5470	19.6800
V / 51	254.2500	-0.1333	24.6000	-0.1810	-0.1916
Cr / 52	167.6000	-0.1083	24.1600	-0.1849	-0.1105
Mn / 55	3678.0000	0.1005	24.2900	-0.4227	-0.3726
Fe / 57	212750.0000	38.4400	4844.0000	8.4390	3.9070
Co / 59	35.6950	0.0198	9.8120	0.0041	0.0055
Ni / 60	61.9000	0.0400	24.6700	0.0048	0.0796
Cu / 65	69.7000	0.1064	24.5400	0.0442	0.1675
Zn / 66	199.6500	0.1880	24.6400	-0.0081	0.6179
As / 75	40.9550	0.0018	23.8300	-0.0803	-0.1493
Se / 82	2.6620	0.0499	23.6500	0.0747	0.0368
Sr / 88	149.4000	0.0360	24.2600	0.0245	0.0356
Mo / 98	9.5800	-0.1713	24.0700	-0.0249	-0.1277
Ag / 107	0.0748	-0.0124	9.7050	-0.0095	-0.0084
Cd / 114	0.1650	-0.0020	9.7340	-0.0004	0.0002
Sn / 118	10.8250	0.0844	24.7100	0.0349	0.1571
Sb / 123	6.3100	-0.0079	24.7500	0.0121	0.0010
Ba / 135	292.5500	0.1035	24.9800	0.0509	0.0678
W / 182	1.7600	0.0753	24.0900	0.3470	0.1859
Tl / 203	1.0155	-0.0085	9.1660	0.0853	0.0039
Pb / 208	136.0500	0.2603	24.1000	0.0953	0.0815
Th / 232	35.7950	0.0079	9.0930	0.0064	0.0029
U / 238	7.9600	0.0010	9.3570	0.0029	-0.0011
Li / 6	1182331	1185070	1200476	1180426	1161475
Sc / 45	1046718	1020920	997738.6	984946.9	992677.5
Ge / 72	196146.4	198197.6	196254.5	194392.3	193521.8
Tb / 159	1406779	1456237	1418230	1419895	1406505
Bi / 209	747212.5	825851.9	791592.9	811945.3	804068.3
Li / 6	105.8	106.0	107.4	105.6	103.9
Sc / 45	109.3	106.6	104.2	102.9	103.7
Ge / 72	103.7	104.8	103.7	102.7	102.3
Tb / 159	100.0	103.6	100.9	101.0	100.0
Bi / 209	93.7	103.5	99.2	101.8	100.8

6020 QC Tune Report

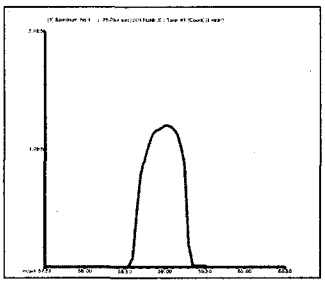
Data File: C:\ICPCHEM\1\DATA\JZF30A.B\001TUNE.D
Date Acquired: Jun 30 2009 04:34 pm
Acq. Method: TN6020.M
Operator: EAM
Sample Name: 6020 Tune
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN6020.M

RSD (%)

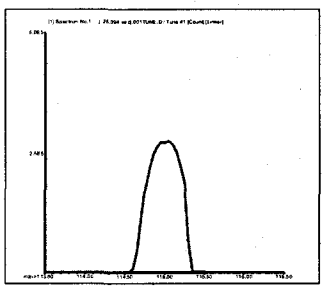
Element	Actual	Required	Flag
7 Li	1.21	5.00	
59 Co	2.20	5.00	
115 In	1.44	5.00	
205 Tl	0.57	5.00	



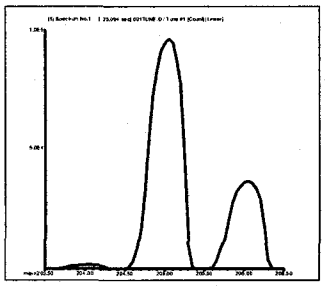
7 Li
Mass Calib.
Actual: 7.00
Required: 6.90 - 7.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



205 Tl
Mass Calib.
Actual: 205.05
Required: 204.90 - 205.10
Flag:
Peak Width
Actual: 0.60
Required: 0.90
Flag:

File:	038SMPL.D#	039SMPL.D#	040SMPL.D#	041SMPL.D#	042SMPL.D#
Sample:	PBSZF18ICS1	SC3171-001	SC3171-001L	SC3171-002	SC3171-005
Date/Time:	6/30/2009 21:48	6/30/2009 21:56	6/30/2009 22:05	6/30/2009 22:13	6/30/2009 22:22
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	10	50	10	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	-0.0163	4.4550	4.3300	1.2860	1.1530
B / 11	2.8915	60.1800	66.7500	12.3100	15.1500
Na / 23	40.7000	189.0000	230.5000	124.4000	213.0500
Mg / 25	41.8600	8584.0000	8330.0000	2283.0000	2235.0000
Al / 27	16.4750	75360.0000	72050.0000	44260.0000	15310.0000
Si / 29	47.0050	4264.0000	4068.0000	3193.0000	3018.5000
K / 39	46.6050	8800.0000	8730.0000	2853.0000	2817.0000
Ca / 44	43.3700	1565.0000	1501.5000	416.4000	1777.5000
V / 51	0.2073	177.1000	167.7000	111.5000	55.9000
Cr / 52	0.5440	136.8000	130.6500	53.6700	41.8850
Mn / 55	0.5225	2035.0000	1999.5000	151.6000	281.5500
Fe / 57	46.6750	92800.0000	90200.0000	48310.0000	25920.0000
Co / 59	-0.0191	39.7500	39.3700	22.1100	17.3850
Ni / 60	0.3036	102.8000	102.0500	110.3000	27.5350
Cu / 65	0.7350	929.2000	919.0000	1637.0000	33.5650
Zn / 66	0.9095	190.7000	197.1500	74.2300	137.3000
As / 75	0.6535	16.7100	23.2350	12.6300	6.0800
Se / 82	0.7460	3.0460	1.8765	3.0590	2.4540
Sr / 88	0.2864	39.0200	39.3150	19.8200	28.0350
Mo / 98	0.6760	5.3360	7.3900	3.2040	2.8325
Ag / 107	-0.0037	0.4981	0.2931	0.2985	0.6970
Cd / 114	0.0086	0.1065	0.0542	-0.0126	0.3639
Sn / 118	6.9150	105.5000	101.2000	48.4000	9.3550
Sb / 123	0.0045	1.4760	0.9935	0.5605	0.6005
Ba / 135	0.3526	258.1000	250.9500	134.6000	156.9500
W / 182	1.0700	1.8000	4.5440	1.2060	0.8395
Tl / 203	0.0081	0.6562	-0.3949	0.2473	0.0933
Pb / 208	0.0415	6017.0000	5850.0000	6386.0000	88.4000
Th / 232	0.0150	20.6400	14.2450	13.9000	13.4250
U / 238	-0.0041	5.9200	5.5200	2.6780	2.7895
Li / 6	1104903	1109800	1128564	1120641	1092298
Sc / 45	979561.4	976617.6	1028050	1022963	942884.4
Ge / 72	202713.8	205372.8	211127.2	206676.3	198762.5
Tb / 159	1605690	1584817	1641386	1645331	1558898
Bi / 209	948297.4	926690.1	974283.8	955186.3	915051.1
Li / 6	100.5	100.9	102.6	101.9	99.4
Sc / 45	103.3	103.0	108.4	107.9	99.4
Ge / 72	102.8	104.1	107.1	104.8	100.8
Tb / 159	104.3	103.0	106.6	106.9	101.3
Bi / 209	104.6	102.2	107.5	105.4	100.9

File:	043SMPL.D#	044SMPL.D#	045SMPL.D#	046SMPL.D#	047_BLK.D#
Sample:	SC3171-013	SC3171-014	SC3171-015	SC3171-019	BLANK
Date/Time:	6/30/2009 22:30	6/30/2009 22:39	6/30/2009 22:47	6/30/2009 22:56	6/30/2009 23:04
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	5	5	5	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	1.2580	1.2270	2.8665	5.3650	-0.0076
B / 11	16.4650	18.2250	126.4500	63.5000	0.4859
Na / 23	179.0000	213.0500	541.5000	629.0000	2.8660
Mg / 25	2380.5000	1963.0000	7810.0000	187200.0000	28.9100
Al / 27	16020.0000	13305.0000	43355.0000	101950.0000	26.0400
Si / 29	2818.0000	3007.5000	3447.5000	3769.5000	2.9780
K / 39	3044.5000	2910.5000	14235.0000	10475.0000	0.8243
Ca / 44	1870.5000	1692.5000	3488.5000	315000.0000	58.0200
V / 51	60.4000	54.3500	141.1000	264.6000	0.0044
Cr / 52	41.7450	42.6400	179.8000	175.7500	-0.0566
Mn / 55	464.6500	380.9000	277.9500	3816.0000	0.8827
Fe / 57	31025.0000	27525.0000	69050.0000	228450.0000	40.7400
Co / 59	17.6250	15.1100	9.4200	37.9900	0.0064
Ni / 60	26.4850	22.2500	19.6100	65.4000	0.0635
Cu / 65	28.2900	23.3900	24.7050	74.5000	0.4226
Zn / 66	133.9500	121.1000	78.4000	211.6000	0.5555
As / 75	6.1500	6.0900	12.7750	42.1000	0.0599
Se / 82	1.2605	1.4240	0.5610	4.1270	-0.0398
Sr / 88	22.7650	20.6100	29.7900	160.0500	0.0468
Mo / 98	1.6710	1.8605	2.9760	10.9900	0.0349
Ag / 107	0.3929	0.4014	0.0913	0.1237	-0.0046
Cd / 114	0.3267	0.2494	0.0308	0.1928	0.0003
Sn / 118	8.9550	8.4600	8.3150	11.5400	0.0703
Sb / 123	0.4512	0.6215	0.3911	6.7350	-0.0027
Ba / 135	103.1000	89.5500	94.1000	313.3500	0.0789
W / 182	0.5310	0.5055	0.4299	1.4910	0.0386
Tl / 203	0.0656	0.0019	0.0919	0.8830	-0.0306
Pb / 208	56.9000	137.0000	71.2000	142.0500	0.0588
Th / 232	9.4100	9.1550	16.5650	37.9300	0.0025
U / 238	1.9590	2.0755	3.7875	8.5500	-0.0022
Li / 6	1120800	1080717	1115581	1109354	1120309
Sc / 45	995915.7	965930.3	999444.9	1012485	987463.8
Ge / 72	203314.8	198650.5	202361.3	199966.5	207512
Tb / 159	1610198	1588969	1597632	1579419	1609521
Bi / 209	943678	921732.1	923979.4	876503.1	954435.2
Li / 6	101.9	98.3	101.5	100.9	101.9
Sc / 45	105.0	101.8	105.4	106.8	104.1
Ge / 72	103.1	100.7	102.6	101.4	105.2
Tb / 159	104.6	103.2	103.8	102.6	104.6
Bi / 209	104.1	101.7	101.9	96.7	105.3

Quality Control Report

Blank Sample Summary Report

Cation Exchange Capacity

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG65999	SW846 9081	01-JUL-09	29-JUN-09	U 0.54 meq/100g	.54 meq/100g
MBLANK	WG66319	SW846 9081	02-JUL-09	01-JUL-09	U 0.55 meq/100g	.55 meq/100g

Quality Control Report

Laboratory Control Sample Summary Report

Cation Exchange Capacity

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG65999-2	LCS	WG65999	01-JUL-09	29-JUN-09	meq/100g	250	260	104	80-120	
WG66319-2	LCS	WG66319	02-JUL-09	01-JUL-09	meq/100g	250	270	108	80-120	
WG65999-3	LCSD	WG65999	01-JUL-09	29-JUN-09	meq/100g	250	270	108	80-120	3.8

Quality Control Report

Duplicate Sample Summary Report

Cation Exchange Capacity

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG65999-4	SC3171-3	WG65999	01-JUL-09	meq/100g	13.	13.	0	20

Quality Control Report

Matrix Spike Sample Summary Report

Cation Exchange Capacity

Matrix Spike Sample ID	Sample Type	Original Sample ID	QC Batch	Analysis Date	Result Units	Spike Amount	Sample Result	MS Result	Recovery (%)	Recovery Limit
WG66319-4	MSD	SC3171-1	WG66319	02-JUL-09	meq/100g	250	13.	96.	136*	75 - 125
WG66319-3	MS	SC3171-1	WG66319	02-JUL-09	meq/100g	250	13.	92.	129*	75 - 125

Quality Control Report

Blank Sample Summary Report

TOC in Soil

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG65309	Lloyd Kahn	18-JUN-09	N/A	U 400 ug/gdrywt	400 ug/gdrywt

Total Solids

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG65129	ASTM D2216	17-JUN-09	16-JUN-09	U 1 %	1 %
MBLANK	WG65226	ASTM D2216	18-JUN-09	17-JUN-09	U 1 %	1 %
MBLANK	WG65235	ASTM D2216	18-JUN-09	17-JUN-09	U 1 %	1 %

Quality Control Report

Laboratory Control Sample Summary Report

TOC In Soil

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG65309-2	LCS	WG65309	18-JUN-09	N/A	ug/gdrywt	402088.773	430000	107	80-120	

Total Solids

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG65129-2	LCS	WG65129	17-JUN-09	16-JUN-09	%	90	90.	100	80-120	
WG65226-3	LCSD	WG65226	18-JUN-09	17-JUN-09	%	90	90.	100	80-120	0
WG65226-2	LCS	WG65226	18-JUN-09	17-JUN-09	%	90	90.	100	80-120	
WG65235-2	LCS	WG65235	18-JUN-09	17-JUN-09	%	90	90.	100	80-120	

pH(Soil)

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG65291-1	LCS	WG65291	16-JUN-09	16-JUN-09	pH	7	7.0	100	80-120	

Quality Control Report

Duplicate Sample Summary Report

Total Solids

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG65129-3	SC3171-1	WG65129	17-JUN-09	%	84.	84.	0	20
WG65235-3	SC3171-16	WG65235	18-JUN-09	%	81.	81.	0	20

pH(Soil)

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG65291-2	SC3171-1	WG65291	16-JUN-09	pH	4.6	4.5	0	20

Quality Control Report

Matrix Spike Sample Summary Report

TOC In Soil

Matrix Spike Sample ID	Sample Type	Original Sample ID	QC Batch	Analysis Date	Result Units	Spike Amount	Sample Result	MS Result	Recovery (%)	Recovery Limit
WG65309-4	MSD	SC3171-1	WG65309	18-JUN-09	ug/gdrywt	30614.71	10000	48000	122	75 - 125
WG65309-3	MS	SC3171-1	WG65309	18-JUN-09	ug/gdrywt	17796.71	10000	32000	122	75 - 125

Tetra Tech NUS

INTERNAL CORRESPONDENCE

TO: R. BASINSKI **DATE:** SEPTEMBER 14, 2009

FROM: ANN COGNETTI **COPIES:** DV FILE

SUBJECT: ORGANIC DATA VALIDATION – PAHs
NSF INDIAN HEAD
SAMPLE DELIVERY GROUP (SDG) – CTO423-6

SAMPLES: 4/Soil

FD06130902	FD06130903	X16SS0230001
X16SS0370001		

3/Aqueous

RB06170901	SB06160901	IDW06170901

Overview

The sample set for NSF Indian Head, SDG CTO423-6, consists of four (4) soil samples and three (3) aqueous samples. The field duplicate pairs in this SDG are (FD06130902/ X16SS02230001 and FD06130903/ X16SS0370001). RB06170901 is a rinsate blank. SB06160901 is a source blank. The samples were analyzed for Polycyclic Aromatic Hydrocarbons (PAHs). The samples were collected by Tetra Tech NUS on June 13, June 16 and June 17, 2009 and analyzed by Katahdin Analytical Services under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. PAH analyses were conducted using SW846 method 8270C.

Summary

All compounds were successfully analyzed. The findings offered in this report are based upon a general review of all available data. The data review was based on data completeness, holding times, GC/MS tuning, initial / continuing calibration data, laboratory method/preparation blanks, surrogate spike recoveries, laboratory control sample / laboratory control sample duplicate (LCS / LCSD) results, matrix spike / matrix spike duplicate recoveries, field duplicate results, etection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems – None.

Minor Problems-

- Field duplicate imprecision was noted for field duplicate pair FD06130902 and X16SS0230001. The relative percent difference was greater than the 50% quality control limit. Qualification of analytes in both samples was made if the concentration difference between samples was greater than two times the reporting limit. Positive detections in the samples were qualified (J) and nondetects (UJ), respectively. Analytes that were qualified include benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene and pyrene.

- The lab control sample, WG65295 had six %R outside the lower quality control limit. The low %Rs were for 2-methylnaphthalene, acenaphthene, fluorene, phenanthrene, anthracene and

fluoranthene. This noncompliance affects soils samples X16SS0370001, X16SS0230001 and FD06130902. Positive detections were qualified (L) and nondetects (UL).

- The lab control sample WG65398 had low %Rs for naphthalene, 2-methylnaphthalene, acenaphthene and fluorene. This noncompliance affects sample FD06130903. Nondetects were qualified (UL).

- The matrix spike sample/matrix spike duplicate %R for sample FD06130903 had low recoveries for several compounds. These compounds were naphthalene, 2-methylnaphthalene, acenaphthylene, acenaphthene, fluorene and phenanthrene. Nondetects in the sample FD06130903 were qualified (UL).

Notes

Positive results reported below the reporting limit (RL) but above the method detection limit (MDL) for the organic analyses were qualified as estimated, "J".

In the continuing calibration on June 23, 2009 for instrument GCMS-G @ 13:33 1-methylnaphthalene had a percent difference (%D) greater than the quality control limit. This calibration noncompliance affects aqueous samples RB06170901, SB06160901 and IDW06170901. No action was taken since there were no positive detections for 1-methylnaphthalene in these three samples.

In the continuing calibration for instrument GCMS-G on July 6, 2009 @ 9:49, 2-methylnaphthalene had a %D greater than 25%. This calibration noncompliance affects LCS WG65398 and method blank WG65398. No action was taken because quality control samples are not qualified.

Several samples had marginally low percent recoveries (%R) for the surrogate fluorene-d10. No action was taken on this single low %R.

The lab control sample WG65278 had a single high %R for 1-methylnaphthalene. This noncompliance affects the aqueous samples RB06170901, SB06160901 and IDW06170901. No action was taken on this undetected target analyte in these samples.

Field duplicate imprecision was noted in the field duplicate pair FD06130903 and X16SS0370001 for two analytes. The relative percent difference was greater than the 50% quality control limit. The difference in concentration between the two samples was less than two times the reporting limit. Therefore, data was not validated.

Executive Summary

Laboratory Performance: Samples were qualified as a result of laboratory control sample and matrix spike/matrix spike duplicate noncompliances.

Other Factors Affecting Data Quality: Field duplicate imprecision was noted for FD06130902 and X16SS0230001. This noncompliance resulted in qualification of data in these two samples.

The data for these analyses were reviewed with reference to Region III modifications to the "National Functional guidelines for Organic Data Review", September 1994, and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories "(January 2006).

The text of this report has been formulated to address only those problem areas affecting data quality.

Ann Cognetti

Tetra Tech NUS
Ann Cognetti
Chemist/Data Validator

Edward Sadlowski /for

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Appendix A

Qualified Analytical Results

Data Validation Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (e.g. base-line drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can be any number of issues; e.g. poor chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 00810	NSAMPLE	FD06130902			FD06130903			X16SS0230001			X16SS0370001		
SDG: CTO423-6	LAB_ID	SC3309-6			SC3309-9			SC3309-8			SC3309-7		
FRACTION: PAH	SAMP_DATE	6/13/2009			6/13/2009			6/13/2009			6/13/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	88.2			85.6			72.4			88.7		
	DUP_OF	X16SS0230001			X16SS0370001								
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE		23	U		23	U		28	U		22	U	
2-METHYLNAPHTHALENE		23	UL	E	23	UL	DE	28	UL	E	22	UL	E
ACENAPHTHENE		23	UL	E	23	UL	DE	28	UL	E	22	UL	E
ACENAPHTHYLENE		23	U		23	UL	D	28	U		22	U	
ANTHRACENE		23	UL	E	23	U		12	L	EP	22	UL	E
BENZO(A)ANTHRACENE		5.3	J	GP	23	U		210	J	G	22	U	
BENZO(A)PYRENE		7.6	J	GP	23	U		240	J	G	22	U	
BENZO(B)FLUORANTHENE		3.8	J	GP	23	U		89	J	G	22	U	
BENZO(G,H,I)PERYLENE		4.3	J	GP	23	U		130	J	G	22	U	
BENZO(K)FLUORANTHENE		23	U		23	U		13	J	P	22	U	
CHRYSENE		8.8	J	GP	3.3	J	P	240	J	G	22	U	
DIBENZO(A,H)ANTHRACENE		23	UJ	G	23	U		41	J	G	22	U	
FLUORANTHENE		2.5	L	EP	23	U		32	L	E	22	UL	E
FLUORENE		23	UL	E	23	UL	DE	28	UL	E	22	UL	E
INDENO(1,2,3-CD)PYRENE		2.5	J	P	2.7	J	P	36			22	U	
NAPHTHALENE		23	U		23	UL	DE	28	U		22	U	
PHENANTHRENE		23	UL	E	23	UL	D	40	L	E	22	UL	E
PYRENE		4.6	J	GP	23	U		160	J	G	22	U	

PROJ_NO: 00810	NSAMPLE	IDW06170901			RB06170901			SB06160901		
SDG: CTO423-6	LAB_ID	SC3309-3			SC3309-1			SC3309-2		
FRACTION: PAH	SAMP_DATE	6/17/2009			6/17/2009			6/16/2009		
MEDIA: WATER	QC_TYPE	NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0		
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE		0.21	U		0.22	U		0.2	U	
2-METHYLNAPHTHALENE		0.21	U		0.22	U		0.2	U	
ACENAPHTHENE		0.21	U		0.22	U		0.2	U	
ACENAPHTHYLENE		0.21	U		0.22	U		0.2	U	
ANTHRACENE		0.21	U		0.22	U		0.2	U	
BENZO(A)ANTHRACENE		0.21	U		0.22	U		0.2	U	
BENZO(A)PYRENE		0.21	U		0.22	U		0.2	U	
BENZO(B)FLUORANTHENE		0.21	U		0.22	U		0.2	U	
BENZO(G,H,I)PERYLENE		0.21	U		0.22	U		0.2	U	
BENZO(K)FLUORANTHENE		0.21	U		0.22	U		0.2	U	
CHRYSENE		0.21	U		0.22	U		0.2	U	
DIBENZO(A,H)ANTHRACENE		0.21	U		0.22	U		0.2	U	
FLUORANTHENE		0.21	U		0.22	U		0.2	U	
FLUORENE		0.21	U		0.22	U		0.2	U	
INDENO(1,2,3-CD)PYRENE		0.21	U		0.22	U		0.2	U	
NAPHTHALENE		0.21	U		0.22	U		0.2	U	
PHENANTHRENE		0.21	U		0.22	U		0.2	U	
PYRENE		0.21	U		0.22	U		0.2	U	

Appendix B

Results as Reported by the Laboratory

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/17/09
Received Date: 06/19/09
Extraction Date: 06/20/09
Analysis Date: 23-JUN-2009 19:55
Report Date: 07/13/2009
Matrix: WATER
% Solids: NA

Lab ID: SC3309-1
Client ID: RB06170901
SDG: CTO423-6
Extracted by: KF
Extraction Method: SW846 3510
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65278
Units: ug/L

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	0.22	1.0	0.20	0.22	0.073
91-20-3	Naphthalene	U	0.22	1.0	0.20	0.22	0.069
91-57-6	2-Methylnaphthalene	U	0.22	1.0	0.20	0.22	0.083
208-96-8	Acenaphthylene	U	0.22	1.0	0.20	0.22	0.058
83-32-9	Acenaphthene	U	0.22	1.0	0.20	0.22	0.069
86-73-7	Fluorene	U	0.22	1.0	0.20	0.22	0.066
85-01-8	Phenanthrene	U	0.22	1.0	0.20	0.22	0.055
120-12-7	Anthracene	U	0.22	1.0	0.20	0.22	0.047
206-44-0	Fluoranthene	U	0.22	1.0	0.20	0.22	0.078
129-00-0	Pyrene	U	0.22	1.0	0.20	0.22	0.063
56-55-3	Benzo(a)anthracene	U	0.22	1.0	0.20	0.22	0.049
218-01-9	Chrysene	U	0.22	1.0	0.20	0.22	0.039
205-99-2	Benzo(b)fluoranthene	U	0.22	1.0	0.20	0.22	0.096
207-08-9	Benzo(k)fluoranthene	U	0.22	1.0	0.20	0.22	0.053
50-32-8	Benzo(a)pyrene	U	0.22	1.0	0.20	0.22	0.071
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.22	1.0	0.20	0.22	0.056
53-70-3	Dibenzo(a,h)anthracene	U	0.22	1.0	0.20	0.22	0.075
191-24-2	Benzo(g,h,i)perylene	U	0.22	1.0	0.20	0.22	0.070
321-60-8	2-Methylnaphthalene-D10		72%				
118-79-6	Fluorene-D10		72%				
1718-51-0	Pyrene-D10		78%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/16/09
Received Date: 06/19/09
Extraction Date: 06/20/09
Analysis Date: 23-JUN-2009 20:39
Report Date: 07/13/2009
Matrix: WATER
% Solids: NA

Lab ID: SC3309-2
Client ID: SB06160901
SDG: CTO423-6
Extracted by: KF
Extraction Method: SW846 3510
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65278
Units: ug/L

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	0.20	1.0	0.20	0.20	0.068
91-20-3	Naphthalene	U	0.20	1.0	0.20	0.20	0.064
91-57-6	2-Methylnaphthalene	U	0.20	1.0	0.20	0.20	0.077
208-96-8	Acenaphthylene	U	0.20	1.0	0.20	0.20	0.054
83-32-9	Acenaphthene	U	0.20	1.0	0.20	0.20	0.064
86-73-7	Fluorene	U	0.20	1.0	0.20	0.20	0.061
85-01-8	Phenanthrene	U	0.20	1.0	0.20	0.20	0.051
120-12-7	Anthracene	U	0.20	1.0	0.20	0.20	0.044
206-44-0	Fluoranthene	U	0.20	1.0	0.20	0.20	0.073
129-00-0	Pyrene	U	0.20	1.0	0.20	0.20	0.059
56-55-3	Benzo(a)anthracene	U	0.20	1.0	0.20	0.20	0.046
218-01-9	Chrysene	U	0.20	1.0	0.20	0.20	0.036
205-99-2	Benzo(b)fluoranthene	U	0.20	1.0	0.20	0.20	0.089
207-08-9	Benzo(k)fluoranthene	U	0.20	1.0	0.20	0.20	0.049
50-32-8	Benzo(a)pyrene	U	0.20	1.0	0.20	0.20	0.066
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.20	1.0	0.20	0.20	0.052
53-70-3	Dibenzo(a,h)anthracene	U	0.20	1.0	0.20	0.20	0.070
191-24-2	Benzo(g,h,i)perylene	U	0.20	1.0	0.20	0.20	0.065
321-60-8	2-Methylnaphthalene-D10		65%				
118-79-6	Fluorene-D10		76%				
1718-51-0	Pyrene-D10		92%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/17/09
Received Date: 06/19/09
Extraction Date: 06/20/09
Analysis Date: 23-JUN-2009 21:23
Report Date: 07/13/2009
Matrix: WATER
% Solids: NA

Lab ID: SC3309-3
Client ID: IDW06170901
SDG: CTO423-6
Extracted by: KF
Extraction Method: SW846 3510
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65278
Units: ug/L

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	0.21	1.0	0.20	0.21	0.070
91-20-3	Naphthalene	U	0.21	1.0	0.20	0.21	0.066
91-57-6	2-Methylnaphthalene	U	0.21	1.0	0.20	0.21	0.079
208-96-8	Acenaphthylene	U	0.21	1.0	0.20	0.21	0.056
83-32-9	Acenaphthene	U	0.21	1.0	0.20	0.21	0.066
86-73-7	Fluorene	U	0.21	1.0	0.20	0.21	0.063
85-01-8	Phenanthrene	U	0.21	1.0	0.20	0.21	0.052
120-12-7	Anthracene	U	0.21	1.0	0.20	0.21	0.045
206-44-0	Fluoranthene	U	0.21	1.0	0.20	0.21	0.075
129-00-0	Pyrene	U	0.21	1.0	0.20	0.21	0.061
56-55-3	Benzo(a)anthracene	U	0.21	1.0	0.20	0.21	0.047
218-01-9	Chrysene	U	0.21	1.0	0.20	0.21	0.037
205-99-2	Benzo(b)fluoranthene	U	0.21	1.0	0.20	0.21	0.092
207-08-9	Benzo(k)fluoranthene	U	0.21	1.0	0.20	0.21	0.050
50-32-8	Benzo(a)pyrene	U	0.21	1.0	0.20	0.21	0.068
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.21	1.0	0.20	0.21	0.054
53-70-3	Dibenzo(a,h)anthracene	U	0.21	1.0	0.20	0.21	0.072
191-24-2	Benzo(g,h,i)perylene	U	0.21	1.0	0.20	0.21	0.067
321-60-8	2-Methylnaphthalene-D10		74%				
118-79-6	Fluorene-D10		78%				
1718-51-0	Pyrene-D10		42%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/19/09
Extraction Date: 06/22/09
Analysis Date: 10-JUL-2009 14:19
Report Date: 07/13/2009
Matrix: SOIL
% Solids: 88.7

Lab ID: SC3309-7
Client ID: X16SS0370001
SDG: CTO423-6
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65295
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	22	1.0	20	22	1.9
91-20-3	Naphthalene	U	22	1.0	20	22	2.9
91-57-6	2-Methylnaphthalene	U	22	1.0	20	22	2.5
208-96-8	Acenaphthylene	U	22	1.0	20	22	1.4
83-32-9	Acenaphthene	U	22	1.0	20	22	1.7
86-73-7	Fluorene	U	22	1.0	20	22	3.6
85-01-8	Phenanthrene	U	22	1.0	20	22	2.0
120-12-7	Anthracene	U	22	1.0	20	22	1.4
206-44-0	Fluoranthene	U	22	1.0	20	22	2.0
129-00-0	Pyrene	U	22	1.0	20	22	2.4
56-55-3	Benzo(a)anthracene	U	22	1.0	20	22	2.1
218-01-9	Chrysene	U	22	1.0	20	22	1.9
205-99-2	Benzo(b)fluoranthene	U	22	1.0	20	22	2.7
207-08-9	Benzo(k)fluoranthene	U	22	1.0	20	22	3.5
50-32-8	Benzo(a)pyrene	U	22	1.0	20	22	3.7
193-39-5	Indeno(1,2,3-cd)pyrene	U	22	1.0	20	22	2.1
53-70-3	Dibenzo(a,h)anthracene	U	22	1.0	20	22	2.0
191-24-2	Benzo(g,h,i)perylene	U	22	1.0	20	22	2.2
321-60-8	2-Methylnaphthalene-D10		46%				
118-79-6	Fluorene-D10		* 48%				
1718-51-0	Pyrene-D10		71%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/19/09
Extraction Date: 06/22/09
Analysis Date: 10-JUL-2009 13:37
Report Date: 07/13/2009
Matrix: SOIL
% Solids: 88.2

Lab ID: SC3309-6
Client ID: FD06130902
SDG: CTO423-6
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65295
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	23	1.0	20	23	1.9
91-20-3	Naphthalene	U	23	1.0	20	23	2.9
91-57-6	2-Methylnaphthalene	U	23	1.0	20	23	2.5
208-96-8	Acenaphthylene	U	23	1.0	20	23	1.4
83-32-9	Acenaphthene	U	23	1.0	20	23	1.7
86-73-7	Fluorene	U	23	1.0	20	23	3.6
85-01-8	Phenanthrene	U	23	1.0	20	23	2.0
120-12-7	Anthracene	U	23	1.0	20	23	1.4
206-44-0	Fluoranthene	J	2.5	1.0	20	23	2.0
129-00-0	Pyrene	J	4.6	1.0	20	23	2.4
56-55-3	Benzo(a)anthracene	J	5.3	1.0	20	23	2.2
218-01-9	Chrysene	J	8.8	1.0	20	23	1.9
205-99-2	Benzo(b)fluoranthene	J	3.8	1.0	20	23	2.7
207-08-9	Benzo(k)fluoranthene	U	23	1.0	20	23	3.5
50-32-8	Benzo(a)pyrene	J	7.6	1.0	20	23	3.7
193-39-5	Indeno(1,2,3-cd)pyrene	J	2.5	1.0	20	23	2.2
53-70-3	Dibenzo(a,h)anthracene	U	23	1.0	20	23	2.0
191-24-2	Benzo(g,h,i)perylene	J	4.3	1.0	20	23	2.3
321-60-8	2-Methylnaphthalene-D10		50%				
118-79-6	Fluorene-D10		* 49%				
1718-51-0	Pyrene-D10		66%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/19/09
Extraction Date: 06/22/09
Analysis Date: 10-JUL-2009 15:02
Report Date: 07/13/2009
Matrix: SOIL
% Solids: 72.4

Lab ID: SC3309-8
Client ID: X16SS0230001
SDG: CTO423-6
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65295
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	28	1.0	20	28	2.3
91-20-3	Naphthalene	U	28	1.0	20	28	3.6
91-57-6	2-Methylnaphthalene	U	28	1.0	20	28	3.0
208-96-8	Acenaphthylene	U	28	1.0	20	28	1.6
83-32-9	Acenaphthene	U	28	1.0	20	28	2.1
86-73-7	Fluorene	U	28	1.0	20	28	4.4
85-01-8	Phenanthrene		40	1.0	20	28	2.5
120-12-7	Anthracene	J	12	1.0	20	28	1.6
206-44-0	Fluoranthene		32	1.0	20	28	2.5
129-00-0	Pyrene		160	1.0	20	28	2.9
56-55-3	Benzo(a)anthracene		210	1.0	20	28	2.6
218-01-9	Chrysene		240	1.0	20	28	2.3
205-99-2	Benzo(b)fluoranthene		89	1.0	20	28	3.3
207-08-9	Benzo(k)fluoranthene	J	13	1.0	20	28	4.3
50-32-8	Benzo(a)pyrene		240	1.0	20	28	4.6
193-39-5	Indeno(1,2,3-cd)pyrene		36	1.0	20	28	2.6
53-70-3	Dibenzo(a,h)anthracene		41	1.0	20	28	2.5
191-24-2	Benzo(g,h,i)perylene		130	1.0	20	28	2.8
321-60-8	2-Methylnaphthalene-D10		50%				
118-79-6	Fluorene-D10		56%				
1718-51-0	Pyrene-D10		76%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/19/09
Extraction Date: 06/25/09
Analysis Date: 09-JUL-2009 16:32
Report Date: 07/13/2009
Matrix: SOIL
% Solids: 85.6

Lab ID: SC3309-9
Client ID: FD06130903
SDG: CTO423-6
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65398
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	23	1.0	20	23	2.0
91-20-3	Naphthalene	U	23	1.0	20	23	3.0
91-57-6	2-Methylnaphthalene	U	23	1.0	20	23	2.6
208-96-8	Acenaphthylene	U	23	1.0	20	23	1.4
83-32-9	Acenaphthene	U	23	1.0	20	23	1.8
86-73-7	Fluorene	U	23	1.0	20	23	3.7
85-01-8	Phenanthrene	U	23	1.0	20	23	2.1
120-12-7	Anthracene	U	23	1.0	20	23	1.4
206-44-0	Fluoranthene	U	23	1.0	20	23	2.1
129-00-0	Pyrene	U	23	1.0	20	23	2.4
56-55-3	Benzo(a)anthracene	U	23	1.0	20	23	2.2
218-01-9	Chrysene	J	3.3	1.0	20	23	2.0
205-99-2	Benzo(b)fluoranthene	U	23	1.0	20	23	2.8
207-08-9	Benzo(k)fluoranthene	U	23	1.0	20	23	3.6
50-32-8	Benzo(a)pyrene	U	23	1.0	20	23	3.8
193-39-5	Indeno(1,2,3-cd)pyrene	J	2.7	1.0	20	23	2.2
53-70-3	Dibenzo(a,h)anthracene	U	23	1.0	20	23	2.1
191-24-2	Benzo(g,h,i)perylene	U	23	1.0	20	23	2.3
321-60-8	2-Methylnaphthalene-D10		40%				
118-79-6	Fluorene-D10		53%				
1718-51-0	Pyrene-D10		63%				

Appendix C

Support Documentation

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CTO 423 NSF INDIAN HEAD
SDG: CTO423-6
SC3309, SC3349

Sample Receipt

The following samples were received on June 19 and 20, 2009 and were logged in under Katahdin Analytical Services work order numbers SC3309 and SC3349 for a hardcopy due date of July 08, 2009.

KATAHDIN Sample No.	TTNUS Sample Identification
SC3309-1	RB06170901
SC3309-2	SB06160901
SC3309-3	IDW06170901
SC3309-6	FD06130902
SC3309-7	X16SS0370001
SC3309-8	X16SS0230001
SC3309-9	FD06130903
SC3309-10	X16SS0130001
SC3309-11	X16SS0420001
SC3309-12	X17SS0010004
SC3309-13	X17SS0130001
SC3309-14	X17SS0280001
SC3309-15	X25SS0320001
SC3309-16	X25SS0190001
SC3309-17	X25SS0130001
SC3309-18	X25SS0060001
SC3309-19	X25SS0100001
SC3309-20	X25SS0130001
SC3349-1	X14SS1200001
SC3349-2	FD06170901

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in this narrative or in the Report of Analysis.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Andrea J. Colby**. This narrative is an integral part of the Report of Analysis.

Organics Analysis

The samples of SDG CTO423-6 were analyzed in accordance with "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846, 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA, and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA, and/or for the specific methods listed below or on the Report of Analysis. Some manual integrations may have been performed due to split peaks and/or corrected baselines. All have been flagged with an "M" (software-generated) on the pertinent quantitation reports.

8270C SIM Analysis

All soil samples and associated QC were subjected to the GPC sample clean-up process.

Sample SC3309-9 was used for the Matrix Spike (MS) and Matrix Spike Duplicate (MSD), as per client request.

The laboratory method blank WG65389-1RA, the LCS WG65295-2 and samples SC3309-6 and 7 had low recoveries for the surrogate Flourene-D10, which were outside the laboratory established acceptance limits. The surrogate acceptance limits were based on non-GPC soil extractions that were concentrated to a final volume of 1mL. Since acceptance limits based on a GPC cleanup would likely result in lower acceptance limits, the samples were not reextracted. Katahdin has begun using a new GPC unit for extract cleanup, which necessitates the generation of new statistical limits for surrogates and spiked analytes.

Samples SC3309-6, 8, and 9 were manually integrated for various target analytes indeno(1,2,3-cd)pyrene, benzo(k)fluoranthene, and/or dibenzo(a,h)anthracene. The specific reason for the manual integration is indicated on the raw data by the manual integration codes (M1-M11). These codes are further explained in the attachment following this narrative.

The reported percent recovery acceptance limits for the Laboratory Control Samples (LCSs) are statistically derived for the full list of spiked compounds and nominal limits for all additional compounds. The recoveries of the spiked analytes in the LCS, Matrix Spike (MS) and Matrix Spike Duplicate (MSD) are compared to these acceptance limits. Katahdin standard operating procedure is to take corrective action only if the number of spiked analytes in the LCS that are outside of the QC limits is greater than the DoD QSM allowable number of exceedances. If the associated MS/MSD has greater than the allowable number of exceedances, no corrective action is taken, as long the LCS is acceptable

The laboratory control sample WG65295-2 had low recoveries for six spiked target analytes that were outside of the laboratory established acceptance limits. The DoD QSM allowable number of exceedances for 18 target analytes is one analyte. Since the recoveries were within the DoD

QSM marginal exceedances allowances for method 8270 SCAN, the associated samples were not reextracted.

The laboratory control sample WG65398-2RA had low recoveries for four spiked target analytes that were outside of the laboratory established acceptance limits. The DoD QSM allowable number of exceedances for 18 target analytes is one analyte. Since the recoveries were within the DoD QSM marginal exceedances allowances for method 8270 SCAN, the associated samples were not reextracted.

There were no other protocol deviations or observations noted by the organics laboratory staff.

Metals Analysis

The samples of SDG CTO423-6 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846. 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA.

Inductively-Coupled Plasma Mass Spectrometric Analysis (ICP-MS)

Aqueous-matrix Katahdin Sample Numbers SC3309-(1-3) were digested for ICP-MS analysis on 06/26/09 (QC Batch ZF26ICW1) in accordance with USEPA Method 3010A.

Solid-matrix Katahdin Sample Numbers SC3309-(19, 20) and SC3349-(1, 2) were digested for ICP-MS analysis on 07/01/09 (QC Batch ZG01ICS0) in accordance with USEPA Method 3050B. Katahdin Sample Numbers SC3309-19 and SC3349-1 were prepared with duplicate matrix-spiked aliquots. Duplicate laboratory control samples were prepared in this batch. The measured tin concentration in the preparation blank in this batch exceeds the laboratory's acceptance limit. Laboratory testing has determined that this tin contamination comes from one of the reagents used in the digestion process.

ICP-MS analyses of SDG CTO423-6 sample digestates were performed using an Agilent 7500 ICP-MS spectrometer in accordance with USEPA Method 6020. Results for all standards and samples are reported using the mean of 3 replicate measurements. All samples were analyzed within holding times and all analytical run QC criteria were met, with the following exception:

The measured lead concentration of the CCB analyzed at 04:42 in ICP-MS analysis sequence JZG07A exceeds the laboratory's acceptance limit. All associated lead results accepted from this portion of the run were greater than ten times the CCB result and not affected by this high bias.

Internal standard recoveries for ICP-MS analyses can be found in the raw data section of the accompanying data package. The following table indicates which analytes are associated with each internal standard element.

Internal Standard Element	Associated Analytes
Lithium	Beryllium
Scandium	Sodium, Magnesium, Aluminum, Potassium, Calcium
Germanium	Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel, Copper, Zinc, Arsenic, Selenium, Silver, Cadmium
Terbium	Antimony, Barium, Tin
Bismuth	Thallium, Lead

Instrument tuning information can also be found in the raw data section in the report labeled "6020 QC Tune Report". The relative standard deviation was determined from 4 replicate measurements. The peak width was measured at 10% of the peak height.

Matrix QC Summary

The measured recoveries of antimony and lead in one or both of the matrix-spiked aliquots of Katahdin Sample Number SC3309-19 are outside the laboratory's acceptance criteria (75% - 125% recovery of the added element, if the native concentration is less than four times the amount added). The measure recoveries of antimony and lead in a post-digestion matrix spike of this sample are within the laboratory's acceptance criteria.

The measured recoveries of antimony both of the matrix-spiked aliquots of Katahdin Sample Number SC3349-1 are outside the laboratory's acceptance criteria (75% - 125% recovery of the added element, if the native concentration is less than four times the amount added). The measured recovery of antimony in a post-digestion matrix spike of this sample are within the laboratory's acceptance criteria.

The matrix spike duplicate analysis of Katahdin Sample Number SC3309-19 is outside the laboratory's acceptance limit (<20% relative difference between duplicate matrix-spiked aliquots) for lead and zinc.

The matrix spike duplicate analysis of Katahdin Sample Number SC3349-1 is outside the laboratory's acceptance limit (<20% relative difference between duplicate matrix-spiked aliquots) for lead.

The serial dilution analyses of Katahdin Sample Numbers SC3309-19 and SC3349-1 are within the laboratory's acceptance limit (<10% relative percent difference, if the concentration in the original sample is greater than 50 times the MDL) for all analytes.

Reporting of Metals Results

Analytical results for client samples, matrix QC samples (duplicates and matrix spikes), and batch QC samples (preparation blanks and laboratory control samples) have been reported down to the laboratory's method detection limits (MDLs). These MDLs have been adjusted for each sample based on the sample amounts used in preparation and analysis. Analytical results that are below the MDLs are flagged with "U" in the C-qualifier column.

Analytical results for instrument run QC samples (ICVs, ICBs, etc.) have been reported down to the laboratory's instrument detection limits (IDLs).

IDLs, MDLs, and PQLs are listed on Form 10 of the accompanying data package.

Wet Chemistry Analysis

The samples of SDG CTO423-6 were analyzed in accordance with the specific methods listed on the Report of Analysis.

Analyses for total solids were performed according to "Annual Book of ASTM Standards", Method D2216-98 "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass".

Analyses for total organic carbon in soil were performed according to "Determination of Total Organic Carbon in Sediment", Lloyd Kahn, USEPA Region II, 7/88.

Analyses for pH (soil) were performed according to "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846. 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA.

All analyses were performed within analytical holding times. All quality control criteria were met.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Operations Manager or the Quality Assurance Officer as verified by the following signature.

Leslie Dimond
07.14.09

Leslie Dimond
Quality Assurance Officer

Katahdin Analytical Services, Inc. — Sample Receipt Condition Report

Client: Indian Head - Tetra Tech	KAS PM: AJC	Sampled By: Client	
Project:	KIMS Entry By: DD	Delivered By: Fed-Ex	
KAS Work Order#: SC3309 / SC3310 / SC3311	KIMS Review By: NC	Received By: GN	
~~SDG~~ #: SC3312 / SC3313	Cooler: 1 of 3	Date/Time Rec.: 6-19-09 1000	

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 5.5
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea				✓	
Soil/Sediment:					
Received in airtight container?					
Received in methanol?					
Methanol covering soil?					
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol,	✓				
TPO4, N+N, TOC, DRO, TPH – pH <2 Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

Sample #SB06160901 = Lab received only 1 Amber for SVOA

FD06150903 canceled per Jim Goodt 6/24/09.
X17550190001 canceled per Jim Goodt 6/24/09.

Katahdin Analytical Services, Inc. — Sample Receipt Condition Report

Client: Tetra Tech Indian Head	KAS PM: AJC	Sampled By: Client
Project:	KIMS Entry By: DD	Delivered By: Fed-Ex
KAS Work Order#: SC3309 / SC3310 / SC3311	KIMS Review By:	Received By: GW
~~SDG~~#: SC3312 / SC3313	Cooler: 2 of 3	Date/Time Rec.: 6-19-09 10:00

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 4.9
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea				✓	
Soil/Sediment: Received in airtight container?					
Received in methanol?					
Methanol covering soil?					
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

Katahdin Analytical Services, Inc. — Sample Receipt Condition Report

Client: Tetra Tech Indian Head	KAS PM: AJC	Sampled By: Client
Project:	KIMS Entry By: DD	Delivered By: Fed-Ex
KAS Work Order#: SC3309 / SC3310 / SC3311	KIMS Review By: [illegible]	Received By: GN
~~SDG#~~: SC3312 / SC3313	Cooler: 3 of 3	Date/Time Rec.: 6-19-09 1000

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 6.0
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea				✓	
Soil/Sediment:					
Received in airtight container?					
Received in methanol?					
Methanol covering soil?					
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol,	✓				
TPO4, N+N, TOC, DRO, TPH – pH <2				✓	
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

Katahdin Analytical Services, Inc. **Sample Receipt Condition Report**

Client: Tetra Tech	KAS PM: AJC	Sampled By: client
Project: Indian Head	KIMS Entry By: DD	Delivered By: fedex Sat
KAS Work Order#: 5C3349	KIMS Review By: [illegible]	Received By: ACG
SDG #:	Cooler: _____ of _____	Date/Time Rec.: 6/20/09 1030

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1: Custody seals present / intact?	X				
2. Chain of Custody present in cooler?	X				
3. Chain of Custody signed by client?	X				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.		X			Temp (°C): 4.7°C
Samples received at <6 °C w/o freezing?	X				Note: Not required for metals analysis.
Ice packs or ice present?	X				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				X	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea				✓	
Soil/Sediment: Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol,				✓	
TPO4, N+N, TOC, DRO, TPH – pH <2				✓	
Sulfide - >9 Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

FD06150904 canceled per Tim Goerdt 6/24/09.

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 928252 | PAGE 1 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	412 921 8308	Katahdin Labs / Collop
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	412 443 0244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 863138879042		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): P G G G
PRESERVATIVE USED: 4 NO3 | 4°C | 4°C | 4°C
TYPE OF ANALYSIS: TAL Metals SW846 6020 300 | PAH SW846 8270 | PCB SW846 8082 | VOC SW846 8260A/5035

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS								COMMENTS
6/17	1400	[redacted]	QC	-	-	QC	G	3	1	2						Rinsate
6/16	1245	[redacted]	QC	-	-	QC	G	2	1	1						Source
6/17	1400	[redacted]	QC	-	-	QC	G	3	1	2						IDW
6/15	1140	X25550010001	001	0	1	SO	G	1			1					
	1300	" 0040001	004					1			1					
	1535	" 0080001	008					1			1					
	1405	" 0100001	010					3			3					MS/MSD
	1305	" 0130001	013					1			1					
	1155	" 0160001	016					1			1					
	1255	" 0180001	018					1			1					
	1255	" 0190001	019					1			1					
	1313	" 0200001	020					1			1					
V	1327	" 0210001	021	V	V	V	V	1			1					

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6/19/09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No. 028254 | PAGE 2 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bauinski	4129218308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goerdt	4129430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		FedEx/863138879042		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ]
[ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: TCL SVOCs / TAL Metals / SVOC 8270 6020/3050B

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS		COMMENTS
6/15	1345	X2555007 0001	007	0	1	SO	G	1	1	
	1325	" 022 0001	022					1	1	
	1310	" 023 0001	023					1	1	
	1250	" 024 0001	024					1	1	
	1230	" 025 0001	025					1	1	
	0000	FD06150901	QC					1	1	
	0000	FD06150902	QC					1	1	
6/16	950	X1455130 0001	130					1	1	
	950	" 131 0001	131					1	1	
	935	" 132 0001	132					1	1	
	1035	" 134 0001	134					1	1	
	1030	" 135 0001	135					1	1	
	1100	" 138 0001	138					1	1	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028255 | PAGE 3 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Businski	4129218308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		FedEx/863138879042		Scarborough, ME 04074

STANDARD TAT ☒ RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G

PRESERVATIVE USED: 4oC

TYPE OF ANALYSIS: Metals SW846 6020B/7500B

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS		COMMENTS
6/16	1005	X145S139-0001	139	0	1	SO	G	1	1	
↓	1010	" 140-0001	140	↓	↓	↓	↓	1	1	
↓	1015	" 141-0001	141	↓	↓	↓	↓	1	1	
6/10	1517	X15SD033-0006	033	0	.5	SD	G	1	1	
6/10	1355	X15SD030-0006	030	0	.5	SD	G	1	1	
6/17	910	X145S142-0001	142	0	1	SO	G	1	1	
6/17	905	X145B102-0203	102	2	3	↓	↓	1	1	
6/16	1125	X145B111-0102	111	1	2	↓	↓	1	1	
6/17	920	X145S143-0001	143	0	1	↓	↓	1	1	
6/16	1110	X145B084-0102	084	1	2	↓	↓	1	1	
6/16	0000	FD06160901	QC	—	—	↓	↓	1	1	
6/14	1500	X175B014-0102	014	1	2	↓	↓	1	1	
6/11	1525	X175S016-0001	016	0	1	↓	↓	1	1	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No. 028256 | PAGE 4 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bwinski	4129218308	Katahdin Labs / Anjna Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FedEx/863138879042		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS: Metals SW846 6020 / 6010B 4°C; SVOCs SW846 8270 4°C	COMMENTS
6/11	1500	X175501900001	019	0	1	SO	G	3	3			MS/MSD
6/11	1530	" 0220001	022					1	1			
6/11	1545	" 0240001	024					1	1			
6/12	1020	" 0250001	025					1	1			
6/14	1440	X175B0250102	025	1	2			1	1			
6/12	1040	X1755027000 1	027	0	1			1	1			
6/12	1050	X175502800001	028	0	1			1	1			
6/11	0000	FD0611090 1	QC					1	1			
6/13	1515	X165501800001	049					1	1			
6/14	900	" 0540001	054					1	1			
	855	" 0570001	057					1	1			
	930	" 0610001	061					1	1			
	1040	" 0730001	073					1	1			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 928257 | PAGE 5 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Badzinski	4129218308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		Fed Ex / 863138879042		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)									COMMENTS
PRESERVATIVE USED											4°C	4°C						
TYPE OF ANALYSIS									RSK TOC LEC	Metals SW6460/3020B								
6/13	1315	X1655013 0001	013	0	1	SO	G	1	1									
6/13	1515	X1655042 0001	042					1	1									
6/11	840	X1755001 0001	001					1	1									
6/14	1450	X1755013 0001	013					1	1									
6/12	1050	X1755028 0001	028					1	1									
6/17	1055	X1655079 0001	079					1	1	1								
6/16	1350	" 0870001	087					1		1								
6/17	1020	" 0900001	090					1		1								
	1530	" 0910001	091					1		1								
	1515	" 0920001	092					1		1								
	1500	" 0930001	093					1		1								
	1440	" 0940001	094					1		1								
↓	1440	"	095	↓	↓	↓	↓	1		1								

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028258 | PAGE 6 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	412921 8308	Katahdin Lab / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
J. Doerdt		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 863388790 42		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ]
[ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS: M-SVOC 8270 60204/3550B	PH	TOC	LEC	PAH	COMMENTS
									G	4°C						
6/13	1140	X165500800001	008	0	1	SO	G	1	1							
	1315	" 013 0001	013					1	1							
	1245	" 017 0001	017					1	1							
	1255	" 020 0001	020					1	1							
	1345	" 025 0001	025					3	3							MS/MSD
	1425	" 032 0001	032					1	1							
	0000	FD06130901	QC	0	1	SO	G	1	1							
6/15	1355	X255500320001	032					2		2						
	1255	" 019 0001	019					2		2						
	1305	" 013 0001	013					2		2						
	1335	" 006 0001	006					~~2~~ 4		2						
6/11	1500	X175501900001	019					~~6~~ 12		~~6~~ 12						MS/MSD ~~2~~ 4
6/15	0000	FD06150903	QC					2		2						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY: J. Doerdt	6-18-09	1700	1. RECEIVED BY	6/19/09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: X175501900001 - MS/MSD 6 jars (2.5oz)

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028259 | PAGE 7 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G008810	Indian Head	R. Bazinski	4129218308	Katahdin Labs / Andrea Cobb
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goerdt	4124473024	~~34~~ 60 Technology Way / ~~Dogwood Ln~~
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		Fed Ex / 863138879072		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)									COMMENTS
									G	G	G							
									PRESERVATIVE USED			4°C	4°C					
									TYPE OF ANALYSIS									
									Metals 6020A/3050B	8260B	PAH	TOC	VEC					
6/13	0000	[redacted]	QC	0	1	SO	G	2			2							
6/13	1450	[redacted]	037					2			2							~~MS/MSD~~
6/13	1325	[redacted]	023					2			2							
6/13	0000	[redacted]	QC	↓	↓			2			2							
6/14	1450	X175B0110102	011	1	2			1	1									
6/14	1450	" 0130102	013	1	2			1	1									
6/11	1314	X175S0140001	014	0	1			1	1									
6/11	1053	X175B0050004	005	0	4			3	3									MS/MSD
6/11	1110	X175B0050810	005	8	10			1	1									
6/11	1120	X175B0070004	007	0	4			1	1									
6/11	1120	X175B0060406	006	4	6			1	1									
6/15	1320	X2555033001	033	0	1			1	1									
6/11	840	X175B0010004	001	0	4			1	1									

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1500	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028260 | PAGE 8 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bodinski	4129218308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 863138879042		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G): G	PRESERVATIVE USED: 4°C	TYPE OF ANALYSIS: 8260 6060A/8350B	COMMENTS
6/11	917	X175B0020406	002	4	6	SO	G	1	1			
↓	951	" 0030608	003	6	8	↓	↓	1	1			
	1010	" 0040004	004	0	4			1	1			
↓	1013	" 0040608	004	6	8			1	1			
6/15	1208	X2555028 0001	028	0	1			3	3			MS/MSD
↓	1245	" 0300001	030	0	1			1	1			
	1305	" 0310001	031	0	1			1	1			
↓	1355	" 0320001	032	0	1	↓	↓	1	1			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER No 028261 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bwinski	4129218308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goeldt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		Fed Ex / 8631 3888 1969		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)								COMMENTS
									PRESERVATIVE USED								
									TYPE OF ANALYSIS								
6/4	1428	X1455120 0001	120	0	1	SO	G	3	3								MS/MSD
6/17	0000	FD061709 01	QC	0	1	SO	G	1	1								
~~6/3~~	~~1350~~	~~X1655028 0001~~	~~028~~	~~0~~	~~1~~	~~SO~~	~~G~~	~~2~~	~~2~~	~~2~~							~~MS/MSD~~
6/15	0000	FD061509 04	QC	0	1	SO	G	2	2	2							

1. RELINQUISHED BY	DATE 6-19-09	TIME 1000	1. RECEIVED BY	DATE 6/20/09	TIME 1030
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

HOLDTIME

SDG CTO423-6

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	FD06170901	SC3349-002	NM	6/17/2009	7/1/2009	7/9/2009	14.3	8.612	22.91
M	MG/KG	X25SS0130001	SC3309-020	NM	6/15/2009	7/1/2009	7/8/2009	15.54	7	22.54
M	MG/KG	X25SS0100001	SC3309-019	NM	6/15/2009	7/1/2009	7/8/2009	15.49	7	22.49
M	MG/KG	FD06170901	SC3349-002	NM	6/17/2009	7/1/2009	7/8/2009	14.15	7	21.15
M	MG/KG	X14SS1200001	SC3349-001	NM	6/4/2009	7/1/2009	7/8/2009	26.54	7	33.54
M	MG/KG	X25SS0130001	SC3309-020	NM	6/15/2009	7/1/2009	7/9/2009	15.75	8.603	24.35
M	MG/KG	X14SS1200001	SC3349-001	NM	6/4/2009	7/1/2009	7/9/2009	26.46	8	34.46
M	UG/L	IDW06170901	SC3309-003	NM	6/17/2009	6/26/2009	7/7/2009	8.752	11.47	20.22
M	UG/L	RB06170901	SC3309-001	NM	6/17/2009	6/26/2009	7/7/2009	8.751	11.46	20.21
M	UG/L	SB06160901	SC3309-002	NM	6/16/2009	6/26/2009	7/7/2009	9.803	11.47	21.27
PH	PH	X16SS0130001	SC3309-10	NM	6/13/2009	6/23/2009	6/23/2009	9.949	0.211	10.16
PH	PH	X16SS0420001	SC3309-11	NM	6/13/2009	6/23/2009	6/23/2009	9.866	0.214	10.08
PH	PH	X17SS0010004	SC3309-12	NM	6/11/2009	6/23/2009	6/23/2009	12.14	0.215	12.36
PH	PH	X17SS0130001	SC3309-13	NM	6/14/2009	6/23/2009	6/23/2009	8.885	0.215	9.1
PH	PH	X17SS0280001	SC3309-14	NM	6/12/2009	6/23/2009	6/23/2009	11.05	0.216	11.27

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
PH	PH	X25SS0060001	SC3309-18	NM	6/15/2009	6/23/2009	6/23/2009	7.940	0.219	8.159
PH	PH	X25SS0320001	SC3309-15	NM	6/15/2009	6/23/2009	6/23/2009	7.924	0.217	8.141
PH	PH	X25SS0190001	SC3309-16	NM	6/15/2009	6/23/2009	6/23/2009	7.967	0.217	8.184
PH	PH	X25SS0130001	SC3309-17	NM	6/15/2009	6/23/2009	6/23/2009	7.960	0.218	8.178
TOC	UG/GD	X25SS0320001	SC3309-15	NM	6/15/2009	6/24/2009	6/24/2009	8.883	0.144	9.027
TOC	UG/GD	X16SS0420001	SC3309-11	NM	6/13/2009	6/24/2009	6/24/2009	10.82	0.083	10.91
TOC	UG/GD	X17SS0010004	SC3309-12	NM	6/11/2009	6/24/2009	6/24/2009	13.1	0.092	13.19
TOC	UG/GD	X17SS0130001	SC3309-13	NM	6/14/2009	6/24/2009	6/24/2009	9.843	0.124	9.967
TOC	UG/GD	X17SS0280001	SC3309-14	NM	6/12/2009	6/24/2009	6/24/2009	12.01	0.136	12.15
TOC	UG/GD	X25SS0060001	SC3309-18	NM	6/15/2009	6/24/2009	6/24/2009	8.899	0.176	9.074
TOC	UG/GD	X16SS0130001	SC3309-10	NM	6/13/2009	6/24/2009	6/24/2009	10.91	0.075	10.98
TOC	UG/GD	X25SS0190001	SC3309-16	NM	6/15/2009	6/24/2009	6/24/2009	8.925	0.161	9.086
TOC	UG/GD	X25SS0130001	SC3309-17	NM	6/15/2009	6/24/2009	6/24/2009	8.919	0.170	9.089
TS	%	X25SS0100001	SC3309-19	NM	6/15/2009	6/23/2009	6/24/2009	7.791	1.014	8.805
TS	%	X25SS0190001	SC3309-16	NM	6/15/2009	6/23/2009	6/24/2009	7.838	1.016	8.853
TS	%	X25SS0060001	SC3309-18	NM	6/15/2009	6/23/2009	6/24/2009	7.811	1.015	8.826
TS	%	X17SS0010004	SC3309-12	NM	6/11/2009	6/23/2009	6/24/2009	11.97	1.04	13.01
TS	%	X16SS0420001	SC3309-11	NM	6/13/2009	6/23/2009	6/24/2009	9.699	1.040	10.74

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
TS	%	X16SS0370001	SC3309-7	NM	6/13/2009	6/23/2009	6/24/2009	9.721	1.036	10.76
TS	%	X16SS0230001	SC3309-8	NM	6/13/2009	6/23/2009	6/24/2009	9.781	1.035	10.82
TS	%	X16SS0130001	SC3309-10	NM	6/13/2009	6/23/2009	6/24/2009	9.782	1.041	10.82
TS	%	X14SS1200001	SC3349-1	NM	6/4/2009	6/25/2009	6/26/2009	20.73	1.020	21.75
TS	%	FD06170901	SC3349-2	NM	6/17/2009	7/1/2009	7/2/2009	14.39	1	15.39
TS	%	FD06130903	SC3309-9	NM	6/13/2009	6/23/2009	6/24/2009	10.34	1.035	11.38
TS	%	FD06130902	SC3309-6	NM	6/13/2009	6/23/2009	6/24/2009	10.34	1.037	11.38
TS	%	X25SS0130001	SC3309-20	NM	6/15/2009	6/23/2009	6/24/2009	7.833	1.013	8.847
TS	%	X17SS0280001	SC3309-14	NM	6/12/2009	6/23/2009	6/24/2009	10.89	1.038	11.92
TS	%	X25SS0130001	SC3309-17	NM	6/15/2009	6/23/2009	6/24/2009	7.831	1.015	8.847
TS	%	X25SS0320001	SC3309-15	NM	6/15/2009	6/23/2009	6/24/2009	7.758	1.037	8.795
TS	%	X17SS0130001	SC3309-13	NM	6/14/2009	6/23/2009	6/24/2009	8.718	1.039	9.757
SIM	%	FD06130902	SC3309-6	NM	6/13/2009	6/22/2009	7/10/2009	9.501	18.07	27.57
SIM	%	FD06130903	SC3309-9	NM	6/13/2009	6/25/2009	7/9/2009	12.63	14.06	26.69
SIM	%	IDW06170901	SC3309-3	NM	6/17/2009	6/20/2009	6/23/2009	3.044	3.264	6.308
SIM	%	RB06170901	SC3309-1	NM	6/17/2009	6/20/2009	6/23/2009	3.042	3.204	6.247
SIM	%	SB06160901	SC3309-2	NM	6/16/2009	6/20/2009	6/23/2009	4.095	3.234	7.329
SIM	%	X16SS0230001	SC3309-8	NM	6/13/2009	6/22/2009	7/10/2009	8.943	18.12	27.07

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
SIM	%	X16SS0370001	SC3309-7	NM	6/13/2009	6/22/2009	7/10/2009	8.883	18.1	26.98
SIM	UG/KG	X16SS0370001	SC3309-7	NM	6/13/2009	6/22/2009	7/10/2009	8.883	18.1	26.98
SIM	UG/KG	FD06130902	SC3309-6	NM	6/13/2009	6/22/2009	7/10/2009	9.501	18.07	27.57
SIM	UG/KG	FD06130903	SC3309-9	NM	6/13/2009	6/25/2009	7/9/2009	12.63	14.06	26.69
SIM	UG/KG	X16SS0230001	SC3309-8	NM	6/13/2009	6/22/2009	7/10/2009	8.943	18.12	27.07
SIM	UG/L	RB06170901	SC3309-1	NM	6/17/2009	6/20/2009	6/23/2009	3.042	3.204	6.247
SIM	UG/L	SB06160901	SC3309-2	NM	6/16/2009	6/20/2009	6/23/2009	4.095	3.234	7.329
SIM	UG/L	IDW06170901	SC3309-3	NM	6/17/2009	6/20/2009	6/23/2009	3.044	3.264	6.308

NSF INDIAN HEAD
SOIL DATA
CTO423-6

FRACTION	CHEMICAL	FD06130902	UNITS	X16S50230001	RPD	D
PAH	ANTHRACENE	ND	UG/KG	12 L	200.00	12.00
PAH	BENZO(A)ANTHRACENE	5.3 J	UG/KG	210 J	190.15	204.70
PAH	BENZO(A)PYRENE	7.6 J	UG/KG	240 J	187.72	232.40
PAH	BENZO(B)FLUORANTHENE	3.8 J	UG/KG	89 J	183.62	85.20
PAH	BENZO(G,H,I)PERYLENE	4.3 J	UG/KG	130 J	187.19	125.70
PAH	BENZO(K)FLUORANTHENE	ND	UG/KG	13 J	200.00	13.00
PAH	CHRYSENE	8.8 J	UG/KG	240 J	185.85	231.20
PAH	DIBENZO(A,H)ANTHRACENE	ND	UG/KG	41 J	200.00	41.00
PAH	FLUORANTHENE	2.5 L	UG/KG	32 L	171.01	29.50
PAH	INDENO(1,2,3-CD)PYRENE	2.5 J	UG/KG	36	174.03	33.50
PAH	PHENANTHRENE	ND	UG/KG	40 L	200.00	40.00
PAH	PYRENE	4.6 J	UG/KG	160 J	188.82	155.40

Current RPD Quality Control Limit: 55 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

NSF INDIAN HEAD
SOIL DATA
CTO423-6

FRACTION	CHEMICAL	FD06130903	UNITS	X16SS0370001	RPD	D
PAH	CHRYSENE	3.3 J	UG/KG	ND	200.00	3.30
PAH	INDENO(1,2,3-CD)PYRENE	2.7 J	UG/KG	ND	200.00	2.70

Current RPD Quality Control Limit: 55 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG65278-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID: G6126 Lab Sample ID: WG65278-1

Instrument ID: GCMS-G Date Extracted: 06/20/09

Matrix: (soil/water) WATER Date Analyzed: 06/23/09

Level:(low/med) LOW Time Analyzed: 1747

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	WG65278-LCS	WG65278-2	G6127	06/23/09	1829
02	WG65278-LCSD	WG65278-3	G6128	06/23/09	1912
03	RB06170901	SC3309-1	G6129	06/23/09	1955
04	SB06160901	SC3309-2	G6130	06/23/09	2039
05	IDW06170901	SC3309-3	G6131	06/23/09	2123
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COMMENTS:

Katahdin Analytical Services A0000022

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client:
Project: CTO 423 NSF Indian Head
PO No:
Sample Date:
Received Date:
Extraction Date: 06/20/09
Analysis Date: 23-JUN-2009 17:47
Report Date: 07/13/2009
Matrix: WATER
% Solids: NA

Lab ID: WG65278-1
Client ID: WG65278-Blank
SDG: CTO423-6
Extracted by: KF
Extraction Method: SW846 3510
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65278
Units: ug/L

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	0.20	1.0	0.20	0.20	0.068
91-20-3	Naphthalene	U	0.20	1.0	0.20	0.20	0.064
91-57-6	2-Methylnaphthalene	U	0.20	1.0	0.20	0.20	0.077
208-96-8	Acenaphthylene	U	0.20	1.0	0.20	0.20	0.054
83-32-9	Acenaphthene	U	0.20	1.0	0.20	0.20	0.064
86-73-7	Fluorene	U	0.20	1.0	0.20	0.20	0.061
85-01-8	Phenanthrene	U	0.20	1.0	0.20	0.20	0.051
120-12-7	Anthracene	U	0.20	1.0	0.20	0.20	0.044
206-44-0	Fluoranthene	U	0.20	1.0	0.20	0.20	0.073
129-00-0	Pyrene	U	0.20	1.0	0.20	0.20	0.059
56-55-3	Benzo(a)anthracene	U	0.20	1.0	0.20	0.20	0.046
218-01-9	Chrysene	U	0.20	1.0	0.20	0.20	0.036
205-99-2	Benzo(b)fluoranthene	U	0.20	1.0	0.20	0.20	0.089
207-08-9	Benzo(k)fluoranthene	U	0.20	1.0	0.20	0.20	0.049
50-32-8	Benzo(a)pyrene	U	0.20	1.0	0.20	0.20	0.066
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.20	1.0	0.20	0.20	0.052
53-70-3	Dibenzo(a,h)anthracene	U	0.20	1.0	0.20	0.20	0.070
191-24-2	Benzo(g,h,i)perylene	U	0.20	1.0	0.20	0.20	0.065
321-60-8	2-Methylnaphthalene-D10		71%				
118-79-6	Fluorene-D10		71%				
1718-51-0	Pyrene-D10		82%				

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID: GD420 DFTPP Injection Date: 06/09/09

Instrument ID: GCMS-G DFTPP Injection Time: 1142

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	33.6
68	Less than 2.0% of mass 69	0.1 (0.3)1
69	Less than 100.0% of mass 198	33.5
70	Less than 2.0% of mass 69	0.2 (0.6)1
127	40.0 - 60.0% of mass 198	50.3
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.7
275	10.0 - 30.0% of mass 198	24.7
365	1.0 - 100.0% of mass 198	3.5
441	0.0 - 100.0% of mass 443	13.5 (75.8)2
442	40.0 - 100.0% of mass 198	94.4
443	17.0 - 23.0% of mass 442	17.8 (18.9)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0609	G5992	06/09/09	1203
02		SSTD8.00G0609	G5993	06/09/09	1246
03		SSTD5.00G0609	G5994	06/09/09	1328
04		SSTD2.00G0609	G5995	06/09/09	1410
05		SSTD0.50G0609	G5997	06/09/09	1534
06		SSTD0.20G0609	G5998	06/09/09	1616
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FORM V SV

Katahdin Analytical Services A0000025

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID: GD430 DFTPP Injection Date: 06/23/09

Instrument ID: GCMS-G DFTPP Injection Time: 1314

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	33.5
68	Less than 2.0% of mass 69	0.2 (0.5)1
69	Less than 100.0% of mass 198	35.1
70	Less than 2.0% of mass 69	0.2 (0.6)1
127	40.0 - 60.0% of mass 198	49.4
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.7
275	10.0 - 30.0% of mass 198	24.0
365	1.0 - 100.0% of mass 198	3.4
441	0.0 - 100.0% of mass 443	12.3 (76.9)2
442	40.0 - 100.0% of mass 198	82.9
443	17.0 - 23.0% of mass 442	16.1 (19.4)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0623	G6120	06/23/09	1333
02	WG65278-BLANK	WG65278-1	G6126	06/23/09	1747
03	WG65278-LCS	WG65278-2	G6127	06/23/09	1829
04	WG65278-LCSD	WG65278-3	G6128	06/23/09	1912
05	RB06170901	SC3309-1	G6129	06/23/09	1955
06	SB06160901	SC3309-2	G6130	06/23/09	2039
07	IDW06170901	SC3309-3	G6131	06/23/09	2123
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FORM V SV

Katahdin Analytical Services A0000026

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG65295-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID: G6224 Lab Sample ID: WG65295-1

Instrument ID: GCMS-G Date Extracted: 06/22/09

Matrix: (soil/water) SOIL Date Analyzed: 07/01/09

Level:(low/med) LOW Time Analyzed: 1205

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	WG65295-LCS	WG65295-2	G6225	07/01/09	1247
02	FD06130902	SC3309-6	G6330	07/10/09	1337
03	X16SS0370001	SC3309-7	G6331	07/10/09	1419
04	X16SS0230001	SC3309-8	G6332	07/10/09	1502
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COMMENTS:

FORM IVSV

Katahdin Analytical Services A0000023

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client:
Project: CTO 423 NSF Indian Head
PO No:
Sample Date:
Received Date:
Extraction Date: 06/22/09
Analysis Date: 01-JUL-2009 12:05
Report Date: 07/13/2009
Matrix: SOIL
% Solids: 100

Lab ID: WG65295-1
Client ID: WG65295-Blank
SDG: CTO423-6
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65295
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	20	1.0	20	20	1.7
91-20-3	Naphthalene	U	20	1.0	20	20	2.6
91-57-6	2-Methylnaphthalene	U	20	1.0	20	20	2.2
208-96-8	Acenaphthylene	U	20	1.0	20	20	1.2
83-32-9	Acenaphthene	U	20	1.0	20	20	1.5
86-73-7	Fluorene	U	20	1.0	20	20	3.2
85-01-8	Phenanthrene	U	20	1.0	20	20	1.8
120-12-7	Anthracene	U	20	1.0	20	20	1.2
206-44-0	Fluoranthene	U	20	1.0	20	20	1.8
129-00-0	Pyrene	U	20	1.0	20	20	2.1
56-55-3	Benzo(a)anthracene	U	20	1.0	20	20	1.9
218-01-9	Chrysene	U	20	1.0	20	20	1.7
205-99-2	Benzo(b)fluoranthene	U	20	1.0	20	20	2.4
207-08-9	Benzo(k)fluoranthene	U	20	1.0	20	20	3.1
50-32-8	Benzo(a)pyrene	U	20	1.0	20	20	3.3
193-39-5	Indeno(1,2,3-cd)pyrene	U	20	1.0	20	20	1.9
53-70-3	Dibenzo(a,h)anthracene	U	20	1.0	20	20	1.8
191-24-2	Benzo(g,h,i)perylene	U	20	1.0	20	20	2.0
321-60-8	2-Methylnaphthalene-D10		66%				
118-79-6	Fluorene-D10		58%				
1718-51-0	Pyrene-D10		82%				

Katahdin Analytical Services A0000014

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID: GD435 DFTPP Injection Date: 06/30/09

Instrument ID: GCMS-G DFTPP Injection Time: 1321

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	46.3
68	Less than 2.0% of mass 69	0.6 (1.5)1
69	Less than 100.0% of mass 198	43.6
70	Less than 2.0% of mass 69	0.2 (0.4)1
127	40.0 - 60.0% of mass 198	55.0
197	Less than 1.0% of mass 198	0.1
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.5
275	10.0 - 30.0% of mass 198	21.3
365	1.0 - 100.0% of mass 198	2.8
441	0.0 - 100.0% of mass 443	9.3 (85.4)2
442	40.0 - 100.0% of mass 198	60.7
443	17.0 - 23.0% of mass 442	10.8 (17.9)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0630	G6206	06/30/09	1341
02		SSTD8.00G0630	G6207	06/30/09	1437
03		SSTD5.00G0630	G6208	06/30/09	1520
04		SSTD2.00G0630	G6209	06/30/09	1603
05		SSTD0.50G0630	G6211	06/30/09	1729
06		SSTD0.20G0630	G6212	06/30/09	1812
07					
08					
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FORM 5

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK

DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID: GD436 DFTPP Injection Date: 07/01/09

Instrument ID: GCMS-G DFTPP Injection Time: 1057

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	45.6
68	Less than 2.0% of mass 69	0.3 (0.7)1
69	Less than 100.0% of mass 198	42.5
70	Less than 2.0% of mass 69	0.2 (0.4)1
127	40.0 - 60.0% of mass 198	52.0
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.7
275	10.0 - 30.0% of mass 198	23.0
365	1.0 - 100.0% of mass 198	3.2
441	0.0 - 100.0% of mass 443	11.0 (83.7)2
442	40.0 - 100.0% of mass 198	70.8
443	17.0 - 23.0% of mass 442	13.1 (18.5)3

1-Value is % mass 69 2-Value is % mass 443

3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0701	G6223	07/01/09	1117
02	WG65295-BLANK	WG65295-1	G6224	07/01/09	1205
03	WG65295-LCS	WG65295-2	G6225	07/01/09	1247
04					
05					
06					
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FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID: GD442 DFTPP Injection Date: 07/10/09

Instrument ID: GCMS-G DFTPP Injection Time: 1135

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	49.8
68	Less than 2.0% of mass 69	0.8 (1.7)1
69	Less than 100.0% of mass 198	43.3
70	Less than 2.0% of mass 69	0.4 (0.9)1
127	40.0 - 60.0% of mass 198	55.1
197	Less than 1.0% of mass 198	0.2
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	7.8
275	10.0 - 30.0% of mass 198	22.2
365	1.0 - 100.0% of mass 198	2.9
441	0.0 - 100.0% of mass 443	10.5 (80.9)2
442	40.0 - 100.0% of mass 198	67.8
443	17.0 - 23.0% of mass 442	12.9 (19.1)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0710	G6329	07/10/09	1239
02	FD06130902	SC3309-6	G6330	07/10/09	1337
03	X16SS0370001	SC3309-7	G6331	07/10/09	1419
04	X16SS0230001	SC3309-8	G6332	07/10/09	1502
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06					
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FORM V SV

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG65398-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID: G6262 Lab Sample ID: WG65398-1RA

Instrument ID: GCMS-G Date Extracted: 06/25/09

Matrix: (soil/water) SOIL Date Analyzed: 07/06/09

Level:(low/med) LOW Time Analyzed: 1241

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	WG65398-LCS	WG65398-2RA	G6261	07/06/09	1159
02	FD06130903	SC3309-9	G6323	07/09/09	1632
03	FD06130903MS	WG65398-5	G6324	07/09/09	1714
04	FD06130903MSD	WG65398-6	G6325	07/09/09	1759
05					
06					
07					
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09					
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30					

COMMENTS:

Katahdin Analytical Services A0000024

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client:
Project: CTO 423 NSF Indian Head
PO No:
Sample Date:
Received Date:
Extraction Date: 06/25/09
Analysis Date: 06-JUL-2009 12:41
Report Date: 07/13/2009
Matrix: SOIL
% Solids: 100

Lab ID: WG65398-1RA
Client ID: WG65398-Blank
SDG: CTO423-6
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65398
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	20	1.0	20	20	1.7
91-20-3	Naphthalene	U	20	1.0	20	20	2.6
91-57-6	2-Methylnaphthalene	U	20	1.0	20	20	2.2
208-96-8	Acenaphthylene	U	20	1.0	20	20	1.2
83-32-9	Acenaphthene	U	20	1.0	20	20	1.5
86-73-7	Fluorene	U	20	1.0	20	20	3.2
85-01-8	Phenanthrene	U	20	1.0	20	20	1.8
120-12-7	Anthracene	U	20	1.0	20	20	1.2
206-44-0	Fluoranthene	U	20	1.0	20	20	1.8
129-00-0	Pyrene	U	20	1.0	20	20	2.1
56-55-3	Benzo(a)anthracene	U	20	1.0	20	20	1.9
218-01-9	Chrysene	U	20	1.0	20	20	1.7
205-99-2	Benzo(b)fluoranthene	U	20	1.0	20	20	2.4
207-08-9	Benzo(k)fluoranthene	U	20	1.0	20	20	3.1
50-32-8	Benzo(a)pyrene	U	20	1.0	20	20	3.3
193-39-5	Indeno(1,2,3-cd)pyrene	U	20	1.0	20	20	1.9
53-70-3	Dibenzo(a,h)anthracene	U	20	1.0	20	20	1.8
191-24-2	Benzo(g,h,i)perylene	U	20	1.0	20	20	2.0
321-60-8	2-Methylnaphthalene-D10		41%				
118-79-6	Fluorene-D10		* 43%				
1718-51-0	Pyrene-D10		67%				

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID: GD438 DFTPP Injection Date: 07/06/09

Instrument ID: GCMS-G DFTPP Injection Time: 0930

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	42.6
68	Less than 2.0% of mass 69	0.6 (1.5)1
69	Less than 100.0% of mass 198	41.5
70	Less than 2.0% of mass 69	0.2 (0.6)1
127	40.0 - 60.0% of mass 198	51.7
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.7
275	10.0 - 30.0% of mass 198	22.8
365	1.0 - 100.0% of mass 198	2.9
441	0.0 - 100.0% of mass 443	10.8 (86.5)2
442	40.0 - 100.0% of mass 198	70.4
443	17.0 - 23.0% of mass 442	12.5 (17.7)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0706	G6258	07/06/09	0949
02	WG65398-LCS	WG65398-2RA	G6261	07/06/09	1159
03	WG65398-BLANK	WG65398-1RA	G6262	07/06/09	1241
04					
05					
06					
07					
08					
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FORM V SV

Katahdin Analytical Services A0000029

FORM 5

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK

DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID: GD441 DFTPP Injection Date: 07/09/09

Instrument ID: GCMS-G DFTPP Injection Time: 1103

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	47.9
68	Less than 2.0% of mass 69	0.2 (0.5)1
69	Less than 100.0% of mass 198	41.5
70	Less than 2.0% of mass 69	0.1 (0.3)1
127	40.0 - 60.0% of mass 198	52.8
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.5
275	10.0 - 30.0% of mass 198	22.0
365	1.0 - 100.0% of mass 198	2.9
441	0.0 - 100.0% of mass 443	9.9 (78.0)2
442	40.0 - 100.0% of mass 198	67.0
443	17.0 - 23.0% of mass 442	12.6 (18.9)3

1-Value is % mass 69 2-Value is % mass 443

3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0709	G6316	07/09/09	1123
02	FD06130903	SC3309-9	G6323	07/09/09	1632
03	FD06130903MS	WG65398-5	G6324	07/09/09	1714
04	FD06130903MSD	WG65398-6	G6325	07/09/09	1759
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

FORM 2
SOIL SEMIVOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Level:(low/med) LOW

	CLIENT SAMPLE ID	LAB SAMPLE ID	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	WG65295-BLANK	WG65295-1	66	58	82						0
02	WG65295-LCS	WG65295-2	49	52*	69						1
03	WG65398-LCS	WG65398-2RA	40	56	64						0
04	WG65398-BLANK	WG65398-1RA	41	43*	67						1
05	FD06130903	SC3309-9	40	53	63						0
06	FD06130903MS	WG65398-5	50	56	67						0
07	FD06130903MSD	WG65398-6	45	53	73						0
08	FD06130902	SC3309-6	50	49*	66						1
09	X16SS0370001	SC3309-7	46	48*	71						1
10	X16SS0230001	SC3309-8	50	56	76						0
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											

		QC LIMITS
S1	= 2-Methylnaphthalene-D1	(33-125)
S2	= Fluorene-D10	(53-136)
S3	= Pyrene-D10	(16-162)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

FORM 2

WATER SEMIVOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

	CLIENT SAMPLE ID	LAB SAMPLE ID	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	WG65278-BLANK	WG65278-1	71	71	82						0
02	WG65278-LCS	WG65278-2	65	76	72						0
03	WG65278-LCSD	WG65278-3	57	70	70						0
04	RB06170901	SC3309-1	72	72	78						0
05	SB06160901	SC3309-2	65	76	92						0
06	IDW06170901	SC3309-3	74	78	42						0
07											
08											
09											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											

		QC LIMITS
S1	= 2-Methylnaphthalene-D1	(34-110)
S2	= Fluorene-D10	(46-122)
S3	= Pyrene-D10	(36-134)

\# Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogate diluted out

Katahdin Analytical Services A0000017

KATAHDIN ANALYTICAL SERVICES
LAB CONTROL SAMPLE

Client:
Project: CTO 423 NSF Indian Head
PO No:
Sample Date:
Received Date:
Extraction Date: 06/20/09
Analysis Date: 06/23/09
Report Date: 07/13/2009
Matrix: WATER

Lab ID: WG65278-2 & WG65278-3
Client ID: WG65278-LCS & WG65278-LCSD
SDG: CTO423-6
Extracted by: KF
Extraction Method: SW846 3510
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65278
Units: ug/L

COMPOUND	LCS SPIKE	LCSD SPIKE	SAMPLE CONC.	LCS CONC.	LCSD CONC.	LCS %REC.	LCSD %REC.	%RPD	%RPD LIMIT	QC. LIMITS
1-Methylnaphthalene	2.0	2.0	NA	1.8	1.8	* 90	* 90	0.6	30	53- 78
Naphthalene	2.0	2.0	NA	1.4	1.4	71	69	3	30	42- 91
2-Methylnaphthalene	2.0	2.0	NA	1.6	1.6	79	78	2	30	51-125
Acenaphthylene	2.0	2.0	NA	1.4	1.3	69	65	6	30	43- 99
Acenaphthene	2.0	2.0	NA	1.4	1.3	71	67	6	30	44- 93
Fluorene	2.0	2.0	NA	1.5	1.4	76	72	5	30	49-100
Phenanthrene	2.0	2.0	NA	1.6	1.5	80	75	6	30	57-119
Anthracene	2.0	2.0	NA	1.6	1.5	80	74	8	30	50-113
Fluoranthene	2.0	2.0	NA	2.0	1.8	99	91	8	30	60-122
Pyrene	2.0	2.0	NA	1.5	1.4	73	71	3	30	61-121
Benzo(a)anthracene	2.0	2.0	NA	1.5	1.4	77	72	6	30	48-120
Chrysene	2.0	2.0	NA	1.6	1.6	81	80	1	30	53-147
Benzo(b)fluoranthene	2.0	2.0	NA	1.3	1.6	66	81	20	30	49-104
Benzo(k)fluoranthene	2.0	2.0	NA	1.8	1.4	88	72	19	30	57-145
Benzo(a)pyrene	2.0	2.0	NA	1.6	1.5	82	76	8	30	63-113
Indeno(1,2,3-cd)pyrene	2.0	2.0	NA	1.8	1.6	88	80	10	30	30-140
Dibenzo(a,h)anthracene	2.0	2.0	NA	1.8	1.6	90	81	10	30	30-136
Benzo(g,h,i)perylene	2.0	2.0	NA	1.8	1.7	92	86	7	30	48-126

FORM III SV-1

G6127.D & G6128.D

KATAHDIN ANALYTICAL SERVICES
LAB CONTROL SAMPLE

Client:
Project: CTO 423 NSF Indian Head
PO No:
Sample Date:
Received Date:
Extraction Date: 06/22/09
Analysis Date: 07/01/09
Report Date: 07/13/2009
Matrix: SOIL

Lab ID: WG65295-2
Client ID: WG65295-LCS
SDG: CTO423-6
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65295
Units: ug/Kgdrywt

COMPOUND	LCS SPIKE	SAMPLE CONC.	LCS CONC.		%REC.	QC. LIMITS
1-Methylnaphthalene	67	NA	41		61	36-114
Naphthalene	67	NA	38		57	54- 94
2-Methylnaphthalene	67	NA	44	*	66	75-132
Acenaphthylene	67	NA	36		53	51-103
Acenaphthene	67	NA	33	*	50	56- 97
Fluorene	67	NA	34	*	52	61-103
Phenanthrene	67	NA	35	*	52	58-122
Anthracene	67	NA	35	*	52	55-113
Fluoranthene	67	NA	37	*	55	68-126
Pyrene	67	NA	49		74	33-133
Benzo(a)anthracene	67	NA	48		73	50-138
Chrysene	67	NA	43		65	44-132
Benzo(b)fluoranthene	67	NA	48		72	44-119
Benzo(k)fluoranthene	67	NA	39		58	40-120
Benzo(a)pyrene	67	NA	43		64	52-113
Indeno(1,2,3-cd)pyrene	67	NA	48		71	32-134
Dibenzo(a,h)anthracene	67	NA	46		68	30-134
Benzo(g,h,i)perylene	67	NA	42		62	43-121

Katahdin Analytical Services A0000019

KATAHDIN ANALYTICAL SERVICES
LAB CONTROL SAMPLE

Client:
Project: CTO 423 NSF Indian Head
PO No:
Sample Date:
Received Date:
Extraction Date: 06/25/09
Analysis Date: 07/06/09
Report Date: 07/14/2009
Matrix: SOIL

Lab ID: WG65398-2RA
Client ID: WG65398-LCS
SDG: CTO423-6
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65398
Units: ug/Kgdrywt

COMPOUND	LCS SPIKE	SAMPLE CONC.	LCS CONC.	%REC.	QC. LIMITS
1-Methylnaphthalene	67	NA	34	51	36-114
Naphthalene	67	NA	33	* 50	54- 94
2-Methylnaphthalene	67	NA	40	* 60	75-132
Acenaphthylene	67	NA	40	60	51-103
Acenaphthene	67	NA	37	* 55	56- 97
Fluorene	67	NA	40	* 60	61-103
Phenanthrene	67	NA	39	58	58-122
Anthracene	67	NA	49	74	55-113
Fluoranthene	67	NA	54	81	68-126
Pyrene	67	NA	38	57	33-133
Benzo(a)anthracene	67	NA	44	66	50-138
Chrysene	67	NA	48	72	44-132
Benzo(b)fluoranthene	67	NA	50	74	44-119
Benzo(k)fluoranthene	67	NA	37	56	40-120
Benzo(a)pyrene	67	NA	43	64	52-113
Indeno(1,2,3-cd)pyrene	67	NA	58	86	32-134
Dibenzo(a,h)anthracene	67	NA	57	86	30-134
Benzo(g,h,i)perylene	67	NA	46	68	43-121

Katahdin Analytical Services A0000020

KATAHDIN ANALYTICAL SERVICES
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/19/09
Extraction Date: 06/25/09
Analysis Date: 07/09/09
Report Date: 07/13/2009
Matrix: SOIL

Lab ID: WG65398-5 & WG65398-6
Client ID: FD06130903MS & FD06130903MSD
SDG: CTO423-6
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65398
Units: ug/Kgdrywt

COMPOUND	MS SPIKE	MSD SPIKE	SAMPLE CONC.	MS CONC.	MSD CONC.	MS %REC.	MSD %REC.	%RPD	%RPD LIMIT	QC. LIMITS
1-Methylnaphthalene	156	156	0.00	89	78	57	50	14	50	36-114
Naphthalene	156	156	0.00	70	64	* 45	* 41	8	50	54- 94
2-Methylnaphthalene	156	156	0.00	91	84	* 58	* 54	9	50	75-132
Acenaphthylene	156	156	0.00	79	70	51	* 45	12	50	51-103
Acenaphthene	156	156	0.00	75	68	* 48	* 43	10	50	56- 97
Fluorene	156	156	0.00	89	80	* 57	* 52	11	50	61-103
Phenanthrene	156	156	0.00	95	88	61	* 56	8	50	58-122
Anthracene	156	156	0.00	132	121	85	78	9	50	55-113
Fluoranthene	156	156	0.00	138	125	89	80	10	50	68-126
Pyrene	156	156	0.00	84	82	54	52	2	50	33-133
Benzo(a)anthracene	156	156	0.00	113	111	72	71	2	50	50-138
Chrysene	156	156	3.3	107	102	66	63	5	50	44-132
Benzo(b)fluoranthene	156	156	0.00	122	121	78	78	0.8	50	44-119
Benzo(k)fluoranthene	156	156	0.00	84	82	54	53	2	50	40-120
Benzo(a)pyrene	156	156	0.00	97	93	62	60	5	50	52-113
Indeno(1,2,3-cd)pyrene	156	156	2.7	148	147	93	93	0.7	50	32-134
Dibenzo(a,h)anthracene	156	156	0.00	136	130	87	84	4	50	30-134
Benzo(g,h,i)perylene	156	156	0.00	111	109	71	70	2	50	43-121

FORM III SV-2

G6324.D & G6325.D

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Instrument ID: GCMS-G Calibration Date(s): 06/09/09 06/09/09

Column: DB5-MS ID: 0.25 (mm) Calibration Time(s): 1203 1616

LAB FILE ID: RF0.2: G5998 RF0.5: G5997 RF1: G5992
RF2: G5995 RF5: G5994 RF8: G5993

								COEFFICENTS			%RSD	MAX %RSD
COMPOUND	RF0.2	RF0.5	RF1	RF2	RF5	RF8	CURVE	A0	A1	A2	OR R^2	OR R^2
1-Methylnaphthalene	17279	36511	71839	121860	300990	475290	LINR	-0.3146797	2.34469447		0.99682	0.99000
Naphthalene	9143	42814	95418	181260	465920	730220	LINR	-0.1151042	1.48883112		0.99667	0.99000
2-Methylnaphthalene	4276	19944	61439	125780	384480	576870	2ORDR	0.23327640	1.39911307	8.487e-002	0.99605	0.99000
Acenaphthylene	1.362	1.558	1.452	1.535	1.638	1.570	AVRG		1.51898696		6.416	15.000
Acenaphthene	1.215	1.162	0.983	0.995	1.027	0.967	AVRG		1.05825366		9.846	15.000
Fluorene	1.014	1.091	1.017	1.020	1.080	1.043	AVRG		1.04426953		3.238	15.000
Phenanthrene	0.642	0.730	0.748	0.795	0.885	0.928	AVRG		0.78789915		13.389	15.000
Anthracene	1.128	1.179	1.040	1.060	1.028	1.038	AVRG		1.07879612		5.632	15.000
Fluoranthene	0.692	0.821	0.737	0.744	0.815	0.871	AVRG		0.78027978		8.514	15.000
Pyrene	1.534	1.508	1.340	1.396	1.315	1.253	AVRG		1.39099920		7.981	15.000
Benzo(a)anthracene	2802	11426	33555	52152	201790	398650	LINR	0.21908462	1.24952080		0.99727	0.99000
Chrysene	1.377	1.355	1.141	1.133	1.051	0.937	AVRG		1.16566948		14.722	15.000
Benzo(b)fluoranthene	2155	7085	23292	30079	149300	253530	2ORDR	0.25204381	1.14718159	1.401e-002	0.99231	0.99000
Benzo(k)fluoranthene	2.034	1.893	1.560	1.808	1.516	1.496	AVRG		1.71777032		13.114	15.000
Benzo(a)pyrene	1.140	0.872	0.756	0.861	0.874	0.856	AVRG		0.89322157		14.437	15.000
Indeno(1,2,3-cd)pyrene	0.842	0.770	0.663	0.694	0.742	0.759	AVRG		0.74494716		8.399	15.000
Dibenzo(a,h)anthracene	2765	6954	17852	26338	96958	190310	LINR	0.10207017	1.75307739		0.99848	0.99000
Benzo(g,h,i)perylene	0.910	0.860	0.681	0.746	0.748	0.738	AVRG		0.78071073		11.044	15.000
2-Methylnaphthalene-D10	1.079	1.137	0.964	1.064	1.064	0.979	AVRG		1.04783901		6.224	15.000
Fluorene-D10	0.982	1.100	0.994	0.781	0.894	0.871	AVRG		0.93703168		11.928	15.000
Pyrene-D10	1.017	1.008	0.902	0.927	0.882	0.854	AVRG		0.93163622		7.190	15.000

FORM VI SV

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Instrument ID: GCMS-G Calibration Date(s): 06/30/09 06/30/09

Column: RTX5-MS ID: 0.25 (mm) Calibration Time(s): 1341 1812

LAB FILE ID: RF0.2: G6212 RF0.5: G6211 RF1: G6206
RF2: G6209 RF5: G6208 RF8: G6207

								COEFFICENTS		%RSD	MAX %RSD
COMPOUND	RF0.2	RF0.5	RF1	RF2	RF5	RF8	CURVE	A0	A1	OR R^2	OR R^2
1-Methylnaphthalene	0.404	0.486	0.473	0.487	0.528	0.526	AVRG		0.48401506	9.386	15.000
Naphthalene	0.822	0.808	0.771	0.781	0.769	0.774	AVRG		0.78742233	2.773	15.000
2-Methylnaphthalene	0.464	0.496	0.490	0.506	0.536	0.551	AVRG		0.50730315	6.280	15.000
Acenaphthylene	1.634	1.650	1.641	1.830	1.939	2.108	AVRG		1.80024737	10.847	15.000
Acenaphthene	1.521	1.289	1.102	1.198	1.238	1.295	AVRG		1.27383998	11.011	15.000
Fluorene	1.191	1.191	1.206	1.292	1.309	1.375	AVRG		1.26062907	6.043	15.000
Phenanthrene	1.059	1.134	1.019	1.123	1.153	1.327	AVRG		1.13563166	9.361	15.000
Anthracene	0.986	0.934	0.726	0.771	0.850	0.861	AVRG		0.85482025	11.360	15.000
Fluoranthene	0.857	0.860	0.690	0.774	0.826	0.994	AVRG		0.83347524	12.157	15.000
Pyrene	1.624	1.561	1.392	1.494	1.437	1.521	AVRG		1.50492808	5.572	15.000
Benzo(a)anthracene	0.705	0.698	0.789	0.763	0.799	0.928	AVRG		0.78054204	10.725	15.000
Chrysene	4090	10304	17138	32074	92609	135520	LINR	4.905e-002	0.99862276	0.99512	0.99000
Benzo(b)fluoranthene	0.762	0.735	0.820	0.810	0.884	1.020	AVRG		0.83862302	12.257	15.000
Benzo(k)fluoranthene	1.676	1.520	1.091	1.297	1.238	1.395	AVRG		1.36961539	15.224	15.000 <-
Benzo(a)pyrene	1.096	0.943	0.757	0.861	0.892	0.971	AVRG		0.91997024	12.410	15.000
Indeno(1,2,3-cd)pyrene	0.470	0.408	0.504	0.443	0.509	0.570	AVRG		0.48395274	11.760	15.000
Dibenzo(a,h)anthracene	0.588	0.508	0.552	0.533	0.577	0.624	AVRG		0.56356256	7.336	15.000
Benzo(g,h,i)perylene	2379	5204	12771	20294	52710	73696	LINR	-7.99e-003	1.26218652	0.99867	0.99000
2-Methylnaphthalene-D10	1.264	0.988	1.050	1.154	1.172	1.275	AVRG		1.15044161	9.940	15.000
Fluorene-D10	0.968	0.979	1.010	1.081	1.117	1.155	AVRG		1.05182614	7.349	15.000
Pyrene-D10	1.015	0.952	0.733	0.830	0.871	1.066	AVRG		0.91134108	13.553	15.000

FORM VI SV

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Instrument ID: GCMS-G Calibration Date: 06/23/09 Time: 1333

Lab File ID: G6120 Init. Calib. Date(s): 06/09/09 06/09/09

Init. Calib. Times: 1203 1616

GC Column: DB5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
1-Methylnaphthalene	1.3040000	1.0000000	0.6635300	0.01	30.40	100.00	LINR
Naphthalene	1.2171000	1.0000000	0.8793300	0.01	21.71	100.00	LINR
2-Methylnaphthalene	0.9676500	1.0000000	0.5364100	0.01	-3.24	100.00	2RDR
Acenaphthylene	1.5190000	1.6235000	1.6235000	0.01	6.88	100.00	AVRG
Acenaphthene	1.0580000	1.1436000	1.1436000	0.01	8.09	20.00	AVRG
Fluorene	1.0440000	1.1611000	1.1611000	0.01	11.22	100.00	AVRG
Phenanthrene	0.7880000	0.9364300	0.9364300	0.01	18.84	100.00	AVRG
Anthracene	1.0790000	1.1013000	1.1013000	0.01	2.07	100.00	AVRG
Fluoranthene	0.7800000	0.9200500	0.9200500	0.01	17.96	20.00	AVRG
Pyrene	1.3910000	1.2865000	1.2865000	0.01	-7.51	100.00	AVRG
Benzo(a)anthracene	1.1503000	1.0000000	0.7803200	0.01	15.03	100.00	LINR
Chrysene	1.1660000	1.2352000	1.2352000	0.01	5.93	100.00	AVRG
Benzo(b)fluoranthene	0.9217300	1.0000000	0.6218000	0.01	-7.83	100.00	2RDR
Benzo(k)fluoranthene	1.7180000	1.9927000	1.9927000	0.01	15.99	100.00	AVRG
Benzo(a)pyrene	0.8930000	0.8087400	0.8087400	0.01	-9.44	20.00	AVRG
Indeno(1,2,3-cd)pyrene	0.7450000	0.7636100	0.7636100	0.01	2.50	100.00	AVRG
Dibenzo(a,h)anthracene	1.0749000	1.0000000	0.5665800	0.01	7.49	100.00	LINR
Benzo(g,h,i)perylene	0.7800000	0.8253000	0.8253000	0.01	5.81	100.00	AVRG
2-Methylnaphthalene-D10	1.0480000	1.0798000	1.0798000	0.01	3.03	100.00	AVRG
Fluorene-D10	0.9370000	0.8157700	0.8157700	0.01	-12.94	100.00	AVRG
Pyrene-D10	0.9320000	0.8137600	0.8137600	0.01	-12.69	100.00	AVRG

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Instrument ID: GCMS-G Calibration Date: 07/01/09 Time: 1117

Lab File ID: G6223 Init. Calib. Date(s): 06/30/09 06/30/09

Init. Calib. Times: 1341 1812

GC Column: RTX5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
1-Methylnaphthalene	0.4840000	0.5438800	0.5438800	0.01	12.37	100.00	AVRG
Naphthalene	0.7880000	0.8010500	0.8010500	0.01	1.66	100.00	AVRG
2-Methylnaphthalene	0.5070000	0.5310800	0.5310800	0.01	4.75	100.00	AVRG
Acenaphthylene	1.8000000	1.7715000	1.7715000	0.01	-1.58	100.00	AVRG
Acenaphthene	1.2740000	1.1363000	1.1363000	0.01	-10.81	20.00	AVRG
Fluorene	1.2610000	1.2163000	1.2163000	0.01	-3.54	100.00	AVRG
Phenanthrene	1.1360000	1.0933000	1.0933000	0.01	-3.76	100.00	AVRG
Anthracene	0.8550000	0.7447800	0.7447800	0.01	-12.89	100.00	AVRG
Fluoranthene	0.8340000	0.7914300	0.7914300	0.01	-5.10	20.00	AVRG
Pyrene	1.5050000	1.4106000	1.4106000	0.01	-6.27	100.00	AVRG
Benzo(a)anthracene	0.7800000	0.8895300	0.8895300	0.01	14.04	100.00	AVRG
Chrysene	0.9915100	1.0000000	0.9535900	0.01	-0.85	100.00	LINR
Benzo(b)fluoranthene	0.8380000	0.9188600	0.9188600	0.01	9.65	100.00	AVRG
Benzo(k)fluoranthene	1.3700000	1.1419000	1.1419000	0.01	-16.65	100.00	AVRG
Benzo(a)pyrene	0.9200000	0.8910800	0.8910800	0.01	-3.14	20.00	AVRG
Indeno(1,2,3-cd)pyrene	0.4840000	0.5132500	0.5132500	0.01	6.04	100.00	AVRG
Dibenzo(a,h)anthracene	0.5640000	0.5452400	0.5452400	0.01	-3.33	100.00	AVRG
Benzo(g,h,i)perylene	0.8461400	1.0000000	0.6754400	0.01	-15.39	100.00	LINR
2-Methylnaphthalene-D10	1.1500000	1.0274000	1.0274000	0.01	-10.66	100.00	AVRG
Fluorene-D10	1.0520000	0.9941900	0.9941900	0.01	-5.50	100.00	AVRG
Pyrene-D10	0.9110000	0.9494800	0.9494800	0.01	4.22	100.00	AVRG

FORM VII PEST

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Instrument ID: GCMS-G Calibration Date: 07/06/09 Time: 0949

Lab File ID: G6258 Init. Calib. Date(s): 06/30/09 06/30/09

Init. Calib. Times: 1341 1812

GC Column: RTX5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
1-Methylnaphthalene	0.4840000	0.4290000	0.4290000	0.01	-11.36	100.00	AVRG
Naphthalene	0.7880000	0.7446900	0.7446900	0.01	-5.50	100.00	AVRG
2-Methylnaphthalene	0.5070000	0.3766000	0.3766000	0.01	-25.72	100.00	AVRG
Acenaphthylene	1.8000000	1.7052000	1.7052000	0.01	-5.27	100.00	AVRG
Acenaphthene	1.2740000	1.1259000	1.1259000	0.01	-11.62	20.00	AVRG
Fluorene	1.2610000	1.2843000	1.2843000	0.01	1.85	100.00	AVRG
Phenanthrene	1.1360000	1.0564000	1.0564000	0.01	-7.01	100.00	AVRG
Anthracene	0.8550000	0.9521000	0.9521000	0.01	11.36	100.00	AVRG
Fluoranthene	0.8340000	0.8167800	0.8167800	0.01	-2.06	20.00	AVRG
Pyrene	1.5050000	1.3938000	1.3938000	0.01	-7.39	100.00	AVRG
Benzo(a)anthracene	0.7800000	0.7544200	0.7544200	0.01	-3.28	100.00	AVRG
Chrysene	1.0514000	1.0000000	1.0136000	0.01	5.14	100.00	LINR
Benzo(b)fluoranthene	0.8380000	0.8694600	0.8694600	0.01	3.75	100.00	AVRG
Benzo(k)fluoranthene	1.3700000	1.1255000	1.1255000	0.01	-17.85	100.00	AVRG
Benzo(a)pyrene	0.9200000	0.8779200	0.8779200	0.01	-4.57	20.00	AVRG
Indeno(1,2,3-cd)pyrene	0.4840000	0.5175800	0.5175800	0.01	6.94	100.00	AVRG
Dibenzo(a,h)anthracene	0.5640000	0.6045800	0.6045800	0.01	7.20	100.00	AVRG
Benzo(g,h,i)perylene	0.9081900	1.0000000	0.7246000	0.01	-9.18	100.00	LINR
2-Methylnaphthalene-D10	1.1500000	0.9288300	0.9288300	0.01	-19.23	100.00	AVRG
Fluorene-D10	1.0520000	1.0287000	1.0287000	0.01	-2.21	100.00	AVRG
Pyrene-D10	0.9110000	0.8947300	0.8947300	0.01	-1.78	100.00	AVRG

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Instrument ID: GCMS-G Calibration Date: 07/09/09 Time: 1123

Lab File ID: G6316 Init. Calib. Date(s): 06/30/09 06/30/09

Init. Calib. Times: 1341 1812

GC Column: RTX5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
1-Methylnaphthalene	0.4840000	0.4922200	0.4922200	0.01	1.70	100.00	AVRG
Naphthalene	0.7880000	0.7581300	0.7581300	0.01	-3.79	100.00	AVRG
2-Methylnaphthalene	0.5070000	0.4087200	0.4087200	0.01	-19.38	100.00	AVRG
Acenaphthylene	1.8000000	1.5525000	1.5525000	0.01	-13.75	100.00	AVRG
Acenaphthene	1.2740000	1.0601000	1.0601000	0.01	-16.79	20.00	AVRG
Fluorene	1.2610000	1.2162000	1.2162000	0.01	-3.55	100.00	AVRG
Phenanthrene	1.1360000	0.9528600	0.9528600	0.01	-16.12	100.00	AVRG
Anthracene	0.8550000	1.0487000	1.0487000	0.01	22.66	100.00	AVRG
Fluoranthene	0.8340000	0.8501700	0.8501700	0.01	1.94	20.00	AVRG
Pyrene	1.5050000	1.2580000	1.2580000	0.01	-16.41	100.00	AVRG
Benzo(a)anthracene	0.7800000	0.8536500	0.8536500	0.01	9.44	100.00	AVRG
Chrysene	0.9720800	1.0000000	0.9341300	0.01	-2.79	100.00	LINR
Benzo(b)fluoranthene	0.8380000	0.8174000	0.8174000	0.01	-2.46	100.00	AVRG
Benzo(k)fluoranthene	1.3700000	1.1360000	1.1360000	0.01	-17.08	100.00	AVRG
Benzo(a)pyrene	0.9200000	0.8237700	0.8237700	0.01	-10.46	20.00	AVRG
Indeno(1,2,3-cd)pyrene	0.4840000	0.6025800	0.6025800	0.01	24.50	100.00	AVRG
Dibenzo(a,h)anthracene	0.5640000	0.6386200	0.6386200	0.01	13.23	100.00	AVRG
Benzo(g,h,i)perylene	0.9213600	1.0000000	0.7350400	0.01	-7.86	100.00	LINR
2-Methylnaphthalene-D10	1.1500000	0.9625600	0.9625600	0.01	-16.30	100.00	AVRG
Fluorene-D10	1.0520000	0.9914800	0.9914800	0.01	-5.75	100.00	AVRG
Pyrene-D10	0.9110000	0.7487300	0.7487300	0.01	-17.81	100.00	AVRG

FORM VII PEST

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Instrument ID: GCMS-G Calibration Date: 07/10/09 Time: 1239

Lab File ID: G6329 Init. Calib. Date(s): 06/30/09 06/30/09

Init. Calib. Times: 1341 1812

GC Column: RTX5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
1-Methylnaphthalene	0.4840000	0.5713200	0.5713200	0.01	18.04	100.00	AVRG
Naphthalene	0.7880000	0.8217600	0.8217600	0.01	4.28	100.00	AVRG
2-Methylnaphthalene	0.5070000	0.4803900	0.4803900	0.01	-5.25	100.00	AVRG
Acenaphthylene	1.8000000	1.7941000	1.7941000	0.01	-0.33	100.00	AVRG
Acenaphthene	1.2740000	1.1556000	1.1556000	0.01	-9.29	20.00	AVRG
Fluorene	1.2610000	1.2255000	1.2255000	0.01	-2.82	100.00	AVRG
Phenanthrene	1.1360000	1.0605000	1.0605000	0.01	-6.65	100.00	AVRG
Anthracene	0.8550000	0.9674200	0.9674200	0.01	13.15	100.00	AVRG
Fluoranthene	0.8340000	1.0008000	1.0008000	0.01	20.00	20.00	AVRG
Pyrene	1.5050000	1.2092000	1.2092000	0.01	-19.65	100.00	AVRG
Benzo(a)anthracene	0.7800000	0.8961900	0.8961900	0.01	14.90	100.00	AVRG
Chrysene	1.0364000	1.0000000	0.9985800	0.01	3.64	100.00	LINR
Benzo(b)fluoranthene	0.8380000	1.0313000	1.0313000	0.01	23.07	100.00	AVRG
Benzo(k)fluoranthene	1.3700000	1.1315000	1.1315000	0.01	-17.41	100.00	AVRG
Benzo(a)pyrene	0.9200000	0.9052200	0.9052200	0.01	-1.61	20.00	AVRG
Indeno(1,2,3-cd)pyrene	0.4840000	0.5990200	0.5990200	0.01	23.76	100.00	AVRG
Dibenzo(a,h)anthracene	0.5640000	0.6266800	0.6266800	0.01	11.11	100.00	AVRG
Benzo(g,h,i)perylene	0.8882300	1.0000000	0.7087900	0.01	-11.18	100.00	LINR
2-Methylnaphthalene-D10	1.1500000	1.1390000	1.1390000	0.01	-0.96	100.00	AVRG
Fluorene-D10	1.0520000	1.0086000	1.0086000	0.01	-4.12	100.00	AVRG
Pyrene-D10	0.9110000	0.9510700	0.9510700	0.01	4.40	100.00	AVRG

FORM VII PEST

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID (Standard): G6120 Date Analyzed: 06/23/09

Instrument ID: GCMS-G Time Analyzed: 1333

		IS1(DCB) AREA	#	RT	#	IS2(NPT) AREA	#	RT	#	IS3(ANT) AREA	#	RT	#
12 HOUR STD		19745		8.59		74383		11.44		34298		15.52	
UPPER LIMIT		39490		9.13		148766		11.98		68596		16.06	
LOWER LIMIT		9873		8.05		37192		10.90		17149		14.98	
	CLIENT SAMPLE ID	LAB SAMPLE ID											
01	WG65278-BLANK	WG65278-1		20782		8.55		70595		11.53		31490		15.55	
02	WG65278-LCS	WG65278-2		20664		8.58		78049		11.42		33713		15.52	
03	WG65278-LCSD	WG65278-3		19574		8.58		77923		11.42		35794		15.52	
04	RB06170901	SC3309-1		17074		8.67		67322		11.53		28383		15.55	
05	SB06160901	SC3309-2		17474		8.66		73832		11.51		33463		15.53	
06	IDW06170901	SC3309-3		19536		8.56		82377		11.37		38301		15.49	
07															
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19															
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IS1 (DCB) = 1,4-Dichlorobenzene-D4
IS2 (NPT) = Naphthalene-D8
IS3 (ANT) = Acenaphthene-D10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID (Standard): G6120 Date Analyzed: 06/23/09

Instrument ID: GCMS-G Time Analyzed: 1333

		IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
12 HOUR STD		53192	18.99	44873	25.28	35767	28.45
UPPER LIMIT		106384	19.53	89746	25.82	71534	28.99
LOWER LIMIT		26596	18.45	22437	24.74	17884	27.91
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	WG65278-BLANK	WG65278-1	52741	19.05	39645	25.33	30496	28.46
02	WG65278-LCS	WG65278-2	53805	18.99	46979	25.28	37217	28.45
03	WG65278-LCSD	WG65278-3	56924	18.99	47141	25.28	34554	28.45
04	RB06170901	SC3309-1	46789	19.05	36797	25.27	25162	28.48
05	SB06160901	SC3309-2	53266	19.05	33990	25.32	23352	28.48
06	IDW06170901	SC3309-3	59768	18.95	69514	25.25	43061	28.41
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IS4 (PHN) = Phenanthrene-D10
IS5 (CRY) = Chrysene-D12
IS6 (PRY) = Perylene-D12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID (Standard): G6223 Date Analyzed: 07/01/09

Instrument ID: GCMS-G Time Analyzed: 1117

		IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
12 HOUR STD		12793	8.61	42000	11.39	18526	15.53
UPPER LIMIT		25586	9.15	84000	11.93	37052	16.07
LOWER LIMIT		6397	8.07	21000	10.85	9263	14.99
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	WG65295-BLANK	WG65295-1	12961	8.62	43463	11.41	20561	15.53
02	WG65295-LCS	WG65295-2	13329	8.61	43715	11.39	18989	15.52
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IS1 (DCB) = 1,4-Dichlorobenzene-D4
IS2 (NPT) = Naphthalene-D8
IS3 (ANT) = Acenaphthene-D10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID (Standard): G6223 Date Analyzed: 07/01/09

Instrument ID: GCMS-G Time Analyzed: 1117

		IS4 (PHN) AREA #		RT #	IS5 (CRY) AREA #		RT #	IS6 (PRY) AREA #		RT #
12 HOUR STD		30727		19.06	19444		25.37	15029		28.52
UPPER LIMIT		61454		19.60	38888		25.91	30058		29.06
LOWER LIMIT		15364		18.52	9722		24.83	7515		27.98
	CLIENT SAMPLE ID	LAB SAMPLE ID								
01	WG65295-BLANK	WG65295-1	35022	19.06	21482		25.37	14912		28.52
02	WG65295-LCS	WG65295-2	31586	19.06	16328		25.37	11441		28.52
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IS4 (PHN) = Phenanthrene-D10
IS5 (CRY) = Chrysene-D12
IS6 (PRY) = Perylene-D12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID (Standard): G6258 Date Analyzed: 07/06/09

Instrument ID: GCMS-G Time Analyzed: 0949

		IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
12 HOUR STD		12086	8.60	41179	11.39	17753	15.52
UPPER LIMIT		24172	9.14	82358	11.93	35506	16.06
LOWER LIMIT		6043	8.06	20590	10.85	8877	14.98
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	WG65398-LCS	WG65398-2RA	11728	8.61	41805	11.39	16984	15.52
02	WG65398-BLANK	WG65398-1RA	12474	8.60	41716	11.39	20215	15.53
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IS1 (DCB) = 1,4-Dichlorobenzene-D4
IS2 (NPT) = Naphthalene-D8
IS3 (ANT) = Acenaphthene-D10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID (Standard): G6258 Date Analyzed: 07/06/09

Instrument ID: GCMS-G Time Analyzed: 0949

		IS4 (PHN) AREA	#	RT	#	IS5 (CRY) AREA	#	RT	#	IS6 (PRY) AREA	#	RT	#
12 HOUR STD		29081		19.06		19660		25.37		14271		28.52	
UPPER LIMIT		58162		19.60		39320		25.91		28542		29.06	
LOWER LIMIT		14541		18.52		9830		24.83		7136		27.98	
	CLIENT SAMPLE ID	LAB SAMPLE ID											
01	WG65398-LCS	WG65398-2RA		28487		19.06		22136		25.37		17526	28.52
02	WG65398-BLANK	WG65398-1RA		30872		19.06		21472		25.37		16167	28.52
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IS4 (PHN) = Phenanthrene-D10
IS5 (CRY) = Chrysene-D12
IS6 (PRY) = Perylene-D12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID (Standard): G6316 Date Analyzed: 07/09/09

Instrument ID: GCMS-G Time Analyzed: 1123

		IS1(DCB) AREA	#	RT	#	IS2(NPT) AREA	#	RT	#	IS3(ANT) AREA	#	RT	#
12 HOUR STD		13246		8.60		49009		11.41		21408		15.55	
UPPER LIMIT		26492		9.14		98018		11.95		42816		16.09	
LOWER LIMIT		6623		8.06		24505		10.87		10704		15.01	
	CLIENT SAMPLE ID	LAB SAMPLE ID											
01	FD06130903	SC3309-9		12078		8.60		38829		11.41		18558		15.55	
02	FD06130903MS	WG65398-5		11531		8.60		42808		11.41		19436		15.55	
03	FD06130903MSD	WG65398-6		11533		8.61		43375		11.41		19704		15.55	
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IS1 (DCB) = 1,4-Dichlorobenzene-D4
IS2 (NPT) = Naphthalene-D8
IS3 (ANT) = Acenaphthene-D10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID (Standard): G6316 Date Analyzed: 07/09/09

Instrument ID: GCMS-G Time Analyzed: 1123

		IS4(PHN) AREA #	IS4(PHN) RT #	IS5(CRY) AREA #	IS5(CRY) RT #	IS6(PRY) AREA #	IS6(PRY) RT #
12 HOUR STD		34044	19.09	27495	25.40	23730	28.57
UPPER LIMIT		68088	19.63	54990	25.94	47460	29.11
LOWER LIMIT		17022	18.55	13748	24.86	11865	28.03
	CLIENT SAMPLE ID	LAB SAMPLE ID					
01	FD06130903	SC3309-9	31631	19.12	24065	25.40	21973	28.57
02	FD06130903MS	WG65398-5	30703	19.09	26651	25.40	22169	28.57
03	FD06130903MSD	WG65398-6	30903	19.09	23210	25.41	19561	28.56
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IS4 (PHN) = Phenanthrene-D10
IS5 (CRY) = Chrysene-D12
IS6 (PRY) = Perylene-D12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID (Standard): G6329 Date Analyzed: 07/10/09

Instrument ID: GCMS-G Time Analyzed: 1239

		IS1(DCB) AREA	#	RT	#	IS2(NPT) AREA	#	RT	#	IS3(ANT) AREA	#	RT	#
12 HOUR STD		10432		8.60		36284		11.41		16306		15.53	
UPPER LIMIT		20864		9.14		72568		11.95		32612		16.07	
LOWER LIMIT		5216		8.06		18142		10.87		8153		14.99	
	CLIENT SAMPLE ID	LAB SAMPLE ID											
01	FD06130902	SC3309-6		10598		8.60		33825		11.41		15534	15.53
02	X16SS0370001	SC3309-7		10588		8.60		36048		11.41		15987	15.53
03	X16SS0230001	SC3309-8		10608		8.60		35563		11.41		16029	15.54
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20													

IS1 (DCB) = 1,4-Dichlorobenzene-D4
IS2 (NPT) = Naphthalene-D8
IS3 (ANT) = Acenaphthene-D10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID (Standard): G6329 Date Analyzed: 07/10/09

Instrument ID: GCMS-G Time Analyzed: 1239

		IS4 (PHN) AREA	#	RT	#	IS5 (CRY) AREA	#	RT	#	IS6 (PRY) AREA	#	RT	#
12 HOUR STD		25989		19.09		19196		25.40		15472		28.57	
UPPER LIMIT		51978		19.63		38392		25.94		30944		29.11	
LOWER LIMIT		12995		18.55		9598		24.86		7736		28.03	
	CLIENT SAMPLE ID	LAB SAMPLE ID											
01	FD06130902	SC3309-6		25132		19.09		20306		25.40		17709		28.55	
02	X16SS0370001	SC3309-7		25651		19.09		19960		25.39		18262		28.56	
03	X16SS0230001	SC3309-8		27982		19.09		24269		25.40		22353		28.55	
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IS4 (PHN) = Phenanthrene-D10
IS5 (CRY) = Chrysene-D12
IS6 (PRY) = Perylene-D12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.54 minutes of internal standard RT
RT LOWER LIMIT = - 0.54 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

KATAHDIN ANALYTICAL SERVICES Sample Calculation
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 423 NSF Indian Head
PO No:
Sample Date: 06/13/09
Received Date: 06/19/09
Extraction Date: 06/22/09
Analysis Date: 10-JUL-2009 15:02
Report Date: 07/13/2009
Matrix: SOIL
% Solids: 72.4

Lab ID: SC3309-8
Client ID: X16SS0230001
SDG: CTO423-6
Extracted by: AC
Extraction Method: SW846 3550
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG65295
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
90-12-0	1-Methylnaphthalene	U	28	1.0	20	28	2.3
91-20-3	Naphthalene	U	28	1.0	20	28	3.6
91-57-6	2-Methylnaphthalene	U	28	1.0	20	28	3.0
208-96-8	Acenaphthylene	U	28	1.0	20	28	1.6
83-32-9	Acenaphthene	U	28	1.0	20	28	2.1
86-73-7	Fluorene	U	28	1.0	20	28	4.4
85-01-8	Phenanthrene		40	1.0	20	28	2.5
120-12-7	Anthracene	J	12	1.0	20	28	1.6
206-44-0	Fluoranthene		32	1.0	20	28	2.5
129-00-0	Pyrene		160	1.0	20	28	2.9
56-55-3	Benzo(a)anthracene		210	1.0	20	28	2.6
218-01-9	Chrysene		240	1.0	20	28	2.3
205-99-2	Benzo(b)fluoranthene		89	1.0	20	28	3.3
207-08-9	Benzo(k)fluoranthene	J	13	1.0	20	28	4.3
50-32-8	Benzo(a)pyrene		240	1.0	20	28	4.6
193-39-5	Indeno(1,2,3-cd)pyrene		36	1.0	20	28	2.6
53-70-3	Dibenzo(a,h)anthracene		41	1.0	20	28	2.5
191-24-2	Benzo(g,h,i)perylene		130	1.0	20	28	2.8
321-60-8	2-Methylnaphthalene-D10		50%				
118-79-6	Fluorene-D10		56%				
1718-51-0	Pyrene-D10		76%				

Katahdin Analytical Services 3000052

Sample Calculation

FORM 5

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Lab File ID: GD442 DFTPP Injection Date: 07/10/09

Instrument ID: GCMS-G DFTPP Injection Time: 1135

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	49.8
68	Less than 2.0% of mass 69	0.8 (1.7)1
69	Less than 100.0% of mass 198	43.3
70	Less than 2.0% of mass 69	0.4 (0.9)1
127	40.0 - 60.0% of mass 198	55.1
197	Less than 1.0% of mass 198	0.2
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	7.8
275	10.0 - 30.0% of mass 198	22.2
365	1.0 - 100.0% of mass 198	2.9
441	0.0 - 100.0% of mass 443	10.5 (80.9)2
442	40.0 - 100.0% of mass 198	67.8
443	17.0 - 23.0% of mass 442	12.9 (19.1)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		SSTD1.00G0710	G6329	07/10/09	1239
02	FD06130902	SC3309-6	G6330	07/10/09	1337
03	X16SS0370001	SC3309-7	G6331	07/10/09	1419
04	X16SS0230001	SC3309-8	G6332	07/10/09	1502
05					
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FORM V SV

Sample Calculation

Data File: \\Target_server\GG\chem\gcms-g.i\G071009.b\G6332.D
Report Date: 13-Jul-2009 10:38

Katahdin Analytical Services

Data file : \\Target_server\GG\chem\gcms-g.i\G071009.b\G6332.D
Lab Smp Id: SC3309-8 Client Smp ID: X16SS0230001
Inj Date : 10-JUL-2009 15:02 MS Autotune Date: 30-APR-2008 17:47
Operator : JCG Inst ID: gcms-g.i
Smp Info : SC3309-8
Misc Info : SW846 M8270C
Comment :
Method : \\target_server\gg\chem\gcms-g.i\G071009.b\gspsim15.m
Meth Date : 10-Jul-2009 13:25 cgomez Quant Type: ISTD
Cal Date : 30-JUN-2009 18:12 Cal File: G6212.D
Als bottle: 5
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: tetrat423001.sub
Target Version: 4.12
Processing Host: R_INST

Concentration Formula: Amt * DF * (Vt/Ws)*(100/(100-M))*1000 * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	0.00100	Volume of final extract (L)
Ws	0.03000	Weight of sample extracted (Kg)
M	27.645	% Moisture
Cpnd Variable		Local Compound Variable

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/ml)	CONCENTRATIONS FINAL (ug/Kgdrywt)	REVIEW
*	2 1,4-Dichlorobenzene-D4	152	8.599	8.597	(1.000)	10608	0.80000		
*	5 Naphthalene-D8	136	11.410	11.410	(1.000)	35563	0.80000		
$	8 2-Methylnaphthalene-D10	152	13.020	13.020	(0.838)	23103	1.00228	46.2	
*	14 Acenaphthene-D10	164	15.535	15.534	(1.000)	16029	0.80000		
$	17 Fluorene-D10	176	16.792	16.792	(1.081)	23484	1.11432	51.3	
*	24 Phenanthrene-D10	188	19.091	19.090	(1.000)	27982	0.80000		
	25 Phenanthrene	178	19.146	19.146	(1.003)	34670	0.87283	40.2	
	26 Anthracene	178	19.258	19.285	(1.009)	7614	0.25465	11.7(a)	
	28 Fluoranthene	202	21.989	21.989	(1.152)	20232	0.69400	32.0	
$	29 Pyrene-D10	212	22.463	22.463	(0.884)	41811	1.51233	69.7	
	30 Pyrene	202	22.491	22.519	(0.885)	161944	3.54721	163	
	31 Benzo(a)anthracene	228	25.365	25.384	(0.998)	108567	4.58500	211(Q)	
*	32 Chrysene-D12	240	25.404	25.403	(1.000)	24269	0.80000		
	33 Chrysene	228	25.462	25.461	(1.002)	160475	5.32183	245	
	35 Benzo(b)fluoranthene	252	27.781	27.781	(0.973)	45116	1.92539	88.7	
	36 Benzo(k)fluoranthene	252	27.839	27.839	(0.975)	10837	0.28318	13.0(aM)	M6
	37 Benzo(a)pyrene	252	28.439	28.438	(0.996)	132203	5.14306	237	
*	38 Perylene-D12	264	28.554	28.573	(1.000)	22353	0.80000		
	39 Indeno(1,2,3-cd)pyrene	276	30.797	30.796	(1.079)	10661	0.78840	36.3	
	40 Dibenzo(a,h)anthracene	278	30.874	30.893	(1.081)	13961	0.88660	40.8(QM)	M3
	41 Benzo(g,h,i)perylene	276	31.435	31.434	(1.101)	61270	2.76135	127	

cm 7-13-09

Sample Calculation

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO 423 NSF INDIAN HEAD SDG No.: CTO423-6

Instrument ID: GCMS-G Calibration Date: 07/10/09 Time: 1239

Lab File ID: G6329 Init. Calib. Date(s): 06/30/09 06/30/09

Init. Calib. Times: 1341 1812

GC Column: RTX5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
1-Methylnaphthalene	0.4840000	0.5713200	0.5713200	0.01	18.04	100.00	AVRG
Naphthalene	0.7880000	0.8217600	0.8217600	0.01	4.28	100.00	AVRG
2-Methylnaphthalene	0.5070000	0.4803900	0.4803900	0.01	-5.25	100.00	AVRG
Acenaphthylene	1.8000000	1.7941000	1.7941000	0.01	-0.33	100.00	AVRG
Acenaphthene	1.2740000	1.1556000	1.1556000	0.01	-9.29	20.00	AVRG
Fluorene	1.2610000	1.2255000	1.2255000	0.01	-2.82	100.00	AVRG
Phenanthrene	1.1360000	1.0605000	1.0605000	0.01	-6.65	100.00	AVRG
Anthracene	0.8550000	0.9674200	0.9674200	0.01	13.15	100.00	AVRG
Fluoranthene	0.8340000	1.0008000	1.0008000	0.01	20.00	20.00	AVRG
Pyrene	1.5050000	1.2092000	1.2092000	0.01	-19.65	100.00	AVRG
Benzo(a)anthracene	0.7800000	0.8961900	0.8961900	0.01	14.90	100.00	AVRG
Chrysene	1.0364000	1.0000000	0.9985800	0.01	3.64	100.00	LINR
Benzo(b)fluoranthene	0.8380000	1.0313000	1.0313000	0.01	23.07	100.00	AVRG
Benzo(k)fluoranthene	1.3700000	1.1315000	1.1315000	0.01	-17.41	100.00	AVRG
Benzo(a)pyrene	0.9200000	0.9052200	0.9052200	0.01	-1.61	20.00	AVRG
Indeno(1,2,3-cd)pyrene	0.4840000	0.5990200	0.5990200	0.01	23.76	100.00	AVRG
Dibenzo(a,h)anthracene	0.5640000	0.6266800	0.6266800	0.01	11.11	100.00	AVRG
Benzo(g,h,i)perylene	0.8882300	1.0000000	0.7087900	0.01	-11.18	100.00	LINR
2-Methylnaphthalene-D10	1.1500000	1.1390000	1.1390000	0.01	-0.96	100.00	AVRG
Fluorene-D10	1.0520000	1.0086000	1.0086000	0.01	-4.12	100.00	AVRG
Pyrene-D10	0.9110000	0.9510700	0.9510700	0.01	4.40	100.00	AVRG

FORM VII PEST

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE _____ OF _____

CLIENT NSF Indian Head		JOB NUMBER CTO423-6	
SUBJECT Sample Calculation			
BASED ON		DRAWING NUMBER	
BY Ann Cognetti	CHECKED BY	APPROVED BY	DATE 7-29-09

Sample Calculation for X16550230001; (anthracene)

$$\frac{7614}{27982} * \frac{0.001}{0.03} * \frac{100}{(100-27.645)} * 1000 * \frac{0.80}{0.855} = 11.73 \mu g/kg \checkmark$$

Tetra Tech NUS

INTERNAL CORRESPONDENCE

TO: R. BASINSKI **DATE:** AUGUST 4, 2009

FROM: TERRI L. SOLOMON **COPIES:** DV FILE

SUBJECT: INORGANIC DATA VALIDATION – SELECT METALS, pH, TOTAL ORGANIC CARBON, TOTAL SOLIDS
NSF INDIAN HEAD
SAMPLE DELIVERY GROUP (SDG) – CTO423-6

SAMPLES: 3/Aqueous/

IDW06170901	RB06170901	SB06160901

17/Soil/

FD06170901	X14SS1200001	X25SS0100001
X25SS0130001	FD06130902	FD06130903
X16SS0130001	X16SS0230001	X16SS0370001
X16SS0420001	X17SS0010001	X17SS0130001
X17SS0280001	X25SS0060001	X25SS0190001
X25SS0320001	X25SS0320001	

Overview

The sample set for NSF Indian Head, SDG CTO423-6, consists of two (2) aqueous environmental samples, one (1) rinsate blank (RB06170901) and seventeen (17) soil environmental samples. Three (3) field duplicate pairs (X16SS090001 (SDG CTO423-9) / FD06170901, X16SS0230001 / FD06130902 and X16SS0370001 / FD06130903) were included within this SDG.

Samples FD06170901, X14SS1200001, X25SS0100001, X25SS0130001 and all aqueous samples were analyzed for antimony, arsenic, copper, lead, tin and zinc. Samples X16SS0130001, X16SS0420001, X17SS0010001, X17SS0130001, X17SS0280001, X25SS0060001, X25SS0130001, X25SS0190001 and X25SS0320001 were analyzed for pH and total organic carbon. All soil samples were also analyzed for total solids. The samples were collected by Tetra Tech NUS, Inc. on June 4, 11-17, 2009 and analyzed by Katahdin Analytical Services under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Metals analyses were conducted using ICP/MS SW-846 method 6020A. Total organic carbon analyses were conducted using Lloyd Kahn. Total solids analyses were conducted using ASTM D2216 and the pH analyses were conducted using SW-846 method 9045C.

Summary

All analytes were successfully analyzed. The findings offered in this report are based upon a general review of all available data. The data review was based on data completeness, holding times, calibration data, ICP/MS tune, laboratory method/preparation blanks, interference check sample (ICS) results, matrix spike / matrix spike duplicate results, laboratory control sample (LCS)

results, ICP serial dilution results, ICP/MS internal standard recoveries, detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems - None

Minor Problems

- The Contract Required Detection Limit (CRDL) percent recovery for antimony was > 110% quality control limit affecting the soil samples. The positive result < 2X CRDL for antimony was qualified as estimated, "J", as a result of conflicting noncompliances.

- The following contaminants were detected in the laboratory method/preparation blanks at the following maximum concentrations:

Aqueous Samples:

Analyte	Maximum Concentration	Action Level
Antimony[(1)]	0.241 ug/L	1.205 ug/L
Arsenic[(1)]	1.801 ug/L	9.005 ug/L
Copper	0.13 ug/L	0.65 ug/L
Lead[(1)]	0.270 ug/L	1.35 ug/L
Tin[(1)]	0.385 ug/L	1.925 ug/L

Soil Samples:

Analyte	Maximum Concentration	Action Level
Antimony	0.06 ug/L	0.03 mg/kg
Arsenic	0.83 ug/L	0.415 mg/kg
Copper[(1)]	0.145 mg/kg	0.725 mg/kg
Lead	0.40 ug/L	0.2 mg/kg
Tin[(1)]	0.621 mg/kg	3.105 mg/kg

[(1)] Maximum concentration present in a preparation blank.

An action level of 5X the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot and dilution factors, if applicable, were taken into consideration when evaluating for blank contamination. The positive results less than the blank action level reported for antimony, arsenic, copper and tin were qualified "B" as a result of laboratory blank contamination.

- The matrix spike / matrix spike duplicate percent recoveries for antimony for all spiked samples were < 75% quality control limit. The positive results reported for antimony were qualified as estimated, "J", as a result of conflicting noncompliances.

- The matrix spike duplicate percent recovery for lead for sample X25SS0100001 was < 125% quality control limit. The positive result reported for lead for sample X25SS0100001 was qualified as estimated, "J", as a result of conflicting noncompliances.

- Field duplicate imprecision for antimony and lead was > 50% quality control limit for sample pair X16SS0900001 / FD06170901. The positive results reported for antimony and lead were qualified as estimated, "J".

Notes

The CRDL percent recoveries for antimony, arsenic, copper, lead, tin and zinc were > 110% quality control limit affecting the aqueous samples. No validation actions were required as all sample results were either nondetects, > 2X CRDL or were qualified as a result of blank contamination.

The CRDL percent recoveries for arsenic, copper, lead, tin and zinc were > 110% quality control limit affecting the soil samples. No validation actions were required as all sample results were either > 2X CRDL or were qualified as a result of blank contamination.

All preparation blank samples were analyzed at a 5X dilution. All environmental samples were analyzed at a minimum dilution of 5X.

The matrix spike / matrix spike duplicate relative percent difference for lead for sample X14SS1200001 was > 35% quality control limit. However, no validation actions are required for MS/MSD RPD noncompliances.

Executive Summary

Laboratory Performance: The CRDL percent recovery for antimony was > 110% quality control limit affecting the soil samples. Several contaminants were present in the laboratory method / preparation blanks.

Other Factors Affecting Data Quality: The matrix spike and/or matrix spike duplicate percent recoveries for antimony and lead were outside the 75-125% quality control limit. Field duplicate imprecision for antimony and lead was > 50% quality control limit for sample pair X16SS0900001 / FD06170901.

The data for these analyses were reviewed with reference to Region III modifications to the "National Functional Guidelines for Inorganic Data Validation", April 1993, and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories " (January 2006).

The text of this report has been formulated to address only those problem areas affecting data quality.

Tetra Tech NUS
Terri L. Solomon
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A
QUALIFIED ANALYTICAL RESULTS

Data Validation Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS-GFAA MSA's r < 0.995 / ICP PDS Recovery Noncompliance
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O - Poor Instrument Performance (e.g. base-line drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DOT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient r < 0.995
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 00810	NSAMPLE	IDW06170901			RB06170901			SB06160901		
SDG: CTO423-6	LAB_ID	SC3309-003			SC3309-001			SC3309-002		
FRACTION: M	SAMP_DATE	6/17/2009			6/17/2009			6/16/2009		
MEDIA: WATER	QC_TYPE	NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L		
	PCT_SOLIDS	.0			.0			.0		
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		2			0.15	U		0.15	U	
ARSENIC		25.1			1.5	U		1.9	B	A
COPPER		195			0.35	U		0.41	B	A
LEAD		2490			0.05	U		0.05	U	
TIN		18.2			0.1	K	C	0.22	B	A
ZINC		708			3.55	U		5	K	C

PROJ_NO: 00810	NSAMPLE	FD06170901			X14SS1200001			X25SS0100001			X25SS0130001		
SDG: CTO423-6	LAB_ID	SC3349-002			SC3349-001			SC3309-019			SC3309-020		
FRACTION: M	SAMP_DATE	6/17/2009			6/4/2009			6/15/2009			6/15/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	83.3			79.0			80.8			83.0		
	DUP_OF	X16SS0900001											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		1.6	J	DG	0.14	B	A	0.48	J	DG	0.2	J	CDG
ARSENIC		2.4			1.6	B	A	8.5			4.4		
COPPER		5			276			14			9.2		
LEAD		338	J	G	741	J	G	84	J	DG	19.8	J	G
TIN		1.1	B	A	3.7			1.4	B	A	1.2	B	A
ZINC		22.4			9.3			33.4			36.3		

PROJ_NO: 00810	NSAMPLE	FD06130902			FD06130903			FD06170901			X14SS1200001		
SDG: CTO423-6	LAB_ID	SC3309-6			SC3309-9			SC3349-2			SC3349-1		
FRACTION: MISC	SAMP_DATE	6/13/2009			6/13/2009			6/17/2009			6/4/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	88.2			85.6			83.3			79.0		
	DUP_OF	X16SS0230001			X16SS0370001			X16SS0900001					
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PH													
TOTAL ORGANIC CARBON													
TOTAL SOLIDS		88			86			83			79		

PROJ_NO: 00810	NSAMPLE	X16SS0130001									X16SS0230001		
SDG: CTO423-6	LAB_ID	SC3309-10									SC3309-8		
FRACTION: MISC	SAMP_DATE	6/13/2009									6/13/2009		
MEDIA: SOIL	QC_TYPE	NM									NM		
	UNITS	%			S.U.			UG			%		
	PCT_SOLIDS	82.3			82.3			82.3			72.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PH					7.9								
TOTAL ORGANIC CARBON								9700					
TOTAL SOLIDS		82									72		

PROJ_NO: 00810	NSAMPLE	X16SS0370001			X16SS0420001								
SDG: CTO423-6	LAB_ID	SC3309-7			SC3309-11								
FRACTION: MISC	SAMP_DATE	6/13/2009			6/13/2009								
MEDIA: SOIL	QC_TYPE	NM			NM								
	UNITS	%			%			S.U.			UG		
	PCT_SOLIDS	88.7			64.2			64.2			64.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PH								7.9					
TOTAL ORGANIC CARBON											13000		
TOTAL SOLIDS		89			64								

PROJ_NO: 00810	NSAMPLE	X17SS0010001									X17SS0130001		
SDG: CTO423-6	LAB_ID	SC3309-12									SC3309-13		
FRACTION: MISC	SAMP_DATE	6/11/2009									6/14/2009		
MEDIA: SOIL	QC_TYPE	NM									NM		
	UNITS	%			S.U.			UG			%		
	PCT_SOLIDS	90.7			90.7			90.7			84.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PH					7.3								
TOTAL ORGANIC CARBON								660					
TOTAL SOLIDS		91									84		

PROJ_NO: 00810 SDG: CTO423-6 FRACTION: MISC MEDIA: SOIL	NSAMPLE	X17SS0130001						X17SS0280001					
	LAB_ID	SC3309-13						SC3309-14					
	SAMP_DATE	6/14/2009						6/12/2009					
	QC_TYPE	NM						NM					
	UNITS	S.U.			UG			%			S.U.		
	PCT_SOLIDS	84.3			84.3			93.0			93.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PH		7.3									7.8		
TOTAL ORGANIC CARBON					10000								
TOTAL SOLIDS								93					

PROJ_NO: 00810	NSAMPLE	X17SS0280001			X25SS0060001								
SDG: CTO423-6	LAB_ID	SC3309-14			SC3309-18								
FRACTION: MISC	SAMP_DATE	6/12/2009			6/15/2009								
MEDIA: SOIL	QC_TYPE	NM			NM								
	UNITS	UG			%			S.U.			UG		
	PCT_SOLIDS	93.0			86.7			86.7			86.7		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PH								7.6					
TOTAL ORGANIC CARBON		3100									4600		
TOTAL SOLIDS					87								

PROJ_NO: 00810	NSAMPLE	X25SS0100001			X25SS0130001								
SDG: CTO423-6	LAB_ID	SC3309-19			SC3309-17								
FRACTION: MISC	SAMP_DATE	6/15/2009			6/15/2009								
MEDIA: SOIL	QC_TYPE	NM			NM								
	UNITS	%			%			S.U.			UG		
	PCT_SOLIDS	80.8			79.7			79.7			79.7		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PH								7.4					
TOTAL ORGANIC CARBON											14000		
TOTAL SOLIDS		81			80								

PROJ_NO: 00810	NSAMPLE	X25SS0190001									X25SS0320001		
SDG: CTO423-6	LAB_ID	SC3309-16									SC3309-15		
FRACTION: MISC	SAMP_DATE	6/15/2009									6/15/2009		
MEDIA: SOIL	QC_TYPE	NM									NM		
	UNITS	%			S.U.			UG			%		
	PCT_SOLIDS	83.6			83.6			83.6			86.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PH					7.4								
TOTAL ORGANIC CARBON								42000					
TOTAL SOLIDS		84									87		

PROJ_NO: 00810	NSAMPLE	X25SS0320001					
SDG: CTO423-6	LAB_ID	SC3309-15					
FRACTION: MISC	SAMP_DATE	6/15/2009					
MEDIA: SOIL	QC_TYPE	NM					
	UNITS	S.U.			UG		
	PCT_SOLIDS	86.6			86.6		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
PH		7.5					
TOTAL ORGANIC CARBON					13000		
TOTAL SOLIDS							

APPENDIX B
RESULTS AS REPORTED BY THE LABORATORY

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** IDW06170901

Matrix: WATER **SDG Name:** CTO423-6

Percent Solids: 0.00 **Lab Sample ID:** SC3309-003

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	2.0			MS	5	1.0	0.15
7440-38-2	ARSENIC, TOTAL	25.1			MS	5	5.0	1.50
7440-50-8	COPPER, TOTAL	195			MS	5	5.0	0.35
7439-92-1	LEAD, TOTAL	2490			MS	5	1.0	0.05
7440-31-5	TIN, TOTAL	18.2			MS	5	5.0	0.10
7440-66-6	ZINC, TOTAL	708			MS	5	10	3.55

Bottle ID: C

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** RB06170901

Matrix: WATER **SDG Name:** CTO423-6

Percent Solids: 0.00 **Lab Sample ID:** SC3309-001

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.15	U		MS	5	1.0	0.15
7440-38-2	ARSENIC, TOTAL	1.50	U		MS	5	5.0	1.50
7440-50-8	COPPER, TOTAL	0.35	U		MS	5	5.0	0.35
7439-92-1	LEAD, TOTAL	0.05	U		MS	5	1.0	0.05
7440-31-5	TIN, TOTAL	0.10	B		MS	5	5.0	0.10
7440-66-6	ZINC, TOTAL	3.55	U		MS	5	10	3.55

Bottle ID: C

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** SB06160901

Matrix: WATER **SDG Name:** CTO423-6

Percent Solids: 0.00 **Lab Sample ID:** SC3309-002

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.15	U		MS	5	1.0	0.15
7440-38-2	ARSENIC, TOTAL	1.9	B		MS	5	5.0	1.50
7440-50-8	COPPER, TOTAL	0.41	B		MS	5	5.0	0.35
7439-92-1	LEAD, TOTAL	0.05	U		MS	5	1.0	0.05
7440-31-5	TIN, TOTAL	0.22	B		MS	5	5.0	0.10
7440-66-6	ZINC, TOTAL	5.0	B		MS	5	10	3.55

Bottle ID: B

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** FD06170901

Matrix: SOIL **SDG Name:** CTO423-6

Percent Solids: 83.3 **Lab Sample ID:** SC3349-002

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	1.6		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	2.4			MS	5	0.50	0.15
7440-50-8	COPPER, TOTAL	5.0			MS	5	0.50	0.11
7439-92-1	LEAD, TOTAL	338		N*	MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.1			MS	5	0.50	0.19
7440-66-6	ZINC, TOTAL	22.4		*	MS	5	1.0	0.35

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS1200001

Matrix: SOIL **SDG Name:** CTO423-6

Percent Solids: 79.0 **Lab Sample ID:** SC3349-001

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.14		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	1.6			MS	5	0.53	0.16
7440-50-8	COPPER, TOTAL	276			MS	10	1.0	0.23
7439-92-1	LEAD, TOTAL	741		N*	MS	10	0.21	0.06
7440-31-5	TIN, TOTAL	3.7			MS	5	0.53	0.20
7440-66-6	ZINC, TOTAL	9.3		*	MS	5	1.0	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0100001

Matrix: SOIL **SDG Name:** CTO423-6

Percent Solids: 80.8 **Lab Sample ID:** SC3309-019

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.48		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	8.5			MS	5	0.54	0.16
7440-50-8	COPPER, TOTAL	14.0			MS	5	0.54	0.12
7439-92-1	LEAD, TOTAL	84.0		N*	MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.4			MS	5	0.54	0.20
7440-66-6	ZINC, TOTAL	33.4		*	MS	5	1.1	0.38

Bottle ID: B

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0130001

Matrix: SOIL **SDG Name:** CTO423-6

Percent Solids: 83.0 **Lab Sample ID:** SC3309-020

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.20		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	4.4			MS	5	0.55	0.17
7440-50-8	COPPER, TOTAL	9.2			MS	5	0.55	0.12
7439-92-1	LEAD, TOTAL	19.8		N*	MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.2			MS	5	0.55	0.21
7440-66-6	ZINC, TOTAL	36.3		*	MS	5	1.1	0.39

Bottle ID: A

Comments:

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3309-6
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-6

Sample Description	Matrix	Date Sampled	Date Received
FD06130902	SL	13-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	88. %	1	D2216	WG65411	24-JUN-09 09:00:00	ASTM D2216	23-JUN-09	JF	

Katahdin
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Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3309-9
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-6

Sample Description	Matrix	Date Sampled	Date Received
FD06130903	SL	13-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG65411	24-JUN-09 09:00:00	ASTM D2216	23-JUN-09	JF	

Katahdin
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Cert No E87604

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3349-2
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-6

Sample Description	Matrix	Date Sampled	Date Received
FD06170901	SL	17-JUN-09	20-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	83. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3349-1
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-6

Sample Description	Matrix	Date Sampled	Date Received
X14SS1200001	SL	04-JUN-09	20-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	79. %	1	D2216	WG65541	26-JUN-09 08:30:00	ASTM D2216	25-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3309-10
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-6

Sample Description	Matrix	Date Sampled	Date Received
X16SS0130001	SL	13-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	9700 ug/gdrywt	480	LLOYDKAHN	WG65524	24-JUN-09 12:49:10	N/A	N/A	CP	
Total Solids	82. %	1	D2216	WG65411	24-JUN-09 09:00:00	ASTM D2216	23-JUN-09	JF	
pH(Soil)	7.9 pH	.1	SW846 9045C	WG65425	23-JUN-09 17:05:00	SW846 9045C	23-JUN-09	JF	

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Cert No E87604

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3309-8
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-6

Sample Description	Matrix	Date Sampled	Date Received
X16SS0230001	SL	13-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	72. %	1	D2216	WG65411	24-JUN-09 09:00:00	ASTM D2216	23-JUN-09	JF	

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Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3309-7
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-6

Sample Description	Matrix	Date Sampled	Date Received
X16SS0370001	SL	13-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	89. %	1	D2216	WG65411	24-JUN-09 09:00:00	ASTM D2216	23-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3309-11
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-6

Sample Description	Matrix	Date Sampled	Date Received
X16SS0420001	SL	13-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	13000 ug/gdrywt	620	LLOYDKAHN	WG65524	24-JUN-09 13:02:46	N/A	N/A	CP	
Total Solids	64. %	1	D2216	WG65411	24-JUN-09 09:00:00	ASTM D2216	23-JUN-09	JF	
pH(Soil)	7.9 pH	.1	SW846 9045C	WG65425	23-JUN-09 17:10:00	SW846 9045C	23-JUN-09	JF	

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3309-12
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-6

Sample Description	Matrix	Date Sampled	Date Received
X17SS001000A1 TS 5-4	SL	11-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	660 ug/gdrywt	440	LLOYDKAHN	WG65524	24-JUN-09 13:15:45	N/A	N/A	CP	
Total Solids	91. %	1	D2216	WG65411	24-JUN-09 09:00:00	ASTM D2216	23-JUN-09	JF	
pH(Soil)	7.3 pH	.1	SW846 9045C	WG65425	23-JUN-09 17:12:00	SW846 9045C	23-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3309-13
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-6

Sample Description	Matrix	Date Sampled	Date Received
X17SS0130001	SL	14-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	10000 ug/gdrywt	470	LLOYDKAHN	WG65524	24-JUN-09 14:03:59	N/A	N/A	CP	
Total Solids	84. %	1	D2216	WG65411	24-JUN-09 09:00:00	ASTM D2216	23-JUN-09	JF	
pH(Soil)	7.3 pH	.1	SW846 9045C	WG65425	23-JUN-09 17:14:00	SW846 9045C	23-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3309-14
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-6

Sample Description	Matrix	Date Sampled	Date Received
X17SS0280001	SL	12-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	3100 ug/gdrywt	430	LLOYDKAHN	WG65524	24-JUN-09 14:21:43	N/A	N/A	CP	
Total Solids	93. %	1	D2216	WG65411	24-JUN-09 09:00:00	ASTM D2216	23-JUN-09	JF	
pH(Soil)	7.8 pH	.1	SW846 9045C	WG65425	23-JUN-09 17:16:00	SW846 9045C	23-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3309-18
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-6

Sample Description	Matrix	Date Sampled	Date Received
X25SS0060001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	4600 ug/gdrywt	460	LLOYDKAHN	WG65524	24-JUN-09 15:22:44	N/A	N/A	CP	
Total Solids	87. %	1	D2216	WG65412	24-JUN-09 09:24:00	ASTM D2216	23-JUN-09	JF	
pH(Soil)	7.6 pH	.1	SW846 9045C	WG65425	23-JUN-09 17:24:00	SW846 9045C	23-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3309-19
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-6

Sample Description	Matrix	Date Sampled	Date Received
X25SS0100001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	81. %	1	D2216	WG65412	24-JUN-09 09:24:00	ASTM D2216	23-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3309-17
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-6

Sample Description	Matrix	Date Sampled	Date Received
X25SS0130001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	14000 ug/gdrywt	500	LLOYDKAHN	WG65524	24-JUN-09 15:13:10	N/A	N/A	CP	
Total Solids	80. %	1	D2216	WG65412	24-JUN-09 09:24:00	ASTM D2216	23-JUN-09	JF	
pH(Soil)	7.4 pH	.1	SW846 9045C	WG65425	23-JUN-09 17:22:00	SW846 9045C	23-JUN-09	JF	

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Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3309-20
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-6

Sample Description	Matrix	Date Sampled	Date Received
X25SS0130001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	83. %	1	D2216	WG65412	24-JUN-09 09:24:00	ASTM D2216	23-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3309-16
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-6

Sample Description	Matrix	Date Sampled	Date Received
X25SS0190001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	42000 ug/gdrywt	480	LLOYDKAHN	WG65524	24-JUN-09 14:59:25	N/A	N/A	CP	
Total Solids	84. %	1	D2216	WG65412	24-JUN-09 09:24:00	ASTM D2216	23-JUN-09	JF	
pH(Soil)	7.4 pH	.1	SW846 9045C	WG65425	23-JUN-09 17:20:00	SW846 9045C	23-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3309-15
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-6

Sample Description	Matrix	Date Sampled	Date Received
X25SS0320001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	13000 ug/gdrywt	460	LLOYDKAHN	WG65524	24-JUN-09 14:34:22	N/A	N/A	CP	
Total Solids	87. %	1	D2216	WG65411	24-JUN-09 09:00:00	ASTM D2216	23-JUN-09	JF	
pH(Soil)	7.5 pH	.1	SW846 9045C	WG65425	23-JUN-09 17:18:00	SW846 9045C	23-JUN-09	JF	

APPENDIX C
SUPPORT DOCUMENTATION

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CTO 423 NSF INDIAN HEAD
SDG: CTO423-6
SC3309, SC3349

Sample Receipt

The following samples were received on June 19 and 20, 2009 and were logged in under Katahdin Analytical Services work order numbers SC3309 and SC3349 for a hardcopy due date of July 08, 2009.

KATAHDIN Sample No.	TTNUS Sample Identification
SC3309-1	RB06170901
SC3309-2	SB06160901
SC3309-3	IDW06170901
SC3309-6	FD06130902
SC3309-7	X16SS0370001
SC3309-8	X16SS0230001
SC3309-9	FD06130903
SC3309-10	X16SS0130001
SC3309-11	X16SS0420001
SC3309-12	X17SS0010004
SC3309-13	X17SS0130001
SC3309-14	X17SS0280001
SC3309-15	X25SS0320001
SC3309-16	X25SS0190001
SC3309-17	X25SS0130001
SC3309-18	X25SS0060001
SC3309-19	X25SS0100001
SC3309-20	X25SS0130001
SC3349-1	X14SS1200001
SC3349-2	FD06170901

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in this narrative or in the Report of Analysis.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Andrea J. Colby**. This narrative is an integral part of the Report of Analysis.

Organics Analysis

The samples of SDG CTO423-6 were analyzed in accordance with "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846, 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA, and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA, and/or for the specific methods listed below or on the Report of Analysis. Some manual integrations may have been performed due to split peaks and/or corrected baselines. All have been flagged with an "M" (software-generated) on the pertinent quantitation reports.

8270C SIM Analysis

All soil samples and associated QC were subjected to the GPC sample clean-up process.

Sample SC3309-9 was used for the Matrix Spike (MS) and Matrix Spike Duplicate (MSD), as per client request.

The laboratory method blank WG65389-1RA, the LCS WG65295-2 and samples SC3309-6 and 7 had low recoveries for the surrogate Flourene-D10, which were outside the laboratory established acceptance limits. The surrogate acceptance limits were based on non-GPC soil extractions that were concentrated to a final volume of 1mL. Since acceptance limits based on a GPC cleanup would likely result in lower acceptance limits, the samples were not reextracted. Katahdin has begun using a new GPC unit for extract cleanup, which necessitates the generation of new statistical limits for surrogates and spiked analytes.

Samples SC3309-6, 8, and 9 were manually integrated for various target analytes indeno(1,2,3-cd)pyrene, benzo(k)fluoranthene, and/or dibenzo(a,h)anthracene. The specific reason for the manual integration is indicated on the raw data by the manual integration codes (M1-M11). These codes are further explained in the attachment following this narrative.

The reported percent recovery acceptance limits for the Laboratory Control Samples (LCSs) are statistically derived for the full list of spiked compounds and nominal limits for all additional compounds. The recoveries of the spiked analytes in the LCS, Matrix Spike (MS) and Matrix Spike Duplicate (MSD) are compared to these acceptance limits. Katahdin standard operating procedure is to take corrective action only if the number of spiked analytes in the LCS that are outside of the QC limits is greater than the DoD QSM allowable number of exceedances. If the associated MS/MSD has greater than the allowable number of exceedances, no corrective action is taken, as long the LCS is acceptable

The laboratory control sample WG65295-2 had low recoveries for six spiked target analytes that were outside of the laboratory established acceptance limits. The DoD QSM allowable number of exceedances for 18 target analytes is one analyte. Since the recoveries were within the DoD

QSM marginal exceedances allowances for method 8270 SCAN, the associated samples were not reextracted.

The laboratory control sample WG65398-2RA had low recoveries for four spiked target analytes that were outside of the laboratory established acceptance limits. The DoD QSM allowable number of exceedances for 18 target analytes is one analyte. Since the recoveries were within the DoD QSM marginal exceedances allowances for method 8270 SCAN, the associated samples were not reextracted.

There were no other protocol deviations or observations noted by the organics laboratory staff.

Metals Analysis

The samples of SDG CTO423-6 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846. 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA.

Inductively-Coupled Plasma Mass Spectrometric Analysis (ICP-MS)

Aqueous-matrix Katahdin Sample Numbers SC3309-(1-3) were digested for ICP-MS analysis on 06/26/09 (QC Batch ZF26ICW1) in accordance with USEPA Method 3010A.

Solid-matrix Katahdin Sample Numbers SC3309-(19, 20) and SC3349-(1, 2) were digested for ICP-MS analysis on 07/01/09 (QC Batch ZG01ICS0) in accordance with USEPA Method 3050B. Katahdin Sample Numbers SC3309-19 and SC3349-1 were prepared with duplicate matrix-spiked aliquots. Duplicate laboratory control samples were prepared in this batch. The measured tin concentration in the preparation blank in this batch exceeds the laboratory's acceptance limit. Laboratory testing has determined that this tin contamination comes from one of the reagents used in the digestion process.

ICP-MS analyses of SDG CTO423-6 sample digestates were performed using an Agilent 7500 ICP-MS spectrometer in accordance with USEPA Method 6020. Results for all standards and samples are reported using the mean of 3 replicate measurements. All samples were analyzed within holding times and all analytical run QC criteria were met, with the following exception:

The measured lead concentration of the CCB analyzed at 04:42 in ICP-MS analysis sequence JZG07A exceeds the laboratory's acceptance limit. All associated lead results accepted from this portion of the run were greater than ten times the CCB result and not affected by this high bias.

Internal standard recoveries for ICP-MS analyses can be found in the raw data section of the accompanying data package. The following table indicates which analytes are associated with each internal standard element.

Internal Standard Element	Associated Analytes
Lithium	Beryllium
Scandium	Sodium, Magnesium, Aluminum, Potassium, Calcium
Germanium	Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel, Copper, Zinc, Arsenic, Selenium, Silver, Cadmium
Terbium	Antimony, Barium, Tin
Bismuth	Thallium, Lead

Instrument tuning information can also be found in the raw data section in the report labeled "6020 QC Tune Report". The relative standard deviation was determined from 4 replicate measurements. The peak width was measured at 10% of the peak height.

Matrix QC Summary

The measured recoveries of antimony and lead in one or both of the matrix-spiked aliquots of Katahdin Sample Number SC3309-19 are outside the laboratory's acceptance criteria (75% - 125% recovery of the added element, if the native concentration is less than four times the amount added). The measure recoveries of antimony and lead in a post-digestion matrix spike of this sample are within the laboratory's acceptance criteria.

The measured recoveries of antimony both of the matrix-spiked aliquots of Katahdin Sample Number SC3349-1 are outside the laboratory's acceptance criteria (75% - 125% recovery of the added element, if the native concentration is less than four times the amount added). The measured recovery of antimony in a post-digestion matrix spike of this sample are within the laboratory's acceptance criteria.

The matrix spike duplicate analysis of Katahdin Sample Number SC3309-19 is outside the laboratory's acceptance limit (<20% relative difference between duplicate matrix-spiked aliquots) for lead and zinc.

The matrix spike duplicate analysis of Katahdin Sample Number SC3349-1 is outside the laboratory's acceptance limit (<20% relative difference between duplicate matrix-spiked aliquots) for lead.

The serial dilution analyses of Katahdin Sample Numbers SC3309-19 and SC3349-1 are within the laboratory's acceptance limit (<10% relative percent difference, if the concentration in the original sample is greater than 50 times the MDL) for all analytes.

Reporting of Metals Results

Analytical results for client samples, matrix QC samples (duplicates and matrix spikes), and batch QC samples (preparation blanks and laboratory control samples) have been reported down to the laboratory's method detection limits (MDLs). These MDLs have been adjusted for each sample based on the sample amounts used in preparation and analysis. Analytical results that are below the MDLs are flagged with "U" in the C-qualifier column.

Analytical results for instrument run QC samples (ICVs, ICBs, etc.) have been reported down to the laboratory's instrument detection limits (IDLs).

IDLs, MDLs, and PQLs are listed on Form 10 of the accompanying data package.

Wet Chemistry Analysis

The samples of SDG CTO423-6 were analyzed in accordance with the specific methods listed on the Report of Analysis.

Analyses for total solids were performed according to "Annual Book of ASTM Standards", Method D2216-98 "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass".

Analyses for total organic carbon in soil were performed according to "Determination of Total Organic Carbon in Sediment", Lloyd Kahn, USEPA Region II, 7/88.

Analyses for pH (soil) were performed according to "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846. 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA.

All analyses were performed within analytical holding times. All quality control criteria were met.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Operations Manager or the Quality Assurance Officer as verified by the following signature.

Leslie Dimond
07.14.09
Leslie Dimond
Quality Assurance Officer

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER No 028261 PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bwinski	4129216308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FedEx 8631 3888 1969		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)		PRESERVATIVE USED		TYPE OF ANALYSIS							COMMENTS
									G	G	4°C	4°C								
6/4	1428	X1455120 0001	120	0	1	SO	G	3	(3)											MS/MSD
6/17	0000	FD061709 01	QC	0	1	SO	G	1	(1)											
~~6/13~~	~~1350~~	~~X1655028 0001~~	~~028~~	~~0~~	~~1~~	~~SO~~	~~G~~	~~2~~	~~2~~	~~2~~										~~MS/MSD~~
6/15	0000	FD061509 04	QC	0	1	SO	G	2	2	2										

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-19-09	1000	1. RECEIVED BY	6/20/09	1030
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028252 | PAGE 1 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112600810	Indian Head	R. Basinski	412 921 8308	Katahdin Labs / Andrea Collins
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
J. Doerdt		J. Goerdt	412 443 0244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 863138879042		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): P G G
PRESERVATIVE USED: HNO3 4°C 4°C

TYPE OF ANALYSIS: TAL Metals SW846 6020 300 | PAH SW846 8270 | TAL Metals SW846 6020A/3050B

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS				COMMENTS
6/17	1400	RB06170901	QC	-	-	QC	G	3	(1)	2		Rinsate
6/16	1245	SB06160901	QC	-	-	QC	G	2	(1)	1		Source
6/17	1400	IDW06170901	QC	-	-	QC	G	3	(1)	2		IDW
6/15	1140	X25550010001	001	0	1	SO	G	1			1	
	1300	" 0040001	004					1			1	
	1535	" 0080001	008					1			1	
	1405	" 0100001	010					3			(3)	MS/MSD
	1305	" 0130001	013					1			(1)	
	1155	" 0160001	016					1			1	
	1255	" 0180001	018					1			1	
	1255	" 0190001	019					1			1	
	1313	" 0200001	020					1			1	
	1327	" 0210001	021					1			1	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6/19/09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. — CHAIN OF CUSTODY — NUMBER № 028258 — PAGE 6 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	412 921 8308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
J. Goerdt (signature)		J. Goerdt	412 443 0244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 863138879042		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G, G
PRESERVATIVE USED: 4°C, 4°C
TYPE OF ANALYSIS: Metals 846 6020A/3050B; pH TOC CEC; PAH

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	Metals 846 6020A/3050B	pH TOC CEC	PAH	COMMENTS
6/13	1140	X16SS0080001	008	0	1	SO	G	1	1			
↓	1315	" 0130001	013	↓	↓	↓	↓	1	1			
↓	1245	" 0170001	017	↓	↓	↓	↓	1	1			
↓	1255	" 0200001	020	↓	↓	↓	↓	1	1			
↓	1345	" 0250001	025	↓	↓	↓	↓	3	3			ms/msD
↓	1425	" 0320001	032	↓	↓	↓	↓	1	1			
↓	0000	FD06130901	QC	0	1	SO	G	1	1			
6/15	1355	X25SS0320001	032	↓	↓	↓	↓	2		(2)		
↓	1255	" 0190001	019	↓	↓	↓	↓	2		(2)		
↓	1305	" 0130001	013	↓	↓	↓	↓	2		(2)		
↓	1335	" 0060001	006	↓	↓	↓	↓	~~2~~ 2		(2)		
6/11	1500	X17SS0190001	019	↓	↓	↓	↓	~~66~~ 2		~~66~~	6	~~MS/MSD~~ MS/MSD
6/15	0000	FD06150903	QC	↓	↓	↓	↓	2		~~2~~	2	

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
J. Goerdt (signature)	6-18-09	1700	(signature)	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: X17SS0190001 - ms/MSD 6 jars (2.5oz)

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R

TETRA TECH NUS, INC. — CHAIN OF CUSTODY — NUMBER № 028257 — PAGE 5 OF 8

PROJECT NO: 112G00810	FACILITY: Indian Head	PROJECT MANAGER: R. Basinski	PHONE NUMBER: 4129218308
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER: J. Goerdt	PHONE NUMBER: 4124430244
		CARRIER/WAYBILL NUMBER: Fed Ex/863138879042	

LABORATORY NAME AND CONTACT: Katahdin Labs/ Andrea Colby
ADDRESS: 600 Technology Way
CITY, STATE: Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G, G
PRESERVATIVE USED: 4°C, 4°C
TYPE OF ANALYSIS: TOC CEC; Metals SW846 6020/3050B

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TOC CEC	Metals SW846 6020/3050B	COMMENTS
6/13	1315	X16SS0130001	013	0	1	SO	G	1	(1)		
6/13	1515	X16SS0420001	042	↓	↓	↓	↓	1	(1)		
6/11	840	X17SS0010001	001					1	1		
6/14	1450	X17SS0130001	013					1	(1)		
6/12	1050	X17SS0280001	028					1	(1)		
6/14	1055	X16SS0790001	079					1	X	1	
6/16	1350	" 0870001	087					1		1	
6/17	1020	" 0900001	090					1		1	
	1530	" 0910001	091					1		1	
	1515	" 0920001	092					1		1	
	1500	" 0930001	093					1		1	
	1440	" 0940001	094					1		1	
↓	1440	"	095	↓	↓	↓	↓	1		1	

1. RELINQUISHED BY [signature]	DATE 6-18-09	TIME 1700	1. RECEIVED BY [signature]	DATE 6-19-09	TIME 1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

HOLDTIME

SDG CTO423-6

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	FD06170901	SC3349-002	NM	6/17/2009	7/1/2009	7/9/2009	14.3	8.612	22.91
M	MG/KG	X25SS0130001	SC3309-020	NM	6/15/2009	7/1/2009	7/8/2009	15.54	7	22.54
M	MG/KG	X25SS0100001	SC3309-019	NM	6/15/2009	7/1/2009	7/8/2009	15.49	7	22.49
M	MG/KG	FD06170901	SC3349-002	NM	6/17/2009	7/1/2009	7/8/2009	14.15	7	21.15
M	MG/KG	X14SS1200001	SC3349-001	NM	6/4/2009	7/1/2009	7/8/2009	26.54	7	33.54
M	MG/KG	X25SS0130001	SC3309-020	NM	6/15/2009	7/1/2009	7/9/2009	15.75	8.603	24.35
M	MG/KG	X14SS1200001	SC3349-001	NM	6/4/2009	7/1/2009	7/9/2009	26.46	8	34.46
M	UG/L	IDW06170901	SC3309-003	NM	6/17/2009	6/26/2009	7/7/2009	8.752	11.47	20.22
M	UG/L	RB06170901	SC3309-001	NM	6/17/2009	6/26/2009	7/7/2009	8.751	11.46	20.21
M	UG/L	SB06160901	SC3309-002	NM	6/16/2009	6/26/2009	7/7/2009	9.803	11.47	21.27
PH	PH	X16SS0130001	SC3309-10	NM	6/13/2009	6/23/2009	6/23/2009	9.949	0.211	10.16
PH	PH	X16SS0420001	SC3309-11	NM	6/13/2009	6/23/2009	6/23/2009	9.866	0.214	10.08
PH	PH	X17SS0010004	SC3309-12	NM	6/11/2009	6/23/2009	6/23/2009	12.14	0.215	12.36
PH	PH	X17SS0130001	SC3309-13	NM	6/14/2009	6/23/2009	6/23/2009	8.885	0.215	9.1
PH	PH	X17SS0280001	SC3309-14	NM	6/12/2009	6/23/2009	6/23/2009	11.05	0.216	11.27

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
PH	PH	X25SS0060001	SC3309-18	NM	6/15/2009	6/23/2009	6/23/2009	7.940	0.219	8.159
PH	PH	X25SS0320001	SC3309-15	NM	6/15/2009	6/23/2009	6/23/2009	7.924	0.217	8.141
PH	PH	X25SS0190001	SC3309-16	NM	6/15/2009	6/23/2009	6/23/2009	7.967	0.217	8.184
PH	PH	X25SS0130001	SC3309-17	NM	6/15/2009	6/23/2009	6/23/2009	7.960	0.218	8.178
TOC	UG/GD	X25SS0320001	SC3309-15	NM	6/15/2009	6/24/2009	6/24/2009	8.883	0.144	9.027
TOC	UG/GD	X16SS0420001	SC3309-11	NM	6/13/2009	6/24/2009	6/24/2009	10.82	0.083	10.91
TOC	UG/GD	X17SS0010004	SC3309-12	NM	6/11/2009	6/24/2009	6/24/2009	13.1	0.092	13.19
TOC	UG/GD	X17SS0130001	SC3309-13	NM	6/14/2009	6/24/2009	6/24/2009	9.843	0.124	9.967
TOC	UG/GD	X17SS0280001	SC3309-14	NM	6/12/2009	6/24/2009	6/24/2009	12.01	0.136	12.15
TOC	UG/GD	X25SS0060001	SC3309-18	NM	6/15/2009	6/24/2009	6/24/2009	8.899	0.176	9.074
TOC	UG/GD	X16SS0130001	SC3309-10	NM	6/13/2009	6/24/2009	6/24/2009	10.91	0.075	10.98
TOC	UG/GD	X25SS0190001	SC3309-16	NM	6/15/2009	6/24/2009	6/24/2009	8.925	0.161	9.086
TOC	UG/GD	X25SS0130001	SC3309-17	NM	6/15/2009	6/24/2009	6/24/2009	8.919	0.170	9.089
TS	%	X25SS0100001	SC3309-19	NM	6/15/2009	6/23/2009	6/24/2009	7.791	1.014	8.805
TS	%	X25SS0190001	SC3309-16	NM	6/15/2009	6/23/2009	6/24/2009	7.838	1.016	8.853
TS	%	X25SS0060001	SC3309-18	NM	6/15/2009	6/23/2009	6/24/2009	7.811	1.015	8.826
TS	%	X17SS0010004	SC3309-12	NM	6/11/2009	6/23/2009	6/24/2009	11.97	1.04	13.01
TS	%	X16SS0420001	SC3309-11	NM	6/13/2009	6/23/2009	6/24/2009	9.699	1.040	10.74

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
TS	%	X16SS0370001	SC3309-7	NM	6/13/2009	6/23/2009	6/24/2009	9.721	1.036	10.76
TS	%	X16SS0230001	SC3309-8	NM	6/13/2009	6/23/2009	6/24/2009	9.781	1.035	10.82
TS	%	X16SS0130001	SC3309-10	NM	6/13/2009	6/23/2009	6/24/2009	9.782	1.041	10.82
TS	%	X14SS1200001	SC3349-1	NM	6/4/2009	6/25/2009	6/26/2009	20.73	1.020	21.75
TS	%	FD06170901	SC3349-2	NM	6/17/2009	7/1/2009	7/2/2009	14.39	1	15.39
TS	%	FD06130903	SC3309-9	NM	6/13/2009	6/23/2009	6/24/2009	10.34	1.035	11.38
TS	%	FD06130902	SC3309-6	NM	6/13/2009	6/23/2009	6/24/2009	10.34	1.037	11.38
TS	%	X25SS0130001	SC3309-20	NM	6/15/2009	6/23/2009	6/24/2009	7.833	1.013	8.847
TS	%	X17SS0280001	SC3309-14	NM	6/12/2009	6/23/2009	6/24/2009	10.89	1.038	11.92
TS	%	X25SS0130001	SC3309-17	NM	6/15/2009	6/23/2009	6/24/2009	7.831	1.015	8.847
TS	%	X25SS0320001	SC3309-15	NM	6/15/2009	6/23/2009	6/24/2009	7.758	1.037	8.795
TS	%	X17SS0130001	SC3309-13	NM	6/14/2009	6/23/2009	6/24/2009	8.718	1.039	9.757
SIM	%	FD06130902	SC3309-6	NM	6/13/2009	6/22/2009	7/10/2009	9.501	18.07	27.57
SIM	%	FD06130903	SC3309-9	NM	6/13/2009	6/25/2009	7/9/2009	12.63	14.06	26.69
SIM	%	IDW06170901	SC3309-3	NM	6/17/2009	6/20/2009	6/23/2009	3.044	3.264	6.308
SIM	%	RB06170901	SC3309-1	NM	6/17/2009	6/20/2009	6/23/2009	3.042	3.204	6.247
SIM	%	SB06160901	SC3309-2	NM	6/16/2009	6/20/2009	6/23/2009	4.095	3.234	7.329
SIM	%	X16SS0230001	SC3309-8	NM	6/13/2009	6/22/2009	7/10/2009	8.943	18.12	27.07

NSF INDIAN HEAD
SOIL DATA
CTO423-9 AND CTO423-6

FRACTION	CHEMICAL	X16SS0900001	UNITS	FD06170901	RPD	D
M	ANTIMONY	0.23	MG/KG	1.6	149.73	1.37
M	ARSENIC	3.5	MG/KG	2.4	37.29	1.10
M	COPPER	5.3	MG/KG	5	5.83	0.30
M	LEAD	38.8	MG/KG	338	158.81	299.20
M	TIN	1.1	MG/KG	1.1	0.00	0.00
M	ZINC	16.6	MG/KG	22.4	29.74	5.80

Current RPD Quality Control Limit: 50 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

NSF INDIAN HEAD
SOIL DATA
CTO423-9 AND CTO423-6

FRACTION	CHEMICAL	X16SS0900001	UNITS	FD06170901	RPD	D
MISC	TOTAL SOLIDS	84	%	83	1.20	1.00

Current RPD Quality Control Limit: 50 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

NSF INDIAN HEAD
SOIL DATA
CTO423-6

FRACTION	CHEMICAL	FD06130902	UNITS	X16SS0230001	RPD	D
MISC	TOTAL SOLIDS	88	%	72	20.00	16.00

Current RPD Quality Control Limit: 50 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

NSF INDIAN HEAD
SOIL DATA
CTO423-6

FRACTION	CHEMICAL	FD06130903	UNITS	X16SS0370001	RPD	D
MISC	TOTAL SOLIDS	86	%	89	3.43	3.00

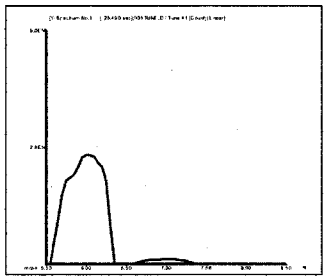
Current RPD Quality Control Limit: 50 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

6020 QC Tune Report

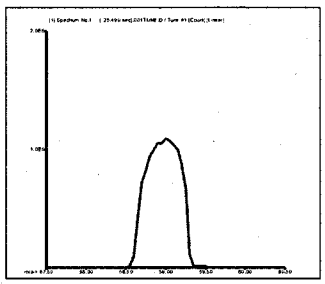
Data File: C:\ICPCHEM\1\DATA\JZG07A.B\001TUNE.D
Date Acquired: Jul 7 2009 02:44 pm
Acq. Method: TN6020.M
Operator: EAM
Sample Name: 6020 Tune
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN6020.M

RSD (%)

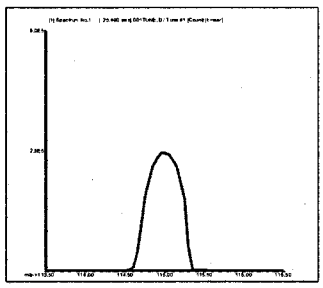
Element	Actual	Required	Flag
7 Li	3.26	5.00	
59 Co	1.11	5.00	
115 In	2.48	5.00	
205 Tl	1.45	5.00	



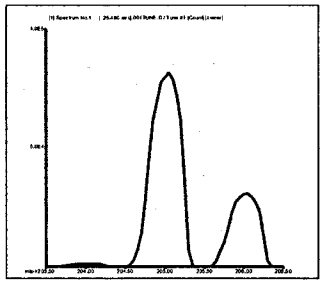
7 Li
Mass Calib.
Actual: 7.00
Required: 6.90 - 7.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.60
Required: 0.90
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



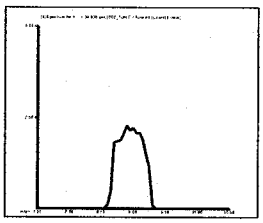
205 Tl
Mass Calib.
Actual: 205.05
Required: 204.90 - 205.10
Flag:
Peak Width
Actual: 0.55
Required: 0.90
Flag:

200.8 QC Tune Report

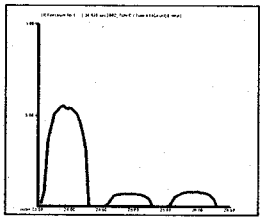
Data File: C:\ICPCHEM\1\DATA\JZG07A.B\002_TUN.D
Date Acquired: Jul 7 2009 02:50 pm
Acq. Method: TN200_8.M
Operator: EAM
Sample Name: 200.8 Tune
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN200_8.M

RSD (%)

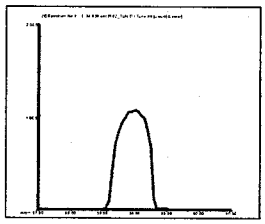
Element	Actual	Required	Flag
9 Be	0.88	5.00	
24 Mg	0.68	5.00	
59 Co	1.08	5.00	
115 In	3.03	5.00	
208 Pb	0.45	5.00	



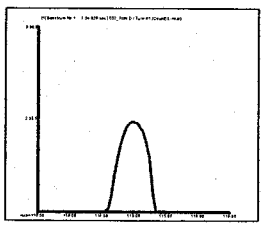
9 Be
Mass Calib.
Actual: 9.00
Required: 8.90 - 9.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



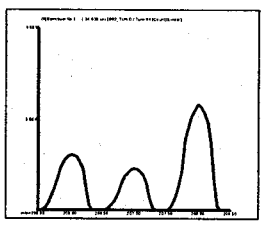
24 Mg
Mass Calib.
Actual: 23.95
Required: 23.90 - 24.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.70
Required: 1.00
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



208 Pb
Mass Calib.
Actual: 208.00
Required: 207.90 - 208.10
Flag:
Peak Width
Actual: 0.60
Required: 1.00
Flag:

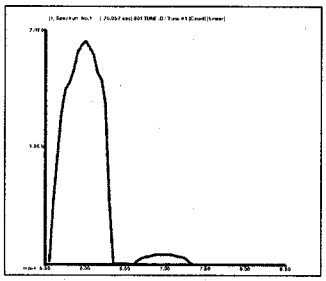
Tune Result: Pass

6020 QC Tune Report

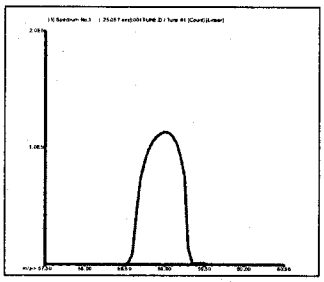
Data File: C:\ICPCHEM\1\DATA\JZG08A.B\001TUNE.D
Date Acquired: Jul 8 2009 04:01 pm
Acq. Method: TN6020.M
Operator: EAM
Sample Name: 6020 Tune
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN6020.M

RSD (%)

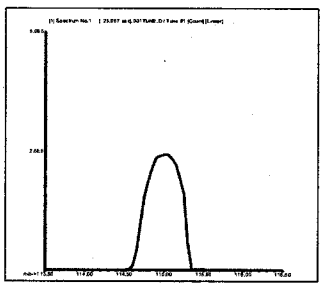
Element	Actual	Required	Flag
7 Li	1.28	5.00	
59 Co	0.98	5.00	
115 In	1.79	5.00	
205 Tl	1.48	5.00	



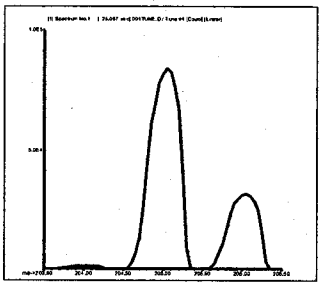
7 Li
Mass Calib.
Actual: 6.95
Required: 6.90 - 7.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



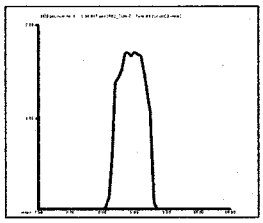
205 Tl
Mass Calib.
Actual: 205.05
Required: 204.90 - 205.10
Flag:
Peak Width
Actual: 0.60
Required: 0.90
Flag:

200.8 QC Tune Report

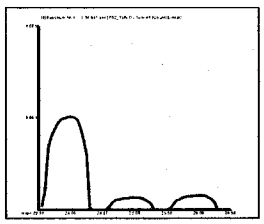
Data File: C:\ICPCHEM\1\DATA\JZG08A.B\002_TUN.D
Date Acquired: Jul 8 2009 04:07 pm
Acq. Method: TN200_8.M
Operator: EAM
Sample Name: 200.8 Tune
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN200_8.M

RSD (%)

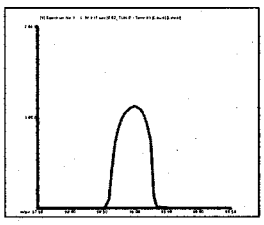
Element	Actual	Required	Flag
9 Be	1.34	5.00	
24 Mg	0.96	5.00	
59 Co	2.19	5.00	
115 In	1.39	5.00	
208 Pb	0.99	5.00	



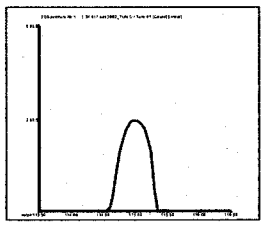
9 Be
Mass Calib.
Actual: 8.95
Required: 8.90 - 9.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



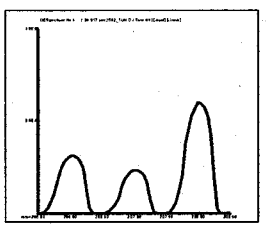
24 Mg
Mass Calib.
Actual: 23.95
Required: 23.90 - 24.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.70
Required: 1.00
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



208 Pb
Mass Calib.
Actual: 208.00
Required: 207.90 - 208.10
Flag:
Peak Width
Actual: 0.60
Required: 1.00
Flag:

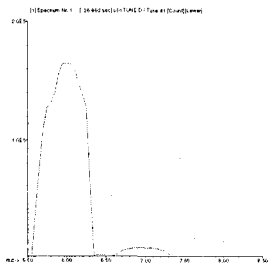
Tune Result: Pass

6020 QC Tune Report

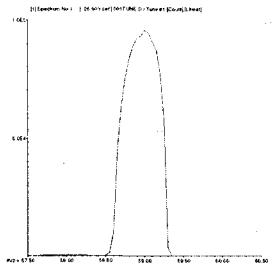
Data File: C:\ICPCHEM\1\DATA\JZG09A.B\001TUNE.D
Date Acquired: Jul 9 2009 05:43 pm
Acq. Method: TN6020.M
Operator: EAM
Sample Name: 6020 Tune
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN6020.M

RSD (%)

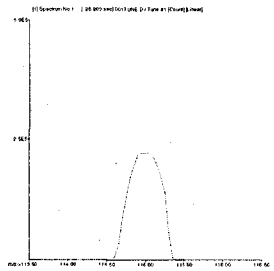
Element	Actual	Required	Flag
7 Li	3.24	5.00	
59 Co	0.83	5.00	
115 In	3.19	5.00	
205 Tl	1.03	5.00	



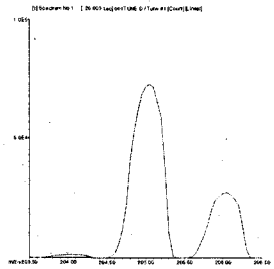
7 Li
Mass Calib.
Actual: 7.00
Required: 6.90 - 7.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



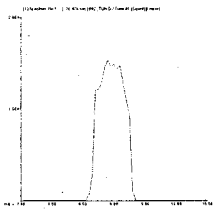
205 Tl
Mass Calib.
Actual: 205.05
Required: 204.90 - 205.10
Flag:
Peak Width
Actual: 0.60
Required: 0.90
Flag:

200.8 QC Tune Report

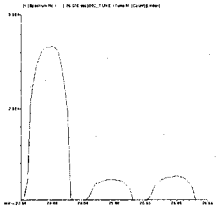
Data File: C:\ICPCHEM\1\DATA\JZG09A.B\002_TUN.D
Date Acquired: Jul 9 2009 05:49 pm
Acq. Method: TN200_8.M
Operator: EAM
Sample Name: 200.8 Tune
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN200_8.M

RSD (%)

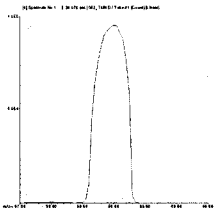
Element	Actual	Required	Flag
9 Be	1.25	5.00	
24 Mg	1.56	5.00	
59 Co	0.55	5.00	
115 In	1.01	5.00	
208 Pb	0.62	5.00	



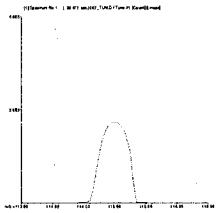
9 Be
Mass Calib.
Actual: 9.00
Required: 8.90 - 9.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



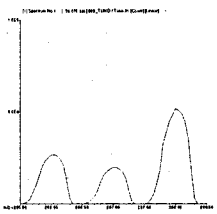
24 Mg
Mass Calib.
Actual: 23.95
Required: 23.90 - 24.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



208 Pb
Mass Calib.
Actual: 208.00
Required: 207.90 - 208.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:

Tune Result: Pass

Katahdin Analytical Services 4000333

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: ICV

File: JZG07A Jul 07, 2009 16:41

Analyte	True	Found	%R (1)
ALUMINUM	400.0	428.00	107.0
ANTIMONY	20.0	19.99	99.9
ARSENIC	20.0	19.54	97.7
CALCIUM	4000.0	4019.00	100.5
COPPER	20.0	20.15	100.7
IRON	4000.0	3968.00	99.2
LEAD	20.0	20.07	100.4
MAGNESIUM	4000.0	4156.00	103.9
MOLYBDENUM	40.0	41.74	104.4
POTASSIUM	4000.0	4052.00	101.3
SODIUM	4000.0	4034.00	100.8
TIN	20.0	21.32	106.6
ZINC	20.0	20.31	101.5

SAMPLE: CCV

File: JZG07A Jul 07, 2009 17:33

Analyte	True	Found	%R (1)
ALUMINUM	500.0	553.40	110.7 •
ANTIMONY	25.0	25.43	101.7
ARSENIC	25.0	25.52	102.1
CALCIUM	5000.0	5202.00	104.0
COPPER	25.0	25.40	101.6
IRON	5000.0	5136.00	102.7
LEAD	25.0	25.56	102.2
MAGNESIUM	5000.0	5092.00	101.8
MOLYBDENUM	25.0	29.98	119.9 •
POTASSIUM	5000.0	5083.00	101.7
SODIUM	5000.0	4934.00	98.7
TIN	25.0	25.23	100.9
ZINC	25.0	25.89	103.6

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: CCV

File: JZG07A Jul 07, 2009 18:07

Analyte	True	Found	%R (1)
ALUMINUM	500.0	560.70	112.1 •
ANTIMONY	25.0	26.94	107.8
ARSENIC	25.0	26.15	104.6
CALCIUM	5000.0	5480.00	109.6
COPPER	25.0	26.30	105.2
IRON	5000.0	5291.00	105.8
LEAD	25.0	26.73	106.9
MAGNESIUM	5000.0	5521.00	110.4
MOLYBDENUM	25.0	27.26	109.0
POTASSIUM	5000.0	5457.00	109.1
SODIUM	5000.0	5408.00	108.2
TIN	25.0	26.91	107.6
ZINC	25.0	26.68	106.7

SAMPLE: CCV

File: JZG07A Jul 07, 2009 19:50

Analyte	True	Found	%R (1)
ALUMINUM	500.0	518.70	103.7
ANTIMONY	25.0	24.58	98.3
ARSENIC	25.0	25.16	100.6
CALCIUM	5000.0	5110.00	102.2
COPPER	25.0	25.28	101.1
IRON	5000.0	5052.00	101.0
LEAD	25.0	25.27	101.1
MAGNESIUM	5000.0	5146.00	102.9
MOLYBDENUM	25.0	26.03	104.1
POTASSIUM	5000.0	5067.00	101.3
SODIUM	5000.0	5062.00	101.2
TIN	25.0	24.61	98.4
ZINC	25.0	25.55	102.2

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: CCV

File: JZG07A Jul 07, 2009 21:33

Analyte	True	Found	%R (1)
ALUMINUM	500.0	514.80	103.0
ANTIMONY	25.0	24.32	97.3
ARSENIC	25.0	24.87	99.5
CALCIUM	5000.0	5074.00	101.5
COPPER	25.0	25.03	100.1
IRON	5000.0	5032.00	100.6
LEAD	25.0	25.08	100.3
MAGNESIUM	5000.0	5199.00	104.0
MOLYBDENUM	25.0	26.01	104.0
POTASSIUM	5000.0	5068.00	101.4
SODIUM	5000.0	5188.00	103.8
TIN	25.0	24.31	97.2
ZINC	25.0	25.61	102.4

SAMPLE: CCV

File: JZG07A Jul 07, 2009 21:58

Analyte	True	Found	%R (1)
ALUMINUM	500.0	495.00	99.0
ANTIMONY	25.0	24.03	96.1
ARSENIC	25.0	24.52	98.1
CALCIUM	5000.0	4983.00	99.7
COPPER	25.0	24.31	97.2
IRON	5000.0	4890.00	97.8
LEAD	25.0	24.69	98.8
MAGNESIUM	5000.0	5018.00	100.4
MOLYBDENUM	25.0	24.96	99.8
POTASSIUM	5000.0	4905.00	98.1
SODIUM	5000.0	4999.00	100.0
TIN	25.0	24.15	96.6
ZINC	25.0	24.81	99.2

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: CCV

File: JZG07A Jul 07, 2009 23:42

Analyte	True	Found	%R (1)
ALUMINUM	500.0	543.40	108.7
ANTIMONY	25.0	24.70	98.8
ARSENIC	25.0	25.43	101.7
CALCIUM	5000.0	5184.00	103.7
COPPER	25.0	25.30	101.2
IRON	5000.0	5035.00	100.7
LEAD	25.0	25.71	102.8
MAGNESIUM	5000.0	5309.00	106.2
MOLYBDENUM	25.0	26.00	104.0
POTASSIUM	5000.0	5207.00	104.1
SODIUM	5000.0	5236.00	104.7
TIN	25.0	24.79	99.2
ZINC	25.0	25.70	102.8

SAMPLE: CCV

File: JZG07A Jul 08, 2009 1:25

Analyte	True	Found	%R (1)
ALUMINUM	500.0	572.70	114.5 •
ANTIMONY	25.0	26.36	105.4
ARSENIC	25.0	25.98	103.9
CALCIUM	5000.0	5476.00	109.5
COPPER	25.0	25.61	102.4
IRON	5000.0	5203.00	104.1
LEAD	25.0	26.23	104.9
MAGNESIUM	5000.0	5555.00	111.1 •
MOLYBDENUM	25.0	26.60	106.4
POTASSIUM	5000.0	5454.00	109.1
SODIUM	5000.0	5480.00	109.6
TIN	25.0	26.75	107.0
ZINC	25.0	26.03	104.1

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: CCV

File: JZG07A Jul 08, 2009 3:08

Analyte	True	Found	%R (1)
ALUMINUM	500.0	548.60	109.7
ANTIMONY	25.0	25.76	103.0
ARSENIC	25.0	25.37	101.5
CALCIUM	5000.0	5289.00	105.8
COPPER	25.0	25.16	100.6
IRON	5000.0	5120.00	102.4
LEAD	25.0	25.57	102.3
MAGNESIUM	5000.0	5416.00	108.3
MOLYBDENUM	25.0	26.23	104.9
POTASSIUM	5000.0	5238.00	104.8
SODIUM	5000.0	5384.00	107.7
TIN	25.0	25.71	102.8
ZINC	25.0	25.86	103.4

SAMPLE: CCV

File: JZG07A Jul 08, 2009 4:34

Analyte	True	Found	%R (1)
ALUMINUM	500.0	543.90	108.8
ANTIMONY	25.0	25.86	103.4
ARSENIC	25.0	25.26	101.0
CALCIUM	5000.0	5246.00	104.9
COPPER	25.0	25.36	101.4
IRON	5000.0	5096.00	101.9
LEAD	25.0	25.95	103.8
MAGNESIUM	5000.0	5400.00	108.0
MOLYBDENUM	25.0	26.20	104.8
POTASSIUM	5000.0	5279.00	105.6
SODIUM	5000.0	5364.00	107.3
TIN	25.0	25.95	103.8
ZINC	25.0	25.76	103.0

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: CCV

File: JZG07A Jul 08, 2009 5:16

Analyte	True	Found	%R (1)
ALUMINUM	500.0	532.70	106.5
ANTIMONY	25.0	25.08	100.3
ARSENIC	25.0	25.10	100.4
CALCIUM	5000.0	5190.00	103.8
COPPER	25.0	24.77	99.1
IRON	5000.0	5002.00	100.0
LEAD	25.0	25.44	101.8
MAGNESIUM	5000.0	5304.00	106.1
MOLYBDENUM	25.0	25.38	101.5
POTASSIUM	5000.0	5134.00	102.7
SODIUM	5000.0	5247.00	104.9
TIN	25.0	25.24	101.0
ZINC	25.0	25.39	101.6

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: ICV

File: JZG08A Jul 08, 2009 17:58

Analyte	True	Found	%R (1)
ALUMINUM	400.0	433.10	108.3
CALCIUM	4000.0	4164.00	104.1
COPPER	20.0	20.76	103.8
IRON	4000.0	4060.00	101.5
LEAD	20.0	20.55	102.8
MAGNESIUM	4000.0	4385.00	109.6
MOLYBDENUM	40.0	42.39	106.0
POTASSIUM	4000.0	4256.00	106.4
SODIUM	4000.0	4338.00	108.5

SAMPLE: CCV

File: JZG08A Jul 08, 2009 18:49

Analyte	True	Found	%R (1)
ALUMINUM	500.0	534.00	106.8
CALCIUM	5000.0	5294.00	105.9
COPPER	25.0	25.29	101.2
IRON	5000.0	5075.00	101.5
LEAD	25.0	24.97	99.9
MAGNESIUM	5000.0	5157.00	103.1
MOLYBDENUM	25.0	28.34	113.4 •
POTASSIUM	5000.0	5273.00	105.5
SODIUM	5000.0	5169.00	103.4

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: CCV

File: JZG08A Jul 08, 2009 19:24

Analyte	True	Found	%R (1)
ALUMINUM	500.0	516.90	103.4
CALCIUM	5000.0	5376.00	107.5
COPPER	25.0	25.25	101.0
IRON	5000.0	5066.00	101.3
LEAD	25.0	25.58	102.3
MAGNESIUM	5000.0	5314.00	106.3
MOLYBDENUM	25.0	25.36	101.4
POTASSIUM	5000.0	5407.00	108.1
SODIUM	5000.0	5334.00	106.7

SAMPLE: CCV

File: JZG08A Jul 08, 2009 21:07

Analyte	True	Found	%R (1)
ALUMINUM	500.0	514.50	102.9
CALCIUM	5000.0	5339.00	106.8
COPPER	25.0	25.24	101.0
IRON	5000.0	5108.00	102.2
LEAD	25.0	25.44	101.8
MAGNESIUM	5000.0	5268.00	105.4
MOLYBDENUM	25.0	25.19	100.8
POTASSIUM	5000.0	5340.00	106.8
SODIUM	5000.0	5351.00	107.0

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: CCV

File: JZG08A Jul 08, 2009 22:50

Analyte	True	Found	%R (1)
ALUMINUM	500.0	525.30	105.1
CALCIUM	5000.0	5409.00	108.2
COPPER	25.0	25.57	102.3
IRON	5000.0	5152.00	103.0
LEAD	25.0	25.81	103.2
MAGNESIUM	5000.0	5382.00	107.6
MOLYBDENUM	25.0	25.29	101.2
POTASSIUM	5000.0	5448.00	109.0
SODIUM	5000.0	5475.00	109.5

SAMPLE: CCV

File: JZG08A Jul 09, 2009 0:16

Analyte	True	Found	%R (1)
ALUMINUM	500.0	557.80	111.6 •
CALCIUM	5000.0	5854.00	117.1 •
COPPER	25.0	26.51	106.0
IRON	5000.0	5299.00	106.0
LEAD	25.0	27.16	108.6
MAGNESIUM	5000.0	5828.00	116.6 •
MOLYBDENUM	25.0	26.13	104.5
POTASSIUM	5000.0	5934.00	118.7 •
SODIUM	5000.0	5898.00	118.0 •

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: CCV

File: JZG08A Jul 09, 2009 0:50

Analyte	True	Found	%R (1)
ALUMINUM	500.0	511.60	102.3
CALCIUM	5000.0	5321.00	106.4
COPPER	25.0	25.52	102.1
IRON	5000.0	5040.00	100.8
LEAD	25.0	25.64	102.6
MAGNESIUM	5000.0	5292.00	105.8
MOLYBDENUM	25.0	24.87	99.5
POTASSIUM	5000.0	5427.00	108.5
SODIUM	5000.0	5440.00	108.8

SAMPLE: CCV

File: JZG08A Jul 09, 2009 2:33

Analyte	True	Found	%R (1)
ALUMINUM	500.0	512.60	102.5
CALCIUM	5000.0	5267.00	105.3
COPPER	25.0	25.33	101.3
IRON	5000.0	4961.00	99.2
LEAD	25.0	25.41	101.6
MAGNESIUM	5000.0	5317.00	106.3
MOLYBDENUM	25.0	25.01	100.0
POTASSIUM	5000.0	5324.00	106.5
SODIUM	5000.0	5389.00	107.8

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: ICV

File: JZG09A Jul 09, 2009 19:40

Analyte	True	Found	%R (1)
ALUMINUM	400.0	386.90	96.7
CALCIUM	4000.0	3500.00	87.5 •
IRON	4000.0	3776.00	94.4
MAGNESIUM	4000.0	3803.00	95.1
MOLYBDENUM	40.0	38.74	96.9
POTASSIUM	4000.0	3632.00	90.8
SODIUM	4000.0	3660.00	91.5
TIN	20.0	19.03	95.2

SAMPLE: CCV

File: JZG09A Jul 09, 2009 20:32

Analyte	True	Found	%R (1)
ALUMINUM	500.0	526.60	105.3
CALCIUM	5000.0	5003.00	100.1
IRON	5000.0	5033.00	100.7
MAGNESIUM	5000.0	5000.00	100.0
MOLYBDENUM	25.0	29.06	116.2 •
POTASSIUM	5000.0	5012.00	100.2
SODIUM	5000.0	4944.00	98.9
TIN	25.0	24.26	97.0

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: CCV

File: JZG09A Jul 09, 2009 21:06

Analyte	True	Found	%R (1)
ALUMINUM	500.0	481.40	96.3
CALCIUM	5000.0	4801.00	96.0
IRON	5000.0	4959.00	99.2
MAGNESIUM	5000.0	4781.00	95.6
MOLYBDENUM	25.0	25.33	101.3
POTASSIUM	5000.0	4814.00	96.3
SODIUM	5000.0	4682.00	93.6
TIN	25.0	23.62	94.5

SAMPLE: CCV

File: JZG09A Jul 09, 2009 22:49

Analyte	True	Found	%R (1)
ALUMINUM	500.0	481.10	96.2
CALCIUM	5000.0	4718.00	94.4
IRON	5000.0	4831.00	96.6
MAGNESIUM	5000.0	4814.00	96.3
MOLYBDENUM	25.0	24.25	97.0
POTASSIUM	5000.0	4699.00	94.0
SODIUM	5000.0	4661.00	93.2
TIN	25.0	22.90	91.6

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: PQL

File: JZG07A Jul 07, 2009 16:58

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	81.52	135.9 •
ANTIMONY	0.2	0.25	125.0
ARSENIC	1.0	1.16	116.0
CALCIUM	20.0	30.00	150.0 •
COPPER	0.2	0.27	135.0 •
IRON	20.0	47.49	237.5 •
LEAD	0.2	0.38	190.0 •
MAGNESIUM	20.0	28.50	142.5 •
MOLYBDENUM	1.0	1.27	127.0
POTASSIUM	200.0	235.20	117.6
SODIUM	200.0	234.30	117.2
TIN	0.2	0.25	125.0
ZINC	2.0	2.22	111.0

SAMPLE: PQL

File: JZG07A Jul 07, 2009 21:50

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	68.28	113.8
ANTIMONY	0.2	0.25	125.0
ARSENIC	1.0	1.25	125.0
CALCIUM	20.0	29.69	148.5 •
COPPER	0.2	0.25	125.0
IRON	20.0	20.63	103.1
LEAD	0.2	0.23	115.0
MAGNESIUM	20.0	28.01	140.1 •
MOLYBDENUM	1.0	1.21	121.0
POTASSIUM	200.0	238.50	119.2
SODIUM	200.0	262.70	131.3 •
TIN	0.2	0.26	130.0
ZINC	2.0	2.26	113.0

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: PQL

File: JZG07A Jul 08, 2009 05:08

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	67.26	112.1
ANTIMONY	0.2	0.21	105.0
ARSENIC	1.0	1.09	109.0
CALCIUM	20.0	16.88	84.4
COPPER	0.2	0.23	115.0
IRON	20.0	20.50	102.5
LEAD	0.2	0.31	155.0 •
MAGNESIUM	20.0	21.94	109.7
MOLYBDENUM	1.0	1.13	113.0
POTASSIUM	200.0	215.40	107.7
SODIUM	200.0	223.10	111.6
TIN	0.2	0.23	115.0
ZINC	2.0	2.15	107.5

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: PQL

File: JZG08A Jul 08, 2009 18:15

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	62.85	104.8
CALCIUM	20.0	23.55	117.8
COPPER	0.2	0.22	110.0
IRON	20.0	24.44	122.2
LEAD	0.2	0.23	115.0
MAGNESIUM	20.0	23.56	117.8
MOLYBDENUM	1.0	1.07	107.0
POTASSIUM	200.0	217.80	108.9
SODIUM	200.0	221.90	110.9

SAMPLE: PQL

File: JZG08A Jul 09, 2009 00:41

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	55.44	92.4
CALCIUM	20.0	13.36	66.8 •
COPPER	0.2	0.22	110.0 ✓
IRON	20.0	19.93	99.6
LEAD	0.2	0.19	95.0 ✓
MAGNESIUM	20.0	12.22	61.1 •
MOLYBDENUM	1.0	0.72	72.0
POTASSIUM	200.0	243.90	122.0
SODIUM	200.0	221.60	110.8

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: PQL

File: JZG09A Jul 09, 2009 19:57

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	55.18	92.0
CALCIUM	20.0	17.15	85.8
IRON	20.0	15.09	75.4
MAGNESIUM	20.0	18.56	92.8
MOLYBDENUM	1.0	1.05	105.0
POTASSIUM	200.0	189.20	94.6
SODIUM	200.0	195.30	97.7
TIN	0.2	0.20	100.0

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: ICB

File: JZG07A Jul 07, 2009 16:50

Analyte	Result	C
ALUMINUM	9.28	B
ANTIMONY	0.04	B
ARSENIC	0.53	B
CALCIUM	6.51	B
COPPER	0.24	B
IRON	21.48	
LEAD	0.11	B
MAGNESIUM	6.17	B
MOLYBDENUM	0.47	B
POTASSIUM	8.80	U
SODIUM	7.26	B
TIN	0.16	B
ZINC	0.44	U

SAMPLE: CCB

File: JZG07A Jul 07, 2009 17:41

Analyte	Result	C
ALUMINUM	22.35	B
ANTIMONY	0.05	B
ARSENIC	0.82	B
CALCIUM	24.65	
COPPER	0.14	B
IRON	28.49	
LEAD	0.03	B
MAGNESIUM	23.79	
MOLYBDENUM	3.13	
POTASSIUM	31.20	B
SODIUM	34.39	B
TIN	0.17	B
ZINC	0.44	U

SAMPLE: CCB

File: JZG07A Jul 07, 2009 18:15

Analyte	Result	C
ALUMINUM	5.13	B
ANTIMONY	0.04	B
ARSENIC	0.57	B
CALCIUM	6.10	B
COPPER	0.11	B
IRON	5.49	B
LEAD	0.02	U
MAGNESIUM	8.34	B
MOLYBDENUM	0.92	B
POTASSIUM	8.80	U
SODIUM	10.81	B
TIN	0.17	B
ZINC	0.44	U

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: CCB
File: JZG07A Jul 07, 2009 19:58

Analyte	Result	C
ALUMINUM	3.32	B
ANTIMONY	0.04	B
ARSENIC	1.00	B
CALCIUM	7.68	B
COPPER	0.13	B
IRON	6.77	B
LEAD	0.05	B
MAGNESIUM	6.05	B
MOLYBDENUM	0.42	B
POTASSIUM	8.80	U
SODIUM	20.26	B
TIN	0.19	B
ZINC	0.44	U

SAMPLE: CCB
File: JZG07A Jul 07, 2009 21:41

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.05	B
ARSENIC	0.91	B
CALCIUM	9.77	B
COPPER	0.18	B
IRON	6.58	B
LEAD	0.02	U
MAGNESIUM	6.58	B
MOLYBDENUM	0.38	B
POTASSIUM	8.80	U
SODIUM	42.55	B
TIN	0.20	B
ZINC	0.44	U

SAMPLE: CCB
File: JZG07A Jul 07, 2009 22:07

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.04	B
ARSENIC	0.64	B
CALCIUM	3.90	U
COPPER	0.10	B
IRON	7.19	B
LEAD	0.02	U
MAGNESIUM	4.37	B
MOLYBDENUM	0.33	B
POTASSIUM	8.80	U
SODIUM	21.76	B
TIN	0.16	B
ZINC	0.44	U

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: CCB
File: JZG07A Jul 07, 2009 23:50

Analyte	Result	C
ALUMINUM	5.28	B
ANTIMONY	0.04	B
ARSENIC	0.18	B
CALCIUM	3.90	U
COPPER	0.08	B
IRON	12.03	B
LEAD	0.15	B
MAGNESIUM	3.56	B
MOLYBDENUM	0.36	B
POTASSIUM	8.80	U
SODIUM	8.92	B
TIN	0.23	B
ZINC	0.44	U

SAMPLE: CCB
File: JZG07A Jul 08, 2009 1:33

Analyte	Result	C
ALUMINUM	9.13	B
ANTIMONY	0.05	B
ARSENIC	0.83	B
CALCIUM	3.90	U
COPPER	0.05	B
IRON	15.76	B
LEAD	0.05	B
MAGNESIUM	5.02	B
MOLYBDENUM	0.32	B
POTASSIUM	8.80	U
SODIUM	10.24	B
TIN	0.25	B
ZINC	0.44	U

SAMPLE: CCB
File: JZG07A Jul 08, 2009 3:17

Analyte	Result	C
ALUMINUM	6.44	B
ANTIMONY	0.05	B
ARSENIC	0.27	B
CALCIUM	5.12	B
COPPER	0.06	B
IRON	19.42	B
LEAD	0.07	B
MAGNESIUM	4.65	B
MOLYBDENUM	0.42	B
POTASSIUM	10.57	B
SODIUM	10.20	B
TIN	0.37	B
ZINC	0.44	U

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: CCB

File: JZG07A Jul 08, 2009 4:42

Analyte	Result	C
ALUMINUM	7.85	B
ANTIMONY	0.06	B
ARSENIC	0.64	B
CALCIUM	6.30	B
COPPER	0.16	B
IRON	19.35	B
LEAD	0.40	
MAGNESIUM	4.71	B
MOLYBDENUM	0.32	B
POTASSIUM	13.27	B
SODIUM	8.85	B
TIN	0.29	B
ZINC	0.44	U

SAMPLE: CCB

File: JZG07A Jul 08, 2009 5:25

Analyte	Result	C
ALUMINUM	2.40	B
ANTIMONY	0.05	B
ARSENIC	0.54	B
CALCIUM	3.90	U
COPPER	0.04	B
IRON	11.58	B
LEAD	0.09	B
MAGNESIUM	3.90	B
MOLYBDENUM	0.88	B
POTASSIUM	9.27	B
SODIUM	7.89	B
TIN	0.32	B
ZINC	0.44	U

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: ICB

File: JZG08A Jul 08, 2009 18:06

Analyte	Result	C
ALUMINUM	-2.32	B
CALCIUM	3.90	U
COPPER	0.04	U
IRON	3.10	U
LEAD	0.02	U
MAGNESIUM	2.00	U
MOLYBDENUM	0.20	B
POTASSIUM	10.68	B
SODIUM	6.50	U

SAMPLE: CCB

File: JZG08A Jul 08, 2009 18:58

Analyte	Result	C
ALUMINUM	7.44	B
CALCIUM	11.75	B
COPPER	0.04	U
IRON	12.23	B
LEAD	-0.02	B
MAGNESIUM	10.72	B
MOLYBDENUM	1.60	
POTASSIUM	25.91	B
SODIUM	17.14	B

SAMPLE: CCB

File: JZG08A Jul 08, 2009 19:32

Analyte	Result	C
ALUMINUM	-7.34	B
CALCIUM	3.90	U
COPPER	0.04	U
IRON	-4.73	B
LEAD	-0.04	B
MAGNESIUM	-2.32	B
MOLYBDENUM	0.32	B
POTASSIUM	8.80	U
SODIUM	6.50	U

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: CCB

File: JZG08A Jul 08, 2009 21:15

Analyte	Result	C
ALUMINUM	-7.78	B
CALCIUM	3.90	U
COPPER	0.04	U
IRON	3.10	U
LEAD	-0.02	B
MAGNESIUM	-3.23	B
MOLYBDENUM	0.07	U
POTASSIUM	8.80	U
SODIUM	6.50	U

SAMPLE: CCB

File: JZG08A Jul 08, 2009 22:59

Analyte	Result	C
ALUMINUM	-4.62	B
CALCIUM	3.90	U
COPPER	0.04	U
IRON	8.99	B
LEAD	0.04	B
MAGNESIUM	-2.89	B
MOLYBDENUM	0.07	U
POTASSIUM	14.21	B
SODIUM	6.50	U

SAMPLE: CCB

File: JZG08A Jul 09, 2009 0:24

Analyte	Result	C
ALUMINUM	2.20	U
CALCIUM	3.90	U
COPPER	0.05	B
IRON	15.93	B
LEAD	0.09	B
MAGNESIUM	2.00	U
MOLYBDENUM	0.07	U
POTASSIUM	38.62	B
SODIUM	6.50	U

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: CCB
File: JZG08A Jul 09 2009 0:59

Analyte	Result	C
ALUMINUM	-9.03	B
CALCIUM	-5.38	B
COPPER	0.04	U
IRON	3.10	U
LEAD	0.02	U
MAGNESIUM	-3.12	B
MOLYBDENUM	-0.12	B
POTASSIUM	19.14	B
SODIUM	6.50	U

SAMPLE: CCB
File: JZG08A Jul 09 2009 2:42

Analyte	Result	C
ALUMINUM	-7.09	B
CALCIUM	3.90	U
COPPER	0.04	U
IRON	4.89	B
LEAD	0.05	B
MAGNESIUM	-3.49	B
MOLYBDENUM	-0.07	B
POTASSIUM	22.57	B
SODIUM	6.50	U

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: ICB

File: JZG09A Jul 09, 2009 19:48

Analyte	Result	C
ALUMINUM	2.20	U
CALCIUM	3.90	U
IRON	3.10	U
MAGNESIUM	2.89	B
MOLYBDENUM	0.32	B
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.04	U

SAMPLE: CCB

File: JZG09A Jul 09, 2009 20:40

Analyte	Result	C
ALUMINUM	18.55	B
CALCIUM	20.54	
IRON	18.34	B
MAGNESIUM	22.52	
MOLYBDENUM	2.23	
POTASSIUM	27.15	B
SODIUM	27.53	B
TIN	0.04	U

SAMPLE: CCB

File: JZG09A Jul 09, 2009 21:15

Analyte	Result	C
ALUMINUM	2.20	U
CALCIUM	3.90	U
IRON	3.23	B
MAGNESIUM	6.52	B
MOLYBDENUM	0.57	B
POTASSIUM	8.80	U
SODIUM	9.59	B
TIN	0.05	B

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: CCB

File: JZG09A Jul 09, 2009 22:57

Analyte	Result	C
ALUMINUM	2.28	B
CALCIUM	3.90	U
IRON	3.10	U
MAGNESIUM	3.37	B
MOLYBDENUM	0.20	B
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.04	U

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services **Sample ID:** PBWZF26ICW1

Matrix: WATER **SDG Name:** CTO423-6

QC Batch ID: ZF26ICW1

Concentration Units : ug/L

Analyte	RESULT	C
ANTIMONY	0.241	B
ARSENIC	1.801	B
COPPER	0.370	U
LEAD	0.270	B
TIN	0.385	B
ZINC	3.540	U

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services **Sample ID:** PBSZG01ICS0

Matrix: SOIL **SDG Name:** CTO423-6

QC Batch ID: ZG01ICS0

Concentration Units : mg/Kgdrywt

Analyte	RESULT	C
ANTIMONY	0.020	U
ARSENIC	0.150	U
COPPER	0.145	B
LEAD	0.030	B
TIN	0.621	
ZINC	0.350	U

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: ICSA

File: JZG07A Jul 07, 2009 17:07

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	102100	102.1
ANTIMONY	0	0	
ARSENIC	0	0	
CALCIUM	100000	100500	100.5
COPPER	0	1	
IRON	100000	93040	93.0
LEAD	0	0	
MAGNESIUM	100000	99890	99.9
MOLYBDENUM	2000	2046	102.3
POTASSIUM	100000	102900	102.9
SODIUM	100000	101600	101.6
TIN	0	0	
ZINC	0	1	

SAMPLE: ICSAB

File: JZG07A Jul 07, 2009 17:15

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	103500	103.5
ANTIMONY	20	21	105.0
ARSENIC	20	20	100.0
CALCIUM	100000	102700	102.7
COPPER	20	19	95.0
IRON	100000	94210	94.2
LEAD	20	22	110.0
MAGNESIUM	100000	101000	101.0
MOLYBDENUM	2000	2119	106.0
POTASSIUM	100000	103200	103.2
SODIUM	100000	102500	102.5
TIN	20	23	115.0
ZINC	21	18	85.7

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: ICSA

File: JZG08A Jul 08, 2009 18:23

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	98600	98.6
CALCIUM	100000	98800	98.8
COPPER	0	1	
IRON	100000	91910	91.9
LEAD	0	0	
MAGNESIUM	100000	97300	97.3
MOLYBDENUM	2000	1980	99.0
POTASSIUM	100000	103500	103.5
SODIUM	100000	100900	100.9

SAMPLE: ICSAB

File: JZG08A Jul 08, 2009 18:32

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	98790	98.8
CALCIUM	100000	99080	99.1
COPPER	20	19	95.0
IRON	100000	91640	91.6
LEAD	20	21	105.0
MAGNESIUM	100000	97700	97.7
MOLYBDENUM	2000	2011	100.6
POTASSIUM	100000	103700	103.7
SODIUM	100000	100900	100.9

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Concentration Units: ug/L

SAMPLE: ICSA

File: JZG09A Jul 09, 2009 20:06

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	92800	92.8
CALCIUM	100000	90100	90.1
IRON	100000	90620	90.6
MAGNESIUM	100000	90150	90.1
MOLYBDENUM	2000	1943	97.2
POTASSIUM	100000	92810	92.8
SODIUM	100000	92140	92.1
TIN	0	0	

SAMPLE: ICSAB

File: JZG09A Jul 09, 2009 20:14

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	97220	97.2
CALCIUM	100000	94490	94.5
IRON	100000	93390	93.4
MAGNESIUM	100000	94860	94.9
MOLYBDENUM	2000	2040	102.0
POTASSIUM	100000	97640	97.6
SODIUM	100000	96490	96.5
TIN	20	21	105.0

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0100001S

Matrix: SOIL **SDG Name:** CTO423-6

Percent Solids: 80.8 **Lab Sample ID:** SC3309-019P

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	26.2175		0.4849		49.92	51.5	N	75	125	MS
ARSENIC, TOTAL	49.2102		8.4668		49.92	81.6		75	125	MS
COPPER, TOTAL	35.1330		14.0001		24.96	84.7		75	125	MS
LEAD, TOTAL	124.5979		83.9681		49.92	81.4		75	125	MS
TIN, TOTAL	48.2118		1.3941		49.92	93.8		75	125	MS
ZINC, TOTAL	72.6821		33.4204		49.92	78.6		75	125	MS

Comments:

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services | **Client Field ID:** X25SS0100001S

Matrix: SOIL | **SDG Name:** CTO423-6

Percent Solids: 80.8 | **Lab Sample ID:** SC3309-019S

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	28.6310		0.4849		49.13	57.3	N	75	125	MS
ARSENIC, TOTAL	52.2904		8.4668		49.13	89.2		75	125	MS
COPPER, TOTAL	41.2074		14.0001		24.56	110.8		75	125	MS
LEAD, TOTAL	160.2511		83.9681		49.13	155.3	N	75	125	MS
TIN, TOTAL	50.7183		1.3941		49.13	100.4		75	125	MS
ZINC, TOTAL	89.9607		33.4204		49.13	115.1		75	125	MS

Comments:

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services | **Client Field ID:** X14SS1200001S

Matrix: SOIL | **SDG Name:** CTO423-6

Percent Solids: 79.0 | **Lab Sample ID:** SC3349-001P

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	33.2506		0.1419		51.46	64.3	N	75	125	MS
ARSENIC, TOTAL	47.2774		1.6234		51.46	88.7		75	125	MS
COPPER, TOTAL	159.8210		276.5788		25.73	-453.8		75	125	MS
LEAD, TOTAL	420.9065		741.0244		51.46	-622.1		75	125	MS
TIN, TOTAL	53.2153		3.7368		51.46	96.1		75	125	MS
ZINC, TOTAL	59.2665		9.2720		51.46	97.2		75	125	MS

Comments:

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS1200001S

Matrix: SOIL **SDG Name:** CTO423-6

Percent Solids: 79.0 **Lab Sample ID:** SC3349-001S

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	33.5386		0.1419		52.31	63.8	N	75	125	MS
ARSENIC, TOTAL	47.5776		1.6234		52.31	87.8		75	125	MS
COPPER, TOTAL	193.5324		276.5788		26.15	-317.6		75	125	MS
LEAD, TOTAL	614.9101		741.0244		52.31	-241.1		75	125	MS
TIN, TOTAL	52.5153		3.7368		52.31	93.2		75	125	MS
ZINC, TOTAL	56.9299		9.2720		52.31	91.1		75	125	MS

Comments:

5B

POST DIGEST SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0100001S

Matrix: SOIL **SDG Name:** CTO423-6

Percent Solids: 80.8 **Lab Sample ID:** SC3309-019A

Concentration Units : ug/L

Analyte	Spiked Sample	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	2.9090		0.9008		2	100.4		75	125	MS
LEAD, TOTAL	361.0000		156.0000		200	102.5		75	125	MS

Comments:

5B

POST DIGEST SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS1200001S

Matrix: SOIL **SDG Name:** CTO423-6

Percent Solids: 79.0 **Lab Sample ID:** SC3349-001A

Concentration Units : ug/L

Analyte	Spiked Sample	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	2.2640		0.2690		2	99.8		75	125	MS

Comments:

5D

SPIKE DUPLICATES

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0100001

Matrix: SOIL **SDG Name:** CTO423-6

Percent Solids: 80.8 **Lab Sample ID:** SC3309-019

Concentration Units : mg/Kgdrywt

Analyte	Control Limits	Spike Result	C	Spike Dup. Result	C	RPD	Q	M
ANTIMONY, TOTAL		28.6310		26.2175		8.8		MS
ARSENIC, TOTAL		52.2904		49.2102		6.1		MS
COPPER, TOTAL		41.2074		35.1330		15.9		MS
LEAD, TOTAL		160.2511		124.5979		25.0	* OK	MS
TIN, TOTAL		50.7183		48.2118		5.1		MS
ZINC, TOTAL		89.9607		72.6821		21.2	* OK	MS

Comments:

5D

SPIKE DUPLICATES

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS1200001

Matrix: SOIL **SDG Name:** CTO423-6

Percent Solids: 79.0 **Lab Sample ID:** SC3349-001

Concentration Units : mg/Kgdrywt

Analyte	Control Limits	Spike Result	C	Spike Dup. Result	C	RPD	Q	M
ANTIMONY, TOTAL		33.5386		33.2506		0.9		MS
ARSENIC, TOTAL		47.5776		47.2774		0.6		MS
COPPER, TOTAL		193.5324		159.8210		19.1		MS
LEAD, TOTAL		614.9101		420.9065		37.5	*	MS
TIN, TOTAL		52.5153		53.2153		1.3		MS
ZINC, TOTAL		56.9299		59.2665		4.0		MS

Comments:

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID:** LC2SZG01ICS0

Matrix: SOIL **SDG Name:** CTO423-6

QC Batch ID: ZG01ICS0

Concentration Units : mg/Kgdrywt

Analyte	TRUE	FOUND	% R	LIMITS (%)	
ANTIMONY	126.0	114.32	90.7	50	150
ARSENIC	225.0	227.89	101.3	80	120
COPPER	66.7	70.92	106.3	81	119
LEAD	223.0	237.59	106.5	82	118
TIN	164.0	184.55	112.5	74	126
ZINC	349.0	383.58	109.9	80	120

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID:** LCSSZG01ICS0

Matrix: SOIL **SDG Name:** CTO423-6

QC Batch ID: ZG01ICS0

Concentration Units : mg/Kgdrywt

Analyte	TRUE	FOUND	% R	LIMITS (%)	
ANTIMONY	126.0	114.41	90.8	50	150
ARSENIC	225.0	231.44	102.9	80	120
COPPER	66.7	69.39	104.0	81	119
LEAD	223.0	237.03	106.3	82	118
TIN	164.0	187.63	114.4	74	126
ZINC	349.0	375.10	107.5	80	120

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID:** LCSWZF26ICW1

Matrix: WATER **SDG Name:** CTO423-6

QC Batch ID: ZF26ICW1

Concentration Units : ug/L

Analyte	TRUE	FOUND	% R	LIMITS (%)	
ANTIMONY	500.0	503.80	100.8	80	120
ARSENIC	500.0	495.30	99.1	80	120
COPPER	250.0	250.90	100.4	80	120
LEAD	500.0	513.50	102.7	80	120
TIN	500.0	533.00	106.6	80	120
ZINC	500.0	493.50	98.7	80	120

7D

LABORATORY CONTROL SAMPLE DUPLICATES

Lab Name: Katahdin Analytical Services

Matrix: SOIL **SDG Name:** CTO423-6

QC Batch ID: ZG01ICS0 **Lab Sample ID:** LCSSZG01ICS0

Concentration Units: mg/Kgdrywt

Analyte	Control Limit (%)	LCS Result	LCS Dup. Result	RPD(%)	Q
ANTIMONY	20.0	114.41	114.32	0.1	
ARSENIC	20.0	231.44	227.89	1.5	
COPPER	20.0	69.39	70.92	2.2	
LEAD	20.0	237.03	237.59	0.2	
TIN	20.0	187.63	184.55	1.7	
ZINC	20.0	375.10	383.58	2.2	

ICP SERIAL DILUTION

Lab Name: Katahdin Analytical Services

Matrix: SOIL

Client Field ID: X25SS0100001L

SDG Name: CTO423-6

Lab Sample ID: SC3309-019L

Concentration Units: ug/L

Analyte	Sample Result	C	Dilution Result	C	% Difference	Q	M
ANTIMONY, TOTAL	0.90		0.87	B	3.3		MS
ARSENIC, TOTAL	15.73		16.97		7.9		MS
COPPER, TOTAL	26.01		28.01		7.7		MS
LEAD, TOTAL	156.00		151.05		3.2		MS
TIN, TOTAL	2.59		2.28	B	12.0		MS
ZINC, TOTAL	62.09		65.45		5.4		MS

ICP SERIAL DILUTION

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS1200001L

Matrix: SOIL **SDG Name:** CTO423-6

Lab Sample ID: SC3349-001L

Concentration Units: ug/L

Analyte	Sample Result	C	Dilution Result	C	% Difference	Q	M
ANTIMONY, TOTAL	0.27		0.31	B	14.8	OK	MS
ARSENIC, TOTAL	3.08		3.93	B	27.6	OK	MS
COPPER, TOTAL	262.20		264.15		0.7		MS
LEAD, TOTAL	702.50		685.50		2.4		MS
TIN, TOTAL	7.09		6.57		7.3		MS
ZINC, TOTAL	17.58		18.63		6.0		MS

INSTRUMENT DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name AGILENT 7500 ICP-MS **Date:** 3/6/2009

Concentration Units: ug/L

Analyte	CRDL	IDL	M
ALUMINUM	60	2.20	MS
ANTIMONY	0.20	0.03	MS
ARSENIC	1.0	0.08	MS
CALCIUM	20	3.90	MS
COPPER	1.0	0.04	MS
IRON	20	3.10	MS
LEAD	0.20	0.02	MS
MAGNESIUM	20	2.00	MS
MOLYBDENUM	1.0	0.07	MS
POTASSIUM	200	8.80	MS
SODIUM	200	6.50	MS
TIN	1.0	0.04	MS
ZINC	2.0	0.44	MS

METHOD DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name AGILENT 7500 ICP-MS **Date:** 2/25/2009

Analyte	MDL	Units	M	EPA Prep./Anal. Method
ANTIMONY	0.03	ug/L	MS	SW846 3010A / SW846 6020
ARSENIC	0.30	ug/L	MS	SW846 3010A / SW846 6020
COPPER	0.07	ug/L	MS	SW846 3010A / SW846 6020
LEAD	0.01	ug/L	MS	SW846 3010A / SW846 6020
TIN	0.02	ug/L	MS	SW846 3010A / SW846 6020
ZINC	0.71	ug/L	MS	SW846 3010A / SW846 6020

METHOD DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name AGILENT 7500 ICP-MS **Date:** 3/11/2009

Analyte	MDL	Units	M	EPA Prep./Anal. Method
ANTIMONY	0.01	mg/kg	MS	SW846 3050B / SW846 6020
ARSENIC	0.03	mg/kg	MS	SW846 3050B / SW846 6020
COPPER	0.02	mg/kg	MS	SW846 3050B / SW846 6020
LEAD	0.01	mg/kg	MS	SW846 3050B / SW846 6020
TIN	0.04	mg/kg	MS	SW846 3050B / SW846 6020
ZINC	0.07	mg/kg	MS	SW846 3050B / SW846 6020

ICP LINEAR RANGES

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name AGILENT 7500 ICP-MS **Date:** 1/6/2009

Concentration Units: ug/L

Analyte	Integration Time (sec)	Linear Range	M
ALUMINUM	0.01	100000	MS
ANTIMONY	0.10	1000	MS
ARSENIC	0.30	1000	MS
CALCIUM	0.03	100000	MS
COPPER	0.10	500	MS
IRON	0.03	100000	MS
LEAD	0.10	1000	MS
MAGNESIUM	0.05	100000	MS
MOLYBDENUM	0.10	2000	MS
POTASSIUM	0.01	100000	MS
SODIUM	0.01	100000	MS
TIN	0.10	1000	MS
ZINC	0.10	250	MS

PREPARATION LOG

Lab Name: Katahdin Analytical Services **QC Batch ID:** ZF26ICW1

Matrix: WATER **SDG Name:** CTO423-6

Method: P **Prep Date:** 06/26/2009

Client ID	Lab Sample ID	Initial (L)	Final (L)
LCSWZF26ICW1	LCSWZF26ICW1	0.05	0.05
PBWZF26ICW1	PBWZF26ICW1	0.05	0.05
RB06170901	SC3309-001	0.05	0.05
SB06160901	SC3309-002	0.05	0.05
IDW06170901	SC3309-003	0.05	0.05

PREPARATION LOG

Lab Name: Katahdin Analytical Services **QC Batch ID:** ZG01ICS0

Matrix: SOIL **SDG Name:** CTO423-6

Method: P **Prep Date:** 07/01/2009

Client ID	Lab Sample ID	Initial (g)	Final (L)
LC2SZG01ICS0	LC2SZG01ICS0	0.5055	0.1
LCSSZG01ICS0	LCSSZG01ICS0	0.5012	0.1
PBSZG01ICS0	PBSZG01ICS0	1	0.1
X25SS0100001	SC3309-019	1.15	0.1
X25SS0100001P	SC3309-019P	1.24	0.1
X25SS0100001S	SC3309-019S	1.26	0.1
X25SS0130001	SC3309-020	1.09	0.1
X14SS1200001	SC3349-001	1.2	0.1
X14SS1200001P	SC3349-001P	1.23	0.1
X14SS1200001S	SC3349-001S	1.21	0.1
FD06170901	SC3349-002	1.2	0.1

File:	009CALB.D#	010CALI.D#	011CALI.D#	012CALI.D#	013CALI.D#
Sample:	Cal Blank	Cal Std 1	Cal Std 2	Cal Std 3	Cal Std 4
Date/Time:	7/7/2009 15:50	7/7/2009 15:58	7/7/2009 16:07	7/7/2009 16:15	7/7/2009 16:24
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0000	0.5164	4.9140	25.0200	68.8900
B / 11	0.0000	0.5556	4.9570	25.0100	70.9200
Na / 23	0.0000	112.4000	1049.0000	4990.0000	11320.0000
Mg / 25	0.0000	101.1000	1008.0000	4998.0000	11140.0000
Al / 27	0.0000	10.4900	103.6000	499.3000	1134.0000
Si / 29	0.0000	13.5500	111.5000	497.6000	1162.0000
K / 39	0.0000	116.8000	1049.0000	4990.0000	11300.0000
Ca / 44	0.0000	103.7000	1008.0000	4998.0000	11190.0000
V / 51	0.0000	0.6306	5.0360	24.9900	54.7400
Cr / 52	0.0000	0.7183	5.2450	24.9500	54.4200
Mn / 55	0.0000	0.5463	5.1990	24.9600	54.6400
Fe / 57	0.0000	105.4000	1028.0000	4994.0000	10930.0000
Co / 59	0.0000	0.5353	5.2710	24.9400	54.7100
Ni / 60	0.0000	0.5983	5.1960	24.9600	54.2100
Cu / 65	0.0000	0.5917	5.2090	24.9600	54.4100
Zn / 66	0.0000	0.5866	5.2390	24.9500	53.3700
As / 75	0.0000	0.7906	5.2770	24.9400	54.2400
Se / 82	0.0000	0.5139	5.3280	24.9300	52.8900
Sr / 88	0.0000	0.5245	5.1920	24.9600	55.0900
Mo / 98	0.0000	0.5323	5.2350	24.9500	56.1500
Ag / 107	0.0000	0.5300	5.2680	24.9400	54.2900
Cd / 114	0.0000	0.5381	5.1280	24.9700	53.8100
Sn / 118	0.0000	0.5520	5.3400	24.9300	56.8300
Sb / 123	0.0000	0.5330	5.2220	24.9500	55.7500
Ba / 135	0.0000	0.6061	5.1320	24.9700	56.8100
W / 182	0.0000	0.4921	5.2920	24.9400	58.9600
Tl / 203	0.0000	0.4669	4.8930	25.0200	56.0700
Pb / 208	0.0000	0.5231	5.1120	24.9800	55.7700
Th / 232	0.0000	0.3384	4.2670	25.1500	58.5900
U / 238	0.0000	0.4965	5.0070	25.0000	56.4000
Li / 6	942468.6	959266.1	963697.7	981324.8	718238.8
Sc / 45	767582.6	776025	772718.6	825504.1	717146.4
Ge / 72	161803	160639.8	161701.1	169298.3	151885.3
Tb / 159	1126156	1149234	1138803	1216438	1067098
Bi / 209	660364.8	661902.9	661950.4	680777	596454.9
Li / 6	100.0	101.8	102.3	104.1	76.2
Sc / 45	100.0	101.1	100.7	107.5	93.4
Ge / 72	100.0	99.3	99.9	104.6	93.9
Tb / 159	100.0	102.0	101.1	108.0	94.8
Bi / 209	100.0	100.2	100.2	103.1	90.3

File:	014SMPL.D#	015_ICV.D#	016_ICB.D#	017_PQL.D#	018ICSA.D#
Sample:	Blank	ICV	ICB	PQL	ICSA
Date/Time:	7/7/2009 16:32	7/7/2009 16:41	7/7/2009 16:50	7/7/2009 16:58	7/7/2009 17:07
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0643	20.0800	0.0258	0.2860	0.0513
B / 11	0.6563	21.5900	0.2810	10.4000	0.9525
Na / 23	10.5100	4034.0000	7.2610	234.3000	101600.0000
Mg / 25	9.8620	4156.0000	6.1720	28.5000	99890.0000
Al / 27	5.1640	428.0000	9.2820	81.5200	102100.0000
Si / 29	-0.0498	417.0000	14.6600	45.9200	75.0100
K / 39	15.4600	4052.0000	-1.2450	235.2000	102900.0000
Ca / 44	11.0400	4019.0000	6.5100	30.0000	100500.0000
V / 51	0.0866	20.1500	0.3992	1.1950	0.3542
Cr / 52	0.0795	19.9900	0.9014	0.7241	1.9230
Mn / 55	0.1063	19.8800	0.2122	0.5016	2.1270
Fe / 57	14.5800	3968.0000	21.4800	47.4900	93040.0000
Co / 59	0.0562	19.9900	0.0412	0.2740	0.1808
Ni / 60	0.0518	20.0000	0.0412	0.2744	1.1760
Cu / 65	0.2183	20.1500	0.2403	0.2664	0.8419
Zn / 66	0.1299	20.3100	0.3441	2.2230	0.5080
As / 75	0.0852	19.5400	0.5315	1.1630	0.4797
Se / 82	0.1098	19.6900	0.3910	1.1610	-0.2998
Sr / 88	0.0537	20.9900	0.0699	0.3258	2.8000
Mo / 98	0.3828	41.7400	0.4691	1.2660	2046.0000
Ag / 107	0.0484	20.2100	0.0304	0.2460	0.0625
Cd / 114	0.0503	19.7600	0.0296	0.2539	0.0934
Sn / 118	0.0754	21.3200	0.1625	0.2469	0.0662
Sb / 123	0.0497	19.9900	0.0441	0.2498	0.1527
Ba / 135	0.0551	20.5900	0.0823	0.3237	1.6230
W / 182	0.4195	26.4100	0.3145	1.5090	0.3482
Tl / 203	0.3667	19.6700	0.2247	0.5201	0.0960
Pb / 208	0.0844	20.0700	0.1128	0.3772	0.2365
Th / 232	0.0553	21.6600	0.1855	0.1256	0.0701
U / 238	0.0445	20.6300	0.0306	0.2452	0.0228
Li / 6	834287.1	961633.6	1195105	838105.1	569139.6
Sc / 45	769718.7	814698.2	951420.1	771927.9	739185.7
Ge / 72	161514.9	168564.5	178824.3	161291.5	158534
Tb / 159	1137193	1189538	1296762	1135152	1082503
Bi / 209	661440.4	674589.5	702510.8	650818.9	563198.3
Li / 6	88.5	102.0	126.8	88.9	60.4
Sc / 45	100.3	106.1	124.0	100.6	96.3
Ge / 72	99.8	104.2	110.5	99.7	98.0
Tb / 159	101.0	105.6	115.1	100.8	96.1
Bi / 209	100.2	102.2	106.4	98.6	85.3

File:	019ICSB.D#	020_BLK.D#	021_CCV.D#	022_CCB.D#	023_BLK.D#
Sample:	ICSAB	Blank	CCV	CCB	BLANK
Date/Time:	7/7/2009 17:15	7/7/2009 17:24	7/7/2009 17:33	7/7/2009 17:41	7/7/2009 17:50
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	31.2000	0.0410	13.7500	0.0083	0.0065
B / 11	33.0500	0.4717	34.3700	0.4551	0.3623
Na / 23	102500.0000	99.8100	4934.0000	34.3900	16.3200
Mg / 25	101000.0000	87.2500	5092.0000	23.7900	16.1200
Al / 27	103500.0000	103.1000	553.4000	22.3500	16.2300
Si / 29	573.3000	-0.6776	510.1000	22.9300	-1.7700
K / 39	103200.0000	96.6100	5083.0000	31.2000	22.4400
Ca / 44	102700.0000	92.0100	5202.0000	24.6500	16.0500
V / 51	20.5700	0.0343	25.2100	0.5705	0.0040
Cr / 52	21.4900	0.0753	24.8300	1.0430	0.0301
Mn / 55	21.6100	0.2453	25.1500	0.1077	0.0467
Fe / 57	94210.0000	103.2000	5136.0000	28.4900	12.1900
Co / 59	19.4100	0.0501	10.3300	0.0122	0.0075
Ni / 60	19.8000	0.0549	25.3700	0.0343	0.0251
Cu / 65	19.2300	0.1907	25.4000	0.1425	0.1757
Zn / 66	17.8300	0.1404	25.8900	0.1549	0.0856
As / 75	19.9200	0.0427	25.5200	0.8170	0.1029
Se / 82	18.1700	0.0967	25.1100	0.3234	0.0937
Sr / 88	24.5700	0.0826	25.5900	0.0320	0.0154
Mo / 98	2119.0000	12.5200	29.9800	3.1350	1.4030
Ag / 107	18.3000	0.0385	10.5800	0.0139	0.0082
Cd / 114	18.2000	0.0344	10.4700	0.0148	0.0099
Sn / 118	22.5700	0.0504	25.2300	0.1719	0.0198
Sb / 123	20.8600	0.0369	25.4300	0.0482	0.0133
Ba / 135	22.9300	0.1093	25.7000	0.0239	0.0212
W / 182	28.8200	0.1238	25.6000	0.3093	0.1397
Tl / 203	22.2600	0.1474	10.1300	0.1253	0.0409
Pb / 208	21.8900	0.1451	25.5600	0.0319	0.0154
Th / 232	24.0000	0.0303	9.9350	0.1344	0.0084
U / 238	22.8900	0.0282	10.1100	0.0108	0.0056
Li / 6	551097.4	691341	675148.9	988678.8	814572.6
Sc / 45	728677.3	796286	777147.6	794566.6	789181.9
Ge / 72	158393.7	165638.8	164481.8	162152.4	168911.4
Tb / 159	1080696	1185646	1197883	1161240	1198732
Bi / 209	564852.9	690333.6	669398.6	642977.9	690178.6
Li / 6	58.5	73.4	71.6	104.9	86.4
Sc / 45	94.9	103.7	101.2	103.5	102.8
Ge / 72	97.9	102.4	101.7	100.2	104.4
Tb / 159	96.0	105.3	106.4	103.1	106.4
Bi / 209	85.5	104.5	101.4	97.4	104.5

File:	024_BLK.D#	025_CCV.D#	026_CCB.D#	027SMPL.D#	028SMPL.D#
Sample:	BLANK	CCV	CCB	PBWZF26ICW1	SC3557-001
Date/Time:	7/7/2009 17:58	7/7/2009 18:07	7/7/2009 18:15	7/7/2009 18:24	7/7/2009 18:33
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	5	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0008	14.3300	0.0009	0.1586	0.0130
B / 11	0.3887	34.6700	0.3495	1.8975	9.1240
Na / 23	10.7500	5408.0000	10.8100	114.0500	51900.0000
Mg / 25	10.4700	5521.0000	8.3410	138.6000	11.3000
Al / 27	10.2800	560.7000	5.1250	123.5000	9.4400
Si / 29	-0.9389	551.0000	16.4100	73.0000	6527.0000
K / 39	12.0300	5457.0000	5.8390	143.2500	178.3000
Ca / 44	9.9600	5480.0000	6.0990	119.0500	26.9500
V / 51	0.0050	26.2300	0.3353	0.8885	0.4433
Cr / 52	0.0517	26.0400	0.8576	1.4945	0.9351
Mn / 55	0.0330	26.1500	0.0596	0.6485	0.0259
Fe / 57	7.7020	5291.0000	5.4940	129.3500	3.8890
Co / 59	0.0015	10.7300	0.0033	0.1639	0.0095
Ni / 60	0.0223	26.7000	0.0233	0.1593	0.1261
Cu / 65	0.1575	26.3000	0.1078	0.2013	19.4400
Zn / 66	0.0723	26.6800	0.1980	0.5885	0.7098
As / 75	0.2062	26.1500	0.5743	1.8010	190.9000
Se / 82	0.0483	25.9500	0.4830	1.8910	0.2659
Sr / 88	0.0103	26.6300	0.0176	0.1627	0.0188
Mo / 98	0.9736	27.2600	0.9160	4.2555	0.9002
Ag / 107	0.0074	10.8000	0.0101	0.1538	0.0097
Cd / 114	0.0030	10.8200	0.0072	0.1262	0.0097
Sn / 118	0.0252	26.9100	0.1688	0.3854	0.0782
Sb / 123	0.0059	26.9400	0.0390	0.2406	0.4250
Ba / 135	0.0236	26.8100	0.0110	0.2437	0.0164
W / 182	0.1266	27.2700	0.3309	0.9165	1.3230
Tl / 203	0.0399	10.6500	0.1106	0.2794	0.0111
Pb / 208	0.0107	26.7300	0.0108	0.2700	0.1963
Th / 232	0.0052	10.4900	0.1308	0.1172	0.0084
U / 238	0.0023	10.8100	0.0081	0.1070	1.3030
Li / 6	727715.4	716436.4	1104129	939033.5	688774.4
Sc / 45	791876.2	753894	892297.6	786978.5	790081.7
Ge / 72	164456.5	160674.3	175420	164322.7	163495.5
Tb / 159	1175762	1143776	1290877	1169547	1152362
Bi / 209	678805.4	652737.9	719995.7	689721.6	657839.3
Li / 6	77.2	76.0	117.2	99.6	73.1
Sc / 45	103.2	98.2	116.2	102.5	102.9
Ge / 72	101.6	99.3	108.4	101.6	101.0
Tb / 159	104.4	101.6	114.6	103.9	102.3
Bi / 209	102.8	98.8	109.0	104.4	99.6

File:	029SMPL.D#	030SMPL.D#	031SMPL.D#	032SMPL.D#	033SMPL.D#
Sample:	SC3562-001	SC3256-012	SC3256-013	SC3309-001	SC3309-002
Date/Time:	7/7/2009 18:41	7/7/2009 18:50	7/7/2009 18:58	7/7/2009 19:07	7/7/2009 19:15
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	5	5	5	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0096	0.0675	0.0358	-0.0128	-0.0208
B / 11	9.5610	437.7500	408.7500	4.7050	1.9435
Na / 23	9890.0000	430600.0000	434800.0000	515.5000	255.9500
Mg / 25	37490.0000	107500.0000	105950.0000	162.3500	107.7500
Al / 27	6.2400	147.6500	51.9500	28.6200	27.1450
Si / 29	6525.0000	29155.0000	28115.0000	126.0000	107.2000
K / 39	1365.0000	28440.0000	28385.0000	57.6000	36.8400
Ca / 44	42280.0000	67250.0000	66450.0000	118.6500	64.5000
V / 51	1.2580	2.7310	1.9170	0.8690	0.7795
Cr / 52	3.4650	3.0755	2.1470	2.5730	6.1250
Mn / 55	0.0208	4633.0000	4523.5000	4.5315	2.8945
Fe / 57	104.2000	17380.0000	16960.0000	39.7000	41.8550
Co / 59	0.0739	1.3360	1.3295	0.0151	0.0491
Ni / 60	0.4286	2.1910	2.1455	0.8450	2.6495
Cu / 65	10.7100	1.3705	1.4055	0.2290	0.4099
Zn / 66	1.5760	2.1595	0.8930	2.4950	5.0450
As / 75	0.8605	3.4460	3.7985	0.9375	1.9180
Se / 82	0.2787	3.7290	3.6820	1.0350	0.8545
Sr / 88	668.6000	1110.5000	1103.5000	1.4720	0.8315
Mo / 98	1.7240	2.0855	2.1185	1.5395	1.4845
Ag / 107	0.0070	0.0258	0.0556	0.0070	0.0038
Cd / 114	0.0173	0.0329	0.0550	-0.0028	0.0331
Sn / 118	0.0297	0.5195	0.4626	0.1044	0.2154
Sb / 123	0.0150	0.1026	0.1012	0.0233	0.0284
Ba / 135	217.9000	202.5500	197.7000	0.7615	0.2787
W / 182	0.1153	0.6470	0.5800	1.1280	0.2693
Tl / 203	0.0040	0.0518	0.0318	-0.0343	-0.0577
Pb / 208	0.4863	0.3234	0.1993	0.0495	0.0122
Th / 232	0.0047	0.0686	0.0434	0.0077	0.0122
U / 238	4.3870	0.0492	0.0505	0.0039	0.0025
Li / 6	952206.3	608998.6	684365.1	835359.6	956229.4
Sc / 45	864834.2	755889.1	749739.9	778906.8	797409.1
Ge / 72	170682.5	153968.1	153563.1	162092.4	163080.9
Tb / 159	1300753	1129662	1123560	1173766	1203774
Bi / 209	702105.4	622436.7	619243.9	693701.1	706518.1
Li / 6	101.0	64.6	72.6	88.6	101.5
Sc / 45	112.7	98.5	97.7	101.5	103.9
Ge / 72	105.5	95.2	94.9	100.2	100.8
Tb / 159	115.5	100.3	99.8	104.2	106.9
Bi / 209	106.3	94.3	93.8	105.0	107.0

File:	034SMPL.D#	035SMPL.D#	036_BLK.D#	037_CCV.D#	038_CCB.D#
Sample:	SC3309-003	LCSWZF26ICW1	BLANK	CCV	CCB
Date/Time:	7/7/2009 19:24	7/7/2009 19:33	7/7/2009 19:41	7/7/2009 19:50	7/7/2009 19:58
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	10	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	3.9995	59.8600	-0.0040	12.4700	-0.0006
B / 11	220.8000	646.2000	0.9570	30.6700	0.6363
Na / 23	183200.0000	8287.0000	21.6400	5062.0000	20.2600
Mg / 25	6630.0000	4922.0000	5.3480	5146.0000	6.0550
Al / 27	93850.0000	2331.0000	7.3780	518.7000	3.3200
Si / 29	65500.0000	5719.0000	8.1760	512.5000	37.6300
K / 39	24350.0000	10470.0000	-3.7120	5067.0000	6.0660
Ca / 44	4318.5000	2457.0000	2.6590	5110.0000	7.6840
V / 51	181.2500	491.8000	0.1781	25.2700	0.6718
Cr / 52	129.3500	195.3000	0.0955	24.8000	1.5030
Mn / 55	1011.0000	494.7000	0.1763	25.2300	0.1339
Fe / 57	89500.0000	1071.0000	0.6883	5052.0000	6.7740
Co / 59	35.8950	494.8000	0.0272	10.2100	0.0078
Ni / 60	228.1000	503.0000	0.0612	25.0600	0.0277
Cu / 65	195.5000	250.9000	0.0314	25.2800	0.1251
Zn / 66	708.0000	493.5000	0.4247	25.5500	0.1610
As / 75	25.0950	495.3000	0.2417	25.1600	0.9962
Se / 82	2.3685	494.4000	0.1626	25.2500	0.3685
Sr / 88	45.1700	535.6000	0.0738	25.7400	0.0459
Mo / 98	8.4200	314.3000	0.3138	26.0300	0.4242
Ag / 107	0.2702	51.1800	0.0066	10.5400	0.0088
Cd / 114	0.4863	258.8000	0.0174	10.4300	0.0150
Sn / 118	18.2350	533.0000	0.1086	24.6100	0.1934
Sb / 123	1.9590	503.8000	0.0339	24.5800	0.0396
Ba / 135	358.1500	1988.0000	0.1282	25.6000	0.0515
W / 182	21.8300	0.7860	0.0450	24.9300	0.3258
Tl / 203	0.8735	485.1000	0.2850	10.1800	0.1244
Pb / 208	2492.0000	513.5000	0.1637	25.2700	0.0539
Th / 232	10.8250	0.3861	0.0005	9.8440	0.1237
U / 238	4.1675	104.5000	0.0057	10.1500	0.0074
Li / 6	911984.1	815778.4	949728.5	805502.6	1029493
Sc / 45	823234.8	782793.3	821015.7	798829.1	783181.2
Ge / 72	160682.1	162942.1	168227.3	165438	160399.9
Tb / 159	1170631	1205963	1260658	1236904	1132343
Bi / 209	645833.9	697615.6	724302.3	701351.6	641437.9
Li / 6	96.8	86.6	100.8	85.5	109.2
Sc / 45	107.3	102.0	107.0	104.1	102.0
Ge / 72	99.3	100.7	104.0	102.2	99.1
Tb / 159	103.9	107.1	111.9	109.8	100.5
Bi / 209	97.8	105.6	109.7	106.2	97.1

File:	074SMPL.D#	075_BLK.D#	076_CCV.D#	077_CCB.D#	078SMPL.D#
Sample:	SC3313-016P	BLANK	CCV	CCB	PBSZG01ICS0
Date/Time:	7/8/2009 1:08	7/8/2009 1:16	7/8/2009 1:25	7/8/2009 1:33	7/8/2009 1:42
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	10	1	1	1	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	51.0700	0.0001	10.8300	0.0023	0.0143
B / 11	527.9000	0.7232	26.5600	0.6172	2.2650
Na / 23	8035.0000	5.7610	5480.0000	10.2400	45.5800
Mg / 25	16600.0000	3.7340	5555.0000	5.0160	35.4950
Al / 27	236100.0000	34.1100	572.7000	9.1250	44.0050
Si / 29	2910.0000	-4.4420	547.3000	20.0700	1.5905
K / 39	24410.0000	4.4220	5454.0000	8.7200	13.8450
Ca / 44	6924.0000	-0.6381	5476.0000	3.6970	16.6900
V / 51	884.2000	2.2930	25.7500	0.4619	0.4489
Cr / 52	450.8000	0.0126	25.4100	0.8910	0.8745
Mn / 55	1713.0000	0.3654	25.7700	0.1768	1.4380
Fe / 57	166600.0000	28.3800	5203.0000	15.7600	68.5500
Co / 59	529.3000	0.0511	10.5400	0.0180	0.0479
Ni / 60	600.8000	0.1785	25.9000	0.0283	0.4079
Cu / 65	340.3000	1.1220	25.6100	0.0490	1.4485
Zn / 66	758.9000	0.2652	26.0300	0.1477	2.1895
As / 75	497.5000	0.1306	25.9800	0.8320	0.1460
Se / 82	453.2000	0.1329	25.9600	0.5328	0.4231
Sr / 88	604.1000	0.1749	26.7000	0.1347	0.8790
Mo / 98	305.8000	0.2539	26.6000	0.3186	0.5280
Ag / 107	49.4600	0.0093	10.7700	0.0073	0.0309
Cd / 114	246.7000	0.0244	10.7700	0.0129	0.0733
Sn / 118	523.2000	0.1102	26.7500	0.2471	6.2100
Sb / 123	305.9000	0.0464	26.3600	0.0460	0.0821
Ba / 135	2558.0000	0.3109	27.4400	0.0868	0.4860
W / 182	1.1280	0.0330	27.0000	0.3020	0.5705
Tl / 203	449.5000	0.9372	9.6630	0.5627	1.0665
Pb / 208	663.3000	0.1272	26.2300	0.0513	0.3029
Th / 232	47.0400	0.0099	10.5800	0.0899	0.0348
U / 238	112.9000	0.0112	10.6700	0.0102	0.0241
Li / 6	1036153	1032086	953494.4	1052784	1013157
Sc / 45	825895.7	772085.6	756077.3	767292.9	816492.9
Ge / 72	164331.9	161453.1	160592	155438.7	165946.2
Tb / 159	1193146	1189209	1153279	1122328	1237933
Bi / 209	693195.2	709613.4	682087.8	636821.8	719929.3
Li / 6	109.9	109.5	101.2	111.7	107.5
Sc / 45	107.6	100.6	98.5	100.0	106.4
Ge / 72	101.6	99.8	99.3	96.1	102.6
Tb / 159	105.9	105.6	102.4	99.7	109.9
Bi / 209	105.0	107.5	103.3	96.4	109.0

File:	079SMPL.D#	080SMPL.D#	081SMPL.D#	082SMPL.D#	083SMPL.D#
Sample:	SC3309-019	SC3309-019L	SC3309-020	SC3309-019A	SC3309-019S
Date/Time:	7/8/2009 1:51	7/8/2009 1:59	7/8/2009 2:08	7/8/2009 2:16	7/8/2009 2:25
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	25	5	5	10
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	8.1050	7.5625	4.6165	13.1950	53.4000
B / 11	25.6750	24.8750	31.5150	52.0000	476.5000
Na / 23	216.1500	286.5000	238.5000	2690.5000	7681.0000
Mg / 25	8415.0000	8357.5000	8615.0000	9025.0000	16750.0000
Al / 27	117950.0000	125650.0000	110550.0000	120050.0000	193900.0000
Si / 29	4269.0000	4365.0000	3764.0000	5265.0000	4997.0000
K / 39	10175.0000	10907.5000	8555.0000	12450.0000	24040.0000
Ca / 44	4506.5000	4765.0000	8445.0000	5405.0000	8828.0000
V / 51	332.2000	337.5000	265.6000	355.1000	900.0000
Cr / 52	221.0000	226.1250	145.5500	244.2500	432.7000
Mn / 55	4155.5000	4427.5000	4404.0000	4130.5000	4835.0000
Fe / 57	356200.0000	377000.0000	183250.0000	355200.0000	383300.0000
Co / 59	119.3000	122.6250	99.6500	122.3500	602.4000
Ni / 60	109.0000	114.0000	87.4000	117.8000	646.3000
Cu / 65	130.0500	140.0500	83.1000	154.9500	419.4000
Zn / 66	310.4500	327.2500	328.1000	402.2500	915.6000
As / 75	78.6500	84.8750	39.6700	126.4500	532.2000
Se / 82	3.1485	6.2750	3.8400	49.4650	458.7000
Sr / 88	125.1000	131.4500	86.1000	129.9000	617.5000
Mo / 98	8.4850	9.4175	7.3700	18.5350	294.8000
Ag / 107	0.2020	0.1850	0.2906	2.7335	48.0500
Cd / 114	0.6575	0.6793	0.6785	3.0065	243.1000
Sn / 118	12.9500	13.5225	11.2700	23.4300	516.2000
Sb / 123	4.5040	4.3600	1.7645	14.5450	291.4000
Ba / 135	667.0000	663.7500	658.5000	674.5000	2800.0000
W / 182	0.9070	2.0958	6.0700	13.8500	1.7380
Tl / 203	2.0960	4.0900	1.5720	6.2000	445.2000
Pb / 208	780.0000	755.2500	179.0500	783.5000	1631.0000
Th / 232	33.9300	24.8050	27.1450	36.1950	38.9100
U / 238	8.3000	7.7400	5.9500	9.4250	115.6000
Li / 6	999663.4	1027993	1030092	1008046	1031009
Sc / 45	833162.3	769878.7	806006	817762.4	796048.2
Ge / 72	165019.7	160245.4	162163.8	161910.4	161507.7
Tb / 159	1139779	1178915	1173060	1133853	1157028
Bi / 209	660281.1	714968.3	680953.9	659653.3	685599.8
Li / 6	106.1	109.1	109.3	107.0	109.4
Sc / 45	108.5	100.3	105.0	106.5	103.7
Ge / 72	102.0	99.0	100.2	100.1	99.8
Tb / 159	101.2	104.7	104.2	100.7	102.7
Bi / 209	100.0	108.3	103.1	99.9	103.8

File:	084SMPL.D#	085SMPL.D#	086SMPL.D#	087_BLK.D#	088_CCV.D#
Sample:	SC3309-019P	LCSSZG01ICS0	LC2SZG01ICS0	BLANK	CCV
Date/Time:	7/8/2009 2:34	7/8/2009 2:42	7/8/2009 2:51	7/8/2009 3:00	7/8/2009 3:08
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	10	10	10	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	49.8300	800.5000	810.1000	0.0569	9.7890
B / 11	484.4000	589.3000	597.1000	0.8668	24.0800
Na / 23	7563.0000	3151.0000	3359.0000	10.2400	5384.0000
Mg / 25	13370.0000	26830.0000	26520.0000	5.5940	5416.0000
Al / 27	159700.0000	79430.0000	79650.0000	21.5200	548.6000
Si / 29	5226.0000	3739.0000	4453.0000	-7.9250	525.3000
K / 39	21850.0000	24820.0000	24840.0000	-0.9495	5238.0000
Ca / 44	6373.0000	52620.0000	52260.0000	4.7490	5289.0000
V / 51	761.4000	547.9000	552.6000	0.0639	25.5300
Cr / 52	346.6000	665.1000	662.5000	-0.0048	25.0500
Mn / 55	3179.0000	2059.0000	2052.0000	0.4891	25.5400
Fe / 57	273800.0000	114200.0000	114800.0000	28.6500	5120.0000
Co / 59	532.5000	606.3000	599.4000	0.0740	10.3100
Ni / 60	548.8000	911.2000	895.9000	0.1079	25.4100
Cu / 65	351.9000	347.8000	358.5000	0.1799	25.1600
Zn / 66	728.0000	1880.0000	1939.0000	0.2672	25.8600
As / 75	492.9000	1160.0000	1152.0000	0.2670	25.3700
Se / 82	451.7000	768.5000	761.1000	0.2001	25.2600
Sr / 88	600.8000	665.7000	672.3000	0.4102	26.0200
Mo / 98	284.8000	618.8000	612.3000	0.5579	26.2300
Ag / 107	47.6400	194.0000	192.2000	0.0153	10.6100
Cd / 114	240.3000	362.9000	358.7000	0.0338	10.6200
Sn / 118	482.9000	940.4000	932.9000	0.1943	25.7100
Sb / 123	262.6000	573.4000	577.9000	0.0732	25.7600
Ba / 135	2472.0000	3113.0000	3053.0000	0.3390	26.0700
W / 182	0.9242	2.6080	3.4430	0.0294	26.4600
Tl / 203	443.4000	878.2000	888.8000	1.3420	9.8660
Pb / 208	1248.0000	1188.0000	1201.0000	0.1962	25.5700
Th / 232	29.5500	52.9000	54.6700	0.0106	10.1800
U / 238	106.2000	12.0700	11.3000	0.0047	10.3500
Li / 6	1029164	1033594	1006795	1059245	1008050
Sc / 45	811797.3	771372.3	751840.6	814453.4	749978
Ge / 72	161936	159190	156903.5	166585.6	156164.4
Tb / 159	1223413	1166789	1152455	1260993	1140858
Bi / 209	703124.6	700039.4	681739.9	742904.5	678993.6
Li / 6	109.2	109.7	106.8	112.4	107.0
Sc / 45	105.8	100.5	97.9	106.1	97.7
Ge / 72	100.1	98.4	97.0	103.0	96.5
Tb / 159	108.6	103.6	102.3	112.0	101.3
Bi / 209	106.5	106.0	103.2	112.5	102.8

File:	089_CCB.D#	090SMPL.D#	091SMPL.D#	092SMPL.D#	093SMPL.D#
Sample:	CCB	SC3349-001	SC3349-001L	SC3349-002	SC3482-001
Date/Time:	7/8/2009 3:17	7/8/2009 3:25	7/8/2009 3:34	7/8/2009 3:42	7/8/2009 3:51
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	5	25	5	25
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0153	1.1990	1.2630	4.8010	2.0920
B / 11	0.6954	17.3050	19.3900	23.1100	1283.0000
Na / 23	10.2000	330.5500	619.0000	268.0000	16045.0000
Mg / 25	4.6460	2966.5000	3105.0000	8175.0000	100250.0000
Al / 27	6.4410	53750.0000	54525.0000	119750.0000	63425.0000
Si / 29	19.1700	3871.5000	3837.5000	3779.5000	1667.7500
K / 39	10.5700	5125.0000	5472.5000	5965.0000	396000.0000
Ca / 44	5.1190	536.0000	608.2500	2583.0000	919750.0000
V / 51	0.1427	120.0000	119.0250	238.4000	103.3000
Cr / 52	0.9292	58.1500	56.6750	126.3000	121.2000
Mn / 55	0.2052	181.2500	185.5250	3801.5000	63350.0000
Fe / 57	19.4200	48770.0000	48725.0000	93150.0000	42325.0000
Co / 59	0.0261	16.6650	16.6225	36.5700	26.2750
Ni / 60	0.0440	125.0500	126.4750	61.5000	155.5750
Cu / 65	0.0601	2639.0000	2627.5000	49.7650	548.2500
Zn / 66	0.1285	87.9000	93.1750	223.8500	11695.0000
As / 75	0.2701	15.3900	19.6700	24.0650	20.7925
Se / 82	0.3748	3.0460	6.8600	3.6195	7.5875
Sr / 88	0.1800	34.6150	41.3000	54.9000	5195.0000
Mo / 98	0.4209	4.1470	5.6750	6.8050	7.5600
Ag / 107	0.0091	0.3772	0.5953	0.2698	3.5750
Cd / 114	0.0172	0.1295	0.2140	0.4441	119.3000
Sn / 118	0.3743	35.4250	35.9500	12.0800	12.4625
Sb / 123	0.0513	1.3450	1.5585	16.2400	1.4605
Ba / 135	0.0985	175.1000	178.5750	639.0000	10950.0000
W / 182	0.3125	1.2300	2.7825	0.9050	4.0300
Tl / 203	0.7167	2.2480	6.4700	2.2870	6.5375
Pb / 208	0.0674	6785.0000	6962.5000	3384.0000	222.6250
Th / 232	0.0870	15.5050	10.6175	37.9000	3.8700
U / 238	0.0068	2.9680	2.8025	7.4750	1.8715
Li / 6	1065405	1075149	1077230	1068447	998988.4
Sc / 45	752062.9	782050.7	766893.7	810130.8	765994.1
Ge / 72	150132.7	159304.5	159542.8	160298.2	157558.5
Tb / 159	1089384	1166136	1175034	1171726	1162259
Bi / 209	623383.5	690651.6	698832.8	680470.4	668256.3
Li / 6	113.0	114.1	114.3	113.4	106.0
Sc / 45	98.0	101.9	99.9	105.5	99.8
Ge / 72	92.8	98.5	98.6	99.1	97.4
Tb / 159	96.7	103.6	104.3	104.0	103.2
Bi / 209	94.4	104.6	105.8	103.0	101.2

File:	094SMPL.D#	095SMPL.D#	096SMPL.D#	097_BLK.D#	098_CCV.D#
Sample:	SC3349-001A	SC3349-001S	SC3349-001P	BLANK	CCV
Date/Time:	7/8/2009 4:00	7/8/2009 4:08	7/8/2009 4:17	7/8/2009 4:25	7/8/2009 4:34
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	10	10	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	6.3700	46.2900	47.6300	0.0025	10.2100
B / 11	46.8550	466.2000	496.2000	0.8796	26.1400
Na / 23	2844.5000	7731.0000	8106.0000	5.3200	5364.0000
Mg / 25	3395.0000	8585.0000	9222.0000	3.1040	5400.0000
Al / 27	53100.0000	83460.0000	92180.0000	17.3000	543.9000
Si / 29	4810.5000	3733.0000	3869.0000	-5.1770	523.1000
K / 39	7675.0000	20200.0000	22030.0000	7.1260	5279.0000
Ca / 44	1600.0000	2813.0000	3026.0000	3.3430	5246.0000
V / 51	144.5000	594.1000	618.1000	0.0801	25.5500
Cr / 52	82.6000	255.2000	264.5000	0.0267	24.9900
Mn / 55	200.9000	626.8000	659.2000	0.4531	25.5700
Fe / 57	49970.0000	47000.0000	50100.0000	14.4400	5096.0000
Co / 59	21.6350	475.8000	487.0000	0.0566	10.3100
Ni / 60	134.8000	582.8000	570.4000	0.0857	25.3200
Cu / 65	2662.5000	1850.0000	1553.0000	0.4372	25.3600
Zn / 66	187.4500	544.2000	575.9000	0.1876	25.7600
As / 75	64.0000	454.8000	459.4000	0.2437	25.2600
Se / 82	51.0000	448.5000	461.5000	0.1780	25.2500
Sr / 88	38.1500	553.3000	562.7000	0.1836	25.9600
Mo / 98	13.8050	278.8000	283.3000	0.2955	26.2000
Ag / 107	3.0110	47.7500	49.0700	0.0074	10.4500
Cd / 114	2.7275	239.2000	242.9000	0.0294	10.5600
Sn / 118	47.1250	502.0000	517.1000	0.1516	25.9500
Sb / 123	11.3200	320.6000	323.1000	0.0425	25.8600
Ba / 135	191.7000	2136.0000	2241.0000	0.3333	26.5900
W / 182	13.9950	1.1240	1.1730	0.0367	25.8800
Tl / 203	5.5800	417.1000	439.0000	0.8218	9.6470
Pb / 208	6905.0000	5878.0000	4090.0000	0.8344	25.9500
Th / 232	17.8300	22.4300	18.7000	0.0077	10.1600
U / 238	3.9575	95.6800	103.5000	0.0123	10.2400
Li / 6	1030126	1054264	1030189	979616	976703.6
Sc / 45	790339.9	817238.3	780645.8	745479.9	760594.2
Ge / 72	160144.7	162263.1	157512.8	156751.8	157637.4
Tb / 159	1151574	1212807	1148676	1125228	1135929
Bi / 209	672018.9	699356.4	676128.6	673880.8	666100.3
Li / 6	109.3	111.9	109.3	103.9	103.6
Sc / 45	103.0	106.5	101.7	97.1	99.1
Ge / 72	99.0	100.3	97.3	96.9	97.4
Tb / 159	102.3	107.7	102.0	99.9	100.9
Bi / 209	101.8	105.9	102.4	102.0	100.9

File:	099_CCB.D#	100_BLK.D#	101_BLK.D#	102_PQL.D#	103_CCV.D#
Sample:	CCB	Blank	Blank	PQL	CCV
Date/Time:	7/8/2009 4:42	7/8/2009 4:51	7/8/2009 4:59	7/8/2009 5:08	7/8/2009 5:16
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0045	0.0001	-0.0044	0.2122	9.8650
B / 11	0.7309	0.4796	0.4616	8.2350	24.8500
Na / 23	8.8540	5.0210	3.4870	223.1000	5247.0000
Mg / 25	4.7110	3.1430	1.2970	21.9400	5304.0000
Al / 27	7.8500	5.8460	3.2680	67.2600	532.7000
Si / 29	19.7700	-6.5890	-5.3300	36.1700	509.0000
K / 39	13.2700	1.9460	-2.0900	215.4000	5134.0000
Ca / 44	6.2990	1.9880	-1.6760	16.8800	5190.0000
V / 51	0.8259	0.0904	0.0930	1.0610	25.1900
Cr / 52	0.9959	0.0230	0.0074	0.5770	24.7600
Mn / 55	0.3466	0.2229	0.1102	0.3084	24.9700
Fe / 57	19.3500	5.1300	0.2003	20.5000	5002.0000
Co / 59	0.0157	0.0121	0.0020	0.2070	10.0700
Ni / 60	0.0516	0.0374	0.0324	0.2058	24.8500
Cu / 65	0.1649	0.0632	0.0170	0.2326	24.7700
Zn / 66	0.1610	0.3833	0.3903	2.1480	25.3900
As / 75	0.6370	0.1703	0.1025	1.0910	25.1000
Se / 82	0.5902	0.1843	0.1333	0.8565	25.2600
Sr / 88	0.1296	0.1161	0.0830	0.2934	25.5400
Mo / 98	0.3214	0.0842	0.1018	1.1280	25.3800
Ag / 107	0.0091	0.0061	0.0044	0.2150	10.4500
Cd / 114	0.0172	0.0091	0.0052	0.2067	10.4100
Sn / 118	0.2927	0.0796	0.0548	0.2295	25.2400
Sb / 123	0.0585	0.0206	0.0081	0.2138	25.0800
Ba / 135	0.1714	0.1009	0.0481	0.2808	25.5200
W / 182	0.3427	0.1021	0.1041	1.2930	25.3600
Tl / 203	0.5135	0.2133	0.2262	0.5234	9.4060
Pb / 208	0.3979	0.2318	0.1016	0.3063	25.4400
Th / 232	0.1067	0.0044	0.0013	0.1044	10.1000
U / 238	0.0116	0.0044	0.0014	0.2047	10.0700
Li / 6	1083073	1035538	1032409	1029844	1013363
Sc / 45	760654.6	790055.8	772408.8	777099	771894.6
Ge / 72	150454.3	161226.2	159367.8	161191.7	160050.5
Tb / 159	1074844	1199658	1164577	1182364	1168135
Bi / 209	612057.6	699192.6	696436.5	700306.7	681891.3
Li / 6	114.9	109.9	109.5	109.3	107.5
Sc / 45	99.1	102.9	100.6	101.2	100.6
Ge / 72	93.0	99.6	98.5	99.6	98.9
Tb / 159	95.4	106.5	103.4	105.0	103.7
Bi / 209	92.7	105.9	105.5	106.0	103.3

File:	009CALB.D#	010CALI.D#	011CALI.D#	012CALI.D#	013CALI.D#
Sample:	Cal Blank	Cal Std 1	Cal Std 2	Cal Std 3	Cal Std 4
Date/Time:	7/8/2009 17:06	7/8/2009 17:15	7/8/2009 17:23	7/8/2009 17:32	7/8/2009 17:40
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0000	0.5000	4.4790	26.3100	47.6700
B / 11	0.0000	0.5000	5.4320	25.8200	48.5200
Na / 23	0.0000	100.0000	810.1000	5037.0000	9391.0000
Mg / 25	0.0000	100.0000	885.6000	5291.0000	9435.0000
Al / 27	0.0000	10.0000	43.9300	496.3000	934.5000
Si / 29	0.0000	10.0000	107.4000	498.4000	943.0000
K / 39	0.0000	100.0000	834.8000	5001.0000	9530.0000
Ca / 44	0.0000	100.0000	869.6000	5260.0000	9342.0000
V / 51	0.0000	0.5000	4.8750	25.3200	48.1000
Cr / 52	0.0000	0.5000	4.5100	25.0700	47.8900
Mn / 55	0.0000	0.5000	3.8390	25.4600	47.2400
Fe / 57	0.0000	100.0000	844.5000	5185.0000	9441.0000
Co / 59	0.0000	0.5000	4.3570	26.0100	47.1100
Ni / 60	0.0000	0.5000	4.1180	25.2400	47.3100
Cu / 65	0.0000	0.5000	0.6949	23.9000	47.1700
Zn / 66	0.0000	0.5000	3.5010	25.3200	46.8000
As / 75	0.0000	0.5000	4.8730	26.1300	47.4700
Se / 82	0.0000	0.5000	4.1960	25.4000	46.4900
Sr / 88	0.0000	0.5000	4.3210	25.3800	48.8800
Mo / 98	0.0000	0.5000	3.3150	25.2000	48.7700
Ag / 107	0.0000	0.5000	4.4260	25.1100	47.9600
Cd / 114	0.0000	0.5000	4.4560	25.6700	47.5100
Sn / 118	0.0000	0.5000	4.9780	24.5800	46.5600
Sb / 123	0.0000	0.5000	4.8400	25.8900	46.3000
Ba / 135	0.0000	0.5000	4.4890	26.1900	45.8600
W / 182	0.0000	0.5000	5.2380	24.8700	48.0900
Tl / 203	0.0000	0.5000	3.9920	27.4800	49.4600
Pb / 208	0.0000	0.5000	3.8710	25.7200	47.9300
Th / 232	0.0000	0.5000	7.7170	33.1000	50.4400
U / 238	0.0000	0.5000	4.6510	26.0100	48.4900
Li / 6	574260.4	568441.9	563079.2	555711.1	566947.9
Sc / 45	797376.9	788111.2	749732.8	759428.5	778803.6
Ge / 72	171143.8	168662.6	163880.3	162449	165129.2
Tb / 159	1284392	1252777	1192698	1193452	1245375
Bi / 209	715112	710020.5	684285.6	671956.9	667783.6
Li / 6	100.0	99.0	98.1	96.8	98.7
Sc / 45	100.0	98.8	94.0	95.2	97.7
Ge / 72	100.0	98.6	95.8	94.9	96.5
Tb / 159	100.0	97.5	92.9	92.9	97.0
Bi / 209	100.0	99.3	95.7	94.0	93.4

File:	014SMPL.D#	015_ICV.D#	016_ICB.D#	017_PQL.D#	018ICSA.D#
Sample:	Blank	ICV	ICB	PQL	ICSA
Date/Time:	7/8/2009 17:49	7/8/2009 17:58	7/8/2009 18:06	7/8/2009 18:15	7/8/2009 18:23
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0388	20.9500	0.0118	0.2166	0.0260
B / 11	0.6317	21.9500	0.2200	8.2030	0.4708
Na / 23	13.5400	4338.0000	3.5080	221.9000	100900.0000
Mg / 25	7.0520	4385.0000	0.9469	23.5600	97300.0000
Al / 27	2.0050	433.1000	-2.3200	62.8500	98600.0000
Si / 29	11.7100	427.8000	2.5860	41.3500	67.7200
K / 39	24.8900	4256.0000	10.6800	217.8000	103500.0000
Ca / 44	13.4900	4164.0000	-0.0162	23.5500	98800.0000
V / 51	0.3697	20.5300	-0.0313	0.9685	0.1285
Cr / 52	0.4052	20.4700	-0.0519	0.5080	1.8370
Mn / 55	0.1561	20.3500	0.0183	0.2589	1.9980
Fe / 57	13.8200	4060.0000	2.5940	24.4400	91910.0000
Co / 59	0.0398	20.6800	0.0222	0.2098	0.1300
Ni / 60	0.0459	21.0700	0.0130	0.2207	1.0780
Cu / 65	0.1656	20.7600	0.0134	0.2228	0.8086
Zn / 66	0.1590	21.0300	0.0264	2.0790	0.6717
As / 75	0.2986	20.0400	-0.0993	0.7227	-0.1308
Se / 82	0.1478	20.6200	-0.0181	0.7091	-0.3314
Sr / 88	0.1653	21.3900	0.0747	0.2597	2.7520
Mo / 98	0.3692	42.3900	0.2036	1.0650	1980.0000
Ag / 107	0.0352	20.9400	0.0132	0.2126	0.0647
Cd / 114	0.0385	20.4300	0.0182	0.2058	0.0579
Sn / 118	0.1580	22.5600	0.0460	0.2491	0.0586
Sb / 123	0.0585	21.5000	0.0234	0.2160	0.1590
Ba / 135	0.0761	21.5000	0.0241	0.2329	1.5820
W / 182	0.5644	27.0500	0.3620	1.3000	0.3847
Tl / 203	0.6833	20.0100	0.3493	0.4683	0.1118
Pb / 208	0.0647	20.5500	0.0146	0.2291	0.1822
Th / 232	0.1349	21.6500	0.0225	0.1058	0.0576
U / 238	0.0357	21.3200	0.0217	0.2165	0.0133
Li / 6	548955.1	544480.9	621792.8	566515.3	505094.1
Sc / 45	707959.8	719862.7	746500.4	778673.8	730965.4
Ge / 72	154978.1	155845.1	160046.5	166615.9	158667.8
Tb / 159	1097001	1126264	1142821	1257178	1124136
Bi / 209	639444.8	646879.6	672837.6	712315.8	595414.3
Li / 6	95.6	94.8	108.3	98.7	88.0
Sc / 45	88.8	90.3	93.6	97.7	91.7
Ge / 72	90.6	91.1	93.5	97.4	92.7
Tb / 159	85.4	87.7	89.0	97.9	87.5
Bi / 209	89.4	90.5	94.1	99.6	83.3

File:	019ICSB.D#	020_BLK.D#	021_CCV.D#	022_CCB.D#	023_BLK.D#
Sample:	ICSAB	Blank	CCV	CCB	BLANK
Date/Time:	7/8/2009 18:32	7/8/2009 18:41	7/8/2009 18:49	7/8/2009 18:58	7/8/2009 19:07
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	21.5400	0.0139	11.4000	0.0004	-0.0042
B / 11	20.6400	0.4665	25.6900	0.3180	0.3836
Na / 23	100900.0000	127.0000	5169.0000	17.1400	11.4900
Mg / 25	97700.0000	94.0900	5157.0000	10.7200	3.5990
Al / 27	98790.0000	103.9000	534.0000	7.4380	1.8710
Si / 29	538.0000	10.7400	489.7000	1.8000	10.8100
K / 39	103700.0000	126.2000	5273.0000	25.9100	23.4600
Ca / 44	99080.0000	106.7000	5294.0000	11.7500	10.0600
V / 51	19.9500	0.4538	24.6200	-0.0385	0.4936
Cr / 52	21.0600	1.0650	24.3300	-0.0365	0.5527
Mn / 55	20.9700	0.0959	24.6700	-0.0178	0.0339
Fe / 57	91640.0000	100.9000	5075.0000	12.2300	6.4840
Co / 59	19.2400	0.0205	10.2400	0.0027	0.0002
Ni / 60	19.5200	0.0549	25.3200	0.0080	0.0119
Cu / 65	19.0200	0.2019	25.2900	0.0195	0.1509
Zn / 66	17.4400	0.1781	25.4600	-0.0067	0.1526
As / 75	19.3400	0.5857	25.1900	0.0451	0.5963
Se / 82	17.9600	0.0908	25.4700	-0.0010	0.0045
Sr / 88	23.1700	0.0421	24.8100	-0.0023	-0.0210
Mo / 98	2011.0000	13.6800	28.3400	1.6020	1.1520
Ag / 107	17.7000	0.0116	10.3200	0.0039	-0.0010
Cd / 114	17.6100	0.0188	10.3400	0.0067	0.0040
Sn / 118	22.1200	0.0938	26.2400	0.0488	0.0940
Sb / 123	20.6500	0.0348	26.5000	0.0197	0.0307
Ba / 135	22.6700	0.0208	26.4900	0.0034	0.0114
W / 182	27.6800	0.1762	25.7500	0.2925	0.2001
Tl / 203	20.6800	0.3265	9.9130	0.1582	0.0875
Pb / 208	20.7900	0.0199	24.9700	-0.0240	-0.0386
Th / 232	22.3600	0.0448	9.4900	0.0052	0.0253
U / 238	21.7600	0.0146	10.1500	0.0026	-0.0006
Li / 6	493068.6	509520.4	511005.8	507026.1	498330.7
Sc / 45	735820.1	700575.4	735572.3	729669.8	685730.8
Ge / 72	160100.8	153504.9	159437.6	158329.5	150098
Tb / 159	1123781	1085447	1153578	1141989	1071017
Bi / 209	590102.6	633370.1	668675.1	674052.9	628246.1
Li / 6	85.9	88.7	89.0	88.3	86.8
Sc / 45	92.3	87.9	92.2	91.5	86.0
Ge / 72	93.5	89.7	93.2	92.5	87.7
Tb / 159	87.5	84.5	89.8	88.9	83.4
Bi / 209	82.5	88.6	93.5	94.3	87.9

File:	024_BLK.D#	025_CCV.D#	026_CCB.D#	027SMPL.D#	028SMPL.D#
Sample:	BLANK	CCV	CCB	PBWZG08ICW2	SC3702-001
Date/Time:	7/8/2009 19:15	7/8/2009 19:24	7/8/2009 19:32	7/8/2009 19:41	7/8/2009 19:49
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	-0.0079	11.1300	-0.0005	-0.0075	0.0000
B / 11	0.2338	25.0500	0.2891	0.8955	16.6100
Na / 23	4.1580	5334.0000	1.2990	-0.0784	13510.0000
Mg / 25	-2.3970	5314.0000	-2.3230	6.5130	3485.0000
Al / 27	-3.5110	516.9000	-7.3350	-2.8360	1.8460
Si / 29	12.0900	513.4000	1.6240	46.7400	4392.0000
K / 39	13.7200	5407.0000	5.4760	-1.4280	4925.0000
Ca / 44	2.9310	5376.0000	-2.9170	-5.0040	33720.0000
V / 51	0.4346	25.0300	-0.0469	-0.0072	0.2568
Cr / 52	0.6159	24.7400	-0.0732	0.0138	0.0955
Mn / 55	0.0195	25.0100	-0.0421	0.1529	1.1440
Fe / 57	1.6670	5066.0000	-4.7320	-8.1040	48.6800
Co / 59	-0.0084	10.2400	-0.0034	-0.0070	0.0404
Ni / 60	0.0065	25.4100	0.0075	0.0174	0.6187
Cu / 65	0.1226	25.2500	0.0023	0.0308	81.3400
Zn / 66	0.1365	25.7400	-0.0127	0.4756	7.3640
As / 75	0.5930	25.3000	-0.1040	-0.0035	0.2255
Se / 82	0.0393	25.6500	0.0598	0.2808	0.0720
Sr / 88	-0.0294	25.4100	-0.0238	-0.0338	90.0500
Mo / 98	0.6828	25.3600	0.3222	0.1044	0.6020
Ag / 107	-0.0069	10.4000	-0.0021	-0.0071	-0.0061
Cd / 114	-0.0005	10.4700	0.0020	-0.0017	-0.0013
Sn / 118	0.0600	26.8000	0.0502	0.0441	0.2996
Sb / 123	0.0205	26.8600	0.0222	0.0129	0.0480
Ba / 135	0.0074	26.4700	-0.0024	-0.0050	11.9100
W / 182	0.1423	25.5100	0.3285	0.1673	5.2600
Tl / 203	0.0832	10.3600	0.0880	-0.0034	0.0009
Pb / 208	-0.0459	25.5800	-0.0383	-0.0477	0.2959
Th / 232	0.0124	9.6430	0.0032	-0.0004	-0.0025
U / 238	-0.0042	10.4300	0.0019	-0.0059	1.5680
Li / 6	505551.2	518371.9	517457.1	533615.1	525133.2
Sc / 45	694702.9	725689.1	739719.9	767651.9	727697.6
Ge / 72	153110.4	161374.6	162314.2	165016	159328.4
Tb / 159	1113098	1173080	1181281	1258024	1169393
Bi / 209	642550.4	675385	692127.7	716887.7	667269.3
Li / 6	88.0	90.3	90.1	92.9	91.4
Sc / 45	87.1	91.0	92.8	96.3	91.3
Ge / 72	89.5	94.3	94.8	96.4	93.1
Tb / 159	86.7	91.3	92.0	97.9	91.0
Bi / 209	89.9	94.4	96.8	100.2	93.3

File:	034SMPL.D#	035SMPL.D#	036_BLK.D#	037_CCV.D#	038_CCB.D#
Sample:	SC3702-001P	LCSWZG08ICW2	BLANK	CCV	CCB
Date/Time:	7/8/2009 20:41	7/8/2009 20:50	7/8/2009 20:58	7/8/2009 21:07	7/8/2009 21:15
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	10	10	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	55.3700	55.8900	-0.0087	11.2500	0.0006
B / 11	557.3000	543.5000	1.0150	25.8900	0.3870
Na / 23	21550.0000	8621.0000	-3.1070	5351.0000	-0.1108
Mg / 25	8087.0000	5282.0000	-7.3290	5268.0000	-3.2350
Al / 27	2162.0000	2249.0000	-6.0110	514.5000	-7.7840
Si / 29	9557.0000	5548.0000	5.1540	504.0000	2.9060
K / 39	15610.0000	11530.0000	-2.3970	5340.0000	8.3560
Ca / 44	36520.0000	2505.0000	-4.3160	5339.0000	-3.8970
V / 51	500.8000	504.8000	0.0270	24.9800	0.0013
Cr / 52	195.8000	198.8000	0.1137	24.6700	-0.0510
Mn / 55	496.8000	509.1000	0.0360	24.8700	-0.0135
Fe / 57	1137.0000	1033.0000	-2.6980	5108.0000	-1.2110
Co / 59	505.1000	521.2000	0.0404	10.3200	0.0125
Ni / 60	509.7000	525.0000	0.0640	25.5100	0.0241
Cu / 65	333.2000	260.4000	0.0946	25.2400	0.0295
Zn / 66	511.7000	520.1000	0.3942	25.7200	0.0296
As / 75	507.1000	511.2000	-0.0847	25.4500	-0.1169
Se / 82	515.0000	520.2000	-0.0962	25.5500	0.0046
Sr / 88	607.9000	540.5000	0.0217	24.9800	-0.0002
Mo / 98	301.9000	313.8000	0.0831	25.1900	0.0428
Ag / 107	51.4400	52.7400	-0.0062	10.4500	-0.0035
Cd / 114	256.6000	269.1000	0.0232	10.4300	0.0111
Sn / 118	569.1000	599.3000	0.2001	26.6900	0.0887
Sb / 123	548.2000	572.0000	0.0659	26.8800	0.0357
Ba / 135	2198.0000	2261.0000	0.2033	26.5400	0.0598
W / 182	5.6860	0.4291	0.0523	25.4000	0.2813
Tl / 203	492.3000	513.1000	0.7146	9.8710	0.2976
Pb / 208	507.5000	532.1000	0.0107	25.4400	-0.0208
Th / 232	0.0018	-0.0152	-0.0048	9.7320	0.0033
U / 238	110.9000	100.6000	0.0041	10.2800	0.0031
Li / 6	515523	512076.6	530232.9	511146.9	514535
Sc / 45	724821.7	682560.2	730342.3	714166.6	707462.6
Ge / 72	158498.2	153631.8	158770.3	154982.9	153938.8
Tb / 159	1129601	1073295	1158060	1132540	1117703
Bi / 209	669137.3	645694.9	680506.3	655487.5	661989.8
Li / 6	89.8	89.2	92.3	89.0	89.6
Sc / 45	90.9	85.6	91.6	89.6	88.7
Ge / 72	92.6	89.8	92.8	90.6	89.9
Tb / 159	87.9	83.6	90.2	88.2	87.0
Bi / 209	93.6	90.3	95.2	91.7	92.6

File:	039SMPL.D#	040SMPL.D#	041SMPL.D#	042SMPL.D#	043SMPL.D#
Sample:	PBSZF27ICS1	SC3313-013	SC3313-014	SC3313-014	SC3313-015
Date/Time:	7/8/2009 21:24	7/8/2009 21:32	7/8/2009 21:41	7/8/2009 21:50	7/8/2009 21:58
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	5	5	10	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	-0.0221	3.1635	3.3115	3.3050	2.5405
B / 11	2.3535	15.4500	15.5250	15.7000	10.7200
Na / 23	-7.4200	142.4000	137.9500	116.7000	121.4000
Mg / 25	-9.9900	3268.5000	5040.0000	5256.0000	2054.5000
Al / 27	-21.5450	107650.0000	138300.0000	144600.0000	77950.0000
Si / 29	53.5500	2329.0000	1572.0000	1688.0000	2381.0000
K / 39	17.3900	4747.5000	5640.0000	6009.0000	3694.0000
Ca / 44	49.5400	642.0000	917.5000	935.0000	569.0000
V / 51	0.4112	226.5500	297.0000	298.1000	208.9500
Cr / 52	1.1075	178.8000	173.8000	173.8000	166.5000
Mn / 55	0.5715	436.6000	1935.0000	1974.0000	363.5500
Fe / 57	5.0800	183500.0000	246450.0000	248000.0000	155150.0000
Co / 59	0.0265	42.1700	82.4500	82.3800	33.2800
Ni / 60	0.5125	74.7000	89.7000	90.3700	58.6000
Cu / 65	0.6725	89.6500	415.4000	417.5000	59.5500
Zn / 66	13.2600	195.9000	369.7500	376.2000	161.1500
As / 75	-0.1623	64.1000	79.4000	78.8300	47.2650
Se / 82	-0.0389	1.7630	2.2310	3.3000	1.1820
Sr / 88	-0.0409	19.9200	194.6000	193.5000	19.6900
Mo / 98	-0.4724	11.1250	14.6250	12.7400	6.7850
Ag / 107	-0.0330	0.0508	0.1338	0.0724	0.0019
Cd / 114	0.0167	0.1527	0.3382	0.2583	0.0325
Sn / 118	6.2300	11.5900	13.1800	13.4000	8.4150
Sb / 123	0.0718	3.7210	27.6050	27.2800	1.3975
Ba / 135	0.1301	189.0500	320.8500	318.3000	138.1000
W / 182	0.7575	0.8960	0.8325	1.0850	0.5240
Tl / 203	0.8130	1.2185	1.5315	1.5610	0.5090
Pb / 208	-0.1067	778.0000	6445.0000	6463.0000	99.1000
Th / 232	0.0064	19.3600	35.5650	33.8000	18.9350
U / 238	-0.0138	5.9100	7.9450	7.6310	4.1325
Li / 6	523110	518328.2	529578.7	536403.6	528156.6
Sc / 45	725002.6	741898.9	761921.1	734419.4	743264.7
Ge / 72	152220.9	152717.8	154187.3	154809.5	151702.8
Tb / 159	1134822	1072155	1081735	1083883	1074411
Bi / 209	663140.3	620913.9	620463.8	634246.4	621817
Li / 6	91.1	90.3	92.2	93.4	92.0
Sc / 45	90.9	93.0	95.6	92.1	93.2
Ge / 72	88.9	89.2	90.1	90.5	88.6
Tb / 159	88.4	83.5	84.2	84.4	83.7
Bi / 209	92.7	86.8	86.8	88.7	87.0

File:	044SMPL.D#	045SMPL.D#	046SMPL.D#	047SMPL.D#	048_BLK.D#
Sample:	SC3313-016L	SC3309-019L	SC3309-019A	LCSSZF27ICS1	BLANK
Date/Time:	7/8/2009 22:07	7/8/2009 22:16	7/8/2009 22:24	7/8/2009 22:33	7/8/2009 22:41
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	25	25	5	10	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	3.1375	8.7900	1126.5000	956.9000	0.1213
B / 11	24.6025	26.2000	1067.5000	628.3000	1.2680
Na / 23	25.7250	16.3850	1184.0000	3126.0000	-5.7580
Mg / 25	8230.0000	7860.0000	8970.0000	26030.0000	-6.6690
Al / 27	160900.0000	120175.0000	111750.0000	73240.0000	5.7160
Si / 29	2590.0000	4280.0000	4372.0000	992.1000	6.8540
K / 39	8430.0000	11155.0000	19825.0000	25720.0000	15.0100
Ca / 44	5025.0000	4505.0000	5350.0000	55110.0000	-0.9924
V / 51	301.7500	325.0000	1324.0000	554.5000	0.1971
Cr / 52	185.0250	221.2500	1207.5000	670.4000	0.2100
Mn / 55	1334.5000	4367.5000	5050.0000	2130.0000	0.4603
Fe / 57	151175.0000	368750.0000	357150.0000	110400.0000	34.7300
Co / 59	40.8750	122.8500	1119.0000	637.2000	0.1087
Ni / 60	80.6750	113.1250	1084.5000	946.5000	0.1490
Cu / 65	93.8250	136.9750	1096.0000	363.8000	0.1544
Zn / 66	251.0000	321.7500	1243.5000	1888.0000	0.5435
As / 75	32.7250	77.3750	1032.5000	1197.0000	0.1593
Se / 82	6.1900	4.4350	937.5000	780.8000	0.1747
Sr / 88	55.1750	121.7250	121.8500	693.7000	0.0145
Mo / 98	0.9770	1.2015	1000.0000	624.7000	0.4086
Ag / 107	-0.0358	-0.1426	989.5000	194.8000	0.0655
Cd / 114	0.2085	0.5075	973.5000	367.9000	0.0834
Sn / 118	15.3850	13.3950	12.9750	1030.0000	0.1788
Sb / 123	2.1828	4.3650	1058.0000	641.4000	0.1657
Ba / 135	460.2500	682.5000	1754.5000	3360.0000	0.3514
W / 182	1.7440	1.4928	0.8030	2.4640	0.0316
Tl / 203	1.2253	0.6740	1058.5000	933.5000	1.0910
Pb / 208	173.4000	740.5000	1805.0000	1203.0000	0.1801
Th / 232	33.1500	26.3500	33.2250	52.0800	0.0007
U / 238	7.4625	7.4975	8.0150	11.1100	-0.0068
Li / 6	519729.1	527332.8	500589.1	505025	519463.1
Sc / 45	694506.7	724907.3	753294.3	702165.6	700981.3
Ge / 72	151086.3	154250.1	151473.3	148520.3	153370
Tb / 159	1062017	1092429	1057290	1048685	1077317
Bi / 209	630246.3	646516.1	605687.8	615674.5	637358.3
Li / 6	90.5	91.8	87.2	87.9	90.5
Sc / 45	87.1	90.9	94.5	88.1	87.9
Ge / 72	88.3	90.1	88.5	86.8	89.6
Tb / 159	82.7	85.1	82.3	81.6	83.9
Bi / 209	88.1	90.4	84.7	86.1	89.1

File:	049_CCV.D#	050_CCB.D#	051SMPL.D#	052SMPL.D#	053SMPL.D#
Sample:	CCV	CCB	PBWZG07ICW1	SC3672-001R	SC3519-003
Date/Time:	7/8/2009 22:50	7/8/2009 22:59	7/8/2009 23:07	7/8/2009 23:16	7/8/2009 23:24
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	11.3700	0.0218	0.0117	0.0511	0.0050
B / 11	26.0200	0.5104	1.3180	27.2000	322.1000
Na / 23	5475.0000	-1.5050	-1.7930	1896.0000	4778.0000
Mg / 25	5382.0000	-2.8930	6.6040	96.4900	40.4400
Al / 27	525.3000	-4.6180	0.2141	32.7200	82.3300
Si / 29	508.1000	3.7690	40.2700	1391.0000	98.6300
K / 39	5448.0000	14.2100	13.3600	340.2000	5375.0000
Ca / 44	5409.0000	-0.1986	-0.1334	296.5000	172.7000
V / 51	24.9400	0.0312	-0.0359	0.3356	0.0987
Cr / 52	24.7500	-0.0225	0.0950	0.4279	0.5828
Mn / 55	25.0500	0.0697	0.0684	7.9590	2.9990
Fe / 57	5152.0000	8.9860	5.1790	48.3600	286.9000
Co / 59	10.3600	0.0271	0.0113	0.1998	0.0068
Ni / 60	25.7800	0.0426	0.0288	0.8519	0.1008
Cu / 65	25.5700	0.0364	0.0907	0.7683	0.8716
Zn / 66	25.9300	0.0798	0.3189	1.7600	7.1170
As / 75	25.5100	-0.0071	-0.0547	0.4049	0.4370
Se / 82	25.7600	0.0281	-0.0156	0.2230	1.1770
Sr / 88	25.3400	-0.0116	-0.0355	19.9800	1.4660
Mo / 98	25.2900	0.0087	-0.1434	0.2546	-0.1790
Ag / 107	10.3500	0.0167	0.0025	0.0296	7.7650
Cd / 114	10.4300	0.0229	0.0099	0.0446	0.0035
Sn / 118	26.9600	0.0650	0.0848	0.0856	0.0499
Sb / 123	27.4800	0.0614	0.0243	0.1553	0.0227
Ba / 135	27.3600	0.0697	0.0474	65.4400	0.5866
W / 182	25.6700	0.2814	0.1487	0.1033	0.0638
Tl / 203	10.2200	0.2904	0.1104	0.1319	0.0420
Pb / 208	25.8100	0.0391	0.0144	0.2914	0.0471
Th / 232	10.0200	0.0033	-0.0008	0.0141	-0.0018
U / 238	10.3600	0.0050	-0.0044	0.0081	-0.0055
Li / 6	503786	512194.4	500704.1	511888.8	511025.3
Sc / 45	690187.8	694941.8	678062.8	689683.4	724225.5
Ge / 72	150498.5	152645.6	146472.7	149651.2	151247.5
Tb / 159	1075257	1089508	1052192	1044388	1085697
Bi / 209	621596.9	642124.4	617477.4	618583.6	637175.1
Li / 6	87.7	89.2	87.2	89.1	89.0
Sc / 45	86.6	87.2	85.0	86.5	90.8
Ge / 72	87.9	89.2	85.6	87.4	88.4
Tb / 159	83.7	84.8	81.9	81.3	84.5
Bi / 209	86.9	89.8	86.3	86.5	89.1

File:	059_CCV.D#	060_CCB.D#	061_BLK.D#	062_PQL.D#	063_CCV.D#
Sample:	CCV	CCB	BLANK	PQL	CCV
Date/Time:	7/9/2009 0:16	7/9/2009 0:24	7/9/2009 0:33	7/9/2009 0:41	7/9/2009 0:50
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	12.0200	0.0152	0.0008	0.2230	11.3400
B / 11	27.5400	0.9202	0.7144	8.4400	25.5900
Na / 23	5898.0000	6.0640	-1.6970	221.6000	5440.0000
Mg / 25	5828.0000	1.2460	-6.3500	12.2200	5292.0000
Al / 27	557.8000	-0.0662	-5.9230	55.4400	511.6000
Si / 29	549.6000	4.8240	3.9670	44.4400	503.1000
K / 39	5934.0000	38.6200	10.6500	243.9000	5427.0000
Ca / 44	5854.0000	3.8930	-4.3290	13.3600	5321.0000
V / 51	26.0900	0.0331	0.0784	1.0040	24.7500
Cr / 52	25.8400	0.0240	0.0481	0.6551	24.6700
Mn / 55	26.1600	0.0858	0.0373	0.1914	24.8200
Fe / 57	5299.0000	15.9300	1.9840	19.9300	5040.0000
Co / 59	10.7500	0.0317	0.0157	0.2019	10.2500
Ni / 60	26.7000	0.0638	0.0310	0.2283	25.2300
Cu / 65	26.5100	0.0458	0.0727	0.2245	25.5200
Zn / 66	26.8900	0.0093	0.3142	2.1010	25.4200
As / 75	26.7400	-0.0676	0.1046	0.9157	25.4600
Se / 82	26.9500	0.3310	0.1149	0.7963	25.5600
Sr / 88	26.6000	0.0371	-0.0165	0.1669	25.1100
Mo / 98	26.1300	0.0087	-0.1823	0.7191	24.8700
Ag / 107	10.9700	0.0130	0.0025	0.2006	10.2600
Cd / 114	10.9400	0.0278	0.0080	0.2030	10.3800
Sn / 118	29.8800	0.1203	0.0895	0.2683	27.1600
Sb / 123	29.8400	0.0868	0.0271	0.2230	27.7600
Ba / 135	29.2800	0.1796	0.0698	0.2533	27.3300
W / 182	28.0700	0.2858	0.1377	1.3080	25.7500
Tl / 203	10.2800	0.5851	0.3158	0.5419	9.5730
Pb / 208	27.1600	0.0877	0.0078	0.1929	25.6400
Th / 232	10.4100	0.0068	-0.0013	0.0872	9.7560
U / 238	11.0000	0.0086	-0.0034	0.1941	10.2400
Li / 6	473403.3	492283.4	508033.8	495802.8	502069.8
Sc / 45	624819.2	635569.8	681534.4	671983.3	680747.3
Ge / 72	139323	142443.2	147184.4	146753.6	148150.9
Tb / 159	951060	979030	1049195	1034050	1044099
Bi / 209	563650.8	590577.4	619214.1	618277.4	611768.3
Li / 6	82.4	85.7	88.5	86.3	87.4
Sc / 45	78.4	79.7	85.5	84.3	85.4
Ge / 72	81.4	83.2	86.0	85.7	86.6
Tb / 159	74.0	76.2	81.7	80.5	81.3
Bi / 209	78.8	82.6	86.6	86.5	85.5

File:	064_CCB.D#	065SMPL.D#	066SMPL.D#	067SMPL.D#	068SMPL.D#
Sample:	CCB	PBSZG01ICS0	SC3309-020	SC3349-001	SC3349-001L
Date/Time:	7/9/2009 0:59	7/9/2009 1:07	7/9/2009 1:16	7/9/2009 1:24	7/9/2009 1:33
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	5	5	10	25
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0068	-0.0303	5.4750	1.3130	0.9688
B / 11	0.5660	3.1760	33.9150	18.9100	23.3625
Na / 23	0.0461	-2.3115	205.9000	127.9000	-3.8925
Mg / 25	-3.1240	-12.8300	8120.0000	2772.0000	2610.0000
Al / 27	-9.0330	-28.9400	104650.0000	51720.0000	50775.0000
Si / 29	2.6020	55.5500	3532.5000	3692.0000	3620.0000
K / 39	19.1400	100.2500	8880.0000	5519.0000	5600.0000
Ca / 44	-5.3790	-5.2450	8560.0000	452.2000	377.2500
V / 51	0.0467	0.6615	264.8000	116.3000	113.9750
Cr / 52	-0.0410	1.1365	147.1500	57.6400	56.5000
Mn / 55	-0.0134	0.9175	4405.5000	182.5000	183.6250
Fe / 57	-0.5798	37.8800	185200.0000	49050.0000	47725.0000
Co / 59	0.0076	0.0165	101.4500	16.6100	16.8550
Ni / 60	0.0303	0.4707	88.9000	125.9000	126.4500
Cu / 65	0.0150	1.5560	84.8500	2622.0000	2632.5000
Zn / 66	0.0230	2.1380	332.1000	87.7600	89.3500
As / 75	-0.0586	-0.0108	39.6550	14.9500	14.4825
Se / 82	0.0858	-1.2025	2.5815	0.9733	4.3000
Sr / 88	-0.0109	-0.0281	84.6000	29.7400	29.1750
Mo / 98	-0.1195	-1.1675	5.7100	-0.0782	-5.4175
Ag / 107	0.0043	-0.0251	0.2524	0.2661	0.0490
Cd / 114	0.0135	0.0238	0.7510	0.0147	-0.0517
Sn / 118	0.0705	6.9950	12.3000	38.0800	37.2000
Sb / 123	0.0402	0.1086	2.0355	1.3090	1.1485
Ba / 135	0.0416	0.3469	684.0000	183.6000	182.4250
W / 182	0.2805	0.8325	6.2150	1.3940	2.3963
Tl / 203	0.2860	0.7670	1.6230	1.2560	1.8768
Pb / 208	-0.0090	-0.0354	178.2500	7025.0000	6937.5000
Th / 232	0.0076	0.0076	24.3550	12.1400	9.6425
U / 238	0.0035	-0.0213	5.9000	2.8290	2.6525
Li / 6	505204.4	509535.5	509108.8	513868.8	517725.8
Sc / 45	685972.4	680830.6	715911	681169.3	693644.6
Ge / 72	148721	146325.5	146987.8	146772.6	147830.3
Tb / 159	1062743	1039501	1046941	1045600	1060835
Bi / 209	628137	624618.9	596879.3	612858.9	627980
Li / 6	88.0	88.7	88.7	89.5	90.2
Sc / 45	86.0	85.4	89.8	85.4	87.0
Ge / 72	86.9	85.5	85.9	85.8	86.4
Tb / 159	82.7	80.9	81.5	81.4	82.6
Bi / 209	87.8	87.3	83.5	85.7	87.8

File:	069SMPL.D#	070SMPL.D#	071SMPL.D#	072SMPL.D#	073SMPL.D#
Sample:	SC3349-001L	SC3349-002	LCSSZF29ICS0	LCSSZG01ICS0	LC2SZG01ICS0
Date/Time:	7/9/2009 1:42	7/9/2009 1:50	7/9/2009 1:59	7/9/2009 2:07	7/9/2009 2:16
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	50	5	10	10	10
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.5425	5.6400	914.8000	955.1000	922.1000
B / 11	28.7150	25.1600	598.8000	617.3000	621.5000
Na / 23	-205.6000	195.7500	2808.0000	3094.0000	2988.0000
Mg / 25	2469.0000	7825.0000	23650.0000	26410.0000	25220.0000
Al / 27	51650.0000	118050.0000	65270.0000	76170.0000	72760.0000
Si / 29	3878.5000	3701.0000	4582.0000	3641.0000	4037.0000
K / 39	6130.0000	6380.0000	23010.0000	25760.0000	24330.0000
Ca / 44	261.6000	2640.5000	49910.0000	53480.0000	50400.0000
V / 51	111.9000	235.2000	505.7000	551.4000	530.2000
Cr / 52	54.8000	127.5500	625.5000	668.1000	641.0000
Mn / 55	183.2500	3853.0000	1879.0000	2056.0000	1954.0000
Fe / 57	48100.0000	93650.0000	99970.0000	114700.0000	110700.0000
Co / 59	16.3250	37.0950	586.0000	615.6000	589.3000
Ni / 60	126.0500	63.1000	887.5000	926.7000	882.2000
Cu / 65	2641.5000	50.7500	336.9000	352.7000	351.7000
Zn / 66	89.8000	227.7000	1767.0000	1853.0000	1867.0000
As / 75	6.4300	25.1650	1099.0000	1177.0000	1137.0000
Se / 82	-0.3224	3.7830	731.0000	784.0000	754.2000
Sr / 88	29.0550	52.7000	618.2000	647.6000	636.4000
Mo / 98	-13.7550	3.9375	565.0000	602.1000	575.5000
Ag / 107	-0.3249	0.2225	180.8000	191.1000	184.5000
Cd / 114	-0.2326	0.4167	347.3000	361.5000	345.2000
Sn / 118	38.6700	13.1900	912.9000	1015.0000	948.7000
Sb / 123	1.0350	17.6500	524.5000	630.0000	597.5000
Ba / 135	183.8500	683.5000	2990.0000	3299.0000	3056.0000
W / 182	3.1240	0.8800	2.8580	2.6040	3.0400
Tl / 203	2.2035	1.5280	831.5000	910.2000	879.2000
Pb / 208	6855.0000	3523.0000	1120.0000	1195.0000	1158.0000
Th / 232	8.7900	36.4450	45.3200	45.2300	45.3300
U / 238	2.4520	7.5200	10.5300	12.1500	10.7600
Li / 6	527891	515951.4	507346.1	502393.4	503745.8
Sc / 45	685110.9	711231.6	709504.6	684896.7	700740.9
Ge / 72	147877.7	148456.3	148367.7	146680.6	147913.5
Tb / 159	1061266	1054109	1065948	1031181	1072374
Bi / 209	633150.5	602054.6	621141.5	611058.5	618110.3
Li / 6	91.9	89.8	88.3	87.5	87.7
Sc / 45	85.9	89.2	89.0	85.9	87.9
Ge / 72	86.4	86.7	86.7	85.7	86.4
Tb / 159	82.6	82.1	83.0	80.3	83.5
Bi / 209	88.5	84.2	86.9	85.4	86.4

File:	074_BLK.D#	075_CCV.D#	076_CCB.D#	077SMPL.D#	078SMPL.D#
Sample:	BLANK	CCV	CCB	PBSZF29ICS0	SC3310-001
Date/Time:	7/9/2009 2:24	7/9/2009 2:33	7/9/2009 2:42	7/9/2009 2:50	7/9/2009 2:59
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	5	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0770	11.3700	0.0209	0.1866	12.0800
B / 11	1.0520	25.1100	0.5499	2.7795	16.7200
Na / 23	-6.7090	5389.0000	-2.6090	-8.7850	151.2000
Mg / 25	-6.7200	5317.0000	-3.4950	-8.1600	9365.0000
Al / 27	0.6131	512.6000	-7.0850	-7.7300	93150.0000
Si / 29	5.9110	492.0000	1.8090	79.0000	3542.0000
K / 39	22.4500	5324.0000	22.5700	177.4000	13975.0000
Ca / 44	1.5000	5267.0000	-0.1569	24.4550	5270.0000
V / 51	0.8563	24.5500	0.0102	1.0970	465.3500
Cr / 52	0.4856	24.4500	-0.0099	2.0465	206.1000
Mn / 55	0.2600	24.6600	0.0617	0.9875	2327.5000
Fe / 57	17.1300	4961.0000	4.8910	59.8000	567000.0000
Co / 59	0.0598	10.0700	0.0174	0.1573	106.0500
Ni / 60	0.1426	25.4900	0.0385	1.1845	103.1000
Cu / 65	0.3873	25.3300	0.0285	0.5975	123.1500
Zn / 66	0.3002	25.7200	0.0895	1.1755	341.5500
As / 75	0.2675	25.2200	0.0559	0.3964	46.3700
Se / 82	-0.0806	25.1600	0.1179	0.0219	2.5230
Sr / 88	0.0178	24.9600	-0.0078	0.0137	76.7000
Mo / 98	0.2483	25.0100	-0.0749	-0.9780	7.6600
Ag / 107	0.0175	10.2400	0.0003	0.0224	0.1556
Cd / 114	0.0374	10.3500	0.0183	0.0807	0.3335
Sn / 118	0.2526	26.9800	0.1014	6.9000	12.5500
Sb / 123	0.0864	27.0100	0.0437	0.2917	0.9230
Ba / 135	0.3916	27.3200	0.0766	1.1680	537.5000
W / 182	0.0357	25.6700	0.3050	0.7985	0.8570
Tl / 203	1.3540	9.9370	0.4935	1.7910	3.0715
Pb / 208	0.1576	25.4100	0.0471	0.5130	59.4000
Th / 232	0.0106	9.6750	0.0058	0.0512	47.8600
U / 238	-0.0068	10.1300	0.0029	-0.0181	7.1600
Li / 6	507111.1	495506.7	501276.1	492234.4	499151.3
Sc / 45	670498.5	673062.3	687082.6	628411.8	735895.1
Ge / 72	143574.7	146294.5	147075.6	138652.5	149882.6
Tb / 159	1032299	1045403	1066605	983037.2	1008753
Bi / 209	604089.8	609928.3	629409.4	582372.8	575130.3
Li / 6	88.3	86.3	87.3	85.7	86.9
Sc / 45	84.1	84.4	86.2	78.8	92.3
Ge / 72	83.9	85.5	85.9	81.0	87.6
Tb / 159	80.4	81.4	83.0	76.5	78.5
Bi / 209	84.5	85.3	88.0	81.4	80.4

File:	009CALB.D#	010CALI.D#	011CALI.D#	012CALI.D#	013CALI.D#
Sample:	Cal Blank	Cal Std 1	Cal Std 2	Cal Std 3	Cal Std 4
Date/Time:	7/9/2009 18:49	7/9/2009 18:57	7/9/2009 19:06	7/9/2009 19:14	7/9/2009 19:23
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0000	0.5011	4.6620	26.7300	50.0300
B / 11	0.0000	0.4062	4.6480	25.9400	50.0400
Na / 23	0.0000	92.1300	944.2000	5349.0000	10000.0000
Mg / 25	0.0000	92.5600	899.0000	5428.0000	10010.0000
Al / 27	0.0000	8.4360	92.6500	537.3000	1001.0000
Si / 29	0.0000	7.4840	92.6200	525.0000	1001.0000
K / 39	0.0000	98.1200	937.9000	5311.0000	10010.0000
Ca / 44	0.0000	91.4700	905.1000	5386.0000	10010.0000
V / 51	0.0000	0.5972	4.7120	26.6700	50.0300
Cr / 52	0.0000	0.4949	4.6770	26.9100	50.0300
Mn / 55	0.0000	0.5369	4.8110	26.8700	50.0200
Fe / 57	0.0000	96.7300	953.9000	5364.0000	10000.0000
Co / 59	0.0000	0.5372	4.9350	27.2400	50.0100
Ni / 60	0.0000	0.5513	4.9350	27.2800	50.0000
Cu / 65	0.0000	0.5797	4.8800	27.1300	50.0100
Zn / 66	0.0000	0.6613	5.1670	27.3400	49.9800
As / 75	0.0000	0.6169	4.7190	26.9300	50.0300
Se / 82	0.0000	0.6448	4.6490	26.9600	50.0300
Sr / 88	0.0000	0.4812	4.8370	26.8300	50.0200
Mo / 98	0.0000	0.5109	4.6080	26.4200	50.0400
Ag / 107	0.0000	0.5419	4.8570	27.1800	50.0100
Cd / 114	0.0000	0.5356	4.9120	27.2100	50.0100
Sn / 118	0.0000	0.4656	4.5640	26.3600	50.0400
Sb / 123	0.0000	0.5000	4.5890	27.3300	50.0400
Ba / 135	0.0000	0.4768	4.5680	26.9100	50.0400
W / 182	0.0000	0.4065	4.3380	26.3800	50.0700
Tl / 203	0.0000	0.4025	4.5930	23.6400	50.0400
Pb / 208	0.0000	0.4886	4.5890	26.4600	50.0400
Th / 232	0.0000	0.2158	2.7810	25.4900	50.2200
U / 238	0.0000	0.5040	4.5210	26.4400	50.0500
Li / 6	472131.3	501491.4	499041.3	465471.7	473116
Sc / 45	649566.8	697226.2	681340.9	621996.2	640312.6
Ge / 72	142615.3	150350.8	149102.4	139363	143430.4
Tb / 159	1018723	1091750	1070602	976255.1	996214.9
Bi / 209	595430.4	628288.1	622395.6	567401.3	570732.9
Li / 6	100.0	106.2	105.7	98.6	100.2
Sc / 45	100.0	107.3	104.9	95.8	98.6
Ge / 72	100.0	105.4	104.5	97.7	100.6
Tb / 159	100.0	107.2	105.1	95.8	97.8
Bi / 209	100.0	105.5	104.5	95.3	95.9

File:	014SMPL.D#	015_ICV.D#	016_ICB.D#	017_PQL.D#	018ICSA.D#
Sample:	Blank	ICV	ICB	PQL	ICSA
Date/Time:	7/9/2009 19:31	7/9/2009 19:40	7/9/2009 19:48	7/9/2009 19:57	7/9/2009 20:06
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0418	19.0300	0.0116	0.1384	-0.0079
B / 11	0.4710	22.0200	0.3358	6.1940	0.3713
Na / 23	8.4580	3660.0000	3.1180	195.3000	92140.0000
Mg / 25	8.0820	3803.0000	2.8880	18.5600	90150.0000
Al / 27	0.9667	386.9000	-1.8060	55.1800	92800.0000
Si / 29	-0.5987	369.9000	-0.9681	36.1900	54.7000
K / 39	10.1200	3632.0000	-2.3540	189.2000	92810.0000
Ca / 44	6.3680	3500.0000	1.6040	17.1500	90100.0000
V / 51	0.0658	18.9800	0.0564	1.0390	0.2235
Cr / 52	-0.0620	19.0200	-0.1185	0.4618	1.7050
Mn / 55	0.0331	18.9700	-0.0337	0.1705	1.8460
Fe / 57	9.9980	3776.0000	-1.5290	15.0900	90620.0000
Co / 59	0.0427	19.3600	0.0105	0.1849	0.0813
Ni / 60	0.0356	19.3300	-0.0047	0.1814	0.9729
Cu / 65	0.0501	19.3400	0.0027	0.1978	0.7440
Zn / 66	0.0300	19.5900	-0.0203	2.0730	0.7364
As / 75	-0.0334	18.3200	-0.0873	0.8650	0.3349
Se / 82	-0.1529	18.8200	-0.1833	0.5960	-0.3651
Sr / 88	0.0420	20.0400	0.0132	0.2182	2.5860
Mo / 98	0.4170	38.7400	0.3195	1.0540	1943.0000
Ag / 107	0.0466	19.2100	0.0042	0.1943	0.0297
Cd / 114	0.0440	19.0800	0.0126	0.1971	-0.0139
Sn / 118	0.0862	19.0300	0.0347	0.1983	0.0491
Sb / 123	0.0990	18.0700	0.0352	0.2029	0.1214
Ba / 135	0.0561	18.2900	-0.0010	0.1615	1.4140
W / 182	0.5643	25.2900	0.4005	1.3220	0.3582
Tl / 203	0.1387	18.2900	0.0061	0.2502	-0.0374
Pb / 208	0.0260	18.4300	-0.0300	0.1365	0.0521
Th / 232	0.0499	19.1800	0.0189	0.0834	0.0348
U / 238	0.0434	19.0900	0.0141	0.1925	-0.0008
Li / 6	501735.9	507733.7	507828.8	644432.9	456717.8
Sc / 45	686967.2	708200.6	693642.6	711707.4	681865
Ge / 72	149828.7	152186.9	154599.4	155746.2	150842.5
Tb / 159	1067017	1104036	1102825	1123909	1068020
Bi / 209	628857.1	629914.4	646433.8	656318.9	566052.9
Li / 6	106.3	107.5	107.6	136.5	96.7
Sc / 45	105.8	109.0	106.8	109.6	105.0
Ge / 72	105.1	106.7	108.4	109.2	105.8
Tb / 159	104.7	108.4	108.3	110.3	104.8
Bi / 209	105.6	105.8	108.6	110.2	95.1

File:	019ICSB.D#	020_BLK.D#	021_CCV.D#	022_CCB.D#	023_BLK.D#
Sample:	ICSAB	Blank	CCV	CCB	BLANK
Date/Time:	7/9/2009 20:14	7/9/2009 20:23	7/9/2009 20:32	7/9/2009 20:40	7/9/2009 20:49
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	20.3000	-0.0056	11.0700	0.0028	-0.0127
B / 11	21.2200	0.1801	26.5700	0.2947	0.1742
Na / 23	96490.0000	101.9000	4944.0000	27.5300	14.0400
Mg / 25	94860.0000	80.8500	5000.0000	22.5200	9.9510
Al / 27	97220.0000	84.6600	526.6000	18.5500	7.9790
Si / 29	519.1000	-1.0990	472.3000	-1.0510	0.0346
K / 39	97640.0000	90.2100	5012.0000	27.1500	11.6900
Ca / 44	94490.0000	83.1400	5003.0000	20.5400	6.3510
V / 51	20.4900	0.0536	24.6600	-0.0038	-0.0025
Cr / 52	21.4900	-0.0054	24.5000	-0.1134	-0.1102
Mn / 55	21.2900	-0.0310	24.8200	-0.0197	-0.0370
Fe / 57	93390.0000	82.6000	5033.0000	18.3400	4.0260
Co / 59	19.5200	-0.0032	10.1700	-0.0007	-0.0140
Ni / 60	19.6700	-0.0053	25.0600	0.0059	-0.0153
Cu / 65	19.3000	-0.0139	24.9400	0.0055	-0.0153
Zn / 66	18.6300	-0.0060	25.9800	-0.0258	-0.0089
As / 75	19.4000	-0.0257	24.6700	0.0454	-0.0576
Se / 82	18.1500	-0.1000	24.6800	0.1622	-0.0173
Sr / 88	23.9700	0.0108	25.3000	0.0055	-0.0008
Mo / 98	2040.0000	11.9000	29.0600	2.2290	1.2620
Ag / 107	18.0300	-0.0049	10.2200	-0.0021	-0.0118
Cd / 114	17.9600	0.0069	10.3600	0.0087	-0.0032
Sn / 118	20.8600	0.0075	24.2600	0.0391	0.0043
Sb / 123	20.1700	0.0008	25.3900	0.0161	0.0066
Ba / 135	21.6500	0.0112	24.5000	0.0312	-0.0173
W / 182	27.1000	0.1284	23.2500	0.3156	0.1725
Tl / 203	18.5900	0.1563	8.6590	0.0915	-0.0215
Pb / 208	20.6600	-0.0472	24.2900	-0.0163	-0.0427
Th / 232	21.6100	0.0048	8.9680	0.0079	-0.0032
U / 238	21.4500	0.0037	9.7060	0.0049	-0.0026
Li / 6	447125.6	479670.3	453632.4	462376.4	462801.5
Sc / 45	669990.8	715324	678731.8	689893.7	692771.3
Ge / 72	150692.3	157512.6	151830.3	154406.5	154429.9
Tb / 159	1036039	1133313	1094985	1115824	1130249
Bi / 209	544364	656709.8	634771.8	659693.7	663308.1
Li / 6	94.7	101.6	96.1	97.9	98.0
Sc / 45	103.1	110.1	104.5	106.2	106.7
Ge / 72	105.7	110.4	106.5	108.3	108.3
Tb / 159	101.7	111.2	107.5	109.5	110.9
Bi / 209	91.4	110.3	106.6	110.8	111.4

File:	024_BLK.D#	025_CCV.D#	026_CCB.D#	027SMPL.D#	028SMPL.D#
Sample:	BLANK	CCV	CCB	SC3309-019L	SC3309-020
Date/Time:	7/9/2009 20:57	7/9/2009 21:06	7/9/2009 21:15	7/9/2009 21:23	7/9/2009 21:32
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	25	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	-0.0141	10.6400	-0.0059	7.6800	4.9960
B / 11	0.1670	25.5100	0.2397	28.1250	32.1400
Na / 23	9.1100	4682.0000	9.5870	331.5000	230.2000
Mg / 25	5.8230	4781.0000	6.5220	7385.0000	7080.0000
Al / 27	4.7230	481.4000	1.4210	112575.0000	97450.0000
Si / 29	-1.5390	463.2000	1.5880	3945.0000	3318.0000
K / 39	2.0640	4814.0000	2.3750	9935.0000	7835.0000
Ca / 44	4.1940	4801.0000	2.9780	4475.0000	7835.0000
V / 51	-0.0631	24.1600	0.0375	322.5000	258.9000
Cr / 52	-0.0927	24.1500	-0.1225	219.2750	145.1500
Mn / 55	-0.0477	24.4300	-0.0279	4302.5000	4387.0000
Fe / 57	-0.3470	4959.0000	3.2300	360250.0000	181600.0000
Co / 59	-0.0174	9.9330	-0.0070	118.7500	100.4000
Ni / 60	-0.0244	24.6500	0.0053	110.5750	87.1000
Cu / 65	-0.0075	24.9000	0.0064	134.3000	83.2000
Zn / 66	-0.0438	25.5800	-0.0255	334.2500	339.7000
As / 75	-0.0314	24.5800	0.0108	79.2500	38.0000
Se / 82	-0.2400	24.6500	-0.0777	1.3060	1.5460
Sr / 88	-0.0040	25.1500	0.0167	124.1500	84.7000
Mo / 98	0.7954	25.3300	0.5747	17.2850	8.6700
Ag / 107	-0.0168	10.2700	-0.0084	-0.1435	0.2313
Cd / 114	-0.0069	10.2500	0.0003	0.4950	0.6760
Sn / 118	0.0060	23.6200	0.0477	11.3875	10.4650
Sb / 123	-0.0076	24.5400	0.0154	4.0375	1.5945
Ba / 135	-0.0150	23.8600	-0.0009	595.5000	613.0000
W / 182	0.1186	22.8500	0.3076	5.0275	5.8400
Tl / 203	-0.0535	8.4400	0.0444	0.1998	0.6530
Pb / 208	-0.0485	23.8100	-0.0373	709.2500	169.7500
Th / 232	-0.0066	8.8480	0.0035	17.9750	22.9300
U / 238	-0.0075	9.5560	0.0005	7.0500	5.5750
Li / 6	467717.3	462630.4	475464	475140.3	469834.3
Sc / 45	699557.6	689777.7	697372.9	709805.9	717918
Ge / 72	154345.3	152697.4	154686.4	155890.5	152006.9
Tb / 159	1139649	1123288	1151165	1153934	1112152
Bi / 209	667146.5	650805.1	671486.5	664192.5	629164.9
Li / 6	99.1	98.0	100.7	100.6	99.5
Sc / 45	107.7	106.2	107.4	109.3	110.5
Ge / 72	108.2	107.1	108.5	109.3	106.6
Tb / 159	111.9	110.3	113.0	113.3	109.2
Bi / 209	112.0	109.3	112.8	111.5	105.7

File:	029SMPL.D#	030SMPL.D#	031SMPL.D#	032SMPL.D#	033SMPL.D#
Sample:	SC3349-001L	SC3349-002	SC3310-006	SC3310-007	SC3310-010
Date/Time:	7/9/2009 21:40	7/9/2009 21:49	7/9/2009 21:57	7/9/2009 22:06	7/9/2009 22:14
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	25	5	20	50	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.6910	5.0600	2.9220	1.8515	4.3230
B / 11	20.2725	25.8950	21.0800	22.8200	34.8950
Na / 23	292.5000	217.6500	162.3200	482.6500	165.7500
Mg / 25	2712.5000	7070.0000	4192.0000	6255.0000	5900.0000
Al / 27	49100.0000	113500.0000	43720.0000	92050.0000	85250.0000
Si / 29	3505.0000	3500.0000	3690.0000	4468.0000	4039.5000
K / 39	5095.0000	5760.0000	4400.0000	5825.0000	6795.0000
Ca / 44	548.5000	2459.5000	8478.0000	7350.0000	2092.0000
V / 51	117.3750	238.4500	153.0600	199.6000	199.1500
Cr / 52	56.4750	128.9500	113.2600	120.1500	130.6500
Mn / 55	193.7500	3878.5000	3216.0000	2934.0000	1890.0000
Fe / 57	48250.0000	94200.0000	130120.0000	102600.0000	134600.0000
Co / 59	16.9700	37.0950	81.1600	38.4300	48.9700
Ni / 60	125.5500	61.7000	60.9200	58.3000	68.4000
Cu / 65	2600.0000	50.6000	1526.4000	3314.5000	106.7000
Zn / 66	89.6750	233.0500	556.0000	608.0000	229.1000
As / 75	14.0250	24.4700	31.8400	48.1300	35.5850
Se / 82	-3.9200	2.6225	0.0538	3.5930	1.6865
Sr / 88	29.9500	54.2000	69.9600	69.6500	41.8600
Mo / 98	9.3675	6.2650	8.9660	17.4200	8.1750
Ag / 107	-0.1820	0.1710	-0.0056	-0.0947	0.0682
Cd / 114	-0.0152	0.3535	0.5070	0.0933	0.3981
Sn / 118	32.8500	11.4850	10.4680	14.0150	11.0800
Sb / 123	0.5303	16.5850	48.8200	95.5500	1.8850
Ba / 135	166.7750	621.5000	386.6000	416.9500	508.5000
W / 182	3.0500	0.9645	2.4040	2.7675	0.7050
Tl / 203	-1.0733	0.8535	-1.1688	-4.0510	0.3569
Pb / 208	6745.0000	3394.5000	12316.0000	30930.0000	592.5000
Th / 232	9.1700	34.7900	9.4300	11.5950	19.6100
U / 238	2.6225	7.0700	3.4120	4.5725	5.2050
Li / 6	467704.5	463418.9	470215	488656.4	470704.1
Sc / 45	674153.3	685764.1	670265.4	694238.6	699025.3
Ge / 72	150657.7	147133	150103.2	154024.2	149368.6
Tb / 159	1099792	1077513	1078729	1143561	1082487
Bi / 209	641457.2	612942.8	634168.3	658434.4	619480.1
Li / 6	99.1	98.2	99.6	103.5	99.7
Sc / 45	103.8	105.6	103.2	106.9	107.6
Ge / 72	105.6	103.2	105.3	108.0	104.7
Tb / 159	108.0	105.8	105.9	112.3	106.3
Bi / 209	107.7	102.9	106.5	110.6	104.0

File:	034SMPL.D#	035SMPL.D#	036_BLK.D#	037_CCV.D#	038_CCB.D#
Sample:	SC3310-011	SC3310-012	BLANK	CCV	CCB
Date/Time:	7/9/2009 22:23	7/9/2009 22:32	7/9/2009 22:40	7/9/2009 22:49	7/9/2009 22:57
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	5	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	4.3585	3.6335	-0.0197	10.2300	-0.0103
B / 11	37.3100	31.6500	0.0635	24.4600	0.1960
Na / 23	210.7000	205.8000	0.8752	4661.0000	5.1460
Mg / 25	7965.0000	8345.0000	1.4230	4814.0000	3.3690
Al / 27	88000.0000	93550.0000	19.9200	481.1000	2.2800
Si / 29	4683.0000	4415.5000	-0.1836	455.0000	-0.0932
K / 39	6720.0000	6940.0000	-3.5350	4699.0000	0.0131
Ca / 44	5845.0000	6830.0000	1.2550	4718.0000	1.8730
V / 51	198.1000	216.1500	0.0683	23.7800	0.0025
Cr / 52	127.0000	134.3500	-0.0976	23.6900	-0.1259
Mn / 55	3037.0000	2109.0000	0.4865	24.1200	0.0641
Fe / 57	97000.0000	103100.0000	22.0200	4831.0000	1.3060
Co / 59	50.1500	49.8900	-0.0159	9.8550	-0.0108
Ni / 60	66.5000	68.1500	-0.0180	24.1900	-0.0004
Cu / 65	388.6500	432.2500	0.0542	24.2100	0.0113
Zn / 66	338.2500	366.3000	0.0666	25.2000	-0.0239
As / 75	22.5500	24.8700	-0.0069	24.1000	-0.0646
Se / 82	2.4520	1.5235	-0.2107	24.4300	-0.0183
Sr / 88	68.6500	83.7000	0.0047	24.5800	0.0088
Mo / 98	5.5150	5.7200	0.0525	24.2500	0.1999
Ag / 107	0.2340	0.1098	-0.0216	10.1000	-0.0115
Cd / 114	0.4462	0.5010	-0.0142	10.1400	-0.0071
Sn / 118	16.7650	14.3900	-0.0022	22.9000	0.0327
Sb / 123	11.7500	14.7500	-0.0130	23.7100	0.0099
Ba / 135	572.0000	530.0000	0.0755	23.4200	0.0096
W / 182	0.6425	0.5530	0.0085	21.9300	0.2794
Tl / 203	0.4064	0.4473	-0.1125	8.2170	0.0143
Pb / 208	4555.5000	4259.5000	0.8492	23.8300	0.1202
Th / 232	22.7700	27.5600	-0.0039	8.6710	-0.0020
U / 238	5.5750	5.7900	-0.0114	9.3590	-0.0044
Li / 6	473861.8	475993.8	488315	475251.3	477024.5
Sc / 45	701988.1	692839.5	690287.8	698648.3	674355.4
Ge / 72	148674.9	148308.5	154964.7	155538.5	152079.1
Tb / 159	1091525	1078081	1125370	1167505	1118812
Bi / 209	620502.6	614176.7	661115.7	663897.4	661988.5
Li / 6	100.4	100.8	103.4	100.7	101.0
Sc / 45	108.1	106.7	106.3	107.6	103.8
Ge / 72	104.2	104.0	108.7	109.1	106.6
Tb / 159	107.1	105.8	110.5	114.6	109.8
Bi / 209	104.2	103.1	111.0	111.5	111.2

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG07A

Date: 7/7/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements									
ZZZZZZ		1	14:44										
ZZZZZZ		1	14:50										
Cal Blank		1	15:50	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
Cal Std 1		1	15:58	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
Cal Std 2		1	16:07	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
Cal Std 3		1	16:15	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
Cal Std 4		1	16:24	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
ZZZZZZ		1	16:32										
ICV		1	16:41	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
ICB		1	16:50	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
PQL		1	16:58	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
ICSA		1	17:07	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
ICSAB		1	17:15	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
Blank		1	17:24	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
CCV		1	17:33	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
CCB		1	17:41	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
BLANK		1	17:50	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
BLANK		1	17:58	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
CCV		1	18:07	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
CCB		1	18:15	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
PBWZF26ICW1		5	18:24	Sb As		Cu Pb				Sn	Zn		
ZZZZZZ		1	18:33										
ZZZZZZ		1	18:41										
ZZZZZZ		5	18:50										
ZZZZZZ		5	18:58										
SC3309-001	RB06170901	5	19:07	Sb As		Cu Pb				Sn	Zn		
SC3309-002	SB06160901	5	19:15	Sb As		Cu Pb				Sn	Zn		
SC3309-003	IDW06170901	5	19:24	Sb As		Cu Pb				Sn	Zn		
LCSWZF26ICW1		10	19:33	Sb As		Cu Pb				Sn	Zn		
BLANK		1	19:41	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
CCV		1	19:50	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
CCB		1	19:58	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
ZZZZZZ		1	20:07										
ZZZZZZ		1	20:15										
ZZZZZZ		1	20:24										
ZZZZZZ		1	20:33										
ZZZZZZ		1	20:41										
ZZZZZZ		1	20:50										
ZZZZZZ		1	20:59										
ZZZZZZ		1	21:07										
ZZZZZZ		10	21:16										
BLANK		1	21:24	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
CCV		1	21:33	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
CCB		1	21:41	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
PQL		1	21:50	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
CCV		1	21:58	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
CCB		1	22:07	Al Sb As	Ca	Cu Fe Pb Mg	Mo	K	Na	Sn	Zn		
ZZZZZZ		5	22:15										
ZZZZZZ		1	22:24										
ZZZZZZ		25	22:33										

FORM XIV - IN

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG07A

Date: 7/7/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements										
ZZZZZZ		5	22:41											
ZZZZZZ		5	22:50											
ZZZZZZ		5	22:59											
ZZZZZZ		5	23:07											
ZZZZZZ		5	23:16											
ZZZZZZ		10	23:25											
BLANK		1	23:33	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCV		1	23:42	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCB		1	23:50	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
ZZZZZZ		5	23:59													
ZZZZZZ		5	0:07													
ZZZZZZ		25	0:16													
ZZZZZZ		5	0:25													
ZZZZZZ		5	0:33													
ZZZZZZ		5	0:42													
ZZZZZZ		5	0:50													
ZZZZZZ		10	0:59													
ZZZZZZ		10	1:08													
BLANK		1	1:16	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCV		1	1:25	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCB		1	1:33	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
PBSZG01ICS0		5	1:42		Sb	As		Cu		Pb					Sn	Zn
SC3309-019	X25SS0100001	5	1:51		Sb	As		Cu		Pb					Sn	Zn
SC3309-019L	X25SS0100001L	25	1:59		Sb	As		Cu		Pb						Zn
SC3309-020	X25SS0130001	5	2:08		Sb	As		Cu		Pb						Zn
SC3309-019A	X25SS0100001A	5	2:16		Sb	As		Cu							Sn	Zn
SC3309-019S	X25SS0100001S	10	2:25		Sb	As		Cu		Pb					Sn	Zn
SC3309-019P	X25SS0100001P	10	2:34		Sb	As		Cu		Pb					Sn	Zn
LCSSZG01ICS0		10	2:42		Sb	As		Cu		Pb					Sn	Zn
LC2SZG01ICS0		10	2:51		Sb	As		Cu		Pb					Sn	Zn
BLANK		1	3:00	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCV		1	3:08	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCB		1	3:17	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
SC3349-001	X14SS1200001	5	3:25		Sb	As									Sn	Zn
SC3349-001L	X14SS1200001L	25	3:34		Sb	As										Zn
SC3349-002	FD06170901	5	3:42		Sb	As		Cu		Pb						Zn
ZZZZZZ		25	3:51													
SC3349-001A	X14SS1200001A	5	4:00		Sb	As									Sn	Zn
SC3349-001S	X14SS1200001S	10	4:08		Sb	As		Cu		Pb					Sn	Zn
SC3349-001P	X14SS1200001P	10	4:17		Sb	As		Cu		Pb					Sn	Zn
BLANK		1	4:25	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCV		1	4:34	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCB		1	4:42	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
Blank		1	4:51	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
Blank		1	4:59	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
PQL		1	5:08	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCV		1	5:16	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCB		1	5:25	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn

FORM XIV - IN

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG08A

Date: 7/8/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
ZZZZZZ		1	16:01							
ZZZZZZ		1	16:07							
Cal Blank		1	17:06	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
Cal Std 1		1	17:15	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
Cal Std 2		1	17:23	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
Cal Std 3		1	17:32	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
Cal Std 4		1	17:40	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
ZZZZZZ		1	17:49							
ICV		1	17:58	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
ICB		1	18:06	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
PQL		1	18:15	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
ICSA		1	18:23	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
ICSAB		1	18:32	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
Blank		1	18:41	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
CCV		1	18:49	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
CCB		1	18:58	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
BLANK		1	19:07	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
BLANK		1	19:15	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
CCV		1	19:24	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
CCB		1	19:32	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
ZZZZZZ		1	19:41							
ZZZZZZ		1	19:49							
ZZZZZZ		5	19:58							
ZZZZZZ		5	20:07							
ZZZZZZ		5	20:15							
ZZZZZZ		5	20:24							
ZZZZZZ		10	20:32							
ZZZZZZ		10	20:41							
ZZZZZZ		10	20:50							
BLANK		1	20:58	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
CCV		1	21:07	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
CCB		1	21:15	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
ZZZZZZ		5	21:24							
ZZZZZZ		5	21:32							
ZZZZZZ		5	21:41							
ZZZZZZ		10	21:50							
ZZZZZZ		5	21:58							
ZZZZZZ		25	22:07							
ZZZZZZ		25	22:16							
✓SC3309-019A	X25SS0100001A	5	22:24			Pb				
ZZZZZZ		10	22:33							
BLANK		1	22:41	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
CCV		1	22:50	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
CCB		1	22:59	Al	Ca	Cu Fe Pb Mg	Mo	K	Na	
ZZZZZZ		1	23:07							
ZZZZZZ		1	23:16							
ZZZZZZ		1	23:24							
ZZZZZZ		5	23:33							
ZZZZZZ		10	23:42							
ZZZZZZ		10	23:50							

FORM XIV - IN

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG08A

Date: 7/8/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements								
ZZZZZZ		10	23:59									
BLANK		1	0:07	Al	Ca	Cu	Fe	Pb	Mg	Mo	K	Na
CCV		1	0:16	Al	Ca	Cu	Fe	Pb	Mg	Mo	K	Na
CCB		1	0:24	Al	Ca	Cu	Fe	Pb	Mg	Mo	K	Na
BLANK		1	0:33	Al	Ca	Cu	Fe	Pb	Mg	Mo	K	Na
PQL		1	0:41	Al	Ca	Cu	Fe	Pb	Mg	Mo	K	Na
CCV		1	0:50	Al	Ca	Cu	Fe	Pb	Mg	Mo	K	Na
CCB		1	0:59	Al	Ca	Cu	Fe	Pb	Mg	Mo	K	Na
ZZZZZZ		5	1:07									
ZZZZZZ		5	1:16									
SC3349-001	X14SS1200001	10	1:24			Cu		Pb				
ZZZZZZ		25	1:33									
SC3349-001L	X14SS1200001L	50	1:42			Cu		Pb				
ZZZZZZ		5	1:50									
ZZZZZZ		10	1:59									
ZZZZZZ		10	2:07									
ZZZZZZ		10	2:16									
BLANK		1	2:24	Al	Ca	Cu	Fe	Pb	Mg	Mo	K	Na
CCV		1	2:33	Al	Ca	Cu	Fe	Pb	Mg	Mo	K	Na
CCB		1	2:42	Al	Ca	Cu	Fe	Pb	Mg	Mo	K	Na

FORM XIV - IN

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-6

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG09A

Date: 7/9/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
ZZZZZZ		1	17:43							
ZZZZZZ		1	17:49							
Cal Blank		1	18:49	Al	Ca	Fe	Mg	Mo	K	Na	Sn
Cal Std 1		1	18:57	Al	Ca	Fe	Mg	Mo	K	Na	Sn
Cal Std 2		1	19:06	Al	Ca	Fe	Mg	Mo	K	Na	Sn
Cal Std 3		1	19:14	Al	Ca	Fe	Mg	Mo	K	Na	Sn
Cal Std 4		1	19:23	Al	Ca	Fe	Mg	Mo	K	Na	Sn
ZZZZZZ		1	19:31							
ICV		1	19:40	Al	Ca	Fe	Mg	Mo	K	Na	Sn
ICB		1	19:48	Al	Ca	Fe	Mg	Mo	K	Na	Sn
PQL		1	19:57	Al	Ca	Fe	Mg	Mo	K	Na	Sn
ICSA		1	20:06	Al	Ca	Fe	Mg	Mo	K	Na	Sn
ICSAB		1	20:14	Al	Ca	Fe	Mg	Mo	K	Na	Sn
Blank		1	20:23	Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	20:32	Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	20:40	Al	Ca	Fe	Mg	Mo	K	Na	Sn
BLANK		1	20:49	Al	Ca	Fe	Mg	Mo	K	Na	Sn
BLANK		1	20:57	Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	21:06	Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	21:15	Al	Ca	Fe	Mg	Mo	K	Na	Sn
SC3309-019L	X25SS0100001L	25	21:23								Sn
SC3309-020	X25SS0130001	5	21:32								Sn
SC3349-001L	X14SS1200001L	25	21:40								Sn
SC3349-002	FD06170901	5	21:49								Sn
ZZZZZZ		20	21:57							
ZZZZZZ		50	22:06							
ZZZZZZ		5	22:14							
ZZZZZZ		5	22:23							
ZZZZZZ		5	22:32							
BLANK		1	22:40	Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	22:49	Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	22:57	Al	Ca	Fe	Mg	Mo	K	Na	Sn

FORM XIV - IN

Quality Control Report

Blank Sample Summary Report

TOC in Soil

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG65524	Lloyd Kahn	24-JUN-09	N/A	U 400 ug/gdrywt	400 ug/gdrywt

Total Solids

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG65411	ASTM D2216	24-JUN-09	23-JUN-09	U 1 %	1 %
MBLANK	WG65412	ASTM D2216	24-JUN-09	23-JUN-09	U 1 %	1 %

Quality Control Report

Blank Sample Summary Report

Total Solids

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG65541	ASTM D2216	26-JUN-09	25-JUN-09	U 1 %	1 %
MBLANK	WG65779	ASTM D2216	02-JUL-09	01-JUL-09	U 1 %	1 %

Quality Control Report

Laboratory Control Sample Summary Report

Total Solids

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG65541-2	LCS	WG65541	26-JUN-09	25-JUN-09	%	90	90.	100	80-120	
WG65779-2	LCS	WG65779	02-JUL-09	01-JUL-09	%	90	90.	100	80-120	
WG65541-3	LCSD	WG65541	26-JUN-09	25-JUN-09	%	90	90.	99	80-120	1

Quality Control Report

Laboratory Control Sample Summary Report

TOC In Soil

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG65524-3	LCSD	WG65524	24-JUN-09	N/A	ug/gdrywt	400000.000	440000	110	80-120	
WG65524-2	LCS	WG65524	24-JUN-09	N/A	ug/gdrywt	400000.000	440000	111	80-120	

Total Solids

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG65411-2	LCS	WG65411	24-JUN-09	23-JUN-09	%	90	90.	100	80-120	
WG65412-2	LCS	WG65412	24-JUN-09	23-JUN-09	%	90	90.	100	80-120	

pH(Soil)

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG65425-1	LCS	WG65425	23-JUN-09	23-JUN-09	pH	7	7.0	100	80-120	

Quality Control Report

Duplicate Sample Summary Report

Total Solids

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG65412-3	SC3309-16	WG65412	24-JUN-09	%	84.	84.	0	20
WG65411-4	SC3309-10	WG65411	24-JUN-09	%	82.	82.	0	20

pH(Soil)

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG65425-2	SC3309-10	WG65425	23-JUN-09	pH	7.9	7.9	0	20

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JZG07A.B\079SMPL.D\079SMPL.D#
Date Acquired: Jul 8 2009 01:51 am
Acq. Method: K10CCV.M
Operator: EAM
Sample Name: SC3309-019
Misc Info: DILUTION - 2/10
Vial Number: 2402
Current Method: C:\ICPCHEM\1\METHODS\K10CCV.M
Calibration File: C:\ICPCHEM\1\CALIB\K10CCV.C
Last Cal. Update: Jul 08 2009 08:08 am
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

Sample
X25550100001
rep. result
arsenic
8.5 mg/kg

$\left(\frac{78.65\ ug}{L}\right)\left(\frac{100ml}{1.15g}\right)\left(\frac{1}{.808}\right)\left(\frac{1}{1000}\right)$

$= 8.46\ mg/kg$

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
7 Li	2,549.5	509.9	ppb	---	#VALUE!	
9 Be	8.105	1.621	ppb	2.50	1000.	
11 B	25.675	5.135	ppb	3.23	1000.	
23 Na	216.15	43.23	ppb	1.92	100000.	
25 Mg	8,415.	1,683.	ppb	0.08	100000.	
27 Al	117,950.	23,590.	ppb	0.53	100000.	
28 Si	4,249.5	849.9	ppb	0.99	#VALUE!	
29 Si	4,269.	853.8	ppb	0.27	10000.	
39 K	10,175.	2,035.	ppb	1.46	100000.	
43 Ca	5,015.	1,003.	ppb	2.66	100000.	
44 Ca	4,506.5	901.3	ppb	0.42	100000.	
51 V	332.2	66.44	ppb	0.41	1000.	
52 Cr	221.	44.2	ppb	0.61	1000.	
53 Cr	198.15	39.63	ppb	1.81	1000.	
55 Mn	4,155.5	831.1	ppb	0.44	500.	>LDR
56 Fe	372,650.	74,530.	ppb	0.53	100000.	
57 Fe	356,200.	71,240.	ppb	0.26	100000.	
59 Co	119.3	23.86	ppb	0.70	500.	
60 Ni	109.	21.8	ppb	1.83	500.	
63 Cu	129.3	25.86	ppb	0.52	1000.	
65 Cu	130.05	26.01	ppb	1.01	500.	
66 Zn	310.45	62.09	ppb	0.72	500.	
68 Zn	323.5	64.7	ppb	0.54	1000.	
75 As	78.65	15.73	ppb	1.16	1000.	
82 Se	3.1485	0.6297	ppb	71.46	500.	
88 Sr	125.1	25.02	ppb	1.51	1000.	
89 Y	----	--------	---	---	#VALUE!	
98 Mo	8.485	1.697	ppb	2.90	1000.	
107 Ag	0.202	0.0404	ppb	6.68	100.	
109 Ag	0.1872	0.0374	ppb	12.12	200.	
111 Cd	1.0315	0.2063	ppb	11.57	200.	
114 Cd	0.6575	0.1315	ppb	8.05	500.	
115 In	----	--------	---	---	#VALUE!	
118 Sn	12.95	2.59	ppb	0.30	1000.	
120 Sn	12.845	2.569	ppb	1.02	1000.	
121 Sb	4.318	0.8636	ppb	2.01	1000.	
123 Sb	4.504	0.9008	ppb	3.52	1000.	
135 Ba	667.	133.4	ppb	0.28	1000.	
137 Ba	667.	133.4	ppb	1.07	#VALUE!	
182 W	0.907	0.1814	ppb	6.30	1000.	
200 Hg	1.284	0.2568	ppb	20.62	#VALUE!	
202 Hg	1.8845	0.3769	ppb	14.78	#VALUE!	
203 Tl	2.096	0.4192	ppb	7.14	1000.	
205 Tl	2.127	0.4254	ppb	5.27	#VALUE!	
208 Pb	780.	156.	ppb	0.20	1000.	
232 Th	33.93	6.786	ppb	1.40	1000.	
238 U	8.3	1.66	ppb	1.06	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	999663.44	1.07	942468.63	106.1	69.5 - 130	
45 Sc	833162.31	0.90	767582.63	108.5	69.5 - 130	
72 Ge	165019.73	0.76	161803.05	102.0	69.5 - 130	
159 Tb	1139778.60	1.15	1126156.10	101.2	69.5 - 130	
209 Bi	660281.13	0.45	660364.75	100.0	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JZG07A.B\009CALB.D\009CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000170

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: **R.BASINSKI** **DATE:** **September 14, 2009**

FROM: **MEGAN CARSON** **COPIES:** **DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – SELECT METALS AND TOTAL SOLIDS**
NSF INDIAN HEAD
SAMPLE DELIVERY GROUP (SDG) – CTO423-7

SAMPLES: 20/Soil/

FD06150901	FD06150902	X14SS1300001	X14SS1310001
X14SS1320001	X14SS1340001	X17SS0190001	X25SS0010001
X25SS0040001	X25SS0070001	X25SS0080001	X25SS0160001
X25SS0180001	X25SS0190001	X25SS0200001	X25SS0210001
X25SS0220001	X25SS0230001	X25SS0240001	X25SS0250001

Overview

The sample set for NSF Indian Head, SDG CTO423-7 consists of twenty soil environmental samples. Two (2) field duplicate pairs: FD06150901/ X25SS0070001 and FD06150902/ X25SS0210001.

The samples were collected by Tetra Tech NUS, Inc. on June 11th, 15th, 16th , 2009 and analyzed by Katahdin analytical services under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Metals analyses were conducted using SW-846 methods 6020 and 3050B, and total solids by ASTM method D2216.

Summary

All analytes were successfully analyzed. The findings offered in this report are based upon a general review of all available data. The data review was based on data completeness, holding times, calibration data, laboratory method/preparation blanks, interference check sample (ICS) results, matrix spike / matrix spike duplicate results, laboratory control sample (LCS) results, ICP serial dilution results, field duplicate results, detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems: None.

Minor Problems:

- The following contaminants were detected in the laboratory method/preparation blanks at the following maximum concentration:

Analyte	Maximum Concentration	Action Level
Antimony [(1)]	0.029mg/kg	0.145ug/kg
Lead [(1)]	0.051mg/kg	0.255ug/kg
Tin [(1)]	0.619mg/kg	3.10ug/kg
Arsenic	0.07ug/L	0.35mg/kg
Copper	0.05ug/L	0.25mg/kg

[1] Results from a prep-blank.

An action level of 5X the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot, percent soilds and dilution factors, if applicable, were taken into consideration when evaluating for blank contamination. Positive results less than the blank action level for the above compounds were qualified "B" as a result of blank contamination.

- The matrix spike and matrix spike duplicate for sample X17SS0190001 had a percent recovery <75% for antimony. Positive results for antimony were qualified as biased low (L).

- Field duplicate pair FD06150901/X25SS0070001 had an relative percent difference (RPD) above the quality control limit of 50% for arsenic. Positive results for arsenic were qualified as estimated (J).

Notes

All samples in the SDG were analyzed at a 5X dilution.

Sample X14SS1340001 and X25SS0190001 were also analyzed at a 20X dilution to bring lead within linear calibration range.

Sample X25SS0200001 was analyzed at a 50X dilution to bring copper within linear calibration range.

Executive Summary

Laboratory Performance: Method blanks and preparation blanks were found to contain contaminates.

Other Factors Affecting Data Quality: One field duplicate pair was found to have an RPD out of control limits for arsenic. Matrix spike/spike duplicate percent recoveries for antimony were <75%.

The data for these analyses were reviewed with reference to Region III modifications to the "National Functional Guidelines for Inorganic Data Validation", April 1993, and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories " (January 2006).

The text of this report has been formulated to address only those problem areas affecting data quality.

Megan Carson

Tetra Tech NUS
Megan Carson
Chemist/Data Validator

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Appendix A

Qualified Analytical Results

Data Validation Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS-GFAA MSA's r < 0.995 / ICP PDS Recovery Noncompliance
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O - Poor Instrument Performance (e.g. base-line drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DOT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient r < 0.995
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 00810	NSAMPLE	FD06150901			FD06150902			X14SS1300001			X14SS1310001		
SDG: CTO423-7	LAB_ID	SC3310-014			SC3310-015			SC3310-016			SC3310-017		
FRACTION: M	SAMP_DATE	6/15/2009			6/15/2009			6/16/2009			6/16/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	73.9			84.7			86.5			81.3		
	DUP_OF	X25SS0070001			X25SS0210001								
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.16	B	A	0.27	L	D	0.02	B	A	0.02	B	A
ARSENIC		5.8	J	G	2.9			2.2			3.1		
COPPER		10.5			9.2			18.8			36.4		
LEAD		34.5			127			44.7			120		
TIN		0.68	B	A	0.47	B	A	0.49	B	A	0.58	B	A
ZINC		32.8			24.9			41.1			46.2		

PROJ_NO: 00810	NSAMPLE	X14SS1320001			X14SS1340001			X17SS0190001			X25SS0010001		
SDG: CTO423-7	LAB_ID	SC3310-018			SC3310-019			SC3310-020			SC3310-001		
FRACTION: M	SAMP_DATE	6/16/2009			6/16/2009			6/11/2009			6/15/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	87.1			88.1			85.1			85.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.22	L	D	0.32	L	D	0.26	L	D	0.02	B	A
ARSENIC		3.2			7.3			8.5			4.9		
COPPER		8.6			77.9			12			13.1		
LEAD		17.9			904			39.4			6.3		
TIN		0.54	B	A	32.3			0.56	B	A	0.56	B	A
ZINC		60.3			28.2			24			36.4		

PROJ_NO: 00810	NSAMPLE	X25SS0040001			X25SS0070001			X25SS0080001			X25SS0160001		
SDG: CTO423-7	LAB_ID	SC3310-002			SC3310-009			SC3310-003			SC3310-004		
FRACTION: M	SAMP_DATE	6/15/2009			6/15/2009			6/15/2009			6/15/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	91.6			69.4			85.8			84.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.15	B	A	0.02	B	A	0.27	L	D	0.4	L	D
ARSENIC		2.8			2.3	J	G	2.4			22.6		
COPPER		7.4			10.3			11			24.8		
LEAD		19.5			43.5			91.4			88.6		
TIN		0.49	B	A	0.62	B	A	0.51	B	A	0.52	B	A
ZINC		30.6			27.5			26.6			43.8		

PROJ_NO: 00810	NSAMPLE	X25SS0180001			X25SS0190001			X25SS0200001			X25SS0210001		
SDG: CTO423-7	LAB_ID	SC3310-005			SC3310-006			SC3310-007			SC3310-008		
FRACTION: M	SAMP_DATE	6/15/2009			6/15/2009			6/15/2009			6/15/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	82.6			81.0			80.1			80.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		2.4	L	D	4.4	L	D	12.2	L	D	0.3	L	D
ARSENIC		5.6			2.5			5			2.4		
COPPER		48.5			130			370			10.9		
LEAD		529			1060			3450			131		
TIN		0.55	B	A	0.43	B	A	0.56	B	A	0.5	B	A
ZINC		32.4			45.1			63.9			26.8		

PROJ_NO: 00810	NSAMPLE	X25SS0220001			X25SS0230001			X25SS0240001			X25SS0250001		
SDG: CTO423-7	LAB_ID	SC3310-010			SC3310-011			SC3310-012			SC3310-013		
FRACTION: M	SAMP_DATE	6/15/2009			6/15/2009			6/15/2009			6/15/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	85.8			85.2			82.3			87.7		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.19	L	D	1.3	L	D	1.7	L	D	0.27	L	D
ARSENIC		3.8			2.6			3.2			3.7		
COPPER		11			44			50.2			11.5		
LEAD		62.6			546			522			34.2		
TIN		0.51	B	A	0.55	B	A	0.58	B	A	0.5	B	A
ZINC		23.1			37			40.6			22		

PROJ_NO: 00810	NSAMPLE	FD06150901			FD06150902			X14SS1300001			X14SS1310001		
SDG: CTO423-7	LAB_ID	SC3310-14			SC3310-15			SC3310-16			SC3310-17		
FRACTION: MISC	SAMP_DATE	6/15/2009			6/15/2009			6/16/2009			6/16/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	73.9			84.7			86.5			81.3		
	DUP_OF	X25SS0070001			X25SS0210001								
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		74			85			86			81		

PROJ_NO: 00810	NSAMPLE	X14SS1320001			X14SS1340001			X17SS0190001			X25SS0010001		
SDG: CTO423-7	LAB_ID	SC3310-18			SC3310-19			SC3310-20			SC3310-1		
FRACTION: MISC	SAMP_DATE	6/16/2009			6/16/2009			6/11/2009			6/15/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	87.1			88.1			85.1			85.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		87			88			85			85		

PROJ_NO: 00810	NSAMPLE	X25SS0040001			X25SS0070001			X25SS0080001			X25SS0160001		
SDG: CTO423-7	LAB_ID	SC3310-2			SC3310-9			SC3310-3			SC3310-4		
FRACTION: MISC	SAMP_DATE	6/15/2009			6/15/2009			6/15/2009			6/15/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	91.6			69.4			85.8			84.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		92			69			86			84		

PROJ_NO: 00810	NSAMPLE	X25SS0180001			X25SS0200001			X25SS0210001			X25SS0220001		
SDG: CTO423-7	LAB_ID	SC3310-5			SC3310-7			SC3310-8			SC3310-10		
FRACTION: MISC	SAMP_DATE	6/15/2009			6/15/2009			6/15/2009			6/15/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	82.6			80.1			80.4			85.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		82			80			80			86		

PROJ_NO: 00810	NSAMPLE	X25SS0230001			X25SS0240001			X25SS0250001		
SDG: CTO423-7	LAB_ID	SC3310-11			SC3310-12			SC3310-13		
FRACTION: MISC	SAMP_DATE	6/15/2009			6/15/2009			6/15/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM		
	UNITS	%			%			%		
	PCT_SOLIDS	85.2			82.3			87.7		
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		85			82			88		

Appendix B

Results as Reported by the Laboratory

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** FD06150901

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 73.9 **Lab Sample ID:** SC3310-014

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.16		N	MS	5	0.14	0.03
7440-38-2	ARSENIC, TOTAL	5.8			MS	5	0.68	0.20
7440-50-8	COPPER, TOTAL	10.5			MS	5	0.68	0.15
7439-92-1	LEAD, TOTAL	34.5			MS	5	0.14	0.04
7440-31-5	TIN, TOTAL	1.2			MS	5	0.68	0.26
7440-66-6	ZINC, TOTAL	32.8		N	MS	5	1.4	0.47

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** FD06150902

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 84.7 **Lab Sample ID:** SC3310-015

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.27		N	MS	5	0.094	0.02
7440-38-2	ARSENIC, TOTAL	2.9			MS	5	0.47	0.14
7440-50-8	COPPER, TOTAL	9.2			MS	5	0.47	0.10
7439-92-1	LEAD, TOTAL	127			MS	5	0.094	0.03
7440-31-5	TIN, TOTAL	1.6			MS	5	0.47	0.18
7440-66-6	ZINC, TOTAL	24.9		N	MS	5	0.94	0.33

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS1300001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 86.5 **Lab Sample ID:** SC3310-016

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.08	J	N	MS	5	0.098	0.02
7440-38-2	ARSENIC, TOTAL	2.2			MS	5	0.49	0.15
7440-50-8	COPPER, TOTAL	18.8			MS	5	0.49	0.11
7439-92-1	LEAD, TOTAL	44.7			MS	5	0.098	0.03
7440-31-5	TIN, TOTAL	1.4			MS	5	0.49	0.19
7440-66-6	ZINC, TOTAL	41.1		N	MS	5	0.98	0.34

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS1310001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 81.3 **Lab Sample ID:** SC3310-017

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.08	J	N	MS	5	0.12	0.02
7440-38-2	ARSENIC, TOTAL	3.1			MS	5	0.58	0.17
7440-50-8	COPPER, TOTAL	36.4			MS	5	0.58	0.13
7439-92-1	LEAD, TOTAL	120			MS	5	0.12	0.03
7440-31-5	TIN, TOTAL	3.0			MS	5	0.58	0.22
7440-66-6	ZINC, TOTAL	46.2		N	MS	5	1.2	0.40

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS1320001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 87.0 **Lab Sample ID:** SC3310-018

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.22		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	3.2			MS	5	0.54	0.16
7440-50-8	COPPER, TOTAL	8.6			MS	5	0.54	0.12
7439-92-1	LEAD, TOTAL	17.9			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.0			MS	5	0.54	0.20
7440-66-6	ZINC, TOTAL	60.3		N	MS	5	1.1	0.38

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS1340001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 88.1 **Lab Sample ID:** SC3310-019

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.32		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	7.3			MS	5	0.51	0.15
7440-50-8	COPPER, TOTAL	77.9			MS	5	0.51	0.11
7439-92-1	LEAD, TOTAL	904			MS	20	0.41	0.12
7440-31-5	TIN, TOTAL	32.3			MS	5	0.51	0.19
7440-66-6	ZINC, TOTAL	28.2		N	MS	5	1.0	0.36

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SS0190001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 85.1 **Lab Sample ID:** SC3310-020

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.26		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	8.5			MS	5	0.56	0.17
7440-50-8	COPPER, TOTAL	12.0			MS	5	0.56	0.12
7439-92-1	LEAD, TOTAL	39.4			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.1			MS	5	0.56	0.21
7440-66-6	ZINC, TOTAL	24.0		N	MS	5	1.1	0.39

Bottle ID: B

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0010001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 85.3 **Lab Sample ID:** SC3310-001

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.1	J	N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	4.9			MS	5	0.53	0.16
7440-50-8	COPPER, TOTAL	13.1			MS	5	0.53	0.12
7439-92-1	LEAD, TOTAL	6.3			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.3			MS	5	0.53	0.20
7440-66-6	ZINC, TOTAL	36.4		N	MS	5	1.1	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0040001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 91.6 **Lab Sample ID:** SC3310-002

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.15		N	MS	5	0.098	0.02
7440-38-2	ARSENIC, TOTAL	2.8			MS	5	0.49	0.15
7440-50-8	COPPER, TOTAL	7.4			MS	5	0.49	0.11
7439-92-1	LEAD, TOTAL	19.5			MS	5	0.098	0.03
7440-31-5	TIN, TOTAL	1.1			MS	5	0.49	0.19
7440-66-6	ZINC, TOTAL	30.6		N	MS	5	0.98	0.34

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0070001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 69.4 **Lab Sample ID:** SC3310-009

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.17		N	MS	5	0.12	0.02
7440-38-2	ARSENIC, TOTAL	2.3			MS	5	0.62	0.18
7440-50-8	COPPER, TOTAL	10.3			MS	5	0.62	0.14
7439-92-1	LEAD, TOTAL	43.5			MS	5	0.12	0.04
7440-31-5	TIN, TOTAL	1.3			MS	5	0.62	0.23
7440-66-6	ZINC, TOTAL	27.5		N	MS	5	1.2	0.43

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0080001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 85.8 **Lab Sample ID:** SC3310-003

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.27		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	2.4			MS	5	0.51	0.15
7440-50-8	COPPER, TOTAL	11.0			MS	5	0.51	0.11
7439-92-1	LEAD, TOTAL	91.4			MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.7			MS	5	0.51	0.19
7440-66-6	ZINC, TOTAL	26.6		N	MS	5	1.0	0.36

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0160001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 84.0 **Lab Sample ID:** SC3310-004

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.40		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	22.6			MS	5	0.52	0.16
7440-50-8	COPPER, TOTAL	24.8			MS	5	0.52	0.11
7439-92-1	LEAD, TOTAL	88.6			MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	2.2			MS	5	0.52	0.20
7440-66-6	ZINC, TOTAL	43.8		N	MS	5	1.0	0.36

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0180001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 82.6 **Lab Sample ID:** SC3310-005

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	2.4		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	5.6			MS	5	0.55	0.17
7440-50-8	COPPER, TOTAL	48.5			MS	5	0.55	0.12
7439-92-1	LEAD, TOTAL	529			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.4			MS	5	0.55	0.21
7440-66-6	ZINC, TOTAL	32.4		N	MS	5	1.1	0.39

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0190001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 81.0 **Lab Sample ID:** SC3310-006

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	4.4		N	MS	5	0.086	0.02
7440-38-2	ARSENIC, TOTAL	2.5			MS	5	0.43	0.13
7440-50-8	COPPER, TOTAL	130			MS	5	0.43	0.09
7439-92-1	LEAD, TOTAL	1060			MS	20	0.34	0.10
7440-31-5	TIN, TOTAL	0.95			MS	5	0.43	0.16
7440-66-6	ZINC, TOTAL	45.1		N	MS	5	0.86	0.30

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0200001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 80.1 **Lab Sample ID:** SC3310-007

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	12.2		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	5.0			MS	5	0.56	0.17
7440-50-8	COPPER, TOTAL	370			MS	50	5.6	1.23
7439-92-1	LEAD, TOTAL	3450			MS	50	1.1	0.33
7440-31-5	TIN, TOTAL	1.7			MS	5	0.56	0.21
7440-66-6	ZINC, TOTAL	63.9		N	MS	5	1.1	0.39

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0210001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 80.4 **Lab Sample ID:** SC3310-008

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.30		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	2.4			MS	5	0.50	0.15
7440-50-8	COPPER, TOTAL	10.9			MS	5	0.50	0.11
7439-92-1	LEAD, TOTAL	131			MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.5			MS	5	0.50	0.19
7440-66-6	ZINC, TOTAL	26.8		N	MS	5	1.0	0.35

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0220001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 85.8 **Lab Sample ID:** SC3310-010

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.19		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	3.8			MS	5	0.51	0.15
7440-50-8	COPPER, TOTAL	11.0			MS	5	0.51	0.11
7439-92-1	LEAD, TOTAL	62.6			MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.1			MS	5	0.51	0.19
7440-66-6	ZINC, TOTAL	23.1		N	MS	5	1.0	0.35

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0230001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 85.2 **Lab Sample ID:** SC3310-011

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	1.3		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	2.6			MS	5	0.55	0.17
7440-50-8	COPPER, TOTAL	44.0			MS	5	0.55	0.12
7439-92-1	LEAD, TOTAL	546			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.8			MS	5	0.55	0.21
7440-66-6	ZINC, TOTAL	37.0		N	MS	5	1.1	0.39

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0240001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 82.3 **Lab Sample ID:** SC3310-012

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	1.7		N	MS	5	0.12	0.02
7440-38-2	ARSENIC, TOTAL	3.2			MS	5	0.58	0.17
7440-50-8	COPPER, TOTAL	50.2			MS	5	0.58	0.13
7439-92-1	LEAD, TOTAL	522			MS	5	0.12	0.03
7440-31-5	TIN, TOTAL	1.7			MS	5	0.58	0.22
7440-66-6	ZINC, TOTAL	40.6		N	MS	5	1.2	0.41

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0250001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 87.8 **Lab Sample ID:** SC3310-013

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.27		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	3.7			MS	5	0.50	0.15
7440-50-8	COPPER, TOTAL	11.5			MS	5	0.50	0.11
7439-92-1	LEAD, TOTAL	34.2			MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.3			MS	5	0.50	0.19
7440-66-6	ZINC, TOTAL	22.0		N	MS	5	1.0	0.35

Bottle ID: A

Comments:

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ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-1
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X25SS0010001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	85. %	1	D2216	WG65687	30-JUN-09 08:30:00	ASTM D2216	29-JUN-09	JF	

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Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-2
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X25SS0040001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	92. %	1	D2216	WG65687	30-JUN-09 08:30:00	ASTM D2216	29-JUN-09	JF	

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Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-3
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X25SS0080001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG65687	30-JUN-09 08:30:00	ASTM D2216	29-JUN-09	JF	

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Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-4
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X25SS0160001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	84. %	1	D2216	WG65687	30-JUN-09 08:30:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-5
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X25SS0180001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	82. %	1	D2216	WG65687	30-JUN-09 08:30:00	ASTM D2216	29-JUN-09	JF	

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Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-6
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X25SS0190001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	81. %	1	D2216	WG65687	30-JUN-09 08:30:00	ASTM D2216	29-JUN-09	JF	

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Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-7
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X25SS0200001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	80. %	1	D2216	WG65687	30-JUN-09 08:30:00	ASTM D2216	29-JUN-09	JF	

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Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-8
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X25SS0210001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	80. %	1	D2216	WG65687	30-JUN-09 08:30:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-9
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X25SS0070001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	69. %	1	D2216	WG65687	30-JUN-09 08:30:00	ASTM D2216	29-JUN-09	JF	

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Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-10
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X25SS0220001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG65687	30-JUN-09 08:30:00	ASTM D2216	29-JUN-09	JF	

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Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-11
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X25SS0230001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	85. %	1	D2216	WG65687	30-JUN-09 08:30:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-12
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X25SS0240001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	82. %	1	D2216	WG65687	30-JUN-09 08:30:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-13
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X25SS0250001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	88. %	1	D2216	WG65687	30-JUN-09 08:30:00	ASTM D2216	29-JUN-09	JF	

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ANALYTICAL SERVICES

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Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-14
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
FD06150901	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	74. %	1	D2216	WG65687	30-JUN-09 08:30:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-15
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
FD06150902	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	85. %	1	D2216	WG65687	30-JUN-09 08:30:00	ASTM D2216	29-JUN-09	JF	

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Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-16
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X14SS1300001	SL	16-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG65689	30-JUN-09 09:00:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-17
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X14SS1310001	SL	16-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	81. %	1	D2216	WG65689	30-JUN-09 09:00:00	ASTM D2216	29-JUN-09	JF	

Katahdin
ANALYTICAL SERVICES

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Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-18
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X14SS1320001	SL	16-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	87. %	1	D2216	WG65689	30-JUN-09 09:00:00	ASTM D2216	29-JUN-09	JF	

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-19
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X14SS1340001	SL	16-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	88. %	1	D2216	WG65689	30-JUN-09 09:00:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3310-20
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-7

Sample Description	Matrix	Date Sampled	Date Received
X17SS0190001	SL	11-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	85. %	1	D2216	WG65689	30-JUN-09 09:00:00	ASTM D2216	29-JUN-09	JF	

Appendix C

Support Documentation

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028252 | PAGE 1 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	4129218308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		Fed Ex / 863138879042		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)									PRESERVATIVE USED									COMMENTS
		TYPE OF ANALYSIS							P	G	G							HNO3		4°C		4°C					
		TAL Metals SW846 6020 300																									
		SW846 8270																									
		PP Metals SW846 6020A/3050B																									
6/17	1400	RB06170901	QC	–	–	QC	G	3	1	2																	Rinsate
6/16	1245	SB06160901	QC	–	–	QC	G	2	1	1																	Source
6/17	1400	IDW06170901	QC	–	–	QC	G	3	1	2																	IDW
✓ 6/15	1140	X25550010001	001	0	1	SO	G	1			1																
✓	1300	" 0040001	004					1			1																
✓	1535	" 0080001	008					1			1																
	1405	" 0100001	010					3			3																MS/MSD
	1305	" 0130001	013					1			1																
✓	1155	" 0160001	016					1			1																
✓	1255	" 0180001	018					1			1																
✓	1255	" 0190001	019					1			1																
	1313	" 0200001	020					1			1																
✓	1327	" 0210001	021	✓	✓	✓	✓	1			1																

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6/19/09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TINUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028254 | PAGE 2 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Badinski	4129218308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Gorski	4129430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FedEx 863138879042		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: TCL SVOCs 8270 6020/3050B

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS		COMMENTS
6/15	1345	X2555007 0001	007	0	1	SO	G	1	1	
	1325	" 022 0001	022					1	1	
	1310	" 023 0001	023					1	1	
	1250	" 024 0001	024					1	1	
	1230	" 025 0001	025					1	1	
	0000	FD06150901	QC					1	1	
	0000	FD06150902	QC					1	1	
6/16	950	X1455130 0001	130					1	1	
	950	" 131 0001	131					1	1	
	935	" 132 0001	132					1	1	
	1035	" 134 0001	134					1	1	
	1030	" 135 0001	135					1	1	
	1100	" 138 0001	138					1	1	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028256 | PAGE 4 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Businski	4129218308	Katahdin Labs / Amyra Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 863138879042		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS: Metals SW846 6020 / 8151 PAHs SW846 8270	COMMENTS
									G		4°C	
									G		4°C	
✓ 6/11	1500	X175S0190001	019	0	1	SO	G	3	3			MS/MSD
6/11	1530	" 0220001	022	↓	↓	↓	↓	1	1			
6/11	1545	" 0240001	024					1	1			
6/12	1020	" 0250001	025					1	1			
6/14	1440	X175B0250102	025	1	2			1	1			
6/12	1040	X175S0270001	027	0	1			1	1			
6/12	1050	X175S0280001	028	0	1			1	1			
6/11	0000	FD0611090 1	QC					1	1			
6/13	1515	X165S0420001	042					1	1			
6/14	900	" 0540001	054					1	1			
↓	855	" 0570001	057					1	1			
	930	" 0610001	061					1	1			
↓	1040	" 0730001	073	↓	↓	↓	↓	1	1			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TINUS-001

Katahdin ANALYTICAL SERVICES

nelac Cert. No. E87604

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CTO 423 NSF INDIAN HEAD
SDG: CTO423-7
SC3310

Sample Receipt

The following samples were received on June 19, 2009 and were logged in under Katahdin Analytical Services work order numbers SC3310 for a hardcopy due date of July 08, 2009.

KATAHDIN Sample No.	TTNUS Sample Identification
SC3310-1	X25SS0010001
SC3310-2	X25SS0040001
SC3310-3	X25SS0080001
SC3310-4	X25SS0160001
SC3310-5	X25SS0180001
SC3310-6	X25SS0190001
SC3310-7	X25SS0200001
SC3310-8	X25SS0210001
SC3310-9	X25SS0070001
SC3310-10	X25SS0220001
SC3310-11	X25SS0230001
SC3310-12	X25SS0240001
SC3310-13	X25SS0250001
SC3310-14	FD06150901
SC3310-15	FD06150902
SC3310-16	X14SS1300001
SC3310-17	X14SS1310001
SC3310-18	X14SS1320001
SC3310-19	X14SS1340001
SC3310-20	X17SS0190001

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in this narrative or in the Report of Analysis.

Sample analyses have been performed by the methods as noted herein.

000001A

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Andrea J. Colby**. This narrative is an integral part of the Report of Analysis.

Metals Analysis

The samples of SDG CTO423-7 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846. 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA.

Inductively-Coupled Plasma Mass Spectrometric Analysis (ICP-MS)

Solid-matrix Katahdin Sample Numbers SC3310- (1-20) were digested for ICP-MS analysis on 06/29/09 (QC Batch ZF29ICS0) in accordance with USEPA Method 3050B. Katahdin Sample Number SC3310-20 was prepared with duplicate matrix-spiked aliquots. The measured tin concentration in the preparation blank in this batch exceeds the laboratory's acceptance limit. Laboratory testing has determined that this tin contamination comes from one of the reagents used in the digestion process.

ICP-MS analyses of SDG CTO423-7 sample digestates were performed using an Agilent 7500 ICP-MS spectrometer in accordance with USEPA Method 6020. Results for all standards and samples are reported using the mean of 3 replicate measurements. All samples were analyzed within holding times and all analytical run QC criteria were met, with the following exception:

The measured lead concentrations of the CCBs analyzed at 04:25 and 06:08 in ICP-MS analysis sequence JZG08A exceed the laboratory's acceptance limit. All associated lead results accepted from this portion of the run were less than the PQL or greater than ten times the CCB result and not affected by this high bias.

Internal standard recoveries for ICP-MS analyses can be found in the raw data section of the accompanying data package. The following table indicates which analytes are associated with each internal standard element.

Internal Standard Element	Associated Analytes
Scandium	Sodium, Magnesium, Aluminum, Potassium, Calcium
Germanium	Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel, Copper, Zinc, Arsenic, Selenium, Silver, Cadmium
Terbium	Antimony, Barium, Tin
Bismuth	Thallium, Lead

Instrument tuning information can also be found in the raw data section in the report labeled "6020 QC Tune Report". The relative standard deviation was determined from 4 replicate measurements. The peak width was measured at 10% of the peak height.

Matrix QC Summary

The measured recoveries of antimony and zinc in one or both of the matrix-spiked aliquots of Katahdin Sample Number SC3310-20 are outside the laboratory's acceptance criteria (75% - 125% recovery of the added element, if the native concentration is less than four times the amount added). The measure recoveries of antimony and zinc in a post-digestion spike of this sample are within acceptance criteria.

The matrix spike duplicate analysis of Katahdin Sample Number SC3310-20 is within the laboratory's acceptance limit (<20% relative difference between duplicate matrix-spiked aliquots) for all analytes.

The serial dilution analysis of Katahdin Sample Number SC3310-20 is within the laboratory's acceptance limit (<10% relative percent difference, if the concentration in the original sample is greater than 50 times the MDL) for all analytes.

Reporting of Metals Results

Analytical results for client samples, matrix QC samples (duplicates and matrix spikes), and batch QC samples (preparation blanks and laboratory control samples) have been reported down to the laboratory's method detection limits (MDLs). These MDLs have been adjusted for each sample based on the sample amounts used in preparation and analysis. Analytical results that are below the MDLs are flagged with "U" in the C-qualifier column.

Analytical results for instrument run QC samples (ICVs, ICBs, etc.) have been reported down to the laboratory's instrument detection limits (IDLs).

IDLs, MDLs, and PQLs are listed on Form 10 of the accompanying data package.

Wet Chemistry Analysis

The samples of SDG CTO423-7 were analyzed in accordance with the specific methods listed on the Report of Analysis.

Analyses for total solids were performed according to "Annual Book of ASTM Standards", Method D2216-98 "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass".

All analyses were performed within analytical holding times, and all quality control criteria were met.

Katahdin
ANALYTICAL SERVICES

nelac
Cert. No. E87604

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Operations Manager or the Quality Assurance Officer as verified by the following signature.

Leslie Dimond

07.15.09

Leslie Dimond
Quality Assurance Officer

P.O. Box 540, Scarborough, ME 04070 • Tel: (207) 874-2400 • Fax: (207) 775-4029 • 600 Technology Way, Scarborough, ME 04074
www.katahdinlab.com

NSF INDIAN HEAD
SOIL DATA
CTO423-7

FRACTION	CHEMICAL	FD06150901	UNITS	X25SS0070001	RPD	D
M	ANTIMONY	0.16 J	MG/KG	0.02 B	155.56	0.14
M	ARSENIC	5.8	MG/KG	2.3	86.42	3.50
M	COPPER	10.5	MG/KG	10.3	1.92	0.20
M	LEAD	34.5	MG/KG	43.5	23.08	9.00
M	TIN	0.68 B	MG/KG	0.62 B	9.23	0.06
M	ZINC	32.8	MG/KG	27.5	17.58	5.30

NOTabove 2xRL

J positive

Current RPD Quality Control Limit: 55 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

NSF INDIAN HEAD
SOIL DATA
CTO423-7

FRACTION	CHEMICAL	FD06150901	UNITS	X25SS0070001	RPD	D
MISC	TOTAL SOLIDS	74	%	69	6.99	5.00

Current RPD Quality Control Limit: 55 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

NSF INDIAN HEAD
SOIL DATA
CTO423-7

FRACTION	CHEMICAL	FD06150902	UNITS	X25SS0210001	RPD	D
M	ANTIMONY	0.27 J	MG/KG	0.3 J	10.53	0.03
M	ARSENIC	2.9	MG/KG	2.4	18.87	0.50
M	COPPER	9.2	MG/KG	10.9	16.92	1.70
M	LEAD	127	MG/KG	131	3.10	4.00
M	TIN	0.47 B	MG/KG	0.5 B	6.19	0.03
M	ZINC	24.9	MG/KG	26.8	7.35	1.90

Current RPD Quality Control Limit: 55 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

NSF INDIAN HEAD
SOIL DATA
CTO423-7

FRACTION	CHEMICAL	FD06150902	UNITS	X25SS0210001	RPD	D
MISC	TOTAL SOLIDS	85	%	80	6.06	5.00

Current RPD Quality Control Limit: 55 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JZG08A.B\078SMPL.D\078SMPL.D#
Date Acquired: Jul 9 2009 02:59 am
Acq. Method: K10CCV.M
Operator: EAM
Sample Name: SC3310-001
Misc Info: DILUTION - 2/10
Vial Number: 2312
Current Method: C:\ICPCHEM\1\METHODS\K10CCV.M
Calibration File: C:\ICPCHEM\1\CALIB\K10CCV.C
Last Cal. Update: Jul 08 2009 05:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

Reported Result for Zn = 36.4 mg/kg

$341.55\ \mu g/L \times \left(\frac{100\ mL}{1.10\ g}\right)\left(\frac{1}{.853}\right)\left(\frac{1}{1000}\right) = 36.40\ mg/kg$

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
7 Li	19,625.	3,925.	ppb	---	#VALUE!	
9 Be	12.08	2.416	ppb	2.27	1000.	
11 B	16.72	3.344	ppb	9.18	1000.	
23 Na	151.2	30.24	ppb	2.35	100000.	
25 Mg	9,365.	1,873.	ppb	2.05	100000.	
27 Al	93,150.	18,630.	ppb	1.51	100000.	
28 Si	3,580.	716.	ppb	2.21	#VALUE!	
29 Si	3,542.	708.4	ppb	3.10	10000.	
39 K	13,975.	2,795.	ppb	1.82	100000.	
43 Ca	5,525.	1,105.	ppb	1.95	100000.	
44 Ca	5,270.	1,054.	ppb	0.85	100000.	
51 V	465.35	93.07	ppb	1.11	1000.	
52 Cr	206.1	41.22	ppb	1.14	1000.	
53 Cr	221.3	44.26	ppb	0.85	1000.	
55 Mn	2,327.5	465.5	ppb	1.17	500.	
56 Fe	593,500.	118,700.	ppb	0.50	100000.	
57 Fe	567,000.	113,400.	ppb	0.41	100000.	>LDR
59 Co	106.05	21.21	ppb	0.69	500.	
60 Ni	103.1	20.62	ppb	0.66	500.	
63 Cu	122.4	24.48	ppb	0.87	1000.	
65 Cu	123.15	24.63	ppb	1.04	500.	
66 Zn	341.55	68.31	ppb	1.37	500.	
68 Zn	349.	69.8	ppb	0.91	1000.	
75 As	46.37	9.274	ppb	1.37	1000.	
82 Se	2.523	0.5046	ppb	29.21	500.	
88 Sr	76.7	15.34	ppb	1.31	1000.	
89 Y	----	--------	---	---	#VALUE!	
98 Mo	7.66	1.532	ppb	4.42	1000.	
107 Ag	0.1556	0.0311	ppb	26.51	100.	
109 Ag	0.1467	0.0293	ppb	24.39	200.	
111 Cd	0.702	0.1404	ppb	12.82	200.	
114 Cd	0.3335	0.0667	ppb	19.42	500.	
115 In	----	--------	---	---	#VALUE!	
118 Sn	12.55	2.51	ppb	1.80	1000.	
120 Sn	12.86	2.572	ppb	2.96	1000.	
121 Sb	0.9725	0.1945	ppb	4.04	1000.	
123 Sb	0.923	0.1846	ppb	6.77	1000.	
135 Ba	537.5	107.5	ppb	0.81	1000.	
137 Ba	537.	107.4	ppb	1.40	#VALUE!	
182 W	0.857	0.1714	ppb	10.68	1000.	
200 Hg	0.8635	0.1727	ppb	52.22	#VALUE!	
202 Hg	1.568	0.3136	ppb	11.48	#VALUE!	
203 Tl	3.0715	0.6143	ppb	2.16	1000.	
205 Tl	3.09	0.618	ppb	5.24	#VALUE!	
208 Pb	59.4	11.88	ppb	0.96	1000.	
232 Th	47.86	9.572	ppb	1.96	1000.	
238 U	7.16	1.432	ppb	1.35	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	499151.28	1.57	574260.44	86.9	69.5 - 130.4	
45 Sc	735895.06	1.68	797376.94	92.3	69.5 - 130.4	
72 Ge	149882.58	0.71	171143.83	87.6	69.5 - 130.4	
159 Tb	1008753.40	1.29	1284391.50	78.5	69.5 - 130.4	
209 Bi	575130.25	1.61	715112.00	80.4	69.5 - 130.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JZG08A.B\009CALB.D\009CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

File:	074_BLK.D#	075_CCV.D#	076_CCB.D#	077SMPL.D#	078SMPL.D#
Sample:	BLANK	CCV	CCB	PBSZF29ICS0	SC3310-001
Date/Time:	7/9/2009 2:24	7/9/2009 2:33	7/9/2009 2:42	7/9/2009 2:50	7/9/2009 2:59
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	1	5	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.0770	11.3700	0.0209	0.1866	12.0800
B / 11	1.0520	25.1100	0.5499	2.7795	16.7200
Na / 23	-6.7090	5389.0000	-2.6090	-8.7850	151.2000
Mg / 25	-6.7200	5317.0000	-3.4950	-8.1600	9365.0000
Al / 27	0.6131	512.6000	-7.0850	-7.7300	93150.0000
Si / 29	5.9110	492.0000	1.8090	79.0000	3542.0000
K / 39	22.4500	5324.0000	22.5700	177.4000	13975.0000
Ca / 44	1.5000	5267.0000	-0.1569	24.4550	5270.0000
V / 51	0.8563	24.5500	0.0102	1.0970	465.3500
Cr / 52	0.4856	24.4500	-0.0099	2.0465	206.1000
Mn / 55	0.2600	24.6600	0.0617	0.9875	2327.5000
Fe / 57	17.1300	4961.0000	4.8910	59.8000	567000.0000
Co / 59	0.0598	10.0700	0.0174	0.1573	106.0500
Ni / 60	0.1426	25.4900	0.0385	1.1845	103.1000
Cu / 65	0.3873	25.3300	0.0285	0.5975	123.1500
Zn / 66	0.3002	25.7200	0.0895	1.1755	341.5500
As / 75	0.2675	25.2200	0.0559	0.3964	46.3700
Se / 82	-0.0806	25.1600	0.1179	0.0219	2.5230
Sr / 88	0.0178	24.9600	-0.0078	0.0137	76.7000
Mo / 98	0.2483	25.0100	-0.0749	-0.9780	7.6600
Ag / 107	0.0175	10.2400	0.0003	0.0224	0.1556
Cd / 114	0.0374	10.3500	0.0183	0.0807	0.3335
Sn / 118	0.2526	26.9800	0.1014	6.9000	12.5500
Sb / 123	0.0864	27.0100	0.0437	0.2917	0.9230
Ba / 135	0.3916	27.3200	0.0766	1.1680	537.5000
W / 182	0.0357	25.6700	0.3050	0.7985	0.8570
Tl / 203	1.3540	9.9370	0.4935	1.7910	3.0715
Pb / 208	0.1576	25.4100	0.0471	0.5130	59.4000
Th / 232	0.0106	9.6750	0.0058	0.0512	47.8600
U / 238	-0.0068	10.1300	0.0029	-0.0181	7.1600
Li / 6	507111.1	495506.7	501276.1	492234.4	499151.3
Sc / 45	670498.5	673062.3	687082.6	628411.8	735895.1
Ge / 72	143574.7	146294.5	147075.6	138652.5	149882.6
Tb / 159	1032299	1045403	1066605	983037.2	1008753
Bi / 209	604089.8	609928.3	629409.4	582372.8	575130.3
Li / 6	88.3	86.3	87.3	85.7	86.9
Sc / 45	84.1	84.4	86.2	78.8	92.3
Ge / 72	83.9	85.5	85.9	81.0	87.6
Tb / 159	80.4	81.4	83.0	76.5	78.5
Bi / 209	84.5	85.3	88.0	81.4	80.4

Katahdin Analytical Services, Inc. — **Metals Preparation Benchsheet**

Reagent Information:
JT Baker HNO3: H09035 JT Baker HCL: G45Q3 KMG H2O2: 64022 Method: 3050B

LCS / Spike — LCS/Spiking Information:

☐	☑	I.V. CLPP-SPK-1 (ID/Vol):	MS1569 / 0.1	mL
☐	☑	CLPP-SPK-INT1 (ID/Vol):	MW11799 / 1.0	mL
☐	☑	CLPP-SPK-INT2 (ID/Vol):	MW11810 / 1.0	mL
☐	☑	Uranium Spike (ID/Vol):	MS1526 / 0.09	mL
☐	☐	CLPP-SPK-4 (ID/Vol):	N/A /	mL

LCSS: MS1578 Balance ID: Ohaus Galaxy 410 + Mettler AE200

Hot Plate/Block ID: B
Start Temp.: 93 °C
End Temp.: 95 °C
Thermometer ID/Pos.: ALC 8 / 3:8

Fisher Filter Paper: K11589105A

REVIEWED
EA 063009
KATAHDIN ANALYTICAL
METALS SECTION

Sample ID	Batch ID	Initial Wt/Vol	Initial Units	Final Vol	Final Units	MX	Meth	Anal.	Date	Initial Color	Initial Texture	Final Color	Final Clarity	Artifacts	Bottle
LCSSZF29ICS0	ZF29ICS0	0.5082	g	0.1	L	SL	IC	AJB	06/29/2009	N/A	N/A	N/A	N/A		
PBSZF29ICS0	ZF29ICS0	1.00	g		L	SL	IC	AJB	06/29/2009	N/A	N/A	N/A	N/A		A
SC3310-001	ZF29ICS0	1.10	g		L	SL	IC	AJB	06/29/2009						
SC3310-002	ZF29ICS0	1.11	g		L	SL	IC	AJB	06/29/2009						
SC3310-003	ZF29ICS0	1.14	g		L	SL	IC	AJB	06/29/2009						
SC3310-004	ZF29ICS0	1.15	g		L	SL	IC	AJB	06/29/2009						
SC3310-005	ZF29ICS0	1.10	g		L	SL	IC	AJB	06/29/2009						
SC3310-006	ZF29ICS0	1.43	g		L	SL	IC	AJB	06/29/2009						
SC3310-007	ZF29ICS0	1.12	g		L	SL	IC	AJB	06/29/2009						
SC3310-008	ZF29ICS0	1.24	g		L	SL	IC	AJB	06/29/2009						
SC3310-009	ZF29ICS0	1.17	g		L	SL	IC	AJB	06/29/2009						
SC3310-010	ZF29ICS0	1.15	g		L	SL	IC	AJB	06/29/2009						
SC3310-011	ZF29ICS0	1.06	g		L	SL	IC	AJB	06/29/2009						
SC3310-012	ZF29ICS0	1.05	g		L	SL	IC	AJB	06/29/2009						
SC3310-013	ZF29ICS0	1.13	g		L	SL	IC	AJB	06/29/2009						
SC3310-014	ZF29ICS0	1.00	g		L	SL	IC	AJB	06/29/2009						
SC3310-015	ZF29ICS0	1.25	g		L	SL	IC	AJB	06/29/2009						
SC3310-016	ZF29ICS0	1.18	g		L	SL	IC	AJB	06/29/2009						
SC3310-017	ZF29ICS0	1.07	g		L	SL	IC	AJB	06/29/2009						J
SC3310-018	ZF29ICS0	1.07	g		L	SL	IC	AJB	06/29/2009						A
SC3310-019	ZF29ICS0	1.11	g		L	SL	IC	AJB	06/29/2009						B
SC3310-020	ZF29ICS0	1.05	g		L	SL	IC	AJB	06/29/2009						D
SC3310-020P	ZF29ICS0	1.14	g		L	SL	IC	AJB	06/29/2009						B
SC3310-020S	ZF29ICS0	1.13	g	0.1	L	SL	IC	AJB	06/29/2009						

AJB 6/29/09

Digestion performed by: AJB On: 6/29/09

Page: ZF116 Revision: 00

Katahdin Analytical Services 4000424

HOLDTIME

SDG CTO423-7

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	X25SS0160001	SC3310-004	NM	6/15/2009	6/29/2009	7/11/2009	13.60	12	25.60
M	MG/KG	X25SS0200001	SC3310-007	NM	6/15/2009	6/29/2009	7/9/2009	13.61	10	23.61
M	MG/KG	X25SS0040001	SC3310-002	NM	6/15/2009	6/29/2009	7/9/2009	13.59	10	23.59
M	MG/KG	X25SS0070001	SC3310-009	NM	6/15/2009	6/29/2009	7/11/2009	13.60	12	25.60
M	MG/KG	X25SS0070001	SC3310-009	NM	6/15/2009	6/29/2009	7/9/2009	13.62	10	23.62
M	MG/KG	X25SS0070001	SC3310-009	NM	6/15/2009	6/29/2009	7/11/2009	13.73	12.3	26.03
M	MG/KG	X25SS0010001	SC3310-001	NM	6/15/2009	6/29/2009	7/9/2009	13.64	10	23.64
M	MG/KG	X25SS0080001	SC3310-003	NM	6/15/2009	6/29/2009	7/9/2009	13.49	10	23.49
M	MG/KG	X25SS0010001	SC3310-001	NM	6/15/2009	6/29/2009	7/11/2009	13.6	12	25.6
M	MG/KG	X25SS0160001	SC3310-004	NM	6/15/2009	6/29/2009	7/9/2009	13.65	10	23.65
M	MG/KG	X25SS0180001	SC3310-005	NM	6/15/2009	6/29/2009	7/9/2009	13.61	10	23.61
M	MG/KG	X25SS0180001	SC3310-005	NM	6/15/2009	6/29/2009	7/11/2009	13.77	12.28	26.04
M	MG/KG	X25SS0190001	SC3310-006	NM	6/15/2009	6/29/2009	7/9/2009	13.62	10	23.62
M	MG/KG	X25SS0190001	SC3310-006	NM	6/15/2009	6/29/2009	7/9/2009	13.77	10.61	24.38
M	MG/KG	FD06150901	SC3310-014	NM	6/15/2009	6/29/2009	7/10/2009	14.06	11	25.06

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	X25SS0080001	SC3310-003	NM	6/15/2009	6/29/2009	7/11/2009	13.44	12	25.44
M	MG/KG	X14SS1320001	SC3310-018	NM	6/16/2009	6/29/2009	7/9/2009	12.86	10	22.86
M	MG/KG	FD06150901	SC3310-014	NM	6/15/2009	6/29/2009	7/9/2009	14.22	10	24.22
M	MG/KG	FD06150902	SC3310-015	NM	6/15/2009	6/29/2009	7/10/2009	14.06	11	25.06
M	MG/KG	FD06150902	SC3310-015	NM	6/15/2009	6/29/2009	7/9/2009	14.23	10	24.23
M	MG/KG	X14SS1300001	SC3310-016	NM	6/16/2009	6/29/2009	7/10/2009	12.66	11	23.66
M	MG/KG	X14SS1300001	SC3310-016	NM	6/16/2009	6/29/2009	7/9/2009	12.82	10	22.82
M	MG/KG	X25SS0040001	SC3310-002	NM	6/15/2009	6/29/2009	7/11/2009	13.55	12	25.55
M	MG/KG	X14SS1310001	SC3310-017	NM	6/16/2009	6/29/2009	7/9/2009	12.89	10.66	23.55
M	MG/KG	X25SS0200001	SC3310-007	NM	6/15/2009	6/29/2009	7/9/2009	13.75	10.62	24.37
M	MG/KG	X14SS1320001	SC3310-018	NM	6/16/2009	6/29/2009	7/9/2009	12.9	10.67	23.57
M	MG/KG	X14SS1340001	SC3310-019	NM	6/16/2009	6/29/2009	7/9/2009	12.83	10	22.83
M	MG/KG	X14SS1340001	SC3310-019	NM	6/16/2009	6/29/2009	7/9/2009	12.86	10.68	23.53
M	MG/KG	X14SS1340001	SC3310-019	NM	6/16/2009	6/29/2009	7/9/2009	12.86	10.68	23.54
M	MG/KG	X17SS0190001	SC3310-020	NM	6/11/2009	6/29/2009	7/9/2009	17.65	10	27.65
M	MG/KG	X17SS0190001	SC3310-020	NM	6/11/2009	6/29/2009	7/9/2009	17.68	10.69	28.36
M	MG/KG	X14SS1310001	SC3310-017	NM	6/16/2009	6/29/2009	7/9/2009	12.83	10	22.83
M	MG/KG	X25SS0250001	SC3310-013	NM	6/15/2009	6/29/2009	7/10/2009	13.53	11	24.53

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	X25SS0190001	SC3310-006	NM	6/15/2009	6/29/2009	7/11/2009	13.77	12.28	26.05
M	MG/KG	X25SS0250001	SC3310-013	NM	6/15/2009	6/29/2009	7/9/2009	13.69	10	23.69
M	MG/KG	X25SS0240001	SC3310-012	NM	6/15/2009	6/29/2009	7/9/2009	13.76	10.64	24.40
M	MG/KG	X25SS0240001	SC3310-012	NM	6/15/2009	6/29/2009	7/9/2009	13.67	10	23.67
M	MG/KG	X25SS0230001	SC3310-011	NM	6/15/2009	6/29/2009	7/9/2009	13.75	10.64	24.38
M	MG/KG	X25SS0220001	SC3310-010	NM	6/15/2009	6/29/2009	7/9/2009	13.73	10.63	24.37
M	MG/KG	X25SS0220001	SC3310-010	NM	6/15/2009	6/29/2009	7/9/2009	13.64	10	23.64
M	MG/KG	X25SS0210001	SC3310-008	NM	6/15/2009	6/29/2009	7/11/2009	13.75	12.29	26.04
M	MG/KG	X25SS0210001	SC3310-008	NM	6/15/2009	6/29/2009	7/9/2009	13.61	10	23.61
M	MG/KG	X25SS0230001	SC3310-011	NM	6/15/2009	6/29/2009	7/9/2009	13.65	10	23.65
M	MG/KG	X25SS0200001	SC3310-007	NM	6/15/2009	6/29/2009	7/11/2009	13.75	12.29	26.04
TS	%	X25SS0230001	SC3310-11	NM	6/15/2009	6/29/2009	6/30/2009	13.81	1	14.81
TS	%	X25SS0160001	SC3310-4	NM	6/15/2009	6/29/2009	6/30/2009	13.86	1	14.86
TS	%	X25SS0180001	SC3310-5	NM	6/15/2009	6/29/2009	6/30/2009	13.82	1	14.82
TS	%	X25SS0190001	SC3310-6	NM	6/15/2009	6/29/2009	6/30/2009	13.82	1	14.82
TS	%	X25SS0200001	SC3310-7	NM	6/15/2009	6/29/2009	6/30/2009	13.80	1	14.80
TS	%	X25SS0240001	SC3310-12	NM	6/15/2009	6/29/2009	6/30/2009	13.82	1	14.82
TS	%	X25SS0220001	SC3310-10	NM	6/15/2009	6/29/2009	6/30/2009	13.8	1	14.8

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
TS	%	X25SS0080001	SC3310-3	NM	6/15/2009	6/29/2009	6/30/2009	13.70	1	14.70
TS	%	X14SS1310001	SC3310-17	NM	6/16/2009	6/29/2009	6/30/2009	12.97	1	13.97
TS	%	X25SS0210001	SC3310-8	NM	6/15/2009	6/29/2009	6/30/2009	13.79	1	14.79
TS	%	X25SS0070001	SC3310-9	NM	6/15/2009	6/29/2009	6/30/2009	13.78	1	14.78
TS	%	X25SS0040001	SC3310-2	NM	6/15/2009	6/29/2009	6/30/2009	13.81	1	14.81
TS	%	X25SS0010001	SC3310-1	NM	6/15/2009	6/29/2009	6/30/2009	13.87	1	14.87
TS	%	X17SS0190001	SC3310-20	NM	6/11/2009	6/29/2009	6/30/2009	17.75	1	18.75
TS	%	X14SS1320001	SC3310-18	NM	6/16/2009	6/29/2009	6/30/2009	12.98	1	13.98
TS	%	X25SS0250001	SC3310-13	NM	6/15/2009	6/29/2009	6/30/2009	13.83	1	14.83
TS	%	X14SS1300001	SC3310-16	NM	6/16/2009	6/29/2009	6/30/2009	12.97	1	13.97
TS	%	FD06150902	SC3310-15	NM	6/15/2009	6/29/2009	6/30/2009	14.35	1	15.35
TS	%	FD06150901	SC3310-14	NM	6/15/2009	6/29/2009	6/30/2009	14.35	1	15.35
TS	%	X14SS1340001	SC3310-19	NM	6/16/2009	6/29/2009	6/30/2009	12.93	1	13.93

Katahdin Analytical Services, Inc.

Sample Receipt Condition Report

Client: Indian Head - Tetra Tech	KAS PM: AJC	Sampled By: Client
Project:	KIMS Entry By: DD	Delivered By: Fed Ex
KAS Work Order#: SC3309 / SC3310 / SC3311	KIMS Review By: DC	Received By: GN
~~SDG~~ #: SC3312 / SC3313	Cooler: 1 of 3	Date/Time Rec.: 6-19-09 1000

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 5.5
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea				✓	
Soil/Sediment:					
Received in airtight container?					
Received in methanol?					
Methanol covering soil?					
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

Sample # SB06160901 = Lab received only 1 Amber for SVOA

Katahdin Analytical Services, Inc.

Sample Receipt Condition Report

Client: Tetra Tech Indian Head	KAS PM: AJC	Sampled By: Client
Project:	KIMS Entry By: DD	Delivered By: Fed-Ex
KAS Work Order#: SC3309/SC3310/SC3311	KIMS Review By:	Received By: GW
~~SDG~~ # SC3312/SC3313	Cooler: 2 of 3	Date/Time Rec: 6-19-09 10:00

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun	✓				Temp (°C): 4.9
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea **Soil/Sediment:**				✓	
Received in airtight container?					
Received in methanol?					
Methanol covering soil?					
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

0000006

Katahdin Analytical Services, Inc.

Sample Receipt Condition Report

Client: Tetra Tech Indian Head	KAS PM: AJC	Sampled By: Client	
Project:	KIMS Entry By: DD	Delivered By: Fed-Ex	
KAS Work Order#: SC3309 / SC3310 / SC3311	KIMS Review By: AJC	Received By: GN	
~~SDG#~~ SC3312 / SC3313	Cooler: 3 of 3	Date/Time Rec.: 6-19-09 1000	

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 6.0
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea **Soil/Sediment:** Received in airtight container?				✓	
Received in methanol?					
Methanol covering soil?					
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

0000007

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services **Sample ID:** PBSZF29ICS0

Matrix: SOIL **SDG Name:** CTO423-7

QC Batch ID: ZF29ICS0

Concentration Units : mg/Kgdrywt

Analyte	RESULT	C
ANTIMONY	0.029	J
ARSENIC	0.150	U
COPPER	0.110	U
LEAD	0.051	J
TIN	0.619	
ZINC	0.350	U

INSTRUMENT DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 3/6/2009

Concentration Units: ug/L

Analyte	CRDL	IDL	M
ALUMINUM	60	2.20	MS
ANTIMONY	0.20	0.03	MS
ARSENIC	1.0	0.08	MS
CALCIUM	20	3.90	MS
COPPER	1.0	0.04	MS
IRON	20	3.10	MS
LEAD	0.20	0.02	MS
MAGNESIUM	20	2.00	MS
MOLYBDENUM	1.0	0.07	MS
POTASSIUM	200	8.80	MS
SODIUM	200	6.50	MS
TIN	1.0	0.04	MS
ZINC	2.0	0.44	MS

METHOD DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 3/11/2009

Analyte	MDL	Units	M	EPA Prep./Anal. Method
ANTIMONY	0.01	mg/kg	MS	SW846 3050B / SW846 6020
ARSENIC	0.03	mg/kg	MS	SW846 3050B / SW846 6020
COPPER	0.02	mg/kg	MS	SW846 3050B / SW846 6020
LEAD	0.01	mg/kg	MS	SW846 3050B / SW846 6020
TIN	0.04	mg/kg	MS	SW846 3050B / SW846 6020
ZINC	0.07	mg/kg	MS	SW846 3050B / SW846 6020

ICP LINEAR RANGES

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 1/6/2009

Concentration Units: ug/L

Analyte	Integration Time (sec)	Linear Range	M
ALUMINUM	0.01	100000	MS
ANTIMONY	0.10	1000	MS
ARSENIC	0.30	1000	MS
CALCIUM	0.03	100000	MS
COPPER	0.10	500	MS
IRON	0.03	100000	MS
LEAD	0.10	1000	MS
MAGNESIUM	0.05	100000	MS
MOLYBDENUM	0.10	2000	MS
POTASSIUM	0.01	100000	MS
SODIUM	0.01	100000	MS
TIN	0.10	1000	MS
ZINC	0.10	250	MS

PREPARATION LOG

Lab Name: Katahdin Analytical Services **QC Batch ID:** ZF29ICS0

Matrix: SOIL **SDG Name:** CTO423-7

Method: P **Prep Date:** 06/29/2009

Client ID	Lab Sample ID	Initial (g)	Final (L)
LCSSZF29ICS0	LCSSZF29ICS0	0.5082	0.1
PBSZF29ICS0	PBSZF29ICS0	1	0.1
X25SS0010001	SC3310-001	1.1	0.1
X25SS0040001	SC3310-002	1.11	0.1
X25SS0080001	SC3310-003	1.14	0.1
X25SS0160001	SC3310-004	1.15	0.1
X25SS0180001	SC3310-005	1.1	0.1
X25SS0190001	SC3310-006	1.43	0.1
X25SS0200001	SC3310-007	1.12	0.1
X25SS0210001	SC3310-008	1.24	0.1
X25SS0070001	SC3310-009	1.17	0.1
X25SS0220001	SC3310-010	1.15	0.1
X25SS0230001	SC3310-011	1.06	0.1
X25SS0240001	SC3310-012	1.05	0.1
X25SS0250001	SC3310-013	1.13	0.1
FD06150901	SC3310-014	1	0.1
FD06150902	SC3310-015	1.25	0.1
X14SS1300001	SC3310-016	1.18	0.1
X14SS1310001	SC3310-017	1.07	0.1
X14SS1320001	SC3310-018	1.07	0.1
X14SS1340001	SC3310-019	1.11	0.1
X17SS0190001	SC3310-020	1.05	0.1
X17SS0190001P	SC3310-020P	1.14	0.1
X17SS0190001S	SC3310-020S	1.13	0.1

Factor for Blank is 10

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG08A

Date: 7/8/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements								
6020 TUNE		1	16:01									
200.8 TUNE		1	16:07									
Cal Blank		1	17:06	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
Cal Std 1		1	17:15	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
Cal Std 2		1	17:23	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
Cal Std 3		1	17:32	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
Cal Std 4		1	17:40	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
ZZZZZZ		1	17:49												
ICV		1	17:58	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
ICB		1	18:06	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
PQL		1	18:15	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
ICSA		1	18:23	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
ICSAB		1	18:32	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
Blank		1	18:41	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
CCV		1	18:49	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
CCB		1	18:58	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
BLANK		1	19:07	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
BLANK		1	19:15	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
CCV		1	19:24	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
CCB		1	19:32	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
ZZZZZZ		1	19:41												
ZZZZZZ		1	19:49												
ZZZZZZ		5	19:58												
ZZZZZZ		5	20:07												
ZZZZZZ		5	20:15												
ZZZZZZ		5	20:24												
ZZZZZZ		10	20:32												
ZZZZZZ		10	20:41												
ZZZZZZ		10	20:50												
BLANK		1	20:58	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
CCV		1	21:07	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
CCB		1	21:15	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
ZZZZZZ		5	21:24												
ZZZZZZ		5	21:32												
ZZZZZZ		5	21:41												
ZZZZZZ		10	21:50												
ZZZZZZ		5	21:58												
ZZZZZZ		25	22:07												
ZZZZZZ		25	22:16												
ZZZZZZ		5	22:24												
ZZZZZZ		10	22:33												
BLANK		1	22:41	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
CCV		1	22:50	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
CCB		1	22:59	Al	Sb	As	Ca	Cu	Fe	Pb	Mg	Mo	K	Na	Zn
ZZZZZZ		1	23:07												
ZZZZZZ		1	23:16												
ZZZZZZ		1	23:24												
ZZZZZZ		5	23:33												
ZZZZZZ		10	23:42												
ZZZZZZ		10	23:50												

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG08A

Date: 7/8/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements
ZZZZZZ		10	23:59	
BLANK		1	0:07	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
CCV		1	0:16	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
CCB		1	0:24	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
BLANK		1	0:33	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
PQL		1	0:41	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
CCV		1	0:50	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
CCB		1	0:59	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
ZZZZZZ		5	1:07	
ZZZZZZ		5	1:16	
ZZZZZZ		10	1:24	
ZZZZZZ		25	1:33	
ZZZZZZ		50	1:42	
ZZZZZZ		5	1:50	
LCSSZF29ICS0		10	1:59	As Cu Pb Zn
ZZZZZZ		10	2:07	
ZZZZZZ		10	2:16	
BLANK		1	2:24	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
CCV		1	2:33	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
CCB		1	2:42	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
PBSZF29ICS0		5	2:50	Sb As Cu Pb Zn
SC3310-001	X25SS0010001	5	2:59	Sb As Cu Pb Zn
SC3310-002	X25SS0040001	5	3:08	Sb As Cu Pb Zn
SC3310-003	X25SS0080001	5	3:16	Sb As Cu Pb Zn
SC3310-004	X25SS0160001	5	3:25	Sb As Cu Pb Zn
SC3310-005	X25SS0180001	5	3:33	Sb As Cu Pb Zn
SC3310-006	X25SS0190001	5	3:42	Sb As Cu Zn
SC3310-007	X25SS0200001	5	3:51	Sb As Zn
SC3310-008	X25SS0210001	5	3:59	Sb As Cu Pb Zn
BLANK		1	4:08	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
CCV		1	4:16	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
CCB		1	4:25	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
SC3310-009	X25SS0070001	5	4:33	As Cu Pb Zn
SC3310-010	X25SS0220001	5	4:42	As Cu Pb Zn
SC3310-011	X25SS0230001	5	4:51	As Cu Pb Zn
SC3310-012	X25SS0240001	5	4:59	As Cu Pb Zn
SC3310-013	X25SS0250001	5	5:08	As Cu Pb Zn
SC3310-014	FD06150901	5	5:17	As Cu Pb Zn
SC3310-015	FD06150902	5	5:25	As Cu Pb Zn
SC3310-016	X14SS1300001	5	5:34	As Cu Pb Zn
SC3310-017	X14SS1310001	5	5:43	As Cu Pb Zn
BLANK		1	5:51	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
CCV		1	6:00	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
CCB		1	6:08	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
SC3310-018	X14SS1320001	5	6:17	As Cu Pb Zn
SC3310-019	X14SS1340001	5	6:26	As Cu Zn
SC3310-020	X17SS0190001	5	6:34	As Cu Pb Zn
SC3310-020L	X17SS0190001L	25	6:43	As Cu Pb Zn
SC3310-020A	X17SS0190001A	5	6:52	As Cu Zn
SC3310-020S	X17SS0190001S	10	7:00	As Cu Pb Zn
SC3310-020P	X17SS0190001P	10	7:09	As Cu Pb Zn

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG08A

Date: 7/9/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements
BLANK		1	7:18	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
CCV		1	7:26	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn
CCB		1	7:35	Al Sb As Ca Cu Fe Pb Mg Mo K Na Zn

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: ICV

File: JZG08A Jul 08, 2009 17:58

Analyte	True	Found	%R (1)
ALUMINUM	400.0	433.10	108.3
ANTIMONY	20.0	21.50	107.5
ARSENIC	20.0	20.04	100.2
CALCIUM	4000.0	4164.00	104.1
COPPER	20.0	20.76	103.8
IRON	4000.0	4060.00	101.5
LEAD	20.0	20.55	102.8
MAGNESIUM	4000.0	4385.00	109.6
MOLYBDENUM	40.0	42.39	106.0
POTASSIUM	4000.0	4256.00	106.4
SODIUM	4000.0	4338.00	108.5
ZINC	20.0	21.03	105.2

SAMPLE: CCV

File: JZG08A Jul 08, 2009 18:49

Analyte	True	Found	%R (1)
ALUMINUM	500.0	534.00	106.8
ANTIMONY	25.0	26.50	106.0
ARSENIC	25.0	25.19	100.8
CALCIUM	5000.0	5294.00	105.9
COPPER	25.0	25.29	101.2
IRON	5000.0	5075.00	101.5
LEAD	25.0	24.97	99.9
MAGNESIUM	5000.0	5157.00	103.1
MOLYBDENUM	25.0	28.34	113.4•
POTASSIUM	5000.0	5273.00	105.5
SODIUM	5000.0	5169.00	103.4
ZINC	25.0	25.46	101.8

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: CCV

File: JZG08A Jul 08, 2009 19:24

Analyte	True	Found	%R (1)
ALUMINUM	500.0	516.90	103.4
ANTIMONY	25.0	26.86	107.4
ARSENIC	25.0	25.30	101.2
CALCIUM	5000.0	5376.00	107.5
COPPER	25.0	25.25	101.0
IRON	5000.0	5066.00	101.3
LEAD	25.0	25.58	102.3
MAGNESIUM	5000.0	5314.00	106.3
MOLYBDENUM	25.0	25.36	101.4
POTASSIUM	5000.0	5407.00	108.1
SODIUM	5000.0	5334.00	106.7
ZINC	25.0	25.74	103.0

SAMPLE: CCV

File: JZG08A Jul 08, 2009 21:07

Analyte	True	Found	%R (1)
ALUMINUM	500.0	514.50	102.9
ANTIMONY	25.0	26.88	107.5
ARSENIC	25.0	25.45	101.8
CALCIUM	5000.0	5339.00	106.8
COPPER	25.0	25.24	101.0
IRON	5000.0	5108.00	102.2
LEAD	25.0	25.44	101.8
MAGNESIUM	5000.0	5268.00	105.4
MOLYBDENUM	25.0	25.19	100.8
POTASSIUM	5000.0	5340.00	106.8
SODIUM	5000.0	5351.00	107.0
ZINC	25.0	25.72	102.9

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: CCV X

File: JZG08A Jul 08, 2009 22:50

Analyte	True	Found	%R (1)
ALUMINUM	500.0	525.30	105.1
ANTIMONY	25.0	27.48	109.9
ARSENIC	25.0	25.51	102.0
CALCIUM	5000.0	5409.00	108.2
COPPER	25.0	25.57	102.3
IRON	5000.0	5152.00	103.0
LEAD	25.0	25.81	103.2
MAGNESIUM	5000.0	5382.00	107.6
MOLYBDENUM	25.0	25.29	101.2
POTASSIUM	5000.0	5448.00	109.0
SODIUM	5000.0	5475.00	109.5
ZINC	25.0	25.93	103.7

SAMPLE: CCV X

File: JZG08A Jul 09, 2009 0:16

Analyte	True	Found	%R (1)
ALUMINUM	500.0	557.80	111.6•
ANTIMONY	25.0	29.84	119.4•
ARSENIC	25.0	26.74	107.0
CALCIUM	5000.0	5854.00	117.1•
COPPER	25.0	26.51	106.0
IRON	5000.0	5299.00	106.0
LEAD	25.0	27.16	108.6
MAGNESIUM	5000.0	5828.00	116.6•
MOLYBDENUM	25.0	26.13	104.5
POTASSIUM	5000.0	5934.00	118.7•
SODIUM	5000.0	5898.00	118.0•
ZINC	25.0	26.89	107.6

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: CCV X

File: JZG08A Jul 09, 2009 0:50

Analyte	True	Found	%R (1)
ALUMINUM	500.0	511.60	102.3
ANTIMONY	25.0	27.76	111.0*
ARSENIC	25.0	25.46	101.8
CALCIUM	5000.0	5321.00	106.4
COPPER	25.0	25.52	102.1
IRON	5000.0	5040.00	100.8
LEAD	25.0	25.64	102.6
MAGNESIUM	5000.0	5292.00	105.8
MOLYBDENUM	25.0	24.87	99.5
POTASSIUM	5000.0	5427.00	108.5
SODIUM	5000.0	5440.00	108.8
ZINC	25.0	25.42	101.7

SAMPLE: CCV ✓

File: JZG08A Jul 09, 2009 2:33

Analyte	True	Found	%R (1)
ALUMINUM	500.0	512.60	102.5
ANTIMONY	25.0	27.01	108.0
ARSENIC	25.0	25.22	100.9
CALCIUM	5000.0	5267.00	105.3
COPPER	25.0	25.33	101.3
IRON	5000.0	4961.00	99.2
LEAD	25.0	25.41	101.6
MAGNESIUM	5000.0	5317.00	106.3
MOLYBDENUM	25.0	25.01	100.0
POTASSIUM	5000.0	5324.00	106.5
SODIUM	5000.0	5389.00	107.8
ZINC	25.0	25.72	102.9

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

Not quant. for antimony

SAMPLE: CCV

File: JZG08A Jul 09, 2009 4:16

Analyte	True	Found	%R (1)
ALUMINUM	500.0	512.30	102.5
ANTIMONY	25.0	27.17	108.7
ARSENIC	25.0	25.14	100.6
CALCIUM	5000.0	5272.00	105.4
COPPER	25.0	25.11	100.4
IRON	5000.0	5049.00	101.0
LEAD	25.0	26.49	106.0
MAGNESIUM	5000.0	5162.00	103.2
MOLYBDENUM	25.0	24.46	97.8
POTASSIUM	5000.0	5354.00	107.1
SODIUM	5000.0	5253.00	105.1
ZINC	25.0	25.13	100.5

SAMPLE: CCV

File: JZG08A Jul 09, 2009 6:00

Analyte	True	Found	%R (1)
ALUMINUM	500.0	536.10	107.2
ANTIMONY	25.0	28.04	112.2•
ARSENIC	25.0	25.71	102.8
CALCIUM	5000.0	5482.00	109.6
COPPER	25.0	25.74	103.0
IRON	5000.0	5190.00	103.8
LEAD	25.0	26.27	105.1
MAGNESIUM	5000.0	5409.00	108.2
MOLYBDENUM	25.0	25.36	101.4
POTASSIUM	5000.0	5589.00	111.8•
SODIUM	5000.0	5451.00	109.0
ZINC	25.0	25.89	103.6

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: CCV

File: JZG08A Jul 09, 2009 7:26

Analyte	True	Found	%R (1)
ALUMINUM	500.0	535.80	107.2
ANTIMONY	25.0	27.84	111.4•
ARSENIC	25.0	25.38	101.5
CALCIUM	5000.0	5375.00	107.5
COPPER	25.0	25.70	102.8
IRON	5000.0	5101.00	102.0
LEAD	25.0	25.94	103.8
MAGNESIUM	5000.0	5371.00	107.4
MOLYBDENUM	25.0	25.55	102.2
POTASSIUM	5000.0	5454.00	109.1
SODIUM	5000.0	5372.00	107.4
ZINC	25.0	25.89	103.6

(1) Control Limits: Mercury 80-120; Other Metals 90-110

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: PQL

File: JZG08A Jul 08, 2009 18:15

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	62.85	104.8
ANTIMONY	0.2	0.22	110.0
ARSENIC	1.0	0.72	72.0
CALCIUM	20.0	23.55	117.8
COPPER	0.2	0.22	110.0
IRON	20.0	24.44	122.2
LEAD	0.2	0.23	115.0
MAGNESIUM	20.0	23.56	117.8
MOLYBDENUM	1.0	1.07	107.0
POTASSIUM	200.0	217.80	108.9
SODIUM	200.0	221.90	110.9
ZINC	2.0	2.08	104.0

SAMPLE: PQL

File: JZG08A Jul 09, 2009 00:41

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	55.44	92.4
ANTIMONY	0.2	0.22	110.0
ARSENIC	1.0	0.92	92.0
CALCIUM	20.0	13.36	66.8•
COPPER	0.2	0.22	110.0
IRON	20.0	19.93	99.6
LEAD	0.2	0.19	95.0
MAGNESIUM	20.0	12.22	61.1•
MOLYBDENUM	1.0	0.72	72.0
POTASSIUM	200.0	243.90	122.0
SODIUM	200.0	221.60	110.8
ZINC	2.0	2.10	105.0

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: ICB

File: JZG08A Jul 08, 2009 18:06

Analyte	Result	C
ALUMINUM	-2.32	J
ANTIMONY	0.03	U
ARSENIC	-0.10	J
CALCIUM	3.90	U
COPPER	0.04	U
IRON	3.10	U
LEAD	0.02	U
MAGNESIUM	2.00	U
MOLYBDENUM	0.20	J
POTASSIUM	10.68	J
SODIUM	6.50	U
ZINC	0.44	U

SAMPLE: CCB

File: JZG08A Jul 08, 2009 18:58

Analyte	Result	C
ALUMINUM	7.44	J
ANTIMONY	0.03	U
ARSENIC	0.08	U
CALCIUM	11.75	J
COPPER	0.04	U
IRON	12.23	J
LEAD	-0.02	J
MAGNESIUM	10.72	J
MOLYBDENUM	1.60	
POTASSIUM	25.91	J
SODIUM	17.14	J
ZINC	0.44	U

SAMPLE: CCB

File: JZG08A Jul 08, 2009 19:32

Analyte	Result	C
ALUMINUM	-7.34	J
ANTIMONY	0.03	U
ARSENIC	-0.10	J
CALCIUM	3.90	U
COPPER	0.04	U
IRON	-4.73	J
LEAD	-0.04	J
MAGNESIUM	-2.32	J
MOLYBDENUM	0.32	J
POTASSIUM	8.80	U
SODIUM	6.50	U
ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: CCB
File: JZG08A Jul 08, 2009 21:15

Analyte	Result	C
ALUMINUM	-7.78	J
ANTIMONY	0.04	J
ARSENIC	-0.12	J
CALCIUM	3.90	U
COPPER	0.04	U
IRON	3.10	U
LEAD	-0.02	J
MAGNESIUM	-3.23	J
MOLYBDENUM	0.07	U
POTASSIUM	8.80	U
SODIUM	6.50	U
ZINC	0.44	U

SAMPLE: CCB
File: JZG08A Jul 08, 2009 22:59

Analyte	Result	C
ALUMINUM	-4.62	J
ANTIMONY	0.06	J
ARSENIC	0.08	U
CALCIUM	3.90	U
COPPER	0.04	U
IRON	8.99	J
LEAD	0.04	J
MAGNESIUM	-2.89	J
MOLYBDENUM	0.07	U
POTASSIUM	14.21	J
SODIUM	6.50	U
ZINC	0.44	U

SAMPLE: CCB
File: JZG08A Jul 09, 2009 0:24

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.09	J
ARSENIC	0.08	U
CALCIUM	3.90	U
COPPER	0.05	J
IRON	15.93	J
LEAD	0.09	J
MAGNESIUM	2.00	U
MOLYBDENUM	0.07	U
POTASSIUM	38.62	J
SODIUM	6.50	U
ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: CCB
File: JZG08A Jul 09, 2009 0:59

Analyte	Result	C
ALUMINUM	-9.03	J
ANTIMONY	0.04	J
ARSENIC	0.08	U
CALCIUM	-5.38	J
COPPER	0.04	U
IRON	3.10	U
LEAD	0.02	U
MAGNESIUM	-3.12	J
MOLYBDENUM	-0.12	J
POTASSIUM	19.14	J
SODIUM	6.50	U
ZINC	0.44	U

SAMPLE: CCB
File: JZG08A Jul 09, 2009 2:42

Analyte	Result	C
ALUMINUM	-7.09	J
ANTIMONY	0.04	J
ARSENIC	0.08	U
CALCIUM	3.90	U
COPPER	0.04	U
IRON	4.89	J
LEAD	0.05	J
MAGNESIUM	-3.49	J
MOLYBDENUM	0.07	J
POTASSIUM	22.57	J
SODIUM	6.50	U
ZINC	0.44	U

SAMPLE: CCB
File: JZG08A Jul 09, 2009 4:25

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.03	J
ARSENIC	-0.14	J
CALCIUM	3.90	U
COPPER	0.10	J
IRON	11.07	J
LEAD	0.81	
MAGNESIUM	-3.73	J
MOLYBDENUM	0.15	J
POTASSIUM	26.14	J
SODIUM	6.50	U
ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: CCB

File: JZG08A Jul 09, 2009 6:08

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.03	J
ARSENIC	0.08	U
CALCIUM	-4.19	J
COPPER	0.05	J
IRON	12.40	J
LEAD	0.22	
MAGNESIUM	-4.03	J
MOLYBDENUM	0.18	J
POTASSIUM	23.20	J
SODIUM	6.50	U
ZINC	0.44	U

SAMPLE: CCB

File: JZG08A Jul 09, 2009 7:35

Analyte	Result	C
ALUMINUM	2.86	J
ANTIMONY	0.03	J
ARSENIC	0.08	U
CALCIUM	3.90	U
COPPER	0.04	U
IRON	20.07	
LEAD	0.17	J
MAGNESIUM	3.25	J
MOLYBDENUM	0.17	J
POTASSIUM	22.57	J
SODIUM	6.50	U
ZINC	0.44	U

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: ICSA

File: JZG08A Jul 08, 2009 18:23

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	98600	98.6
ANTIMONY	0	0	
ARSENIC	0	0	
CALCIUM	100000	98800	98.8
COPPER	0	1	
IRON	100000	91910	91.9
LEAD	0	0	
MAGNESIUM	100000	97300	97.3
MOLYBDENUM	2000	1980	99.0
POTASSIUM	100000	103500	103.5
SODIUM	100000	100900	100.9
ZINC	0	1	

SAMPLE: ICSAB

File: JZG08A Jul 08, 2009 18:32

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	98790	98.8
ANTIMONY	20	21	105.0
ARSENIC	20	19	95.0
CALCIUM	100000	99080	99.1
COPPER	20	19	95.0
IRON	100000	91640	91.6
LEAD	20	21	105.0
MAGNESIUM	100000	97700	97.7
MOLYBDENUM	2000	2011	100.6
POTASSIUM	100000	103700	103.7
SODIUM	100000	100900	100.9
ZINC	21	17	81.0

5D

SPIKE DUPLICATES

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SS0190001

Matrix: SOIL **SDG Name:** CTO423-7

Percent Solids: 85.1 **Lab Sample ID:** SC3310-020

Concentration Units : mg/Kgdrywt

Analyte	Control Limits	Spike Result	C	Spike Dup. Result	C	RPD	Q	M
ANTIMONY, TOTAL		28.0976		27.5420		2.0		MS
ARSENIC, TOTAL		61.4863		58.9892		4.1		MS
COPPER, TOTAL		40.0519		36.0118		10.6		MS
LEAD, TOTAL		80.8106		82.6467		2.2		MS
TIN, TOTAL		50.2493		50.0352		0.4		MS
ZINC, TOTAL		90.6130		77.4742		15.6		MS

Comments:

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID:** LCSSZF29ICS0

Matrix: SOIL **SDG Name:** CTO423-7

QC Batch ID: ZF29ICS0

Concentration Units : mg/Kgdrywt

Analyte	TRUE	FOUND	% R	LIMITS (%)	
ANTIMONY	126.0	97.82	77.6	50	150
ARSENIC	225.0	216.25	96.1	80	120
COPPER	66.7	66.29	99.4	81	119
LEAD	223.0	220.39	98.8	82	118
TIN	164.0	166.35	101.4	74	126
ZINC	349.0	347.70	99.6	80	120

ICP SERIAL DILUTION

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SS0190001L

Matrix: SOIL **SDG Name:** CTO423-7

Lab Sample ID: SC3310-020L

Concentration Units: ug/L

Analyte	Sample Result	C	Dilution Result	C	% Difference	Q	M
ANTIMONY, TOTAL	0.46		0.35	J	23.9		MS
ARSENIC, TOTAL	15.23		16.22		6.5		MS
COPPER, TOTAL	21.40		22.31		4.3		MS
LEAD, TOTAL	70.54		71.65		1.6		MS
TIN, TOTAL	2.01		1.90	J	5.5		MS
ZINC, TOTAL	42.93		46.15		7.5		MS

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG09A

Date: 7/9/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements
6020 TUNE		1	17:43	
200.8 TUNE		1	17:49	
Cal Blank		1	18:49	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
Cal Std 1		1	18:57	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
Cal Std 2		1	19:06	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
Cal Std 3		1	19:14	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
Cal Std 4		1	19:23	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
ZZZZZZ		1	19:31	
ICV		1	19:40	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
ICB		1	19:48	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
PQL		1	19:57	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
ICSA		1	20:06	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
ICSAB		1	20:14	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
Blank		1	20:23	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
CCV		1	20:32	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
CCB		1	20:40	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
BLANK		1	20:49	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
BLANK		1	20:57	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
CCV		1	21:06	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
CCB		1	21:15	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
ZZZZZZ		25	21:23	
ZZZZZZ		5	21:32	
ZZZZZZ		25	21:40	
ZZZZZZ		5	21:49	
SC3310-006	X25SS0190001	20	21:57	Pb
SC3310-007	X25SS0200001	50	22:06	Cu Pb
SC3310-010	X25SS0220001	5	22:14	Sb Sn
SC3310-011	X25SS0230001	5	22:23	Sb Sn
SC3310-012	X25SS0240001	5	22:32	Sb Sn
BLANK		1	22:40	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
CCV		1	22:49	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
CCB		1	22:57	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
SC3310-017	X14SS1310001	5	23:06	Sb Sn
SC3310-018	X14SS1320001	5	23:15	Sb Sn
SC3310-019	X14SS1340001	5	23:23	Sb Sn
SC3310-019	X14SS1340001	20	23:32	Pb
SC3310-020	X17SS0190001	5	23:40	Sb Sn
SC3310-020L	X17SS0190001L	25	23:49	Sb Sn
SC3310-020A	X17SS0190001A	5	23:58	Sb Sn
SC3310-020S	X17SS0190001S	10	0:06	Sb Sn
SC3310-020P	X17SS0190001P	10	0:15	Sb Sn
BLANK		1	0:24	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
CCV		1	0:32	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
CCB		1	0:41	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
ZZZZZZ		1	0:49	
ZZZZZZ		1	0:58	
ZZZZZZ		1	1:06	
SC3310-013	X25SS0250001	5	1:15	Sb Sn
SC3310-014	FD06150901	5	1:24	Sb Sn
SC3310-015	FD06150902	5	1:32	Sb Sn

FORM XIV - IN

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG09A

Date: 7/10/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements
SC3310-016	X14SS1300001	5	1:41	Sb Sn
BLANK		1	1:50	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
CCV		1	1:58	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn
CCB		1	2:07	Al Sb Ca Cu Fe Pb Mg Mo K Na Sn

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: ICV

File: JZG09A Jul 09, 2009 19:40

Analyte	True	Found	%R (1)
ALUMINUM	400.0	386.90	96.7
ANTIMONY	20.0	18.07	90.3
CALCIUM	4000.0	3500.00	87.5•
COPPER	20.0	19.34	96.7
IRON	4000.0	3776.00	94.4
LEAD	20.0	18.43	92.2
MAGNESIUM	4000.0	3803.00	95.1
MOLYBDENUM	40.0	38.74	96.9
POTASSIUM	4000.0	3632.00	90.8
SODIUM	4000.0	3660.00	91.5
TIN	20.0	19.03	95.2

SAMPLE: CCV

File: JZG09A Jul 09, 2009 20:32

Analyte	True	Found	%R (1)
ALUMINUM	500.0	526.60	105.3
ANTIMONY	25.0	25.39	101.6
CALCIUM	5000.0	5003.00	100.1
COPPER	25.0	24.94	99.8
IRON	5000.0	5033.00	100.7
LEAD	25.0	24.29	97.2
MAGNESIUM	5000.0	5000.00	100.0
MOLYBDENUM	25.0	29.06	116.2•
POTASSIUM	5000.0	5012.00	100.2
SODIUM	5000.0	4944.00	98.9
TIN	25.0	24.26	97.0

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: CCV

File: JZG09A Jul 09, 2009 21:06

Analyte	True	Found	%R (1)
ALUMINUM	500.0	481.40	96.3
ANTIMONY	25.0	24.54	98.2
CALCIUM	5000.0	4801.00	96.0
COPPER	25.0	24.90	99.6
IRON	5000.0	4959.00	99.2
LEAD	25.0	23.81	95.2
MAGNESIUM	5000.0	4781.00	95.6
MOLYBDENUM	25.0	25.33	101.3
POTASSIUM	5000.0	4814.00	96.3
SODIUM	5000.0	4682.00	93.6
TIN	25.0	23.62	94.5

SAMPLE: CCV

File: JZG09A Jul 09, 2009 22:49

Analyte	True	Found	%R (1)
ALUMINUM	500.0	481.10	96.2
ANTIMONY	25.0	23.71	94.8
CALCIUM	5000.0	4718.00	94.4
COPPER	25.0	24.21	96.8
IRON	5000.0	4831.00	96.6
LEAD	25.0	23.83	95.3
MAGNESIUM	5000.0	4814.00	96.3
MOLYBDENUM	25.0	24.25	97.0
POTASSIUM	5000.0	4699.00	94.0
SODIUM	5000.0	4661.00	93.2
TIN	25.0	22.90	91.6

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: CCV

File: JZG09A Jul 10, 2009 0:32

Analyte	True	Found	%R (1)
ALUMINUM	500.0	508.60	101.7
ANTIMONY	25.0	23.66	94.6
CALCIUM	5000.0	4708.00	94.2
COPPER	25.0	24.22	96.9
IRON	5000.0	4990.00	99.8
LEAD	25.0	24.09	96.4
MAGNESIUM	5000.0	4754.00	95.1
MOLYBDENUM	25.0	24.62	98.5
POTASSIUM	5000.0	4625.00	92.5
SODIUM	5000.0	4645.00	92.9
TIN	25.0	22.81	91.2

SAMPLE: CCV

File: JZG09A Jul 10, 2009 1:58

Analyte	True	Found	%R (1)
ALUMINUM	500.0	496.30	99.3
ANTIMONY	25.0	24.28	97.1
CALCIUM	5000.0	4885.00	97.7
COPPER	25.0	24.50	98.0
IRON	5000.0	4995.00	99.9
LEAD	25.0	24.25	97.0
MAGNESIUM	5000.0	4799.00	96.0
MOLYBDENUM	25.0	24.75	99.0
POTASSIUM	5000.0	4812.00	96.2
SODIUM	5000.0	4729.00	94.6
TIN	25.0	23.21	92.8

(1) Control Limits: Mercury 80-120; Other Metals 90-110

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: PQL ✓

File: JZG09A Jul 09, 2009 19:57

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	55.18	92.0
ANTIMONY	0.2	0.20	100.0
CALCIUM	20.0	17.15	85.8
COPPER	0.2	0.20	100.0
IRON	20.0	15.09	75.4
LEAD	0.2	0.14	70.0
MAGNESIUM	20.0	18.56	92.8
MOLYBDENUM	1.0	1.05	105.0
POTASSIUM	200.0	189.20	94.6
SODIUM	200.0	195.30	97.7
TIN	0.2	0.20	100.0

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: ICB			**SAMPLE: CCB**			**SAMPLE: CCB**		
File: JZG09A Jul 09, 2009 19:48			File: JZG09A Jul 09, 2009 20:40			File: JZG09A Jul 09, 2009 21:15		
Analyte	**Result**	**C**	**Analyte**	**Result**	**C**	**Analyte**	**Result**	**C**
ALUMINUM	2.20	U	ALUMINUM	18.55	J	ALUMINUM	2.20	U
ANTIMONY	0.04	J	ANTIMONY	0.03	U	ANTIMONY	0.03	U
CALCIUM	3.90	U	CALCIUM	20.54		CALCIUM	3.90	U
COPPER	0.04	U	COPPER	0.04	U	COPPER	0.04	U
IRON	3.10	U	IRON	18.34	J	IRON	3.23	J
LEAD	-0.03	J	LEAD	0.02	U	LEAD	-0.04	J
MAGNESIUM	2.89	J	MAGNESIUM	22.52		MAGNESIUM	6.52	J
MOLYBDENUM	0.32	J	MOLYBDENUM	2.23		MOLYBDENUM	0.57	J
POTASSIUM	8.80	U	POTASSIUM	27.15	J	POTASSIUM	8.80	U
SODIUM	6.50	U	SODIUM	27.53	J	SODIUM	9.59	J
TIN	0.04	U	TIN	0.04	U	TIN	0.05	J

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: CCB
File: JZG09A Jul 09, 2009 22:57

Analyte	Result	C
ALUMINUM	2.28	J
ANTIMONY	0.03	U
CALCIUM	3.90	U
COPPER	0.04	U
IRON	3.10	U
LEAD	0.12	J
MAGNESIUM	3.37	J
MOLYBDENUM	0.20	J
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.04	U

SAMPLE: CCB
File: JZG09A Jul 10, 2009 0:41

Analyte	Result	C
ALUMINUM	17.22	J
ANTIMONY	0.03	U
CALCIUM	3.90	U
COPPER	0.04	U
IRON	34.66	
LEAD	0.12	J
MAGNESIUM	7.14	J
MOLYBDENUM	0.23	J
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.06	J

SAMPLE: CCB
File: JZG09A Jul 10, 2009 2:07

Analyte	Result	C
ALUMINUM	6.50	J
ANTIMONY	0.03	U
CALCIUM	3.90	U
COPPER	0.04	U
IRON	11.92	J
LEAD	0.02	U
MAGNESIUM	5.48	J
MOLYBDENUM	0.17	J
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.05	J

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: ICSA

File: JZG09A Jul 09, 2009 20:06

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	92800	92.8
ANTIMONY	0	0	
CALCIUM	100000	90100	90.1
COPPER	0	1	
IRON	100000	90620	90.6
LEAD	0	0	
MAGNESIUM	100000	90150	90.1
MOLYBDENUM	2000	1943	97.2
POTASSIUM	100000	92810	92.8
SODIUM	100000	92140	92.1
TIN	0	0	

SAMPLE: ICSAB

File: JZG09A Jul 09, 2009 20:14

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	97220	97.2
ANTIMONY	20	20	100.0
CALCIUM	100000	94490	94.5
COPPER	20	19	95.0
IRON	100000	93390	93.4
LEAD	20	21	105.0
MAGNESIUM	100000	94860	94.9
MOLYBDENUM	2000	2040	102.0
POTASSIUM	100000	97640	97.6
SODIUM	100000	96490	96.5
TIN	20	21	105.0

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services | **Client Field ID:** X17SS0190001S

Matrix: SOIL | **SDG Name:** CTO423-7

Percent Solids: 85.1 | **Lab Sample ID:** SC3310-020P

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	27.5420		0.2592		51.52	53.0	N	75	125	MS
ARSENIC, TOTAL	58.9892		8.5189		51.52	98.0		75	125	MS
COPPER, TOTAL	36.0118		11.9701		25.76	93.3		75	125	MS
LEAD, TOTAL	82.6467		39.4565		51.52	83.8		75	125	MS
TIN, TOTAL	50.0352		1.1265		51.52	94.9		75	125	MS
ZINC, TOTAL	77.4742		24.0128		51.52	103.8		75	125	MS

Comments:

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Client Field ID: X17SS0190001S

Matrix: SOIL

SDG Name: CTO423-7

Percent Solids: 85.1

Lab Sample ID: SC3310-020S

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	28.0976		0.2592		51.97	53.6	N	75	125	MS
ARSENIC, TOTAL	61.4863		8.5189		51.97	101.9		75	125	MS
COPPER, TOTAL	40.0519		11.9701		25.99	108.0		75	125	MS
LEAD, TOTAL	80.8106		39.4565		51.97	79.6		75	125	MS
TIN, TOTAL	50.2493		1.1265		51.97	94.5		75	125	MS
ZINC, TOTAL	90.6130		24.0128		51.97	128.2	N	75	125	MS

Comments:

5B

POST DIGEST SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Matrix: SOIL

Percent Solids: 85.1

Client Field ID: X17SS0190001S

SDG Name: CTO423-7

Lab Sample ID: SC3310-020A

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	2.4660		0.4634		2	100.1		75	125	MS
ZINC, TOTAL	62.3900		42.9300		20	97.3		75	125	MS

Comments:

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG10A

Date: 7/10/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
6020 TUNE		1	18:25							
200.8 TUNE		1	18:32							
Cal Blank		1	19:31	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
Cal Std 1		1	19:40	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
Cal Std 2		1	19:48	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
Cal Std 3		1	19:57	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
Cal Std 4		1	20:05	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
ZZZZZZ		1	20:14							
ICV		1	20:22	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
ICB		1	20:31	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
PQL		1	20:39	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
ICSA		1	20:48	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
ICSAB		1	20:57	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
Blank		1	21:06	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	21:14	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	21:23	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
BLANK		1	21:31	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
BLANK		1	21:40	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	21:49	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	21:57	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
ZZZZZZ		1	22:06							
ZZZZZZ		1	22:14							
ZZZZZZ		1	22:23							
ZZZZZZ		5	22:31							
ZZZZZZ		1	22:40							
ZZZZZZ		1	22:48							
ZZZZZZ		10	22:57							
ZZZZZZ		10	23:06							
ZZZZZZ		10	23:14							
BLANK		1	23:23	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	23:31	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	23:40	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
ZZZZZZ		1	23:48							
ZZZZZZ		1	23:57							
ZZZZZZ		1	0:06							
ZZZZZZ		1	0:14							
ZZZZZZ		5	0:23							
ZZZZZZ		5	0:32							
ZZZZZZ		5	0:40							
ZZZZZZ		5	0:49							
ZZZZZZ		5	0:58							
BLANK		1	1:06	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	1:15	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	1:23	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
ZZZZZZ		5	1:32							
ZZZZZZ		5	1:40							
ZZZZZZ		25	1:49							
SC3310-001	X25SS0010001	5	1:58							Sn
SC3310-002	X25SS0040001	5	2:06							Sn
SC3310-003	X25SS0080001	5	2:15							Sn

FORM XIV - IN

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG10A

Date: 7/11/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
SC3310-004	X25SS0160001	5	2:24							Sn
BLANK		1	2:32	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	2:41	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	2:50	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
BLANK		1	2:58	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
PQL		1	3:07	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	3:15	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	3:24	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
ZZZZZZ		5	3:32								
ZZZZZZ		5	3:41								
ZZZZZZ		5	3:50								
ZZZZZZ		5	3:58								
ZZZZZZ		5	4:07								
SC3310-009	X25SS0070001	5	4:15	Sb							
ZZZZZZ		10	4:24								
ZZZZZZ		10	4:32								
LCSSZF29ICS0		10	4:41	Sb							
BLANK		1	4:50	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	4:58	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	5:07	Al Sb	Ca	Fe	Mg	Mo	K	Na	Sn

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: ICV

File: JZG10A Jul 10, 2009 20:22

Analyte	True	Found	%R (1)
ALUMINUM	400.0	427.90	107.0
ANTIMONY	20.0	19.72	98.6
CALCIUM	4000.0	3900.00	97.5
IRON	4000.0	3959.00	99.0
MAGNESIUM	4000.0	4171.00	104.3
MOLYBDENUM	40.0	41.16	102.9
POTASSIUM	4000.0	3963.00	99.1
SODIUM	4000.0	3994.00	99.9
TIN	20.0	20.72	103.6

SAMPLE: CCV

File: JZG10A Jul 10, 2009 21:14

Analyte	True	Found	%R (1)
ALUMINUM	500.0	548.90	109.8
ANTIMONY	25.0	25.52	102.1
CALCIUM	5000.0	5126.00	102.5
IRON	5000.0	5086.00	101.7
MAGNESIUM	5000.0	5190.00	103.8
MOLYBDENUM	25.0	29.39	117.6•
POTASSIUM	5000.0	5049.00	101.0
SODIUM	5000.0	5109.00	102.2
TIN	25.0	25.21	100.8

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: CCV

File: JZG10A Jul 10, 2009 21:49

Analyte	True	Found	%R (1)
ALUMINUM	500.0	527.30	105.5
ANTIMONY	25.0	25.13	100.5
CALCIUM	5000.0	5042.00	100.8
IRON	5000.0	5032.00	100.6
MAGNESIUM	5000.0	5157.00	103.1
MOLYBDENUM	25.0	26.22	104.9
POTASSIUM	5000.0	5093.00	101.9
SODIUM	5000.0	5036.00	100.7
TIN	25.0	24.91	99.6

SAMPLE: CCV

File: JZG10A Jul 10, 2009 23:31

Analyte	True	Found	%R (1)
ALUMINUM	500.0	504.30	100.9
ANTIMONY	25.0	25.03	100.1
CALCIUM	5000.0	5121.00	102.4
IRON	5000.0	5122.00	102.4
MAGNESIUM	5000.0	5237.00	104.7
MOLYBDENUM	25.0	24.96	99.8
POTASSIUM	5000.0	5141.00	102.8
SODIUM	5000.0	5278.00	105.6
TIN	25.0	24.73	98.9

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: CCV

File: JZG10A Jul 11, 2009 1:15

Analyte	True	Found	%R (1)
ALUMINUM	500.0	521.70	104.3
ANTIMONY	25.0	25.75	103.0
CALCIUM	5000.0	5154.00	103.1
IRON	5000.0	5133.00	102.7
MAGNESIUM	5000.0	5269.00	105.4
MOLYBDENUM	25.0	24.54	98.2
POTASSIUM	5000.0	5160.00	103.2
SODIUM	5000.0	5326.00	106.5
TIN	25.0	25.62	102.5

SAMPLE: CCV

File: JZG10A Jul 11, 2009 2:41

Analyte	True	Found	%R (1)
ALUMINUM	500.0	525.00	105.0
ANTIMONY	25.0	25.54	102.2
CALCIUM	5000.0	5158.00	103.2
IRON	5000.0	5179.00	103.6
MAGNESIUM	5000.0	5229.00	104.6
MOLYBDENUM	25.0	24.72	98.9
POTASSIUM	5000.0	5182.00	103.6
SODIUM	5000.0	5310.00	106.2
TIN	25.0	25.78	103.1

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: CCV

File: JZG10A Jul 11, 2009 3:15

Analyte	True	Found	%R (1)
ALUMINUM	500.0	503.40	100.7
ANTIMONY	25.0	26.56	106.2
CALCIUM	5000.0	5139.00	102.8
IRON	5000.0	5155.00	103.1
MAGNESIUM	5000.0	5221.00	104.4
MOLYBDENUM	25.0	24.77	99.1
POTASSIUM	5000.0	5173.00	103.5
SODIUM	5000.0	5261.00	105.2
TIN	25.0	26.49	106.0

SAMPLE: CCV

File: JZG10A Jul 11, 2009 4:58

Analyte	True	Found	%R (1)
ALUMINUM	500.0	546.80	109.4
ANTIMONY	25.0	27.39	109.6
CALCIUM	5000.0	5543.00	110.9•
IRON	5000.0	5294.00	105.9
MAGNESIUM	5000.0	5596.00	111.9•
MOLYBDENUM	25.0	25.44	101.8
POTASSIUM	5000.0	5559.00	111.2•
SODIUM	5000.0	5675.00	113.5•
TIN	25.0	27.80	111.2•

NOT Quantitative for this compound

(1) Control Limits: Mercury 80-120; Other Metals 90-110

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: PQL

File: JZG10A Jul 10, 2009 20:39

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	63.15	105.3
ANTIMONY	0.2	0.22	110.0
CALCIUM	20.0	20.83	104.1
IRON	20.0	20.51	102.6
MAGNESIUM	20.0	20.76	103.8
MOLYBDENUM	1.0	1.12	112.0
POTASSIUM	200.0	210.10	105.1
SODIUM	200.0	215.00	107.5
TIN	0.2	0.24	120.0

SAMPLE: PQL

File: JZG10A Jul 11, 2009 03:07

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	64.48	107.5
ANTIMONY	0.2	0.22	110.0
CALCIUM	20.0	17.67	88.4
IRON	20.0	29.44	147.2
MAGNESIUM	20.0	18.37	91.9
MOLYBDENUM	1.0	1.01	101.0
POTASSIUM	200.0	223.00	111.5
SODIUM	200.0	212.70	106.3
TIN	0.2	0.24	120.0

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: ICB
File: JZG10A Jul 10, 2009 20:31

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.03	U
CALCIUM	3.90	U
IRON	3.10	U
MAGNESIUM	2.16	J
MOLYBDENUM	0.34	J
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.04	J

SAMPLE: CCB
File: JZG10A Jul 10, 2009 21:23

Analyte	Result	C
ALUMINUM	21.60	J
ANTIMONY	0.03	U
CALCIUM	21.06	
IRON	25.21	
MAGNESIUM	22.68	
MOLYBDENUM	2.39	
POTASSIUM	31.79	J
SODIUM	23.16	J
TIN	0.05	J

SAMPLE: CCB
File: JZG10A Jul 10, 2009 21:57

Analyte	Result	C
ALUMINUM	6.40	J
ANTIMONY	0.03	J
CALCIUM	7.26	J
IRON	10.16	J
MAGNESIUM	8.24	J
MOLYBDENUM	0.81	J
POTASSIUM	12.96	J
SODIUM	8.65	J
TIN	0.06	J

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: CCB
File: JZG10A Jul 10, 2009 23:40

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.04	J
CALCIUM	3.90	U
IRON	4.24	J
MAGNESIUM	3.80	J
MOLYBDENUM	0.33	J
POTASSIUM	8.80	U
SODIUM	-8.75	J
TIN	0.09	J

SAMPLE: CCB
File: JZG10A Jul 11, 2009 1:23

Analyte	Result	C
ALUMINUM	7.08	J
ANTIMONY	0.03	U
CALCIUM	3.90	U
IRON	17.46	J
MAGNESIUM	3.30	J
MOLYBDENUM	0.25	J
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.06	J

SAMPLE: CCB
File: JZG10A Jul 11, 2009 2:50

Analyte	Result	C
ALUMINUM	12.86	J
ANTIMONY	0.03	J
CALCIUM	3.90	U
IRON	29.72	
MAGNESIUM	5.59	J
MOLYBDENUM	0.21	J
POTASSIUM	13.45	J
SODIUM	6.50	U
TIN	0.06	J

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: CCB

File: JZG10A Jul 11, 2009 3:24

Analyte	Result	C
ALUMINUM	2.60	J
ANTIMONY	0.03	U
CALCIUM	3.90	U
IRON	9.73	J
MAGNESIUM	2.00	U
MOLYBDENUM	0.19	J
POTASSIUM	8.80	U
SODIUM	-9.91	J
TIN	0.05	J

SAMPLE: CCB

File: JZG10A Jul 11, 2009 5:07

Analyte	Result	C
ALUMINUM	4.71	J
ANTIMONY	0.04	J
CALCIUM	3.90	U
IRON	11.66	J
MAGNESIUM	2.00	U
MOLYBDENUM	0.22	J
POTASSIUM	11.92	J
SODIUM	12.13	J
TIN	0.07	J

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: ICSA

File: JZG10A Jul 10, 2009 20:48

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	99130	99.1
ANTIMONY	0	0	
CALCIUM	100000	95750	95.8
IRON	100000	94140	94.1
MAGNESIUM	100000	96440	96.4
MOLYBDENUM	2000	2001	100.1
POTASSIUM	100000	97750	97.8
SODIUM	100000	98180	98.2
TIN	0	0	

SAMPLE: ICSAB

File: JZG10A Jul 10, 2009 20:57

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	100800	100.8
ANTIMONY	20	20	100.0
CALCIUM	100000	98150	98.2
IRON	100000	96230	96.2
MAGNESIUM	100000	98670	98.7
MOLYBDENUM	2000	2090	104.5
POTASSIUM	100000	100300	100.3
SODIUM	100000	100700	100.7
TIN	20	22	110.0

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG11A

Date: 7/11/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements							
6020 TUNE		1	10:13								
Cal Blank		1	11:11	Al	Ca	Fe	Mg	Mo	K	Na	Sn
Cal Std 1		1	11:19	Al	Ca	Fe	Mg	Mo	K	Na	Sn
Cal Std 2		1	11:28	Al	Ca	Fe	Mg	Mo	K	Na	Sn
Cal Std 3		1	11:36	Al	Ca	Fe	Mg	Mo	K	Na	Sn
Cal Std 4		1	11:45	Al	Ca	Fe	Mg	Mo	K	Na	Sn
ZZZZZZ		1	11:53								
ICV		1	12:02	Al	Ca	Fe	Mg	Mo	K	Na	Sn
ICB		1	12:11	Al	Ca	Fe	Mg	Mo	K	Na	Sn
PQL		1	12:19	Al	Ca	Fe	Mg	Mo	K	Na	Sn
ICSA		1	12:28	Al	Ca	Fe	Mg	Mo	K	Na	Sn
ICSAB		1	12:37	Al	Ca	Fe	Mg	Mo	K	Na	Sn
Blank		1	12:45	Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	12:54	Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	13:02	Al	Ca	Fe	Mg	Mo	K	Na	Sn
BLANK		1	13:11	Al	Ca	Fe	Mg	Mo	K	Na	Sn
BLANK		1	13:20	Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	13:28	Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	13:37	Al	Ca	Fe	Mg	Mo	K	Na	Sn
PBSZF29ICS0		5	13:45								Sn
SC3310-005	X25SS0180001	5	13:54								Sn
SC3310-006	X25SS0190001	5	14:03								Sn
SC3310-007	X25SS0200001	5	14:11								Sn
SC3310-008	X25SS0210001	5	14:20								Sn
SC3310-009	X25SS0070001	5	14:28								Sn
ZZZZZZ		5	14:37								
LCSSZF29ICS0		10	14:45								Sn
ZZZZZZ		10	14:54								
BLANK		1	15:02	Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	15:11	Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	15:20	Al	Ca	Fe	Mg	Mo	K	Na	Sn

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: PQL

File: JZG11A Jul 11, 2009 12:19

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	60.69	101.2
CALCIUM	20.0	19.46	97.3
IRON	20.0	19.79	98.9
MAGNESIUM	20.0	21.72	108.6
MOLYBDENUM	1.0	1.13	113.0
POTASSIUM	200.0	212.00	106.0
SODIUM	200.0	211.20	105.6
TIN	0.2	0.22	110.0

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: ICV ✓

File: JZG11A Jul 11, 2009 12:02

Analyte	True	Found	%R (1)
ALUMINUM	400.0	420.20	105.1
CALCIUM	4000.0	3826.00	95.7
IRON	4000.0	3908.00	97.7
MAGNESIUM	4000.0	4120.00	103.0
MOLYBDENUM	40.0	41.30	103.3
POTASSIUM	4000.0	3934.00	98.4
SODIUM	4000.0	3995.00	99.9
TIN	20.0	20.75	103.8

SAMPLE: CCV X

File: JZG11A Jul 11, 2009 12:54

Analyte	True	Found	%R (1)
ALUMINUM	500.0	586.00	117.2•
CALCIUM	5000.0	5391.00	107.8
IRON	5000.0	5138.00	102.8
MAGNESIUM	5000.0	5516.00	110.3
MOLYBDENUM	25.0	31.21	124.8•
POTASSIUM	5000.0	5273.00	105.5
SODIUM	5000.0	5484.00	109.7
TIN	25.0	26.09	104.4

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: CCV

File: JZG11A Jul 11, 2009 13:28

Analyte	True	Found	%R (1)
ALUMINUM	500.0	531.40	106.3
CALCIUM	5000.0	5099.00	102.0
IRON	5000.0	4949.00	99.0
MAGNESIUM	5000.0	5378.00	107.6
MOLYBDENUM	25.0	26.00	104.0
POTASSIUM	5000.0	5131.00	102.6
SODIUM	5000.0	5306.00	106.1
TIN	25.0	25.11	100.4

SAMPLE: CCV

File: JZG11A Jul 11, 2009 15:11

Analyte	True	Found	%R (1)
ALUMINUM	500.0	508.80	101.8
CALCIUM	5000.0	4956.00	99.1
IRON	5000.0	4918.00	98.4
MAGNESIUM	5000.0	5116.00	102.3
MOLYBDENUM	25.0	25.49	102.0
POTASSIUM	5000.0	4884.00	97.7
SODIUM	5000.0	5100.00	102.0
TIN	25.0	24.07	96.3

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: ICB

File: JZG11A Jul 11, 2009 12:11

Analyte	Result	C
ALUMINUM	2.20	U
CALCIUM	4.11	J
IRON	4.21	J
MAGNESIUM	5.12	J
MOLYBDENUM	0.37	J
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.05	J

SAMPLE: CCB

File: JZG11A Jul 11, 2009 13:02

Analyte	Result	C
ALUMINUM	22.76	J
CALCIUM	25.07	
IRON	28.12	
MAGNESIUM	26.11	
MOLYBDENUM	2.57	
POTASSIUM	49.25	J
SODIUM	32.23	J
TIN	0.05	J

SAMPLE: CCB

File: JZG11A Jul 11, 2009 13:37

Analyte	Result	C
ALUMINUM	4.06	J
CALCIUM	6.45	J
IRON	6.61	J
MAGNESIUM	8.57	J
MOLYBDENUM	0.79	J
POTASSIUM	16.66	J
SODIUM	11.92	J
TIN	0.04	J

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: CCB

File: JZG11A Jul 11, 2009 15:20

Analyte	Result	C
ALUMINUM	7.42	J
CALCIUM	7.43	J
IRON	18.08	J
MAGNESIUM	7.41	J
MOLYBDENUM	0.47	J
POTASSIUM	20.85	J
SODIUM	8.50	J
TIN	0.10	J

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-7

Concentration Units: ug/L

SAMPLE: ICSA

File: JZG11A Jul 11, 2009 12:28

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	99000	99.0
CALCIUM	100000	97130	97.1
IRON	100000	92440	92.4
MAGNESIUM	100000	97600	97.6
MOLYBDENUM	2000	2022	101.1
POTASSIUM	100000	99190	99.2
SODIUM	100000	102500	102.5
TIN	0	0	

SAMPLE: ICSAB

File: JZG11A Jul 11, 2009 12:37

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	97650	97.7
CALCIUM	100000	95850	95.9
IRON	100000	92380	92.4
MAGNESIUM	100000	96460	96.5
MOLYBDENUM	2000	2042	102.1
POTASSIUM	100000	98130	98.1
SODIUM	100000	98300	98.3
TIN	20	21	105.0

Quality Control Report

Blank Sample Summary Report

Total Solids

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG65687	ASTM D2216	30-JUN-09	29-JUN-09	U 1 %	1 %
MBLANK	WG65689	ASTM D2216	30-JUN-09	29-JUN-09	U 1 %	1 %

Quality Control Report

Laboratory Control Sample Summary Report

Total Solids

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG65687-3	LCSD	WG65687	30-JUN-09	29-JUN-09	%	90	90.	100	80-120	0
WG65687-2	LCS	WG65687	30-JUN-09	29-JUN-09	%	90	90.	100	80-120	
WG65689-2	LCS	WG65689	30-JUN-09	29-JUN-09	%	90	90.	100	80-120	
WG65689-3	LCSD	WG65689	30-JUN-09	29-JUN-09	%	90	90.	100	80-120	0

Quality Control Report

Duplicate Sample Summary Report

Total Solids

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG65689-4	SC3310-20	WG65689	30-JUN-09	%	85.	85.	0	20
WG65687-5	SC3310-6	WG65687	30-JUN-09	%	81.	80.	2	20

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: **R.BASINSKI** **DATE:** **September 14, 2009**

FROM: **MEGAN CARSON** **COPIES:** **DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – SELECT METALS AND TOTAL SOLIDS**
NSF INDIAN HEAD
SAMPLE DELIVERY GROUP (SDG) – CTO423-8

SAMPLES: 20/Soil/

FD06160901	X14SB0840102	X14SB1020203	X14SB1110102
X14SS1350001	X14SS1380001	X14SS1390001	X14SS1400001
X14SS1410001	X14SS1420001	X14SS1430001	X15SD0300006
X15SD0330006	X16SS0250001	X17SB0140102	X17SB0250102
X17SS0160001	X17SS0220001	X17SS0240001	X17SS0250001

Overview

The sample set for NSF Indian Head, SDG CTO423-8 consists of twenty (20) soil environmental samples. This SDG contains one field duplicate pair: FD06160901/ X14SS0840102.

The samples were collected by Tetra Tech NUS, Inc. on June 11th, 12th, 14th, 16th, 17th, 2009 and analyzed by Katahdin analytical services under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Metals analyses were conducted using SW-846 methods 6020 and 3050B, and total solids by ASTM D2216.

Summary

All analytes were successfully analyzed. The findings offered in this report are based upon a general review of all available data. The data review was based on data completeness, holding times, calibration data, laboratory method/preparation blanks, interference check sample (ICS) results, matrix spike / matrix spike duplicate results, laboratory control sample (LCS) results, ICP/MS tune, ICP/MS internal standard recoveries, ICP serial dilution results, field duplicate results, detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems:

None.

Minor Problems:

- The following contaminant was detected in the laboratory method/preparation blanks at the following maximum concentration:

Analyte	Maximum Concentration	Action Level
Antimony	0.07 ug/L	0.035 mg/kg
Lead	1.86 ug/L	0.93 mg/kg
Tin	0.10 ug/L	0.05 mg/kg
Copper	0.44 ug/L	0.22 mg/kg

An action level of 5X the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot and dilution factors, if applicable, were taken into consideration when evaluating for blank contamination. Positive results less than the blank action level for the above compounds were qualified "B" as a result of blank contamination. Results for arsenic were not qualified based on an action level because of the negative result. Positive arsenic results were qualified as estimated (J).

- The matrix spike and matrix spike duplicate for sample X16SS0250001 had a low percent recovery for antimony and lead. Positive result for sample X16SS0250001 was qualified as estimated(J).

- The field duplicate pair FD06160901/ X14SS0840102 had a percent relative standard deviation greater than the quality control limit of 50% for antimony, arsenic, copper, lead, and tin. Positive results for these two samples were qualified as estimated (J).

Notes

Positive results below the reporting limit but above the method detection limit were qualified as estimated (J).

All samples in the SDG were analyzed at a 5X dilution.

The following samples were analyzed at dilutions to bring lead within calibration range:

Sample	Dilution Factor
FD06160901	50X
X14SB0840102	100X
X14SB1020203	20X
X14SB1110102	50X
X14SS1400001	10X
X17SS0250001	10X

The PQL standard analyzed on 6/13/09 at 18:35 had a 195% recovery for lead. No results were qualified as all sample results were >2x CRQL.

Executive Summary

Laboratory Performance: Method blanks and preparation blanks were found to contain contaminates.

Other Factors Affecting Data Quality: Matrix spikes were found to have several analytes out of control limits. Field duplicate non-compliances resulted in the qualification of data.

The data for these analyses were reviewed with reference to Region III modifications to the "National Functional Guidelines for Inorganic Data Validation", April 1993, and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories "(January 2006).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the DoD QSM."

Tetra Tech NUS
Megan Carson
Chemist/Data Validator

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Appendix A

Qualified Analytical Results

PROJ_NO: 00810	NSAMPLE	FD06160901			X14SB0840102			X14SB1020203			X14SB1110102		
SDG: CTO423-8	LAB_ID	SC3311-013			SC3311-012			SC3311-009			SC3311-010		
FRACTION: M	SAMP_DATE	6/16/2009			6/16/2009			6/17/2009			6/16/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	78.3			78.8			85.6			83.9		
	DUP_OF	X14SB0840102											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.46	B	A	0.88	B	A	0.18	B	A	0.6	B	A
ARSENIC		4	J	G	7.8	J	G	3.9			2.2		
COPPER		434	J	G	849	J	G	113			251		
LEAD		3590	J	G	6620	J	G	1220			2640		
TIN		77.6	J	G	131	J	G	29.3			139		
ZINC		39.4			53.9			25.8			9.8		

PROJ_NO: 00810 SDG: CTO423-8 FRACTION: M MEDIA: SOIL	NSAMPLE	X14SS1350001			X14SS1380001			X14SS1390001			X14SS1400001		
	LAB_ID	SC3311-001			SC3311-002			SC3311-003			SC3311-004		
	SAMP_DATE	6/16/2009			6/16/2009			6/16/2009			6/16/2009		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	86.1			84.8			84.0			81.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.28	B	A	0.14	B	A	0.14	B	A	0.32	B	A
ARSENIC		4.5			2.2			2.3			3		
COPPER		9.4			28.2			63.4			141		
LEAD		45.1			137			280			676		
TIN		1.6			2.8			4.9			81.8		
ZINC		30.5			33.8			25.4			20		

PROJ_NO: 00810	NSAMPLE	X14SS1410001			X14SS1420001			X14SS1430001			X15SD0300006		
SDG: CTO423-8	LAB_ID	SC3311-005			SC3311-008			SC3311-011			SC3311-007		
FRACTION: M	SAMP_DATE	6/16/2009			6/17/2009			6/17/2009			6/10/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	85.1			86.2			83.8			41.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.1	B	A	0.14	B	A	0.14	B	A	0.28	B	A
ARSENIC		1.2			4.8			3.8			5.8		
COPPER		13.6			9.8			20.3			36.1		
LEAD		405			11	B	A	166			37		
TIN		3			1.3	B	A	1.7			3.4		
ZINC		7			29.2			19.7			164		

PROJ_NO: 00810 SDG: CTO423-8 FRACTION: M MEDIA: SOIL	NSAMPLE	X15SD0330006			X16SS0250001			X17SB0140102			X17SB0250102		
	LAB_ID	SC3311-006			SC3311-020			SC3311-014			SC3311-019		
	SAMP_DATE	6/10/2009			6/13/2009			6/14/2009			6/14/2009		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	78.3			85.5			90.1			90.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.083	B	A	0.73	B	A	0.44	B	A	0.55	B	A
ARSENIC		0.36			4	J	D	5.5			4.6		
COPPER		2.1	B	A	8.8	J	D	11.8			10.9		
LEAD		5	B	A	159	J	D	77.6			87.5		
TIN		0.64	B	A	1.2	B	A	1.5			1.2	B	A
ZINC		9.3			29.4	J	D	25.4			24		

PROJ_NO: 00810	NSAMPLE	X17SS0160001			X17SS0220001			X17SS0240001			X17SS0250001		
SDG: CTO423-8	LAB_ID	SC3311-015			SC3311-016			SC3311-017			SC3311-018		
FRACTION: M	SAMP_DATE	6/11/2009			6/11/2009			6/11/2009			6/12/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	83.7			86.8			87.4			92.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.19	B	A	0.13	B	A	0.15	B	A	3.3	B	A
ARSENIC		5.1			3.5			3.9			5.1		
COPPER		9.6			8.2			7.2			26		
LEAD		12.2	B	A	7	B	A	10.3	B	A	479		
TIN		1.3	B	A	1	B	A	1.2	B	A	0.96	B	A
ZINC		19.5			13.7			14.8			20		

PROJ_NO: 00810	NSAMPLE	FD06160901			X14SB0840102			X14SB1020203			X14SB1110102		
SDG: CTO423-8	LAB_ID	SC3311-13			SC3311-12			SC3311-9			SC3311-10		
FRACTION: MISC	SAMP_DATE	6/16/2009			6/16/2009			6/17/2009			6/16/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	78.3			78.8			85.6			83.9		
	DUP_OF	X14SB0840102											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		78			79			86			84		

PROJ_NO: 00810	NSAMPLE	X14SS1350001			X14SS1380001			X14SS1390001			X14SS1400001		
SDG: CTO423-8	LAB_ID	SC3311-1			SC3311-2			SC3311-3			SC3311-4		
FRACTION: MISC	SAMP_DATE	6/16/2009			6/16/2009			6/16/2009			6/16/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	86.1			84.8			84.0			81.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		86			85			84			81		

PROJ_NO: 00810	NSAMPLE	X14SS1410001			X14SS1420001			X14SS1430001			X15SD0300006		
SDG: CTO423-8	LAB_ID	SC3311-5			SC3311-8			SC3311-11			SC3311-7		
FRACTION: MISC	SAMP_DATE	6/16/2009			6/17/2009			6/17/2009			6/10/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	85.1			86.2			83.8			41.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		85			86			84			41		

PROJ_NO: 00810	NSAMPLE	X15SD0330006			X16SS0250001			X17SB0140102			X17SB0250102		
SDG: CTO423-8	LAB_ID	SC3311-6			SC3311-20			SC3311-14			SC3311-19		
FRACTION: MISC	SAMP_DATE	6/10/2009			6/13/2009			6/14/2009			6/14/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	78.3			85.5			90.1			90.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		78			85			90			91		

PROJ_NO: 00810	NSAMPLE	X17SS0160001			X17SS0220001			X17SS0240001			X17SS0250001		
SDG: CTO423-8	LAB_ID	SC3311-15			SC3311-16			SC3311-17			SC3311-18		
FRACTION: MISC	SAMP_DATE	6/11/2009			6/11/2009			6/11/2009			6/12/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	83.7			86.8			87.4			92.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		84			87			87			92		

Appendix B

Results as Reported by the Laboratory

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** FD06160901

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 78.2 **Lab Sample ID:** SC3311-013

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.46		N	MS	5	0.12	0.02
7440-38-2	ARSENIC, TOTAL	4.0			MS	5	0.58	0.17
7440-50-8	COPPER, TOTAL	434			MS	50	5.8	1.27
7439-92-1	LEAD, TOTAL	3590		N	MS	50	1.2	0.35
7440-31-5	TIN, TOTAL	77.6			MS	5	0.58	0.22
7440-66-6	ZINC, TOTAL	39.4			MS	5	1.2	0.40

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SB0840102

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 78.8 **Lab Sample ID:** SC3311-012

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.88		N	MS	5	0.12	0.02
7440-38-2	ARSENIC, TOTAL	7.8			MS	5	0.59	0.18
7440-50-8	COPPER, TOTAL	849			MS	100	12	2.58
7439-92-1	LEAD, TOTAL	6620		N	MS	100	2.3	0.70
7440-31-5	TIN, TOTAL	131			MS	5	0.59	0.22
7440-66-6	ZINC, TOTAL	53.9			MS	5	1.2	0.41

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SB1020203

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 85.6 **Lab Sample ID:** SC3311-009

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.18		N	MS	5	0.080	0.02
7440-38-2	ARSENIC, TOTAL	3.9			MS	5	0.40	0.12
7440-50-8	COPPER, TOTAL	113			MS	5	0.40	0.09
7439-92-1	LEAD, TOTAL	1220		N	MS	20	0.32	0.10
7440-31-5	TIN, TOTAL	29.3			MS	5	0.40	0.15
7440-66-6	ZINC, TOTAL	25.8			MS	5	0.80	0.28

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SB1110102

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 83.9 **Lab Sample ID:** SC3311-010

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.60		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	2.2			MS	5	0.50	0.15
7440-50-8	COPPER, TOTAL	251			MS	5	0.50	0.11
7439-92-1	LEAD, TOTAL	2640		N	MS	50	1.0	0.30
7440-31-5	TIN, TOTAL	139			MS	5	0.50	0.19
7440-66-6	ZINC, TOTAL	9.8			MS	5	1.0	0.35

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS1350001

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 86.1 **Lab Sample ID:** SC3311-001

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.28		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	4.5			MS	5	0.54	0.16
7440-50-8	COPPER, TOTAL	9.4			MS	5	0.54	0.12
7439-92-1	LEAD, TOTAL	45.1		N	MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.6			MS	5	0.54	0.20
7440-66-6	ZINC, TOTAL	30.5			MS	5	1.1	0.38

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS1380001

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 84.8 **Lab Sample ID:** SC3311-002

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.14		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	2.2			MS	5	0.55	0.16
7440-50-8	COPPER, TOTAL	28.2			MS	5	0.55	0.12
7439-92-1	LEAD, TOTAL	137		N	MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	2.8			MS	5	0.55	0.21
7440-66-6	ZINC, TOTAL	33.8			MS	5	1.1	0.38

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS1390001

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 84.0 **Lab Sample ID:** SC3311-003

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.14		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	2.3			MS	5	0.56	0.17
7440-50-8	COPPER, TOTAL	63.4			MS	5	0.56	0.12
7439-92-1	LEAD, TOTAL	280		N	MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	4.9			MS	5	0.56	0.21
7440-66-6	ZINC, TOTAL	25.4			MS	5	1.1	0.39

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS1400001

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 81.0 **Lab Sample ID:** SC3311-004

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.32		N	MS	5	0.12	0.02
7440-38-2	ARSENIC, TOTAL	3.0			MS	5	0.59	0.18
7440-50-8	COPPER, TOTAL	141			MS	5	0.59	0.13
7439-92-1	LEAD, TOTAL	676		N	MS	10	0.24	0.07
7440-31-5	TIN, TOTAL	81.8			MS	5	0.59	0.23
7440-66-6	ZINC, TOTAL	20.0			MS	5	1.2	0.42

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS1410001

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 85.1 **Lab Sample ID:** SC3311-005

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.1	J	N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	1.2			MS	5	0.52	0.16
7440-50-8	COPPER, TOTAL	13.6			MS	5	0.52	0.12
7439-92-1	LEAD, TOTAL	405		N	MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	3.0			MS	5	0.52	0.20
7440-66-6	ZINC, TOTAL	7.0			MS	5	1.0	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS1420001

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 86.2 **Lab Sample ID:** SC3311-008

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.14		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	4.8			MS	5	0.53	0.16
7440-50-8	COPPER, TOTAL	9.8			MS	5	0.53	0.12
7439-92-1	LEAD, TOTAL	11.0		N	MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.3			MS	5	0.53	0.20
7440-66-6	ZINC, TOTAL	29.2			MS	5	1.1	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X14SS1430001

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 83.8 **Lab Sample ID:** SC3311-011

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.14		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	3.8			MS	5	0.56	0.17
7440-50-8	COPPER, TOTAL	20.3			MS	5	0.56	0.12
7439-92-1	LEAD, TOTAL	166		N	MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.7			MS	5	0.56	0.21
7440-66-6	ZINC, TOTAL	19.7			MS	5	1.1	0.39

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SD0300006

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 41.5 **Lab Sample ID:** SC3311-007

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.28		N	MS	5	0.23	0.05
7440-38-2	ARSENIC, TOTAL	5.8			MS	5	1.2	0.35
7440-50-8	COPPER, TOTAL	36.1			MS	5	1.2	0.26
7439-92-1	LEAD, TOTAL	37.0		N	MS	5	0.23	0.07
7440-31-5	TIN, TOTAL	3.4			MS	5	1.2	0.44
7440-66-6	ZINC, TOTAL	164			MS	5	2.3	0.82

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X15SD0330006

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 78.3 **Lab Sample ID:** SC3311-006

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.04	J	N	MS	5	0.083	0.02
7440-38-2	ARSENIC, TOTAL	0.36	J		MS	5	0.41	0.12
7440-50-8	COPPER, TOTAL	2.1			MS	5	0.41	0.09
7439-92-1	LEAD, TOTAL	5.0		N	MS	5	0.083	0.02
7440-31-5	TIN, TOTAL	0.64			MS	5	0.41	0.16
7440-66-6	ZINC, TOTAL	9.3			MS	5	0.83	0.29

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X16SS0250001

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 85.5 **Lab Sample ID:** SC3311-020

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.73		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	4.0			MS	5	0.54	0.16
7440-50-8	COPPER, TOTAL	8.8			MS	5	0.54	0.12
7439-92-1	LEAD, TOTAL	159		N	MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.2			MS	5	0.54	0.21
7440-66-6	ZINC, TOTAL	29.4			MS	5	1.1	0.38

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SB0140102

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 90.1 **Lab Sample ID:** SC3311-014

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.44		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	5.5			MS	5	0.53	0.16
7440-50-8	COPPER, TOTAL	11.8			MS	5	0.53	0.12
7439-92-1	LEAD, TOTAL	77.6		N	MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.5			MS	5	0.53	0.20
7440-66-6	ZINC, TOTAL	25.4			MS	5	1.1	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SB0250102

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 90.9 **Lab Sample ID:** SC3311-019

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.55		N	MS	5	0.099	0.02
7440-38-2	ARSENIC, TOTAL	4.6			MS	5	0.50	0.15
7440-50-8	COPPER, TOTAL	10.9			MS	5	0.50	0.11
7439-92-1	LEAD, TOTAL	87.5		N	MS	5	0.099	0.03
7440-31-5	TIN, TOTAL	1.2			MS	5	0.50	0.19
7440-66-6	ZINC, TOTAL	24.0			MS	5	0.99	0.35

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SS0160001

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 83.7 **Lab Sample ID:** SC3311-015

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.19		N	MS	5	0.099	0.02
7440-38-2	ARSENIC, TOTAL	5.1			MS	5	0.49	0.15
7440-50-8	COPPER, TOTAL	9.6			MS	5	0.49	0.11
7439-92-1	LEAD, TOTAL	12.2		N	MS	5	0.099	0.03
7440-31-5	TIN, TOTAL	1.3			MS	5	0.49	0.19
7440-66-6	ZINC, TOTAL	19.5			MS	5	0.99	0.35

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SS0220001

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 86.8 **Lab Sample ID:** SC3311-016

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.13		N	MS	5	0.085	0.02
7440-38-2	ARSENIC, TOTAL	3.5			MS	5	0.43	0.13
7440-50-8	COPPER, TOTAL	8.2			MS	5	0.43	0.09
7439-92-1	LEAD, TOTAL	7.0		N	MS	5	0.085	0.03
7440-31-5	TIN, TOTAL	1.0			MS	5	0.43	0.16
7440-66-6	ZINC, TOTAL	13.7			MS	5	0.85	0.30

Bottle ID: A

Comments:

I

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SS0240001

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 87.4 **Lab Sample ID:** SC3311-017

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.15		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	3.9			MS	5	0.52	0.16
7440-50-8	COPPER, TOTAL	7.2			MS	5	0.52	0.12
7439-92-1	LEAD, TOTAL	10.3		N	MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.2			MS	5	0.52	0.20
7440-66-6	ZINC, TOTAL	14.8			MS	5	1.0	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SS0250001

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 92.3 **Lab Sample ID:** SC3311-018

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	3.3		N	MS	5	0.091	0.02
7440-38-2	ARSENIC, TOTAL	5.1			MS	5	0.46	0.14
7440-50-8	COPPER, TOTAL	26.0			MS	5	0.46	0.10
7439-92-1	LEAD, TOTAL	479		N	MS	10	0.18	0.05
7440-31-5	TIN, TOTAL	0.96			MS	5	0.46	0.17
7440-66-6	ZINC, TOTAL	20.0			MS	5	0.91	0.32

Bottle ID: A

Comments:

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-1
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X14SS1350001	SL	16-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86 %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-2
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X14SS1380001	SL	16-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	85. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-3
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X14SS1390001	SL	16-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	84. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-4
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X14SS1400001	SL	16-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	81. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-5
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X14SS1410001	SL	16-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	85. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-6
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X15SD0330006	SL	10-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	78. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-7
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X15SD0300006	SL	10-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	41. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-8
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X14SS1420001	SL	17-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-9
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X14SB1020203	SL	17-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-10
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X14SB1110102	SL	16-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	84. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-11
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X14SS1430001	SL	17-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	84. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-12
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X14SB0840102	SL	16-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	79. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-13
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
FD06160901	SL	16-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	78. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-14
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X17SB0140102	SL	14-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	90. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-15
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X17SS0160001	SL	11-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	84. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-16
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X17SS0220001	SL	11-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	87. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-17
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X17SS0240001	SL	11-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	87. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-18
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X17SS0250001	SL	12-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	92. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-19
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X17SB0250102	SL	14-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	91. %	1	D2216	WG65643	29-JUN-09 10:00:00	ASTM D2216	26-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3311-20
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-8

Sample Description	Matrix	Date Sampled	Date Received
X16SS0250001	SL	13-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	85. %	1	D2216	WG65656	29-JUN-09 10:25:00	ASTM D2216	26-JUN-09	JF	

Appendix C

Support Documentation

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER No 028254 | PAGE 2 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112600810	Indian Head	R. Bubnis	4129218308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4129430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 863138879042		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ]
[ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G): G	PRESERVATIVE USED: 4°C	TYPE OF ANALYSIS: TCL VOC SW 8260B / 6030/3050B	COMMENTS
6/15	1345	X2555007 0001	007	0	1	SO	G	1	1			
	1325	" 022 0001	022					1	1			
	1310	" 023 0001	023					1	1			
	1250	" 024 0001	024					1	1			
	1230	" 025 0001	025					1	1			
	0000	FD06150901	QC					1	1			
	0000	FD06150902	QC					1	1			
6/16	950	X1455130 0001	130					1	1			
	950	" 131 0001	131					1	1			
	935	" 132 0001	132					1	1			
	1035	" 134 0001	134					1	1			
✓	1030	" 135 0001	135					1	1			
✓	1100	" 136 0001	136					1	1			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER Nº 028255 | PAGE 3 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Businski	4129218308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		FedEx/863138879042		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G): G	PRESERVATIVE USED: 4°C	TYPE OF ANALYSIS: Metals SW846 6020B/3050B	COMMENTS
6/16	1005	X145S139 0001	139	0	1	SO	G	1	1			
	1010	" 140 0001	140					1	1			
	1015	" 141 0001	141					1	1			
6/10	1517	X15SD033 0006	033	0	.5	SD	G	1	1			
6/10	1355	X15SD030 0006	030	0	.5	SD	G	1	1			
6/17	910	X145S142 0001	142	0	1	SO	G	1	1			
6/17	905	X145B102 0203	102	2	3			1	1			
6/16	1125	X145B111 0102	111	1	2			1	1			
6/17	920	X145S143 0001	143	0	1			1	1			
6/16	1110	X145B084 0102	084	1	2			1	1			
6/16	0000	FD06160901	QC	—	—			1	1			
6/14	1500	X175B014 0102	014	1	2			1	1			
6/11	1525	X175S016 0001	016	0	1			1	1			

1. RELINQUISHED BY	DATE 6-18-09	TIME 1700	1. RECEIVED BY	DATE 6-19-09	TIME 1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028256 | PAGE 4 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Bwinski	4129218308	Katahdin Labs / Angela Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 8631 3887 9042		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS: Metals SW846 6020 / 8050B / SW846 PAHs / SW846 8270	COMMENTS
									G	4°C		
6/11	1500	X175501900001	019	0	1	SO	G	3	3			MS/MSD
6/11	1530	" 0220001	022	↓	↓	↓	↓	1	1			
6/11	1545	" 0240001	024					1	1			
6/12	1020	" 0250001	025					1	1			
6/14	1440	X175B0250102	025	1	2			1	1			
6/12	1040	X1755027000 1	027	0	1			1	1			
6/12	1050	X175502850001	028	0	1			1	1			
6/11	0000	FD0611090 1	QC					1	1			
6/13	1515	X16550 1830001	042					1	1			
6/14	900	" 0540001	054					1	1			
	855	" 0570001	057					1	1			
	930	" 0610001	061					1	1			
↓	1040	" 0730001	073	↓	↓	↓	↓	1	1			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028258 | PAGE 6 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	412921 8308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
J. Doerdt		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		Fed Ex/863388790 72		Scarborough, ME 04074

STANDARD TAT ☒ RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS: M 8015 8260B/3050B PH TOC LEC PAH	COMMENTS
									G	4°C		
6/13	1140	X1655008 0001	008	0	1	SO	G	1	1			
|	1315	" 013 0001	013	|	|	|	|	1	1			
|	1245	" 017 0001	017	|	|	|	|	1	1			
|	1255	" 020 0001	020	|	|	|	|	1	1			
✓	1345	" 025 0001	025	|	|	|	|	3	3			MS/MSD
|	1425	" 032 0001	032	↓	↓	↓	↓	1	1			
|	0000	FD06130901	QC	0	1	SO	G	1	1			
6/15	1355	X2555032 0001	032					2		2		
|	1255	" 019 0001	019					2		2		
|	1305	" 013 0001	013					2		2		
↓	1335	" 006 0001	006					~~2~~		2		
6/11	1500	X1755 0190001	019					6		~~6~~ 6		~~MS/MSD~~ MS/MSD
6/15	0000	FD06150903	QC					2		~~2~~ 2		

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
J. Doerdt	6-18-09	1700		6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: X1755019 0001 - MS/MSD 6 jars (2.5oz)

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CTO 423 NSF INDIAN HEAD
SDG: CTO423-8
SC3311

Sample Receipt

The following samples were received on June 19, 2009 and were logged in under Katahdin Analytical Services work order numbers SC3311 for a hardcopy due date of July 08, 2009.

KATAHDIN Sample No.	TTNUS Sample Identification
SC3311-1	X14SS1350001
SC3311-2	X14SS1380001
SC3311-3	X14SS1390001
SC3311-4	X14SS1400001
SC3311-5	X14SS1410001
SC3311-6	X15SD0330006
SC3311-7	X15SD0300006
SC3311-8	X14SS1420001
SC3311-9	X14SB1020203
SC3311-10	X14SB1110102
SC3311-11	X14SS1430001
SC3311-12	X14SB0840102
SC3311-13	FD06160901
SC3311-14	X17SB0140102
SC3311-15	X17SS0160001
SC3311-16	X17SS0220001
SC3311-17	X17SS0240001
SC3311-18	X17SS0250001
SC3311-19	X17SB0250102
SC3311-20	X16SS0250001

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in this narrative or in the Report of Analysis.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Andrea J. Colby**. This narrative is an integral part of the Report of Analysis.

Metals Analysis

The samples of SDG CTO423-8 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846. 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA.

Inductively-Coupled Plasma Mass Spectrometric Analysis (ICP-MS)

Solid-matrix Katahdin Sample Numbers SC3311-(1-20) were digested for ICP-MS analysis on 06/30/09 (QC Batch ZF30ICS0) in accordance with USEPA Method 3050B. Katahdin Sample Number SC3311-20 was prepared with duplicate matrix-spiked aliquots. The measured tin concentration in the preparation blank in this batch exceeds the laboratory's acceptance limit. Laboratory testing has determined that this tin contamination comes from one of the reagents used in the digestion process.

ICP-MS analyses of SDG CTO423-8 sample digestates were performed using an Agilent 7500 ICP-MS spectrometer in accordance with USEPA Method 6020. Results for all standards and samples are reported using the mean of 3 replicate measurements. All samples were analyzed within holding times and all analytical run QC criteria were met, with the following exceptions:

The measured lead concentrations of some of the CCBs analyzed in runs JZG11A and JZG13A and the ICB in run JZG13A are greater than the laboratory's practical quantitation limit (PQL) for lead. Lead results that are less than the PQL or more than ten times the measured CCB concentrations have been reported from these runs.

The measured lead recovery of the PQL standard analyzed at 18:35 in run JZG13A is higher than the laboratory's acceptance limit. Associated lead results that are less than the PQL or more than ten times the measured PQL concentrations have been reported from this run.

Internal standard recoveries for ICP-MS analyses can be found in the raw data section of the accompanying data package. The following table indicates which analytes are associated with each internal standard element.

Internal Standard Element	Associated Analytes
Scandium	Sodium, Magnesium, Aluminum, Potassium, Calcium
Germanium	Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel, Copper, Zinc, Arsenic, Selenium, Silver, Cadmium
Terbium	Antimony, Barium, Tin
Bismuth	Thallium, Lead

Instrument tuning information can also be found in the raw data section in the report labeled "6020 QC Tune Report". The relative standard deviation was determined from 4 replicate measurements. The peak width was measured at 10% of the peak height.

Matrix QC Summary

The measured recoveries of antimony and lead in one or both of the matrix-spiked aliquots of Katahdin Sample Number SC3311-20 are outside the laboratory's acceptance criteria (75% - 125% recovery of the added element, if the native concentration is less than four times the amount added). The measure recoveries of antimony and lead in a post-digestion matrix spike of this sample are within the laboratory's acceptance criteria.

The matrix spike duplicate analysis of Katahdin Sample Number SC3311-20 is within the laboratory's acceptance limit (<20% relative difference between duplicate matrix-spiked aliquots) for all analytes.

The serial dilution analysis of Katahdin Sample Number SC3311-20 is within the laboratory's acceptance limit (<10% relative percent difference, if the concentration in the original sample is greater than 50 times the MDL) for all analytes.

Reporting of Metals Results

Analytical results for client samples, matrix QC samples (duplicates and matrix spikes), and batch QC samples (preparation blanks and laboratory control samples) have been reported down to the laboratory's method detection limits (MDLs). These MDLs have been adjusted for each sample based on the sample amounts used in preparation and analysis. Analytical results that are below the MDLs are flagged with "U" in the C-qualifier column.

Analytical results for instrument run QC samples (ICVs, ICBs, etc.) have been reported down to the laboratory's instrument detection limits (IDLs).

IDLs, MDLs, and PQLs are listed on Form 10 of the accompanying data package.

Wet Chemistry Analysis

The samples of SDG CTO423-8 were analyzed in accordance with the specific methods listed on the Report of Analysis.

Analyses for total solids were performed according to "Annual Book of ASTM Standards", Method D2216-98 "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass".

All analyses were performed within analytical holding times, and all quality control criteria were met.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Operations Manager or the Quality Assurance Officer as verified by the following signature.

Leslie Dimond
07.16.09

Leslie Dimond
Quality Assurance Officer

HOLDTIME

SDG CTO423-8

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	X14SS1400001	SC3311-004	NM	6/16/2009	6/30/2009	7/11/2009	13.88	11.37	25.25
M	MG/KG	FD06160901	SC3311-013	NM	6/16/2009	6/30/2009	7/11/2009	14.3	11.45	25.74
M	MG/KG	X17SB0250102	SC3311-019	NM	6/14/2009	6/30/2009	7/11/2009	15.69	11.5	27.18
M	MG/KG	X17SB0140102	SC3311-014	NM	6/14/2009	6/30/2009	7/13/2009	15.67	13.58	29.25
M	MG/KG	X17SB0140102	SC3311-014	NM	6/14/2009	6/30/2009	7/11/2009	15.67	11.45	27.12
M	MG/KG	X16SS0250001	SC3311-020	NM	6/13/2009	6/30/2009	7/11/2009	16.73	11.5	28.23
M	MG/KG	X15SD0330006	SC3311-006	NM	6/10/2009	6/30/2009	7/11/2009	19.67	11.38	31.04
M	MG/KG	X15SD0300006	SC3311-007	NM	6/10/2009	6/30/2009	7/11/2009	19.73	11.38	31.11
M	MG/KG	X14SS1430001	SC3311-011	NM	6/17/2009	6/30/2009	7/13/2009	12.90	13.56	26.47
M	MG/KG	X14SS1430001	SC3311-011	NM	6/17/2009	6/30/2009	7/11/2009	12.90	11.43	24.34
M	MG/KG	X14SS1420001	SC3311-008	NM	6/17/2009	6/30/2009	7/11/2009	12.92	11.39	24.31
M	MG/KG	X17SS0160001	SC3311-015	NM	6/11/2009	6/30/2009	7/13/2009	18.65	13.59	32.24
M	MG/KG	X14SS1400001	SC3311-004	NM	6/16/2009	6/30/2009	7/13/2009	13.88	13.54	27.42
M	MG/KG	X17SS0220001	SC3311-016	NM	6/11/2009	6/30/2009	7/11/2009	18.65	11.46	30.11
M	MG/KG	X14SS1390001	SC3311-003	NM	6/16/2009	6/30/2009	7/11/2009	13.88	11.36	25.24

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	X14SS1380001	SC3311-002	NM	6/16/2009	6/30/2009	7/11/2009	13.84	11.36	25.2
M	MG/KG	X14SS1350001	SC3311-001	NM	6/16/2009	6/30/2009	7/11/2009	13.85	11.36	25.21
M	MG/KG	X14SB1110102	SC3311-010	NM	6/16/2009	6/30/2009	7/13/2009	13.82	13.56	27.38
M	MG/KG	X14SB1110102	SC3311-010	NM	6/16/2009	6/30/2009	7/11/2009	13.82	11.43	25.25
M	MG/KG	X14SB1020203	SC3311-009	NM	6/17/2009	6/30/2009	7/13/2009	12.93	13.54	26.47
M	MG/KG	X14SB1020203	SC3311-009	NM	6/17/2009	6/30/2009	7/11/2009	12.93	11.41	24.34
M	MG/KG	X14SB0840102	SC3311-012	NM	6/16/2009	6/30/2009	7/13/2009	13.83	13.57	27.4
M	MG/KG	X14SB0840102	SC3311-012	NM	6/16/2009	6/30/2009	7/11/2009	13.83	11.44	25.27
M	MG/KG	FD06160901	SC3311-013	NM	6/16/2009	6/30/2009	7/13/2009	14.3	13.57	27.87
M	MG/KG	X14SS1410001	SC3311-005	NM	6/16/2009	6/30/2009	7/11/2009	13.88	11.37	25.25
M	MG/KG	X17SS0220001	SC3311-016	NM	6/11/2009	6/30/2009	7/14/2009	18.65	14.57	33.22
M	MG/KG	X17SS0240001	SC3311-017	NM	6/11/2009	6/30/2009	7/11/2009	18.64	11.47	30.11
M	MG/KG	X17SS0250001	SC3311-018	NM	6/12/2009	6/30/2009	7/11/2009	17.87	11.49	29.36
M	MG/KG	X17SS0250001	SC3311-018	NM	6/12/2009	6/30/2009	7/13/2009	17.87	13.64	31.51
M	MG/KG	X17SS0160001	SC3311-015	NM	6/11/2009	6/30/2009	7/11/2009	18.65	11.46	30.11
TS	%	X14SS1390001	SC3311-3	NM	6/16/2009	6/26/2009	6/29/2009	9.997	3	13
TS	%	X17SS0240001	SC3311-17	NM	6/11/2009	6/26/2009	6/29/2009	14.76	3	17.76
TS	%	X17SS0220001	SC3311-16	NM	6/11/2009	6/26/2009	6/29/2009	14.77	3	17.77

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JZG11A.B\039SMPL.D\039SMPL.D#
Date Acquired: Jul 11 2009 03:37 pm
Acq. Method: K10CCV.M
Operator: EAM
Sample Name: SC3311-001
Misc Info: DILUTION - 2/10
Vial Number: 2111
Current Method: C:\ICPCHEM\1\METHODS\K10CCV.M
Calibration File: C:\ICPCHEM\1\CALIB\K10CCV.C
Last Cal. Update: Jul 11 2009 11:47 am
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

Reported Arsenic = 4.5 mg/kg

%S = 86.1

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
7 Li	-92,800.	-18,560.	ppb	---	#VALUE!	
9 Be	3.6295	0.7259	ppb	4.13	1000.	
11 B	40.65	8.13	ppb	4.93	1000.	
23 Na	1,058.	211.6	ppb	0.71	100000.	
25 Mg	7,605.	1,521.	ppb	1.65	100000.	
27 Al	87,400.	17,480.	ppb	1.44	100000.	
28 Si	4,444.	888.8	ppb	1.32	#VALUE!	
29 Si	4,449.	889.8	ppb	0.44	10000.	
39 K	6,620.	1,324.	ppb	0.76	100000.	
43 Ca	17,140.	3,428.	ppb	1.74	100000.	
44 Ca	16,135.	3,227.	ppb	1.26	100000.	
51 V	272.35	54.47	ppb	0.23	1000.	
52 Cr	133.8	26.76	ppb	1.11	1000.	
53 Cr	162.65	32.53	ppb	0.88	1000.	
55 Mn	1,371.5	274.3	ppb	1.69	500.	
56 Fe	112,400.	22,480.	ppb	0.50	100000.	
57 Fe	109,800.	21,960.	ppb	1.04	100000.	
59 Co	50.8	10.16	ppb	0.84	500.	
60 Ni	87.2	17.44	ppb	1.46	500.	
63 Cu	87.15	17.43	ppb	1.94	1000.	
65 Cu	87.9	17.58	ppb	1.45	500.	
66 Zn	283.6	56.72	ppb	0.72	500.	
68 Zn	282.4	56.48	ppb	0.74	1000.	
75 As	42.11	8.422	ppb	1.17	1000.	
82 Se	1.851	0.3702	ppb	80.44	500.	
88 Sr	146.8	29.36	ppb	0.72	1000.	
89 Y	----	--------	---	---	#VALUE!	
98 Mo	7.765	1.553	ppb	2.22	1000.	
107 Ag	0.532	0.1064	ppb	11.06	100.	
109 Ag	0.5075	0.1015	ppb	7.36	200.	
111 Cd	1.2605	0.2521	ppb	7.27	200.	
114 Cd	0.877	0.1754	ppb	1.73	500.	
115 In	----	--------	---	---	#VALUE!	
118 Sn	14.535	2.907	ppb	2.15	1000.	
120 Sn	14.485	2.897	ppb	2.69	1000.	
121 Sb	2.6355	0.5271	ppb	4.72	1000.	
123 Sb	2.584	0.5168	ppb	8.63	1000.	
135 Ba	322.05	64.41	ppb	0.72	1000.	
137 Ba	322.15	64.43	ppb	1.43	#VALUE!	
182 W	4.0975	0.8195	ppb	3.79	1000.	
200 Hg	2.7695	0.5539	ppb	25.91	#VALUE!	
202 Hg	3.9995	0.7999	ppb	19.23	#VALUE!	
203 Tl	1.8965	0.3793	ppb	10.87	1000.	
205 Tl	1.868	0.3736	ppb	8.34	#VALUE!	
208 Pb	419.3	83.86	ppb	0.43	1000.	
232 Th	24.175	4.835	ppb	1.76	1000.	
238 U	5.27	1.054	ppb	2.16	1000.	

$42.11 \mu g/L \times \left(\frac{100 mL}{1.085}\right) \times \left(\frac{1}{.861}\right) \times \left(\frac{1}{1000}\right) = 4.52 mg/kg$

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	423521.00	2.04	434325.84	97.5	69.5 - 130.4	
45 Sc	598498.63	0.30	613068.44	97.6	69.5 - 130.4	
72 Ge	128992.72	0.08	139607.69	92.4	69.5 - 130.4	
159 Tb	971007.25	0.50	1042963.90	93.1	69.5 - 130.4	
209 Bi	568239.50	1.00	606201.94	93.7	69.5 - 130.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JZG11A.B\008CALB.D\008CALB.D#

0 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

File:	038SMPL.D#	039SMPL.D#	040SMPL.D#	041SMPL.D#	042SMPL.D#
Sample:	PBSZF30ICS0	SC3311-001	SC3311-002	SC3311-003	SC3311-004
Date/Time:	7/11/2009 15:28	7/11/2009 15:37	7/11/2009 15:45	7/11/2009 15:54	7/11/2009 16:03
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	5	5	5	5	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	0.1528	3.6295	6.6850	4.9570	3.0895
B / 11	3.8390	40.6500	26.8550	21.9550	17.8350
Na / 23	43.3800	1058.0000	254.0000	199.7000	164.1000
Mg / 25	45.9050	7605.0000	11615.0000	8000.0000	7585.0000
Al / 27	45.0850	87400.0000	150950.0000	110800.0000	91900.0000
Si / 29	34.2600	4449.0000	4575.0000	4901.0000	3500.5000
K / 39	99.2500	6620.0000	9565.0000	6205.0000	4777.0000
Ca / 44	53.6500	16135.0000	1902.5000	2436.0000	566.0000
V / 51	0.5400	272.3500	408.4000	254.7000	212.3500
Cr / 52	1.1920	133.8000	217.7500	134.7500	111.8000
Mn / 55	1.0335	1371.5000	590.5000	937.5000	561.5000
Fe / 57	89.0500	109800.0000	179400.0000	109950.0000	102000.0000
Co / 59	0.1164	50.8000	45.6050	40.6900	29.3000
Ni / 60	0.4430	87.2000	133.2500	143.9000	107.4000
Cu / 65	0.7460	87.9000	257.9500	564.5000	1187.5000
Zn / 66	1.2075	283.6000	309.8500	226.3500	168.1500
As / 75	0.9750	42.1100	19.7450	20.5000	25.4750
Se / 82	0.8750	1.8510	3.7740	3.8400	2.9055
Sr / 88	0.2368	146.8000	65.6000	46.9900	24.1100
Mo / 98	1.6225	7.7650	6.5900	6.4200	7.0200
Ag / 107	0.0905	0.5320	0.2687	0.3575	0.3780
Cd / 114	0.1372	0.8770	0.3017	0.3021	-0.4907
Sn / 118	5.8400	14.5350	25.2600	43.6000	689.0000
Sb / 123	0.2935	2.5840	1.2665	1.2895	2.7000
Ba / 135	0.4537	322.0500	475.2500	425.7500	217.8500
W / 182	0.9810	4.0975	0.8310	1.3875	0.6140
Tl / 203	1.8645	1.8965	2.5190	1.7565	0.8915
Pb / 208	1.4930	419.3000	1253.5000	2489.0000	5335.0000
Th / 232	0.0320	24.1750	48.2150	35.1600	25.0400
U / 238	0.0071	5.2700	7.9050	6.5450	4.9225
Li / 6	415645.8	423521	413230.5	420680.2	425618.8
Sc / 45	584817.6	598498.6	622378.6	607320.5	602298.8
Ge / 72	127214.1	128992.7	127332.3	128192.7	129212
Tb / 159	988985	971007.3	950370.8	980070.9	988305.7
Bi / 209	578169.3	568239.5	544675.2	564051.6	641915.6
Li / 6	95.7	97.5	95.1	96.9	98.0
Sc / 45	95.4	97.6	101.5	99.1	98.2
Ge / 72	91.1	92.4	91.2	91.8	92.6
Tb / 159	94.8	93.1	91.1	94.0	94.8
Bi / 209	95.4	93.7	89.9	93.0	105.9

NSF INDIAN HEAD
SOIL DATA
CTO423-8

FRACTION	CHEMICAL	FD06160901	UNITS	X14SB0640102	RPD	D
M	ANTIMONY	0.46	MG/KG	0.88	62.69	0.42
M	ARSENIC	4	MG/KG	7.8	64.41	3.80
M	COPPER	434	MG/KG	849	64.69	415.00
M	LEAD	3590	MG/KG	6620	59.35	3030.00
M	TIN	77.6	MG/KG	131	51.20	53.40
M	ZINC	39.4	MG/KG	53.9	31.08	14.50

Current RPD Quality Control Limit: 50 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

Katahdin Analytical Services, Inc. — Sample Receipt Condition Report

Client: Indian Head - Tetra Tech	KAS PM: AJC	Sampled By: Client
Project:	KIMS Entry By: DD	Delivered By: Fed-Ex
KAS Work Order#: SC3309 / SC3310 / SC3311	KIMS Review By: NC	Received By: GN
~~SDG~~ #: SC3312 / SC3313	Cooler: 1 of 3	Date/Time Rec.: 6-19-09 1000

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 5.5
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea				✓	
Soil/Sediment:					
Received in airtight container?					
Received in methanol?					
Methanol covering soil?					
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

Sample #SB06160901 = Lab received only 1 Amber for SVOA

0000006

Katahdin Analytical Services, Inc. — Sample Receipt Condition Report

Client: Tetra Tech Indian Head	KAS PM: AJC	Sampled By: Client
Project:	KIMS Entry By: DD	Delivered By: Fed-Ex
KAS Work Order#: SC3309 / SC3310 / SC3311	KIMS Review By: AV	Received By: GW
~~SDG~~ # SC3312 / SC3313	Cooler: 2 of 3	Date/Time Rec.: 6-19-09 10:00

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 4.9
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea				✓	
Soil/Sediment: Received in airtight container?					
Received in methanol?					
Methanol covering soil?					
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

0000007

Katahdin Analytical Services, Inc.

Sample Receipt Condition Report

Client: Tetra Tech Indian Head		KAS PM: AJC		Sampled By: Client	
Project:		KIMS Entry By: DD		Delivered By: Fed-Ex	
KAS Work Order#: SC3309 / SC3310 / SC3311		KIMS Review By: [illegible]		Received By: GN	
~~SDG#~~ SC3312 / SC3313	Cooler: 3 of 3			Date/Time Rec.: 6-19-09 1000	

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 6.0
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea				✓	
Soil/Sediment: Received in airtight container?					
Received in methanol?					
Methanol covering soil?					
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

Andrea Colby

From: Goerdt, James [James.Goerdt@tetratech.com]
Sent: Thursday, June 18, 2009 11:45 PM
To: acolby@katahdinlab.com
Subject: Sample Shipment 112G00810 CTO 423

Andrea, we shipped 3 coolers of samples today for delivery tomorrow (Friday). I was looking over the COCs tonight and found the following mistakes:

- Page 5 of 8, third line down, the sample ID should be X17SS0010004.
- Page 5 of 8, last line, the sample should be X16SS0950001.
- Page 6 of 8, 2nd line from the bottom (X17SS0190001), the analysis should be for PAHs.

Also, I ran out of 4 oz jars, so you'll find some of the samples for PAHs and some for TOC, CEC, pH are either in the large 16 oz(?) jars, or in (2) 2.5 oz jars. I sent two of the 2.5 oz jars to make sure you had enough sample material. In instances where two jars were sent, they were placed in the same Ziploc baggie. Hope this isn't too much of a pain to figure out. If you have any questions once the samples are received, let me know.

Also, I forgot a few samples and will be shipping them out tomorrow for Saturday delivery. The last time we talked you mentioned a different address for Saturday deliveries. Please call me tomorrow morning between 8:00-9:00 and let me know the correct address. 412-443-0244

Thanks!

Jim

Jim Goerdt | Environmental Scientist
Phone: 412.921.8425 | Fax: 412.921.4040
james.goerdt@tetratech.com www.ttnus.com

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661 Anderson Drive | Pittsburgh, PA 15220
www.tetratech.com | NASDAQ:TTEK

Live Green, Work Green, Save Green
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Katahdin Analytical Services, Inc. | **Metals Preparation Benchsheet**

Reagent Information:

JT Baker HNO3: H09035 JT Baker HCL: G45023 KMG H2O2: 64022 Method: 3050H

LCS / Spike **LCS/Spiking Information:**

- ☐ ☑ I.V. CLPP-SPK-1 (ID/Vol): MS1569 / 0.1 mL
- ☐ ☑ CLPP-SPK-INT1 (ID/Vol): MW11799 / 1.0 mL
- ☐ ☑ CLPP-SPK-INT2 (ID/Vol): MW11810 / 1.0 mL
- ☐ ☑ Uranium Spike (ID/Vol): MS1526 / 0.01 mL
- ☐ ☐ CLPP-SPK-4 (ID/Vol): N/A / mL

LCSS : MS1578 Balance ID: Ohaus Galaxy 400 + Mettler AE200

Hot Plate/Block ID : B

Start Temp.: 93 °C

End Temp. : 95 °C

Thermometer ID/Pos.: ALC 8 / 2:5

Fisher Filter Paper: W11589/05A

REVIEWED

EG 070109

KATAHDIN ANALYTICAL METALS SECTION

Sample ID	Batch ID	Initial Wt/Vol	Initial Units	Final Vol	Final Units	MX	Meth	Anal.	Date	Initial Color	Initial Texture	Final Color	Final Clarity	Artifacts	Bottle
LCSSZF30ICS0	ZF30ICS0	0.5079	g	0.1	L	SL	IC	AJB	06/30/2009	N/A	N/A	N/A	N/A		
PBSZF30ICS0	ZF30ICS0	1.00	g		L	SL	IC	AJB	06/30/2009	N/A	N/A	N/A	N/A		
SC3311-001	ZF30ICS0	1.08	g		L	SL	IC	AJB	06/30/2009						A
SC3311-002	ZF30ICS0	1.08	g		L	SL	IC	AJB	06/30/2009						
SC3311-003	ZF30ICS0	1.06	g		L	SL	IC	AJB	06/30/2009						
SC3311-004	ZF30ICS0	1.04	g		L	SL	IC	AJB	06/30/2009						
SC3311-005	ZF30ICS0	1.12	g		L	SL	IC	AJB	06/30/2009						
SC3311-006	ZF30ICS0	1.54	g		L	SL	IC	AJB	06/30/2009						
SC3311-007	ZF30ICS0	1.03	g		L	SL	IC	AJB	06/30/2009						
SC3311-008	ZF30ICS0	1.09	g		L	SL	IC	AJB	06/30/2009						
SC3311-009	ZF30ICS0	1.46	g		L	SL	IC	AJB	06/30/2009						
SC3311-010	ZF30ICS0	1.18	g		L	SL	IC	AJB	06/30/2009						
SC3311-011	ZF30ICS0	1.07	g		L	SL	IC	AJB	06/30/2009						
SC3311-012	ZF30ICS0	1.08	g		L	SL	IC	AJB	06/30/2009						
SC3311-013	ZF30ICS0	1.11	g		L	SL	IC	AJB	06/30/2009						
SC3311-014	ZF30ICS0	1.04	g		L	SL	IC	AJB	06/30/2009						
SC3311-015	ZF30ICS0	1.21	g		L	SL	IC	AJB	06/30/2009						
SC3311-016	ZF30ICS0	1.35	g		L	SL	IC	AJB	06/30/2009						
SC3311-017	ZF30ICS0	1.09	g		L	SL	IC	AJB	06/30/2009						
SC3311-018	ZF30ICS0	1.19	g		L	SL	IC	AJB	06/30/2009						
SC3311-019	ZF30ICS0	1.11	g		L	SL	IC	AJB	06/30/2009						
SC3311-020	ZF30ICS0	1.68	g		L	SL	IC	AJB	06/30/2009						
SC3311-020P	ZF30ICS0	1.12	g		L	SL	IC	AJB	06/30/2009						A
SC3311-020S	ZF30ICS0	1.14	g	0.1	L	SL	IC	AJB	06/30/2009						

AJB 6/30/09

Digestion performed by: AJB On: 6/30/09

Katahdin Analytical Services 4000255

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services **Sample ID:** PBSZF30ICS0

Matrix: SOIL **SDG Name:** CTO423-8

QC Batch ID: ZF30ICS0

Concentration Units : mg/Kgdrywt

Analyte	RESULT	C
ANTIMONY	0.029	J
ARSENIC	0.150	U
COPPER	0.110	U
LEAD	0.030	U
TIN	0.584	
ZINC	0.350	U

INSTRUMENT DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 3/6/2009

Concentration Units: ug/L

Analyte	CRDL	IDL	M
ALUMINUM	60	2.20	MS
ANTIMONY	0.20	0.03	MS
ARSENIC	1.0	0.08	MS
CALCIUM	20	3.90	MS
COPPER	1.0	0.04	MS
IRON	20	3.10	MS
LEAD	0.20	0.02	MS
MAGNESIUM	20	2.00	MS
MOLYBDENUM	1.0	0.07	MS
POTASSIUM	200	8.80	MS
SODIUM	200	6.50	MS
TIN	1.0	0.04	MS
ZINC	2.0	0.44	MS

METHOD DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 3/11/2009

Analyte	MDL	Units	M	EPA Prep./Anal. Method
ANTIMONY	0.01	mg/kg	MS	SW846 3050B / SW846 6020
ARSENIC	0.03	mg/kg	MS	SW846 3050B / SW846 6020
COPPER	0.02	mg/kg	MS	SW846 3050B / SW846 6020
LEAD	0.01	mg/kg	MS	SW846 3050B / SW846 6020
TIN	0.04	mg/kg	MS	SW846 3050B / SW846 6020
ZINC	0.07	mg/kg	MS	SW846 3050B / SW846 6020

ICP LINEAR RANGES

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 1/6/2009

Concentration Units: ug/L

Analyte	Integration Time (sec)	Linear Range	M
ALUMINUM	0.01	100000	MS
ANTIMONY	0.10	1000	MS
ARSENIC	0.30	1000	MS
CALCIUM	0.03	100000	MS
COPPER	0.10	500	MS
IRON	0.03	100000	MS
LEAD	0.10	1000	MS
MAGNESIUM	0.05	100000	MS
MOLYBDENUM	0.10	2000	MS
POTASSIUM	0.01	100000	MS
SODIUM	0.01	100000	MS
TIN	0.10	1000	MS
ZINC	0.10	250	MS

PREPARATION LOG

Lab Name: Katahdin Analytical Services **QC Batch ID:** ZF30ICS0

Matrix: SOIL **SDG Name:** CTO423-8

Method: P **Prep Date:** 06/30/2009

Client ID	Lab Sample ID	Initial (g)	Final (L)
LCSSZF30ICS0	LCSSZF30ICS0	0.5079	0.1
PBSZF30ICS0	PBSZF30ICS0	1	0.1
X14SS1350001	SC3311-001	1.08	0.1
X14SS1380001	SC3311-002	1.08	0.1
X14SS1390001	SC3311-003	1.06	0.1
X14SS1400001	SC3311-004	1.04	0.1
X14SS1410001	SC3311-005	1.12	0.1
X15SD0330006	SC3311-006	1.54	0.1
X15SD0300006	SC3311-007	1.03	0.1
X14SS1420001	SC3311-008	1.09	0.1
X14SB1020203	SC3311-009	1.46	0.1
X14SB1110102	SC3311-010	1.18	0.1
X14SS1430001	SC3311-011	1.07	0.1
X14SB0840102	SC3311-012	1.08	0.1
FD06160901	SC3311-013	1.11	0.1
X17SB0140102	SC3311-014	1.04	0.1
X17SS0160001	SC3311-015	1.21	0.1
X17SS0220001	SC3311-016	1.35	0.1
X17SS0240001	SC3311-017	1.09	0.1
X17SS0250001	SC3311-018	1.19	0.1
X17SB0250102	SC3311-019	1.11	0.1
X16SS0250001	SC3311-020	1.08	0.1
X16SS0250001P	SC3311-020P	1.12	0.1
X16SS0250001S	SC3311-020S	1.14	0.1

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG11A

Date: 7/11/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements
6020 TUNE		1	10:13	
Cal Blank		1	11:11	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Cal Std 1		1	11:19	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Cal Std 2		1	11:28	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Cal Std 3		1	11:36	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Cal Std 4		1	11:45	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ZZZZZZ		1	11:53	
ICV		1	12:02	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ICB		1	12:11	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
PQL		1	12:19	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ICSA		1	12:28	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ICSAB		1	12:37	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Blank		1	12:45	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	12:54	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	13:02	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
BLANK		1	13:11	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
BLANK		1	13:20	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	13:28	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	13:37	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ZZZZZZ		5	13:45	
ZZZZZZ		5	13:54	
ZZZZZZ		5	14:03	
ZZZZZZ		5	14:11	
ZZZZZZ		5	14:20	
ZZZZZZ		5	14:28	
ZZZZZZ		5	14:37	
ZZZZZZ		10	14:45	
LCSSZF30ICS0		10	14:54	Sb As Cu Pb Sn Zn
BLANK		1	15:02	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	15:11	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	15:20	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
PBSZF30ICS0		5	15:28	Sb As Cu Sn Zn
SC3311-001	X14SS1350001	5	15:37	Sb As Cu Pb Sn Zn
SC3311-002	X14SS1380001	5	15:45	Sb As Cu Pb Sn Zn
SC3311-003	X14SS1390001	5	15:54	Sb As Cu Pb Sn Zn
SC3311-004	X14SS1400001	5	16:03	Sb As Cu Sn Zn
SC3311-005	X14SS1410001	5	16:11	Sb As Cu Pb Sn Zn
SC3311-006	X15SD0330006	5	16:20	Sb As Cu Pb Sn Zn
SC3311-007	X15SD0300006	5	16:28	Sb As Cu Pb Sn Zn
SC3311-008	X14SS1420001	5	16:37	Sb As Cu Pb Sn Zn
BLANK		1	16:46	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	16:54	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	17:03	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
SC3311-009	X14SB1020203	5	17:11	Sb As Cu Sn Zn
SC3311-010	X14SB1110102	5	17:20	Sb As Cu Sn Zn
SC3311-011	X14SS1430001	5	17:29	Sb As Cu Sn Zn
SC3311-012	X14SB0840102	5	17:37	Sb As Sn Zn
SC3311-013	FD06160901	5	17:46	Sb As Sn Zn
SC3311-014	X17SB0140102	5	17:55	Sb As Sn Zn
SC3311-015	X17SS0160001	5	18:03	Sb As Cu Sn Zn

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG11A

Date: 7/11/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements
SC3311-016	X17SS0220001	5	18:12	Sb As Cu Sn Zn
SC3311-017	X17SS0240001	5	18:21	Sb As Cu Pb Sn Zn
BLANK		1	18:29	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	18:38	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	18:46	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
SC3311-018	X17SS0250001	5	18:55	Sb As Cu Sn Zn
SC3311-019	X17SB0250102	5	19:04	Sb As Cu Pb Sn Zn
SC3311-020	X16SS0250001	5	19:12	Sb As Cu Pb Sn Zn
SC3311-020L	X16SS0250001L	25	19:21	Sb As Cu Pb Sn Zn
SC3311-020A	X16SS0250001A	5	19:29	Sb
SC3311-020S	X16SS0250001S	10	19:38	Sb As Cu Pb Sn Zn
SC3311-020P	X16SS0250001P	10	19:47	Sb As Cu Pb Sn Zn
BLANK		1	19:55	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	20:04	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	20:13	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: ICV

File: JZG11A Jul 11, 2009 12:02

Analyte	True	Found	%R (1)
ALUMINUM	400.0	420.20	105.1
ANTIMONY	20.0	19.68	98.4
ARSENIC	20.0	19.23	96.2
CALCIUM	4000.0	3826.00	95.7
COPPER	20.0	20.15	100.7
IRON	4000.0	3908.00	97.7
LEAD	20.0	19.63	98.1
MAGNESIUM	4000.0	4120.00	103.0
MOLYBDENUM	40.0	41.30	103.3
POTASSIUM	4000.0	3934.00	98.4
SODIUM	4000.0	3995.00	99.9
TIN	20.0	20.75	103.8
ZINC	20.0	20.32	101.6

SAMPLE: CCV

File: JZG11A Jul 11, 2009 12:54

Analyte	True	Found	%R (1)
ALUMINUM	500.0	586.00	117.2•
ANTIMONY	25.0	26.10	104.4
ARSENIC	25.0	25.87	103.5
CALCIUM	5000.0	5391.00	107.8
COPPER	25.0	26.48	105.9
IRON	5000.0	5138.00	102.8
LEAD	25.0	26.08	104.3
MAGNESIUM	5000.0	5516.00	110.3
MOLYBDENUM	25.0	31.21	124.8•
POTASSIUM	5000.0	5273.00	105.5
SODIUM	5000.0	5484.00	109.7
TIN	25.0	26.09	104.4
ZINC	25.0	26.86	107.4

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: CCV

File: JZG11A Jul 11, 2009 13:28

Analyte	True	Found	%R (1)
ALUMINUM	500.0	531.40	106.3
ANTIMONY	25.0	25.67	102.7
ARSENIC	25.0	25.42	101.7
CALCIUM	5000.0	5099.00	102.0
COPPER	25.0	25.39	101.6
IRON	5000.0	4949.00	99.0
LEAD	25.0	25.31	101.2
MAGNESIUM	5000.0	5378.00	107.6
MOLYBDENUM	25.0	26.00	104.0
POTASSIUM	5000.0	5131.00	102.6
SODIUM	5000.0	5306.00	106.1
TIN	25.0	25.11	100.4
ZINC	25.0	25.99	104.0

SAMPLE: CCV

File: JZG11A Jul 11, 2009 15:11

Analyte	True	Found	%R (1)
ALUMINUM	500.0	508.80	101.8
ANTIMONY	25.0	24.50	98.0
ARSENIC	25.0	24.99	100.0
CALCIUM	5000.0	4956.00	99.1
COPPER	25.0	25.01	100.0
IRON	5000.0	4918.00	98.4
LEAD	25.0	24.90	99.6
MAGNESIUM	5000.0	5116.00	102.3
MOLYBDENUM	25.0	25.49	102.0
POTASSIUM	5000.0	4884.00	97.7
SODIUM	5000.0	5100.00	102.0
TIN	25.0	24.07	96.3
ZINC	25.0	25.72	102.9

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: CCV

File: JZG11A Jul 11, 2009 16:54

Analyte	True	Found	%R (1)
ALUMINUM	500.0	531.70	106.3
ANTIMONY	25.0	24.70	98.8
ARSENIC	25.0	25.09	100.4
CALCIUM	5000.0	4864.00	97.3
COPPER	25.0	25.49	102.0
IRON	5000.0	4943.00	98.9
LEAD	25.0	25.07	100.3
MAGNESIUM	5000.0	5211.00	104.2
MOLYBDENUM	25.0	25.27	101.1
POTASSIUM	5000.0	4973.00	99.5
SODIUM	5000.0	5112.00	102.2
TIN	25.0	24.57	98.3
ZINC	25.0	25.82	103.3

SAMPLE: CCV

File: JZG11A Jul 11, 2009 18:38

Analyte	True	Found	%R (1)
ALUMINUM	500.0	547.20	109.4
ANTIMONY	25.0	25.08	100.3
ARSENIC	25.0	25.19	100.8
CALCIUM	5000.0	5149.00	103.0
COPPER	25.0	25.78	103.1
IRON	5000.0	4956.00	99.1
LEAD	25.0	25.93	103.7
MAGNESIUM	5000.0	5271.00	105.4
MOLYBDENUM	25.0	25.59	102.4
POTASSIUM	5000.0	5138.00	102.8
SODIUM	5000.0	5231.00	104.6
TIN	25.0	25.19	100.8
ZINC	25.0	26.14	104.6

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: CCV

File: JZG11A Jul 11, 2009 20:04

Analyte	True	Found	%R (1)
ALUMINUM	500.0	539.10	107.8
ANTIMONY	25.0	24.73	98.9
ARSENIC	25.0	25.03	100.1
CALCIUM	5000.0	4910.00	98.2
COPPER	25.0	25.54	102.2
IRON	5000.0	4953.00	99.1
LEAD	25.0	25.36	101.4
MAGNESIUM	5000.0	5174.00	103.5
MOLYBDENUM	25.0	25.67	102.7
POTASSIUM	5000.0	4995.00	99.9
SODIUM	5000.0	5139.00	102.8
TIN	25.0	24.59	98.4
ZINC	25.0	26.08	104.3

(1) Control Limits: Mercury 80-120; Other Metals 90-110

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: PQL

File: JZG11A Jul 11, 2009 12:19

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	60.69	101.2
ANTIMONY	0.2	0.22	110.0
ARSENIC	1.0	0.83	83.0
CALCIUM	20.0	19.46	97.3
COPPER	0.2	0.23	115.0
IRON	20.0	19.79	98.9
LEAD	0.2	0.17	85.0
MAGNESIUM	20.0	21.72	108.6
MOLYBDENUM	1.0	1.13	113.0
POTASSIUM	200.0	212.00	106.0
SODIUM	200.0	211.20	105.6
TIN	0.2	0.22	110.0
ZINC	2.0	2.16	108.0

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: ICB
File: JZG11A Jul 11, 2009 12:11

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.03	J
ARSENIC	-0.11	J
CALCIUM	4.11	J
COPPER	0.04	U
IRON	4.21	J
LEAD	0.02	U
MAGNESIUM	5.12	J
MOLYBDENUM	0.37	J
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.05	J
ZINC	0.44	U

SAMPLE: CCB
File: JZG11A Jul 11, 2009 13:02

Analyte	Result	C
ALUMINUM	22.76	J
ANTIMONY	0.03	U
ARSENIC	-0.13	J
CALCIUM	25.07	
COPPER	0.04	U
IRON	28.12	
LEAD	0.02	U
MAGNESIUM	26.11	
MOLYBDENUM	2.57	
POTASSIUM	49.25	J
SODIUM	32.23	J
TIN	0.05	J
ZINC	0.44	U

SAMPLE: CCB
File: JZG11A Jul 11, 2009 13:37

Analyte	Result	C
ALUMINUM	4.06	J
ANTIMONY	0.03	U
ARSENIC	-0.17	J
CALCIUM	6.45	J
COPPER	0.04	U
IRON	6.61	J
LEAD	0.02	U
MAGNESIUM	8.57	J
MOLYBDENUM	0.79	J
POTASSIUM	16.66	J
SODIUM	11.92	J
TIN	0.04	J
ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: CCB
File: JZG11A Jul 11, 2009 15:20

Analyte	Result	C
ALUMINUM	7.42	J
ANTIMONY	0.07	J
ARSENIC	0.08	U
CALCIUM	7.43	J
COPPER	0.09	J
IRON	18.08	J
LEAD	0.33	
MAGNESIUM	7.41	J
MOLYBDENUM	0.47	J
POTASSIUM	20.85	J
SODIUM	8.50	J
TIN	0.10	J
ZINC	0.44	U

SAMPLE: CCB
File: JZG11A Jul 11, 2009 17:03

Analyte	Result	C
ALUMINUM	9.11	J
ANTIMONY	0.03	U
ARSENIC	-0.11	J
CALCIUM	3.90	U
COPPER	0.04	U
IRON	19.71	J
LEAD	0.11	J
MAGNESIUM	6.58	J
MOLYBDENUM	0.25	J
POTASSIUM	15.75	J
SODIUM	6.50	U
TIN	0.06	J
ZINC	0.44	U

SAMPLE: CCB
File: JZG11A Jul 11, 2009 18:46

Analyte	Result	C
ALUMINUM	16.76	J
ANTIMONY	0.03	U
ARSENIC	0.08	U
CALCIUM	4.21	J
COPPER	0.10	J
IRON	25.25	
LEAD	0.56	
MAGNESIUM	6.44	J
MOLYBDENUM	0.21	J
POTASSIUM	24.30	J
SODIUM	6.50	U
TIN	0.06	J
ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: CCB

File: JZG11A Jul 11, 2009 20:13

Analyte	Result	C
ALUMINUM	14.06	J
ANTIMONY	0.03	J
ARSENIC	0.08	U
CALCIUM	3.90	U
COPPER	0.04	J
IRON	7.91	J
LEAD	0.25	
MAGNESIUM	5.45	J
MOLYBDENUM	0.22	J
POTASSIUM	27.90	J
SODIUM	6.50	U
TIN	0.06	J
ZINC	0.44	U

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: ICSA

File: JZG11A Jul 11, 2009 12:28

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	99000	99.0
ANTIMONY	0	0	
ARSENIC	0	0	
CALCIUM	100000	97130	97.1
COPPER	0	1	
IRON	100000	92440	92.4
LEAD	0	0	
MAGNESIUM	100000	97600	97.6
MOLYBDENUM	2000	2022	101.1
POTASSIUM	100000	99190	99.2
SODIUM	100000	102500	102.5
TIN	0	0	
ZINC	0	1	

SAMPLE: ICSAB

File: JZG11A Jul 11, 2009 12:37

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	97650	97.7
ANTIMONY	20	20	100.0
ARSENIC	20	19	95.0
CALCIUM	100000	95850	95.9
COPPER	20	19	95.0
IRON	100000	92380	92.4
LEAD	20	21	105.0
MAGNESIUM	100000	96460	96.5
MOLYBDENUM	2000	2042	102.1
POTASSIUM	100000	98130	98.1
SODIUM	100000	98300	98.3
TIN	20	21	105.0
ZINC	21	19	90.5

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services | **Client Field ID:** X16SS0250001S

Matrix: SOIL | **SDG Name:** CTO423-8

Percent Solids: 85.5 | **Lab Sample ID:** SC3311-020P

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	29.1168		0.7294		52.22	54.4	N	75	125	MS
ARSENIC, TOTAL	51.5289		4.0517		52.22	90.9		75	125	MS
COPPER, TOTAL	33.3465		8.8322		26.11	93.9		75	125	MS
LEAD, TOTAL	162.2940		159.3156		52.22	5.7	N	75	125	MS
TIN, TOTAL	52.2704		1.1724		52.22	97.9		75	125	MS
ZINC, TOTAL	77.3768		29.4534		52.22	91.8		75	125	MS

Comments:

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services | **Client Field ID:** X16SS0250001S

Matrix: SOIL | **SDG Name:** CTO423-8

Percent Solids: 85.5 | **Lab Sample ID:** SC3311-020S

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	28.5034		0.7294		51.3	54.1	N	75	125	MS
ARSENIC, TOTAL	51.3020		4.0517		51.3	92.1		75	125	MS
COPPER, TOTAL	33.7260		8.8322		25.65	97.1		75	125	MS
LEAD, TOTAL	197.9233		159.3156		51.3	75.3		75	125	MS
TIN, TOTAL	50.5325		1.1724		51.3	96.2		75	125	MS
ZINC, TOTAL	81.3856		29.4534		51.3	101.2		75	125	MS

Comments:

5B

POST DIGEST SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** X16SS0250001S

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 85.5 **Lab Sample ID:** SC3311-020A

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	3.3560		1.3470		2	100.4		75	125	MS
LEAD, TOTAL	507.4000		294.2000		200	106.6		75	125	MS

Comments:

5D

SPIKE DUPLICATES

Lab Name: Katahdin Analytical Services **Client Field ID:** X16SS0250001

Matrix: SOIL **SDG Name:** CTO423-8

Percent Solids: 85.5 **Lab Sample ID:** SC3311-020

Concentration Units : mg/Kgdrywt

Analyte	Control Limits	Spike Result	C	Spike Dup. Result	C	RPD	Q	M
ANTIMONY, TOTAL		28.5034		29.1168		2.1		MS
ARSENIC, TOTAL		51.3020		51.5289		0.4		MS
COPPER, TOTAL		33.7260		33.3465		1.1		MS
LEAD, TOTAL		197.9233		162.2940		19.8		MS
TIN, TOTAL		50.5325		52.2704		3.4		MS
ZINC, TOTAL		81.3856		77.3768		5.1		MS

Comments:

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID:** LCSSZF30ICS0

Matrix: SOIL **SDG Name:** CTO423-8

QC Batch ID: ZF30ICS0

Concentration Units : mg/Kgdrywt

Analyte	TRUE	FOUND	% R	LIMITS (%)	
ANTIMONY	126.0	107.01	84.9	50	150
ARSENIC	225.0	221.11	98.3	80	120
COPPER	66.7	70.37	105.5	81	119
LEAD	223.0	223.67	100.3	82	118
TIN	164.0	174.13	106.2	74	126
ZINC	349.0	357.16	102.3	80	120

ICP SERIAL DILUTION

Lab Name: Katahdin Analytical Services **Client Field ID:** X16SS0250001L

Matrix: SOIL **SDG Name:** CTO423-8

Lab Sample ID: SC3311-020L

Concentration Units: ug/L

Analyte	Sample Result	C	Dilution Result	C	% Difference	Q	M
ANTIMONY, TOTAL	1.35		1.37		1.5		MS
ARSENIC, TOTAL	7.48		7.93		6.0		MS
COPPER, TOTAL	16.31		16.71		2.5		MS
LEAD, TOTAL	294.20		287.00		2.4		MS
TIN, TOTAL	2.16		2.08	J	3.7		MS
ZINC, TOTAL	54.39		57.80		6.3		MS

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG13A

Date: 7/13/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements
6020 TUNE		1	16:29	
Cal Blank		1	17:27	Al Ca Cu Fe Pb Mg Mo K Na
Cal Std 1		1	17:35	Al Ca Cu Fe Pb Mg Mo K Na
Cal Std 2		1	17:44	Al Ca Cu Fe Pb Mg Mo K Na
Cal Std 3		1	17:52	Al Ca Cu Fe Pb Mg Mo K Na
Cal Std 4		1	18:01	Al Ca Cu Fe Pb Mg Mo K Na
ZZZZZZ		1	18:10	
ICV		1	18:18	Al Ca Cu Fe Pb Mg Mo K Na
ICB		1	18:27	Al Ca Cu Fe Pb Mg Mo K Na
PQL		1	18:35	Al Ca Cu Fe Pb Mg Mo K Na
ICSA		1	18:44	Al Ca Cu Fe Pb Mg Mo K Na
ICSAB		1	18:53	Al Ca Cu Fe Pb Mg Mo K Na
Blank		1	19:01	Al Ca Cu Fe Pb Mg Mo K Na
CCV		1	19:10	Al Ca Cu Fe Pb Mg Mo K Na
CCB		1	19:19	Al Ca Cu Fe Pb Mg Mo K Na
BLANK		1	19:27	Al Ca Cu Fe Pb Mg Mo K Na
BLANK		1	19:36	Al Ca Cu Fe Pb Mg Mo K Na
CCV		1	19:44	Al Ca Cu Fe Pb Mg Mo K Na
CCB		1	19:53	Al Ca Cu Fe Pb Mg Mo K Na
PBSZF30ICS0		5	20:01	Pb
SC3311-004	X14SS1400001	10	20:10	Pb
SC3311-009	X14SB1020203	20	20:18	Pb
SC3311-010	X14SB1110102	50	20:27	Pb
SC3311-011	X14SS1430001	5	20:36	Pb
SC3311-012	X14SB0840102	100	20:44	Cu Pb
SC3311-013	FD06160901	50	20:53	Cu Pb
SC3311-014	X17SB0140102	5	21:01	Cu Pb
SC3311-015	X17SS0160001	5	21:10	Pb
BLANK		1	21:19	Al Ca Cu Fe Pb Mg Mo K Na
CCV		1	21:27	Al Ca Cu Fe Pb Mg Mo K Na
CCB		1	21:36	Al Ca Cu Fe Pb Mg Mo K Na
ZZZZZZ		5	21:44	
ZZZZZZ		5	21:53	
ZZZZZZ		5	22:02	
ZZZZZZ		5	22:10	
ZZZZZZ		5	22:19	
SC3311-018	X17SS0250001	10	22:28	Pb
ZZZZZZ		10	22:36	
SC3311-020A	X16SS0250001A	5	22:45	Pb
BLANK		1	22:53	Al Ca Cu Fe Pb Mg Mo K Na
BLANK		1	23:02	Al Ca Cu Fe Pb Mg Mo K Na
CCV		1	23:10	Al Ca Cu Fe Pb Mg Mo K Na
CCB		1	23:19	Al Ca Cu Fe Pb Mg Mo K Na

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: ICV

File: JZG13A Jul 13, 2009 18:18

Analyte	True	Found	%R (1)
ALUMINUM	400.0	424.90	106.2
CALCIUM	4000.0	3870.00	96.8
COPPER	20.0	20.07	100.4
IRON	4000.0	3950.00	98.8
LEAD	20.0	19.86	99.3
MAGNESIUM	4000.0	4153.00	103.8
MOLYBDENUM	40.0	41.44	103.6
POTASSIUM	4000.0	3999.00	100.0
SODIUM	4000.0	4008.00	100.2

SAMPLE: CCV

File: JZG13A Jul 13, 2009 19:10

Analyte	True	Found	%R (1)
ALUMINUM	500.0	576.60	115.3
CALCIUM	5000.0	5171.00	103.4
COPPER	25.0	25.68	102.7
IRON	5000.0	5015.00	100.3
LEAD	25.0	25.33	101.3
MAGNESIUM	5000.0	5380.00	107.6
MOLYBDENUM	25.0	31.06	124.2
POTASSIUM	5000.0	5126.00	102.5
SODIUM	5000.0	5199.00	104.0

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: CCV

File: JZG13A Jul 13, 2009 19:44

Analyte	True	Found	%R (1)
ALUMINUM	500.0	531.90	106.4
CALCIUM	5000.0	5212.00	104.2
COPPER	25.0	25.96	103.8
IRON	5000.0	5010.00	100.2
LEAD	25.0	25.57	102.3
MAGNESIUM	5000.0	5268.00	105.4
MOLYBDENUM	25.0	26.85	107.4
POTASSIUM	5000.0	5144.00	102.9
SODIUM	5000.0	5111.00	102.2

SAMPLE: CCV

File: JZG13A Jul 13, 2009 21:27

Analyte	True	Found	%R (1)
ALUMINUM	500.0	550.80	110.2
CALCIUM	5000.0	5269.00	105.4
COPPER	25.0	26.14	104.6
IRON	5000.0	5177.00	103.5
LEAD	25.0	26.01	104.0
MAGNESIUM	5000.0	5384.00	107.7
MOLYBDENUM	25.0	26.37	105.5
POTASSIUM	5000.0	5247.00	104.9
SODIUM	5000.0	5274.00	105.5

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: CCV

File: JZG13A Jul 13, 2009 23:10

Analyte	True	Found	%R (1)
ALUMINUM	500.0	543.30	108.7
CALCIUM	5000.0	5195.00	103.9
COPPER	25.0	25.68	102.7
IRON	5000.0	5094.00	101.9
LEAD	25.0	25.59	102.4
MAGNESIUM	5000.0	5336.00	106.7
MOLYBDENUM	25.0	26.32	105.3
POTASSIUM	5000.0	5194.00	103.9
SODIUM	5000.0	5197.00	103.9

(1) Control Limits: Mercury 80-120; Other Metals 90-110

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: PQL

File: JZG13A Jul 13, 2009 18:35

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	63.26	105.4
CALCIUM	20.0	19.49	97.4
COPPER	0.2	0.24	120.0
IRON	20.0	23.26	116.3
LEAD	0.2	0.39	195.0•
MAGNESIUM	20.0	21.63	108.1
MOLYBDENUM	1.0	1.16	116.0
POTASSIUM	200.0	183.20	91.6
SODIUM	200.0	206.00	103.0

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: ICB

File: JZG13A Jul 13, 2009 18:27

Analyte	Result	C
ALUMINUM	44.75	J
CALCIUM	20.75	
COPPER	0.44	J
IRON	72.49	
LEAD	1.86	
MAGNESIUM	25.21	
MOLYBDENUM	0.83	J
POTASSIUM	17.07	J
SODIUM	26.58	J

SAMPLE: CCB

File: JZG13A Jul 13, 2009 19:19

Analyte	Result	C
ALUMINUM	64.22	
CALCIUM	60.76	
COPPER	0.04	U
IRON	67.83	
LEAD	0.05	J
MAGNESIUM	65.89	
MOLYBDENUM	3.73	
POTASSIUM	78.14	J
SODIUM	74.57	J

SAMPLE: CCB

File: JZG13A Jul 13, 2009 19:53

Analyte	Result	C
ALUMINUM	7.47	J
CALCIUM	6.76	J
COPPER	0.04	U
IRON	12.95	J
LEAD	0.04	J
MAGNESIUM	11.95	J
MOLYBDENUM	0.98	J
POTASSIUM	11.97	J
SODIUM	15.84	J

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: CCB

File: JZG13A Jul 13, 2009 21:36

Analyte	Result	C
ALUMINUM	13.47	J
CALCIUM	3.90	U
COPPER	0.04	J
IRON	18.77	J
LEAD	0.15	J
MAGNESIUM	8.02	J
MOLYBDENUM	0.39	J
POTASSIUM	21.60	J
SODIUM	9.32	J

SAMPLE: CCB

File: JZG13A Jul 13, 2009 23:19

Analyte	Result	C
ALUMINUM	11.07	J
CALCIUM	5.74	J
COPPER	0.06	J
IRON	16.72	J
LEAD	0.20	J
MAGNESIUM	7.94	J
MOLYBDENUM	0.47	J
POTASSIUM	8.80	U
SODIUM	9.72	J

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: ICSA

File: JZG13A Jul 13, 2009 18:44

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	95350	95.3
CALCIUM	100000	94300	94.3
COPPER	0	1	
IRON	100000	91060	91.1
LEAD	0	0	
MAGNESIUM	100000	94150	94.2
MOLYBDENUM	2000	2012	100.6
POTASSIUM	100000	95760	95.8
SODIUM	100000	94380	94.4

SAMPLE: ICSAB

File: JZG13A Jul 13, 2009 18:53

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	101900	101.9
CALCIUM	100000	101500	101.5
COPPER	20	19	95.0
IRON	100000	93840	93.8
LEAD	20	22	110.0
MAGNESIUM	100000	101400	101.4
MOLYBDENUM	2000	2129	106.5
POTASSIUM	100000	103000	103.0
SODIUM	100000	102000	102.0

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG14A

Date: 7/14/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements
6020 TUNE		1	16:20	
200.8 TUNE		1	16:26	
Cal Blank		1	17:26	Al Ca Fe Pb Mg Mo K Na
Cal Std 1		1	17:34	Al Ca Fe Pb Mg Mo K Na
Cal Std 2		1	17:43	Al Ca Fe Pb Mg Mo K Na
Cal Std 3		1	17:51	Al Ca Fe Pb Mg Mo K Na
Cal Std 4		1	18:00	Al Ca Fe Pb Mg Mo K Na
ZZZZZZ		1	18:08	
ICV		1	18:17	Al Ca Fe Pb Mg Mo K Na
ICB		1	18:25	Al Ca Fe Pb Mg Mo K Na
PQL		1	18:34	Al Ca Fe Pb Mg Mo K Na
ICSA		1	18:43	Al Ca Fe Pb Mg Mo K Na
ICSAB		1	18:51	Al Ca Fe Pb Mg Mo K Na
Blank		1	19:00	Al Ca Fe Pb Mg Mo K Na
CCV		1	19:09	Al Ca Fe Pb Mg Mo K Na
CCB		1	19:17	Al Ca Fe Pb Mg Mo K Na
BLANK		1	19:26	Al Ca Fe Pb Mg Mo K Na
BLANK		1	19:34	Al Ca Fe Pb Mg Mo K Na
CCV		1	19:43	Al Ca Fe Pb Mg Mo K Na
CCB		1	19:51	Al Ca Fe Pb Mg Mo K Na
ZZZZZZ		1	20:00	
ZZZZZZ		1	20:09	
ZZZZZZ		1	20:17	
ZZZZZZ		2	20:26	
ZZZZZZ		1	20:34	
ZZZZZZ		1	20:43	
SC3311-016	X17SS0220001	5	20:51	Pb
ZZZZZZ		10	21:00	
ZZZZZZ		10	21:09	
BLANK		1	21:17	Al Ca Fe Pb Mg Mo K Na
CCV		1	21:26	Al Ca Fe Pb Mg Mo K Na
CCB		1	21:34	Al Ca Fe Pb Mg Mo K Na

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: ICV

File: JZG14A Jul 14, 2009 18:17

Analyte	True	Found	%R (1)
ALUMINUM	400.0	408.90	102.2
CALCIUM	4000.0	3882.00	97.0
IRON	4000.0	3886.00	97.2
LEAD	20.0	19.56	97.8
MAGNESIUM	4000.0	4022.00	100.6
MOLYBDENUM	40.0	40.61	101.5
POTASSIUM	4000.0	3900.00	97.5
SODIUM	4000.0	3925.00	98.1

SAMPLE: CCV

File: JZG14A Jul 14, 2009 19:09

Analyte	True	Found	%R (1)
ALUMINUM	500.0	568.10	113.6•
CALCIUM	5000.0	5181.00	103.6
IRON	5000.0	5116.00	102.3
LEAD	40.0	39.78	99.5
MAGNESIUM	5000.0	5153.00	103.1
MOLYBDENUM	40.0	45.98	115.0•
POTASSIUM	5000.0	5157.00	103.1
SODIUM	5000.0	5107.00	102.1

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: CCV

File: JZG14A Jul 14, 2009 19:43

Analyte	True	Found	%R (1)
ALUMINUM	500.0	521.70	104.3
CALCIUM	5000.0	5079.00	101.6
IRON	5000.0	4968.00	99.4
LEAD	40.0	39.57	98.9
MAGNESIUM	5000.0	5067.00	101.3
MOLYBDENUM	40.0	41.10	102.8
POTASSIUM	5000.0	5037.00	100.7
SODIUM	5000.0	4984.00	99.7

SAMPLE: CCV

File: JZG14A Jul 14, 2009 21:26

Analyte	True	Found	%R (1)
ALUMINUM	500.0	521.30	104.3
CALCIUM	5000.0	5029.00	100.6
IRON	5000.0	4996.00	99.9
LEAD	40.0	39.32	98.3
MAGNESIUM	5000.0	4965.00	99.3
MOLYBDENUM	40.0	40.08	100.2
POTASSIUM	5000.0	4979.00	99.6
SODIUM	5000.0	4947.00	98.9

(1) Control Limits: Mercury 80-120; Other Metals 90-110

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: PQL

File: JZG14A Jul 14, 2009 18:34

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	58.20	97.0
CALCIUM	20.0	23.38	116.9
IRON	20.0	21.18	105.9
LEAD	0.2	0.20	100.0
MAGNESIUM	20.0	20.74	103.7
MOLYBDENUM	1.0	1.23	123.0
POTASSIUM	200.0	207.50	103.8
SODIUM	200.0	204.50	102.3

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: ICB

File: JZG14A Jul 14, 2009 18:25

Analyte	Result	C
ALUMINUM	2.20	U
CALCIUM	5.18	J
IRON	3.60	J
LEAD	0.02	U
MAGNESIUM	3.85	J
MOLYBDENUM	0.54	J
POTASSIUM	13.29	J
SODIUM	6.50	U

SAMPLE: CCB

File: JZG14A Jul 14, 2009 19:17

Analyte	Result	C
ALUMINUM	23.12	J
CALCIUM	29.69	
IRON	26.06	
LEAD	0.03	J
MAGNESIUM	27.73	
MOLYBDENUM	3.43	
POTASSIUM	60.79	J
SODIUM	34.54	J

SAMPLE: CCB

File: JZG14A Jul 14, 2009 19:51

Analyte	Result	C
ALUMINUM	4.88	J
CALCIUM	10.76	J
IRON	9.80	J
LEAD	0.04	J
MAGNESIUM	10.33	J
MOLYBDENUM	1.21	
POTASSIUM	33.61	J
SODIUM	14.77	J

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: CCB

File: JZG14A Jul 14, 2009 21:34

Analyte	Result	C
ALUMINUM	4.84	J
CALCIUM	10.75	J
IRON	7.80	J
LEAD	0.05	J
MAGNESIUM	9.30	J
MOLYBDENUM	0.67	J
POTASSIUM	18.92	J
SODIUM	16.22	J

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-8

Concentration Units: ug/L

SAMPLE: ICSA

File: JZG14A Jul 14, 2009 18:43

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	96310	96.3
CALCIUM	100000	95870	95.9
IRON	100000	89840	89.8
LEAD	0	0	
MAGNESIUM	100000	94820	94.8
MOLYBDENUM	2000	2006	100.3
POTASSIUM	100000	97480	97.5
SODIUM	100000	95500	95.5

SAMPLE: ICSAB

File: JZG14A Jul 14, 2009 18:51

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	94160	94.2
CALCIUM	100000	94760	94.8
IRON	100000	91190	91.2
LEAD	20	20	100.0
MAGNESIUM	100000	92940	92.9
MOLYBDENUM	2000	2045	102.3
POTASSIUM	100000	96880	96.9
SODIUM	100000	95410	95.4

Quality Control Report

Blank Sample Summary Report

Total Solids

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG65643	ASTM D2216	29-JUN-09	26-JUN-09	U 1 %	1 %
MBLANK	WG65656	ASTM D2216	29-JUN-09	26-JUN-09	U 1 %	1 %

Quality Control Report

Laboratory Control Sample Summary Report

Total Solids

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG65656-2	LCS	WG65656	29-JUN-09	26-JUN-09	%	90	90.	100	80-120	
WG65643-2	LCS	WG65643	29-JUN-09	26-JUN-09	%	90	90.	100	80-120	

Quality Control Report

Duplicate Sample Summary Report

Total Solids

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG65643-3	SC3311-1	WG65643	29-JUN-09	%	86.	87.	1	20
WG65643-4	SC3311-10	WG65643	29-JUN-09	%	84.	82.	2	20
WG65656-3	SC3311-20	WG65656	29-JUN-09	%	85.	86.	0	20
WG65643-5	SC3311-19	WG65643	29-JUN-09	%	91.	89.	2	20

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: **R.BASINSKI** **DATE:** **September 14, 2009**

FROM: **MEGAN CARSON** **COPIES:** **DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – SELECT METALS AND TOTAL SOILDS**
NSF INDIAN HEAD
SAMPLE DELIVERY GROUP (SDG) – CTO423-9

SAMPLES: 20/Soil/

FD06110901	X16SS0080001	X16SS0130001	X16SS0170001
X16SS0420001	X16SS0540001	X16SS0570001	X16SS0610001
X16SS0730001	X16SS0790001	X16SS0870001	X16SS0900001
X16SS0910001	X16SS0920001	X16SS0930001	X16SS0940001
X16SS0950001	X17SB0050004	X17SS0270001	X17SS0280001

Overview

The sample set for NSF Indian Head, SDG CTO423-9 consists of twenty soil environmental samples. This SDG contains one field duplicate pair: FD06110901/ X17SS0220001 (from SDG CTO423-8).

The samples were collected by Tetra Tech NUS, Inc. on June 11th, 12th, 13th, 14th,16th, 17th , 2009 and analyzed by Katahdin analytical services under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Metals analyses were conducted using SW-846 methods 6020 and 3050B, and total solids by ASTM method D2216.

Summary

All analytes were successfully analyzed. The findings offered in this report are based upon a general review of all available data. The data review was based on data completeness, holding times, calibration data, laboratory method/preparation blanks, interference check sample (ICS) results, matrix spike / matrix spike duplicate results, laboratory control sample (LCS) results, ICP serial dilution results, field duplicate results, detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems: None.

Minor Problems:

- The following contaminants were detected in the laboratory method/preparation blanks at the following maximum concentration:

Analyte	Maximum Concentration	Action Level
Antimony	0.06ug/L	0.03 mg/kg

Lead	2.13 ug/L	1.065 mg/kg
Tin [1]	0.580 mg/kg	2.90 mg/kg
Arsenic	0.07 ug/L	0.035 mg/kg
Copper	0.09 ug/L	0.045 mg/kg

[1] Results from a prep-blank.

An action level of 5X the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot, percent solids, and dilution factors, if applicable, were taken into consideration when evaluating for blank contamination. Positive results less than the blank action level for the above compounds were qualified "B" as a result of blank contamination.

- Matrix spike and matrix spike duplicate for sample X17SB0050004 had a percent recovery <75% for antimony and a percent recovery >125% for copper. Positive results for antimony were qualified as bias low (L) and positive results for copper were qualified as bias high (K).

Notes

All samples in the SDG were analyzed at a 5X dilution.

Samples X16SS0080001, X17SS027001, and X17SB0050004 were also analyzed at a 10X dilution to bring lead within linear calibration range.

The matrix spike/matrix spike dulpicate relative percent difference was greater than the quality control limit for antimony, copper, lead, and zinc. No validation actions are warranted for MS/MSD RPD noncompliances.

The project quantitation limit (PQL) standard performed on 7/10/08 at 08:00 had a percent recovery of 475% for lead. No results were qualified as all sample results were >2x CRQL.

The project quantitation limit (PQL) standard performed on 7/11/08 at 06:32 had a percent recovery of 170% for lead. No results were qualified as all sample results were >2x CRQL.

Executive Summary

Laboratory Performance: Method blanks and preparation blanks were found to contain contaminates.

Other Factors Affecting Data Quality: Matrix spike/spike duplicate percent recovery noncompliances resulted in the qualification of data.

The data for these analyses were reviewed with reference to Region III modifications to the "National Functional Guidelines for Inorganic Data Validation", April 1993, and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories " (January 2006).

The text of this report has been formulated to address only those problem areas affecting data quality.

Tetra Tech NUS
Megan Carson
Chemist/Data Validator

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Appendix A

Qualified Analytical Results

Data Validation Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS-GFAA MSA's r < 0.995 / ICP PDS Recovery Noncompliance
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O - Poor Instrument Performance (e.g. base-line drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DOT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient r < 0.995
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 00810	NSAMPLE	FD06110901			X16SS0080001			X16SS0130001			X16SS0170001		
SDG: CTO423-9	LAB_ID	SC3312-003			SC3312-017			SC3312-018			SC3312-019		
FRACTION: M	SAMP_DATE	6/11/2009			6/13/2009			6/13/2009			6/13/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	86.8			70.7			80.7			82.6		
	DUP_OF	X17SS0220001											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.13	B	A	1	L	D	0.55	L	D	0.45	L	D
ARSENIC		3.6			5.1			2			4.6		
COPPER		8	K	D	10.4	K	D	11.4	K	D	7.4	K	D
LEAD		7.2			616			38.8			51.4		
TIN		1	B	A	1.9	B	A	1.2	B	A	1.5	B	A
ZINC		13.8			30.9			34.9			26.2		

PROJ_NO: 00810	NSAMPLE	X16SS0420001			X16SS0540001			X16SS0570001			X16SS0610001		
SDG: CTO423-9	LAB_ID	SC3312-004			SC3312-005			SC3312-006			SC3312-007		
FRACTION: M	SAMP_DATE	6/13/2009			6/14/2009			6/14/2009			6/14/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	85.0			86.3			76.0			74.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.11	B	A	0.32	L	D	0.14	B	A	0.2	L	D
ARSENIC		1.7			2.4			2.1			6.5		
COPPER		3.9	K	D	5.3	K	D	4.5	K	D	6.5	K	D
LEAD		12.1			35			22.3			23.5		
TIN		1	B	A	1.1	B	A	1.3	B	A	1.8	B	A
ZINC		16.6			27			21.1			24.2		

PROJ_NO: 00810	NSAMPLE	X16SS0730001			X16SS0790001			X16SS0870001			X16SS0900001		
SDG: CTO423-9	LAB_ID	SC3312-008			SC3312-009			SC3312-010			SC3312-011		
FRACTION: M	SAMP_DATE	6/14/2009			6/14/2009			6/16/2009			6/17/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	86.4			74.3			79.3			84.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.92	L	D	1.2	L	D	0.69	L	D	0.23	L	D
ARSENIC		3.1			6.1			3.8			3.5		
COPPER		4.7	K	D	10.6	K	D	5.5	K	D	5.3	K	D
LEAD		40.1			267			90.2			38.8		
TIN		1.3	B	A	1.3	B	A	1.2	B	A	1.1	B	A
ZINC		22.6			31.6			21.8			16.6		

PROJ_NO: 00810	NSAMPLE	X16SS0910001			X16SS0920001			X16SS0930001			X16SS0940001		
SDG: CTO423-9	LAB_ID	SC3312-012			SC3312-013			SC3312-014			SC3312-015		
FRACTION: M	SAMP_DATE	6/17/2009			6/17/2009			6/17/2009			6/17/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	83.2			79.1			88.3			92.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.03	B	A	1	L	D	0.06	B	A	0.09	B	A
ARSENIC		0.16	U		2.4			1.1			1.5		
COPPER		5.7	K	D	5.7	K	D	3.3	K	D	2.4	K	D
LEAD		12.6			143			14.7			6.7		
TIN		1	B	A	1.3	B	A	1	B	A	0.75	B	A
ZINC		15.3			29.3			13.8			9.5		

PROJ_NO: 00810	NSAMPLE	X16SS0950001			X17SB0050004			X17SS0270001			X17SS0280001		
SDG: CTO423-9	LAB_ID	SC3312-016			SC3312-020			SC3312-001			SC3312-002		
FRACTION: M	SAMP_DATE	6/17/2009			6/11/2009			6/12/2009			6/12/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	83.5			86.9			91.7			92.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.08	B	A	1.7	L	D	2.1	L	D	0.5	L	D
ARSENIC		1.9			5.9			3.6			4		
COPPER		3	K	D	42	K	D	5.6	K	D	8.1	K	D
LEAD		19.2			620			645			38.9		
TIN		0.92	B	A	1.6	B	A	0.58	B	A	1.1	B	A
ZINC		16.4			23.8			10			13.5		

PROJ_NO: 00810	NSAMPLE	FD06110901			X16SS0170001			X16SS0540001			X16SS0570001		
SDG: CTO423-9	LAB_ID	SC3312-3			SC3312-19			SC3312-5			SC3312-6		
FRACTION: MISC	SAMP_DATE	6/11/2009			6/13/2009			6/14/2009			6/14/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	86.8			82.6			86.3			76.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		87			82			86			76		

PROJ_NO: 00810	NSAMPLE	X16SS0610001			X16SS0790001			X16SS0870001			X16SS0900001		
SDG: CTO423-9	LAB_ID	SC3312-7			SC3312-9			SC3312-10			SC3312-11		
FRACTION: MISC	SAMP_DATE	6/14/2009			6/14/2009			6/16/2009			6/17/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	74.3			74.3			79.3			84.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		74			74			79			84		

PROJ_NO: 00810	NSAMPLE	X16SS0910001			X16SS0920001			X16SS0930001			X16SS0940001		
SDG: CTO423-9	LAB_ID	SC3312-12			SC3312-13			SC3312-14			SC3312-15		
FRACTION: MISC	SAMP_DATE	6/17/2009			6/17/2009			6/17/2009			6/17/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	83.2			79.1			88.3			92.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		83			79			88			92		

PROJ_NO: 00810	NSAMPLE	X16SS0950001			X17SB0050004			X17SS0270001		
SDG: CTO423-9	LAB_ID	SC3312-16			SC3312-20			SC3312-1		
FRACTION: MISC	SAMP_DATE	6/17/2009			6/11/2009			6/12/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM		
	UNITS	%			%			%		
	PCT_SOLIDS	83.5			86.9			91.7		
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		83			87			92		

Appendix B

Results as Reported by the Laboratory

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: FD06110901
Matrix: SOIL
SDG Name: CTO423-9
Percent Solids: 86.8
Lab Sample ID: SC3312-003

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.13		N*	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	3.6			MS	5	0.51	0.15
7440-50-8	COPPER, TOTAL	8.0		N*	MS	5	0.51	0.11
7439-92-1	LEAD, TOTAL	7.2		*	MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.0			MS	5	0.51	0.20
7440-66-6	ZINC, TOTAL	13.8		*	MS	5	1.0	0.36

Bottle ID: A

Comments:

1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X16SS0080001

Matrix: SOIL **SDG Name:** CTO423-9

Percent Solids: 70.7 **Lab Sample ID:** SC3312-017

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	1.0		N*	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	5.1			MS	5	0.52	0.16
7440-50-8	COPPER, TOTAL	10.4		N*	MS	5	0.52	0.11
7439-92-1	LEAD, TOTAL	616		*	MS	10	0.21	0.06
7440-31-5	TIN, TOTAL	1.9			MS	5	0.52	0.20
7440-66-6	ZINC, TOTAL	30.9		*	MS	5	1.0	0.36

Bottle ID: A

Comments:

1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X16SS0130001

Matrix: SOIL
SDG Name: CTO423-9

Percent Solids: 80.6
Lab Sample ID: SC3312-018

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.55		N*	MS	5	0.090	0.02
7440-38-2	ARSENIC, TOTAL	2.0			MS	5	0.45	0.14
7440-50-8	COPPER, TOTAL	11.4		N*	MS	5	0.45	0.10
7439-92-1	LEAD, TOTAL	38.8		*	MS	5	0.090	0.03
7440-31-5	TIN, TOTAL	1.2			MS	5	0.45	0.17
7440-66-6	ZINC, TOTAL	34.9		*	MS	5	0.90	0.32

Bottle ID: A

Comments:

I

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X16SS0170001

Matrix: SOIL **SDG Name:** CTO423-9

Percent Solids: 82.6 **Lab Sample ID:** SC3312-019

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.45		N*	MS	5	0.086	0.02
7440-38-2	ARSENIC, TOTAL	4.6			MS	5	0.43	0.13
7440-50-8	COPPER, TOTAL	7.4		N*	MS	5	0.43	0.09
7439-92-1	LEAD, TOTAL	51.4		*	MS	5	0.086	0.03
7440-31-5	TIN, TOTAL	1.5			MS	5	0.43	0.16
7440-66-6	ZINC, TOTAL	26.2		*	MS	5	0.86	0.30

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X16SS0420001

Matrix: SOIL
SDG Name: CTO423-9

Percent Solids: 85.0
Lab Sample ID: SC3312-004

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.11		N*	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	1.7			MS	5	0.53	0.16
7440-50-8	COPPER, TOTAL	3.9		N*	MS	5	0.53	0.12
7439-92-1	LEAD, TOTAL	12.1		*	MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.0			MS	5	0.53	0.20
7440-66-6	ZINC, TOTAL	16.6		*	MS	5	1.0	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X16SS0540001

Matrix: SOIL
SDG Name: CTO423-9

Percent Solids: 86.3
Lab Sample ID: SC3312-005

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.32		N*	MS	5	0.098	0.02
7440-38-2	ARSENIC, TOTAL	2.4			MS	5	0.49	0.15
7440-50-8	COPPER, TOTAL	5.3		N*	MS	5	0.49	0.11
7439-92-1	LEAD, TOTAL	35.0		*	MS	5	0.098	0.03
7440-31-5	TIN, TOTAL	1.1			MS	5	0.49	0.19
7440-66-6	ZINC, TOTAL	27.0		*	MS	5	0.98	0.34

Bottle ID: A

Comments:

1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X16SS0570001

Matrix: SOIL **SDG Name:** CTO423-9

Percent Solids: 76.0 **Lab Sample ID:** SC3312-006

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.14		N*	MS	5	0.12	0.02
7440-38-2	ARSENIC, TOTAL	2.1			MS	5	0.60	0.18
7440-50-8	COPPER, TOTAL	4.5		N*	MS	5	0.60	0.13
7439-92-1	LEAD, TOTAL	22.3		*	MS	5	0.12	0.04
7440-31-5	TIN, TOTAL	1.3			MS	5	0.60	0.23
7440-66-6	ZINC, TOTAL	21.1		*	MS	5	1.2	0.42

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X16SS0610001

Matrix: SOIL **SDG Name:** CTO423-9

Percent Solids: 74.3 **Lab Sample ID:** SC3312-007

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.20		N*	MS	5	0.13	0.03
7440-38-2	ARSENIC, TOTAL	6.5			MS	5	0.67	0.20
7440-50-8	COPPER, TOTAL	6.5		N*	MS	5	0.67	0.15
7439-92-1	LEAD, TOTAL	23.5		*	MS	5	0.13	0.04
7440-31-5	TIN, TOTAL	1.8			MS	5	0.67	0.25
7440-66-6	ZINC, TOTAL	24.2		*	MS	5	1.3	0.47

Bottle ID: A

Comments:

1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X16SS0730001

Matrix: SOIL **SDG Name:** CTO423-9

Percent Solids: 86.4 **Lab Sample ID:** SC3312-008

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.92		N*	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	3.1			MS	5	0.57	0.17
7440-50-8	COPPER, TOTAL	4.7		N*	MS	5	0.57	0.12
7439-92-1	LEAD, TOTAL	40.1		*	MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.3			MS	5	0.57	0.22
7440-66-6	ZINC, TOTAL	22.6		*	MS	5	1.1	0.40

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X16SS0790001

Matrix: SOIL
SDG Name: CTO423-9

Percent Solids: 74.3
Lab Sample ID: SC3312-009

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	1.2		N*	MS	5	0.096	0.02
7440-38-2	ARSENIC, TOTAL	6.1			MS	5	0.48	0.14
7440-50-8	COPPER, TOTAL	10.6		N*	MS	5	0.48	0.11
7439-92-1	LEAD, TOTAL	267		*	MS	5	0.096	0.03
7440-31-5	TIN, TOTAL	1.3			MS	5	0.48	0.18
7440-66-6	ZINC, TOTAL	31.6		*	MS	5	0.96	0.34

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X16SS0870001
Matrix: SOIL
SDG Name: CTO423-9
Percent Solids: 79.3
Lab Sample ID: SC3312-010

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.69		N*	MS	5	0.12	0.02
7440-38-2	ARSENIC, TOTAL	3.8			MS	5	0.60	0.18
7440-50-8	COPPER, TOTAL	5.5		N*	MS	5	0.60	0.13
7439-92-1	LEAD, TOTAL	90.2		*	MS	5	0.12	0.04
7440-31-5	TIN, TOTAL	1.2			MS	5	0.60	0.23
7440-66-6	ZINC, TOTAL	21.8		*	MS	5	1.2	0.42

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X16SS0900001
Matrix: SOIL
SDG Name: CTO423-9
Percent Solids: 84.0
Lab Sample ID: SC3312-011

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.23		N*	MS	5	0.093	0.02
7440-38-2	ARSENIC, TOTAL	3.5			MS	5	0.46	0.14
7440-50-8	COPPER, TOTAL	5.3		N*	MS	5	0.46	0.10
7439-92-1	LEAD, TOTAL	38.8		*	MS	5	0.093	0.03
7440-31-5	TIN, TOTAL	1.1			MS	5	0.46	0.18
7440-66-6	ZINC, TOTAL	16.6		*	MS	5	0.93	0.33

Bottle ID: A

Comments:

I

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X16SS0910001

Matrix: SOIL **SDG Name:** CTO423-9

Percent Solids: 83.2 **Lab Sample ID:** SC3312-012

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.03	B	N*	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	0.16	U		MS	5	0.53	0.16
7440-50-8	COPPER, TOTAL	5.7		N*	MS	5	0.53	0.12
7439-92-1	LEAD, TOTAL	12.6		*	MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.0			MS	5	0.53	0.20
7440-66-6	ZINC, TOTAL	15.3		*	MS	5	1.1	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X16SS0920001
Matrix: SOIL
SDG Name: CTO423-9
Percent Solids: 79.1
Lab Sample ID: SC3312-013

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	1.0		N*	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	2.4			MS	5	0.54	0.16
7440-50-8	COPPER, TOTAL	5.7		N*	MS	5	0.54	0.12
7439-92-1	LEAD, TOTAL	143		*	MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.3			MS	5	0.54	0.21
7440-66-6	ZINC, TOTAL	29.3		*	MS	5	1.1	0.38

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X16SS0930001

Matrix: SOIL
SDG Name: CTO423-9

Percent Solids: 88.3
Lab Sample ID: SC3312-014

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.06	B	N*	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	1.1			MS	5	0.52	0.16
7440-50-8	COPPER, TOTAL	3.3		N*	MS	5	0.52	0.12
7439-92-1	LEAD, TOTAL	14.7		*	MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.0			MS	5	0.52	0.20
7440-66-6	ZINC, TOTAL	13.8		*	MS	5	1.0	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X16SS0940001

Matrix: SOIL
SDG Name: CTO423-9

Percent Solids: 92.0
Lab Sample ID: SC3312-015

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.09	B	N*	MS	5	0.090	0.02
7440-38-2	ARSENIC, TOTAL	1.5			MS	5	0.45	0.13
7440-50-8	COPPER, TOTAL	2.4		N*	MS	5	0.45	0.10
7439-92-1	LEAD, TOTAL	6.7		*	MS	5	0.090	0.03
7440-31-5	TIN, TOTAL	0.75			MS	5	0.45	0.17
7440-66-6	ZINC, TOTAL	9.5		*	MS	5	0.90	0.31

Bottle ID: A

Comments:

1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X16SS0950001

Matrix: SOIL **SDG Name:** CTO423-9

Percent Solids: 83.5 **Lab Sample ID:** SC3312-016

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.08	B	N*	MS	5	0.091	0.02
7440-38-2	ARSENIC, TOTAL	1.9			MS	5	0.46	0.14
7440-50-8	COPPER, TOTAL	3.0		N*	MS	5	0.46	0.10
7439-92-1	LEAD, TOTAL	19.2		*	MS	5	0.091	0.03
7440-31-5	TIN, TOTAL	0.92			MS	5	0.46	0.17
7440-66-6	ZINC, TOTAL	16.4		*	MS	5	0.91	0.32

Bottle ID: A

Comments:

1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X17SB0050004

Matrix: SOIL
SDG Name: CTO423-9

Percent Solids: 86.9
Lab Sample ID: SC3312-020

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	1.7		N*	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	5.9			MS	5	0.53	0.16
7440-50-8	COPPER, TOTAL	42.0		N*	MS	5	0.53	0.12
7439-92-1	LEAD, TOTAL	620		*	MS	10	0.21	0.06
7440-31-5	TIN, TOTAL	1.6			MS	5	0.53	0.20
7440-66-6	ZINC, TOTAL	23.8		*	MS	5	1.0	0.37

Bottle ID: A

Comments:

1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X17SS0270001

Matrix: SOIL
SDG Name: CTO423-9

Percent Solids: 91.7
Lab Sample ID: SC3312-001

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	2.1		N*	MS	5	0.074	0.01
7440-38-2	ARSENIC, TOTAL	3.6			MS	5	0.37	0.11
7440-50-8	COPPER, TOTAL	5.6		N*	MS	5	0.37	0.08
7439-92-1	LEAD, TOTAL	645		*	MS	10	0.15	0.04
7440-31-5	TIN, TOTAL	0.58			MS	5	0.37	0.14
7440-66-6	ZINC, TOTAL	10		*	MS	5	0.74	0.26

Bottle ID: A

Comments:

1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: X17SS0280001

Matrix: SOIL
SDG Name: CTO423-9

Percent Solids: 92.3
Lab Sample ID: SC3312-002

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted CRDL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.50		N*	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	4.0			MS	5	0.52	0.16
7440-50-8	COPPER, TOTAL	8.1		N*	MS	5	0.52	0.11
7439-92-1	LEAD, TOTAL	38.9		*	MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.1			MS	5	0.52	0.20
7440-66-6	ZINC, TOTAL	13.5		*	MS	5	1.0	0.36

Bottle ID: A

Comments:

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-3
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
FD06110901	SL	11-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	87. %	1	D2216	WG65689	30-JUN-09 09:00:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-17
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X16SS0080001	SL	13-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	71. %	1	D2216	WG65690	30-JUN-09 09:25:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-18
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X16SS0130001	SL	13-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	81. %	1	D2216	WG65690	30-JUN-09 09:25:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-19
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X16SS0170001	SL	13-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	82. %	1	D2216	WG65690	30-JUN-09 09:25:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-4
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X16SS0420001	SL	13-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	85. %	1	D2216	WG65689	30-JUN-09 09:00:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-5
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X16SS0540001	SL	14-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG65689	30-JUN-09 09:00:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-6
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X16SS0570001	SL	14-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	76. %	1	D2216	WG65689	30-JUN-09 09:00:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-7
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X16SS0610001	SL	14-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	74. %	1	D2216	WG65689	30-JUN-09 09:00:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-8
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X16SS0730001	SL	14-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG65690	30-JUN-09 09:25:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-9
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X16SS0790001	SL	14-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	74. %	1	D2216	WG65690	30-JUN-09 09:25:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-10
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X16SS0870001	SL	16-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	79. %	1	D2216	WG65690	30-JUN-09 09:25:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-11
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X16SS0900001	SL	17-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	84. %	1	D2216	WG65690	30-JUN-09 09:25:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-12
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X16SS0910001	SL	17-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	83. %	1	D2216	WG65690	30-JUN-09 09:25:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-13
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X16SS0920001	SL	17-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	79. %	1	D2216	WG65690	30-JUN-09 09:25:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-14
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X16SS0930001	SL	17-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	88. %	1	D2216	WG65690	30-JUN-09 09:25:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-15
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X16SS0940001	SL	17-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	92. %	1	D2216	WG65690	30-JUN-09 09:25:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-16
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X16SS0950001	SL	17-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	83. %	1	D2216	WG65690	30-JUN-09 09:25:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-20
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X17SB0050004	SL	11-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	87. %	1	D2216	WG65690	30-JUN-09 09:25:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-1
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X17SS0270001	SL	12-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	92. %	1	D2216	WG65689	30-JUN-09 09:00:00	ASTM D2216	29-JUN-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3312-2
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-9

Sample Description	Matrix	Date Sampled	Date Received
X17SS0280001	SL	12-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	92. %	1	D2216	WG65689	30-JUN-09 09:00:00	ASTM D2216	29-JUN-09	JF	

Appendix C

Support Documentation

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER No 028256 PAGE 4 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Buzinski	4129218308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 8631 3887 9042		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ]
[ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE (YEAR 2009)	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS: Metals SW846 6020 / 6050B; SVOCs SW846 8270	COMMENTS
									G		4°C	
6/11	1500	X175501900001	019	0	1	SO	G	3	3			MS/MSD
6/11	1530	" 0220001	022	↓	↓	↓	↓	1	1			
6/11	1545	" 0240001	024					1	1			
6/12	1020	" 0250001	025					1	1			
6/14	1440	X175B0250102	025	1	2			1	1			
6/12	1040	X1755027000 1	027	0	1			1	1			
6/12	1050	X175502850001	028	0	1			1	1			
6/11	0000	FD0611090 1	QC					1	1			
6/13	1515	X16550 1820001	042					1	1			
6/14	900	" 0540001	054					1	1			
	855	" 0570001	057					1	1			
	930	" 0610001	061					1	1			
↓	1040	" 0730001	073	↓	↓	↓	↓	1	1			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER No 028257 PAGE 5 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	4129218308	Katahdin Labs / Colby Andrea
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 863138879042		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)										COMMENTS
									G	G									
									PRESERVATIVE USED		4°C	4°C							
									TYPE OF ANALYSIS		RSK TOC TEC	Metals SW846 6020/3050B							
6/13	1315	X16550130001	013	0	1	SO	G	1	1										
6/13	1515	X16550420001	042					1	1										
6/11	840	X17550010001	001					1	1										
6/14	1450	X17550130001	013					1	1										
6/12	1050	X17550280001	028					1	1										
6/17	1055	X16550790001	079					1	45	1									
6/16	1350	" 0870001	087					1		1									
6/17	1020	" 0900001	090					1		1									
	1530	" 0910001	091					1		1									
	1515	" 0920001	092					1		1									
	1500	" 0930001	093					1		1									
	1440	" 0940001	094					1		1									
	1440	" 095001	095					1		1									

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028258 | PAGE 6 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Badinski	412921 8308	Katahdin Lab / Andrea Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
J. Doerdt		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		Fed Ex / 863388790 42		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS: Metals 6010B/6020A/7471A	PH	TOC	LEC	PAH	COMMENTS
									G		4°C			4°C		
6/13	1140	X165500800001	008	0	1	SO	G	1	1							
	1315	" 013 0001	013					1	1							
	1245	" 017 0001	017					1	1							
	1255	" 020 0001	020					1	1							
	1345	" 025 0001	025					3	3							MS/MSD
	1425	" 032 0001	032					1	1							
	0000	FD06130901	QC	0	1	SO	G	1	1							
6/15	1355	X255500320001	032					2		2						
	1255	" 019 0001	019					2		2						
	1305	" 013 0001	013					2		2						
	1335	" 006 0001	006					~~2~~ 3		2						
6/11	1500	X175501900 01	019					~~6~~ 9		~~6~~ 6						MS/MSD ~~MS/MSD~~ 3 SD's
6/15	0000	FD06150903	QC					2		2						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY: J. Doerdt	6-18-09	1700	1. RECEIVED BY:	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: X175501900 01 - MS/MSD 6 jars (2.5 oz)

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. — CHAIN OF CUSTODY — NUMBER № 028259 — PAGE 7 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	4129218308	Katahdin Labs / Andrea Colby

SAMPLERS (SIGNATURE)	FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
[signature]	J. Goerdt	4124430244	600 Technology Way ~~34 Dogwood Ln~~

CARRIER/WAYBILL NUMBER	CITY, STATE
Fed Ex / 863138879042	Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G, G
PRESERVATIVE USED: 4°C, 4°C

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: Metals 846 6020A/3050B	pH TOC CEC	PAH						COMMENTS
6/13	0000	FD06130902	QC	0	1	SO	G	2			2						
6/13	1450	X16SS0370001	037	↓	↓			~~8~~ 2			~~8~~ 2						~~MS/MSD~~
6/13	1325	" 0230001	023	↓	↓			2			2						
6/13	0000	FD06130903	QC	↓	↓			2			2						
6/14	1450	X17SB0110102	011	1	2			1	1								
6/14	1450	" 0130102	013	1	2			1	1								
6/11	1314	X17SS0140001	014	0	1			1	1								
6/11	1053	X17SB0050004	005	0	4			3	3								ms/msd
6/11	1110	X17SB0050810	005	8	10			1	1								
6/11	1120	X17SB0070004	007	0	4			1	1								
6/11	1120	X17SB0060406	006	4	6			1	1								
6/15	1320	X25SS0330001	033	0	1			1	1								
6/11	840	X17SB0010004	001	0	4			1	1								

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	6-18-09	1500	1. RECEIVED BY [signature]	6-19-09	1000
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

Katahdin ANALYTICAL SERVICES

nelac Cert No. EM760

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CTO 423 NSF INDIAN HEAD
SDG: CTO423-9
SC3312

Sample Receipt

The following samples were received on June 19, 2009 and were logged in under Katahdin Analytical Services work order numbers SC3312 for a hardcopy due date of July 08, 2009.

KATAHDIN Sample No.	TTNUS Sample Identification
SC3312-1	X17SS0270001
SC3312-2	X17SS0280001
SC3312-3	FD06110901
SC3312-4	X16SS0420001
SC3312-5	X16SS0540001
SC3312-6	X16SS0570001
SC3312-7	X16SS0610001
SC3312-8	X16SS0730001
SC3312-9	X16SS0790001
SC3312-10	X16SS0870001
SC3312-11	X16SS0900001
SC3312-12	X16SS0910001
SC3312-13	X16SS0920001
SC3312-14	X16SS0930001
SC3312-15	X16SS0940001
SC3312-16	X16SS0950001
SC3312-17	X16SS0800001
SC3312-18	X16SS0130001
SC3312-19	X16SS0170001
SC3312-20	X17SB0050004

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in this narrative or in the Report of Analysis.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Andrea J. Colby**. This narrative is an integral part of the Report of Analysis.

Metals Analysis

The samples of SDG CTO423-9 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846. 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA.

Inductively-Coupled Plasma Mass Spectrometric Analysis (ICP-MS)

Solid-matrix Katahdin Sample Numbers SC3312-(1-20) were digested for ICP-MS analysis on 07/02/09 (QC Batch ZG02ICS0) in accordance with USEPA Method 3050B. Katahdin Sample Number SC3312-20 was prepared with duplicate matrix-spiked aliquots. The measured tin concentration in the preparation blank in this batch exceeds the laboratory's acceptance limit. Laboratory testing has determined that this tin contamination comes from one of the reagents used in the digestion process.

ICP-MS analyses of SDG CTO423-9 sample digestates were performed using an Agilent 7500 ICP-MS spectrometer in accordance with USEPA Method 6020. Results for all standards and samples are reported using the mean of 3 replicate measurements. All samples were analyzed within holding times and all analytical run QC criteria were met, with the following exceptions:

The measured lead concentrations of some of the CCBs analyzed in runs JZG09A and JZG10A are greater than the laboratory's practical quantitation limit (PQL) for lead. Lead results that are less than the PQL or more than ten times the measured CCB concentrations have been reported from these runs.

The measure lead recoveries for some of the PQL standards analyzed in runs JZG09A and JZG10A are higher than the laboratory's acceptance acceptance limit. Lead results that are less than the PQL or more than ten times the measured PQL concentrations have been reported from these runs.

Internal standard recoveries for ICP-MS analyses can be found in the raw data section of the accompanying data package. The following table indicates which analytes are associated with each internal standard element.

Internal Standard Element	Associated Analytes
Lithium	Beryllium
Scandium	Sodium, Magnesium, Aluminum, Potassium, Calcium
Germanium	Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel, Copper, Zinc, Arsenic, Selenium, Silver, Cadmium
Terbium	Antimony, Barium, Tin
Bismuth	Thallium, Lead

Instrument tuning information can also be found in the raw data section in the report labeled "6020 QC Tune Report". The relative standard deviation was determined from 4 replicate measurements. The peak width was measured at 10% of the peak height.

Matrix QC Summary

The measured recoveries of antimony and copper in one of the matrix-spiked aliquots of Katahdin Sample Number SC3312-20 are outside the laboratory's acceptance criteria (75% - 125% recovery of the added element, if the native concentration is less than four times the amount added). The measure recoveries of antimony and copper in a post-digestion matrix spike of this sample are within the laboratory's acceptance criteria.

The matrix spike duplicate analysis of Katahdin Sample Number SC3312-20 is outside the laboratory's acceptance limit (<20% relative difference between duplicate matrix-spiked aliquots) for antimony, copper, lead, and zinc.

The serial dilution analysis of Katahdin Sample Number SC3312-20 is within the laboratory's acceptance limit (<10% relative percent difference, if the concentration in the original sample is greater than 50 times the MDL) for all analytes.

Reporting of Metals Results

Analytical results for client samples, matrix QC samples (duplicates and matrix spikes), and batch QC samples (preparation blanks and laboratory control samples) have been reported down to the laboratory's method detection limits (MDLs). These MDLs have been adjusted for each sample based on the sample amounts used in preparation and analysis. Analytical results that are below the MDLs are flagged with "U" in the C-qualifier column.

Analytical results for instrument run QC samples (ICVs, ICBs, etc.) have been reported down to the laboratory's instrument detection limits (IDLs).

IDLs, MDLs, and PQLs are listed on Form 10 of the accompanying data package.

Wet Chemistry Analysis

The samples of SDG CTO423-9 were analyzed in accordance with the specific methods listed on the Report of Analysis.

Analyses for total solids were performed according to "Annual Book of ASTM Standards", Method D2216-98 "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass".

All analyses were performed within analytical holding times, and all quality control criteria were met.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Operations Manager or the Quality Assurance Officer as verified by the following signature.

Leslie Dimond
07.15.09

Leslie Dimond
Quality Assurance Officer

NSF INDIAN HEAD
SOIL DATA
CTO423-9 AND CTO423-8

FRACTION	CHEMICAL	FD06110901	UNITS	X17SS0220001	RPD	D
MISC	TOTAL SOLIDS	87	%	87	0.00	0.00

Current RPD Quality Control Limit: 55 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

NSF INDIAN HEAD
SOIL DATA
CTO423-9 AND CTO423-8

FRACTION	CHEMICAL	FD06110901	UNITS	X17SS0220001	RPD	D
M	ANTIMONY	0.13	MG/KG	0.13	0.00	0.00
M	ARSENIC	3.6	MG/KG	3.5	2.82	0.10
M	COPPER	8	MG/KG	8.2	2.47	0.20
M	LEAD	7.2	MG/KG	7	2.82	0.20
M	TIN	1	MG/KG	1	0.00	0.00
M	ZINC	13.8	MG/KG	13.7	0.73	0.10

Current RPD Quality Control Limit: 55 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JZG09A.B\068SMPL.D\068SMPL.D#
Date Acquired: Jul 10 2009 03:15 am
Acq. Method: K10CCV.M
Operator: EAM
Sample Name: SC3312-003
Misc Info: DILUTION - 2/10
Vial Number: 2305
Current Method: C:\ICPCHEM\1\METHODS\K10CCV.M
Calibration File: C:\ICPCHEM\1\CALIB\K10CCV.C
Last Cal. Update: Jul 10 2009 02:16 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

Reported Value for Arsenic = 3.6 mg/kg

%S = 86.8

$34.69\ \mu g/L \times \left(\frac{100mL}{1.12g}\right) \times \left(\frac{1}{.868}\right) \times \left(\frac{1}{1000}\right) = 3.56\ mg/kg$

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
7 Li	84,000.	16,800.	ppb ---		#VALUE!	
9 Be	1.816	0.3632	ppb	3.18	1000.	
11 B	15.595	3.119	ppb	6.18	1000.	
23 Na	248.	49.6	ppb	1.24	100000.	
25 Mg	3,804.	760.8	ppb	0.29	100000.	
27 Al	131,150.	26,230.	ppb	0.47	100000.	
28 Si	4,472.	894.4	ppb	0.58	#VALUE!	
29 Si	4,397.	879.4	ppb	0.33	10000.	
39 K	5,080.	1,016.	ppb	1.18	100000.	
43 Ca	262.65	52.53	ppb	5.45	100000.	
44 Ca	157.75	31.55	ppb	7.52	100000.	
51 V	284.6	56.92	ppb	0.45	1000.	
52 Cr	164.3	32.86	ppb	0.37	1000.	
53 Cr	183.85	36.77	ppb	1.38	1000.	
55 Mn	181.95	36.39	ppb	0.66	500.	
56 Fe	148,400.	29,680.	ppb	0.97	100000.	
57 Fe	142,650.	28,530.	ppb	1.01	100000.	
59 Co	18.86	3.772	ppb	1.77	500.	
60 Ni	45.925	9.185	ppb	2.17	500.	
63 Cu	76.7	15.34	ppb	0.77	1000.	
65 Cu	78.15	15.63	ppb	0.76	500.	
66 Zn	133.8	26.76	ppb	1.61	500.	
68 Zn	136.95	27.39	ppb	0.74	1000.	
75 As	34.69	6.938	ppb	3.80	1000.	
82 Se	1.433	0.2866	ppb	112.25	500.	
88 Sr	21.93	4.386	ppb	3.26	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	8.225	1.645	ppb	3.09	1000.	
107 Ag	-0.0275	-0.0055	ppb	99.33	100.	
109 Ag	-0.0529	-0.0106	ppb	24.40	200.	
111 Cd	0.1995	0.0399	ppb	51.98	200.	
114 Cd	-0.0036	-0.0007	ppb	990.35	500.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	9.685	1.937	ppb	2.47	1000.	
120 Sn	9.86	1.972	ppb	0.93	1000.	
121 Sb	1.183	0.2366	ppb	7.24	1000.	
123 Sb	1.256	0.2512	ppb	6.54	1000.	
135 Ba	209.75	41.95	ppb	0.68	1000.	
137 Ba	210.75	42.15	ppb	0.68	#VALUE!	
182 W	0.902	0.1804	ppb	12.88	1000.	
200 Hg	0.849	0.1698	ppb	39.16	#VALUE!	
202 Hg	0.9705	0.1941	ppb	47.18	#VALUE!	
203 Tl	0.6215	0.1243	ppb	13.19	1000.	
205 Tl	0.594	0.1188	ppb	18.70	#VALUE!	
208 Pb	69.8	13.96	ppb	0.13	1000.	
232 Th	27.205	5.441	ppb	1.49	1000.	
238 U	6.095	1.219	ppb	0.74	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	478503.94	0.94	472131.25	101.3	69.5 - 130	
45 Sc	728161.25	0.95	649566.75	112.1	69.5 - 130	
72 Ge	149007.45	0.27	142615.33	104.5	69.5 - 130	
159 Tb	1106935.80	1.19	1018723.20	108.7	69.5 - 130	
209 Bi	630010.38	0.98	595430.44	105.8	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JZG09A.B\009CALB.D\009CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000170

File:	064_CCB.D#	065SMPL.D#	066SMPL.D#	067SMPL.D#	068SMPL.D#
Sample:	CCB	PBSZG02ICS0	SC3312-001	SC3312-002	SC3312-003
Date/Time:	7/10/2009 2:41	7/10/2009 2:49	7/10/2009 2:58	7/10/2009 3:07	7/10/2009 3:15
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	5	5	5	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	-0.0125	-0.0902	2.6065	1.5935	1.8160
B / 11	0.3306	1.3805	11.3250	14.6250	15.5950
Na / 23	5.3560	48.7250	89.1500	149.1000	248.0000
Mg / 25	4.7390	34.4950	6275.0000	5305.0000	3804.0000
Al / 27	1.0700	19.5700	59950.0000	70350.0000	131150.0000
Si / 29	0.4492	44.0450	4102.5000	4471.0000	4397.0000
K / 39	-2.0830	14.4600	3050.0000	3448.5000	5080.0000
Ca / 44	2.1410	35.6600	23080.0000	11505.0000	157.7500
V / 51	0.0414	0.6110	333.0500	153.3500	284.6000
Cr / 52	-0.1185	0.4316	306.5500	130.4500	164.3000
Mn / 55	0.0014	0.4464	1699.5000	614.5000	181.9500
Fe / 57	2.4810	26.5150	146100.0000	111050.0000	142650.0000
Co / 59	-0.0116	-0.0711	53.9000	30.5150	18.8600
Ni / 60	0.0021	0.1953	102.6500	115.0000	45.9250
Cu / 65	0.0149	0.6075	76.1500	78.2000	78.1500
Zn / 66	-0.0032	1.9810	135.1500	129.4500	133.8000
As / 75	-0.0039	0.3385	48.7900	38.9000	34.6900
Se / 82	0.0529	-0.4537	-0.6350	0.4130	1.4330
Sr / 88	0.0211	0.6620	93.8500	65.8500	21.9300
Mo / 98	0.1522	0.3088	5.9600	6.4300	8.2250
Ag / 107	-0.0062	-0.1090	0.2361	-0.0289	-0.0275
Cd / 114	-0.0006	-0.0170	0.4296	0.1200	-0.0036
Sn / 118	0.0486	5.8000	7.8650	10.3350	9.6850
Sb / 123	0.0204	0.0037	27.9900	4.7760	1.2560
Ba / 135	0.0194	0.2347	149.9000	158.5000	209.7500
W / 182	0.3378	0.8490	1.3430	0.9870	0.9020
Tl / 203	0.0507	-0.3390	0.0095	0.1567	0.6215
Pb / 208	-0.0138	0.0331	8335.0000	373.9000	69.8000
Th / 232	-0.0013	-0.0144	16.2000	14.6050	27.2050
U / 238	0.0000	-0.0402	4.5650	3.2740	6.0950
Li / 6	473259.7	467924.9	484150.8	470039.1	478503.9
Sc / 45	680938.3	654952.6	712684.8	673033.9	728161.3
Ge / 72	152136.5	146168.9	147924.8	145350.6	149007.5
Tb / 159	1122566	1079495	1101229	1061135	1106936
Bi / 209	655448.5	631003.1	621295.2	617988.6	630010.4
Li / 6	100.2	99.1	102.5	99.6	101.3
Sc / 45	104.8	100.8	109.7	103.6	112.1
Ge / 72	106.7	102.5	103.7	101.9	104.5
Tb / 159	110.2	106.0	108.1	104.2	108.7
Bi / 209	110.1	106.0	104.3	103.8	105.8

HOLDTIME

SDG CTO423-9

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	X16SS0730001	SC3312-008	NM	6/14/2009	7/2/2009	7/10/2009	17.75	8	25.75
M	MG/KG	X17SB0050004	SC3312-020	NM	6/11/2009	7/2/2009	7/10/2009	20.83	8	28.83
M	MG/KG	X17SB0050004	SC3312-020	NM	6/11/2009	7/2/2009	7/11/2009	20.77	9	29.77
M	MG/KG	X16SS0950001	SC3312-016	NM	6/17/2009	7/2/2009	7/10/2009	14.63	8	22.63
M	MG/KG	X16SS0940001	SC3312-015	NM	6/17/2009	7/2/2009	7/10/2009	14.62	8	22.62
M	MG/KG	X16SS0930001	SC3312-014	NM	6/17/2009	7/2/2009	7/10/2009	14.60	8	22.60
M	MG/KG	X16SS0920001	SC3312-013	NM	6/17/2009	7/2/2009	7/10/2009	14.58	8	22.58
M	MG/KG	X16SS0910001	SC3312-012	NM	6/17/2009	7/2/2009	7/10/2009	14.57	8	22.57
M	MG/KG	X16SS0900001	SC3312-011	NM	6/17/2009	7/2/2009	7/10/2009	14.78	8	22.78
M	MG/KG	FD06110901	SC3312-003	NM	6/11/2009	7/2/2009	7/10/2009	21.14	8	29.14
M	MG/KG	X16SS0790001	SC3312-009	NM	6/14/2009	7/2/2009	7/10/2009	17.74	8	25.74
M	MG/KG	X17SS0280001	SC3312-002	NM	6/12/2009	7/2/2009	7/10/2009	19.68	8	27.68
M	MG/KG	X16SS0610001	SC3312-007	NM	6/14/2009	7/2/2009	7/10/2009	17.76	8	25.76
M	MG/KG	X16SS0570001	SC3312-006	NM	6/14/2009	7/2/2009	7/10/2009	17.78	8	25.78
M	MG/KG	X16SS0540001	SC3312-005	NM	6/14/2009	7/2/2009	7/10/2009	17.77	8	25.77

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	X16SS0420001	SC3312-004	NM	6/13/2009	7/2/2009	7/10/2009	18.51	8	26.51
M	MG/KG	X16SS0170001	SC3312-019	NM	6/13/2009	7/2/2009	7/10/2009	18.75	8	26.75
M	MG/KG	X16SS0130001	SC3312-018	NM	6/13/2009	7/2/2009	7/10/2009	18.72	8	26.72
M	MG/KG	X16SS0080001	SC3312-017	NM	6/13/2009	7/2/2009	7/10/2009	18.78	8	26.78
M	MG/KG	X16SS0080001	SC3312-017	NM	6/13/2009	7/2/2009	7/11/2009	18.70	9	27.70
M	MG/KG	X16SS0870001	SC3312-010	NM	6/16/2009	7/2/2009	7/10/2009	15.63	8	23.63
M	MG/KG	X17SS0270001	SC3312-001	NM	6/12/2009	7/2/2009	7/10/2009	19.68	8	27.68
M	MG/KG	X17SS0270001	SC3312-001	NM	6/12/2009	7/2/2009	7/11/2009	19.74	9	28.74
TS	%	X16SS0730001	SC3312-8	NM	6/14/2009	6/29/2009	6/30/2009	14.86	1.092	15.95
TS	%	X17SS0270001	SC3312-1	NM	6/12/2009	6/29/2009	6/30/2009	16.93	1	17.93
TS	%	X17SB0050004	SC3312-20	NM	6/11/2009	6/29/2009	6/30/2009	17.85	1.093	18.94
TS	%	X16SS0950001	SC3312-16	NM	6/17/2009	6/29/2009	6/30/2009	11.69	1.096	12.78
TS	%	X16SS0940001	SC3312-15	NM	6/17/2009	6/29/2009	6/30/2009	11.68	1.097	12.78
TS	%	X16SS0930001	SC3312-14	NM	6/17/2009	6/29/2009	6/30/2009	11.67	1.097	12.77
TS	%	X16SS0920001	SC3312-13	NM	6/17/2009	6/29/2009	6/30/2009	11.66	1.098	12.76
TS	%	X16SS0910001	SC3312-12	NM	6/17/2009	6/29/2009	6/30/2009	11.65	1.099	12.75
TS	%	X16SS0900001	SC3312-11	NM	6/17/2009	6/29/2009	6/30/2009	11.86	1.099	12.96
TS	%	X16SS0790001	SC3312-9	NM	6/14/2009	6/29/2009	6/30/2009	14.85	1.092	15.94

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
TS	%	X16SS0610001	SC3312-7	NM	6/14/2009	6/29/2009	6/30/2009	14.98	1	15.98
TS	%	X16SS0570001	SC3312-6	NM	6/14/2009	6/29/2009	6/30/2009	15.00	1	16.00
TS	%	X16SS0540001	SC3312-5	NM	6/14/2009	6/29/2009	6/30/2009	15	1	16
TS	%	X16SS0420001	SC3312-4	NM	6/13/2009	6/29/2009	6/30/2009	15.74	1	16.74
TS	%	X16SS0170001	SC3312-19	NM	6/13/2009	6/29/2009	6/30/2009	15.77	1.094	16.86
TS	%	X16SS0130001	SC3312-18	NM	6/13/2009	6/29/2009	6/30/2009	15.75	1.094	16.84
TS	%	X16SS0080001	SC3312-17	NM	6/13/2009	6/29/2009	6/30/2009	15.81	1.095	16.91
TS	%	FD06110901	SC3312-3	NM	6/11/2009	6/29/2009	6/30/2009	18.38	1	19.38
TS	%	X17SS0280001	SC3312-2	NM	6/12/2009	6/29/2009	6/30/2009	16.92	1	17.92
TS	%	X16SS0870001	SC3312-10	NM	6/16/2009	6/29/2009	6/30/2009	12.72	1.1	13.82

Katahdin Analytical Services, Inc. — Sample Receipt Condition Report

Client: Indian Head - Tetra Tech	KAS PM: AJC	Sampled By: Client
Project:	KIMS Entry By: DD	Delivered By: Fed-Ex
KAS Work Order#: SC3309 / SC3310 / SC3311	KIMS Review By: NC	Received By: GN
~~SDG~~ #: SC3312 / SC3313	Cooler: 1 of 3	Date/Time Rec.: 6-19-09 1000

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 5.5
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea				✓	
Soil/Sediment:					
Received in airtight container?					
Received in methanol?					
Methanol covering soil?					
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

Sample #SB061160901 = Lab received only 1 Amber for SVOA

Katahdin Analytical Services, Inc.

Sample Receipt Condition Report

Client: Tetra Tech Indian Head	KAS PM: AJC	Sampled By: Client
Project:	KIMS Entry By: DD	Delivered By: Fed-Ex
KAS Work Order#: SC3309/SC3310/SC3311	KIMS Review By: AJC	Received By: GW
~~SDG~~#: SC3312/SC3313	Cooler: 2 of 3	Date/Time Rec.: 6-19-09 10:00

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 4.9
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea **Soil/Sediment:** Received in airtight container?				✓	
Received in methanol?					
Methanol covering soil?					
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

0000007

Katahdin Analytical Services, Inc.

Sample Receipt Condition Report

Client: Tetra Tech Indian Head	KAS PM: AJC	Sampled By: Client
Project:	KIMS Entry By: DD	Delivered By: Fed-Ex
KAS Work Order#: SC3309 / SC3310 / SC3311	KIMS Review By: NV	Received By: GN
~~SDG#~~: SC3312 / SC3313 Cooler: 3 of 3		Date/Time Rec.: 6-19-09 1000

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 6.0
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea **Soil/Sediment:**				✓	
Received in airtight container?					
Received in methanol?					
Methanol covering soil?					
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol,	✓				
TPO4, N+N, TOC, DRO, TPH – pH <2				✓	
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

Andrea Colby

From: Goerdt, James [James.Goerdt@tetratech.com]
Sent: Thursday, June 18, 2009 11:45 PM
To: acolby@katahdinlab.com
Subject: Sample Shipment 112G00810 CTO 423

Andrea, we shipped 3 coolers of samples today for delivery tomorrow (Friday). I was looking over the COCs tonight and found the following mistakes:

- Page 5 of 8, third line down, the sample ID should be X17SS0010004.
- Page 5 of 8, last line, the sample should be X16SS0950001.
- Page 6 of 8, 2nd line from the bottom (X17SS0190001), the analysis should be for PAHs.

Also, I ran out of 4 oz jars, so you'll find some of the samples for PAHs and some for TOC, CEC, pH are either in the large 16 oz(?) jars, or in (2) 2.5 oz jars. I sent two of the 2.5 oz jars to make sure you had enough sample material. In instances where two jars were sent, they were placed in the same Ziploc baggie. Hope this isn't too much of a pain to figure out. If you have any questions once the samples are received, let me know.

Also, I forgot a few samples and will be shipping them out tomorrow for Saturday delivery. The last time we talked you mentioned a different address for Saturday deliveries. Please call me tomorrow morning between 8:00-9:00 and let me know the correct address. 412-443-0244

Thanks!

Jim

Jim Goerdt | Environmental Scientist
Phone: 412.921.8425 | Fax: 412.921.4040
james.goerdt@tetratech.com www.ttnus.com

Tetra Tech, Inc. | Complex World, **Clear Solutions™**
661 Anderson Drive | Pittsburgh, PA 15220
www.tetratech.com | NASDAQ:TTEK

Live Green, Work Green, Save Green
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3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services **Sample ID:** PBSZG02ICS0

Matrix: SOIL **SDG Name:** CTO423-9

QC Batch ID: ZG02ICS0

Concentration Units : mg/Kgdrywt

Analyte	RESULT	C
ANTIMONY	0.020	U
ARSENIC	0.150	U
COPPER	0.110	U
LEAD	0.030	U
TIN	0.580	
ZINC	0.350	U

INSTRUMENT DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 3/6/2009

Concentration Units: ug/L

Analyte	CRDL	IDL	M
ALUMINUM	60	2.20	MS
ANTIMONY	0.20	0.03	MS
ARSENIC	1.0	0.08	MS
CALCIUM	20	3.90	MS
COPPER	1.0	0.04	MS
IRON	20	3.10	MS
LEAD	0.20	0.02	MS
MAGNESIUM	20	2.00	MS
MOLYBDENUM	1.0	0.07	MS
POTASSIUM	200	8.80	MS
SODIUM	200	6.50	MS
TIN	1.0	0.04	MS
ZINC	2.0	0.44	MS

METHOD DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 3/11/2009

Analyte	MDL	Units	M	EPA Prep./Anal. Method
ANTIMONY	0.01	mg/kg	MS	SW846 3050B / SW846 6020
ARSENIC	0.03	mg/kg	MS	SW846 3050B / SW846 6020
COPPER	0.02	mg/kg	MS	SW846 3050B / SW846 6020
LEAD	0.01	mg/kg	MS	SW846 3050B / SW846 6020
TIN	0.04	mg/kg	MS	SW846 3050B / SW846 6020
ZINC	0.07	mg/kg	MS	SW846 3050B / SW846 6020

ICP LINEAR RANGES

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 1/6/2009

Concentration Units: ug/L

Analyte	Integration Time (sec)	Linear Range	M
ALUMINUM	0.01	100000	MS
ANTIMONY	0.10	1000	MS
ARSENIC	0.30	1000	MS
CALCIUM	0.03	100000	MS
COPPER	0.10	500	MS
IRON	0.03	100000	MS
LEAD	0.10	1000	MS
MAGNESIUM	0.05	100000	MS
MOLYBDENUM	0.10	2000	MS
POTASSIUM	0.01	100000	MS
SODIUM	0.01	100000	MS
TIN	0.10	1000	MS
ZINC	0.10	250	MS

PREPARATION LOG

Lab Name: Katahdin Analytical Services **QC Batch ID:** ZG02ICS0

Matrix: SOIL **SDG Name:** CTO423-9

Method: P **Prep Date:** 07/02/2009

Client ID	Lab Sample ID	Initial (g)	Final (L)
LCSSZG02ICS0	LCSSZG02ICS0	0.5011	0.1
PBSZG02ICS0	PBSZG02ICS0	1	0.1
X17SS0270001	SC3312-001	1.48	0.1
X17SS0280001	SC3312-002	1.04	0.1
FD06110901	SC3312-003	1.12	0.1
X16SS0420001	SC3312-004	1.11	0.1
X16SS0540001	SC3312-005	1.18	0.1
X16SS0570001	SC3312-006	1.09	0.1
X16SS0610001	SC3312-007	1.01	0.1
X16SS0730001	SC3312-008	1.02	0.1
X16SS0790001	SC3312-009	1.4	0.1
X16SS0870001	SC3312-010	1.05	0.1
X16SS0900001	SC3312-011	1.28	0.1
X16SS0910001	SC3312-012	1.13	0.1
X16SS0920001	SC3312-013	1.17	0.1
X16SS0930001	SC3312-014	1.08	0.1
X16SS0940001	SC3312-015	1.21	0.1
X16SS0950001	SC3312-016	1.31	0.1
X16SS0080001	SC3312-017	1.36	0.1
X16SS0130001	SC3312-018	1.37	0.1
X16SS0170001	SC3312-019	1.41	0.1
X17SB0050004	SC3312-020	1.09	0.1
X17SB0050004P	SC3312-020P	1.16	0.1
X17SB0050004S	SC3312-020S	1.15	0.1

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG09A

Date: 7/10/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements												
ZZZZZZ		5	1:41													
BLANK		1	1:50	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCV		1	1:58	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCB		1	2:07	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
BLANK		1	2:15	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
PQL		1	2:24	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCV		1	2:32	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCB		1	2:41	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
PBSZG02ICS0		5	2:49		Sb	As				Cu		Pb					Sn	Zn
SC3312-001	X17SS0270001	5	2:58		Sb	As				Cu							Sn	Zn
SC3312-002	X17SS0280001	5	3:07		Sb	As				Cu		Pb					Sn	Zn
SC3312-003	FD06110901	5	3:15		Sb	As				Cu		Pb					Sn	Zn
SC3312-004	X16SS0420001	5	3:24		Sb	As				Cu		Pb					Sn	Zn
SC3312-005	X16SS0540001	5	3:33		Sb	As				Cu		Pb					Sn	Zn
SC3312-006	X16SS0570001	5	3:41		Sb	As				Cu		Pb					Sn	Zn
SC3312-007	X16SS0610001	5	3:50		Sb	As				Cu		Pb					Sn	Zn
LCSSZG02ICS0		10	3:59		Sb	As				Cu		Pb					Sn	Zn
BLANK		1	4:07	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCV		1	4:16	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCB		1	4:24	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
SC3312-008	X16SS0730001	5	4:33		Sb	As				Cu		Pb					Sn	Zn
SC3312-009	X16SS0790001	5	4:42		Sb	As				Cu		Pb					Sn	Zn
SC3312-010	X16SS0870001	5	4:50		Sb	As				Cu		Pb					Sn	Zn
SC3312-011	X16SS0900001	5	4:59		Sb	As				Cu		Pb					Sn	Zn
SC3312-012	X16SS0910001	5	5:08		Sb	As				Cu		Pb					Sn	Zn
SC3312-013	X16SS0920001	5	5:16		Sb	As				Cu		Pb					Sn	Zn
SC3312-014	X16SS0930001	5	5:25		Sb	As				Cu		Pb					Sn	Zn
SC3312-015	X16SS0940001	5	5:33		Sb	As				Cu		Pb					Sn	Zn
SC3312-016	X16SS0950001	5	5:42		Sb	As				Cu		Pb					Sn	Zn
BLANK		1	5:51	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCV		1	5:59	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCB		1	6:08	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
ZZZZZZ		1	6:16															
SC3312-017	X16SS0080001	5	6:25		Sb	As				Cu							Sn	Zn
SC3312-018	X16SS0130001	5	6:34		Sb	As				Cu		Pb					Sn	Zn
SC3312-019	X16SS0170001	5	6:42		Sb	As				Cu		Pb					Sn	Zn
SC3312-020	X17SB0050004	5	6:51		Sb	As				Cu							Sn	Zn
SC3312-020L	X17SB0050004L	25	7:00		Sb	As				Cu							Sn	Zn
SC3312-020A	X17SB0050004A	5	7:08		Sb	As											Sn	Zn
SC3312-020S	X17SB0050004S	10	7:17		Sb	As				Cu							Sn	Zn
SC3312-020P	X17SB0050004P	10	7:26		Sb	As				Cu							Sn	Zn
BLANK		1	7:34	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCV		1	7:43	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCB		1	7:51	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
PQL		1	8:00	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCV		1	8:08	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn
CCB		1	8:17	Al	Sb	As		Ca		Cu	Fe	Pb	Mg	Mo	K	Na	Sn	Zn

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG09A

Date: 7/9/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements									
ZZZZZZ		1	17:43										
ZZZZZZ		1	17:49										
Cal Blank		1	18:49	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
Cal Std 1		1	18:57	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
Cal Std 2		1	19:06	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
Cal Std 3		1	19:14	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
Cal Std 4		1	19:23	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
ZZZZZZ		1	19:31										
ICV		1	19:40	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
ICB		1	19:48	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
PQL		1	19:57	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
ICSA		1	20:06	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
ICSAB		1	20:14	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
Blank		1	20:23	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
CCV		1	20:32	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
CCB		1	20:40	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
BLANK		1	20:49	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
BLANK		1	20:57	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
CCV		1	21:06	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
CCB		1	21:15	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
ZZZZZZ		25	21:23										
ZZZZZZ		5	21:32										
ZZZZZZ		25	21:40										
ZZZZZZ		5	21:49										
ZZZZZZ		20	21:57										
ZZZZZZ		50	22:06										
ZZZZZZ		5	22:14										
ZZZZZZ		5	22:23										
ZZZZZZ		5	22:32										
BLANK		1	22:40	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
CCV		1	22:49	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
CCB		1	22:57	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
ZZZZZZ		5	23:06										
ZZZZZZ		5	23:15										
ZZZZZZ		5	23:23										
ZZZZZZ		20	23:32										
ZZZZZZ		5	23:40										
ZZZZZZ		25	23:49										
ZZZZZZ		5	23:58										
ZZZZZZ		10	0:06										
ZZZZZZ		10	0:15										
BLANK		1	0:24	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
CCV		1	0:32	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
CCB		1	0:41	Al Sb As	Ca	Cu Fe Pb Mg		Mo	K	Na	Sn	Zn	
ZZZZZZ		1	0:49										
ZZZZZZ		1	0:58										
ZZZZZZ		1	1:06										
ZZZZZZ		5	1:15										
ZZZZZZ		5	1:24										
ZZZZZZ		5	1:32										

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: ICV

File: JZG09A Jul 09, 2009 19:40

Analyte	True	Found	%R (1)
ALUMINUM	400.0	386.90	96.7
ANTIMONY	20.0	18.07	90.3
ARSENIC	20.0	18.32	91.6
CALCIUM	4000.0	3500.00	87.5 •
COPPER	20.0	19.34	96.7
IRON	4000.0	3776.00	94.4
LEAD	20.0	18.43	92.2
MAGNESIUM	4000.0	3803.00	95.1
MOLYBDENUM	40.0	38.74	96.9
POTASSIUM	4000.0	3632.00	90.8
SODIUM	4000.0	3660.00	91.5
TIN	20.0	19.03	95.2
ZINC	20.0	19.59	98.0

SAMPLE: CCV

File: JZG09A Jul 09, 2009 20:32

Analyte	True	Found	%R (1)
ALUMINUM	500.0	526.60	105.3
ANTIMONY	25.0	25.39	101.6
ARSENIC	25.0	24.67	98.7
CALCIUM	5000.0	5003.00	100.1
COPPER	25.0	24.94	99.8
IRON	5000.0	5033.00	100.7
LEAD	25.0	24.29	97.2
MAGNESIUM	5000.0	5000.00	100.0
MOLYBDENUM	25.0	29.06	116.2 •
POTASSIUM	5000.0	5012.00	100.2
SODIUM	5000.0	4944.00	98.9
TIN	25.0	24.26	97.0
ZINC	25.0	25.98	103.9

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: CCV

File: JZG09A Jul 09, 2009 21:06

Analyte	True	Found	%R (1)
ALUMINUM	500.0	481.40	96.3
ANTIMONY	25.0	24.54	98.2
ARSENIC	25.0	24.58	98.3
CALCIUM	5000.0	4801.00	96.0
COPPER	25.0	24.90	99.6
IRON	5000.0	4959.00	99.2
LEAD	25.0	23.81	95.2
MAGNESIUM	5000.0	4781.00	95.6
MOLYBDENUM	25.0	25.33	101.3
POTASSIUM	5000.0	4814.00	96.3
SODIUM	5000.0	4682.00	93.6
TIN	25.0	23.62	94.5
ZINC	25.0	25.58	102.3

SAMPLE: CCV

File: JZG09A Jul 09, 2009 22:49

Analyte	True	Found	%R (1)
ALUMINUM	500.0	481.10	96.2
ANTIMONY	25.0	23.71	94.8
ARSENIC	25.0	24.10	96.4
CALCIUM	5000.0	4718.00	94.4
COPPER	25.0	24.21	96.8
IRON	5000.0	4831.00	96.6
LEAD	25.0	23.83	95.3
MAGNESIUM	5000.0	4814.00	96.3
MOLYBDENUM	25.0	24.25	97.0
POTASSIUM	5000.0	4699.00	94.0
SODIUM	5000.0	4661.00	93.2
TIN	25.0	22.90	91.6
ZINC	25.0	25.20	100.8

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: CCV

File: JZG09A Jul 10, 2009 0:32

Analyte	True	Found	%R (1)
ALUMINUM	500.0	508.60	101.7
ANTIMONY	25.0	23.66	94.6
ARSENIC	25.0	24.09	96.4
CALCIUM	5000.0	4708.00	94.2
COPPER	25.0	24.22	96.9
IRON	5000.0	4990.00	99.8
LEAD	25.0	24.09	96.4
MAGNESIUM	5000.0	4754.00	95.1
MOLYBDENUM	25.0	24.62	98.5
POTASSIUM	5000.0	4625.00	92.5
SODIUM	5000.0	4645.00	92.9
TIN	25.0	22.81	91.2
ZINC	25.0	25.35	101.4

SAMPLE: CCV

File: JZG09A Jul 10, 2009 1:58

Analyte	True	Found	%R (1)
ALUMINUM	500.0	496.30	99.3
ANTIMONY	25.0	24.28	97.1
ARSENIC	25.0	24.03	96.1
CALCIUM	5000.0	4885.00	97.7
COPPER	25.0	24.50	98.0
IRON	5000.0	4995.00	99.9
LEAD	25.0	24.25	97.0
MAGNESIUM	5000.0	4799.00	96.0
MOLYBDENUM	25.0	24.75	99.0
POTASSIUM	5000.0	4812.00	96.2
SODIUM	5000.0	4729.00	94.6
TIN	25.0	23.21	92.8
ZINC	25.0	25.68	102.7

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: CCV

File: JZG09A Jul 10, 2009 2:32

Analyte	True	Found	%R (1)
ALUMINUM	500.0	486.90	97.4
ANTIMONY	25.0	25.09	100.4
ARSENIC	25.0	24.70	98.8
CALCIUM	5000.0	4946.00	98.9
COPPER	25.0	24.77	99.1
IRON	5000.0	4984.00	99.7
LEAD	25.0	24.00	96.0
MAGNESIUM	5000.0	4837.00	96.7
MOLYBDENUM	25.0	24.77	99.1
POTASSIUM	5000.0	4885.00	97.7
SODIUM	5000.0	4798.00	96.0
TIN	25.0	23.90	95.6
ZINC	25.0	25.80	103.2

SAMPLE: CCV

File: JZG09A Jul 10, 2009 4:16

Analyte	True	Found	%R (1)
ALUMINUM	500.0	503.10	100.6
ANTIMONY	25.0	24.80	99.2
ARSENIC	25.0	24.77	99.1
CALCIUM	5000.0	4906.00	98.1
COPPER	25.0	24.85	99.4
IRON	5000.0	4949.00	99.0
LEAD	25.0	24.24	97.0
MAGNESIUM	5000.0	4904.00	98.1
MOLYBDENUM	25.0	25.09	100.4
POTASSIUM	5000.0	4863.00	97.3
SODIUM	5000.0	4871.00	97.4
TIN	25.0	23.71	94.8
ZINC	25.0	25.44	101.8

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: CCV

File: JZG09A Jul 10, 2009 5:59

Analyte	True	Found	%R (1)
ALUMINUM	500.0	517.00	103.4
ANTIMONY	25.0	25.14	100.6
ARSENIC	25.0	24.54	98.2
CALCIUM	5000.0	4903.00	98.1
COPPER	25.0	24.61	98.4
IRON	5000.0	4972.00	99.4
LEAD	25.0	24.46	97.8
MAGNESIUM	5000.0	4864.00	97.3
MOLYBDENUM	25.0	25.02	100.1
POTASSIUM	5000.0	4867.00	97.3
SODIUM	5000.0	4812.00	96.2
TIN	25.0	23.82	95.3
ZINC	25.0	25.47	101.9

SAMPLE: CCV

File: JZG09A Jul 10, 2009 7:43

Analyte	True	Found	%R (1)
ALUMINUM	500.0	506.40	101.3
ANTIMONY	25.0	25.64	102.6
ARSENIC	25.0	24.90	99.6
CALCIUM	5000.0	4976.00	99.5
COPPER	25.0	25.01	100.0
IRON	5000.0	5006.00	100.1
LEAD	25.0	26.04	104.2
MAGNESIUM	5000.0	4881.00	97.6
MOLYBDENUM	25.0	25.01	100.0
POTASSIUM	5000.0	4877.00	97.5
SODIUM	5000.0	4833.00	96.7
TIN	25.0	24.52	98.1
ZINC	25.0	25.62	102.5

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: CCV

File: JZG09A Jul 10, 2009 8:08

Analyte	True	Found	%R (1)
ALUMINUM	500.0	487.40	97.5
ANTIMONY	25.0	25.34	101.4
ARSENIC	25.0	24.85	99.4
CALCIUM	5000.0	4913.00	98.3
COPPER	25.0	24.61	98.4
IRON	5000.0	4950.00	99.0
LEAD	25.0	24.42	97.7
MAGNESIUM	5000.0	4838.00	96.8
MOLYBDENUM	25.0	24.66	98.6
POTASSIUM	5000.0	4808.00	96.2
SODIUM	5000.0	4787.00	95.7
TIN	25.0	24.26	97.0
ZINC	25.0	24.87	99.5

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: PQL

File: JZG09A Jul 09, 2009 19:57

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	55.18	92.0
ANTIMONY	0.2	0.20	100.0
ARSENIC	1.0	0.87	87.0
CALCIUM	20.0	17.15	85.8
COPPER	0.2	0.20	100.0
IRON	20.0	15.09	75.4
LEAD	0.2	0.14	70.0
MAGNESIUM	20.0	18.56	92.8
MOLYBDENUM	1.0	1.05	105.0
POTASSIUM	200.0	189.20	94.6
SODIUM	200.0	195.30	97.7
TIN	0.2	0.20	100.0
ZINC	2.0	2.07	103.5

SAMPLE: PQL

File: JZG09A Jul 10, 2009 02:24

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	59.52	99.2
ANTIMONY	0.2	0.18	90.0
ARSENIC	1.0	0.86	86.0
CALCIUM	20.0	19.18	95.9
COPPER	0.2	0.19	95.0
IRON	20.0	20.73	103.6
LEAD	0.2	0.18	90.0
MAGNESIUM	20.0	18.37	91.9
MOLYBDENUM	1.0	1.05	105.0
POTASSIUM	200.0	193.50	96.8
SODIUM	200.0	196.80	98.4
TIN	0.2	0.21	105.0
ZINC	2.0	2.04	102.0

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: PQL

File: JZG09A Jul 10, 2009 08:00

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	73.65	122.8
ANTIMONY	0.2	0.22	110.0
ARSENIC	1.0	0.74	74.0
CALCIUM	20.0	25.61	128.1
COPPER	0.2	0.25	125.0
IRON	20.0	38.08	190.4 •
LEAD	0.2	0.95	475.0 •
MAGNESIUM	20.0	25.38	126.9
MOLYBDENUM	1.0	1.06	106.0
POTASSIUM	200.0	200.90	100.4
SODIUM	200.0	245.30	122.7
TIN	0.2	0.24	120.0
ZINC	2.0	2.11	105.5

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: ICB			SAMPLE: CCB			SAMPLE: CCB		
File: JZG09A	Jul 09, 2009	19:48	File: JZG09A	Jul 09, 2009	20:40	File: JZG09A	Jul 09, 2009	21:15
Analyte	**Result**	**C**	**Analyte**	**Result**	**C**	**Analyte**	**Result**	**C**
ALUMINUM	2.20	U	ALUMINUM	18.55	B	ALUMINUM	2.20	U
ANTIMONY	0.04	B	ANTIMONY	0.03	U	ANTIMONY	0.03	U
ARSENIC	-0.09	B	ARSENIC	0.08	U	ARSENIC	0.08	U
CALCIUM	3.90	U	CALCIUM	20.54		CALCIUM	3.90	U
COPPER	0.04	U	COPPER	0.04	U	COPPER	0.04	U
IRON	3.10	U	IRON	18.34	B	IRON	3.23	B
LEAD	-0.03	B	LEAD	0.02	U	LEAD	-0.04	B
MAGNESIUM	2.89	B	MAGNESIUM	22.52		MAGNESIUM	6.52	B
MOLYBDENUM	0.32	B	MOLYBDENUM	2.23		MOLYBDENUM	0.57	B
POTASSIUM	8.80	U	POTASSIUM	27.15	B	POTASSIUM	8.80	U
SODIUM	6.50	U	SODIUM	27.53	B	SODIUM	9.59	B
TIN	0.04	U	TIN	0.04	U	TIN	0.05	B
ZINC	0.44	U	ZINC	0.44	U	ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: CCB X
File: JZG09A Jul 09, 2009 22:57

Analyte	Result	C
ALUMINUM	2.28	B
ANTIMONY	0.03	U
ARSENIC	0.08	U
CALCIUM	3.90	U
COPPER	0.04	U
IRON	3.10	U
LEAD	0.12	B
MAGNESIUM	3.37	B
MOLYBDENUM	0.20	B
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.04	U
ZINC	0.44	U

SAMPLE: CCB X
File: JZG09A Jul 10, 2009 0:41

Analyte	Result	C
ALUMINUM	17.22	B
ANTIMONY	0.03	U
ARSENIC	-0.12	B
CALCIUM	3.90	U
COPPER	0.04	U
IRON	34.66	
LEAD	0.12	B
MAGNESIUM	7.14	B
MOLYBDENUM	0.23	B
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.06	B
ZINC	0.44	U

SAMPLE: CCB X
File: JZG09A Jul 10, 2009 2:07

Analyte	Result	C
ALUMINUM	6.50	B
ANTIMONY	0.03	U
ARSENIC	0.08	U
CALCIUM	3.90	U
COPPER	0.04	U
IRON	11.92	B
LEAD	0.02	U
MAGNESIUM	5.48	B
MOLYBDENUM	0.17	B
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.05	B
ZINC	0.44	U

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: CCB

File: JZG09A Jul 10, 2009 2:41

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.03	U
ARSENIC	0.08	U
CALCIUM	3.90	U
COPPER	0.04	U
IRON	3.10	U
LEAD	0.02	U
MAGNESIUM	4.74	B
MOLYBDENUM	0.15	B
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.05	B
ZINC	0.44	U

SAMPLE: CCB

File: JZG09A Jul 10, 2009 4:24

Analyte	Result	C
ALUMINUM	4.27	B
ANTIMONY	0.03	U
ARSENIC	0.08	U
CALCIUM	3.90	U
COPPER	0.04	U
IRON	5.67	B
LEAD	0.02	U
MAGNESIUM	4.14	B
MOLYBDENUM	0.19	B
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.07	B
ZINC	0.44	U

SAMPLE: CCB

File: JZG09A Jul 10, 2009 6:08

Analyte	Result	C
ALUMINUM	9.93	B
ANTIMONY	0.03	U
ARSENIC	0.09	B
CALCIUM	3.90	U
COPPER	0.04	U
IRON	2.74	B
LEAD	0.02	B
MAGNESIUM	5.31	B
MOLYBDENUM	0.15	B
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.05	B
ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: CCB			**SAMPLE: CCB**		
File: JZG09A Jul 10, 2009 7:51			File: JZG09A Jul 10, 2009 8:17		
Analyte	**Result**	**C**	**Analyte**	**Result**	**C**
ALUMINUM	30.88	B	ALUMINUM	3.35	B
ANTIMONY	0.06	B	ANTIMONY	0.03	U
ARSENIC	0.08	U	ARSENIC	0.08	U
CALCIUM	9.52	B	CALCIUM	3.90	U
COPPER	0.08	B	COPPER	0.04	U
IRON	36.85		IRON	4.87	B
LEAD	2.13		LEAD	0.20	B
MAGNESIUM	11.21	B	MAGNESIUM	6.68	B
MOLYBDENUM	0.22	B	MOLYBDENUM	0.14	B
POTASSIUM	8.80	U	POTASSIUM	8.80	U
SODIUM	48.54	B	SODIUM	24.50	B
TIN	0.09	B	TIN	0.06	B
ZINC	0.44	U	ZINC	0.44	U

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: ICSA

File: JZG09A Jul 09, 2009 20:06

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	92800	92.8
ANTIMONY	0	0	
ARSENIC	0	0	
CALCIUM	100000	90100	90.1
COPPER	0	1	
IRON	100000	90620	90.6
LEAD	0	0	
MAGNESIUM	100000	90150	90.1
MOLYBDENUM	2000	1943	97.2
POTASSIUM	100000	92810	92.8
SODIUM	100000	92140	92.1
TIN	0	0	
ZINC	0	1	

SAMPLE: ICSAB

File: JZG09A Jul 09, 2009 20:14

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	97220	97.2
ANTIMONY	20	20	100.0
ARSENIC	20	19	95.0
CALCIUM	100000	94490	94.5
COPPER	20	19	95.0
IRON	100000	93390	93.4
LEAD	20	21	105.0
MAGNESIUM	100000	94860	94.9
MOLYBDENUM	2000	2040	102.0
POTASSIUM	100000	97640	97.6
SODIUM	100000	96490	96.5
TIN	20	21	105.0
ZINC	21	19	90.5

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Client Field ID: X17SB0050004S

Matrix: SOIL

SDG Name: CTO423-9

Percent Solids: 86.9

Lab Sample ID: SC3312-020P

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	33.6319		1.7394		49.6	64.3	N	75	125	MS
ARSENIC, TOTAL	45.9934		5.8756		49.6	80.9		75	125	MS
COPPER, TOTAL	68.8810		41.9999		24.8	108.4		75	125	MS
LEAD, TOTAL	1681.5971		619.8631		49.6	2140.6		75	125	MS
TIN, TOTAL	45.6561		1.6539		49.6	88.7		75	125	MS
ZINC, TOTAL	68.9504		23.8559		49.6	90.9		75	125	MS

Comments:

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Matrix: SOIL

Percent Solids: 86.9

Client Field ID: X17SB0050004S

SDG Name: CTO423-9

Lab Sample ID: SC3312-020S

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	49.6057		1.7394		50.04	95.7		75	125	MS
ARSENIC, TOTAL	47.1139		5.8756		50.04	82.4		75	125	MS
COPPER, TOTAL	121.9877		41.9999		25.02	319.7	N	75	125	MS
LEAD, TOTAL	5246.7727		619.8631		50.04	9246.4		75	125	MS
TIN, TOTAL	44.5320		1.6539		50.04	85.7		75	125	MS
ZINC, TOTAL	85.9318		23.8559		50.04	124.1		75	125	MS

Comments:

5B

POST DIGEST SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Matrix: SOIL

Percent Solids: 86.9

Client Field ID: X17SB0050004S

SDG Name: CTO423-9

Lab Sample ID: SC3312-020A

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	5.1740		3.2950		2	94.0		75	125	MS
COPPER, TOTAL	278.8000		79.5600		200	99.6		75	125	MS

Comments:

5D

SPIKE DUPLICATES

Lab Name: Katahdin Analytical Services

Matrix: SOIL

Percent Solids: 86.9

Client Field ID: X17SB0050004

SDG Name: CTO423-9

Lab Sample ID: SC3312-020

Concentration Units : mg/Kgdrywt

Analyte	Control Limits	Spike Result	C	Spike Dup. Result	C	RPD	Q	M
ANTIMONY, TOTAL		49.6057		33.6319		38.4	*	MS
ARSENIC, TOTAL		47.1139		45.9934		2.4		MS
COPPER, TOTAL		121.9877		68.8810		55.6	*	MS
LEAD, TOTAL		5246.7727		1681.5971		102.9	*	MS
TIN, TOTAL		44.5320		45.6561		2.5		MS
ZINC, TOTAL		85.9318		68.9504		21.9	*	MS

Comments:

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID:** LCSSZG02ICS0

Matrix: SOIL **SDG Name:** CTO423-9

QC Batch ID: ZG02ICS0

Concentration Units : mg/Kgdrywt

Analyte	TRUE	FOUND	% R	LIMITS (%)	
ANTIMONY	126.0	110.14	87.4	50	150
ARSENIC	225.0	216.12	96.1	80	120
COPPER	66.7	66.11	99.1	81	119
LEAD	223.0	210.94	94.6	82	118
TIN	164.0	168.67	102.8	74	126
ZINC	349.0	354.62	101.6	80	120

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG10A

Date: 7/10/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements					
ZZZZZZ		1	18:25						
ZZZZZZ		1	18:32						
Cal Blank		1	19:31	Al	Ca	Fe Pb Mg	Mo	K	Na
Cal Std 1		1	19:40	Al	Ca	Fe Pb Mg	Mo	K	Na
Cal Std 2		1	19:48	Al	Ca	Fe Pb Mg	Mo	K	Na
Cal Std 3		1	19:57	Al	Ca	Fe Pb Mg	Mo	K	Na
Cal Std 4		1	20:05	Al	Ca	Fe Pb Mg	Mo	K	Na
ZZZZZZ		1	20:14						
ICV		1	20:22	Al	Ca	Fe Pb Mg	Mo	K	Na
ICB		1	20:31	Al	Ca	Fe Pb Mg	Mo	K	Na
PQL		1	20:39	Al	Ca	Fe Pb Mg	Mo	K	Na
ICSA		1	20:48	Al	Ca	Fe Pb Mg	Mo	K	Na
ICSAB		1	20:57	Al	Ca	Fe Pb Mg	Mo	K	Na
Blank		1	21:06	Al	Ca	Fe Pb Mg	Mo	K	Na
CCV		1	21:14	Al	Ca	Fe Pb Mg	Mo	K	Na
CCB		1	21:23	Al	Ca	Fe Pb Mg	Mo	K	Na
BLANK		1	21:31	Al	Ca	Fe Pb Mg	Mo	K	Na
BLANK		1	21:40	Al	Ca	Fe Pb Mg	Mo	K	Na
CCV		1	21:49	Al	Ca	Fe Pb Mg	Mo	K	Na
CCB		1	21:57	Al	Ca	Fe Pb Mg	Mo	K	Na
ZZZZZZ		1	22:06						
ZZZZZZ		1	22:14						
ZZZZZZ		1	22:23						
ZZZZZZ		5	22:31						
ZZZZZZ		1	22:40						
ZZZZZZ		1	22:48						
ZZZZZZ		10	22:57						
ZZZZZZ		10	23:06						
ZZZZZZ		10	23:14						
BLANK		1	23:23	Al	Ca	Fe Pb Mg	Mo	K	Na
CCV		1	23:31	Al	Ca	Fe Pb Mg	Mo	K	Na
CCB		1	23:40	Al	Ca	Fe Pb Mg	Mo	K	Na
ZZZZZZ		1	23:48						
ZZZZZZ		1	23:57						
ZZZZZZ		1	0:06						
ZZZZZZ		1	0:14						
ZZZZZZ		5	0:23						
ZZZZZZ		5	0:32						
ZZZZZZ		5	0:40						
ZZZZZZ		5	0:49						
ZZZZZZ		5	0:58						
BLANK		1	1:06	Al	Ca	Fe Pb Mg	Mo	K	Na
CCV		1	1:15	Al	Ca	Fe Pb Mg	Mo	K	Na
CCB		1	1:23	Al	Ca	Fe Pb Mg	Mo	K	Na
ZZZZZZ		5	1:32						
ZZZZZZ		5	1:40						
ZZZZZZ		25	1:49						
ZZZZZZ		5	1:58						
ZZZZZZ		5	2:06						
ZZZZZZ		5	2:15						

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG10A

Date: 7/11/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
ZZZZZZ		5	2:24							
BLANK		1	2:32	Al	Ca	Fe	Pb	Mg	Mo	K	Na
CCV		1	2:41	Al	Ca	Fe	Pb	Mg	Mo	K	Na
CCB		1	2:50	Al	Ca	Fe	Pb	Mg	Mo	K	Na
BLANK		1	2:58	Al	Ca	Fe	Pb	Mg	Mo	K	Na
PQL		1	3:07	Al	Ca	Fe	Pb	Mg	Mo	K	Na
CCV		1	3:15	Al	Ca	Fe	Pb	Mg	Mo	K	Na
CCB		1	3:24	Al	Ca	Fe	Pb	Mg	Mo	K	Na
ZZZZZZ		5	3:32							
ZZZZZZ		5	3:41							
ZZZZZZ		5	3:50							
ZZZZZZ		5	3:58							
ZZZZZZ		5	4:07							
ZZZZZZ		5	4:15							
SC3312-001	X17SS0270001	10	4:24				Pb				
SC3312-017	X16SS0080001	10	4:32				Pb				
ZZZZZZ		10	4:41							
BLANK		1	4:50	Al	Ca	Fe	Pb	Mg	Mo	K	Na
CCV		1	4:58	Al	Ca	Fe	Pb	Mg	Mo	K	Na
CCB		1	5:07	Al	Ca	Fe	Pb	Mg	Mo	K	Na
SC3312-020	X17SB0050004	10	5:15				Pb				
SC3312-020L	X17SB0050004L	50	5:24				Pb				
ZZZZZZ		5	5:33							
SC3312-020S	X17SB0050004S	100	5:41				Pb				
SC3312-020P	X17SB0050004P	20	5:50				Pb				
CCV		1	5:58	Al	Ca	Fe	Pb	Mg	Mo	K	Na
CCB		1	6:07	Al	Ca	Fe	Pb	Mg	Mo	K	Na
Blank		1	6:15	Al	Ca	Fe	Pb	Mg	Mo	K	Na
Blank		1	6:24	Al	Ca	Fe	Pb	Mg	Mo	K	Na
PQL		1	6:32	Al	Ca	Fe	Pb	Mg	Mo	K	Na
CCV		1	6:41	Al	Ca	Fe	Pb	Mg	Mo	K	Na
CCB		1	6:50	Al	Ca	Fe	Pb	Mg	Mo	K	Na

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: ICV

File: JZG10A Jul 10, 2009 20:22

Analyte	True	Found	%R (1)
ALUMINUM	400.0	427.90	107.0
CALCIUM	4000.0	3900.00	97.5
IRON	4000.0	3959.00	99.0
LEAD	20.0	19.65	98.3
MAGNESIUM	4000.0	4171.00	104.3
MOLYBDENUM	40.0	41.16	102.9
POTASSIUM	4000.0	3963.00	99.1
SODIUM	4000.0	3994.00	99.9

SAMPLE: CCV X

File: JZG10A Jul 10, 2009 21:14

Analyte	True	Found	%R (1)
ALUMINUM	500.0	548.90	109.8
CALCIUM	5000.0	5126.00	102.5
IRON	5000.0	5086.00	101.7
LEAD	25.0	25.17	100.7
MAGNESIUM	5000.0	5190.00	103.8
MOLYBDENUM	25.0	29.39	117.6 •
POTASSIUM	5000.0	5049.00	101.0
SODIUM	5000.0	5109.00	102.2

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: CCV X

File: JZG10A Jul 10, 2009 21:49

Analyte	True	Found	%R (1)
ALUMINUM	500.0	527.30	105.5
CALCIUM	5000.0	5042.00	100.8
IRON	5000.0	5032.00	100.6
LEAD	25.0	25.25	101.0
MAGNESIUM	5000.0	5157.00	103.1
MOLYBDENUM	25.0	26.22	104.9
POTASSIUM	5000.0	5093.00	101.9
SODIUM	5000.0	5036.00	100.7

SAMPLE: CCV X

File: JZG10A Jul 10, 2009 23:31

Analyte	True	Found	%R (1)
ALUMINUM	500.0	504.30	100.9
CALCIUM	5000.0	5121.00	102.4
IRON	5000.0	5122.00	102.4
LEAD	25.0	24.99	100.0
MAGNESIUM	5000.0	5237.00	104.7
MOLYBDENUM	25.0	24.96	99.8
POTASSIUM	5000.0	5141.00	102.8
SODIUM	5000.0	5278.00	105.6

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: CCV X

File: JZG10A Jul 11, 2009 1:15

Analyte	True	Found	%R (1)
ALUMINUM	500.0	521.70	104.3
CALCIUM	5000.0	5154.00	103.1
IRON	5000.0	5133.00	102.7
LEAD	25.0	25.46	101.8
MAGNESIUM	5000.0	5269.00	105.4
MOLYBDENUM	25.0	24.54	98.2
POTASSIUM	5000.0	5160.00	103.2
SODIUM	5000.0	5326.00	106.5

SAMPLE: CCV Y

File: JZG10A Jul 11, 2009 2:41

Analyte	True	Found	%R (1)
ALUMINUM	500.0	525.00	105.0
CALCIUM	5000.0	5158.00	103.2
IRON	5000.0	5179.00	103.6
LEAD	25.0	25.19	100.8
MAGNESIUM	5000.0	5229.00	104.6
MOLYBDENUM	25.0	24.72	98.9
POTASSIUM	5000.0	5182.00	103.6
SODIUM	5000.0	5310.00	106.2

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: CCV

File: JZG10A Jul 11, 2009 3:15

Analyte	True	Found	%R (1)
ALUMINUM	500.0	503.40	100.7
CALCIUM	5000.0	5139.00	102.8
IRON	5000.0	5155.00	103.1
LEAD	25.0	25.19	100.8
MAGNESIUM	5000.0	5221.00	104.4
MOLYBDENUM	25.0	24.77	99.1
POTASSIUM	5000.0	5173.00	103.5
SODIUM	5000.0	5261.00	105.2

SAMPLE: CCV

File: JZG10A Jul 11, 2009 4:58

Analyte	True	Found	%R (1)
ALUMINUM	500.0	546.80	109.4
CALCIUM	5000.0	5543.00	110.9 •
IRON	5000.0	5294.00	105.9
LEAD	25.0	26.58	106.3
MAGNESIUM	5000.0	5596.00	111.9 •
MOLYBDENUM	25.0	25.44	101.8
POTASSIUM	5000.0	5559.00	111.2 •
SODIUM	5000.0	5675.00	113.5 •

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: CCV

File: JZG10A Jul 11, 2009 5:58

Analyte	True	Found	%R (1)
ALUMINUM	500.0	515.60	103.1
CALCIUM	5000.0	5164.00	103.3
IRON	5000.0	5106.00	102.1
LEAD	25.0	26.11	104.4
MAGNESIUM	5000.0	5273.00	105.5
MOLYBDENUM	25.0	24.69	98.8
POTASSIUM	5000.0	5188.00	103.8
SODIUM	5000.0	5381.00	107.6

SAMPLE: CCV

File: JZG10A Jul 11, 2009 6:41

Analyte	True	Found	%R (1)
ALUMINUM	500.0	503.70	100.7
CALCIUM	5000.0	5206.00	104.1
IRON	5000.0	5036.00	100.7
LEAD	25.0	25.16	100.6
MAGNESIUM	5000.0	5290.00	105.8
MOLYBDENUM	25.0	24.43	97.7
POTASSIUM	5000.0	5214.00	104.3
SODIUM	5000.0	5360.00	107.2

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: PQL

File: JZG10A Jul 10, 2009 20:39

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	63.15	105.3
CALCIUM	20.0	20.83	104.1
IRON	20.0	20.51	102.6
LEAD	0.2	0.22	110.0
MAGNESIUM	20.0	20.76	103.8
MOLYBDENUM	1.0	1.12	112.0
POTASSIUM	200.0	210.10	105.1
SODIUM	200.0	215.00	107.5

SAMPLE: PQL

File: JZG10A Jul 11, 2009 03:07

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	64.48	107.5
CALCIUM	20.0	17.67	88.4
IRON	20.0	29.44	147.2 •
LEAD	0.2	0.21	105.0
MAGNESIUM	20.0	18.37	91.9
MOLYBDENUM	1.0	1.01	101.0
POTASSIUM	200.0	223.00	111.5
SODIUM	200.0	212.70	106.3

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: PQL

File: JZG10A Jul 11, 2009 06:32

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	62.37	103.9
CALCIUM	20.0	13.06	65.3 *
IRON	20.0	23.37	116.9
LEAD	0.2	0.34	170.0 *
MAGNESIUM	20.0	16.66	83.3
MOLYBDENUM	1.0	0.98	98.0
POTASSIUM	200.0	224.60	112.3
SODIUM	200.0	211.60	105.8

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: ICB
File: JZG10A Jul 10, 2009 20:31

Analyte	Result	C
ALUMINUM	2.20	U
CALCIUM	3.90	U
IRON	3.10	U
LEAD	0.02	B
MAGNESIUM	2.16	B
MOLYBDENUM	0.34	B
POTASSIUM	8.80	U
SODIUM	6.50	U

SAMPLE: CCB
File: JZG10A Jul 10, 2009 21:23

Analyte	Result	C
ALUMINUM	21.69	B
CALCIUM	21.06	
IRON	25.21	
LEAD	0.03	B
MAGNESIUM	22.68	
MOLYBDENUM	2.39	
POTASSIUM	31.79	B
SODIUM	23.16	B

SAMPLE: CCB
File: JZG10A Jul 10, 2009 21:57

Analyte	Result	C
ALUMINUM	6.40	B
CALCIUM	7.26	B
IRON	10.16	B
LEAD	0.04	B
MAGNESIUM	8.24	B
MOLYBDENUM	0.81	B
POTASSIUM	12.96	B
SODIUM	8.65	B

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: CCB Y
File: JZG10A Jul 10, 2009 23:40

Analyte	Result	C
ALUMINUM	2.20	U
CALCIUM	3.90	U
IRON	4.24	B
LEAD	0.02	U
MAGNESIUM	3.80	B
MOLYBDENUM	0.33	B
POTASSIUM	8.80	U
SODIUM	-8.75	B

SAMPLE: CCB Y
File: JZG10A Jul 11, 2009 1:23

Analyte	Result	C
ALUMINUM	7.08	B
CALCIUM	3.90	U
IRON	17.46	B
LEAD	0.16	B
MAGNESIUM	3.30	B
MOLYBDENUM	0.25	B
POTASSIUM	8.80	U
SODIUM	6.50	U

SAMPLE: CCB Y
File: JZG10A Jul 11, 2009 2:50

Analyte	Result	C
ALUMINUM	12.86	B
CALCIUM	3.90	U
IRON	29.72	
LEAD	0.10	B
MAGNESIUM	5.59	B
MOLYBDENUM	0.21	B
POTASSIUM	13.45	B
SODIUM	6.50	U

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: CCB

File: JZG10A Jul 11, 2009 3:24

Analyte	Result	C
ALUMINUM	2.60	B
CALCIUM	3.90	U
IRON	9.73	B
LEAD	0.02	U
MAGNESIUM	2.00	U
MOLYBDENUM	0.19	B
POTASSIUM	8.80	U
SODIUM	9.91	B

SAMPLE: CCB

File: JZG10A Jul 11, 2009 5:07

Analyte	Result	C
ALUMINUM	4.71	B
CALCIUM	3.90	U
IRON	11.66	B
LEAD	0.31	
MAGNESIUM	2.00	U
MOLYBDENUM	0.22	B
POTASSIUM	11.92	B
SODIUM	-12.13	B

SAMPLE: CCB

File: JZG10A Jul 11, 2009 6:07

Analyte	Result	C
ALUMINUM	5.95	B
CALCIUM	3.90	U
IRON	14.11	B
LEAD	0.53	
MAGNESIUM	2.00	U
MOLYBDENUM	0.21	B
POTASSIUM	10.49	B
SODIUM	12.98	B

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: CCB

File: JZG10A Jul 11, 2009 6:50

Analyte	Result	C
ALUMINUM	2.24	B
CALCIUM	-4.43	B
IRON	7.03	B
LEAD	0.18	B
MAGNESIUM	2.00	U
MOLYBDENUM	0.18	B
POTASSIUM	9.56	B
SODIUM	-13.06	B

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: ICSA

File: JZG10A Jul 10, 2009 20:48

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	99130	99.1
CALCIUM	100000	95750	95.8
IRON	100000	94140	94.1
LEAD	0	0	
MAGNESIUM	100000	96440	96.4
MOLYBDENUM	2000	2001	100.1
POTASSIUM	100000	97750	97.8
SODIUM	100000	98180	98.2

SAMPLE: ICSAB

File: JZG10A Jul 10, 2009 20:57

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	100800	100.8
CALCIUM	100000	98150	98.2
IRON	100000	96230	96.2
LEAD	20	21	105.0
MAGNESIUM	100000	98670	98.7
MOLYBDENUM	2000	2090	104.5
POTASSIUM	100000	100300	100.3
SODIUM	100000	100700	100.7

ICP SERIAL DILUTION

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SB0050004L

Matrix: SOIL **SDG Name:** CTO423-9

Lab Sample ID: SC3312-020L

Concentration Units: ug/L

Analyte	Sample Result	C	Dilution Result	C	% Difference	Q	M
ANTIMONY, TOTAL	3.30		3.24		1.8		MS
ARSENIC, TOTAL	11.13		10.97		1.4		MS
COPPER, TOTAL	79.56		79.75		0.2		MS
LEAD, TOTAL	587.10		605.50		3.1		MS
TIN, TOTAL	3.13		2.88	B	8.0		MS
ZINC, TOTAL	45.19		46.59		3.1		MS

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG11A

Date: 7/11/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
ZZZZZZ		1	10:13							
Cal Blank		1	11:11	Al	Ca	Cu Fe	Mg	Mo	K	Na
Cal Std 1		1	11:19	Al	Ca	Cu Fe	Mg	Mo	K	Na
Cal Std 2		1	11:28	Al	Ca	Cu Fe	Mg	Mo	K	Na
Cal Std 3		1	11:36	Al	Ca	Cu Fe	Mg	Mo	K	Na
Cal Std 4		1	11:45	Al	Ca	Cu Fe	Mg	Mo	K	Na
ZZZZZZ		1	11:53							
ICV		1	12:02	Al	Ca	Cu Fe	Mg	Mo	K	Na
ICB		1	12:11	Al	Ca	Cu Fe	Mg	Mo	K	Na
PQL		1	12:19	Al	Ca	Cu Fe	Mg	Mo	K	Na
ICSA		1	12:28	Al	Ca	Cu Fe	Mg	Mo	K	Na
ICSAB		1	12:37	Al	Ca	Cu Fe	Mg	Mo	K	Na
Blank		1	12:45	Al	Ca	Cu Fe	Mg	Mo	K	Na
CCV		1	12:54	Al	Ca	Cu Fe	Mg	Mo	K	Na
CCB		1	13:02	Al	Ca	Cu Fe	Mg	Mo	K	Na
BLANK		1	13:11	Al	Ca	Cu Fe	Mg	Mo	K	Na
BLANK		1	13:20	Al	Ca	Cu Fe	Mg	Mo	K	Na
CCV		1	13:28	Al	Ca	Cu Fe	Mg	Mo	K	Na
CCB		1	13:37	Al	Ca	Cu Fe	Mg	Mo	K	Na
ZZZZZZ		5	13:45							
ZZZZZZ		5	13:54							
ZZZZZZ		5	14:03							
ZZZZZZ		5	14:11							
ZZZZZZ		5	14:20							
ZZZZZZ		5	14:28							
SC3312-020A	X17SB0050004A	5	14:37			Cu				
ZZZZZZ		10	14:45							
ZZZZZZ		10	14:54							
BLANK		1	15:02	Al	Ca	Cu Fe	Mg	Mo	K	Na
CCV		1	15:11	Al	Ca	Cu Fe	Mg	Mo	K	Na
CCB		1	15:20	Al	Ca	Cu Fe	Mg	Mo	K	Na

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: ICV

File: JZG11A Jul 11, 2009 12:02

Analyte	True	Found	%R (1)
ALUMINUM	400.0	420.20	105.1
CALCIUM	4000.0	3826.00	95.7
COPPER	20.0	20.15	100.7
IRON	4000.0	3908.00	97.7
MAGNESIUM	4000.0	4120.00	103.0
MOLYBDENUM	40.0	41.30	103.3
POTASSIUM	4000.0	3934.00	98.4
SODIUM	4000.0	3995.00	99.9

SAMPLE: CCV

File: JZG11A Jul 11, 2009 12:54

Analyte	True	Found	%R (1)
ALUMINUM	500.0	586.00	117.2 •
CALCIUM	5000.0	5391.00	107.8
COPPER	25.0	26.48	105.9
IRON	5000.0	5138.00	102.8
MAGNESIUM	5000.0	5516.00	110.3
MOLYBDENUM	25.0	31.21	124.8 •
POTASSIUM	5000.0	5273.00	105.5
SODIUM	5000.0	5484.00	109.7

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: CCV

File: JZG11A Jul 11, 2009 13:28

Analyte	True	Found	%R (1)
ALUMINUM	500.0	531.40	106.3
CALCIUM	5000.0	5099.00	102.0
COPPER	25.0	25.39	101.6
IRON	5000.0	4949.00	99.0
MAGNESIUM	5000.0	5378.00	107.6
MOLYBDENUM	25.0	26.00	104.0
POTASSIUM	5000.0	5131.00	102.6
SODIUM	5000.0	5306.00	106.1

SAMPLE: CCV

File: JZG11A Jul 11, 2009 15:11

Analyte	True	Found	%R (1)
ALUMINUM	500.0	508.80	101.8
CALCIUM	5000.0	4956.00	99.1
COPPER	25.0	25.01	100.0
IRON	5000.0	4918.00	98.4
MAGNESIUM	5000.0	5116.00	102.3
MOLYBDENUM	25.0	25.49	102.0
POTASSIUM	5000.0	4884.00	97.7
SODIUM	5000.0	5100.00	102.0

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: PQL

File: JZG11A Jul 11, 2009 12:19

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	60.69	101.2
CALCIUM	20.0	19.46	97.3
COPPER	0.2	0.23	115.0
IRON	20.0	19.79	98.9
MAGNESIUM	20.0	21.72	108.6
MOLYBDENUM	1.0	1.13	113.0
POTASSIUM	200.0	212.00	106.0
SODIUM	200.0	211.20	105.6

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: ICB

File: JZG11A Jul 11, 2009 12:11

Analyte	Result	C
ALUMINUM	2.20	U
CALCIUM	4.11	B
COPPER	0.04	U
IRON	4.21	B
MAGNESIUM	5.12	B
MOLYBDENUM	0.37	B
POTASSIUM	8.80	U
SODIUM	6.50	U

SAMPLE: CCB

File: JZG11A Jul 11, 2009 13:02

Analyte	Result	C
ALUMINUM	22.76	B
CALCIUM	25.07	
COPPER	0.04	U
IRON	28.12	
MAGNESIUM	26.11	
MOLYBDENUM	2.57	
POTASSIUM	49.25	B
SODIUM	32.23	B

SAMPLE: CCB

File: JZG11A Jul 11, 2009 13:37

Analyte	Result	C
ALUMINUM	4.06	B
CALCIUM	6.45	B
COPPER	0.04	U
IRON	6.61	B
MAGNESIUM	8.57	B
MOLYBDENUM	0.79	B
POTASSIUM	16.66	B
SODIUM	11.92	B

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: CCB

File: JZG11A Jul 11, 2009 15:20

Analyte	Result	C
ALUMINUM	7.42	B
CALCIUM	7.43	B
COPPER	0.09	B
IRON	18.08	B
MAGNESIUM	7.41	B
MOLYBDENUM	0.47	B
POTASSIUM	20.85	B
SODIUM	8.50	B

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-9

Concentration Units: ug/L

SAMPLE: ICSA

File: JZG11A Jul 11, 2009 12:28

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	99000	99.0
CALCIUM	100000	97130	97.1
COPPER	0	1	
IRON	100000	92440	92.4
MAGNESIUM	100000	97600	97.6
MOLYBDENUM	2000	2022	101.1
POTASSIUM	100000	99190	99.2
SODIUM	100000	102500	102.5

SAMPLE: ICSAB

File: JZG11A Jul 11, 2009 12:37

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	97650	97.7
CALCIUM	100000	95850	95.9
COPPER	20	19	95.0
IRON	100000	92380	92.4
MAGNESIUM	100000	96460	96.5
MOLYBDENUM	2000	2042	102.1
POTASSIUM	100000	98130	98.1
SODIUM	100000	98300	98.3

Quality Control Report

Blank Sample Summary Report

Total Solids

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG65689	ASTM D2216	30-JUN-09	29-JUN-09	U 1 %	1 %
MBLANK	WG65690	ASTM D2216	30-JUN-09	29-JUN-09	U 1 %	1 %

Quality Control Report

Laboratory Control Sample Summary Report

Total Solids

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG65689-3	LCSD	WG65689	30-JUN-09	29-JUN-09	%	90	90.	100	80-120	0
WG65690-2	LCS	WG65690	30-JUN-09	29-JUN-09	%	90	88.	97	80-120	
WG65689-2	LCS	WG65689	30-JUN-09	29-JUN-09	%	90	90.	100	80-120	

Quality Control Report

Duplicate Sample Summary Report

Total Solids

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG65690-4	SC3312-17	WG65690	30-JUN-09	%	71.	71.	1	20
WG65690-3	SC3312-20	WG65690	30-JUN-09	%	87.	88.	1	20

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sales@katahdinlab.com

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: **R.BASINSKI** **DATE:** **September 14, 2009**

FROM: **MEGAN CARSON** **COPIES:** **DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – SELECT METALS AND TOTAL SOILDS**
NSF INDIAN HEAD
SAMPLE DELIVERY GROUP (SDG) – CTO423-10

SAMPLES: 20/Soil/

FD06130901	X16SS0200001	X16SS0320001	X17SB0010004
X17SB0020406	X17SB0030608	X17SB0040004	X17SB0040608
X17SB0050810	X17SB0060406	X17SB0070004	X17SB0110102
X17SB0130102	X17SS0140001	X25SS0280001	X25SS0300001
X25SS0310001	X25SS0320001	X25SS0330001	

Overview

The sample set for NSF Indian Head, SDG CTO423-10 consists of nineteen (19) soil environmental samples. This SDG contains one field duplicate pair: FD06130901/ X16SS0320001.

The samples were collected by Tetra Tech NUS, Inc. on June 11th, 13th, 14th, 15th , 2009 and analyzed by Katahdin analytical services under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Metals analyses were conducted using SW-846 methods 6020 and 3050B, and total solids by ASTM method D2216.

Summary

All analytes were successfully analyzed. The findings offered in this report are based upon a general review of all available data. The data review was based on data completeness, holding times, calibration data, laboratory method/preparation blanks, interference check sample (ICS) results, matrix spike / matrix spike duplicate results, laboratory control sample (LCS) results, ICP serial dilution results, field duplicate results, detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems:

None.

Minor Problems:

- The following contaminant was detected in the laboratory method/preparation blanks at the following maximum concentration:

Analyte	Maximum Concentration	Action Level
Antimony	0.05 ug/L	0.025 mg/kg
Lead	0.15 ug/L	0.075 mg/kg
Tin [1]	0.674 ug/L	3.37 mg/kg
Arsenic	0.83 ug/L	0.415 mg/kg
Copper	0.24 ug/L	0.12 mg/kg

An action level of 5X the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot and dilution factors, if applicable, were taken into consideration when evaluating for blank contamination. Positive results less than the blank action level for the above compounds were qualified "B" as a result of blank contamination. Results for arsenic were not qualified based on an action level because of the negative result. Positive arsenic results were qualified as estimated (J).

- The matrix spike and matrix spike duplicate for sample X25SS0280001 had a low percent recovery for antimony. Antimony results were qualified as biased low (L).

Notes

All samples in the SDG were analyzed at a 5X dilution.

Sample X17SS0140001 was analyzed at a 25X dilution to bring lead within calibration limits.

Sample X17SB0040004 was analyzed at a 10X dilution to bring lead within calibration limits.

The project quantitation limit (PQL) standard performed on 7/7/09 at 16:58 had a percent recovery of 135% for copper and a percent recovery of 190% for lead. No results were qualified as all sample results were >2X CRQL.

Executive Summary

Laboratory Performance: Method blanks and preparation blanks were found to contain contaminates.

Other Factors Affecting Data Quality: Matrix spike non-compliances resulted in the qualification of data. .

The data for these analyses were reviewed with reference to Region III modifications to the "National Functional Guidelines for Inorganic Data Validation", April 1993, and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories "(January 2006).

The text of this report has been formulated to address only those problem areas affecting data quality.

Tetra Tech NUS
Megan Carson
Chemist/Data Validator

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Appendix A

Qualified Analytical Results

Data Validation Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS-GFAA MSA's r < 0.995 / ICP PDS Recovery Noncompliance
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O - Poor Instrument Performance (e.g. base-line drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DOT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient r < 0.995
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 00810	NSAMPLE	FD06130901			X16SS0200001			X16SS0320001			X17SB0010004		
SDG: CTO423-10	LAB_ID	SC3313-003			SC3313-001			SC3313-002			SC3313-011		
FRACTION: M	SAMP_DATE	6/13/2009			6/13/2009			6/13/2009			6/11/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	86.2			87.1			86.7			92.5		
	DUP_OF	X16SS0320001											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.14	B	A	0.22	L	D	0.14	B	A	0.15	L	D
ARSENIC		3.3			1.9	B	A	4			4.6		
COPPER		8			5.5			9.7			6		
LEAD		13			51.9			13.9			9.1		
TIN		1.3	B	A	1	B	A	1.2	B	A	1.1	B	A
ZINC		26.4			22			31.2			15.6		

PROJ_NO: 00810	NSAMPLE	X17SB0020406			X17SB0030608			X17SB0040004			X17SB0040608		
SDG: CTO423-10	LAB_ID	SC3313-012			SC3313-013			SC3313-014			SC3313-015		
FRACTION: M	SAMP_DATE	6/11/2009			6/11/2009			6/11/2009			6/11/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	88.2			90.0			91.4			90.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.22	L	D	0.3	L	D	2.2	L	D	0.13	B	A
ARSENIC		7.8			5.7			7			4.2		
COPPER		8.2			8			37.1			5.3		
LEAD		8.1			68.2			589			8.9		
TIN		0.92	B	A	1	B	A	1.2	B	A	0.76	B	A
ZINC		24.1			17.9			33.2			14.8		

PROJ_NO: 00810	NSAMPLE	X17SB0050810			X17SB0060406			X17SB0070004			X17SB0110102		
SDG: CTO423-10	LAB_ID	SC3313-007			SC3313-009			SC3313-008			SC3313-004		
FRACTION: M	SAMP_DATE	6/11/2009			6/11/2009			6/11/2009			6/14/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	89.3			91.1			87.5			90.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.3	L	D	1	L	D	0.19	L	D	0.52	L	D
ARSENIC		2.3	B	A	2.4	B	A	4.8			5.1		
COPPER		7.8			10			8.3			10.7		
LEAD		32.4			132			8.2			82.1		
TIN		0.99	B	A	1	B	A	1.3	B	A	1.2	B	A
ZINC		14			13.1			17.5			21.8		

PROJ_NO: 00810	NSAMPLE	X17SB0130102			X17SS0140001			X25SS0280001			X25SS0300001		
SDG: CTO423-10	LAB_ID	SC3313-005			SC3313-006			SC3313-016			SC3313-017		
FRACTION: M	SAMP_DATE	6/14/2009			6/11/2009			6/15/2009			6/15/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	93.0			91.5			85.1			85.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.42	L	D	6	L	D	0.21	L	D	0.26	L	D
ARSENIC		3.7			8.7			3.6			2.8		
COPPER		8.6			36.3			9.6			11		
LEAD		39.2			706			17.9			50.3		
TIN		0.86	B	A	1.5	B	A	1.5	B	A	1.7	B	A
ZINC		13.2			23.5			25.2			28.4		

PROJ_NO: 00810	NSAMPLE	X25SS0310001			X25SS0320001			X25SS0330001		
SDG: CTO423-10	LAB_ID	SC3313-018			SC3313-019			SC3313-010		
FRACTION: M	SAMP_DATE	6/15/2009			6/15/2009			6/15/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	85.4			80.0			86.0		
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ANTIMONY		0.53	L	D	0.24	L	D	0.13	B	A
ARSENIC		2.4	B	A	2.1	B	A	1.9	B	A
COPPER		13.3			13.4			9.5		
LEAD		142			60.2			31.1		
TIN		2.3	B	A	1.8	B	A	1.6	B	A
ZINC		30.3			30.8			35.2		

PROJ_NO: 00810	NSAMPLE	FD06130901			X16SS0200001			X16SS0320001			X17SB0010004		
SDG: CTO423-10	LAB_ID	SC3313-3			SC3313-1			SC3313-2			SC3313-11		
FRACTION: MISC	SAMP_DATE	6/13/2009			6/13/2009			6/13/2009			6/11/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	86.2			87.1			86.7			92.5		
	DUP_OF	X16SS0320001											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		86			87			87			92		

PROJ_NO: 00810	NSAMPLE	X17SB0020406			X17SB0030608			X17SB0040004			X17SB0040608		
SDG: CTO423-10	LAB_ID	SC3313-12			SC3313-13			SC3313-14			SC3313-15		
FRACTION: MISC	SAMP_DATE	6/11/2009			6/11/2009			6/11/2009			6/11/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	88.2			90.0			91.4			90.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		88			90			91			91		

PROJ_NO: 00810	NSAMPLE	X17SB0050810			X17SB0060406			X17SB0070004			X17SB0110102		
SDG: CTO423-10	LAB_ID	SC3313-7			SC3313-9			SC3313-8			SC3313-4		
FRACTION: MISC	SAMP_DATE	6/11/2009			6/11/2009			6/11/2009			6/14/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	89.3			91.1			87.5			90.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		89			91			87			90		

PROJ_NO: 00810	NSAMPLE	X17SB0130102			X17SS0140001			X25SS0280001			X25SS0300001		
SDG: CTO423-10	LAB_ID	SC3313-5			SC3313-6			SC3313-16			SC3313-17		
FRACTION: MISC	SAMP_DATE	6/14/2009			6/11/2009			6/15/2009			6/15/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	93.0			91.5			85.1			85.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		93			92			85			86		

PROJ_NO: 00810	NSAMPLE	X25SS0310001			X25SS0330001		
SDG: CTO423-10	LAB_ID	SC3313-18			SC3313-10		
FRACTION: MISC	SAMP_DATE	6/15/2009			6/15/2009		
MEDIA: SOIL	QC_TYPE	NM			NM		
	UNITS	%			%		
	PCT_SOLIDS	85.4			86.0		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		85			86		

Appendix B

Results as Reported by the Laboratory

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** FD06130901

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 86.2 **Lab Sample ID:** SC3313-003

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.14		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	3.3			MS	5	0.53	0.16
7440-50-8	COPPER, TOTAL	8.0			MS	5	0.53	0.12
7439-92-1	LEAD, TOTAL	13.0			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.3			MS	5	0.53	0.20
7440-66-6	ZINC, TOTAL	26.4			MS	5	1.1	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X16SS0200001

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 87.1 **Lab Sample ID:** SC3313-001

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.22		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	1.9			MS	5	0.50	0.15
7440-50-8	COPPER, TOTAL	5.5			MS	5	0.50	0.11
7439-92-1	LEAD, TOTAL	51.9			MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.0			MS	5	0.50	0.19
7440-66-6	ZINC, TOTAL	22.0			MS	5	1.0	0.35

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X16SS0320001

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 86.7 **Lab Sample ID:** SC3313-002

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.14		N	MS	5	0.094	0.02
7440-38-2	ARSENIC, TOTAL	4.0			MS	5	0.47	0.14
7440-50-8	COPPER, TOTAL	9.7			MS	5	0.47	0.10
7439-92-1	LEAD, TOTAL	13.9			MS	5	0.094	0.03
7440-31-5	TIN, TOTAL	1.2			MS	5	0.47	0.18
7440-66-6	ZINC, TOTAL	31.2			MS	5	0.94	0.33

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SB0010004

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 92.5 **Lab Sample ID:** SC3313-011

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.15		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	4.6			MS	5	0.52	0.16
7440-50-8	COPPER, TOTAL	6.0			MS	5	0.52	0.12
7439-92-1	LEAD, TOTAL	9.1			MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.1			MS	5	0.52	0.20
7440-66-6	ZINC, TOTAL	15.6			MS	5	1.0	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SB0020406

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 88.2 **Lab Sample ID:** SC3313-012

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.22		N	MS	5	0.094	0.02
7440-38-2	ARSENIC, TOTAL	7.8			MS	5	0.47	0.14
7440-50-8	COPPER, TOTAL	8.2			MS	5	0.47	0.10
7439-92-1	LEAD, TOTAL	8.1			MS	5	0.094	0.03
7440-31-5	TIN, TOTAL	0.92			MS	5	0.47	0.18
7440-66-6	ZINC, TOTAL	24.1			MS	5	0.94	0.33

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SB0030608

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 90.0 **Lab Sample ID:** SC3313-013

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.30		N	MS	5	0.088	0.02
7440-38-2	ARSENIC, TOTAL	5.7			MS	5	0.44	0.13
7440-50-8	COPPER, TOTAL	8.0			MS	5	0.44	0.10
7439-92-1	LEAD, TOTAL	68.2			MS	5	0.088	0.03
7440-31-5	TIN, TOTAL	1.0			MS	5	0.44	0.17
7440-66-6	ZINC, TOTAL	17.9			MS	5	0.88	0.31

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SB0040004

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 91.4 **Lab Sample ID:** SC3313-014

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	2.2		N	MS	5	0.091	0.02
7440-38-2	ARSENIC, TOTAL	7.0			MS	5	0.46	0.14
7440-50-8	COPPER, TOTAL	37.1			MS	5	0.46	0.10
7439-92-1	LEAD, TOTAL	589			MS	10	0.18	0.05
7440-31-5	TIN, TOTAL	1.2			MS	5	0.46	0.17
7440-66-6	ZINC, TOTAL	33.2			MS	5	0.91	0.32

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SB0040608

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 90.8 **Lab Sample ID:** SC3313-015

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.13		N	MS	5	0.090	0.02
7440-38-2	ARSENIC, TOTAL	4.2			MS	5	0.45	0.14
7440-50-8	COPPER, TOTAL	5.3			MS	5	0.45	0.10
7439-92-1	LEAD, TOTAL	8.9			MS	5	0.090	0.03
7440-31-5	TIN, TOTAL	0.76			MS	5	0.45	0.17
7440-66-6	ZINC, TOTAL	14.8			MS	5	0.90	0.32

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SB0050810

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 89.3 **Lab Sample ID:** SC3313-007

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.30		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	2.3			MS	5	0.50	0.15
7440-50-8	COPPER, TOTAL	7.8			MS	5	0.50	0.11
7439-92-1	LEAD, TOTAL	32.4			MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	0.99			MS	5	0.50	0.19
7440-66-6	ZINC, TOTAL	14.0			MS	5	1.0	0.35

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SB0060406

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 91.1 **Lab Sample ID:** SC3313-009

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	1.0		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	2.4			MS	5	0.51	0.15
7440-50-8	COPPER, TOTAL	10			MS	5	0.51	0.11
7439-92-1	LEAD, TOTAL	132			MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.0			MS	5	0.51	0.19
7440-66-6	ZINC, TOTAL	13.1			MS	5	1.0	0.36

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SB0070004

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 87.5 **Lab Sample ID:** SC3313-008

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.19		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	4.8			MS	5	0.57	0.17
7440-50-8	COPPER, TOTAL	8.3			MS	5	0.57	0.13
7439-92-1	LEAD, TOTAL	8.2			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.3			MS	5	0.57	0.22
7440-66-6	ZINC, TOTAL	17.5			MS	5	1.1	0.40

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SB0110102

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 90.5 **Lab Sample ID:** SC3313-004

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.52		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	5.1			MS	5	0.51	0.15
7440-50-8	COPPER, TOTAL	10.7			MS	5	0.51	0.11
7439-92-1	LEAD, TOTAL	82.1			MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	1.2			MS	5	0.51	0.19
7440-66-6	ZINC, TOTAL	21.8			MS	5	1.0	0.35

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SB0130102

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 93.0 **Lab Sample ID:** SC3313-005

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.42		N	MS	5	0.10	0.02
7440-38-2	ARSENIC, TOTAL	3.7			MS	5	0.51	0.15
7440-50-8	COPPER, TOTAL	8.6			MS	5	0.51	0.11
7439-92-1	LEAD, TOTAL	39.2			MS	5	0.10	0.03
7440-31-5	TIN, TOTAL	0.86			MS	5	0.51	0.19
7440-66-6	ZINC, TOTAL	13.2			MS	5	1.0	0.35

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X17SS0140001

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 91.5 **Lab Sample ID:** SC3313-006

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	6.0		N	MS	5	0.090	0.02
7440-38-2	ARSENIC, TOTAL	8.7			MS	5	0.45	0.13
7440-50-8	COPPER, TOTAL	36.3			MS	5	0.45	0.10
7439-92-1	LEAD, TOTAL	706			MS	25	0.45	0.13
7440-31-5	TIN, TOTAL	1.5			MS	5	0.45	0.17
7440-66-6	ZINC, TOTAL	23.5			MS	5	0.90	0.31

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0280001

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 85.1 **Lab Sample ID:** SC3313-016

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.21		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	3.6			MS	5	0.53	0.16
7440-50-8	COPPER, TOTAL	9.6			MS	5	0.53	0.12
7439-92-1	LEAD, TOTAL	17.9			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.5			MS	5	0.53	0.20
7440-66-6	ZINC, TOTAL	25.2			MS	5	1.1	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0300001

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 85.8 **Lab Sample ID:** SC3313-017

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.26		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	2.8			MS	5	0.54	0.16
7440-50-8	COPPER, TOTAL	11.0			MS	5	0.54	0.12
7439-92-1	LEAD, TOTAL	50.3			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.7			MS	5	0.54	0.21
7440-66-6	ZINC, TOTAL	28.4			MS	5	1.1	0.38

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0310001

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 85.4 **Lab Sample ID:** SC3313-018

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.53		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	2.4			MS	5	0.53	0.16
7440-50-8	COPPER, TOTAL	13.3			MS	5	0.53	0.12
7439-92-1	LEAD, TOTAL	142			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	2.3			MS	5	0.53	0.20
7440-66-6	ZINC, TOTAL	30.3			MS	5	1.1	0.37

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0320001

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 80.0 **Lab Sample ID:** SC3313-019

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.24		N	MS	5	0.11	0.02
7440-38-2	ARSENIC, TOTAL	2.1			MS	5	0.54	0.16
7440-50-8	COPPER, TOTAL	13.4			MS	5	0.54	0.12
7439-92-1	LEAD, TOTAL	60.2			MS	5	0.11	0.03
7440-31-5	TIN, TOTAL	1.8			MS	5	0.54	0.20
7440-66-6	ZINC, TOTAL	30.8			MS	5	1.1	0.38

Bottle ID: A

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0330001

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 86.0 **Lab Sample ID:** SC3313-010

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted MDL
7440-36-0	ANTIMONY, TOTAL	0.13		N	MS	5	0.091	0.02
7440-38-2	ARSENIC, TOTAL	1.9			MS	5	0.45	0.14
7440-50-8	COPPER, TOTAL	9.5			MS	5	0.45	0.10
7439-92-1	LEAD, TOTAL	31.1			MS	5	0.091	0.03
7440-31-5	TIN, TOTAL	1.6			MS	5	0.45	0.17
7440-66-6	ZINC, TOTAL	35.2			MS	5	0.91	0.32

Bottle ID: A

Comments:

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-1
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X16SS0200001	SL	13-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	87. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-2
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X16SS0320001	SL	13-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	87. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-3
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
FD06130901	SL	13-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-4
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X17SB0110102	SL	14-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	90. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-5
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X17SB0130102	SL	14-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	93. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-6
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X17SS0140001	SL	11-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	92. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-7
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X17SB0050810	SL	11-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	89. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-8
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X17SB0070004	SL	11-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	87. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-9
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X17SB0060406	SL	11-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	91. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-10
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X25SS0330001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-11
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X17SB0010004	SL	11-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	92. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-12
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X17SB0020406	SL	11-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	88. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-13
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X17SB0030608	SL	11-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	90. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-14
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X17SB0040004	SL	11-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	91. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-15
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X17SB0040608	SL	11-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	91. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-16
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X25SS0280001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	85. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-17
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X25SS0300001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	86. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-18
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X25SS0310001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	85. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Report of Analytical Results

Client: Tobrena Skeen
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: SC3313-19
Report Date: 08-JUL-09
Client PO: 1000693 Task 33
Project: CTO 423 NSF Indian Head
SDG: CTO423-10

Sample Description	Matrix	Date Sampled	Date Received
X25SS0320001	SL	15-JUN-09	19-JUN-09

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
Total Solids	80. %	1	D2216	WG65779	02-JUL-09 09:20:00	ASTM D2216	01-JUL-09	JF	

Appendix C

Support Documentation

Katahdin ANALYTICAL SERVICES

nelac Cert No. E87604

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CTO 423 NSF INDIAN HEAD
SDG: CTO423-10
SC3313

Sample Receipt

The following samples were received on June 19, 2009 and were logged in under Katahdin Analytical Services work order numbers SC3313 for a hardcopy due date of July 08, 2009.

KATAHDIN Sample No.	TTNUS Sample Identification
SC3313-1	X16SS0200001
SC3313-2	X16SS0320001
SC3313-3	FD06130901
SC3313-4	X17SB0110102
SC3313-5	X17SB0130102
SC3313-6	X17SS0140001
SC3313-7	X17SB0050810
SC3313-8	X17SB0070004
SC3313-9	X17SB0060406
SC3313-10	X25SS0330001
SC3313-11	X17SB0010004
SC3313-12	X17SB0020406
SC3313-13	X17SB0030608
SC3313-14	X17SB0040004
SC3313-15	X17SB0040608
SC3313-16	X25SS0280001
SC3313-17	X25SS0300001
SC3313-18	X25SS0310001
SC3313-19	X25SS0320001

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in this narrative or in the Report of Analysis.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Andrea J. Colby**. This narrative is an integral part of the Report of Analysis.

Metals Analysis

The samples of SDG CTO423-10 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846. 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA.

Inductively-Coupled Plasma Mass Spectrometric Analysis (ICP-MS)

Solid-matrix Katahdin Sample Numbers SC3313- (1-19) were digested for ICP-MS analysis on 06/27/09 (QC Batch ZF27ICS1) in accordance with USEPA Method 3050B. Katahdin Sample Number SC3313-16 was prepared with duplicate matrix-spiked aliquots. The measured tin concentration in the preparation blank in this batch exceeds the laboratory's acceptance limit. Laboratory testing has determined that this tin contamination comes from one of the reagents used in the digestion process.

ICP-MS analyses of SDG CTO423-10 sample digestates were performed using an Agilent 7500 ICP-MS spectrometer in accordance with USEPA Method 6020. Results for all standards and samples are reported using the mean of 3 replicate measurements. All samples were analyzed within holding times and all analytical run QC criteria were met.

Internal standard recoveries for ICP-MS analyses can be found in the raw data section of the accompanying data package. The following table indicates which analytes are associated with each internal standard element.

Internal Standard Element	Associated Analytes
Scandium	Sodium, Magnesium, Aluminum, Potassium, Calcium
Germanium	Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel, Copper, Zinc, Arsenic, Selenium, Silver, Cadmium
Terbium	Antimony, Barium, Tin
Bismuth	Thallium, Lead

Instrument tuning information can also be found in the raw data section in the report labeled "6020 QC Tune Report". The relative standard deviation was determined from 4 replicate measurements. The peak width was measured at 10% of the peak height.

Matrix QC Summary

The measured recovery of antimony in the matrix-spiked aliquots of Katahdin Sample Number SC3313-16 is outside the laboratory's acceptance criteria (75% - 125% recovery of the added element, if the native concentration is less than four times the amount added). The measure recovery of antimony in a post-digestion spike of this sample is within acceptance criteria.

The matrix spike duplicate analysis of Katahdin Sample Number SC3313-16 is within the laboratory's acceptance limit (<20% relative difference between duplicate matrix-spiked aliquots) for all analytes.

The serial dilution analysis of Katahdin Sample Number SC3313-16 is within the laboratory's acceptance limit (<10% relative percent difference, if the concentration in the original sample is greater than 50 times the MDL) for all analytes.

Reporting of Metals Results

Analytical results for client samples, matrix QC samples (duplicates and matrix spikes), and batch QC samples (preparation blanks and laboratory control samples) have been reported down to the laboratory's method detection limits (MDLs). These MDLs have been adjusted for each sample based on the sample amounts used in preparation and analysis. Analytical results that are below the MDLs are flagged with "U" in the C-qualifier column.

Analytical results for instrument run QC samples (ICVs, ICBs, etc.) have been reported down to the laboratory's instrument detection limits (IDLs).

IDLs, MDLs, and PQLs are listed on Form 10 of the accompanying data package.

Wet Chemistry Analysis

The samples of SDG CTO423-10 were analyzed in accordance with the specific methods listed on the Report of Analysis.

Analyses for total solids were performed according to "Annual Book of ASTM Standards", Method D2216-98 "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass".

All analyses were performed within analytical holding times, and all quality control criteria were met.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Operations Manager or the Quality Assurance Officer as verified by the following signature.

Leslie Dimond
07.15.09

Leslie Dimond
Quality Assurance Officer

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER No 028252 PAGE 1 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	412 921 8308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	412 443 0244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 863138879042		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ]
[ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)								COMMENTS
									P	G	G						
									PRESERVATIVE USED			HN03	4°C	4°C			
									TYPE OF ANALYSIS			TAL Metals SW846 6020 300	PAH SW846 8270	SW846 8015 Mod	SW846 6020A/3050B		
6/17	1400	RB06170901	QC	-	-	QC	G	3	1	2							Rinsate
6/16	1245	SB06160901	QC	-	-	QC	G	2	1	1							Source
6/17	1400	IDW06170901	QC	-	-	QC	G	3	1	2							IDW
6/15	1140	X25550010001	001	0	1	SO	G	1			1						
	1300	" 0040001	004					1			1						
	1535	" 0080001	008					1			1						
	1405	" 0100001	010					3			3						MS/MSD
	1305	" 0130001	013					1			1						
	1155	" 0160001	016					1			1						
	1255	" 0180001	018					1			1						
	1255	" 0190001	019					1			1						
	1313	" 0200001	020					1			1						
	1327	" 0210001	021					1			1						

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
	6-18-09	1700		6/19/09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028254 | PAGE 2 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112600810	Indian Head	R. Bastnagel	4129218308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4129430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 863138879042		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ]
[ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G): G	PRESERVATIVE USED: 4°C	TYPE OF ANALYSIS: Explosives SW 8330 6020/3050B	COMMENTS
6/15	1345	X2555007 0001	007	0	1	SO	G	1	1			
	1325	" 022 0001	022					1	1			
	1310	" 023 0001	023					1	1			
	1250	" 024 0001	024					1	1			
	1230	" 025 0001	025					1	1			
	0000	FD06150901	QC					1	1			
	0000	FD06150902	QC					1	1			
6/16	950	X1455130 0001	130					1	1			
	950	" 131 0001	131					1	1			
	935	" 132 0001	132					1	1			
	1035	" 134 0001	134					1	1			
	1030	" 135 0001	135					1	1			
	1100	" 138 0001	138					1	1			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No. 028255 | PAGE 3 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	4129218308	Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		FedEx/863138879042		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: Metals SW846 6020B/3050B	COMMENTS
6/16	1005	X145S139 0001	139	0	1	SO	G	1	1	
"	1010	" 140 0001	140	"	"	"	"	1	1	
"	1015	" 141 0001	141	"	"	"	"	1	1	
6/10	1517	X15SD033 0006	033	0	.5	SD	G	1	1	
6/10	1355	X15SD030 0006	030	0	.5	SD	G	1	1	
6/17	910	X145S142 0001	142	0	1	SO	G	1	1	
6/17	905	X145B102 0203	102	2	3			1	1	
6/16	1125	X145B111 0102	111	1	2			1	1	
6/17	920	X145S143 0001	143	0	1			1	1	
6/16	1110	X145B084 0102	084	1	2			1	1	
6/16	0000	FD06160901	QC	—	—			1	1	
6/14	1500	X175B014 0102	014	1	2			1	1	
6/11	1525	X175S016 0001	016	0	1			1	1	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. — CHAIN OF CUSTODY — NUMBER № 028256 — PAGE 4 OF 8

PROJECT NO: 112G00810	FACILITY: Indian Head	PROJECT MANAGER: R. Businski	PHONE NUMBER: 4129218308	LABORATORY NAME AND CONTACT: Katahdin Labs / Andrea Colby
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER: J. Goard	PHONE NUMBER: 4124430244	ADDRESS: 600 Technology Way
		CARRIER/WAYBILL NUMBER: Fed Ex / 863138879042		CITY, STATE: Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G, G
PRESERVATIVE USED: 4°C, 4°C
TYPE OF ANALYSIS: Metals SW846 6020/5050B; PAHs SW846 8270

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	Metals SW846 6020/5050B	PAHs SW846 8270							COMMENTS
6/11	1500	X17SS0190001	019	0	1	SO	G	3	3								MS/MSD
6/11	1530	" 0220001	022	↓	↓	↓	↓	1	1								
6/11	1545	" 0240001	024	↓	↓	↓	↓	1	1								
6/12	1020	" 0250001	025	↓	↓	↓	↓	1	1								
6/14	1440	X17SB0250102	025	1	2	↓	↓	1	1								
6/12	1040	X17SS0270001	027	0	1	↓	↓	1	1								
6/12	1050	X17SS0280001	028	0	1	↓	↓	1	1								
6/11	0000	FD06110901	QC	↓	↓	↓	↓	1	1								
6/13	1515	X16SS0420001	042	↓	↓	↓	↓	1	1								
6/14	900	" 0540001	054	↓	↓	↓	↓	1	1								
↓	855	" 0570001	057	↓	↓	↓	↓	1	1								
↓	930	" 0610001	061	↓	↓	↓	↓	1	1								
↓	1040	" 0730001	073	↓	↓	↓	↓	1	1								

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	6-18-09	1700	1. RECEIVED BY [signature]	6-19-09	1000
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028257 | PAGE 5 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	4129218308	Katahdin Labs / Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Goerdt	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		Fed Ex / 863138879042		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)			PRESERVATIVE USED			TYPE OF ANALYSIS								COMMENTS
									G	G		4°C	4°C		RIA	TOC	LEC	Metals SW846 6020/3050B					
6/13	1315	X1655013 0001	013	0	1	SO	G	1	1														
6/13	1515	X1655042 0001	042					1	1														
6/11	840	X1755001 0001	001					1	1														
6/14	1450	X1755013 0001	013					1	1														
6/12	1050	X1755028 0001	028					1	1														
6/14	1055	X1655079 0001	079					1		1					Pb		1						
6/16	1350	" 0870001	087					1		1							1						
6/17	1020	" 0900001	090					1		1							1						
	1530	" 0910001	091					1		1							1						
	1515	" 0920001	092					1		1							1						
	1500	" 0930001	093					1		1							1						
	1440	" 0940001	094					1		1							1						
↓	1440	"	095	↓	↓	↓	↓	1		1							1						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028258 | PAGE 6 OF 8

PROJECT NO: 112G00810	FACILITY: Indian Head	PROJECT MANAGER R. Basinski	PHONE NUMBER 412921 8308	LABORATORY NAME AND CONTACT: Katahdin Lab / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER J. Goerdt	PHONE NUMBER 4124430244	ADDRESS 600 Technology Way
		CARRIER/WAYBILL NUMBER Fed Ex / 863138879042		CITY, STATE Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G): G G	PRESERVATIVE USED: 4°C 4°C	TYPE OF ANALYSIS: MS 8260B / 8260B PH TOC LEC / PAH	COMMENTS
6/13	1140	X16550080001	008	0	1	SO	G	1	1			
|	1315	" 013 0001	013	|	|	|	|	1	1			
|	1245	" 017 0001	017	|	|	|	|	1	1			
|	1255	" 020 0001	020	|	|	|	|	1	1			
|	1345	" 025 0001	025	|	|	|	|	3	3			MS/MSD
|	1425	" 032 0001	032	↓	↓	↓	↓	1	1			
|	0000	FD06130901	QC	0	1	SO	G	1	1			
6/15	1355	X25550320001	032	|	|	|	|	2		2		
|	1255	" 019 0001	019	|	|	|	|	2		2		
|	1305	" 013 0001	013	|	|	|	|	2		2		
↓	1335	" 006 0001	006	|	|	|	|	~~2~~		2		
6/11	1500	X17550190001	019	|	|	|	|	~~2~~ 6		~~2~~ 6		~~MS/MSD~~ MS/MSD
6/15	0000	FD06150903	QC	↓	↓	↓	↓	2				2

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: X17550190001 - MS/MSD 6 jars (2.5oz)

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER No 028259 | PAGE 7 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G008810	Indian Head	R. Bosinski	4129218308	Kadrudin Labs / Andrea Cobb
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4124930244	68 Technology Way / ~~34 Boguwood Ln~~
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 863138879042		Scarborough, ME 04074

STANDARD TAT [X]
RUSH TAT [ ]
[ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)									PRESERVATIVE USED									TYPE OF ANALYSIS									COMMENTS
									G	G								4°C	4°C																	
																											8260B	6020A/7470A	PH	TOC	CEC	PAH				
6/13	0000	FD06130902	QC	0	1	SO	G	2											2																	
6/13	1450	X1655037000 1	037	|	|			2											2																	~~MS/MSD~~
6/13	1325	" 023000 1	023	|	|			2											2																	
6/13	0000	FD06130903	QC	↓	↓			2											2																	
6/14	1450	X175B0110102	011	1	2			1	1																											
6/14	1450	" 0130102	013	1	2			1	1																											
6/11	1314	X1755014000 1	014	0	1			1	1																											
6/11	1053	X175B0050004	005	0	4			3	3																											MS/MSD
6/11	1110	X175B0050810	005	8	10			1	1																											
6/11	1120	X175B0070004	007	0	4			1	1																											
6/11	1120	X175B0060406	006	4	6			1	1																											
6/15	1320	X2555033000 1	033	0	1			1	1																											
6/11	840	X175B0010004	001	0	4			1	1																											

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1500	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER N? 028260 | PAGE 8 OF 8

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00810	Indian Head	R. Basinski	4129218308	Katahdin Labs / Colby
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		J. Gorat	4124430244	600 Technology Way
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		Fed Ex / 863138879042		Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: 8260B / 6010B / 6020A / 9045D / 9050B

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS		COMMENTS
6/11	917	X175B0020406	002	4	6	SO	G	1	1	
	951	" 0030608	003	6	8			1	1	
	1010	" 0040004	004	0	4			1	1	
	1013	" 0040608	004	6	8			1	1	
6/15	1208	X2555028 0001	028	0	1			3	3	MS/MSD
	1245	" 0300001	030	0	1			1	1	
	1305	" 0310001	031	0	1			1	1	
	1355	" 0320001	032	0	1			1	1	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-18-09	1700	1. RECEIVED BY	6-19-09	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

NSF INDIAN HEAD
SOIL DATA
CTO423-10

FRACTION	CHEMICAL	FD06130901	UNITS	X16SS0320001	RPD	D
M	ANTIMONY	0.14	MG/KG	0.14	0.00	0.00
M	ARSENIC	3.3	MG/KG	4	19.18	0.70
M	COPPER	8	MG/KG	9.7	19.21	1.70
M	LEAD	13	MG/KG	13.9	6.69	0.90
M	TIN	0.11 B	MG/KG	0.094 B	15.69	0.02
M	ZINC	26.4	MG/KG	31.2	16.67	4.80

Current RPD Quality Control Limit: 55 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JZG02A.B\053SMPL.D\053SMPL.D#
Date Acquired: Jul 2 2009 11:42 pm
Acq. Method: K10CCV.M
Operator: EAM
Sample Name: SC3313-001 2
Misc Info: DILUTION - ~~0.4~~10
Vial Number: 2209
Current Method: C:\ICPCHEM\1\METHODS\K10CCV.M
Calibration File: C:\ICPCHEM\1\CALIB\K10CCV.C
Last Cal. Update: Jul 02 2009 06:02 pm
Sample Type: Sample
Dilution Factor: ~~25.00~~ 5
Autodil Factor: Undiluted
Final Dil Factor: ~~25.00~~ 5

Reported Results for Arsenic = 1.9mg/kg
%S=87.1
Wrong dilution factor, results should be divided by 5.
Ean 070909

$\frac{97.525}{5} = 19.5050$

$19.5050 \text{ ug/L} \times \left(\frac{100 \text{ mL}}{1.15 \text{ g}}\right) \times \left(\frac{1}{.871}\right) \times \left(\frac{1}{1000}\right) =$

1.94mg/kg

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
7 Li	1,661,000.	66,440.	ppb ---		#VALUE!	
9 Be	26.775	1.071	ppb	3.36	1000.	
11 B	249.825	9.993	ppb	1.28	1000.	
23 Na	927.25	37.09	ppb	6.84	100000.	
25 Mg	50,975.	2,039.	ppb	2.64	100000.	
27 Al	565,750.	22,630.	ppb	2.83	100000.	
28 Si	10,220.	408.8	ppb	3.77	#VALUE!	
29 Si	9,887.5	395.5	ppb	2.99	10000.	
39 K	50,675.	2,027.	ppb	1.91	100000.	
43 Ca	30,850.	1,234.	ppb	1.91	100000.	
44 Ca	29,025.	1,161.	ppb	0.88	100000.	
51 V	1,310.	52.4	ppb	0.34	1000.	
52 Cr	909.5	36.38	ppb	0.92	1000.	
53 Cr	940.	37.6	ppb	1.81	1000.	
55 Mn	4,980.	199.2	ppb	2.05	500.	
56 Fe	533,500.	21,340.	ppb	0.96	100000.	
57 Fe	518,750.	20,750.	ppb	1.49	100000.	
59 Co	186.175	7.447	ppb	1.19	500.	
60 Ni	314.	12.56	ppb	1.49	500.	
63 Cu	273.	10.92	ppb	1.40	1000.	
65 Cu	274.5	10.98	ppb	0.21	500.	
66 Zn	1,104.	44.16	ppb	0.72	500.	
68 Zn	1,154.25	46.17	ppb	1.05	1000.	
75 As	97.525	3.901	ppb	2.98	1000.	
82 Se	17.8225	0.7129	ppb	11.33	500.	
88 Sr	272.25	10.89	ppb	0.90	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	40.7	1.628	ppb	2.90	1000.	
107 Ag	1.5075	0.0603	ppb	1.55	100.	
109 Ag	1.4788	0.0592	ppb	3.59	200.	
111 Cd	2.6125	0.1045	ppb	23.80	200.	
114 Cd	1.0588	0.0424	ppb	6.25	500.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	53.025	2.121	ppb	2.73	1000.	
120 Sn	53.	2.12	ppb	0.78	1000.	
121 Sb	10.3125	0.4125	ppb	7.77	1000.	
123 Sb	10.7825	0.4313	ppb	4.11	1000.	
135 Ba	2,037.5	81.5	ppb	1.92	1000.	
137 Ba	2,034.	81.36	ppb	1.29	#VALUE!	
182 W	34.025	1.361	ppb	4.70	1000.	
200 Hg	5.6375	0.2255	ppb	6.78	#VALUE!	
202 Hg	7.205	0.2882	ppb	17.16	#VALUE!	
203 Tl	12.0725	0.4829	ppb	12.39	1000.	
205 Tl	11.8975	0.4759	ppb	12.64	#VALUE!	
208 Pb	2,600.	104.	ppb	0.64	1000.	
232 Th	162.1	6.484	ppb	3.21	1000.	
238 U	34.2	1.368	ppb	1.67	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	1200851.00	0.68	1159186.40	103.6	69.5 - 130.4	
45 Sc	1022319.70	1.58	969014.25	105.5	69.5 - 130.4	
72 Ge	199351.05	1.34	196431.17	101.5	69.5 - 130.4	
159 Tb	1534430.50	1.14	1478796.30	103.8	69.5 - 130.4	
209 Bi	863844.50	1.55	851325.69	101.5	69.5 - 130.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JZG02A.B\009CALB.D\009CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

File:	049_CCV.D#	050_CCB.D#	051SMPL.D#	052SMPL.D#	053SMPL.D#
Sample:	CCV	CCB	PBSZF27ICS1	SC3304-015L	SC3313-001
Date/Time:	7/2/2009 23:08	7/2/2009 23:16	7/2/2009 23:25	7/2/2009 23:33	7/2/2009 23:42
Operator:	EAM	EAM	EAM	EAM	EAM
Method:	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M	K10CCV.M
Dilution:	1	1	5	25	5
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Be / 9	11.0600	-0.0009	0.0029	-0.0654	5.3550
B / 11	26.6700	0.9267	4.0810	12.3275	49.9650
Na / 23	5104.0000	0.3776	19.5400	-11.0325	185.4500
Mg / 25	5161.0000	3.6210	35.0300	132.2000	10195.0000
Al / 27	514.1000	0.1376	20.1100	20.2575	113150.0000
Si / 29	497.6000	1.4160	53.8500	116.6500	1977.5000
K / 39	5098.0000	10.1600	81.3500	258.5000	10135.0000
Ca / 44	5211.0000	-0.0368	30.9900	174.7750	5805.0000
V / 51	25.1600	0.0035	0.2230	0.3585	262.0000
Cr / 52	25.0800	-0.0124	1.2975	0.6605	181.9000
Mn / 55	25.3000	-0.0091	1.6410	0.5765	996.0000
Fe / 57	5115.0000	16.4200	57.5000	66.4000	103750.0000
Co / 59	10.2800	0.0045	0.0416	-0.0664	37.2350
Ni / 60	25.4100	0.0260	0.5920	0.3298	62.8000
Cu / 65	25.5000	-0.0038	0.7095	0.4743	54.9000
Zn / 66	26.9100	0.0183	2.3425	6.5225	220.8000
As / 75	25.3400	-0.0947	-0.1123	-3.6475	19.5050
Se / 82	25.9800	0.1822	0.2276	-0.4468	3.5645
Sr / 88	25.7400	-0.0712	-0.3217	-1.4143	54.4500
Mo / 98	25.5900	1.5220	2.9685	5.5050	8.1400
Ag / 107	10.6000	0.0055	-0.0021	-0.0477	0.3015
Cd / 114	10.7300	0.0052	0.0511	0.0345	0.2118
Sn / 118	25.7500	0.1967	6.7450	2.0388	10.6050
Sb / 123	25.7100	0.0429	0.0966	0.3953	2.1565
Ba / 135	25.9200	0.0587	0.3816	0.8980	407.5000
W / 182	24.0800	0.7303	2.2270	6.7850	6.8050
Tl / 203	10.4400	1.2530	3.1480	7.5775	2.4145
Pb / 208	25.3900	0.0203	0.1830	0.1297	520.0000
Th / 232	9.4500	0.1317	2.9350	0.9978	32.4200
U / 238	10.2500	0.0223	0.0351	0.0321	6.8400
Li / 6	100.95	102.89	102.75	102.91	103.59
Sc / 45	103.26	101.79	100.52	101.59	105.50
Ge / 72	101.62	102.12	98.67	101.18	101.49
Tb / 159	104.71	105.01	102.32	104.57	103.76
Bi / 209	103.59	106.49	103.90	105.03	101.47
Li / 6	1170228	1192736	1191120	1192900	1200851
Sc / 45	1000603	986320.9	974066.4	984441.6	1022320
Ge / 72	199616.5	200586.8	193828.4	198741.5	199351
Tb / 159	1548439	1552848	1513073	1546330	1534431
Bi / 209	881851	906595.8	884548.8	894163.2	863844.5

HOLDTIME

SDG CTO423-10

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	X17SB0040004	SC3313-014	NM	6/11/2009	6/27/2009	7/7/2009	15.91	10.63	26.55
M	MG/KG	FD06130901	SC3313-003	NM	6/13/2009	6/27/2009	7/2/2009	14.34	5.656	20
M	MG/KG	X17SS0140001	SC3313-006	NM	6/11/2009	6/27/2009	7/3/2009	15.5	6	21.5
M	MG/KG	X17SB0130102	SC3313-005	NM	6/14/2009	6/27/2009	7/3/2009	12.39	6	18.39
M	MG/KG	X17SB0110102	SC3313-004	NM	6/14/2009	6/27/2009	7/3/2009	12.39	6	18.39
M	MG/KG	X17SB0070004	SC3313-008	NM	6/11/2009	6/27/2009	7/3/2009	15.59	6	21.59
M	MG/KG	X17SB0060406	SC3313-009	NM	6/11/2009	6/27/2009	7/3/2009	15.59	6	21.59
M	MG/KG	X17SB0060406	SC3313-009	NM	6/11/2009	6/27/2009	7/11/2009	15.54	14	29.54
M	MG/KG	X17SB0050810	SC3313-007	NM	6/11/2009	6/27/2009	7/3/2009	15.59	6	21.59
M	MG/KG	X17SB0040608	SC3313-015	NM	6/11/2009	6/27/2009	7/7/2009	15.91	10.66	26.57
M	MG/KG	X25SS0280001	SC3313-016	NM	6/15/2009	6/27/2009	7/8/2009	11.5	11	22.5
M	MG/KG	X17SB0040004	SC3313-014	NM	6/11/2009	6/27/2009	7/8/2009	15.91	11.57	27.49
M	MG/KG	X25SS0300001	SC3313-017	NM	6/15/2009	6/27/2009	7/8/2009	11.49	11	22.49
M	MG/KG	X17SB0040004	SC3313-014	NM	6/11/2009	6/27/2009	7/11/2009	15.62	14	29.62
M	MG/KG	X17SB0030608	SC3313-013	NM	6/11/2009	6/27/2009	7/3/2009	15.68	6	21.68

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	X17SB0030608	SC3313-013	NM	6/11/2009	6/27/2009	7/11/2009	15.62	14	29.62
M	MG/KG	X17SB0020406	SC3313-012	NM	6/11/2009	6/27/2009	7/3/2009	15.7	6	21.7
M	MG/KG	X17SB0020406	SC3313-012	NM	6/11/2009	6/27/2009	7/11/2009	15.64	14	29.64
M	MG/KG	X17SB0010004	SC3313-011	NM	6/11/2009	6/27/2009	7/3/2009	15.72	6	21.72
M	MG/KG	X17SB0010004	SC3313-011	NM	6/11/2009	6/27/2009	7/11/2009	15.66	14	29.66
M	MG/KG	X16SS0320001	SC3313-002	NM	6/13/2009	6/27/2009	7/2/2009	13.74	5.650	19.39
M	MG/KG	X16SS0200001	SC3313-001	NM	6/13/2009	6/27/2009	7/2/2009	13.8	5.653	19.45
M	MG/KG	X17SB0040608	SC3313-015	NM	6/11/2009	6/27/2009	7/11/2009	15.64	14	29.64
M	MG/KG	X25SS0310001	SC3313-018	NM	6/15/2009	6/27/2009	7/8/2009	11.48	11	22.48
M	MG/KG	X25SS0320001	SC3313-019	NM	6/15/2009	6/27/2009	7/8/2009	11.45	11	22.45
M	MG/KG	X25SS0330001	SC3313-010	NM	6/15/2009	6/27/2009	7/3/2009	11.52	6	17.52
M	MG/KG	X17SS0140001	SC3313-006	NM	6/11/2009	6/27/2009	7/7/2009	15.79	10.59	26.39
TS	%	X17SB0040004	SC3313-14	NM	6/11/2009	7/1/2009	7/2/2009	19.97	1	20.97
TS	%	X25SS0320001	SC3313-19	NM	6/15/2009	7/1/2009	7/2/2009	15.81	1	16.81
TS	%	X25SS0310001	SC3313-18	NM	6/15/2009	7/1/2009	7/2/2009	15.84	1	16.84
TS	%	X25SS0300001	SC3313-17	NM	6/15/2009	7/1/2009	7/2/2009	15.86	1	16.86
TS	%	X25SS0280001	SC3313-16	NM	6/15/2009	7/1/2009	7/2/2009	15.88	1	16.88
TS	%	X17SS0140001	SC3313-6	NM	6/11/2009	7/1/2009	7/2/2009	19.84	1	20.84

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
TS	%	X17SB0130102	SC3313-5	NM	6/14/2009	7/1/2009	7/2/2009	16.77	1	17.77
TS	%	X17SB0110102	SC3313-4	NM	6/14/2009	7/1/2009	7/2/2009	16.77	1	17.77
TS	%	X17SB0070004	SC3313-8	NM	6/11/2009	7/1/2009	7/2/2009	19.92	1	20.92
TS	%	X17SB0060406	SC3313-9	NM	6/11/2009	7/1/2009	7/2/2009	19.92	1	20.92
TS	%	X17SB0040608	SC3313-15	NM	6/11/2009	7/1/2009	7/2/2009	19.96	1	20.96
TS	%	X25SS0330001	SC3313-10	NM	6/15/2009	7/1/2009	7/2/2009	15.83	1	16.83
TS	%	X17SB0030608	SC3313-13	NM	6/11/2009	7/1/2009	7/2/2009	19.98	1	20.98
TS	%	X17SB0020406	SC3313-12	NM	6/11/2009	7/1/2009	7/2/2009	20.00	1	21.00
TS	%	X17SB0010004	SC3313-11	NM	6/11/2009	7/1/2009	7/2/2009	20.03	1	21.03
TS	%	X16SS0320001	SC3313-2	NM	6/13/2009	7/1/2009	7/2/2009	17.79	1	18.79
TS	%	X16SS0200001	SC3313-1	NM	6/13/2009	7/1/2009	7/2/2009	17.85	1	18.85
TS	%	FD06130901	SC3313-3	NM	6/13/2009	7/1/2009	7/2/2009	18.39	1	19.39
TS	%	X17SB0050810	SC3313-7	NM	6/11/2009	7/1/2009	7/2/2009	19.92	1	20.92

Katahdin Analytical Services, Inc. — Sample Receipt Condition Report

Client: Indian Head - Tetra Tech	KAS PM: AJC	Sampled By: Client	
Project:	KIMS Entry By: DD	Delivered By: Fed-Ex	
KAS Work Order#: SC3309 / SC3310 / SC3311	KIMS Review By: NC	Received By: GN	
~~SDG~~ #: SC3312 / SC3313	Cooler: 1 of 3	Date/Time Rec.: 6-19-09 1000	

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 5.5
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea				✓	
Soil/Sediment: Received in airtight container?					
Received in methanol?					
Methanol covering soil?					
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

Sample # SB06160901 = Lab received only 1 Amber for SVOA

0000005

Katahdin Analytical Services, Inc. — Sample Receipt Condition Report

Client: Tetra Tech Indian Head	KAS PM: AJC	Sampled By: Client	
Project:	KIMS Entry By: DD	Delivered By: Fed-Ex	
KAS Work Order#: SC3309/SC3310/SC3311	KIMS Review By: AJC	Received By: GM	
~~SDG~~#: SC3312/SC3313	Cooler: 2 of 3	Date/Time Rec.: 6-19-09 10:00	

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 4.9
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or (ice) present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea				✓	
Soil/Sediment:					
Received in airtight container?					
Received in methanol?					
Methanol covering soil?					
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol,	✓				
TPO4, N+N, TOC, DRO, TPH – pH <2					
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

Katahdin Analytical Services, Inc.

Sample Receipt Condition Report

Client: Tetra Tech Indian Head	KAS PM: AJC	Sampled By: Client
Project:	KIMS Entry By: DD	Delivered By: Fed-Ex
KAS Work Order#: SC3309 / SC3310 / SC3311	KIMS Review By: [illegible]	Received By: GN
~~SDG#~~ SC3312 / SC3313	Cooler: 3 of 3	Date/Time Rec.: 6-19-09 1000

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 6.0
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea **Soil/Sediment:**				✓	
Received in airtight container?					
Received in methanol?					
Methanol covering soil?					
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

CRC0007

Andrea Colby

From: Goerdt, James [James.Goerdt@tetratech.com]
Sent: Thursday, June 18, 2009 11:45 PM
To: acolby@katahdinlab.com
Subject: Sample Shipment 112G00810 CTO 423

Andrea, we shipped 3 coolers of samples today for delivery tomorrow (Friday). I was looking over the COCs tonight and found the following mistakes:

- Page 5 of 8, third line down, the sample ID should be X17SS0010004.
- Page 5 of 8, last line, the sample should be X16SS0950001.
- Page 6 of 8, 2nd line from the bottom (X17SS0190001), the analysis should be for PAHs.

Also, I ran out of 4 oz jars, so you'll find some of the samples for PAHs and some for TOC, CEC, pH are either in the large 16 oz(?) jars, or in (2) 2.5 oz jars. I sent two of the 2.5 oz jars to make sure you had enough sample material. In instances where two jars were sent, they were placed in the same Ziploc baggie. Hope this isn't too much of a pain to figure out. If you have any questions once the samples are received, let me know.

Also, I forgot a few samples and will be shipping them out tomorrow for Saturday delivery. The last time we talked you mentioned a different address for Saturday deliveries. Please call me tomorrow morning between 8:00-9:00 and let me know the correct address. 412-443-0244

Thanks!

Jim

Jim Goerdt | Environmental Scientist
Phone: 412.921.8425 | Fax: 412.921.4040
james.goerdt@tetratech.com www.ttnus.com

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3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services **Sample ID:** PBSZF27ICS1

Matrix: SOIL **SDG Name:** CTO423-10

QC Batch ID: ZF27ICS1

Concentration Units : mg/Kgdrywt

Analyte	RESULT	C
ANTIMONY	0.020	U
ARSENIC	0.150	U
COPPER	0.110	U
LEAD	0.030	U
TIN	0.674	
ZINC	0.350	U

INSTRUMENT DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 3/6/2009

Concentration Units: ug/L

Analyte	CRDL	IDL	M
ALUMINUM	60	2.20	MS
ANTIMONY	0.20	0.03	MS
ARSENIC	1.0	0.08	MS
CALCIUM	20	3.90	MS
COPPER	1.0	0.04	MS
IRON	20	3.10	MS
LEAD	0.20	0.02	MS
MAGNESIUM	20	2.00	MS
MOLYBDENUM	1.0	0.07	MS
POTASSIUM	200	8.80	MS
SODIUM	200	6.50	MS
TIN	1.0	0.04	MS
ZINC	2.0	0.44	MS

METHOD DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 3/11/2009

Analyte	MDL	Units	M	EPA Prep./Anal. Method
ANTIMONY	0.01	mg/kg	MS	SW846 3050B / SW846 6020
ARSENIC	0.03	mg/kg	MS	SW846 3050B / SW846 6020
COPPER	0.02	mg/kg	MS	SW846 3050B / SW846 6020
LEAD	0.01	mg/kg	MS	SW846 3050B / SW846 6020
TIN	0.04	mg/kg	MS	SW846 3050B / SW846 6020
ZINC	0.07	mg/kg	MS	SW846 3050B / SW846 6020

ICP LINEAR RANGES

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 1/6/2009

Concentration Units: ug/L

Analyte	Integration Time (sec)	Linear Range	M
ALUMINUM	0.01	100000	MS
ANTIMONY	0.10	1000	MS
ARSENIC	0.30	1000	MS
CALCIUM	0.03	100000	MS
COPPER	0.10	500	MS
IRON	0.03	100000	MS
LEAD	0.10	1000	MS
MAGNESIUM	0.05	100000	MS
MOLYBDENUM	0.10	2000	MS
POTASSIUM	0.01	100000	MS
SODIUM	0.01	100000	MS
TIN	0.10	1000	MS
ZINC	0.10	250	MS

PREPARATION LOG

Lab Name: Katahdin Analytical Services **QC Batch ID:** ZF27ICS1

Matrix: SOIL **SDG Name:** CTO423-10

Method: P **Prep Date:** 06/27/2009

Client ID	Lab Sample ID	Initial (g)	Final (L)
LCSSZF27ICS1	LCSSZF27ICS1	0.5039	0.1
PBSZF27ICS1	PBSZF27ICS1	1	0.1
X16SS0200001	SC3313-001	1.15	0.1
X16SS0320001	SC3313-002	1.23	0.1
FD06130901	SC3313-003	1.09	0.1
X17SB0110102	SC3313-004	1.09	0.1
X17SB0130102	SC3313-005	1.06	0.1
X17SS0140001	SC3313-006	1.22	0.1
X17SB0050810	SC3313-007	1.11	0.1
X17SB0070004	SC3313-008	1	0.1
X17SB0060406	SC3313-009	1.07	0.1
X25SS0330001	SC3313-010	1.28	0.1
X17SB0010004	SC3313-011	1.03	0.1
X17SB0020406	SC3313-012	1.21	0.1
X17SB0030608	SC3313-013	1.26	0.1
X17SB0040004	SC3313-014	1.2	0.1
X17SB0040608	SC3313-015	1.22	0.1
X25SS0280001	SC3313-016	1.1	0.1
X25SS0280001P	SC3313-016P	1.07	0.1
X25SS0280001S	SC3313-016S	1.13	0.1
X25SS0300001	SC3313-017	1.07	0.1
X25SS0310001	SC3313-018	1.1	0.1
X25SS0320001	SC3313-019	1.16	0.1

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG02A

Date: 7/2/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements
6020 TUNE		1	16:21	
200.8 TUNE		1	16:28	
Cal Blank		1	17:26	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Cal Std 1		1	17:35	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Cal Std 2		1	17:43	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Cal Std 3		1	17:52	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Cal Std 4		1	18:00	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ZZZZZZ		1	18:09	
ICV		1	18:17	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ICB		1	18:26	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
PQL		1	18:34	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ICSA		1	18:43	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ICSAB		1	18:52	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Blank		1	19:00	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	19:09	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	19:17	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
BLANK		1	19:26	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
BLANK		1	19:35	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	19:43	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	19:52	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ZZZZZZ		5	20:00	
ZZZZZZ		5	20:09	
ZZZZZZ		5	20:17	
ZZZZZZ		5	20:26	
ZZZZZZ		5	20:34	
ZZZZZZ		5	20:43	
ZZZZZZ		5	20:51	
ZZZZZZ		5	21:00	
ZZZZZZ		10	21:08	
BLANK		1	21:17	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	21:25	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	21:34	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ZZZZZZ		5	21:42	
ZZZZZZ		5	21:51	
ZZZZZZ		5	21:59	
ZZZZZZ		5	22:08	
ZZZZZZ		5	22:17	
ZZZZZZ		5	22:25	
ZZZZZZ		5	22:33	
ZZZZZZ		5	22:42	
ZZZZZZ		10	22:51	
BLANK		1	22:59	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	23:08	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	23:16	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
PBSZF27ICS1		5	23:25	Sb As Cu Pb Sn Zn
ZZZZZZ		25	23:33	
SC3313-001	X16SS0200001	5	23:42	Sb As Cu Pb Sn Zn
SC3313-002	X16SS0320001	5	23:50	Sb As Cu Pb Sn Zn
SC3313-003	FD06130901	5	23:59	Sb As Cu Pb Sn Zn
SC3313-004	X17SB0110102	5	0:08	Sb As Cu Pb Sn Zn

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG02A

Date: 7/3/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements
SC3313-005	X17SB0130102	5	0:16	Sb As Cu Pb Sn Zn
ZZZZZZ		10	0:25	
ZZZZZZ		10	0:33	
BLANK		1	0:42	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	0:50	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	0:59	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
SC3313-006	X17SS0140001	5	1:07	Sb As Cu Sn Zn
SC3313-007	X17SB0050810	5	1:16	Sb As Cu Pb Sn Zn
SC3313-008	X17SB0070004	5	1:25	Sb As Cu Pb Sn Zn
SC3313-009	X17SB0060406	5	1:33	Sb As Cu Pb Zn
SC3313-010	X25SS0330001	5	1:42	Sb As Cu Pb Sn Zn
SC3313-011	X17SB0010004	5	1:50	Sb As Cu Pb Zn
SC3313-012	X17SB0020406	5	1:59	Sb As Cu Pb Zn
SC3313-013	X17SB0030608	5	2:08	Sb As Cu Pb Zn
LCSSZF27ICS1		10	2:16	Sb As Cu Pb Sn Zn
BLANK		1	2:25	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	2:34	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	2:42	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: ICV

File: JZG02A Jul 02, 2009 18:17

Analyte	True	Found	%R (1)
ALUMINUM	400.0	426.30	106.6
ANTIMONY	20.0	20.12	100.6
ARSENIC	20.0	19.98	99.9
CALCIUM	4000.0	4138.00	103.5
COPPER	20.0	20.43	102.2
IRON	4000.0	4156.00	103.9
LEAD	20.0	20.09	100.4
MAGNESIUM	4000.0	4202.00	105.1
MOLYBDENUM	40.0	41.64	104.1
POTASSIUM	4000.0	4129.00	103.2
SODIUM	4000.0	4114.00	102.8
TIN	20.0	21.15	105.7
ZINC	20.0	20.96	104.8

SAMPLE: CCV

File: JZG02A Jul 02, 2009 19:09

Analyte	True	Found	%R (1)
ALUMINUM	500.0	534.40	106.9
ANTIMONY	25.0	25.79	103.2
ARSENIC	25.0	25.16	100.6
CALCIUM	5000.0	5191.00	103.8
COPPER	25.0	25.48	101.9
IRON	5000.0	5151.00	103.0
LEAD	25.0	25.08	100.3
MAGNESIUM	5000.0	4950.00	99.0
MOLYBDENUM	25.0	30.04	120.2
POTASSIUM	5000.0	5062.00	101.2
SODIUM	5000.0	4938.00	98.8
TIN	25.0	25.51	102.0
ZINC	25.0	26.46	105.8

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: CCV

File: JZG02A Jul 02, 2009 19:43

Analyte	True	Found	%R (1)
ALUMINUM	500.0	500.60	100.1
ANTIMONY	25.0	25.18	100.7
ARSENIC	25.0	25.11	100.4
CALCIUM	5000.0	5082.00	101.6
COPPER	25.0	25.19	100.8
IRON	5000.0	5097.00	101.9
LEAD	25.0	24.79	99.2
MAGNESIUM	5000.0	4941.00	98.8
MOLYBDENUM	25.0	25.64	102.6
POTASSIUM	5000.0	5066.00	101.3
SODIUM	5000.0	4876.00	97.5
TIN	25.0	25.03	100.1
ZINC	25.0	26.06	104.2

SAMPLE: CCV

File: JZG02A Jul 02, 2009 21:25

Analyte	True	Found	%R (1)
ALUMINUM	500.0	507.30	101.5
ANTIMONY	25.0	25.90	103.6
ARSENIC	25.0	25.15	100.6
CALCIUM	5000.0	5163.00	103.3
COPPER	25.0	25.55	102.2
IRON	5000.0	5078.00	101.6
LEAD	25.0	25.10	100.4
MAGNESIUM	5000.0	5019.00	100.4
MOLYBDENUM	25.0	25.50	102.0
POTASSIUM	5000.0	5089.00	101.8
SODIUM	5000.0	4959.00	99.2
TIN	25.0	25.79	103.2
ZINC	25.0	26.57	106.3

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: CCV

File: JZG02A Jul 02, 2009 23:08

Analyte	True	Found	%R (1)
ALUMINUM	500.0	514.10	102.8
ANTIMONY	25.0	25.71	102.8
ARSENIC	25.0	25.34	101.4
CALCIUM	5000.0	5211.00	104.2
COPPER	25.0	25.50	102.0
IRON	5000.0	5115.00	102.3
LEAD	25.0	25.39	101.6
MAGNESIUM	5000.0	5161.00	103.2
MOLYBDENUM	25.0	25.59	102.4
POTASSIUM	5000.0	5098.00	102.0
SODIUM	5000.0	5104.00	102.1
TIN	25.0	25.75	103.0
ZINC	25.0	26.91	107.6

SAMPLE: CCV

File: JZG02A Jul 03, 2009 0:50

Analyte	True	Found	%R (1)
ALUMINUM	500.0	532.70	106.5
ANTIMONY	25.0	26.29	105.2
ARSENIC	25.0	25.58	102.3
CALCIUM	5000.0	5352.00	107.0
COPPER	25.0	26.16	104.6
IRON	5000.0	5220.00	104.4
LEAD	25.0	25.45	101.8
MAGNESIUM	5000.0	5213.00	104.3
MOLYBDENUM	25.0	25.60	102.4
POTASSIUM	5000.0	5250.00	105.0
SODIUM	5000.0	5134.00	102.7
TIN	25.0	26.45	105.8
ZINC	25.0	26.67	106.7

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: CCV

File: JZG02A Jul 03, 2009 2:34

Analyte	True	Found	%R (1)
ALUMINUM	500.0	537.80	107.6
ANTIMONY	25.0	26.00	104.0
ARSENIC	25.0	25.70	102.8
CALCIUM	5000.0	5259.00	105.2
COPPER	25.0	25.51	102.0
IRON	5000.0	5215.00	104.3
LEAD	25.0	25.45	101.8
MAGNESIUM	5000.0	5231.00	104.6
MOLYBDENUM	25.0	26.06	104.2
POTASSIUM	5000.0	5211.00	104.2
SODIUM	5000.0	5112.00	102.2
TIN	25.0	25.98	103.9
ZINC	25.0	26.71	106.8

(1) Control Limits: Mercury 80-120; Other Metals 90-110

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: PQL

File: JZG02A Jul 02, 2009 18:34

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	59.45	99.1
ANTIMONY	0.2	0.21	105.0
ARSENIC	1.0	0.95	95.0
CALCIUM	20.0	16.62	83.1
COPPER	0.2	0.22	110.0
IRON	20.0	19.07	95.3
LEAD	0.2	0.21	105.0
MAGNESIUM	20.0	19.17	95.9
MOLYBDENUM	1.0	1.11	111.0
POTASSIUM	200.0	209.20	104.6
SODIUM	200.0	202.00	101.0
TIN	0.2	0.23	115.0
ZINC	2.0	2.14	107.0

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: ICB

File: JZG02A Jul 02, 2009 18:26

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.03	U
ARSENIC	0.08	U
CALCIUM	3.90	U
COPPER	0.04	U
IRON	3.10	U
LEAD	0.02	U
MAGNESIUM	2.00	U
MOLYBDENUM	0.40	J
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.04	U
ZINC	0.44	U

SAMPLE: CCB

File: JZG02A Jul 02, 2009 19:17

Analyte	Result	C
ALUMINUM	25.34	J
ANTIMONY	0.03	U
ARSENIC	0.08	U
CALCIUM	24.26	
COPPER	0.04	U
IRON	27.29	
LEAD	0.02	U
MAGNESIUM	27.84	
MOLYBDENUM	2.76	
POTASSIUM	36.01	J
SODIUM	21.85	J
TIN	0.04	U
ZINC	0.44	U

SAMPLE: CCB

File: JZG02A Jul 02, 2009 19:52

Analyte	Result	C
ALUMINUM	4.24	J
ANTIMONY	0.03	U
ARSENIC	0.08	U
CALCIUM	3.90	U
COPPER	0.04	U
IRON	5.03	J
LEAD	0.02	U
MAGNESIUM	7.26	J
MOLYBDENUM	0.72	J
POTASSIUM	9.72	J
SODIUM	6.50	U
TIN	0.04	U
ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: CCB
File: JZG02A Jul 02, 2009 21:34

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.03	U
ARSENIC	0.08	U
CALCIUM	3.90	U
COPPER	0.04	U
IRON	3.12	J
LEAD	0.02	U
MAGNESIUM	4.38	J
MOLYBDENUM	0.35	J
POTASSIUM	9.65	J
SODIUM	6.50	U
TIN	0.05	J
ZINC	0.44	U

SAMPLE: CCB
File: JZG02A Jul 02, 2009 23:16

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.04	J
ARSENIC	-0.09	J
CALCIUM	3.90	U
COPPER	0.04	U
IRON	16.42	J
LEAD	0.02	J
MAGNESIUM	3.62	J
MOLYBDENUM	1.52	
POTASSIUM	10.16	J
SODIUM	6.50	U
TIN	0.20	J
ZINC	0.44	U

SAMPLE: CCB
File: JZG02A Jul 03, 2009 0:59

Analyte	Result	C
ALUMINUM	9.69	J
ANTIMONY	0.03	J
ARSENIC	0.08	U
CALCIUM	-4.16	J
COPPER	0.04	U
IRON	25.03	
LEAD	0.05	J
MAGNESIUM	2.33	J
MOLYBDENUM	1.28	
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.16	J
ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: CCB

File: JZG02A Jul 03, 2009 2:42

Analyte	Result	C
ALUMINUM	17.57	J
ANTIMONY	0.05	J
ARSENIC	0.08	U
CALCIUM	3.90	U
COPPER	0.04	U
IRON	45.28	
LEAD	0.15	J
MAGNESIUM	4.06	J
MOLYBDENUM	1.41	
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.20	J
ZINC	0.44	U

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: ICSA

File: JZG02A Jul 02, 2009 18:43

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	97990	98.0
ANTIMONY	0	0	
ARSENIC	0	0	
CALCIUM	100000	97140	97.1
COPPER	0	1	
IRON	100000	92710	92.7
LEAD	0	0	
MAGNESIUM	100000	95440	95.4
MOLYBDENUM	2000	2002	100.1
POTASSIUM	100000	99270	99.3
SODIUM	100000	97540	97.5
TIN	0	0	
ZINC	0	0	

SAMPLE: ICSAB

File: JZG02A Jul 02, 2009 18:52

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	102100	102.1
ANTIMONY	20	20	100.0
ARSENIC	20	19	95.0
CALCIUM	100000	102500	102.5
COPPER	20	19	95.0
IRON	100000	93540	93.5
LEAD	20	21	105.0
MAGNESIUM	100000	100000	100.0
MOLYBDENUM	2000	2095	104.8
POTASSIUM	100000	103600	103.6
SODIUM	100000	100000	100.0
TIN	20	22	110.0
ZINC	21	18	85.7

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID:** LCSSZF27ICS1

Matrix: SOIL **SDG Name:** CTO423-10

QC Batch ID: ZF27ICS1

Concentration Units : mg/Kgdrywt

Analyte	TRUE	FOUND	% R	LIMITS (%)	
ANTIMONY	126.0	113.89	90.4	50	150
ARSENIC	225.0	233.38	103.7	80	120
COPPER	66.7	71.30	106.9	81	119
LEAD	223.0	229.61	103.0	82	118
TIN	164.0	184.72	112.6	74	126
ZINC	349.0	376.27	107.8	80	120

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG07A

Date: 7/7/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements
6020 TUNE		1	14:44	
200.8 TUNE		1	14:50	
Cal Blank		1	15:50	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Cal Std 1		1	15:58	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Cal Std 2		1	16:07	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Cal Std 3		1	16:15	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Cal Std 4		1	16:24	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ZZZZZZ		1	16:32	
ICV		1	16:41	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ICB		1	16:50	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
PQL		1	16:58	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ICSA		1	17:07	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ICSAB		1	17:15	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
Blank		1	17:24	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	17:33	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	17:41	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
BLANK		1	17:50	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
BLANK		1	17:58	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	18:07	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	18:15	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ZZZZZZ		5	18:24	
ZZZZZZ		1	18:33	
ZZZZZZ		1	18:41	
ZZZZZZ		5	18:50	
ZZZZZZ		5	18:58	
ZZZZZZ		5	19:07	
ZZZZZZ		5	19:15	
ZZZZZZ		5	19:24	
ZZZZZZ		10	19:33	
BLANK		1	19:41	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	19:50	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	19:58	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ZZZZZZ		1	20:07	
ZZZZZZ		1	20:15	
ZZZZZZ		1	20:24	
ZZZZZZ		1	20:33	
ZZZZZZ		1	20:41	
ZZZZZZ		1	20:50	
ZZZZZZ		1	20:59	
ZZZZZZ		1	21:07	
ZZZZZZ		10	21:16	
BLANK		1	21:24	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	21:33	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	21:41	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
PQL		1	21:50	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	21:58	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	22:07	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
ZZZZZZ		5	22:15	
ZZZZZZ		1	22:24	
SC3313-006	X17SS0140001	25	22:33	Pb

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG07A

Date: 7/7/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements
ZZZZZZ		5	22:41	
ZZZZZZ		5	22:50	
ZZZZZZ		5	22:59	
ZZZZZZ		5	23:07	
SC3313-014	X17SB0040004	5	23:16	Sb As Cu Zn
ZZZZZZ		10	23:25	
BLANK		1	23:33	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	23:42	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	23:50	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
SC3313-015	X17SB0040608	5	23:59	Sb As Cu Pb Zn
SC3313-016	X25SS0280001	5	0:07	Sb As Cu Pb Sn Zn
SC3313-016L	X25SS0280001L	25	0:16	Sb As Cu Pb Zn
SC3313-017	X25SS0300001	5	0:25	Sb As Cu Pb Sn Zn
SC3313-018	X25SS0310001	5	0:33	Sb As Cu Pb Sn Zn
SC3313-019	X25SS0320001	5	0:42	Sb As Cu Pb Sn Zn
SC3313-016A	X25SS0280001A	5	0:50	Sb As Cu Sn Zn
SC3313-016S	X25SS0280001S	10	0:59	Sb As Cu Pb Sn Zn
SC3313-016P	X25SS0280001P	10	1:08	Sb As Cu Pb Sn Zn
BLANK		1	1:16	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCV		1	1:25	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn
CCB		1	1:33	Al Sb As Ca Cu Fe Pb Mg Mo K Na Sn Zn

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: ICV

File: JZG07A Jul 07, 2009 16:41

Analyte	True	Found	%R (1)
ALUMINUM	400.0	428.00	107.0
ANTIMONY	20.0	19.99	99.9
ARSENIC	20.0	19.54	97.7
CALCIUM	4000.0	4019.00	100.5
COPPER	20.0	20.15	100.7
IRON	4000.0	3968.00	99.2
LEAD	20.0	20.07	100.4
MAGNESIUM	4000.0	4156.00	103.9
MOLYBDENUM	40.0	41.74	104.4
POTASSIUM	4000.0	4052.00	101.3
SODIUM	4000.0	4034.00	100.8
TIN	20.0	21.32	106.6
ZINC	20.0	20.31	101.5

SAMPLE: CCV

File: JZG07A Jul 07, 2009 17:33

Analyte	True	Found	%R (1)
ALUMINUM	500.0	553.40	110.7
ANTIMONY	25.0	25.43	101.7
ARSENIC	25.0	25.52	102.1
CALCIUM	5000.0	5202.00	104.0
COPPER	25.0	25.40	101.6
IRON	5000.0	5136.00	102.7
LEAD	25.0	25.56	102.2
MAGNESIUM	5000.0	5092.00	101.8
MOLYBDENUM	25.0	29.98	119.9
POTASSIUM	5000.0	5083.00	101.7
SODIUM	5000.0	4934.00	98.7
TIN	25.0	25.23	100.9
ZINC	25.0	25.89	103.6

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: CCV

File: JZG07A Jul 07, 2009 18:07

Analyte	True	Found	%R (1)
ALUMINUM	500.0	560.70	112.1
ANTIMONY	25.0	26.94	107.8
ARSENIC	25.0	26.15	104.6
CALCIUM	5000.0	5480.00	109.6
COPPER	25.0	26.30	105.2
IRON	5000.0	5291.00	105.8
LEAD	25.0	26.73	106.9
MAGNESIUM	5000.0	5521.00	110.4
MOLYBDENUM	25.0	27.26	109.0
POTASSIUM	5000.0	5457.00	109.1
SODIUM	5000.0	5408.00	108.2
TIN	25.0	26.91	107.6
ZINC	25.0	26.68	106.7

SAMPLE: CCV

File: JZG07A Jul 07, 2009 19:50

Analyte	True	Found	%R (1)
ALUMINUM	500.0	518.70	103.7
ANTIMONY	25.0	24.58	98.3
ARSENIC	25.0	25.16	100.6
CALCIUM	5000.0	5110.00	102.2
COPPER	25.0	25.28	101.1
IRON	5000.0	5052.00	101.0
LEAD	25.0	25.27	101.1
MAGNESIUM	5000.0	5146.00	102.9
MOLYBDENUM	25.0	26.03	104.1
POTASSIUM	5000.0	5067.00	101.3
SODIUM	5000.0	5062.00	101.2
TIN	25.0	24.61	98.4
ZINC	25.0	25.55	102.2

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: CCV

File: JZG07A Jul 07, 2009 21:33

Analyte	True	Found	%R (1)
ALUMINUM	500.0	514.80	103.0
ANTIMONY	25.0	24.32	97.3
ARSENIC	25.0	24.87	99.5
CALCIUM	5000.0	5074.00	101.5
COPPER	25.0	25.03	100.1
IRON	5000.0	5032.00	100.6
LEAD	25.0	25.08	100.3
MAGNESIUM	5000.0	5199.00	104.0
MOLYBDENUM	25.0	26.01	104.0
POTASSIUM	5000.0	5068.00	101.4
SODIUM	5000.0	5188.00	103.8
TIN	25.0	24.31	97.2
ZINC	25.0	25.61	102.4

SAMPLE: CCV

File: JZG07A Jul 07, 2009 21:58

Analyte	True	Found	%R (1)
ALUMINUM	500.0	495.00	99.0
ANTIMONY	25.0	24.03	96.1
ARSENIC	25.0	24.52	98.1
CALCIUM	5000.0	4983.00	99.7
COPPER	25.0	24.31	97.2
IRON	5000.0	4890.00	97.8
LEAD	25.0	24.69	98.8
MAGNESIUM	5000.0	5018.00	100.4
MOLYBDENUM	25.0	24.96	99.8
POTASSIUM	5000.0	4905.00	98.1
SODIUM	5000.0	4999.00	100.0
TIN	25.0	24.15	96.6
ZINC	25.0	24.81	99.2

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: CCV

File: JZG07A Jul 07, 2009 23:42

Analyte	True	Found	%R (1)
ALUMINUM	500.0	543.40	108.7
ANTIMONY	25.0	24.70	98.8
ARSENIC	25.0	25.43	101.7
CALCIUM	5000.0	5184.00	103.7
COPPER	25.0	25.30	101.2
IRON	5000.0	5035.00	100.7
LEAD	25.0	25.71	102.8
MAGNESIUM	5000.0	5309.00	106.2
MOLYBDENUM	25.0	26.00	104.0
POTASSIUM	5000.0	5207.00	104.1
SODIUM	5000.0	5236.00	104.7
TIN	25.0	24.79	99.2
ZINC	25.0	25.70	102.8

SAMPLE: CCV

File: JZG07A Jul 08, 2009 1:25

Analyte	True	Found	%R (1)
ALUMINUM	500.0	572.70	114.5 •
ANTIMONY	25.0	26.36	105.4
ARSENIC	25.0	25.98	103.9
CALCIUM	5000.0	5476.00	109.5
COPPER	25.0	25.61	102.4
IRON	5000.0	5203.00	104.1
LEAD	25.0	26.23	104.9
MAGNESIUM	5000.0	5555.00	111.1 •
MOLYBDENUM	25.0	26.60	106.4
POTASSIUM	5000.0	5454.00	109.1
SODIUM	5000.0	5480.00	109.6
TIN	25.0	26.75	107.0
ZINC	25.0	26.03	104.1

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: PQL

File: JZG07A Jul 07, 2009 16:58

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	81.52	135.9•
ANTIMONY	0.2	0.25	125.0
ARSENIC	1.0	1.16	116.0
CALCIUM	20.0	30.00	150.0•
COPPER	0.2	0.27	135.0•
IRON	20.0	47.49	237.5•
LEAD	0.2	0.38	190.0•
MAGNESIUM	20.0	28.50	142.5•
MOLYBDENUM	1.0	1.27	127.0
POTASSIUM	200.0	235.20	117.6
SODIUM	200.0	234.30	117.2
TIN	0.2	0.25	125.0
ZINC	2.0	2.22	111.0

SAMPLE: PQL

File: JZG07A Jul 07, 2009 21:50

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	68.28	113.8
ANTIMONY	0.2	0.25	125.0
ARSENIC	1.0	1.25	125.0
CALCIUM	20.0	29.69	148.5•
COPPER	0.2	0.25	125.0
IRON	20.0	20.63	103.1
LEAD	0.2	0.23	115.0
MAGNESIUM	20.0	28.01	140.1•
MOLYBDENUM	1.0	1.21	121.0
POTASSIUM	200.0	238.50	119.2
SODIUM	200.0	262.70	131.3•
TIN	0.2	0.26	130.0
ZINC	2.0	2.26	113.0

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: ICB
File: JZG07A Jul 07, 2009 16:50

Analyte	Result	C
ALUMINUM	9.28	J
ANTIMONY	0.04	J
ARSENIC	0.53	J
CALCIUM	6.51	J
COPPER	0.24	J
IRON	21.48	
LEAD	0.11	J
MAGNESIUM	6.17	J
MOLYBDENUM	0.47	J
POTASSIUM	8.80	U
SODIUM	7.26	J
TIN	0.16	J
ZINC	0.44	U

SAMPLE: CCB
File: JZG07A Jul 07, 2009 17:41

Analyte	Result	C
ALUMINUM	22.35	J
ANTIMONY	0.05	J
ARSENIC	0.82	J
CALCIUM	24.65	
COPPER	0.14	J
IRON	28.49	
LEAD	0.03	J
MAGNESIUM	23.79	
MOLYBDENUM	3.13	
POTASSIUM	31.20	J
SODIUM	34.39	J
TIN	0.17	J
ZINC	0.44	U

SAMPLE: CCB
File: JZG07A Jul 07, 2009 18:15

Analyte	Result	C
ALUMINUM	5.13	J
ANTIMONY	0.04	J
ARSENIC	0.57	J
CALCIUM	6.10	J
COPPER	0.11	J
IRON	5.49	J
LEAD	0.02	U
MAGNESIUM	8.34	J
MOLYBDENUM	0.92	J
POTASSIUM	8.80	U
SODIUM	10.81	J
TIN	0.17	J
ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: CCB
File: JZG07A Jul 07, 2009 19:58

Analyte	Result	C
ALUMINUM	3.32	J
ANTIMONY	0.04	J
ARSENIC	1.00	J
CALCIUM	7.68	J
COPPER	0.13	J
IRON	6.77	J
LEAD	0.05	J
MAGNESIUM	6.05	J
MOLYBDENUM	0.42	J
POTASSIUM	8.80	U
SODIUM	20.26	J
TIN	0.19	J
ZINC	0.44	U

SAMPLE: CCB
File: JZG07A Jul 07, 2009 21:41

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.05	J
ARSENIC	0.91	J
CALCIUM	9.77	J
COPPER	0.18	J
IRON	6.58	J
LEAD	0.02	U
MAGNESIUM	6.58	J
MOLYBDENUM	0.38	J
POTASSIUM	8.80	U
SODIUM	42.55	J
TIN	0.20	J
ZINC	0.44	U

SAMPLE: CCB
File: JZG07A Jul 07, 2009 22:07

Analyte	Result	C
ALUMINUM	2.20	U
ANTIMONY	0.04	J
ARSENIC	0.64	J
CALCIUM	3.90	U
COPPER	0.10	J
IRON	7.19	J
LEAD	0.02	U
MAGNESIUM	4.37	J
MOLYBDENUM	0.33	J
POTASSIUM	8.80	U
SODIUM	21.76	J
TIN	0.16	J
ZINC	0.44	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: CCB

File: JZG07A Jul 07, 2009 23:50

Analyte	Result	C
ALUMINUM	5.28	J
ANTIMONY	0.04	J
ARSENIC	0.18	J
CALCIUM	3.90	U
COPPER	0.08	J
IRON	12.03	J
LEAD	0.15	J
MAGNESIUM	3.56	J
MOLYBDENUM	0.36	J
POTASSIUM	8.80	U
SODIUM	8.92	J
TIN	0.23	J
ZINC	0.44	U

SAMPLE: CCB

File: JZG07A Jul 08, 2009 1:33

Analyte	Result	C
ALUMINUM	9.13	J
ANTIMONY	0.05	J
ARSENIC	0.83	J
CALCIUM	3.90	U
COPPER	0.05	J
IRON	15.76	J
LEAD	0.05	J
MAGNESIUM	5.02	J
MOLYBDENUM	0.32	J
POTASSIUM	8.80	U
SODIUM	10.24	J
TIN	0.25	J
ZINC	0.44	U

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: ICSA

File: JZG07A Jul 07, 2009 17:07

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	102100	102.1
ANTIMONY	0	0	
ARSENIC	0	0	
CALCIUM	100000	100500	100.5
COPPER	0	1	
IRON	100000	93040	93.0
LEAD	0	0	
MAGNESIUM	100000	99890	99.9
MOLYBDENUM	2000	2046	102.3
POTASSIUM	100000	102900	102.9
SODIUM	100000	101600	101.6
TIN	0	0	
ZINC	0	1	

SAMPLE: ICSAB

File: JZG07A Jul 07, 2009 17:15

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	103500	103.5
ANTIMONY	20	21	105.0
ARSENIC	20	20	100.0
CALCIUM	100000	102700	102.7
COPPER	20	19	95.0
IRON	100000	94210	94.2
LEAD	20	22	110.0
MAGNESIUM	100000	101000	101.0
MOLYBDENUM	2000	2119	106.0
POTASSIUM	100000	103200	103.2
SODIUM	100000	102500	102.5
TIN	20	23	115.0
ZINC	21	18	85.7

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services | **Client Field ID:** X25SS0280001S

Matrix: SOIL | **SDG Name:** CTO423-10

Percent Solids: 85.1 | **Lab Sample ID:** SC3313-016P

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	33.5833		0.2095		54.89	60.8	N	75	125	MS
ARSENIC, TOTAL	54.6181		3.5791		54.89	93.0		75	125	MS
COPPER, TOTAL	37.3599		9.5685		27.45	101.2		75	125	MS
LEAD, TOTAL	72.8205		17.8768		54.89	100.1		75	125	MS
TIN, TOTAL	57.4396		1.4791		54.89	102.0		75	125	MS
ZINC, TOTAL	83.3160		25.1760		54.89	105.9		75	125	MS

Comments:

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Client Field ID: X25SS0280001S

Matrix: SOIL

SDG Name: CTO423-10

Percent Solids: 85.1

Lab Sample ID: SC3313-016S

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	29.0661		0.2095		51.98	55.5	N	75	125	MS
ARSENIC, TOTAL	50.5538		3.5791		51.98	90.4		75	125	MS
COPPER, TOTAL	35.3242		9.5685		25.99	99.1		75	125	MS
LEAD, TOTAL	67.2803		17.8768		51.98	95.0		75	125	MS
TIN, TOTAL	51.0216		1.4791		51.98	95.3		75	125	MS
ZINC, TOTAL	78.3412		25.1760		51.98	102.3		75	125	MS

Comments:

5B

POST DIGEST SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0280001S

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 85.1 **Lab Sample ID:** SC3313-016A

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ANTIMONY, TOTAL	2.3510		0.3924		2	97.9		75	125	MS

Comments:

5D

SPIKE DUPLICATES

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0280001

Matrix: SOIL **SDG Name:** CTO423-10

Percent Solids: 85.1 **Lab Sample ID:** SC3313-016

Concentration Units : mg/Kgdrywt

Analyte	Control Limits	Spike Result	C	Spike Dup. Result	C	RPD	Q	M
ANTIMONY, TOTAL		29.0661		33.5833		14.4		MS
ARSENIC, TOTAL		50.5538		54.6181		7.7		MS
COPPER, TOTAL		35.3242		37.3599		5.6		MS
LEAD, TOTAL		67.2803		72.8205		7.9		MS
TIN, TOTAL		51.0216		57.4396		11.8		MS
ZINC, TOTAL		78.3412		83.3160		6.2		MS

Comments:

ICP SERIAL DILUTION

Lab Name: Katahdin Analytical Services **Client Field ID:** X25SS0280001L

Matrix: SOIL **SDG Name:** CTO423-10

Lab Sample ID: SC3313-016L

Concentration Units: ug/L

Analyte	Sample Result	C	Dilution Result	C	% Difference	Q	M
ANTIMONY, TOTAL	0.39		0.38	J	2.6		MS
ARSENIC, TOTAL	6.70		7.54		12.5		MS
COPPER, TOTAL	17.92		18.47		3.1		MS
LEAD, TOTAL	33.48		33.70		0.7		MS
TIN, TOTAL	2.77		2.82	J	1.8		MS
ZINC, TOTAL	47.15		50.55		7.2		MS

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG08A

Date: 7/8/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements
6020 TUNE		1	16:01	
200.8 TUNE		1	16:07	
Cal Blank		1	17:06	Al Ca Fe Pb Mg Mo K Na
Cal Std 1		1	17:15	Al Ca Fe Pb Mg Mo K Na
Cal Std 2		1	17:23	Al Ca Fe Pb Mg Mo K Na
Cal Std 3		1	17:32	Al Ca Fe Pb Mg Mo K Na
Cal Std 4		1	17:40	Al Ca Fe Pb Mg Mo K Na
ZZZZZZ		1	17:49	
ICV		1	17:58	Al Ca Fe Pb Mg Mo K Na
ICB		1	18:06	Al Ca Fe Pb Mg Mo K Na
PQL		1	18:15	Al Ca Fe Pb Mg Mo K Na
ICSA		1	18:23	Al Ca Fe Pb Mg Mo K Na
ICSAB		1	18:32	Al Ca Fe Pb Mg Mo K Na
Blank		1	18:41	Al Ca Fe Pb Mg Mo K Na
CCV		1	18:49	Al Ca Fe Pb Mg Mo K Na
CCB		1	18:58	Al Ca Fe Pb Mg Mo K Na
BLANK		1	19:07	Al Ca Fe Pb Mg Mo K Na
BLANK		1	19:15	Al Ca Fe Pb Mg Mo K Na
CCV		1	19:24	Al Ca Fe Pb Mg Mo K Na
CCB		1	19:32	Al Ca Fe Pb Mg Mo K Na
ZZZZZZ		1	19:41	
ZZZZZZ		1	19:49	
ZZZZZZ		5	19:58	
ZZZZZZ		5	20:07	
ZZZZZZ		5	20:15	
ZZZZZZ		5	20:24	
ZZZZZZ		10	20:32	
ZZZZZZ		10	20:41	
ZZZZZZ		10	20:50	
BLANK		1	20:58	Al Ca Fe Pb Mg Mo K Na
CCV		1	21:07	Al Ca Fe Pb Mg Mo K Na
CCB		1	21:15	Al Ca Fe Pb Mg Mo K Na
ZZZZZZ		5	21:24	
ZZZZZZ		5	21:32	
ZZZZZZ		5	21:41	
SC3313-014	X17SB0040004	10	21:50	Pb
ZZZZZZ		5	21:58	
ZZZZZZ		25	22:07	
ZZZZZZ		25	22:16	
ZZZZZZ		5	22:24	
ZZZZZZ		10	22:33	
BLANK		1	22:41	Al Ca Fe Pb Mg Mo K Na
CCV		1	22:50	Al Ca Fe Pb Mg Mo K Na
CCB		1	22:59	Al Ca Fe Pb Mg Mo K Na

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: ICV

File: JZG08A Jul 08, 2009 17:58

Analyte	True	Found	%R (1)
ALUMINUM	400.0	433.10	108.3
CALCIUM	4000.0	4164.00	104.1
IRON	4000.0	4060.00	101.5
LEAD	20.0	20.55	102.8
MAGNESIUM	4000.0	4385.00	109.6
MOLYBDENUM	40.0	42.39	106.0
POTASSIUM	4000.0	4256.00	106.4
SODIUM	4000.0	4338.00	108.5

SAMPLE: CCV

File: JZG08A Jul 08, 2009 18:49

Analyte	True	Found	%R (1)
ALUMINUM	500.0	534.00	106.8
CALCIUM	5000.0	5294.00	105.9
IRON	5000.0	5075.00	101.5
LEAD	25.0	24.97	99.9
MAGNESIUM	5000.0	5157.00	103.1
MOLYBDENUM	25.0	28.34	113.4
POTASSIUM	5000.0	5273.00	105.5
SODIUM	5000.0	5169.00	103.4

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: CCV

File: JZG08A Jul 08, 2009 19:24

Analyte	True	Found	%R (1)
ALUMINUM	500.0	516.90	103.4
CALCIUM	5000.0	5376.00	107.5
IRON	5000.0	5066.00	101.3
LEAD	25.0	25.58	102.3
MAGNESIUM	5000.0	5314.00	106.3
MOLYBDENUM	25.0	25.36	101.4
POTASSIUM	5000.0	5407.00	108.1
SODIUM	5000.0	5334.00	106.7

SAMPLE: CCV

File: JZG08A Jul 08, 2009 21:07

Analyte	True	Found	%R (1)
ALUMINUM	500.0	514.50	102.9
CALCIUM	5000.0	5339.00	106.8
IRON	5000.0	5108.00	102.2
LEAD	25.0	25.44	101.8
MAGNESIUM	5000.0	5268.00	105.4
MOLYBDENUM	25.0	25.19	100.8
POTASSIUM	5000.0	5340.00	106.8
SODIUM	5000.0	5351.00	107.0

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: CCV

File: JZG08A Jul 08, 2009 22:50

Analyte	True	Found	%R (1)
ALUMINUM	500.0	525.30	105.1
CALCIUM	5000.0	5409.00	108.2
IRON	5000.0	5152.00	103.0
LEAD	25.0	25.81	103.2
MAGNESIUM	5000.0	5382.00	107.6
MOLYBDENUM	25.0	25.29	101.2
POTASSIUM	5000.0	5448.00	109.0
SODIUM	5000.0	5475.00	109.5

(1) Control Limits: Mercury 80-120; Other Metals 90-110

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: PQL

File: JZG08A Jul 08, 2009 18:15

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	62.85	104.8
CALCIUM	20.0	23.55	117.8
IRON	20.0	24.44	122.2
LEAD	0.2	0.23	115.0
MAGNESIUM	20.0	23.56	117.8
MOLYBDENUM	1.0	1.07	107.0
POTASSIUM	200.0	217.80	108.9
SODIUM	200.0	221.90	110.9

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: ICB

File: JZG08A Jul 08, 2009 18:06

Analyte	Result	C
ALUMINUM	-2.32	J
CALCIUM	3.90	U
IRON	3.10	U
LEAD	0.08	U
MAGNESIUM	2.00	U
MOLYBDENUM	0.20	J
POTASSIUM	10.68	J
SODIUM	6.50	U

SAMPLE: CCB

File: JZG08A Jul 08, 2009 18:58

Analyte	Result	C
ALUMINUM	7.44	J
CALCIUM	11.75	J
IRON	12.23	J
LEAD	-0.02	J
MAGNESIUM	10.72	J
MOLYBDENUM	1.60	
POTASSIUM	25.91	J
SODIUM	17.14	J

SAMPLE: CCB

File: JZG08A Jul 08, 2009 19:32

Analyte	Result	C
ALUMINUM	-7.34	J
CALCIUM	3.90	U
IRON	-4.73	J
LEAD	-0.04	J
MAGNESIUM	-2.32	J
MOLYBDENUM	0.32	J
POTASSIUM	8.80	U
SODIUM	6.50	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: CCB

File: JZG08A Jul 08, 2009 21:15

Analyte	Result	C
ALUMINUM	-7.78	J
CALCIUM	3.90	U
IRON	3.10	U
LEAD	0.02	J
MAGNESIUM	3.23	J
MOLYBDENUM	0.07	U
POTASSIUM	8.80	U
SODIUM	6.50	U

SAMPLE: CCB

File: JZG08A Jul 08, 2009 22:59

Analyte	Result	C
ALUMINUM	-4.62	J
CALCIUM	3.90	U
IRON	8.99	J
LEAD	0.04	J
MAGNESIUM	-2.89	J
MOLYBDENUM	0.07	U
POTASSIUM	14.21	J
SODIUM	6.50	U

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: ICSA

File: JZG08A Jul 08, 2009 18:23

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	98600	98.6
CALCIUM	100000	98800	98.8
IRON	100000	91910	91.9
LEAD	0	0	
MAGNESIUM	100000	97300	97.3
MOLYBDENUM	2000	1980	99.0
POTASSIUM	100000	103500	103.5
SODIUM	100000	100900	100.9

SAMPLE: ICSAB

File: JZG08A Jul 08, 2009 18:32

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	98790	98.8
CALCIUM	100000	99080	99.1
IRON	100000	91640	91.6
LEAD	20	21	105.0
MAGNESIUM	100000	97700	97.7
MOLYBDENUM	2000	2011	100.6
POTASSIUM	100000	103700	103.7
SODIUM	100000	100900	100.9

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG10A

Date: 7/10/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
6020 TUNE		1	18:25							
200.8 TUNE		1	18:32							
Cal Blank		1	19:31 Al	Ca	Fe	Mg	Mo	K	Na	Sn
Cal Std 1		1	19:40 Al	Ca	Fe	Mg	Mo	K	Na	Sn
Cal Std 2		1	19:48 Al	Ca	Fe	Mg	Mo	K	Na	Sn
Cal Std 3		1	19:57 Al	Ca	Fe	Mg	Mo	K	Na	Sn
Cal Std 4		1	20:05 Al	Ca	Fe	Mg	Mo	K	Na	Sn
ZZZZZZ		1	20:14							
ICV		1	20:22 Al	Ca	Fe	Mg	Mo	K	Na	Sn
ICB		1	20:31 Al	Ca	Fe	Mg	Mo	K	Na	Sn
PQL		1	20:39 Al	Ca	Fe	Mg	Mo	K	Na	Sn
ICSA		1	20:48 Al	Ca	Fe	Mg	Mo	K	Na	Sn
ICSAB		1	20:57 Al	Ca	Fe	Mg	Mo	K	Na	Sn
Blank		1	21:06 Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	21:14 Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	21:23 Al	Ca	Fe	Mg	Mo	K	Na	Sn
BLANK		1	21:31 Al	Ca	Fe	Mg	Mo	K	Na	Sn
BLANK		1	21:40 Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	21:49 Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	21:57 Al	Ca	Fe	Mg	Mo	K	Na	Sn
ZZZZZZ		1	22:06							
ZZZZZZ		1	22:14							
ZZZZZZ		1	22:23							
ZZZZZZ		5	22:31							
ZZZZZZ		1	22:40							
ZZZZZZ		1	22:48							
ZZZZZZ		10	22:57							
ZZZZZZ		10	23:06							
ZZZZZZ		10	23:14							
BLANK		1	23:23 Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	23:31 Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	23:40 Al	Ca	Fe	Mg	Mo	K	Na	Sn
ZZZZZZ		1	23:48							
ZZZZZZ		1	23:57							
ZZZZZZ		1	0:06							
ZZZZZZ		1	0:14							
SC3313-009	X17SB0060406	5	0:23							Sn
SC3313-011	X17SB0010004	5	0:32							Sn
SC3313-012	X17SB0020406	5	0:40							Sn
SC3313-013	X17SB0030608	5	0:49							Sn
SC3313-014	X17SB0040004	5	0:58							Sn
BLANK		1	1:06 Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	1:15 Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	1:23 Al	Ca	Fe	Mg	Mo	K	Na	Sn
ZZZZZZ		5	1:32							
SC3313-015	X17SB0040608	5	1:40							Sn
SC3313-016L	X25SS0280001L	25	1:49							Sn
ZZZZZZ		5	1:58							
ZZZZZZ		5	2:06							
ZZZZZZ		5	2:15							

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JZG10A

Date: 7/11/2009 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements							
ZZZZZZ		5	2:24								
BLANK		1	2:32	Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCV		1	2:41	Al	Ca	Fe	Mg	Mo	K	Na	Sn
CCB		1	2:50	Al	Ca	Fe	Mg	Mo	K	Na	Sn

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: ICV

File: JZG10A Jul 10, 2009 20:22

Analyte	True	Found	%R (1)
ALUMINUM	400.0	427.90	107.0
CALCIUM	4000.0	3900.00	97.5
IRON	4000.0	3959.00	99.0
MAGNESIUM	4000.0	4171.00	104.3
MOLYBDENUM	40.0	41.16	102.9
POTASSIUM	4000.0	3963.00	99.1
SODIUM	4000.0	3994.00	99.9
TIN	20.0	20.72	103.6

SAMPLE: CCV

File: JZG10A Jul 10, 2009 21:14

Analyte	True	Found	%R (1)
ALUMINUM	500.0	548.90	109.8
CALCIUM	5000.0	5126.00	102.5
IRON	5000.0	5086.00	101.7
MAGNESIUM	5000.0	5190.00	103.8
MOLYBDENUM	25.0	29.39	117.6
POTASSIUM	5000.0	5049.00	101.0
SODIUM	5000.0	5109.00	102.2
TIN	25.0	25.21	100.8

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: CCV

File: JZG10A Jul 10, 2009 21:49

Analyte	True	Found	%R (1)
ALUMINUM	500.0	527.30	105.5
CALCIUM	5000.0	5042.00	100.8
IRON	5000.0	5032.00	100.6
MAGNESIUM	5000.0	5157.00	103.1
MOLYBDENUM	25.0	26.22	104.9
POTASSIUM	5000.0	5093.00	101.9
SODIUM	5000.0	5036.00	100.7
TIN	25.0	24.91	99.6

SAMPLE: CCV

File: JZG10A Jul 10, 2009 23:31

Analyte	True	Found	%R (1)
ALUMINUM	500.0	504.30	100.9
CALCIUM	5000.0	5121.00	102.4
IRON	5000.0	5122.00	102.4
MAGNESIUM	5000.0	5237.00	104.7
MOLYBDENUM	25.0	24.96	99.8
POTASSIUM	5000.0	5141.00	102.8
SODIUM	5000.0	5278.00	105.6
TIN	25.0	24.73	98.9

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: CCV

File: JZG10A Jul 11, 2009 1:15

Analyte	True	Found	%R (1)
ALUMINUM	500.0	521.70	104.3
CALCIUM	5000.0	5154.00	103.1
IRON	5000.0	5133.00	102.7
MAGNESIUM	5000.0	5269.00	105.4
MOLYBDENUM	25.0	24.54	98.2
POTASSIUM	5000.0	5160.00	103.2
SODIUM	5000.0	5326.00	106.5
TIN	25.0	25.62	102.5

SAMPLE: CCV

File: JZG10A Jul 11, 2009 2:41

Analyte	True	Found	%R (1)
ALUMINUM	500.0	525.00	105.0
CALCIUM	5000.0	5158.00	103.2
IRON	5000.0	5179.00	103.6
MAGNESIUM	5000.0	5229.00	104.6
MOLYBDENUM	25.0	24.72	98.9
POTASSIUM	5000.0	5182.00	103.6
SODIUM	5000.0	5310.00	106.2
TIN	25.0	25.78	103.1

(1) Control Limits: Mercury 80-120; Other Metals 90-110

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: PQL

File: JZG10A Jul 10, 2009 20:39

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	63.15	105.3
CALCIUM	20.0	20.83	104.1
IRON	20.0	20.51	102.6
MAGNESIUM	20.0	20.76	103.8
MOLYBDENUM	1.0	1.12	112.0
POTASSIUM	200.0	210.10	105.1
SODIUM	200.0	215.00	107.5
TIN	0.2	0.24	120.0

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: ICB
File: JZG10A Jul 10, 2009 20:31

Analyte	Result	C
ALUMINUM	2.20	U
CALCIUM	3.90	U
IRON	3.10	U
MAGNESIUM	2.16	J
MOLYBDENUM	0.34	J
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.04	J

SAMPLE: CCB
File: JZG10A Jul 10, 2009 21:23

Analyte	Result	C
ALUMINUM	21.69	J
CALCIUM	21.06	
IRON	25.21	
MAGNESIUM	22.68	
MOLYBDENUM	2.39	
POTASSIUM	31.79	J
SODIUM	23.16	J
TIN	0.05	J

SAMPLE: CCB
File: JZG10A Jul 10, 2009 21:57

Analyte	Result	C
ALUMINUM	6.40	J
CALCIUM	7.26	J
IRON	10.16	J
MAGNESIUM	8.24	J
MOLYBDENUM	0.81	J
POTASSIUM	12.96	J
SODIUM	8.65	J
TIN	0.06	J

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: CCB
File: JZG10A Jul 10, 2009 23:40

Analyte	Result	C
ALUMINUM	2.20	U
CALCIUM	3.90	U
IRON	4.24	J
MAGNESIUM	3.80	J
MOLYBDENUM	0.33	J
POTASSIUM	8.80	U
SODIUM	8.75	J
TIN	0.09	J

SAMPLE: CCB
File: JZG10A Jul 11, 2009 1:23

Analyte	Result	C
ALUMINUM	7.08	J
CALCIUM	3.90	U
IRON	17.46	J
MAGNESIUM	3.30	J
MOLYBDENUM	0.25	J
POTASSIUM	8.80	U
SODIUM	6.50	U
TIN	0.06	J

SAMPLE: CCB
File: JZG10A Jul 11, 2009 2:50

Analyte	Result	C
ALUMINUM	12.86	J
CALCIUM	3.90	U
IRON	29.72	
MAGNESIUM	5.59	J
MOLYBDENUM	0.21	J
POTASSIUM	13.45	J
SODIUM	6.50	U
TIN	0.06	J

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** CTO423-10

Concentration Units: ug/L

SAMPLE: ICSA

File: JZG10A Jul 10, 2009 20:48

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	99130	99.1
CALCIUM	100000	95750	95.8
IRON	100000	94140	94.1
MAGNESIUM	100000	96440	96.4
MOLYBDENUM	2000	2001	100.1
POTASSIUM	100000	97750	97.8
SODIUM	100000	98180	98.2
TIN	0	0	

SAMPLE: ICSAB

File: JZG10A Jul 10, 2009 20:57

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	100800	100.8
CALCIUM	100000	98150	98.2
IRON	100000	96230	96.2
MAGNESIUM	100000	98670	98.7
MOLYBDENUM	2000	2090	104.5
POTASSIUM	100000	100300	100.3
SODIUM	100000	100700	100.7
TIN	20	22	110.0

Quality Control Report

Blank Sample Summary Report

Total Solids

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG65779	ASTM D2216	02-JUL-09	01-JUL-09	U 1 %	1 %

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

sales@katahdinlab.com

Quality Control Report

Laboratory Control Sample Summary Report

Total Solids

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG65779-2	LCS	WG65779	02-JUL-09	01-JUL-09	%	90	90.	100	80-120	

Quality Control Report

Duplicate Sample Summary Report

Total Solids

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG65779-3	SC3313-1	WG65779	02-JUL-09	%	87.	87.	0	20
WG65779-4	SC3313-16	WG65779	02-JUL-09	%	85.	85.	0	20

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. BASINSKI**	**DATE:**	**SEPTEMBER 3, 2009**
FROM:	**ANN COGNETTI**	**COPIES:**	**DV FILE**
SUBJECT:	**ORGANIC DATA VALIDATION – EXPLOSIVES NSF INDIAN HEAD, CTO-0423 SAMPLE DELIVERY GROUP (SDG) – TIP-001**		
SAMPLES:	10/Soil		

X14SS009C001	X14SS001C0001	X14SS002C0001
X14SS003C0001	X14SS004C0001	X14SS005C0001
X14SS006C0001	X14SS007C0001	X14SS008C001
FD05290901		

Overview

The sample set for NSF Indian Head, CTO-0423 SDG TIP-001 consists of nine (9) environmental soil samples and one (1) field duplicate. The field duplicate pair for this SDG is FD052901 and X14SS0004C0001. The samples were analyzed for nitroglycerine.

The samples were collected by Tetra Tech NUS on May 29, 2009 and June 1, 2009 and analyzed by Analytical Laboratory Services, Inc. under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Nitroglycerine analyses were conducted using SW846 method 8330B.

Summary

All compounds were successfully analyzed. The findings offered in this report are based upon a general review of all available data. The data review was based on data completeness, holding times, initial / continuing calibration data, laboratory method/preparation blanks, surrogate spike recoveries, laboratory control sample / laboratory control sample duplicate (LCS / LCSD) results, matrix spike / matrix spike duplicate recoveries (MS/MSD), field duplicate precision, detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems – None.

Minor Problems

- The fourteen day sample extraction time from sample collection date was exceeded by three days for samples X14SS001C0001, X14SS002C0001, X14SS003C0001, X14SS004C0001, X14SS005C0001, X14SS006C0001, X14SS007C0001 and FD05290901. Nondetected results in these samples were qualified (UJ).

Notes

Positive results reported below the reporting limit (RL) but above the method detection limit (MDL) for the organic analyses were qualified as estimated, "J".

Executive Summary

Laboratory Performance: Sample extraction time was exceeded for several samples.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to Region III modifications to the "National Functional guidelines for Organic Data Review", September 1994, and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories "(January 2006).

The text of this report has been formulated to address only those problem areas affecting data quality.

Ann Cognetti
Tetra Tech NUS
Ann Cognetti
Chemist/Data Validator

Joseph Samchuck for
Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Appendix A

Qualified Analytical Results

PROJ_NO: 00810	NSAMPLE	FD05290901			X14SS001C0001			X14SS002C0001			X14SS003C0001		
SDG: TIP-001	LAB_ID	9792411008			9792411001			9792411002			9792411003		
FRACTION: EXP	SAMP_DATE	5/29/2009			5/29/2009			5/29/2009			5/29/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS												
	DUP_OF	X14SS004C0001											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
NITROGLYCERIN		1.2	UJ	H	1.2	UJ	H	1.2	UJ	H	1.2	UJ	H

PROJ_NO: 00810	NSAMPLE	X14SS004C0001			X14SS005C0001			X14SS006C0001			X14SS007C0001		
SDG: TIP-001	LAB_ID	9792411004			9792411005			9792411006			9792411007		
FRACTION: EXP	SAMP_DATE	5/29/2009			5/29/2009			5/29/2009			5/29/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS												
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
NITROGLYCERIN		1.2	UJ	H	1.2	UJ	H	1.2	UJ	H	1.2	UJ	H

PROJ_NO: 00810	NSAMPLE	X14SS008C001			X14SS009C001		
SDG: TIP-001	LAB_ID	9792411009			9792411010		
FRACTION: EXP	SAMP_DATE	6/1/2009			6/1/2009		
MEDIA: SOIL	QC_TYPE	NM			NM		
	UNITS	MG/KG			MG/KG		
	PCT_SOLIDS						
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
NITROGLYCERIN		1.2	U		0.8	J	P

Appendix B

Results as Reported by the Laboratory

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ANALYTICAL RESULTS

Workorder 9792411 TIP001|Soils

Lab ID: **9792411001** Date Collected: 5/29/2009 12:15 Matrix: Other

Sample ID: **X14SS001C0001** Date Received: 6/3/2009 09:11

Parameters	Results	Units	Footnote	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	ND	mg/kg		1.2	0.40	SW846 8330B	6/15/09	AJL	6/24/09 15:23	AJL	A11
Surrogate Recoveries	*Results*	*Units*	*Footnote*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	98.7	%		50-150		SW846 8330B	6/15/09	AJL	6/24/09 15:23	AJL	A11

Sample Comments:

Anna G Milliken
Laboratory Manager

0027

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ANALYTICAL RESULTS

Workorder 9792411 TIP001|Soils

Lab ID: **9792411002** Date Collected: 5/29/2009 12:05 Matrix: Other

Sample ID: **X14SS002C0001** Date Received: 6/3/2009 09:11

Parameters	Results	Units	Footnote	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	ND	mg/kg		1.2	0.40	SW846 8330B	6/15/09	AJL	6/24/09 17:41	AJL	A11
Surrogate Recoveries	*Results*	*Units*	*Footnote*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	95.8	%		50-150		SW846 8330B	6/15/09	AJL	6/24/09 17:41	AJL	A11

Sample Comments:

Anna G Milliken
Laboratory Manager

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ANALYTICAL RESULTS

Workorder 9792411 TIP001|Soils

Lab ID: **9792411003** Date Collected: 5/29/2009 13:10 Matrix: Other

Sample ID: **X14SS003C0001** Date Received: 6/3/2009 09:11

Parameters	Results	Units	Footnote	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	ND	mg/kg		1.2	0.40	SW846 8330B	6/15/09	AJL	6/24/09 19:59	AJL	A11
Surrogate Recoveries	*Results*	*Units*	*Footnote*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	100	%		50-150		SW846 8330B	6/15/09	AJL	6/24/09 19:59	AJL	A11

Sample Comments:

Anna G Milliken
Laboratory Manager

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ANALYTICAL RESULTS

Workorder 9792411 TIP001|Soils

Lab ID: **9792411004** Date Collected: 5/29/2009 13:15 Matrix: Other

Sample ID: **X14SS004C0001** Date Received: 6/3/2009 09:11

Parameters	Results	Units	Footnote	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	ND	mg/kg		1.2	0.40	SW846 8330B	6/15/09	AJL	6/24/09 20:45	AJL	A11
Surrogate Recoveries	*Results*	*Units*	*Footnote*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	98.3	%		50-150		SW846 8330B	6/15/09	AJL	6/24/09 20:45	AJL	A11

Sample Comments:

Anna G Milliken
Laboratory Manager

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ANALYTICAL RESULTS

Workorder 9792411 TIP001|Soils

Lab ID: **9792411005** Date Collected: 5/29/2009 14:20 Matrix: Other

Sample ID: **X14SS005C0001** Date Received: 6/3/2009 09:11

Parameters	Results	Units	Footnote	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	ND	mg/kg		1.2	0.39	SW846 8330B	6/15/09	AJL	6/24/09 22:17	AJL	A11
Surrogate Recoveries	*Results*	*Units*	*Footnote*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	106	%		50-150		SW846 8330B	6/15/09	AJL	6/24/09 22:17	AJL	A11

Sample Comments:

Anna G Milliken
Laboratory Manager

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ANALYTICAL RESULTS

Workorder 9792411 TIP001|Soils

Lab ID: **9792411006** Date Collected: 5/29/2009 14:04 Matrix: Other

Sample ID: **X14SS006C0001** Date Received: 6/3/2009 09:11

Parameters	Results	Units	Footnote	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	ND	mg/kg	1	1.2	0.40	SW846 8330B	6/15/09	AJL	6/24/09 23:03	AJL	A11
Surrogate Recoveries	*Results*	*Units*	*Footnote*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	95.5	%		50-150		SW846 8330B	6/15/09	AJL	6/24/09 23:03	AJL	A11

Sample Comments:

Anna G Milliken
Laboratory Manager

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ANALYTICAL RESULTS

Workorder 9792411 TIP001|Soils

Lab ID: **9792411007** Date Collected: 5/29/2009 14:51 Matrix: Other

Sample ID: **X14SS007C0001** Date Received: 6/3/2009 09:11

Parameters	Results	Units	Footnote	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	ND	mg/kg		1.2	0.40	SW846 8330B	6/15/09	AJL	6/24/09 23:49	AJL	A11
Surrogate Recoveries	*Results*	*Units*	*Footnote*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	97.2	%		50-150		SW846 8330B	6/15/09	AJL	6/24/09 23:49	AJL	A11

Sample Comments:

Anna G Milliken
Laboratory Manager

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ANALYTICAL RESULTS

Workorder 9792411 TIP001|Soils

Lab ID: **9792411008** Date Collected: 5/29/2009 00:00 Matrix: Other

Sample ID: **FD05290901** Date Received: 6/3/2009 09:11

Parameters	Results	Units	Footnote	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	ND	mg/kg		1.2	0.40	SW846 8330B	6/15/09	AJL	6/25/09 00:35	AJL	A11
Surrogate Recoveries	*Results*	*Units*	*Footnote*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	98.4	%		50-150		SW846 8330B	6/15/09	AJL	6/25/09 00:35	AJL	A11

Sample Comments:

Anna G Milliken
Laboratory Manager

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ANALYTICAL RESULTS

Workorder 9792411 TIP001|Soils

Lab ID: **9792411009** Date Collected: 6/1/2009 10:30 Matrix: Other

Sample ID: **X14SS008C001** Date Received: 6/3/2009 09:11

Parameters	Results	Units	Footnote	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	ND	mg/kg		1.2	0.40	SW846 8330B	6/15/09	AJL	6/25/09 01:21	AJL	A11
Surrogate Recoveries	*Results*	*Units*	*Footnote*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	97	%		50-150		SW846 8330B	6/15/09	AJL	6/25/09 01:21	AJL	A11

Sample Comments:

Anna G Milliken
Laboratory Manager

0035

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ANALYTICAL RESULTS

Workorder 9792411 TIP001|Soils

Lab ID: **9792411010** Date Collected: 6/1/2009 11:10 Matrix: Other

Sample ID: **X14SS009C001** Date Received: 6/3/2009 09:11

Parameters	Results	Units	Footnote	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	0.80J	mg/kg		1.2	0.40	SW846 8330B	6/15/09	AJL	6/25/09 02:07	AJL	A11
Surrogate Recoveries	*Results*	*Units*	*Footnote*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	101	%		50-150		SW846 8330B	6/15/09	AJL	6/25/09 02:07	AJL	A11

Sample Comments:

Anna G Milliken
Laboratory Manager

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ANALYTICAL RESULTS QUALIFIERS\FLAGS

Workorder 9792411 TIP001|Soils

PARAMETER QUALIFIERS\FLAGS

[1] A detection with a result of 0.31 mg/kg (J) was observed on the primary column during the 8330 analysis for this compound. This detection did not confirm when analyzed on the alternate (confirmation) column. The compound was reported as non-detect.

0037

Appendix C

Support Documentation

Tetra Tech NUS, Inc.
NSF INDIAN HEAD – MD SITE

Analytical Laboratory Services Inc.
Analytical Narrative
TIP-001

Sample Management

This report contains the results of the analysis of fifteen (15) solid samples collected on May 29, 2009 and June 1, 9, and 11, 2009. Analytical results and quality control information are summarized in this data package.

Sample Receipt

Samples arrived at ALSI via courier on June 3 and 12, 2009. Upon receipt, the samples were inspected and compared to the enclosed chain of custody. All sample bottles were preserved properly. Each sample was assigned a unique identification number (see Certificates of Analysis). The sample information was entered into the computer system and the samples were released for analysis.

Explosives by Method 8330B

Sample Handling. Fifteen (15) solid samples were extracted and analyzed by SW-846 Method 8330B for nitroglycerine. All sample extractions and analyses were performed within the holding times associated with the method.

Reporting. In Method 8330B, each sample extract is first analyzed on a primary column (Acclaim Explosives-E1) at a detector wavelength of 218nm. If target analytes are detected, the samples with detections and their associated QC samples are re-analyzed on a dissimilar column (Acclaim Explosives-E2).

In general, the final result reported on the Certificate of Analysis is the result from the primary column, unless obvious chromatographic interferences or poor quality control results warrant use of results from the secondary column. If an analyte is not detected on both columns, the compound's presence is not confirmed, and the result is reported as non-detected. For this set of samples, second column confirmation results for nitroglycerine were obtained as follows:

Workorder Number	Primary Column Result (ug/kg)	Confirmation Column Result (ug/kg)	RPD(%)
9794207001	3.7*	3.0	21
9794207002	0.49*	0.7	34
9794207003	20.4*	16.7	20
9794207004	9.8*	7.5	27
9794207005	13*	9.5	31
9792411006	0.31	No Detection*	not confirmed
9792411010	0.8*	0.7	16

*Reported result

Calibrations. Calibrations were performed on two dissimilar columns. The primary column, Acclaim Explosives-E1, was calibrated on HPLC-1 on June 19, 2009. The secondary column, Acclaim Explosives-E2 was calibrated on HPLC-1 on July 2, 2009. The initial calibrations for nitroglycerine were in control on both columns.

Calibration verification. The samples in this group, as well as the batch quality control samples, were bracketed by the initial calibration second source standards and/or calibration verification standards on the days of sample analysis. Results for the second source and calibration verification standards were in control as specified by the method (±20%).

Surrogates. A surrogate standard of 3-nitrochlorobenzene was added to each sample, spike and blank prior to extraction. All surrogate recoveries were in within control limits.

Blanks. Three method blanks, identified as 593065, 596178, and 598377, were extracted and analyzed with the samples in this deliverable group. Nitroglycerine was not detected in the method blanks.

Laboratory Control Sample. Three laboratory control samples, identified as 593066, 596179 and 600424 were extracted and analyzed with the samples in this group. Spike recoveries for nitroglycerine were in control on both analytical columns.

Matrix Spike. A matrix spike and matrix spike duplicate, identified as 593067 and 593068, was prepared from sample 9792411001(X14SS001C001). Nitroglycerine was recovered within control limits on the primary column. This sample did not require confirmation analysis on the secondary column.

A matrix spike and matrix spike duplicate, identified as 600425 and 600426, was prepared from sample 9794207001(X15SS077C001). Nitroglycerine was recovered within control limits on the primary column. On the secondary column, results were outside control limits.

Triplicate Samples. Sample 9794207003(X17SS008C0001) was extracted and analyzed in triplicate on both analytical columns, with the following results:

Laboratory Sample ID	Primary Column Result	Confirmation Column Result
9794207003	20.4 µg/kg	16.7 µg/kg
595087	16.0	13.8
595088	17.5	13.7

Standard Deviation (ug/kg):	2.2	1.7
Relative Standard Deviation (%):	12	11

Report ID: 9792411

TETRA TECH NUS, INC. — CHAIN OF CUSTODY — NUMBER No 028238

9792411

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME
112G00810	Indian Head	B. Budzinski	4129215425	Analytical
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	4124430244	34 Dogwood Ln
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex/8631 3888 1991		Middleton, PA 17057

STANDARD TAT [X]
RUSH TAT [ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4C

TYPE OF ANALYSIS: TCL VOCs SW 8260B

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS 13		
5/29	1215	X1455001F0001	001	0	1	SO	C	1	1	
1	1205	X1455002F0001	002					1	1	
0700	1310	X1455003F0001	003					1	1	
	1315	X1455004F0001	004					01	1	
	1420	X1455005F0001	005					1	1	
	1404	X1455006F0001	006					1	1	
	1451	X1455007F0001	007					03	3	MS/MSD
	000	FD05290901	QC					01	1	
6/1	1030	X1455008F0001	008					1	1	
6/1	1110	X1455009F0001	009	↓	↓	↓	↓	1	1	
6/1	1402	X1455059F0001	059	0	1	SO	C	1	1	
6/1	1431	X1455060F0001	060	0	1	SO	C	1	1	

Cooler Seals Present / If present, Seals Intact? Y N
Received on Ice? Y
Cooler Temp 5C
Complete/Accurate? Y
Cont in Good Cond? Y
Correct Containers? Y
Correct Sample Volumes? Y
Correct Preservation? Y
Trip Blank Present? Y
Trip Blank Received? Y
Tracking # 8631 3888 1991
7955021514555
Thermo ID 5403559
Ship Carrier: FedEx UPS DHL Other

No associated baggie

ENTERED 6/3/09 1533

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-1-09	1730	1. RECEIVED BY		
2. RELINQUISHED BY	6-2-09		2. RECEIVED BY	6/2/09	0911
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS: No associated sample baggie for 4C or 7C.

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

FORM NO. TINUS-001

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Page 14 of 15

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SAMPLE SUMMARY

Workorder 9792411 TIP001|Soils

Discard Date: 07/20/2009

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
9792411001	X14SS001C0001	Other	5/29/09 12:15	6/3/09 09:11	Customer
9792411002	X14SS002C0001	Other	5/29/09 12:05	6/3/09 09:11	Customer
9792411003	X14SS003C0001	Other	5/29/09 13:10	6/3/09 09:11	Customer
9792411004	X14SS004C0001	Other	5/29/09 13:15	6/3/09 09:11	Customer
9792411005	X14SS005C0001	Other	5/29/09 14:20	6/3/09 09:11	Customer
9792411006	X14SS006C0001	Other	5/29/09 14:04	6/3/09 09:11	Customer
9792411007	X14SS007C0001	Other	5/29/09 14:51	6/3/09 09:11	Customer
9792411008	FD05290901	Other	5/29/09 00:00	6/3/09 09:11	Customer
9792411009	X14SS008C001	Other	6/1/09 10:30	6/3/09 09:11	Customer
9792411010	X14SS009C001	Other	6/1/09 11:10	6/3/09 09:11	Customer

Workorder Comments:

Notes

-- Samples collected by ALSI personnel are done so in accordance with the procedures set forth in the ALSI Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.

Standard Acronyms/Flags

J, B	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference

0026

HOLDTIME

SDG TIP-001

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
EXP	%	X14SS009C001	9792411010	NM	6/1/2009	6/15/2009	6/25/2009	14	10	24
EXP	%	X14SS001C0001	9792411001	NM	5/29/2009	6/15/2009	6/24/2009	17	9	26
EXP	%	X14SS002C0001	9792411002	NM	5/29/2009	6/15/2009	6/24/2009	17	9	26
EXP	%	X14SS003C0001	9792411003	NM	5/29/2009	6/15/2009	6/24/2009	17	9	26
EXP	%	X14SS004C0001	9792411004	NM	5/29/2009	6/15/2009	6/24/2009	17	9	26
EXP	%	X14SS005C0001	9792411005	NM	5/29/2009	6/15/2009	6/24/2009	17	9	26
EXP	%	X14SS006C0001	9792411006	NM	5/29/2009	6/15/2009	6/24/2009	17	9	26
EXP	%	X14SS007C0001	9792411007	NM	5/29/2009	6/15/2009	6/24/2009	17	9	26
EXP	%	FD05290901	9792411008	NM	5/29/2009	6/15/2009	6/25/2009	17	10	27
EXP	%	X14SS008C001	9792411009	NM	6/1/2009	6/15/2009	6/25/2009	14	10	24
EXP	MG/KG	X14SS009C001	9792411010	NM	6/1/2009	6/15/2009	6/25/2009	14	10	24
EXP	MG/KG	X14SS001C0001	9792411001	NM	5/29/2009	6/15/2009	6/24/2009	17	9	26
EXP	MG/KG	X14SS002C0001	9792411002	NM	5/29/2009	6/15/2009	6/24/2009	17	9	26
EXP	MG/KG	X14SS003C0001	9792411003	NM	5/29/2009	6/15/2009	6/24/2009	17	9	26
EXP	MG/KG	X14SS004C0001	9792411004	NM	5/29/2009	6/15/2009	6/24/2009	17	9	26

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
EXP	MG/KG	X14SS005C0001	9792411005	NM	5/29/2009	6/15/2009	6/24/2009	17	9	26
EXP	MG/KG	X14SS006C0001	9792411006	NM	5/29/2009	6/15/2009	6/24/2009	17	9	26
EXP	MG/KG	X14SS007C0001	9792411007	NM	5/29/2009	6/15/2009	6/24/2009	17	9	26
EXP	MG/KG	X14SS008C001	9792411009	NM	6/1/2009	6/15/2009	6/25/2009	14	10	24
EXP	MG/KG	FD05290901	9792411008	NM	5/29/2009	6/15/2009	6/25/2009	17	10	27

Work continued from page:____

HPLC-1 (Dionex) LOGBOOK

Work continued to page:____

Beads 2198 Chals: 164141
LBN 284740

Sequence: ZFJA Batch: H1090619 Method: 8330 Date: 6/19/09

Seq. No.	Sample ID	Inj. Dilution	Analyst	QC	Standard	Comments
1	Test inj	100	AG	—		Cell Std 1000
2	Level1	1		ICAL	Cal Std	Stock 01-0612 2 µL
3	Level2	2.5				3,5 DNA 1000 08112409IV 2 µL
4	Level3	5				PETN 1000 08111903 10 µL
5	Level4	12.5				NG 1000 08111903 10 µL
6	Level5	25				→ 1.2 : 1:1 H2O:ACN
7	Level6	50				
8	Level7	100		↓	↓	
9	Stand 5	100		Stand 5	IB-1181	5µL → 1mL of IB-1168
10	596078			BLANK	—	Grinly Blank 061109
11	593065			MB		From Grinding Blank 061009
12	593066			LCS		↓
13	[redacted]			—		
14	593067			MS		
15	593068			MSD		
16	[redacted]			Triplicate 5		Triplicate set
17	595087			↓		
18	595088			—		
19	[redacted]			—		DATA
20	[redacted]			—		
21	CCV			CCV	IB-1181	See Inc 9 NOT USED
22	[redacted]					
23	[redacted]					
24	[redacted]					
25	[redacted]					
26	[redacted]					
27	[redacted]					
28	CCV	↓	↓	—	IB-1181	See Inc 9
29						

Reagents: 1:1 H2O/ACN, IB-1168

Add'l. Comments:

Revision 4/07

HPLC-1 (Dionex) LOGBOOK

Sequence: ZFOA Batch: H1090624 Method: 8330 Date: 6/24/09

Seq. No.	Sample ID	Inj. Dilution	Analyst	QC	Initial wt/vol ~~Standard~~	Comments
1	CCV	100µL	AZ	CCV	—	
2	596078			BLANK	10.20 g	Grady Blank 6/11/09
3	593065			BLANK	10.00	Grady Blank 6/10/09
4	593066			LCS	10.02	↓
5	[redacted]				10.03	
6	593067			MS	10.17	
7	593068			MSD	10.15	
8	[redacted]			Triplicate Set	10.07	X14SS002C001
9	595087			↓	~~10.11~~ 10.06 A 6/24/09	
10	595088			↓	10.15	
11	[redacted]			—	10.11	
12	[redacted]			—	10.05	↓
13	CCV			CCV	—	
14	[redacted]			—	10.16 g	
15	[redacted]			—	10.01	confirm.
16	[redacted]			—	10.10	
17	[redacted]			—	10.07	
18	[redacted]			—	10.05	
19	[redacted]	↓		—	10.09 ↓	confirm
20	596079	100µL		MB	1000	6/23/09 Ext Batch
21	596083			LCS	1000	
22	9795321001			—	1000	
23	9795321002			—	990	
24	9795121001			—	1050	
25	596705			MB	1000	6/24/09 Ext Batch
26	596706			LCS	1000	
27	9795321003			—	100	
28	CCV	↓		CCV	—	
29	8330 FUH List		↓			
30	CCV Re-run	100	AZ	CCV	—	

Reagents: IB-1168 / CCV - 5ml of IB-1182 → 1 Vol of 1:1 Acetonitrile: Water - IB-1168

Mobile Phase Method - 04016800S - Water - Filtered DI

Add'l. Comments: Soils - diluted 1:1 w/ reagent water : FV = 40

Aqueous - diluted 1:1 w/ $CaCl_2$ Solution (IB-1170)

Revision 4/07

FORM 4 In-house QC Account SAMPLE NO.

SEMIVOLATILE METHOD BLANK SUMMARY

593065

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Lab File ID: ZFOA003 Lab Sample ID: 593065

Instrument ID: HPL1 Date Extracted: 06/15/09

Matrix: (soil/water) SOIL Date Analyzed: 06/24/09

Level:(low/med) LOW Time Analyzed: 1351

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	
01	GRINDING BLA	593078	ZFOA002	06/24/09	
02	593066	593066	ZFOA004	06/24/09	
03	X14SS001C000	9792411001	ZFOA005	06/24/09	
01	X14SS001C000	593067	ZFOA006	06/24/09	
05	X14SS001C000	593068	ZFOA007	06/24/09	
06	X14SS002C000	9792411002	ZFOA008	06/24/09	
07	X14SS002C001	595087	ZFOA009	06/24/09	
08	X14SS002C001	595088	ZFOA010	06/24/09	
09	X14SS003C000	9792411003	ZFOA011	06/24/09	
10	X14SS004C000	9792411004	ZFOA012	06/24/09	
11	X14SS005C000	9792411005	ZFOA014	06/24/09	
12	X14SS006C000	9792411006	ZFOA015	06/24/09	
13	X14SS007C000	9792411007	ZFOA016	06/24/09	
14	FD05290901	9792411008	ZFOA017	06/25/09	
15	X14SS008C001	9792411009	ZFOA018	06/25/09	
16	X14SS009C001	9792411010	ZFOA019	06/25/09	
17	593065	593065	ZG2A009	07/02/09	SECOND COLUMN CONFIRMATION
18	593066LCS	593066	ZG2A010	07/02/09	SECOND COLUMN CONFIRMATION
19	X14SS006C000	9792411006	ZG2A011	07/02/09	SECOND COLUMN CONFIRMATION
20	X14SS009C001	9792411010	ZG2A012	07/02/09	SECOND COLUMN CONFIRMATION
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

COMMENTS:

FORM 1 In-house QC Account SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

593065

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix: (soil/water) SOIL Lab Sample ID: 593065

Sample wt/vol: 10.0 (g/mL) G Lab File ID: ZFOA003

Level: (low/med) LOW Date Received: 06/15/09

% Moisture: 0 decanted: (Y/N) N Date Extracted:06/15/09

Concentrated Extract Volume: 40000(uL) Date Analyzed: 06/24/09

Injection Volume: 100.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
55-63-0	Nitroglycerin	1.2	U

FORM I SV

0047

FORM 4 In-house QC Account SAMPLE NO.

SEMIVOLATILE METHOD BLANK SUMMARY

596178

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Lab File ID: ZFPA002 Lab Sample ID: 596178

Instrument ID: HPL1 Date Extracted: 06/23/09

Matrix: (soil/water) SOIL Date Analyzed: 06/25/09

Level:(low/med) LOW Time Analyzed: 1633

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	
01	596179LCS	596179	ZFPA003	06/25/09	
02	X15SS078C000	9794207002	ZFPA004	06/25/09	
03	X17SS008C000	9794207003	ZFPA005	06/25/09	
04	X17SS008C001	596182	ZFPA006	06/25/09	
05	X17SS008C001	596183	ZFPA007	06/25/09	
06	X17SS009C000	9794207004	ZFPA008	06/25/09	
07	X17SS010C000	9794207005	ZFPA009	06/25/09	
08	596178	596178	ZG2A013	07/02/09	SECOND COLUMN CONFIRMATION
09	596179LCS	596179	ZG2A014	07/02/09	SECOND COLUMN CONFIRMATION
10	X15SS078C000	9794207002	ZG2A015	07/02/09	SECOND COLUMN CONFIRMATION
11	X17SS008C000	9794207003	ZG2A016	07/03/09	SECOND COLUMN CONFIRMATION
12	X17SS008C000	596182	ZG2A017	07/03/09	SECOND COLUMN CONFIRMATION
13	X17SS008C000	596183	ZG2A018	07/03/09	SECOND COLUMN CONFIRMATION
14	X17SS009C000	9794207004	ZG2A019	07/03/09	SECOND COLUMN CONFIRMATION
15	X17SS010C000	9794207005	ZG2A020	07/03/09	SECOND COLUMN CONFIRMATION
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

COMMENTS:

FORM IV SV

FORM 1 In-house QC Account SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

596178

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix: (soil/water) SOIL Lab Sample ID: 596178

Sample wt/vol: 10.1 (g/mL) G Lab File ID: ZG2A013

Level: (low/med) LOW Date Received: 06/23/09

% Moisture: 0 decanted: (Y/N) N Date Extracted:06/23/09

Concentrated Extract Volume: 40000(uL) Date Analyzed: 07/02/09

Injection Volume: 100.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
55-63-0	Nitroglycerin	1.2	U

SECOND COLUMN CONFIRMATION

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

In-house QC Account SAMPLE NO.

598377

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Lab File ID: ZFUA006 Lab Sample ID: 598377

Instrument ID: HPL1 Date Extracted: 06/29/09

Matrix: (soil/water) SOIL Date Analyzed: 06/30/09

Level:(low/med) LOW Time Analyzed: 1938

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	
01	600424LCS	600424	ZFUA005	06/30/09	
02	X15SS077C000	9794207001	ZFUA015	07/01/09	
03	X15SS077C000	600425	ZFUA016	07/01/09	
04	X15SS077C000	600426	ZFUA017	07/01/09	
05	598377	598377	ZG2A022	07/03/09	
06	600424LCS	600424	ZG2A023	07/03/09	SECOND COLUMN CONFIRMATION
07	X15SS077C000	9794207001	ZG2A028	07/03/09	SECOND COLUMN CONFIRMATION
08	X15SS077C000	600425	ZG2A029	07/03/09	SECOND COLUMN CONFIRMATION
09	X15SS077C000	600426	ZG2A030	07/03/09	SECOND COLUMN CONFIRMATION
05					
06					
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29					
30					

COMMENTS:

FORM 1 In-house QC Account SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

598377

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix: (soil/water) SOIL Lab Sample ID: 598377

Sample wt/vol: 10.1 (g/mL) G Lab File ID: ZG2A022

Level: (low/med) LOW Date Received: 06/29/09

% Moisture: 0 decanted: (Y/N) N Date Extracted:06/29/09

Concentrated Extract Volume: 40000(uL) Date Analyzed: 07/03/09

Injection Volume: 100.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
55-63-0	Nitroglycerin	1.2	U

SECOND COLUMN CONFIRMATION

FORM 1 In-house QC Account SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

GRINDING BLANK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix: (soil/water) SOIL Lab Sample ID: 596078

Sample wt/vol: 10.0 (g/mL) G Lab File ID: ZFOA002

Level: (low/med) LOW Date Received: 06/23/09

% Moisture: 0 decanted: (Y/N) N Date Extracted:06/15/09

Concentrated Extract Volume: 40000(uL) Date Analyzed: 06/24/09

Injection Volume: 100.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
55-63-0	Nitroglycerin	1.2	U

FORM I SV

FORM 2
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Level:(low/med) LOW

	TETRA TECH SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	GRINDING BLA	89								0
02	593065	86								0
03	593065LCS1	88								0
04	X14SS001C000	99								0
05	X14SS001C000	100								0
06	X14SS001C000	97								0
07	X14SS002C000	96								0
08	X14SS002C001	95								0
09	X14SS002C001	95								0
10	X14SS003C000	100								0
11	X14SS004C000	98								0
12	X14SS005C000	106								0
13	X14SS006C000	95								0
14	X14SS007C000	97								0
15	FD05290901	98								0
16	X14SS008C001	97								0
17	X14SS009C001	101								0
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

		QC LIMITS
S1	= 1-C-3-NB	(50-150)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

FORM 2
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Level: (low/med) LOW

	TETRA TECH SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	596178	62								0
02	596179LCS	87								0
03	X15SS078C000	96								0
04	X17SS008C000	96								0
05	X17SS008C001	96								0
06	X17SS008C001	96								0
07	X17SS009C000	97								0
08	X17SS010C000	97								0
09										
10										
11										
12										
13										
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27										
28										
29										
30										

		QC LIMITS
S1	= 1-C-3-NB	(50-150)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

FORM 2
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Level: (low/med) LOW

	TETRA TECH SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	600424LCS	92								0
02	598377	86								0
03	X15SS077C000	100								0
04	X15SS077C000	99								0
05	X15SS077C000	104								0
06										
07										
08										
09										
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29										
30										

QC LIMITS

S1 = 1-C-3-NB (50-150)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

FORM 2
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Level:(low/med) LOW

SECOND COLUMN CONFIRMATION

	TETRA TECH SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	593065	81								0
02	593066LCS	76								0
03	X14SS006C000	93								0
04	X14SS009C001	92								0
05	596178	59								0
06	596179LCS	84								0
07	X15SS078C000	91								0
08	X17SS008C000	92								0
09	X17SS008C000	92								0
10	X17SS008C000	92								0
11	X17SS009C000	89								0
12	X17SS010C000	91								0
13	598377	93								0
14	600424LCS	89								0
15	X15SS077C000	120								0
16	X15SS077C000	87								0
17	X15SS077C000	89								0
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

		QC LIMITS
S1	= 1-C-3-NB	(50-150)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

0096

FORM 3
SOIL SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix Spike - In-house QC Sample No.: 593066 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (ug/Kg)	LCS CONCENTRATION (mg/kg)	LCS % REC #	QC. LIMITS REC.
Nitroglycerin	2.0	0.0	2.0	100	70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 1 outside limits

COMMENTS: _____

_____

FORM 3

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix Spike - 593067 Tetra Tech Sample No.: 9792411001(X14SS001C001)

Level:(low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (mg/kg)	MS CONCENTRATION (mg/kg)	MS % REC #	QC. LIMITS REC.
Nitroglycerin	2.0	0.00	2.0	100	70-130

Matrix Spike - 593068 Tetra Tech Sample No.: 9792411001(X14SS001C001)

COMPOUND	SPIKE ADDED (mg/kg)	MSD CONCENTRATION (mg/kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Nitroglycerin	2.0	2.0	100	0	30	70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

COMMENTS: _____

_____

FORM 3
SOIL SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix Spike - In-house QC Sample No.: 596179 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (mg/kg)	LCS CONCENTRATION (mg/kg)	LCS % REC	#	QC. LIMITS REC.
Nitroglycerin	2.0	0.00	1.6	80		70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 1 outside limits

COMMENTS: _____

_____

FORM III SV

FORM 3
SOIL SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix Spike - In-house QC Sample No.: 600424 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (mg/kg)	LCS CONCENTRATION (mg/kg)	LCS % REC #	QC. LIMITS REC.
Nitroglycerin	2.0	0.0	1.7	85	70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 1 outside limits

COMMENTS: _____

_____

FORM III SV

FORM 3

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix Spike - 600425 Tetra Tech Sample No.: 9794207001(X15SS077C001)

Level:(low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (mg/kg)	MS CONCENTRATION (mg/kg)	MS % REC #	QC. LIMITS REC.
Nitroglycerin	5.0	3.7	8.4	94	70-130

Matrix Spike - 600426 Tetra Tech Sample No.: 9794207001(X15SS077C001)

COMPOUND	SPIKE ADDED (mg/kg)	MSD CONCENTRATION (mg/kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Nitroglycerin	4.9	7.7	82	14	30	70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

COMMENTS: _____

_____

FORM 3
SOIL SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix Spike - In-house QC Sample No.: 593066 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (mg/kg)	LCS CONCENTRATION (mg/kg)	LCS % REC #	QC. LIMITS REC.
Nitroglycerin	2.0	0.00	1.8	90	70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 1 outside limits

COMMENTS: SECOND COLUMN CONFIRMATION

FORM 3
SOIL SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix Spike - In-house QC Sample No.: 596179 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (mg/kg)	LCS CONCENTRATION (mg/kg)	LCS % REC #	QC. LIMITS REC.
Nitroglycerin	2.0	0.00	1.8	90	70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 1 outside limits

COMMENTS: SECOND COLUMN CONFIRMATION

FORM 3
SOIL SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix Spike - In-house QC Sample No.: 600424 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (mg/kg)	LCS CONCENTRATION (mg/kg)	LCS % REC	#	QC. LIMITS REC.
Nitroglycerin	2.0	0.0	1.8	90		70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 1 outside limits

COMMENTS: _____SECOND COLUMN CONFIRMATION_____

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 06/19/09 06/19/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1111 1547

LAB FILE ID: RF20: ZFJA002 RF50: ZFJA003 RF100: ZFJA004
RF250: ZFJA005 RF500: ZFJA006 RF1000: ZFJA007

COMPOUND	RF20	RF50	RF100	RF250	RF500	RF1000
PETN	68.620	84.152	78.018	79.173	80.051	80.639
3,5-Dinitroaniline	890.150	757.660	757.100	758.696	772.174	778.882
Nitroglycerin	62.050	75.772	70.278	68.290	70.773	70.549
1-C-3-NB	335.300	403.800	446.210	456.216	432.796	443.341

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 06/19/09 06/19/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1111 1547

F2000: ZFJA008

COMPOUND	RF2000	CURVE	COEFFICENT A1	%RSD OR R^2	MAX %RSD OR R^2
PETN	79.282	AVRG	78.5621286	6.100	20.000
3,5-Dinitroaniline	764.926	AVRG	782.798357	6.136	20.000
Nitroglycerin	69.419	AVRG	69.5901143	5.854	20.000
1-C-3-NB	444.238	AVRG	423.128714	9.963	20.000

FORM VI SV

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 06/19/09 06/19/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1111 1547

LAB FILE ID: RT1: ZFJA002 RT2: ZFJA003 RT3: ZFJA004
RT4: ZFJA005 RT5: ZFJA006 RT6: ZFJA007

COMPOUND	RT1	RT2	RT3	RT4	RT5	RT6
PETN	30.767	30.813	30.790	30.777	30.727	30.733
3,5-Dinitroaniline	17.117	17.110	17.160	17.087	17.067	17.057
Nitroglycerin	16.193	16.217	16.273	16.190	16.170	16.173
1-C-3-NB	37.770	37.797	37.767	37.730	37.660	37.653

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 06/19/09 06/19/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1111 1547

RT7: ZFJA008

COMPOUND	RT7	MEAN RT	RT WINDOW FROM	RT WINDOW TO
PETN	30.757	30.766	29.866	31.714
3,5-Dinitroaniline	17.050	17.093	16.645	17.675
Nitroglycerin	16.183	16.200	15.785	16.762
1-C-3-NB	37.637	37.716	37.389	38.144

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 07/02/09 07/02/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1044 1619

LAB FILE ID: RF20: ZG2A001 RF50: ZG2A002 RF100: ZG2A003
RF250: ZG2A004 RF500: ZG2A005

COMPOUND	RF20	RF50	RF100	RF250	RF500
PETN	95.900	91.044	102.408	75.156	88.626
3,5-Dinitroaniline	729.700	762.200	726.430	772.048	777.228
Nitroglycerin	0.013	0.014	0.015	0.015	0.014
1-C-3-NB	0.003	0.002	0.002	0.002	0.002

SECOND COLUMN CONFIRMATION

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 07/02/09 07/02/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1044 1619

LAB FILE ID: RF1000: ZG2A006 RF2000: ZG2A007

COMPOUND	RF1000	RF2000
PETN	80.271	75.782
3,5-Dinitroaniline	762.094	743.588
Nitroglycerin	0.014	0.015
1-C-3-NB	0.002	0.002

SECOND COLUMN CONFIRMATION

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 07/02/09 07/02/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1044 1619

COMPOUND	CURVE	COEFFICENTS A0	A1	A2	%RSD OR R^2
PETN	AVRG		87.0267000		11.9
3,5-Dinitroaniline	AVRG		753.326786		2.7
Nitroglycerin	2ORDR	-575.63163	69.0397365	-8.43e-005	1.000
1-C-3-NB	2ORDR	-1104.7394	428.278515	-2.54e-003	1.000

SECOND COLUMN CONFIRMATION

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 07/02/09 07/02/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1044 1619

LAB FILE ID: RT1: ZG2A001 RT2: ZG2A002 RT3: ZG2A003
RT4: ZG2A004 RT5: ZG2A005

COMPOUND	RT1	RT2	RT3	RT4	RT5
PETN	50.473	50.417	50.580	50.523	50.347
3,5-Dinitroaniline	30.400	30.357	30.367	30.323	30.217
Nitroglycerin	22.520	22.757	22.623	22.747	22.670
1-C-3-NB	39.053	39.057	39.257	39.043	38.923

SECOND COLUMN CONFIRMATION

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 07/02/09 07/02/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1044 1619

AB FILE ID: RT6: ZG2A006 RT7: ZG2A007

COMPOUND	RT6	RT7	MEAN RT	RT WINDOW FROM	RT WINDOW TO
PETN	50.597	50.043	50.426	49.580	51.580
3,5-Dinitroaniline	30.367	30.010	30.292	29.367	31.367
Nitroglycerin	22.863	22.563	22.678	21.623	23.623
1-C-3-NB	39.183	38.950	39.067	38.257	40.257

ECOND COLUMN CONFIRMATION

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 06/19/09 Time: 1648

Lab File ID: ZFJA009 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	RRF OR AMOUNT	RRF100.00 OR AMOUNT	MIN RRF	%D OR %DRIFT	MAX %D OR %DRIFT	CURV TYPE
PETN	88.745000	100.00	0.01	-11.25	20.00	AVRG
3,5-Dinitroaniline	21.099900	20.000	0.01	5.50	20.00	AVRG
Nitroglycerin	99.655000	100.00	0.01	-0.35	20.00	AVRG
1-C-3-NB	85.954900	100.00	0.01	-14.04	20.00	AVRG

FORM VII SV

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 06/24/09 Time: 1149

Lab File ID: ZFOA001 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	71.460	0.01	2.7	20.0
1-C-3-NB	423.129	414.430	0.01	2.0	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 06/24/09 Time: 2131

Lab File ID: ZFOA013 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	70.510	0.01	1.3	20.0
1-C-3-NB	423.129	397.550	0.01	6.0	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 06/25/09 Time: 0901

Lab File ID: ZFOA028 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D	
Nitroglycerin	69.590	75.700	0.01	8.8	20.0	
1-C-3-NB	423.129	2081.310	0.01	391.9	20.0	<-

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 06/25/09 Time: 1240

Lab File ID: ZFOA030 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	61.464	0.01	11.7	20.0
1-C-3-NB	423.129	390.850	0.01	7.6	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 06/25/09 Time: 1521

Lab File ID: ZFPA001 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	63.114	0.01	9.3	20.0
1-C-3-NB	423.129	407.110	0.01	3.8	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 06/26/09 Time: 0145

Lab File ID: ZFPA014 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	70.546	0.01	1.4	20.0
1-C-3-NB	423.129	393.210	0.01	7.1	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 06/26/09 Time: 0231

Lab File ID: ZFPA015 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	70.274	0.01	1.0	20.0
1-C-3-NB	423.129	429.370	0.01	1.5	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 06/30/09 Time: 1806

Lab File ID: ZFUA004 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	74.088	0.01	6.5	20.0
1-C-3-NB	423.129	492.130	0.01	16.3	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 07/01/09 Time: 0146

Lab File ID: ZFUA014 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	70.846	0.01	1.8	20.0
1-C-3-NB	423.129	428.840	0.01	1.3	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 07/01/09 Time: 0622

Lab File ID: ZFUA020 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	64.212	0.01	7.7	20.0
1-C-3-NB	423.129	501.500	0.01	18.5	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 07/01/09 Time: 0708

Lab File ID: ZFUA021 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	63.728	0.01	8.4	20.0
1-C-3-NB	423.129	476.870	0.01	12.7	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 07/02/09 Time: 1715

Lab File ID: ZG2A008 Init. Calib. Date(s): 07/02/09 07/02/09

Init. Calib. Times: 1044 1619

GC Column: C18 ID: 4.60 (mm)

COMPOUND	SAMPLE AMOUNT	CAL100 AMOUNT	CURVE	%D	MAX %d	
PETN	393	500	AVRG	21.4	20.0	<-
3,5-Dinitroaniline	88.0	100	AVRG	12.0	20.0	
Nitroglycerin	406	500	2ORDR	18.8	20.0	
1-C-3-NB	81.5	100	2ORDR	18.5	20.0	

SECOND COLUMN CONFIRMATION

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 07/03/09 Time: 0523

Lab File ID: ZG2A021 Init. Calib. Date(s): 07/02/09 07/02/09

Init. Calib. Times: 1044 1619

GC Column: C18 ID: 4.60 (mm)

COMPOUND	SAMPLE AMOUNT	CAL100 AMOUNT	CURVE	%D	MAX %d
Nitroglycerin	440	500	2ORDR	12.0	20.0
1-C-3-NB	82.2	100	2ORDR	17.8	20.0

SECOND COLUMN CONFIRMATION

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 07/03/09 Time: 1634

Lab File ID: ZG2A033 Init. Calib. Date(s): 07/02/09 07/02/09

Init. Calib. Times: 1044 1619

GC Column: C18 ID: 4.60 (mm)

COMPOUND	SAMPLE AMOUNT	CAL100 AMOUNT	CURVE	%D	MAX %d
Nitroglycerin	439	500	2ORDR	12.2	20.0
1-C-3-NB	107	100	2ORDR	7.0	20.0

SECOND COLUMN CONFIRMATION

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 07/03/09 Time: 1730

Lab File ID: ZG2A034 Init. Calib. Date(s): 07/02/09 07/02/09

Init. Calib. Times: 1044 1619

GC Column: C18 ID: 4.60 (mm)

COMPOUND	SAMPLE AMOUNT	CAL100 AMOUNT	CURVE	%D	MAX %d	
Nitroglycerin	567	500	2ORDR	13.4	20.0	
1-C-3-NB	126	100	2ORDR	26.0	20.0	<-

SECOND COLUMN CONFIRMATION

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

GC Column: C18 ID: 4.60(mm) Init. Calib. Date(s): 06/19/09 06/19/09

Instrument ID: HPL1

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 37.77

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT	#	RT	#
01	LEVEL1	LEVEL1	06/19/09	1111	37.77			
02	LEVEL2	LEVEL2	06/19/09	1157	37.80			
03	LEVEL3	LEVEL3	06/19/09	1243	37.71			
04	LEVEL4	LEVEL4	06/19/09	1329	37.73			
05	LEVEL5	LEVEL5	06/19/09	1415	37.66			
06	LEVEL6	LEVEL6	06/19/09	1501	37.65			
07	LEVEL7	LEVEL7	06/19/09	1547	37.64			
08	SECOND SOURC	SECOND SOURC	06/19/09	1648	37.77			
09								
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11								
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32								

QC LIMITS
S1 = 1-C-3-NB (+/- 0.38 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

GC Column: C18 ID: 4.60 (mm) Init. Calib. Date(s): 06/19/09 06/19/09

Instrument ID: HPL1

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 37.08

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT	#	RT	#
01	CCV	CCV	06/24/09	1149	37.09			
02	GRINDING BLA	596078	06/24/09	1305	36.97			
03	593065	593065	06/24/09	1351	36.97			
04	593066	593066	06/24/09	1437	36.93			
05	X14SS001C000	9792411001	06/24/09	1523	36.93			
06	X14SS001C000	593067	06/24/09	1609	36.90			
07	X14SS001C000	593068	06/24/09	1655	36.92			
08	X14SS002C000	9792411002	06/24/09	1741	36.94			
09	X14SS002C001	595087	06/24/09	1827	36.91			
10	X14SS002C001	595088	06/24/09	1913	36.90			
11	X14SS003C000	9792411003	06/24/09	1959	36.92			
12	X14SS004C000	9792411004	06/24/09	2045	36.92			
13	CCV	CCV	06/24/09	2131	36.91			
14	X14SS005C000	9792411005	06/24/09	2217	36.90			
15	X14SS006C000	9792411006	06/24/09	2303	36.93			
16	X14SS007C000	9792411007	06/24/09	2349	36.93			
17	FD05290901	9792411008	06/25/09	0035	36.93			
18	X14SS008C001	9792411009	06/25/09	0121	36.94			
19	X14SS009C001	9792411010	06/25/09	0207	36.94			
20	CCV	CCV	06/25/09	0901	37.20			
21	CCV RE-RUN	CCV RE-RUN	06/25/09	1240	37.08			
22								
23								
24								
25								
26								
27								
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30								
31								
32								

QC LIMITS
S1 = 1-C-3-NB (+/- 1.00 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

GC Column: C18 ID: 4.60 (mm) Init. Calib. Date(s): 06/19/09 06/19/09

Instrument ID: HPL1

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 37.08

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT #	RT #
01	CCV	CCV	06/25/09	1521	37.08	
02	596178	596178	06/25/09	1633	37.03	
03	596179LCS	596179	06/25/09	1719	37.03	
04	X15SS078C000	9794207002	06/25/09	1805	37.05	
05	X17SS008C000	9794207003	06/25/09	1851	37.03	
06	X17SS008C001	596182	06/25/09	1937	37.05	
07	X17SS008C001	596183	06/25/09	2023	37.05	
08	X17SS009C000	9794207004	06/25/09	2109	37.00	
09	X17SS010C000	9794207005	06/25/09	2155	36.95	
10	CCV	CCV	06/26/09	0145	36.97	
11	CCV	CCV	06/26/09	0231	36.92	
12						
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S1 = 1-C-3-NB

QC LIMITS
(+/- 1.00 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

GC Column: C18 ID: 4.60 (mm) Init. Calib. Date(s): 06/19/09 06/19/09

Instrument ID: HPL1

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 36.80

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT #	RT #
01	CCV	CCV	06/30/09	1806	36.25	
02	600424LCS	600424	06/30/09	1852	36.35	
03	598377	598377	06/30/09	1938	36.60	
04	CCV	CCV	07/01/09	0146	36.90	
05	X15SS077C000	9794207001	07/01/09	0232	36.88	
06	X15SS077C000	600425	07/01/09	0318	36.86	
07	X15SS077C000	600426	07/01/09	0404	36.89	
08	CCV	CCV	07/01/09	0622	36.76	
09	CCV	CCV	07/01/09	0708	36.80	
10						
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QC LIMITS
(+/- 1.00 MINUTES)

S1 = 1-C-3-NB

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

GC Column: C18 ID: 4.60 (mm) Init. Calib. Date(s): 07/02/09 07/02/09

Instrument ID: HPL1

SECOND COLUMN CONFIRMATION

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 39.26

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT #	RT #
01	LEVEL1	LEVEL1	07/02/09	1044	39.05	
02	LEVEL2	LEVEL2	07/02/09	1140	39.06	
03	LEVEL3	LEVEL3	07/02/09	1235	39.50	
04	LEVEL4	LEVEL4	07/02/09	1331	39.04	
05	LEVEL5	LEVEL5	07/02/09	1427	38.92	
06	LEVEL6	LEVEL6	07/02/09	1523	39.18	
07	LEVEL7	LEVEL7	07/02/09	1619	38.95	
08	SECOND SOURC	SECOND SOURC	07/02/09	1715	38.97	
09	593065	593065	07/02/09	1811	39.21	
10	593066LCS	593066	07/02/09	1907	39.10	
11	X14SS006C000	9792411006	07/02/09	2003	38.92	
12	X14SS009C001	9792411010	07/02/09	2059	39.18	
13	596178	596178	07/02/09	2155	38.79	
14	596179LCS	596179	07/02/09	2251	39.03	
15	X15SS078C000	9794207002	07/02/09	2347	38.93	
16	X17SS008C000	9794207003	07/03/09	0043	39.39	
17	X17SS008C000	596182	07/03/09	0139	39.32	
18	X17SS008C000	596183	07/03/09	0235	38.77	
19	X17SS009C000	9794207004	07/03/09	0331	38.90	
20	X17SS010C000	9794207005	07/03/09	0427	38.61	
21	CCV	CCV	07/03/09	0523	39.26	
22	598377	598377	07/03/09	0619	38.59	
23	600424LCS	600424	07/03/09	0715	38.78	
24	X15SS077C000	9794207001	07/03/09	1155	38.87	
25	X15SS077C000	600425	07/03/09	1251	38.58	
26	X15SS077C000	600426	07/03/09	1347	38.87	
27	CCV	CCV	07/03/09	1634	38.48	
28	CCV	CCV	07/03/09	1730	38.57	
29						

QC LIMITS
(+/- 1.00 MINUTES)

S1 = 1-C-3-NB

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

Sample Calculation

Analytical Laboratory Services, Inc.

EXPLOSIVES ANALYSIS

Data file : \\Gc01\TargetData\Chem\hpl1.i\H1090624.b\ZFOA019.d
Lab Smp Id: 9792411010 Client Smp ID: X14SS009C001
Inj Date : 25-JUN-2009 02:07
Operator : AJL Inst ID: hpl1.i
Smp Info : 9792411010;AJL;;;;;;10.09;;;593065
Misc Info : ZZ HPLC 2199 8330S
Comment : E1
Method : \\Gc01\TargetData\Chem\hpl1.i\H1090624.b\8330B_ADD_218.m
Meth Date : 25-Jun-2009 13:21 Lopez Quant Type: ESTD
Cal Date : 19-JUN-2009 15:47 Cal File: ZFJA008.d
Als bottle: 25
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: all.sub
Target Version: 4.12
Processing Host: WMMS014

Concentration Formula: Amt * DF * UF*(Vt/(Vi * Ws * (100 - M)/100)) * CpndVa

Name	Value	Description
DF	1.000	Dilution Factor
UF	0.00010	CORRECTION FACTOR
Vt	40000.000	Volume of final extract (uL)
Vi	100.000	Volume injected (uL)
Ws	10.090	Weight of sample extracted (g)
M	0.00000	% Moisture
Cpnd Variable		Local Compound Variable

Compounds	RT	EXP RT	DLT RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	CONCENTRATIONS FINAL (mg/kg)
1 Nitroglycerin	15.930	15.956	-0.026	14054	201.954	0.800610(a)
2 3,5-Dinitroaniline	Compound Not Detected.					
3 PETN	Compound Not Detected.					
4 1-C-3-NB	36.936	37.076	-0.140	213743	505.149	2.00257

see H1090624.b\ZFOA012
0.6847
16%RPD

QC Flag Legend

a - Target compound detected but, quantitated amount Below Limit Of Quantitation(BLOQ).

DATA REVIEW
REPORTED
APPROVED
2nd REVIEW

Analytical Laboratory Services, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 19-JUN-2009 11:11
End Cal Date : 19-JUN-2009 15:47
Quant Method : ESTD
Target Version : 4.12
Integrator : Falcon
Method file : \\Gc01\TargetData\Chem\hpl1.i\H1090619.b\8330B_ADD_218.m
Cal Date : 24-Jun-2009 09:55 hpl1.i

Calibration File Names:
Level 1: \\Gc01\TargetData\Chem\hpl1.i\H1090619.b\ZFJA002.d
Level 2: \\Gc01\TargetData\Chem\hpl1.i\H1090619.b\ZFJA003.d
Level 3: \\Gc01\TargetData\Chem\hpl1.i\H1090619.b\ZFJA004.d
Level 4: \\Gc01\TargetData\Chem\hpl1.i\H1090619.b\ZFJA005.d
Level 5: \\Gc01\TargetData\Chem\hpl1.i\H1090619.b\ZFJA006.d
Level 6: \\Gc01\TargetData\Chem\hpl1.i\H1090619.b\ZFJA007.d
Level 7: \\Gc01\TargetData\Chem\hpl1.i\H1090619.b\ZFJA008.d

Compound	20.0000 Level 1	50.0000 Level 2	100.0000 Level 3	250.0000 Level 4	500.0000 Level 5	1000.0000 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
	2000.0000 Level 7										
1 Nitroglycerin	62.05000	75.77200	70.27800	68.28960	70.77320	70.54860					
	69.41940						AVRG		69.59011		5.85417
2 3,5-Dinitroaniline	890	758	757	759	772	779					
	765						AVRG		783		6.13656
3 PETN	68.62000	84.15200	78.01800	79.17280	80.05120	80.63940					
	79.28150						AVRG		78.56213		6.10034

Simple Calculation

Sample calculation

Analytical Laboratory Services, Inc.

TARGET COMPOUNDS

Client Name: Tetra Tech NUS, Inc
Lab Smp Id: 9792411010
Sample Location:
Sample Date: 01-JUN-2009
Sample Matrix: SOIL
Analysis Type: SV
Data Type: LC DATA
Misc Info: ZZ HPLC 2199 8330S

Client SDG: TIP001
Client Smp ID: X14SS009C001
Sample Point:
Date Received: 03-JUN-2009
Quant Type: ESTD
Level: LOW
Operator: AJL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/KG) mg/kg	Q
55-63-0	Nitroglycerin	0.800610	J
618-87-1	3,5-Dinitroaniline	0.000000	U
78-11-5	PETN	0.991080	U
121-73-3	1-C-3-NB	2.00257	

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE _____ OF _____

CLIENT	JOB NUMBER		
NSF Indian Head 00810, CTO#23	TIP-001		
SUBJECT: Sample Calculation			
BASED ON	DRAWING NUMBER		
BY: Conn Cognetta	CHECKED BY	APPROVED BY	DATE: August 7, 2009

Sample Calculation for X14550090001
Nitroglycerin

$$\frac{14054 * 40000 * 1}{69.59011 * 100 * 10.09 * 1 * 1000} = 0.80 \mu g/kg \checkmark$$

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. BASINSKI**	**DATE:**	**SEPTEMBER 3, 2009**
FROM:	**ANN COGNETTI**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION – EXPLOSIVES**
NSF INDIAN HEAD, CTO-0423
SAMPLE DELIVERY GROUP (SDG) – TIP-002

SAMPLES: 5/Soil

X17SS010C0001	X17SS009C0001	X17SS008C0001
X15SS078C0002	X15SS077C0001	

Overview

The sample set for NSF Indian Head, CTO-0423, SDG TIP-002 consists of five (5) environmental soil samples. The samples were analyzed for nitroglycerine.

The samples were collected by Tetra Tech NUS June 9, 2009 and June 11, 2009 and analyzed by Analytical Laboratory Services, Inc. under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Nitroglycerine analyses were conducted using SW846 method 8330B.

Summary

All compounds were successfully analyzed. The findings offered in this report are based upon a general review of all available data. The data review was based on data completeness, holding times, initial / continuing calibration data, laboratory method/preparation blanks, surrogate spike recoveries, laboratory control sample / laboratory control sample duplicate (LCS / LCSD) results, matrix spike / matrix spike duplicate recoveries (MS/MSD), detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems – None.

Minor Problems

- The fourteen day sample extraction time from sample collection date was exceeded by six days for sample X15SS077C0001. The positive result in this sample was qualified (J) due to this noncompliance.

Notes

Positive results reported below the reporting limit (RL) but above the method detection limit (MDL) for the organic analyses were qualified as estimated, "J".

A matrix spike and matrix spike duplicate was prepared from sample X15SS077C0001. On the primary column matrix spike/matrix spike duplicate were recovered within quality control limits. During analyses on the second column, results were outside quality control limits. Since the sample results were taken from the primary column, no validation of data was warranted.

Executive Summary

Laboratory Performance: Sample extraction time was exceeded for sample X15SS077C0001.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to Region III modifications to the "National Functional guidelines for Organic Data Review", September 1994, and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories "(January 2006).

The text of this report has been formulated to address only those problem areas affecting data quality.

Ann Cognetti
Tetra Tech NUS
Ann Cognetti
Chemist/Data Validator

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Appendix A

Qualified Analytical Results

Data Validation Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (e.g. base-line drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can be any number of issues; e.g. poor chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 00810	NSAMPLE	X15SS077C0001			X15SS078C0002			X17SS008C0001			X17SS009C0001		
SDG: TIP-002	LAB_ID	9794207001			9794207002			9794207003			9794207004		
FRACTION: EXP	SAMP_DATE	6/9/2009			6/9/2009			6/11/2009			6/11/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS												
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
NITROGLYCERIN		3.7	J	H	0.49	J	P	20.4			9.8		

PROJ_NO: 00810	NSAMPLE	X17SS010C0001		
SDG: TIP-002	LAB_ID	9794207005		
FRACTION: EXP	SAMP_DATE	6/11/2009		
MEDIA: SOIL	QC_TYPE	NM		
	UNITS	MG/KG		
	PCT_SOLIDS			
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
NITROGLYCERIN		13		

Appendix B

Results as Reported by the Laboratory

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ANALYTICAL RESULTS

Workorder: 9794207 TIP002|Soils

Lab ID: **9794207001** Date Collected: 6/9/2009 11:00 Matrix: Other

Sample ID: **X15SS077C0001** Date Received: 6/12/2009 08:58

Parameter	Results	Units	Footnotes	MDL	MQL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	3.7	mg/kg		2.3	0.78	SW846 8330B	6/29/09	AJL	7/1/09 02:32	AJL	
Surrogate Recoveries	*Results*	*Units*	*Footnotes*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	99.6	%		50-150		SW846 8330B	6/29/09	AJL	7/1/09 02:32	AJL	

Sample Comments:

Anna G Milliken
Laboratory Manager

0040

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ANALYTICAL RESULTS

Workorder: 9794207 TIP002|Soils

Lab ID: **9794207002** Date Collected: 6/9/2009 10:30 Matrix: Other

Sample ID: **X15SS078C0002** Date Received: 6/12/2009 08:58

Parameter	Results	Units	Footnotes	PQL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	0.49J	mg/kg		1.2	0.39	SW846 8330B	6/23/09	AJL	6/25/09 18:05	AJL	A11
Surrogate Recoveries	*Results*	*Units*	*Footnotes*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	96.2	%		50-150		SW846 8330B	6/23/09	AJL	6/25/09 18:05	AJL	A11

Sample Comments:

Anna G Milliken
Laboratory Manager

0041

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ANALYTICAL RESULTS

Workorder: 9794207 TIP002|Soils

Lab ID: **9794207003** Date Collected: 6/11/2009 12:20 Matrix: Other

Sample ID: **X17SS008C0001** Date Received: 6/12/2009 08:58

Parameters	Results	Units	Footnotes	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	20.4	mg/kg		1.2	0.39	SW846 8330B	6/23/09	AJL	6/25/09 18:51	AJL	A11
Surrogate Recoveries	*Results*	*Units*	*Footnotes*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	96.3	%		50-150		SW846 8330B	6/23/09	AJL	6/25/09 18:51	AJL	A11

Sample Comments:

Anna G Milliken
Laboratory Manager

0042

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ANALYTICAL RESULTS

Workorder: 9794207 TIP002|Soils

Lab ID: **9794207004** Date Collected: 6/11/2009 13:30 Matrix: Other

Sample ID: **X17SS009C0001** Date Received: 6/12/2009 08:58

Parameters	Results	Units	Footnotes	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	9.8	mg/kg		1.2	0.39	SW846 8330B	6/23/09	AJL	6/25/09 21:09	AJL	A11
Surrogate Recoveries	*Results*	*Units*	*Footnotes*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	96.9	%		50-150		SW846 8330B	6/23/09	AJL	6/25/09 21:09	AJL	A11

Sample Comments:

Anna G Milliken
Laboratory Manager

0043

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ANALYTICAL RESULTS

Workorder: 9794207 TIP002|Soils

Lab ID: **9794207005** Date Collected: 6/11/2009 14:00 Matrix: Other

Sample ID: **X17SS010C0001** Date Received: 6/12/2009 08:58

Parameters	Results	Units	Footnotes	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	13.0	mg/kg		1.2	0.39	SW846 8330B	6/23/09	AJL	6/25/09 21:55	AJL	A11
Surrogate Recoveries	*Results*	*Units*	*Footnotes*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	97.4	%		50-150		SW846 8330B	6/23/09	AJL	6/25/09 21:55	AJL	A11

Sample Comments:

Anna G Milliken
Laboratory Manager

0044

Appendix C

Support Documentation

Tetra Tech NUS, Inc.
NSF INDIAN HEAD – MD SITE

Analytical Laboratory Services Inc.
Analytical Narrative
TIP-001

Sample Management

This report contains the results of the analysis of fifteen (15) solid samples collected on May 29, 2009 and June 1, 9, and 11, 2009. Analytical results and quality control information are summarized in this data package.

Sample Receipt

Samples arrived at ALSI via courier on June 3 and 12, 2009. Upon receipt, the samples were inspected and compared to the enclosed chain of custody. All sample bottles were preserved properly. Each sample was assigned a unique identification number (see Certificates of Analysis). The sample information was entered into the computer system and the samples were released for analysis.

Explosives by Method 8330B

Sample Handling. Fifteen (15) solid samples were extracted and analyzed by SW-846 Method 8330B for nitroglycerine. All sample extractions and analyses were performed within the holding times associated with the method.

Reporting. In Method 8330B, each sample extract is first analyzed on a primary column (Acclaim Explosives-E1) at a detector wavelength of 218nm. If target analytes are detected, the samples with detections and their associated QC samples are re-analyzed on a dissimilar column (Acclaim Explosives-E2).

In general, the final result reported on the Certificate of Analysis is the result from the primary column, unless obvious chromatographic interferences or poor quality control results warrant use of results from the secondary column. If an analyte is not detected on both columns, the compound's presence is not confirmed, and the result is reported as non-detected. For this set of samples, second column confirmation results for nitroglycerine were obtained as follows:

Workorder Number	Primary Column Result (ug/kg)	Confirmation Column Result (ug/kg)	RPD(%)
9794207001	3.7*	3.0	21
9794207002	0.49*	0.7	34
9794207003	20.4*	16.7	20
9794207004	9.8*	7.5	27
9794207005	13*	9.5	31
9792411006	0.31	No Detection*	not confirmed
9792411010	0.8*	0.7	16

*Reported result

Calibrations. Calibrations were performed on two dissimilar columns. The primary column, Acclaim Explosives-E1, was calibrated on HPLC-1 on June 19, 2009. The secondary column, Acclaim Explosives-E2 was calibrated on HPLC-1 on July 2, 2009. The initial calibrations for nitroglycerine were in control on both columns.

Calibration verification. The samples in this group, as well as the batch quality control samples, were bracketed by the initial calibration second source standards and/or calibration verification standards on the days of sample analysis. Results for the second source and calibration verification standards were in control as specified by the method (±20%).

Surrogates. A surrogate standard of 3-nitrochlorobenzene was added to each sample, spike and blank prior to extraction. All surrogate recoveries were in within control limits.

Blanks. Three method blanks, identified as 593065, 596178, and 598377, were extracted and analyzed with the samples in this deliverable group. Nitroglycerine was not detected in the method blanks.

Laboratory Control Sample. Three laboratory control samples, identified as 593066, 596179 and 600424 were extracted and analyzed with the samples in this group. Spike recoveries for nitroglycerine were in control on both analytical columns.

Matrix Spike. A matrix spike and matrix spike duplicate, identified as 593067 and 593068, was prepared from sample 9792411001(X14SS001C001). Nitroglycerine was recovered within control limits on the primary column. This sample did not require confirmation analysis on the secondary column.

A matrix spike and matrix spike duplicate, identified as 600425 and 600426, was prepared from sample 9794207001(X15SS077C001). Nitroglycerine was recovered within control limits on the primary column. On the secondary column, results were outside control limits.

Triplicate Samples. Sample 9794207003(X17SS008C0001) was extracted and analyzed in triplicate on both analytical columns, with the following results:

Laboratory Sample ID	Primary Column Result	Confirmation Column Result
9794207003	20.4 µg/kg	16.7 µg/kg
595087	16.0	13.8
595088	17.5	13.7

Standard Deviation (ug/kg):	2.2	1.7
Relative Standard Deviation (%):	12	11

9794207

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER № 028244 PAGE 1 OF 1

PROJECT NO: 112G00810	FACILITY: Indian Head	PROJECT MANAGER: R. Puimaki	PHONE NUMBER: 4129218308	LABORATORY NAME AND CONTACT: Analytical
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER: J. Oberdt	PHONE NUMBER: 4124430244	ADDRESS: 34 Dog
		CARRIER/WAYBILL NUMBER: FedEx / 863138882027		CITY, STATE: Middletown, PA 1705

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): P
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: Nitro/Nitroglycerin SW846 8330B

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	Nitro / SW846 8330B	COMMENTS
6/9	1100	X15SB077C0001	077	0	1	SO	C	1	1	
6/9	1030	X15SB078C0001	078	0	1	↓	↓	1	1	
6/11	1220	X17SS008C0001	008	0	1	↓	↓	1	1	
6/11	1330	X17SS009C0001	009	0	1	↓	↓	1	1	
6/11	1900	X17SS010C0001	010	0	1	↓	↓	1	1	

6T009

6/12/09
	Y	N
Custody Seals Present?	X	
(If present) Seals Intact?	X	
Received on Ice?	X	
COC/Labels Complete/Accurate?	X	
Cont. in Good Cond.?	X	
Correct Containers?	X	
Correct Sample Volumes?	X	
Correct Preservation?	X	
Headspace/Volatiles?		

Initial: ART
Cooler Temp: 5.0
Therm ID: S1023559
Ship Carrier: FedEx / UPS / USPS / Other
Tracking #: 863138882027

6/12 1136

1. RELINQUISHED BY	DATE 6-11-09	TIME 1800	1. RECEIVED BY Adams Thomson ALSI	DATE 6/12/09	TIME 0958
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TINUS-001

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HOLDTIME

SDG TIP-002

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
EXP	%	X17SS010C0001	9794207005	NM	6/11/2009	6/23/2009	6/25/2009	12	2	14
EXP	%	X17SS009C0001	9794207004	NM	6/11/2009	6/23/2009	6/25/2009	12	2	14
EXP	%	X17SS008C0001	9794207003	NM	6/11/2009	6/23/2009	6/25/2009	12	2	14
EXP	%	X15SS078C0002	9794207002	NM	6/9/2009	6/23/2009	6/25/2009	14	2	16
EXP	%	X15SS077C0001	9794207001	NM	6/9/2009	6/29/2009	7/1/2009	20	2	22
EXP	MG/KG	X17SS010C0001	9794207005	NM	6/11/2009	6/23/2009	6/25/2009	12	2	14
EXP	MG/KG	X17SS009C0001	9794207004	NM	6/11/2009	6/23/2009	6/25/2009	12	2	14
EXP	MG/KG	X17SS008C0001	9794207003	NM	6/11/2009	6/23/2009	6/25/2009	12	2	14
EXP	MG/KG	X15SS078C0002	9794207002	NM	6/9/2009	6/23/2009	6/25/2009	14	2	16
EXP	MG/KG	X15SS077C0001	9794207001	NM	6/9/2009	6/29/2009	7/1/2009	20	2	22

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SAMPLE SUMMARY

Workorder: 9794207 TIP002|Soils

Discard Date: 09/04/2009

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Comments
9794207001	X15SS077C0001	Other	6/9/09 11:00	6/12/09 08:58	Customer
9794207002	X15SS078C0002	Other	6/9/09 10:30	6/12/09 08:58	Customer
9794207003	X17SS008C0001	Other	6/11/09 12:20	6/12/09 08:58	Customer
9794207004	X17SS009C0001	Other	6/11/09 13:30	6/12/09 08:58	Customer
9794207005	X17SS010C0001	Other	6/11/09 14:00	6/12/09 08:58	Customer

Workorder Comments:

Notes

- Samples collected by ALSI personnel are done so in accordance with the procedures set forth in the ALSI Field Sampling Plan (20 - Field Services Sampling Plan).
- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.

Standard Acronyms/Flags

J, B	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference

0039

Turbochrom Sequence File C:\Meth_Seq\HPLC1\ZG2A.seq
Printed by : gc on: 7/15/2009 8:46:05 AM
Created by : gc on: 7/2/2009 9:35:06 AM
Edited by : gc on: 7/2/2009 12:14:08 PM
Number of Times Edited : 2
Description: 8330 Explosives

Alternate Column Confirmation

Sequence File Header Information:
Number of Rows : 40
Instrument Type : 900 Series Intelligent Interface
Injection Type : SINGLE

Sequence Sample Descriptions - Channel A

Row	Name
1	LEVEL1;AJL;1;1
2	LEVEL2;AJL;1;2
3	LEVEL3;AJL;1;3
4	LEVEL4;AJL;1;4
5	LEVEL5;AJL;1;5
6	LEVEL6;AJL;1;6
7	LEVEL7;AJL;1;7
8	SECOND SOURCE;AJL;2
9	593065;AJL;3;;BLANK;;;10;;;593065
10	593066;AJL;3;;LCS;1;;10.02;;;593065
11	9792411006;AJL;;;;;;10.01;;;593065
12	9792411010;AJL;;;;;;10.09;;;593065
13	596178;AJL;3;;BLANK;;;10.07;;;596178
14	596179;AJL;3;;LCS;1;;10.10;;;596178
15	[redacted]JL;;;;;;10.24;;;596178
16	[redacted]L;;;;;;10.34;;;596178
17	596182;AJL;;;;;;10.35;;;596178
18	596183;AJL;;;;;;10.23;;;596178
19	[redacted]JL;;;;;;10.36;;;596178
20	[redacted]JL;;;;;;10.24;;;596178
21	CCV;AJL;2
22	598377;AJL;3;;BLANK;;;10.06;;;598377
23	598378;AJL;3;;LCS;1;;10;;;598377 AKA 600424 (SBF 7/14/09)
24	9794521002;AJL;;;;;;10.07;;;598377
25	598381;AJL;3;;MS;1;;10.06;;;598377
26	598382;AJL;3;;MSD;;10.28;;;598377
27	9794521003;AJL;;;;;;10.20;;;598377
28	[redacted]JL;;;;;;10.24;;;598377
29	[redacted]JL;3;;MS;1;;10.01;;;598377
30	[redacted]JL;3;;MSD;1;;10.25;;;598377
31	BLANK
32	BLANK
33	CCV;AJL;2
34	CCV;AJL;2
35	
36	
37	
38	
39	
40	

Sequence Process Information - Channel A

Row	Inst Method	Raw Data File
1	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A001
2	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A002
3	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A003
4	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A004
5	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A005
6	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A006
7	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A007
8	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A008
9	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A009
10	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A010
11	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A011
12	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A012
13	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A013
14	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A014
15	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A015
16	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A016
17	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A017
18	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A018
19	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A019
20	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A020
21	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A021
22	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A022
23	c:\meth_seq\hplc1\8330_conf	c:\data\hplc1\ZG2A023

0566

[redacted]

Work continued from page:_____

HPLC-1 (Dionex) LOGBOOK

Work continued to page:_____

Sequence: ZFUA Batch: H1090630 Method: 8330 Date: 6/30/09

Seq. No.	Sample ID	Inj. Dilution	Analyst	QC	Inject ~~Standard~~	Comments
1	~~CCV~~	~~100~~	~~AR~~			Peak width NR wrkd
2	~~598378~~					
3	~~598377~~					
4	CCV	*100		CCV	—	
5	~~598378~~ 600424			~~MB~~ LCS*	10	
6	~~598377~~ Attn: 598377			~~LCS~~ MB*	10.06	~~600424~~* *SF 7/18/09
7	9794521001			triplicate	10.01	
8	598379				10.06	
9	598380				10.05	
10	9794521002			—	10.07	
11	598381 7/1/09			MS	10.06	600427
12	598382			MSD	10.28	600428
13	9794521003			—	10.20	
14	CCV			CCV	—	
15	[redacted]	50	7/1/09	—	10.24	Reextracted 600425
16	[redacted]	50		MS	10.01	
17	[redacted]	50		MSD	~~10.05~~ 10.25	600426
18	BLANK	100		—	—	
19	↓			—	—	
20	CCV			CCV	—	
21	CCV			CCV	—	

Reagents: Methanol 090116800S - for mobile phase

Add'l. Comments: samples are diluted 1:1 w/reagent water

0565

Revision 4/07

FORM 4 In-house QC Account SAMPLE NO.

SEMIVOLATILE METHOD BLANK SUMMARY

596178

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Lab File ID: ZFPA002 Lab Sample ID: 596178

Instrument ID: HPL1 Date Extracted: 06/23/09

Matrix: (soil/water) SOIL Date Analyzed: 06/25/09

Level:(low/med) LOW Time Analyzed: 1633

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	
01	596179LCS	596179	ZFPA003	06/25/09	
02	X15SS078C000	9794207002	ZFPA004	06/25/09	
03	X17SS008C000	9794207003	ZFPA005	06/25/09	
04	X17SS008C001	596182	ZFPA006	06/25/09	
05	X17SS008C001	596183	ZFPA007	06/25/09	
06	X17SS009C000	9794207004	ZFPA008	06/25/09	
07	X17SS010C000	9794207005	ZFPA009	06/25/09	
08	596178	596178	ZG2A013	07/02/09	SECOND COLUMN CONFIRMATION
09	596179LCS	596179	ZG2A014	07/02/09	SECOND COLUMN CONFIRMATION
10	X15SS078C000	9794207002	ZG2A015	07/02/09	SECOND COLUMN CONFIRMATION
11	X17SS008C000	9794207003	ZG2A016	07/03/09	SECOND COLUMN CONFIRMATION
12	X17SS008C000	596182	ZG2A017	07/03/09	SECOND COLUMN CONFIRMATION
13	X17SS008C000	596183	ZG2A018	07/03/09	SECOND COLUMN CONFIRMATION
14	X17SS009C000	9794207004	ZG2A019	07/03/09	SECOND COLUMN CONFIRMATION
15	X17SS010C000	9794207005	ZG2A020	07/03/09	SECOND COLUMN CONFIRMATION
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

COMMENTS:

FORM 1 In-house QC Account SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

596178

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix: (soil/water) SOIL Lab Sample ID: 596178

Sample wt/vol: 10.1 (g/mL) G Lab File ID: ZFPA002

Level: (low/med) LOW Date Received: 06/23/09

% Moisture: 0 decanted: (Y/N) N Date Extracted:06/23/09

Concentrated Extract Volume: 40000(uL) Date Analyzed: 06/25/09

Injection Volume: 100.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
55-63-0	Nitroglycerin	1.2	U

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

In-house QC Account SAMPLE NO.

598377

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Lab File ID: ZFUA006 Lab Sample ID: 598377

Instrument ID: HPL1 Date Extracted: 06/29/09

Matrix: (soil/water) SOIL Date Analyzed: 06/30/09

Level:(low/med) LOW Time Analyzed: 1938

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	
01	600424LCS	600424	ZFUA005	06/30/09	
02	X15SS077C000	9794207001	ZFUA015	07/01/09	
03	X15SS077C000	600425	ZFUA016	07/01/09	
04	X15SS077C000	600426	ZFUA017	07/01/09	
05	598377	598377	ZG2A022	07/03/09	
06	600424LCS	600424	ZG2A023	07/03/09	SECOND COLUMN CONFIRMATION
07	X15SS077C000	9794207001	ZG2A028	07/03/09	SECOND COLUMN CONFIRMATION
08	X15SS077C000	600425	ZG2A029	07/03/09	SECOND COLUMN CONFIRMATION
09	X15SS077C000	600426	ZG2A030	07/03/09	SECOND COLUMN CONFIRMATION
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
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16					
17					
18					
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29					
30					

COMMENTS:

FORM 1 In-house QC Account SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

598377

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix: (soil/water) SOIL Lab Sample ID: 598377

Sample wt/vol: 10.1 (g/mL) G Lab File ID: ZFUA006

Level: (low/med) LOW Date Received: 06/29/09

% Moisture: 0 decanted: (Y/N) N Date Extracted:06/29/09

Concentrated Extract Volume: 40000(uL) Date Analyzed: 06/30/09

Injection Volume: 100.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
55-63-0	Nitroglycerin	1.2	U

FORM 2
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Level: (low/med) LOW

	TETRA TECH SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	596178	62								0
02	596179LCS	87								0
03	X15SS078C000	96								0
04	X17SS008C000	96								0
05	X17SS008C001	96								0
06	X17SS008C001	96								0
07	X17SS009C000	97								0
08	X17SS010C000	97								0
09										
10										
11										
12										
13										
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28										
29										
30										

QC LIMITS

S1 = 1-C-3-NB (50-150)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

FORM 2
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Level:(low/med) LOW

	TETRA TECH SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	600424LCS	92								0
02	598377	86								0
03	X15SS077C000	100								0
04	X15SS077C000	99								0
05	X15SS077C000	104								0
06										
07										
08										
09										
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27										
28										
29										
30										

QC LIMITS

S1 = 1-C-3-NB (50-150)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

FORM 2
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Level:(low/med) LOW

SECOND COLUMN CONFIRMATION

	TETRA TECH SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	593065	81								0
02	593066LCS	76								0
03	X14SS006C000	93								0
04	X14SS009C001	92								0
05	596178	59								0
06	596179LCS	84								0
07	X15SS078C000	91								0
08	X17SS008C000	92								0
09	X17SS008C000	92								0
10	X17SS008C000	92								0
11	X17SS009C000	89								0
12	X17SS010C000	91								0
13	598377	93								0
14	600424LCS	89								0
15	X15SS077C000	120								0
16	X15SS077C000	87								0
17	X15SS077C000	89								0
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

		QC LIMITS
S1	= 1-C-3-NB	(50-150)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

9600

FORM 3
SOIL SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix Spike - In-house QC Sample No.: 593066 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (ug/Kg)	LCS CONCENTRATION (mg/kg)	LCS % REC #	QC. LIMITS REC.
Nitroglycerin	2.0	0.0	2.0	100	70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 1 outside limits

COMMENTS: _____

FORM 3
SOIL SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix Spike - In-house QC Sample No.: 596179 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (mg/kg)	LCS CONCENTRATION (mg/kg)	LCS % REC #	QC. LIMITS REC.
Nitroglycerin	2.0	0.00	1.6	80	70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 1 outside limits

COMMENTS: _____

_____

FORM 3
SOIL SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix Spike - In-house QC Sample No.: 600424 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (mg/kg)	LCS CONCENTRATION (mg/kg)	LCS % REC #	QC. LIMITS REC.
Nitroglycerin	2.0	0.0	1.7	85	70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 1 outside limits

COMMENTS: _____

FORM 3
SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix Spike - 600425 Tetra Tech Sample No.: 9794207001(X15SS077C001)

Level:(low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (mg/kg)	MS CONCENTRATION (mg/kg)	MS % REC #	QC. LIMITS REC.
Nitroglycerin	5.0	3.7	8.4	94	70-130

Matrix Spike - 600426 Tetra Tech Sample No.: 9794207001(X15SS077C001)

COMPOUND	SPIKE ADDED (mg/kg)	MSD CONCENTRATION (mg/kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Nitroglycerin	4.9	7.7	82	14	30	70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

COMMENTS: _____

FORM 3
SOIL SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix Spike - In-house QC Sample No.: 593066 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (mg/kg)	LCS CONCENTRATION (mg/kg)	LCS % REC #	QC. LIMITS REC.
Nitroglycerin	2.0	0.00	1.8	90	70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 1 outside limits

COMMENTS: _____SECOND COLUMN CONFIRMATION_____

FORM 3
SOIL SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix Spike - In-house QC Sample No.: 596179 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (mg/kg)	LCS CONCENTRATION (mg/kg)	LCS % REC #	QC. LIMITS REC.
Nitroglycerin	2.0	0.00	1.8	90	70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 1 outside limits

COMMENTS: SECOND COLUMN CONFIRMATION

FORM 3
SOIL SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix Spike - In-house QC Sample No.: 600424 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (mg/kg)	LCS CONCENTRATION (mg/kg)	LCS % REC #	QC. LIMITS REC.
Nitroglycerin	2.0	0.0	1.8	90	70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 1 outside limits

COMMENTS: _____SECOND COLUMN CONFIRMATION_____

FORM 3

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Matrix Spike - 600425 Tetra Tech Sample No.: 9794207001(X15SS077C001)

Level:(low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (mg/kg)	MS CONCENTRATION (mg/kg)	MS % REC #	QC. LIMITS REC.
Nitroglycerin	2.0	3.0	9.3	315*	70-130

Matrix Spike - 600426 Tetra Tech Sample No.: 9794207001(X15SS077C001)

COMPOUND	SPIKE ADDED (mg/kg)	MSD CONCENTRATION (mg/kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Nitroglycerin	2.0	2.9	-5*	206*	40	70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 1 out of 1 outside limits
Spike Recovery: 2 out of 2 outside limits

COMMENTS: _____SECOND COLUMN CONFIRMATION

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 06/19/09 06/19/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1111 1547

LAB FILE ID: RF20: ZFJA002 RF50: ZFJA003 RF100: ZFJA004
RF250: ZFJA005 RF500: ZFJA006 RF1000: ZFJA007

COMPOUND	RF20	RF50	RF100	RF250	RF500	RF1000
PETN	68.620	84.152	78.018	79.173	80.051	80.639
3,5-Dinitroaniline	890.150	757.660	757.100	758.696	772.174	778.882
Nitroglycerin	62.050	75.772	70.278	68.290	70.773	70.549
1-C-3-NB	335.300	403.800	446.210	456.216	432.796	443.341

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 06/19/09 06/19/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1111 1547

F2000: ZFJA008

COMPOUND	RF2000	CURVE	COEFFICENT A1	%RSD OR R^2	MAX %RSD OR R^2
PETN	79.282	AVRG	78.5621286	6.100	20.000
3,5-Dinitroaniline	764.926	AVRG	782.798357	6.136	20.000
Nitroglycerin	69.419	AVRG	69.5901143	5.854	20.000
1-C-3-NB	444.238	AVRG	423.128714	9.963	20.000

FORM VI SV

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 06/19/09 06/19/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1111 1547

LAB FILE ID: RT1: ZFJA002 RT2: ZFJA003 RT3: ZFJA004
RT4: ZFJA005 RT5: ZFJA006 RT6: ZFJA007

COMPOUND	RT1	RT2	RT3	RT4	RT5	RT6
PETN	30.767	30.813	30.790	30.777	30.727	30.733
3,5-Dinitroaniline	17.117	17.110	17.160	17.087	17.067	17.057
Nitroglycerin	16.193	16.217	16.273	16.190	16.170	16.173
1-C-3-NB	37.770	37.797	37.767	37.730	37.660	37.653

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 06/19/09 06/19/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1111 1547

RT7: ZFJA008

COMPOUND	RT7	MEAN RT	RT WINDOW FROM	RT WINDOW TO
PETN	30.757	30.766	29.866	31.714
3,5-Dinitroaniline	17.050	17.093	16.645	17.675
Nitroglycerin	16.183	16.200	15.785	16.762
1-C-3-NB	37.637	37.716	37.389	38.144

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 07/02/09 07/02/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1044 1619

LAB FILE ID: RF20: ZG2A001 RF50: ZG2A002 RF100: ZG2A003
RF250: ZG2A004 RF500: ZG2A005

COMPOUND	RF20	RF50	RF100	RF250	RF500
PETN	95.900	91.044	102.408	75.156	88.626
3,5-Dinitroaniline	729.700	762.200	726.430	772.048	777.228
Nitroglycerin	0.013	0.014	0.015	0.015	0.014
1-C-3-NB	0.003	0.002	0.002	0.002	0.002

SECOND COLUMN CONFIRMATION

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 07/02/09 07/02/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1044 1619

LAB FILE ID: RF1000: ZG2A006 RF2000: ZG2A007

COMPOUND	RF1000	RF2000
PETN	80.271	75.782
3,5-Dinitroaniline	762.094	743.588
Nitroglycerin	0.014	0.015
1-C-3-NB	0.002	0.002

SECOND COLUMN CONFIRMATION

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 07/02/09 07/02/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1044 1619

COMPOUND	CURVE	COEFFICENTS A0	A1	A2	%RSD OR R^2
PETN	AVRG		87.0267000		11.9
3,5-Dinitroaniline	AVRG		753.326786		2.7
Nitroglycerin	2ORDR	-575.63163	69.0397365	-8.43e-005	1.000
1-C-3-NB	2ORDR	-1104.7394	428.278515	-2.54e-003	1.000

ECOND COLUMN CONFIRMATION

FORM VI SV

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 07/02/09 07/02/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1044 1619

LAB FILE ID: RT1: ZG2A001 RT2: ZG2A002 RT3: ZG2A003
RT4: ZG2A004 RT5: ZG2A005

COMPOUND	RT1	RT2	RT3	RT4	RT5
PETN	50.473	50.417	50.580	50.523	50.347
3,5-Dinitroaniline	30.400	30.357	30.367	30.323	30.217
Nitroglycerin	22.520	22.757	22.623	22.747	22.670
1-C-3-NB	39.053	39.057	39.257	39.043	38.923

SECOND COLUMN CONFIRMATION

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 07/02/09 07/02/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1044 1619

AB FILE ID: RT6: ZG2A006 RT7: ZG2A007

COMPOUND	RT6	RT7	MEAN RT	RT WINDOW FROM	RT WINDOW TO
PETN	50.597	50.043	50.426	49.580	51.580
3,5-Dinitroaniline	30.367	30.010	30.292	29.367	31.367
Nitroglycerin	22.863	22.563	22.678	21.623	23.623
1-C-3-NB	39.183	38.950	39.067	38.257	40.257

ECOND COLUMN CONFIRMATION

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 06/19/09 Time: 1648

Lab File ID: ZFJA009 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	RRF OR AMOUNT	RRF100.00 OR AMOUNT	MIN RRF	%D OR %DRIFT	MAX %D OR %DRIFT	CURV TYPE
PETN	88.745000	100.00	0.01	-11.25	20.00	AVRG
3,5-Dinitroaniline	21.099900	20.000	0.01	5.50	20.00	AVRG
Nitroglycerin	99.655000	100.00	0.01	-0.35	20.00	AVRG
1-C-3-NB	85.954900	100.00	0.01	-14.04	20.00	AVRG

FORM VII SV

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 06/25/09 Time: 0901

Lab File ID: ZFOA028 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D	
Nitroglycerin	69.590	75.700	0.01	8.8	20.0	
1-C-3-NB	423.129	2081.310	0.01	391.9	20.0	<-

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 06/25/09 Time: 1240

Lab File ID: ZFOA030 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	61.464	0.01	11.7	20.0
1-C-3-NB	423.129	390.850	0.01	7.6	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 06/25/09 Time: 1521

Lab File ID: ZFPA001 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	63.114	0.01	9.3	20.0
1-C-3-NB	423.129	407.110	0.01	3.8	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 06/26/09 Time: 0145

Lab File ID: ZFPA014 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	70.546	0.01	1.4	20.0
1-C-3-NB	423.129	393.210	0.01	7.1	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 06/26/09 Time: 0231

Lab File ID: ZFPA015 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	70.274	0.01	1.0	20.0
1-C-3-NB	423.129	429.370	0.01	1.5	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 06/30/09 Time: 1806

Lab File ID: ZFUA004 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	74.088	0.01	6.5	20.0
1-C-3-NB	423.129	492.130	0.01	16.3	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 07/01/09 Time: 0146

Lab File ID: ZFUA014 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	70.846	0.01	1.8	20.0
1-C-3-NB	423.129	428.840	0.01	1.3	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 07/01/09 Time: 0622

Lab File ID: ZFUA020 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	64.212	0.01	7.7	20.0
1-C-3-NB	423.129	501.500	0.01	18.5	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 07/01/09 Time: 0708

Lab File ID: ZFUA021 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	63.728	0.01	8.4	20.0
1-C-3-NB	423.129	476.870	0.01	12.7	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 07/02/09 Time: 1715

Lab File ID: ZG2A008 Init. Calib. Date(s): 07/02/09 07/02/09

Init. Calib. Times: 1044 1619

GC Column: C18 ID: 4.60 (mm)

COMPOUND	SAMPLE AMOUNT	CAL100 AMOUNT	CURVE	%D	MAX %d	
PETN	393	500	AVRG	21.4	20.0	<-
3,5-Dinitroaniline	88.0	100	AVRG	12.0	20.0	
Nitroglycerin	406	500	2ORDR	18.8	20.0	
1-C-3-NB	81.5	100	2ORDR	18.5	20.0	

SECOND COLUMN CONFIRMATION

FORM VII SV

0130

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 07/03/09 Time: 0523

Lab File ID: ZG2A021 Init. Calib. Date(s): 07/02/09 07/02/09

Init. Calib. Times: 1044 1619

GC Column: C18 ID: 4.60 (mm)

COMPOUND	SAMPLE AMOUNT	CAL100 AMOUNT	CURVE	%D	MAX %d
Nitroglycerin	440	500	2ORDR	12.0	20.0
1-C-3-NB	82.2	100	2ORDR	17.8	20.0

SECOND COLUMN CONFIRMATION

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 07/03/09 Time: 1634

Lab File ID: ZG2A033 Init. Calib. Date(s): 07/02/09 07/02/09

Init. Calib. Times: 1044 1619

GC Column: C18 ID: 4.60 (mm)

COMPOUND	SAMPLE AMOUNT	CAL100 AMOUNT	CURVE	%D	MAX %d
Nitroglycerin	439	500	2ORDR	12.2	20.0
1-C-3-NB	107	100	2ORDR	7.0	20.0

SECOND COLUMN CONFIRMATION

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date: 07/03/09 Time: 1730

Lab File ID: ZG2A034 Init. Calib. Date(s): 07/02/09 07/02/09

Init. Calib. Times: 1044 1619

GC Column: C18 ID: 4.60 (mm)

COMPOUND	SAMPLE AMOUNT	CAL100 AMOUNT	CURVE	%D	MAX %d	
Nitroglycerin	567	500	2ORDR	13.4	20.0	
1-C-3-NB	126	100	2ORDR	26.0	20.0	<-

SECOND COLUMN CONFIRMATION

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

GC Column: C18 ID: 4.60(mm) Init. Calib. Date(s): 06/19/09 06/19/09

Instrument ID: HPL1

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 37.77

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT	#	RT	#
01	LEVEL1	LEVEL1	06/19/09	1111	37.77			
02	LEVEL2	LEVEL2	06/19/09	1157	37.80			
03	LEVEL3	LEVEL3	06/19/09	1243	37.71			
04	LEVEL4	LEVEL4	06/19/09	1329	37.73			
05	LEVEL5	LEVEL5	06/19/09	1415	37.66			
06	LEVEL6	LEVEL6	06/19/09	1501	37.65			
07	LEVEL7	LEVEL7	06/19/09	1547	37.64			
08	SECOND SOURC	SECOND SOURC	06/19/09	1648	37.77			
09								
10								
11								
12								
13								
14								
15								
16								
17								
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32								

QC LIMITS
S1 = 1-C-3-NB (+/- 0.38 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

GC Column: C18 ID: 4.60 (mm) Init. Calib. Date(s): 06/19/09 06/19/09

Instrument ID: HPL1

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 37.08

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT	#	RT	#
01	CCV	CCV	06/24/09	1149	37.09			
02	GRINDING BLA	596078	06/24/09	1305	36.97			
03	593065	593065	06/24/09	1351	36.97			
04	593066	593066	06/24/09	1437	36.93			
05	X14SS001C000	9792411001	06/24/09	1523	36.93			
06	X14SS001C000	593067	06/24/09	1609	36.90			
07	X14SS001C000	593068	06/24/09	1655	36.92			
08	X14SS002C000	9792411002	06/24/09	1741	36.94			
09	X14SS002C001	595087	06/24/09	1827	36.91			
10	X14SS002C001	595088	06/24/09	1913	36.90			
11	X14SS003C000	9792411003	06/24/09	1959	36.92			
12	X14SS004C000	9792411004	06/24/09	2045	36.92			
13	CCV	CCV	06/24/09	2131	36.91			
14	X14SS005C000	9792411005	06/24/09	2217	36.90			
15	X14SS006C000	9792411006	06/24/09	2303	36.93			
16	X14SS007C000	9792411007	06/24/09	2349	36.93			
17	FD05290901	9792411008	06/25/09	0035	36.93			
18	X14SS008C001	9792411009	06/25/09	0121	36.94			
19	X14SS009C001	9792411010	06/25/09	0207	36.94			
20	CCV	CCV	06/25/09	0901	37.20			
21	CCV RE-RUN	CCV RE-RUN	06/25/09	1240	37.08			
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								

QC LIMITS
(+/- 1.00 MINUTES)

S1 = 1-C-3-NB

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

GC Column: C18 ID: 4.60 (mm) Init. Calib. Date(s): 06/19/09 06/19/09

Instrument ID: HPL1

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 37.08

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT	#	RT	#
01	CCV	CCV	06/25/09	1521	37.08			
02	596178	596178	06/25/09	1633	37.03			
03	596179LCS	596179	06/25/09	1719	37.03			
04	X15SS078C000	9794207002	06/25/09	1805	37.05			
05	X17SS008C000	9794207003	06/25/09	1851	37.03			
06	X17SS008C001	596182	06/25/09	1937	37.05			
07	X17SS008C001	596183	06/25/09	2023	37.05			
08	X17SS009C000	9794207004	06/25/09	2109	37.00			
09	X17SS010C000	9794207005	06/25/09	2155	36.95			
10	CCV	CCV	06/26/09	0145	36.97			
11	CCV	CCV	06/26/09	0231	36.92			
12								
13								
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15								
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QC LIMITS
S1 = 1-C-3-NB (+/- 1.00 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

GC Column: C18 ID: 4.60 (mm) Init. Calib. Date(s): 06/19/09 06/19/09

Instrument ID: HPL1

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 36.80

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT #	RT #
01	CCV	CCV	06/30/09	1806	36.25	
02	600424LCS	600424	06/30/09	1852	36.35	
03	598377	598377	06/30/09	1938	36.60	
04	CCV	CCV	07/01/09	0146	36.90	
05	X15SS077C000	9794207001	07/01/09	0232	36.88	
06	X15SS077C000	600425	07/01/09	0318	36.86	
07	X15SS077C000	600426	07/01/09	0404	36.89	
08	CCV	CCV	07/01/09	0622	36.76	
09	CCV	CCV	07/01/09	0708	36.80	
10						
11						
12						
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S1 = 1-C-3-NB

QC LIMITS
(+/- 1.00 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

GC Column: C18 ID: 4.60 (mm) Init. Calib. Date(s): 07/02/09 07/02/09

Instrument ID: HPL1

SECOND COLUMN CONFIRMATION

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 39.26

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT #	RT #
01	LEVEL1	LEVEL1	07/02/09	1044	39.05	
02	LEVEL2	LEVEL2	07/02/09	1140	39.06	
03	LEVEL3	LEVEL3	07/02/09	1235	39.50	
04	LEVEL4	LEVEL4	07/02/09	1331	39.04	
05	LEVEL5	LEVEL5	07/02/09	1427	38.92	
06	LEVEL6	LEVEL6	07/02/09	1523	39.18	
07	LEVEL7	LEVEL7	07/02/09	1619	38.95	
08	SECOND SOURC	SECOND SOURC	07/02/09	1715	38.97	
09	593065	593065	07/02/09	1811	39.21	
10	593066LCS	593066	07/02/09	1907	39.10	
11	X14SS006C000	9792411006	07/02/09	2003	38.92	
12	X14SS009C001	9792411010	07/02/09	2059	39.18	
13	596178	596178	07/02/09	2155	38.79	
14	596179LCS	596179	07/02/09	2251	39.03	
15	X15SS078C000	9794207002	07/02/09	2347	38.93	
16	X17SS008C000	9794207003	07/03/09	0043	39.39	
17	X17SS008C000	596182	07/03/09	0139	39.32	
18	X17SS008C000	596183	07/03/09	0235	38.77	
19	X17SS009C000	9794207004	07/03/09	0331	38.90	
20	X17SS010C000	9794207005	07/03/09	0427	38.61	
21	CCV	CCV	07/03/09	0523	39.26	
22	598377	598377	07/03/09	0619	38.59	
23	600424LCS	600424	07/03/09	0715	38.78	
24	X15SS077C000	9794207001	07/03/09	1155	38.87	
25	X15SS077C000	600425	07/03/09	1251	38.58	
26	X15SS077C000	600426	07/03/09	1347	38.87	
27	CCV	CCV	07/03/09	1634	38.48	
28	CCV	CCV	07/03/09	1730	38.57	
29						

QC LIMITS
(+/- 1.00 MINUTES)

S1 = 1-C-3-NB

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

Sample Calculation

Analytical Laboratory Services, Inc.

EXPLOSIVES ANALYSIS

Data file : \\Gc01\TargetData\Chem\hpl1.i\H1090625.b\ZFPA004.d
Lab Smp Id: 9794207002 Client Smp ID: X15SS078C0002
Inj Date : 25-JUN-2009 18:05
Operator : AJL Inst ID: hpl1.i
Smp Info : 9794207002;AJL;;;;;;10.24;;;596178
Misc Info : ZZ HPLC 2205 8330S
Comment : Column: Acclaim E1
Method : \\Gc01\TargetData\Chem\hpl1.i\H1090625.b\8330B_ADD_218.m
Meth Date : 26-Jun-2009 11:29 deb Quant Type: ESTD
Cal Date : 19-JUN-2009 15:47 Cal File: ZFJA008.d
Als bottle: 11
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: all.sub
Target Version: 4.12
Processing Host: WMMS014

Concentration Formula: Amt * DF * UF*(Vt/(Vi * Ws * (100 - M)/100)) * CpndVa

Name	Value	Description
DF	1.000	Dilution Factor
UF	0.00010	CORRECTION FACTOR
Vt	40000.000	Volume of final extract (uL)
Vi	100.000	Volume injected (uL)
Ws	10.240	Weight of sample extracted (g)
M	0.00000	% Moisture
Cpnd Variable		Local Compound Variable

Compounds	RT	EXP RT	DLT RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	CONCENTRATIONS FINAL (mg/kg)
1 Nitroglycerin	15.966	15.980	-0.014	8651	124.314	0.485600(a)
2 3,5-Dinitroaniline	Compound Not Detected.					
3 PETN	Compound Not Detected.					
$ 4 1-C-3-NB	37.053	37.076	-0.023	203495	480.929	1.87863

confirm H1090702 2G0A015

-0.6927 J

RPD 35%

QC Flag Legend

a - Target compound detected but, quantitated amount Below Limit Of Quantitation(BLOQ).

PRIMARY REVIEW AJ 7/2/09
REPORTED AJ 7/2/09
APPROVED
SECONDARY REVIEW

Sample Calculation

Analytical Laboratory Services, Inc.

TARGET COMPOUNDS

Client Name: Tetra Tech NUS, Inc
Lab Smp Id: 9794207002
Sample Location:
Sample Date: 09-JUN-2009
Sample Matrix: SOIL
Analysis Type: SV
Data Type: LC DATA
Misc Info: ZZ HPLC 2205 8330S

Client SDG: TIP002
Client Smp ID: X15SS078C0002
Sample Point:
Date Received: 12-JUN-2009
Quant Type: ESTD
Level: LOW
Operator: AJL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/KG) mg/kg	Q
55-63-0	Nitroglycerin	0.485600	J
618-87-1	3,5-Dinitroaniline	0.000000	U
78-11-5	PETN	0.976562	U
121-73-3	1-C-3-NB	1.87863	

Sample Calculation

Report Date : 26-Jun-2009 12:01

Analytical Laboratory Services, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 19-JUN-2009 11:11
End Cal Date : 19-JUN-2009 15:47
Quant Method : ESTD
Target Version : 4.12
Integrator : Falcon
Method file : \\Gc01\TargetData\Chem\hpl1.i\H1090619.b\8330B_ADD_218.m
Cal Date : 24-Jun-2009 09:55 hpl1.i

Calibration File Names:
Level 1: \\Gc01\TargetData\Chem\hpl1.i\H1090619.b\ZFJA002.d
Level 2: \\Gc01\TargetData\Chem\hpl1.i\H1090619.b\ZFJA003.d
Level 3: \\Gc01\TargetData\Chem\hpl1.i\H1090619.b\ZFJA004.d
Level 4: \\Gc01\TargetData\Chem\hpl1.i\H1090619.b\ZFJA005.d
Level 5: \\Gc01\TargetData\Chem\hpl1.i\H1090619.b\ZFJA006.d
Level 6: \\Gc01\TargetData\Chem\hpl1.i\H1090619.b\ZFJA007.d
Level 7: \\Gc01\TargetData\Chem\hpl1.i\H1090619.b\ZFJA008.d

Compound	20.0000 Level 1	50.0000 Level 2	100.0000 Level 3	250.0000 Level 4	500.0000 Level 5	1000.0000 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
	2000.0000 Level 7										
1 Nitroglycerin	62.05000	75.77200	70.27800	68.28960	70.77320	70.54860					
	69.41940						AVRG		69.59011		5.85417
2 3,5-Dinitroaniline	890	758	757	759	772	779					
	765						AVRG		783		6.13656
3 PETN	68.62000	84.15200	78.01800	79.17280	80.05120	80.63940					
	79.28150						AVRG		78.56213		6.10034

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE _____ OF _____

CLIENT		JOB NUMBER	
NSF Indian Head		SDG TIP-002	
SUBJECT			
Sample Calculation			
BASED ON		DRAWING NUMBER	
BY	CHECKED BY	APPROVED BY	DATE
Dawn Cognetti			8-7-09

Sample Calculation for X1555078C0002

Nitroglycerin

$$\frac{8651 * 40{,}000}{69.59011 * 100 * 10.24 * 100 * 100} = 0.485 \text{ µg/kg} \checkmark$$

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: R. BASINSKI **DATE:** SEPTEMBER 3, 2009

FROM: ANN COGNETTI **COPIES:** DV FILE

SUBJECT: ORGANIC DATA VALIDATION – EXPLOSIVES-NITROGLYCERIN
NSF INDIAN HEAD, CTO-0423
SAMPLE DELIVERY GROUP (SDG) – TIP-002A

SAMPLES: 3/Soil

X25SS034C0001 X16SS080C0001 X16SS081C0001

Overview

The sample set for NSF Indian Head, CTO-0423, SDG TIP-002A consists of three (3) environmental soil samples. The samples were analyzed for nitroglycerine.

The samples were collected by Tetra Tech NUS June 14-15, 2009 and analyzed by Analytical Laboratory Services, Inc. under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Nitroglycerine analyses were conducted using SW846 method 8330B.

Summary

All compounds were successfully analyzed. The findings offered in this report are based upon a general review of all available data. The data review was based on data completeness, holding times, initial / continuing calibration data, laboratory method/preparation blanks, surrogate spike recoveries, laboratory control sample / laboratory control sample duplicate (LCS / LCSD) results, matrix spike / matrix spike duplicate recoveries (MS/MSD), detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems – None.

Minor Problems

- The fourteen day sample extraction time since sample collection date was exceeded by one day for samples X16SS080C0001 and X16SS081C0001. The nondetected results in these samples were qualified (UJ) due to this noncompliance.

Notes- None.

Executive Summary

Laboratory Performance: Sample extraction time was exceeded for two samples, X16SS080C0001 and X16SS081C0001, resulting in the qualification of data.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to Region III modifications to the "National Functional guidelines for Organic Data Review", September 1994, and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories "(January 2006).

Ann Cognetti

Tetra Tech NUS
Ann Cognetti
Chemist/Data Validator

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Appendix A

Qualified Analytical Results

Data Validation Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (e.g. base-line drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can be any number of issues; e.g. poor chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 00810	NSAMPLE	X16SS080C0001			X16SS081C0001			X25SS034C0001		
SDG: TIP-002A	LAB_ID	9794521002			9794521003			9794521001		
FRACTION: EXP	SAMP_DATE	6/14/2009			6/14/2009			6/15/2009		
MEDIA: SOIL	QC_TYPE	NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS									
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
NITROGLYCERIN		1.2	UJ	H	1.2	UJ	H	1.2	U	

Appendix B

Results as Reported by the Laboratory

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ANALYTICAL RESULTS

Workorder 9794521 TIP002|Soils

Lab ID: **9794521001** Date Collected: 6/15/2009 15:00 Matrix: Other

Sample ID: **X25SS034C0001** Date Received: 6/16/2009 10:45

Parameters	Results	Units	Footnote	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	ND	mg/kg		1.2	0.40	SW846 8330B	6/29/09	AJL	6/30/09 20:24	AJL	A11
Surrogate Recoveries	*Results*	*Units*	*Footnote*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	101	%		50-150		SW846 8330B	6/29/09	AJL	6/30/09 20:24	AJL	A11

Sample Comments:

Anna G Milliken
Laboratory Manager

0017

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ANALYTICAL RESULTS

Workorder 9794521 TIP002|Soils

Lab ID: **9794521002** Date Collected: 6/14/2009 12:45 Matrix: Other

Sample ID: **X16SS080C0001** Date Received: 6/16/2009 10:45

Parameters	Results	Units	Footnote	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	ND	mg/kg	1	1.2	0.40	SW846 8330B	6/29/09	AJL	6/30/09 22:42	AJL	A11
Surrogate Recoveries	*Results*	*Units*	*Footnote*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	100	%		50-150		SW846 8330B	6/29/09	AJL	6/30/09 22:42	AJL	A11

Sample Comments:

Anna G Milliken
Laboratory Manager

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ANALYTICAL RESULTS

Workorder 9794521 TIP002|Soils

Lab ID: **9794521003** Date Collected: 6/14/2009 12:50 Matrix: Other

Sample ID: **X16SS081C0001** Date Received: 6/16/2009 10:45

Parameters	Results	Units	Footnote	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	ND	mg/kg		1.2	0.39	SW846 8330B	6/29/09	AJL	7/1/09 01:00	AJL	A11
Surrogate Recoveries	*Results*	*Units*	*Footnote*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	102	%		50-150		SW846 8330B	6/29/09	AJL	7/1/09 01:00	AJL	A11

Sample Comments:

Anna G Milliken
Laboratory Manager

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ANALYTICAL RESULTS QUALIFIERS\FLAGS

Workorder 9794521 TIP002|Soils

PARAMETER QUALIFIERS\FLAGS

[1] The detection of this compound was confirmed on an alternate column. Precision between the two results exceeded in house control limits (40%RPD). The result from the alternate column is 0.16 mg/kg "J". Both results were below the laboratory quantitation limit but above the detection limit and are condsidered estimated values. AJL 7/6/09

0020

Appendix C

Support Documentation

Tetra Tech NUS, Inc.
NSF INDIAN HEAD – MD SITE

Analytical Laboratory Services Inc.
Analytical Narrative
TIP-002

Sample Management

This report contains the results of the analysis of three (3) solid samples collected on June 14 and 15, 2009. Analytical results and quality control information are summarized in this data package.

Sample Receipt

Samples arrived at ALSI via courier on June 16, 2009. Upon receipt, the samples were inspected and compared to the enclosed chain of custody. All sample bottles were preserved properly. Each sample was assigned a unique identification number (see Certificates of Analysis). The sample information was entered into the computer system and the samples were released for analysis.

Explosives in Water by Method 8330B

Sample Handling. Three (3) solid samples were extracted and analyzed by SW-846 Method 8330B for nitroglycerine. All sample extractions and analyses were performed within the holding times associated with the method.

Reporting. In Method 8330B, each sample extract is first analyzed on a primary column (Acclaim Explosives-E1) at a detector wavelength of 218nm. If target analytes are detected, the samples with detections and their associated QC samples are re-analyzed on a dissimilar column (Acclaim Explosives-E2).

In general, the final result reported on the Certificate of Analysis is the result from the primary column, unless obvious chromatographic interferences or poor quality control results warrant use of results from the secondary column. If an analyte is not detected on both columns, the compound's presence is not confirmed, and the result is reported as non-detected. For this set of samples, second column confirmation results for nitroglycerine were obtained as follows:

Workorder Number	Primary Column Result (ug/kg)	Confirmation Column Result (ug/kg)	RPD(%)
9794521001	1.2 U	Not analyzed	
9794521002	0.30 *	0.16 *	31
9994521003	0.37 *	0.41	10

*Value is <MDL; reported result is 1.2U

Calibrations. Calibrations were performed on two dissimilar columns. The primary column, Acclaim Explosives-E1, was calibrated on HPLC-1 on June 19, 2009. The secondary column, Acclaim Explosives-E2 was calibrated on HPLC-1 on July 2, 2009. The initial calibrations for nitroglycerine were in control on both columns.

Calibration verification. The samples in this group, as well as the batch quality control samples, were bracketed by the initial calibration secor source standards and/or calibration verification

standards on the days of sample analysis. Results for the second source and calibration verification standards were in control as specified by the method (±20%).

Surrogates. A surrogate standard of 3-nitrochlorobenzene was added to each sample, spike and blank prior to extraction. All surrogate recoveries were in within control limits.

Blanks. A method blank, identified as 598377, was extracted and analyzed with the samples in this deliverable group. Nitroglycerine was not detected in the method blank.

Laboratory Control Sample. A laboratory control sample, identified as 600424, was extracted and analyzed with the samples in this group. Spike recoveries for nitroglycerine were in control on both analytical columns.

Matrix Spike. A matrix spike and matrix spike duplicate, identified as 600427 and 600428, was prepared from sample 9794521002(X16SS080C0001). Nitroglycerine was recovered within control limits on the primary column. The matrix spikes were not re-analyzed on the secondary column.

Duplicate Samples. Sample 9794521001(X25SS034C0001) was extracted and analyzed in triplicate on the primary column. Nitroglycerine was not detected in any of the analyses.

9794521

TETRA TECH NUS, INC. — **CHAIN OF CUSTODY** — NUMBER № 928246

9794521

PROJECT NO: 112G00810	FACILITY: Indian Head	PROJECT MANAGER: R. Budinski	PHONE NUMBER: 4129218308	LABORATORY NAME: Analyti
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER: J. Goerdt	PHONE NUMBER: 4430244	ADDRESS: 34 Dogwood Ln
		CARRIER/WAYBILL NUMBER: Fed Ex/863138882049		CITY, STATE: Middletown, PA 17057

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): P
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: Nitroaromatics SW846 8330B

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	Nitroaromatics SW846 8330B	COMMENTS
6/5	1500	X25SS034C0001	084	0	1	SO	C	1	1	
6/14	1245	X16SS080C0001	080	↓	↓	↓	↓	1	1	
6/14	1250	X16SS081C0001	081	↓	↓	↓	↓	1	1	

0100

	Y	N	Initials
Custody Seals Present?		☑	SJ
(if present) Seals Intact?	☑		
Received on Ice?	☑		
COC/Labels Complete/Accurate	☑		
Cont. in Good Cond.?	☑		
Correct Containers?	☑		
Correct Sample Volumes?	☑		
Correct Preservation?	☑		
Headspace/Volatiles?			

Cooler Temp.: 2
Cooler #:
Therm ID: 5162535
Ship Carrier: FedEx
DHL
Other
Tracking # 863138882049

1. RELINQUISHED BY [signature]	DATE 6/15/09	TIME 1730	1. RECEIVED BY [signature]	DATE 6/16/09	TIME 1045
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R
FORM NO. TtNUS-001

SJ 6/16/09 009/288

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HOLDTIME

SDG TIP-002A

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
EXP	%	X25SS034C0001	9794521001	NM	6/15/2009	6/29/2009	6/30/2009	14	1	15
EXP	%	X16SS081C0001	9794521003	NM	6/14/2009	6/29/2009	7/1/2009	15	2	17
EXP	%	X16SS080C0001	9794521002	NM	6/14/2009	6/29/2009	6/30/2009	15	1	16
EXP	MG/KG	X25SS034C0001	9794521001	NM	6/15/2009	6/29/2009	6/30/2009	14	1	15
EXP	MG/KG	X16SS081C0001	9794521003	NM	6/14/2009	6/29/2009	7/1/2009	15	2	17
EXP	MG/KG	X16SS080C0001	9794521002	NM	6/14/2009	6/29/2009	6/30/2009	15	1	16

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SAMPLE SUMMARY

Workorder 9794521 TIP002|Soils

Discard Date: 09/04/2009

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
9794521001	X25SS034C0001	Other	6/15/09 15:00	6/16/09 10:45	Customer
9794521002	X16SS080C0001	Other	6/14/09 12:45	6/16/09 10:45	Customer
9794521003	X16SS081C0001	Other	6/14/09 12:50	6/16/09 10:45	Customer

Workorder Comments:

Notes

-- Samples collected by ALSI personnel are done so in accordance with the procedures set forth in the ALSI Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.

Standard Acronyms/Flags

J, B	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample.
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference

0016

FORM 4 In-house QC Account SAMPLE NO.

SEMIVOLATILE METHOD BLANK SUMMARY

598377

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP002

Lab File ID: ZFUA006 Lab Sample ID: 598377

Instrument ID: HPL1 Date Extracted: 06/29/09

Matrix: (soil/water) SOIL Date Analyzed: 06/30/09

Level:(low/med) LOW Time Analyzed: 1938

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	600424LCS	600424	ZFUA005	06/30/09
02	X25SS034C000	9794521001	ZFUA007	06/30/09
03	X25SS034C000	598379	ZFUA008	06/30/09
04	X25SS034C000	598380	ZFUA009	06/30/09
05	X16SS080C000	9794521002	ZFUA010	06/30/09
06	X16SS080C000	600427	ZFUA011	06/30/09
07	X16SS080C000	600428	ZFUA012	07/01/09
08	X16SS081C000	9794521003	ZFUA013	07/01/09
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
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30				

COMMENTS:

FORM 1 In-house QC Account SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

598377

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP002

Matrix: (soil/water) SOIL Lab Sample ID: 598377

Sample wt/vol: 10.1 (g/mL) G Lab File ID: ZFUA006

Level: (low/med) LOW Date Received: 06/29/09

% Moisture: 0 decanted: (Y/N) N Date Extracted:06/29/09

Concentrated Extract Volume: 40000(uL) Date Analyzed: 06/30/09

Injection Volume: 100.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
55-63-0	Nitroglycerin	1.2	U

FORM 2
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP002

Level:(low/med) LOW

	TETRA TECH SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	600424	92								0
02	598377	86								0
03	X25SS034C000	101								0
04	X25SS034C000	103								0
05	X25SS034C000	102								0
06	X16SS080C000	100								0
07	X16SS080C000	100								0
08	X16SS080C000	98								0
09	X16SS081C000	102								0
10										
11										
12										
13										
14										
15										
16										
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24										
25										
26										
27										
28										
29										
30										

		QC LIMITS
S1	= 1-C-3-NB	(50-150)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

FORM 3
SOIL SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP002

Matrix Spike - In-house QC Sample No.: 600424 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (mg/kg)	LCS CONCENTRATION (mg/kg)	LCS % REC #	QC. LIMITS REC.
Nitroglycerin	2.0	0.0	1.7	85	70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 1 outside limits

COMMENTS: _____

FORM 3
SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP002

Matrix Spike - 600427 Tetra Tech Sample No.: 9794521002(X16SS080C0001)

Level:(low/med) LOW

COMPOUND	SPIKE ADDED (mg/kg)	SAMPLE CONCENTRATION (mg/kg)	MS CONCENTRATION (mg/kg)	MS % REC #	QC. LIMITS REC.
Nitroglycerin	2.0	0.30	2.9	130	70-130

Matrix Spike - 600428 Tetra Tech Sample No.: 9794521002(X16SS080C0001)

COMPOUND	SPIKE ADDED (mg/kg)	MSD CONCENTRATION (mg/kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Nitroglycerin	1.9	2.6	121	7	40	70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

COMMENTS: _____

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP002

Instrument ID: HPL1 Calibration Date(s): 06/19/09 06/19/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1111 1547

LAB FILE ID: RF20: ZFJA002 RF50: ZFJA003 RF100: ZFJA004
RF250: ZFJA005 RF500: ZFJA006 RF1000: ZFJA007

COMPOUND	RF20	RF50	RF100	RF250	RF500	RF1000
PETN	68.620	84.152	78.018	79.173	80.051	80.639
3,5-Dinitroaniline	890.150	757.660	757.100	758.696	772.174	778.882
Nitroglycerin	62.050	75.772	70.278	68.290	70.773	70.549
1-C-3-NB	335.300	403.800	446.210	456.216	432.796	443.341

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP001

Instrument ID: HPL1 Calibration Date(s): 06/19/09 06/19/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1111 1547

RF2000: ZFJA008

COMPOUND	RF2000	CURVE	COEFFICENT A1	%RSD OR R^2	MAX %RSD OR R^2
PETN	79.282	AVRG	78.5621286	6.100	20.000
3,5-Dinitroaniline	764.926	AVRG	782.798357	6.136	20.000
Nitroglycerin	69.419	AVRG	69.5901143	5.854	20.000
1-C-3-NB	444.238	AVRG	423.128714	9.963	20.000

FORM VI SV

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP002

Instrument ID: HPL1 Calibration Date(s): 06/19/09 06/19/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1111 1547

AB FILE ID: RT1: ZFJA002 RT2: ZFJA003 RT3: ZFJA004
T4: ZFJA005 RT5: ZFJA006 RT6: ZFJA007

COMPOUND	RT1	RT2	RT3	RT4	RT5	RT6
PETN	30.767	30.813	30.790	30.777	30.727	30.733
3,5-Dinitroaniline	17.117	17.110	17.160	17.087	17.067	17.057
Nitroglycerin	16.193	16.217	16.273	16.190	16.170	16.173
1-C-3-NB	37.770	37.797	37.767	37.730	37.660	37.653

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP002

Instrument ID: HPL1 Calibration Date(s): 06/19/09 06/19/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1111 1547

RT7: ZFJA008

COMPOUND	RT7	MEAN RT	RT WINDOW FROM	RT WINDOW TO
PETN	30.757	30.766	29.866	31.714
3,5-Dinitroaniline	17.050	17.093	16.645	17.675
Nitroglycerin	16.183	16.200	15.785	16.762
1-C-3-NB	37.637	37.716	37.389	38.144

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP002

Instrument ID: HPL1 Calibration Date: 06/19/09 Time: 1648

Lab File ID: ZFJA009 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	RRF OR AMOUNT	RRF100.00 OR AMOUNT	MIN RRF	%D OR %DRIFT	MAX %D OR %DRIFT	CURV TYPE
PETN	88.745000	100.00	0.01	-11.25	20.00	AVRG
3,5-Dinitroaniline	21.099900	20.000	0.01	5.50	20.00	AVRG
Nitroglycerin	99.655000	100.00	0.01	-0.35	20.00	AVRG
1-C-3-NB	85.954900	100.00	0.01	-14.04	20.00	AVRG

FORM VII SV

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP002

Instrument ID: HPL1 Calibration Date: 06/30/09 Time: 1806

Lab File ID: ZFUA004 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	74.088	0.01	6.5	20.0
1-C-3-NB	423.129	492.130	0.01	16.3	20.0

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP002

Instrument ID: HPL1 Calibration Date: 07/01/09 Time: 0146

Lab File ID: ZFUA014 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	$\overline{RRF}$	RRF100	MIN RRF	%D	MAX %D
Nitroglycerin	69.590	70.846	0.01	1.8	20.0
1-C-3-NB	423.129	428.840	0.01	1.3	20.0

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP002

GC Column: C18 ID: 4.60(mm) Init. Calib. Date(s): 06/19/09 06/19/09

Instrument ID: HPL1

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 37.77

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT	#	RT	#
01	LEVEL1	LEVEL1	06/19/09	1111	37.77			
02	LEVEL2	LEVEL2	06/19/09	1157	37.80			
03	LEVEL3	LEVEL3	06/19/09	1243	37.71			
04	LEVEL4	LEVEL4	06/19/09	1329	37.73			
05	LEVEL5	LEVEL5	06/19/09	1415	37.66			
06	LEVEL6	LEVEL6	06/19/09	1501	37.65			
07	LEVEL7	LEVEL7	06/19/09	1547	37.64			
08	SECOND SOURC	SECOND SOURC	06/19/09	1648	37.77			
09								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								

QC LIMITS
S1 = 1-C-3-NB (+/- 0.38 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP002

GC Column: C18 ID: 4.60 (mm) Init. Calib. Date(s): 06/19/09 06/19/09

Instrument ID: HPL1

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 36.80

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT	#	RT	#
01	CCV	CCV	06/30/09	1806	36.25			
02	600424LCS	600424	06/30/09	1852	36.35			
03	598377	598377	06/30/09	1938	36.60			
04	X25SS034C000	9794521001	06/30/09	2024	36.65			
05	X25SS034C000	598379	06/30/09	2110	36.68			
06	X25SS034C000	598380	06/30/09	2156	36.92			
07	X16SS080C000	9794521002	06/30/09	2242	36.84			
08	X16SS080C000	600427	06/30/09	2328	36.88			
09	X16SS080C000	600428	07/01/09	0014	36.84			
10	X16SS081C000	9794521003	07/01/09	0100	36.89			
11	CCV	CCV	07/01/09	0146	36.90			
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								

QC LIMITS
S1 = 1-C-3-NB (+/- 1.00 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

Work continued from page:_____

HPLC-1 (Dionex) LOGBOOK

Work continued to page:_____

Bal 2190 Chah: 164141
LBN 28470

Sequence: ZFJA Batch: H1090619 Method: 8330 Date: 6/19/09

Seq. No.	Sample ID	Inj. Dilution	Analyst	QC	Standard	Comments
1	Test inj	100	AGJ	—		Cal std (crossed out)
2	Level1	1		ICAL	Cal STD	Stor 01-0612 2 µL
3	Level2	2.5				2,5DNA 1000 0811240110 2 µL
4	Level3	5				PETN 1000 08119003 10 µL
5	Level4	12.5				NG 1000 08111003 10 µL
6	Level5	25				→ 1 l in 1:1 H_2O:ACN
7	Level6	50				
8	Level7	100		↓	↓	
9	Second S	100		Second S.	IB-1181	5 µL → 1 ml of IB-1168
10	596078			BLANK		Grinding Blank 061109
11	593065			MB		From Grinding BLANK 061009
12	593066			LCS		↓
13	9792411001			—		
14	593067			MS		
15	593068			MSD		
16	9792411002			Triplicate S		Triplicate set
17	595087			↓		
18	595088					
19	9792411003			—		DATA
20	9792411004			—		
21	CCV			CCV	IB-1181	See line 9 NOT
22	9792411005					USED
23	9792411006					AB 6/22/09
24	9792411007					
25	9792411008					
26	9792411009					
27	9792411010					
28	CCV	↓	↓	—	IB-1181	See line 9
29						

Reagents: 1:1 H_2O/ACN . IB-1168

Add'l. Comments:

0153

Revision 4/07

Work continued from page:_____ **HPLC-1 (Dionex) LOGBOOK** Work continued to page:_____

Sequence: ZFUA Batch: H1090630 Method: 8330 Date: 6/30/09

Seq. No.	Sample ID	Inj. Dilution	Analyst	QC	~~Standard~~ Analyte	Comments
1	CCV	100	AR			Blank injected Not used
2	598378	1				
3	598377	↓				
4	CCV	100		CCV	—	
5	598378 600424*	1 *	*	MB* LCS	ID	4* 600424
6	598377 Aliq 598377*		7/15/09	~~LCS~~* MB	10.06	
7	[redacted]				10.01	
8	[redacted]			triplicate set	10.06	
9	[redacted]			✓	10.05	
10	[redacted]			—	10.07	
11	598381 Aliq			MS	10.06	600427
12	598382			MSD	10.28	600428
13	[redacted]			—	10.20	
14	CCV			CCV	—	
15	9794207001	50	7/16/09	—	10.24	Re-extracted 600425
16	9794207001	50		MS	10.01	
17	9794207001	50		MSD	~~10.05~~ 10.25	600426
18	BLANK	100		—	—	
19	↓			—	—	
20	CCV			CCV	—	
21	CCV	↓	✓	CCV	—	

Reagents: Methanol 0901168005 - for mobile Phase

Add'l. Comments: Samples not diluted 1:1 w/ Reagent wtr ✓

OLSA

Revision 4/07

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. BASINSKI**	**DATE:**	**SEPTEMBER 3, 2009**
FROM:	**ANN COGNETTI**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION – EXPLOSIVES-NITROGLYCERIN**
NSF INDIAN HEAD, CTO-0423
SAMPLE DELIVERY GROUP (SDG) – TIP-003

SAMPLES: 3/Aqueous

SB06160901 RB06170901 IDW06170901

Overview

The sample set for NSF Indian Head, CTO-0423, SDG TIP-003 consists of three (3) aqueous quality control samples. Sample SB06160901 is a source blank and sample RB06170901 is a rinsate blank. Sample IDW06170901 is a decon sample. The samples were analyzed for nitroglycerine.

The samples were collected by Tetra Tech NUS June 16-17, 2009 and analyzed by Analytical Laboratory Services, Inc. under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Nitroglycerine analyses were conducted using SW846 method 8330B.

Summary

All compounds were successfully analyzed. The findings offered in this report are based upon a general review of all available data. The data review was based on data completeness, holding times, initial / continuing calibration data, laboratory method/preparation blanks, surrogate spike recoveries, laboratory control sample / laboratory control sample duplicate (LCS / LCSD) results, matrix spike / matrix spike duplicate recoveries (MS/MSD), detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems – None.

Minor Problems

- Sample IDW06170901 had no reported surrogate recovery for 1-C-3-NB. The nondetected result was qualified as biased low (UL) due to this noncompliance. In the laboratory's case narrative, problems occurred in the extraction of this sample due to the turbidity of the sample.
- The laboratory control sample (LCS) had a percent recovery below the quality control limits. Sample IDW06170901 is the associated sample with this LCS. The nondetected result reported for sample IDW06170901 was qualified as biased low (UL).

Notes

The laboratory reran the closing continuing calibration verification (CCV) on June 19, 2009. For validation purposes, the second closing CCV analyzed at 12:40pm will be used.

Executive Summary

Laboratory Performance: No surrogate recovery was reported for sample IDW06170901. LCS percent recovery was low affecting sample IDW06170901.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to Region III modifications to the "National Functional guidelines for Organic Data Review", September 1994, and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories "(January 2006).

Ann Cognetti

Tetra Tech NUS
Ann Cognetti
Chemist/Data Validator

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Appendix A

Qualified Analytical Results

Data Validation Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (e.g. base-line drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can be any number of issues; e.g. poor chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 00810	NSAMPLE	IDW06170901			RB06170901			SB06160901		
SDG: TIP-003	LAB_ID	9795321003			9795321002			9795321001		
FRACTION: EXP	SAMP_DATE	6/17/2009			6/17/2009			6/16/2009		
MEDIA: WATER	QC_TYPE	NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L		
	PCT_SOLIDS									
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
NITROGLYCERIN		15	UJ	ER	1.5	U		1.5	U	

Appendix B

Results as Reported by the Laboratory

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ANALYTICAL RESULTS

Workorder: 9795321 TIP003|QC Samples-Aqueous

Lab ID: **9795321001** Date Collected: 6/16/2009 12:45 Matrix: Water

Sample ID: **SB06160901** Date Received: 6/19/2009 09:30

Parameters	Results	Units	Footnotes	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	ND	ug/L		1.5	0.43	SW846 8330B	6/23/09	AJL	6/25/09 04:25	AJL	A1
Surrogate Recoveries	*Results*	*Units*	*Footnotes*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	102	%		50-150		SW846 8330B	6/23/09	AJL	6/25/09 04:25	AJL	A1

Sample Comments:

Anna G Milliken
Laboratory Manager

0017

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ANALYTICAL RESULTS

Workorder: 9795321 TIP003|QC Samples-Aqueous

Lab ID: **9795321002** Date Collected: 6/17/2009 14:00 Matrix: Water

Sample ID: **RB06170901** Date Received: 6/19/2009 09:30

Parameters	Results	Units	Footnotes	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	ND	ug/L		1.5	0.43	SW846 8330B	6/23/09	AJL	6/25/09 05:11	AJL	A1
Surrogate Recoveries	*Results*	*Units*	*Footnotes*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	99.7	%		50-150		SW846 8330B	6/23/09	AJL	6/25/09 05:11	AJL	A1

Sample Comments:

Anna G Milliken
Laboratory Manager

0018

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ANALYTICAL RESULTS

Workorder: 9795321 TIP003|QC Samples-Aqueous

Lab ID: **9795321003** Date Collected: 6/17/2009 14:00 Matrix: Water

Sample ID: **IDW06170901** Date Received: 6/19/2009 09:30

Parameters	Results	Units	Footnotes	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
EXPLOSIVES											
Nitroglycerin	ND	ug/L		15.0	4.3	SW846 8330B	6/24/09	AJL	6/25/09 08:15	AJL	A2
Surrogate Recoveries	*Results*	*Units*	*Footnotes*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
3-Nitrochlorobenzene (S)	0	%		50-150		SW846 8330B	6/24/09	AJL	6/25/09 08:15	AJL	A2

Sample Comments:

A reduced volume of sample was extracted during the 8330 analysis of this sample due to sample matrix. Surrogate recovery could not be evaluated due to sample matrix and as a result of the decreased volume of the surrogate fortified sample used for the extraction. Reporting limits were adjusted accordingly. AJL 7/6/09

Low surrogate and analyte recoveries were observed in the Method 8330 batch quality control associated with this sample. Results may have been affected. AJL 7/6/09

Anna G Milliken
Laboratory Manager

0019

Appendix C

Support Documentation

Tetra Tech NUS, Inc.
NSF INDIAN HEAD – MD SITE

Analytical Laboratory Services Inc.
Analytical Narrative
TIP-003

Sample Management

This report contains the results of the analysis of three (3) water samples collected on June 16 and 17, 2009. Analytical results and quality control information are summarized in this data package.

Sample Receipt

Samples arrived at ALSI via courier on June 19, 2009. Upon receipt, the samples were inspected and compared to the enclosed chain of custody. All sample bottles were preserved properly. Each sample was assigned a unique identification number (see Certificates of Analysis). The sample information was entered into the computer system and the samples were released for analysis.

Explosives in Water by Method 8330B

Sample Handling. Three (3) water samples were extracted and analyzed by SW-846 Method 8330B for nitroglycerine. Extractions and analyses were performed within the holding time.

The extraction analyst had difficulty with the extraction of the liquid Decon sample labeled IDW06170901 due to the amount of suspended solids present in the sample. After filtering the sample under full vacuum for several hours, only about 100mL of the sample passed through the filter. This was with the use of filter aide. Using volumetric glassware, 500mL of the sample was withdrawn from the filter funnel and transferred to a sample container. Two 40 mL aliquots were centrifuged. Some sediment did settle, but the samples were still very turbid. This sample was re-extracted. The initial extraction problems were confirmed.

Reporting. In Method 8330B, each sample extract is first analyzed on a primary column (Acclaim Explosives-E1) at a detector wavelength of 218nm. If target analytes are detected, the samples with detections are re-analyzed on a dissimilar column (Acclaim Explosives-E2). There was no nitroglycerine detected in the samples in this deliverable group, so column confirmation was not required.

Calibrations. The initial calibration was performed HPLC-1 on June 19, 2009. The initial calibration for nitroglycerine was within control limits.

Calibration verification. The samples in this group, as well as the batch quality control samples, were bracketed by calibration verification standards on the day of sample analysis. Results for the second source and calibration verification standards were in control as specified by the method (±20%).

Surrogates. A surrogate standard of 3-nitrochlorobenzene was added to each sample, spike and blank prior to extraction. Surrogate recoveries were in within control, except as follows:

- In method blank 596705, the surrogate was recovered below control limits.
- In sample 9795321003(IDW06170901), a reduced sample volume was necessary due to the sample's matrix. As a result, the surrogate recovery cannot be properly evaluated.

Blanks. Two method blanks, identified as 596079 and 596705, were extracted and analyzed with the samples in this deliverable group. Nitrogylcerine was not detected in the method blanks.

Laboratory Control Sample. Two laboratory control samples, identified as 596083 and 596706 were extracted and analyzed with the samples in this group. In 596083, the recovery of nitroglycerine was within control limits. In 596707, the recovery of nitroglycerine was below control limits. The data user is cautioned that this may have impacted the data for sample 9795321003(IDW06170901).

Report ID: 9795321

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER No 928253

9795321

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME
112G00810	Indian Head	R. Batzinski	912921 8308	Analytical
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		J. Goerdt	412443 0244	34 Dogwood Ln
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex/863138879053		Middletown, PA 17057

STANDARD TAT [X]
RUSH TAT [ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE YEAR 2009	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS NG 8346-83308	COMMENTS
									G	4°C		
6/16	1245	SB06160901	QC	-	-	QC	G	1	1			Source
6/17	1400	RB06170901	↓	-	-	↓	G	1	1			Rinsate
6/17	1400	IDW06170901	↓	-	-	↓	G	1	1			Decon

	Y	N	Initials	Cooler Temp
Custody Seals Present?	X		DKS	3°C
(if present) Seals Intact?	X			Cooler #:
Received on Ice?	X			
COC/Labels Complete/Accurate	X			Therm ID:
Cont in Good Cond?	X			5103589
Correct Containers?	X			Ship Cont #
Correct Sample Volumes?	X			FedEx UPS
Correct Preservation?	X			
Headspace/Volatiles?		X		DHL
Tracking #	863138879053			Other

Shipping Label

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
	6-12-09	1700			
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME
				6/19/09	0930

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

FORM NO. TtNUS-001

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SDG TIP-003

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
EXP	%	SB06160901	9795321001	NM	6/16/2009	6/23/2009	6/25/2009	7	2	9
EXP	%	RB06170901	9795321002	NM	6/17/2009	6/23/2009	6/25/2009	6	2	8
EXP	%	IDW06170901	9795321003	NM	6/17/2009	6/24/2009	6/25/2009	7	1	8
EXP	UG/L	SB06160901	9795321001	NM	6/16/2009	6/23/2009	6/25/2009	7	2	9
EXP	UG/L	RB06170901	9795321002	NM	6/17/2009	6/23/2009	6/25/2009	6	2	8
EXP	UG/L	IDW06170901	9795321003	NM	6/17/2009	6/24/2009	6/25/2009	7	1	8

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SAMPLE SUMMARY

Workorder: 9795321 TIP003|QC Samples-Aqueous

Discard Date: 10/05/2009

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
9795321001	SB06160901	Water	6/16/09 12:45	6/19/09 09:30	Customer
9795321002	RB06170901	Water	6/17/09 14:00	6/19/09 09:30	Customer
9795321003	IDW06170901	Water	6/17/09 14:00	6/19/09 09:30	Customer

Workorder Comments:

This report was modified to indicate a 0% surrogate recovery for sample IDW06170901. Due to sample matrix interference, surrogate recovery could not be evaluated. SM 8-6-09

Notes

- Samples collected by ALSI personnel are done so in accordance with the procedures set forth in the ALSI Field Sampling Plan (20 - Field Services Sampling Plan).
- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.

Standard Acronyms/Flags

J, B	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference

FORM 4 In-house QC Account SAMPLE NO.

SEMIVOLATILE METHOD BLANK SUMMARY

596079

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

Lab File ID: ZFOA020 Lab Sample ID: 596079

Instrument ID: HPL1 Date Extracted: 06/23/09

Matrix: (soil/water) WATER Date Analyzed: 06/25/09

Level:(low/med) LOW Time Analyzed: 0253

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	596083LCS	596083	ZFOA021	06/25/09
02	SB06160901	9795321001	ZFOA022	06/25/09
03	RB06170901	9795321002	ZFOA023	06/25/09
04				
05				
06				
07				
08				
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30				

COMMENTS:

FORM 1 In-house QC Account SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

596079

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

Matrix: (soil/water) WATER Lab Sample ID: 596079

Sample wt/vol: 1000 (g/mL) ML Lab File ID: ZFOA020

Level: (low/med) LOW Date Received: 06/23/09

% Moisture: _____ Decanted: (Y/N)___ Date Extracted: 06/23/09

Concentrated Extract Volume: 10000(uL) Date Analyzed: 06/25/09

Injection Volume: 100.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
55-63-0	Nitroglycerin	1.5	U

FORM 4 In-house QC Account SAMPLE NO.

SEMIVOLATILE METHOD BLANK SUMMARY

596705

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

Lab File ID: ZFOA025 Lab Sample ID: 596705

Instrument ID: HPL1 Date Extracted: 06/24/09

Matrix: (soil/water) WATER Date Analyzed: 06/25/09

Level:(low/med) LOW Time Analyzed: 0643

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	596706LCS	596706	ZFOA026	06/25/09
02	IDW06170901	9795321003	ZFOA027	06/25/09
03				
04				
05				
06				
07				
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COMMENTS:

FORM 1 In-house QC Account SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

596705

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

Matrix: (soil/water) WATER Lab Sample ID: 596705

Sample wt/vol: 1000 (g/mL) ML Lab File ID: ZFOA025

Level: (low/med) LOW Date Received: 06/24/09

% Moisture: _____ Decanted: (Y/N)___ Date Extracted: 06/24/09

Concentrated Extract Volume: 10000(uL) Date Analyzed: 06/25/09

Injection Volume: 100.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
55-63-0	Nitroglycerin	1.5	U

FORM 2
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

	TETRA TECH SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	596079	93								0
02	596083LCS	98								0
03	SB06160901	102								0
04	RB06170901	100								0
05	596705	50*								0
06	596706LCS	62								0
07	IDW06170901	- *								1
08										
09										
10										
11										
12										
13										
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S1 = 1-C-3-NB QC LIMITS (50-150)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

FORM 3
WATER SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

Matrix Spike - In-house QC Sample No.: 596083

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC	#	QC. LIMITS REC.
Nitroglycerin	5.0	0.00	5.4	108		70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 1 outside limits

COMMENTS: _____

FORM 3
WATER SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

Matrix Spike - In-house QC Sample No.: 596706

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
Nitroglycerin	5.0	0.00	2.9	58*	70-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 1 out of 1 outside limits

COMMENTS: _____

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

Instrument ID: HPL1 Calibration Date(s): 06/19/09 06/19/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1111 1547

LAB FILE ID: RF20: ZFJA002 RF50: ZFJA003 RF100: ZFJA004
RF250: ZFJA005 RF500: ZFJA006 RF1000: ZFJA007

COMPOUND	RF20	RF50	RF100	RF250	RF500	RF1000
PETN	68.620	84.152	78.018	79.173	80.051	80.639
3,5-Dinitroaniline	890.150	757.660	757.100	758.696	772.174	778.882
Nitroglycerin	62.050	75.772	70.278	68.290	70.773	70.549
1-C-3-NB	335.300	403.800	446.210	456.216	432.796	443.341

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

Instrument ID: HPL1 Calibration Date(s): 06/19/09 06/19/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1111 1547

RF2000: ZFJA008

COMPOUND	RF2000	CURVE	COEFFICENT A1	%RSD OR R^2	MAX %RSD OR R^2
PETN	79.282	AVRG	78.5621286	6.100	20.000
3,5-Dinitroaniline	764.926	AVRG	782.798357	6.136	20.000
Nitroglycerin	69.419	AVRG	69.5901143	5.854	20.000
1-C-3-NB	444.238	AVRG	423.128714	9.963	20.000

FORM VI SV

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

Instrument ID: HPL1 Calibration Date(s): 06/19/09 06/19/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1111 1547

LAB FILE ID: RT1: ZFJA002 RT2: ZFJA003 RT3: ZFJA004
RT4: ZFJA005 RT5: ZFJA006 RT6: ZFJA007

COMPOUND	RT1	RT2	RT3	RT4	RT5	RT6
PETN	30.767	30.813	30.790	30.777	30.727	30.733
3,5-Dinitroaniline	17.117	17.110	17.160	17.087	17.067	17.057
Nitroglycerin	16.193	16.217	16.273	16.190	16.170	16.173
1-C-3-NB	37.770	37.797	37.767	37.730	37.660	37.653

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

Instrument ID: HPL1 Calibration Date(s): 06/19/09 06/19/09

Column: C18 ID: 4.60 (mm) Calibration Time(s): 1111 1547

RT7: ZFJA008

COMPOUND	RT7	MEAN RT	RT WINDOW FROM	RT WINDOW TO
PETN	30.757	30.766	29.866	31.714
3,5-Dinitroaniline	17.050	17.093	16.645	17.675
Nitroglycerin	16.183	16.200	15.785	16.762
1-C-3-NB	37.637	37.716	37.389	38.144

FORM 7B

SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

Instrument ID: HPL1 Calibration Date: 06/19/09 Time: 1648

Lab File ID: ZFJA009 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	RRF OR AMOUNT	RRF100.00 OR AMOUNT	MIN RRF	%D OR %DRIFT	MAX %D OR %DRIFT	CURV TYPE
PETN	88.745000	100.00	0.01	-11.25	20.00	AVRG
3,5-Dinitroaniline	21.099900	20.000	0.01	5.50	20.00	AVRG
Nitroglycerin	99.655000	100.00	0.01	-0.35	20.00	AVRG
1-C-3-NB	85.954900	100.00	0.01	-14.04	20.00	AVRG

FORM VII SV

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

Instrument ID: HPL1 Calibration Date: 06/24/09 Time: 1149

Lab File ID: ZFOA001 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	RRF OR AMOUNT	RRF100.00 OR AMOUNT	MIN RRF	%D OR %DRIFT	MAX %D OR %DRIFT	CURV TYPE
Nitroglycerin	69.590000	71.460000	0.01	2.69	20.00	AVRG
1-C-3-NB	423.12900	414.43000	0.01	-2.06	20.00	AVRG

FORM VII SV

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

Instrument ID: HPL1 Calibration Date: 06/24/09 Time: 2131

Lab File ID: ZFOA013 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	RRF OR AMOUNT	RRF100.00 OR AMOUNT	MIN RRF	%D OR %DRIFT	MAX %D OR %DRIFT	CURV TYPE
Nitroglycerin	69.590000	70.510000	0.01	1.32	20.00	AVRG
1-C-3-NB	423.12900	397.55000	0.01	-6.04	20.00	AVRG

FORM VII SV

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

Instrument ID: HPL1 Calibration Date: 06/25/09 Time: 0901

Lab File ID: ZFOA028 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	RRF OR AMOUNT	RRF100.00 OR AMOUNT	MIN RRF	%D OR %DRIFT	MAX %D OR %DRIFT	CURV TYPE	
Nitroglycerin	69.590000	75.700000	0.01	8.78	20.00	AVRG	
1-C-3-NB	423.12900	2081.3100	0.01	391.88	20.00	AVRG	<-

Average %D/%Drift test result.

Calculate Average %D/%Drift: 8.299322128
Maximum Average %D/%Drift: 15.00000000

Note: Passes Average %D/%Drift Test.

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

Instrument ID: HPL1 Calibration Date: 06/25/09 Time: 1240

Lab File ID: ZFOA030 Init. Calib. Date(s): 06/19/09 06/19/09

Init. Calib. Times: 1111 1547

GC Column: C18 ID: 4.60 (mm)

COMPOUND	RRF OR AMOUNT	RRF100.00 OR AMOUNT	MIN RRF	%D OR %DRIFT	MAX %D OR %DRIFT	CURV TYPE
Nitroglycerin	69.590000	61.464000	0.01	-11.68	20.00	AVRG
1-C-3-NB	423.12900	390.85000	0.01	-7.63	20.00	AVRG

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

GC Column: C18 ID: 4.60(mm) Init. Calib. Date(s): 06/19/09 06/19/09

Instrument ID: HPL1

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 37.77

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT	#	RT	#
01	LEVEL1	LEVEL1	06/19/09	1111	37.77			
02	LEVEL2	LEVEL2	06/19/09	1157	37.80			
03	LEVEL3	LEVEL3	06/19/09	1243	37.71			
04	LEVEL4	LEVEL4	06/19/09	1329	37.73			
05	LEVEL5	LEVEL5	06/19/09	1415	37.66			
06	LEVEL6	LEVEL6	06/19/09	1501	37.65			
07	LEVEL7	LEVEL7	06/19/09	1547	37.64			
08	SECOND SOURC	SECOND SOURC	06/19/09	1648	37.77			
09								
10								
11								
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32								

QC LIMITS
S1 = 1-C-3-NB (+/- 0.38 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

0039

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TIP003

GC Column: C18 ID: 4.60(mm) Init. Calib. Date(s): 06/19/09 06/19/09

Instrument ID: HPL1

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 37.08

	TETRA TECH SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT	#	RT	#
01	CCV	CCV	06/24/09	1149	37.09			
02	CCV	CCV	06/24/09	2131	36.91			
03	596079	596079	06/25/09	0253	36.96			
04	596083LCS	596083	06/25/09	0339	36.98			
05	SB06160901	9795321001	06/25/09	0425	36.99			
06	RB06170901	9795321002	06/25/09	0511	37.02			
07	596705	596705	06/25/09	0643	37.05			
08	596706LCS	596706	06/25/09	0729	37.04			
09	IDW06170901	9795321003	06/25/09	0815	38.01			
10	CCV	CCV	06/25/09	0901	37.20			
11	CCV RE-RUN	CCV RE-RUN	06/25/09	1240	37.08			
12								
13								
14								
15								
16								
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18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								

QC LIMITS
S1 = 1-C-3-NB (+/- 1.00 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

0052

Work continued from page:____

HPLC-1 (Dionex) LOGBOOK

Work continued to page:____

Rack 2194 Chals: 164141
IBN 284740

Sequence: ZFJA Batch: H1090619 Method: 8330 Date: 6/19/09

Seq. No.	Sample ID	Inj. Dilution	Analyst	QC	Standard	Comments
1	Test inj	100	AJ	—		Cal Std 1000
2	Level1	1		ICAL	Cal Std	Stock 01-0612 2 mL
3	Level2	2.5				3,5 DNA 1000 08112401U 2 mL
4	Level3	5				PETN 1000 08111903 10 mL
5	Level4	12.5				NG 1000 08111903 10 mL
6	Level5	25				→ 1 mL in 1:1 H2O:ACN
7	Level6	50				
8	Level7	100		↓	↓	
9	Stand 5	100		Stand 5.	IB-1181	5 mL → 1 mL of IB-1168
10	596078			Blank	—	Grinly Blank 06109
11	593065			MB		From Grinly Blank 06109
12	593066			LCS		↓
13	9792411001			—		
14	593067			MS		
15	593068			MSD		
16	9792411002			Triplicate S		} Triplicate set
17	593087			↓		
18	593088					
19	9792411003			→		DATA
20	9792411004			—		
21	CCV			CCV	IB-1181	See line 9 NOT USED 6/22/09
22	9792411005					
23	9792411006					
24	9792411007					
25	9792411008					
26	9792411009					
27	9792411010					
28	CCV	↓	↓	—	IB-1181	See line 9
29						

Reagents: 1:1 H2O/ACN , IB-1168

Add'l. Comments:

01554

/ork continued from page:_____

HPLC-1 (Dionex) LOGBOOK

Work continued to page:_____

Sequence: ZFOA Batch: H1090624 Method: 8330 Date: 6/24/09

Seq. No.	Sample ID	Inj. Dilution	Analyst	QC	Initial wt/vol ~~Standard~~	Comments
1	CCV	100µL	AR	CCV	—	
2	596078			BLANK	10.20 g	Grady Blank 6/11/09
3	593065			BLANK	10.00	Grady Blank 6/11/09
4	593066			LCS	10.02	↓
5	9792411001				10.03	
6	593067			MS	10.17	
7	593068			MSD	10.15	
8	9792411002			Triplicate	10.07	X14SS002C001
9	595087			Set	~~10.11~~ 10.06 6/24/09	
10	595688			↓	10.15	
11	9792411003			—	10.11	
12	9792411004			—	10.05	
13	CCV			CCV	—	
14	9792411005			—	10.16 g	
15	9792411006			—	10.01	confirm.
16	9792411007			—	10.10	
17	9792411008			—	10.07	
18	9792411009			—	10.05	
19	9792411010	↓		—	10.09 ↓	confirm
20	596079	100µL		MB	1000	6/23/09 Ext Batch
21	596083			LCS	1000	
22	9795321001			—	1000	
23	9795321002			—	990	
24	9795121001			—	1050	
25	596705			MB	1000	6/24/09 Ext Batch
26	596706			LCS	1000	
27	9795321003			—	100	
28	CCV	↓		CCV	—	
29	8330 Full List	↓	↓			
30	CCV Re-run	100	AR	CCV	—	

Reagents: IB-1168 / CCV - 5mL of IB-1182 → 1L of 1:1 Acetonitrile: Water - IB-1168
Mobile Phase Method: 0901B900S - Water - Filter / DE

Add'l. Comments: Soils - Diluted 1:1 w/ reagent water : FV = 40
Aqueous - Diluted 1:1 w/ CaCl2 Solution (IB-1170)

Revision 4/07

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY MARINE RIFLE RANGE - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X14SS001C0001	NITROGLYCERIN	1.2	MG/KG	UJ	H	HOLDING TIME NONCOMPLIANCE
X14SS005C0001	NITROGLYCERIN	1.2	MG/KG	UJ	H	HOLDING TIME NONCOMPLIANCE
X14SS003C0001	NITROGLYCERIN	1.2	MG/KG	UJ	H	HOLDING TIME NONCOMPLIANCE
X14SS004C0001	NITROGLYCERIN	1.2	MG/KG	UJ	H	HOLDING TIME NONCOMPLIANCE
X14SS004C0001-D	NITROGLYCERIN	1.2	MG/KG	UJ	H	HOLDING TIME NONCOMPLIANCE
X14SS009C0001	NITROGLYCERIN	0.8	MG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X14SS002C0001	NITROGLYCERIN	1.2	MG/KG	UJ	H	HOLDING TIME NONCOMPLIANCE
X14SS006C0001	NITROGLYCERIN	1.2	MG/KG	UJ	H	HOLDING TIME NONCOMPLIANCE
X14SS007C0001	NITROGLYCERIN	1.2	MG/KG	UJ	H	HOLDING TIME NONCOMPLIANCE
X14SB0840102-D	ANTIMONY	0.46	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SB0840102-D	ARSENIC	4	MG/KG	J	G	FIELD DUPLICATE IMPRECISION
X14SB0840102-D	COPPER	434	MG/KG	J	G	FIELD DUPLICATE IMPRECISION
X14SB0840102-D	LEAD	3590	MG/KG	J	G	FIELD DUPLICATE IMPRECISION
X14SB0840102-D	TIN	77.6	MG/KG	J	G	FIELD DUPLICATE IMPRECISION
X14SS001C0001	ANTIMONY	0.15	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X14SS001C0001	COPPER	9.5	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X14SS001C0001	TIN	1.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS005C0001	ANTIMONY	0.13	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X14SS005C0001	COPPER	12.7	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X14SS005C0001	TIN	1.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS0390001	ANTIMONY	0.16	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X14SS0390001	TIN	2.9	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS0630001	ANTIMONY	0.11	MG/KG	B	A	LAB BLANK CONTAMINATION

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY MARINE RIFLE RANGE - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X14SS0630001	TIN	3	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS0720001	ANTIMONY	0.13	MG/KG	L	DE	MATRIX SPIKE AND LCS NONCOMPLIANCE
X14SS0720001	TIN	2.5	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1170001	ANTIMONY	0.07	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1260001	ANTIMONY	0.07	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1420001	ANTIMONY	0.14	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1420001	LEAD	11	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1420001	TIN	1.3	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SB1020203	ANTIMONY	0.18	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS003C0001	ANTIMONY	0.18	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X14SS003C0001	COPPER	11.9	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X14SS003C0001	TIN	1.3	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS004C0001	ANTIMONY	1.4	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X14SS004C0001	COPPER	25.5	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X14SS004C0001	TIN	3.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS009C0001	ANTIMONY	0.3	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X14SS009C0001	COPPER	12.8	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X14SS009C0001	TIN	1.5	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS0430001	ANTIMONY	0.13	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X14SS0940001	ANTIMONY	0.14	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY MARINE RIFLE RANGE - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X14SS1080001	ANTIMONY	0.14	MG/KG	L	DE	MATRIX SPIKE AND LCS NONCOMPLIANCE
X14SS1080001	TIN	1.6	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SB0840102	ANTIMONY	0.88	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SB0840102	ARSENIC	7.8	MG/KG	J	G	FIELD DUPLICATE IMPRECISION
X14SB0840102	COPPER	849	MG/KG	J	G	FIELD DUPLICATE IMPRECISION
X14SS1200001	ANTIMONY	0.14	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1200001	ARSENIC	1.6	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1200001	LEAD	741	MG/KG	J	G	FIELD DUPLICATE IMPRECISION
X14SS1350001	ANTIMONY	0.28	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1380001	ANTIMONY	0.14	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1400001	ANTIMONY	0.32	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1410001	ANTIMONY	0.1	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1430001	ANTIMONY	0.14	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SB0840102	LEAD	6620	MG/KG	J	G	FIELD DUPLICATE IMPRECISION
X14SB0840102	TIN	131	MG/KG	J	G	FIELD DUPLICATE IMPRECISION
X14SS002C0001	ANTIMONY	0.19	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X14SS002C0001	COPPER	9.3	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X14SS002C0001	TIN	1.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS006C0001	ANTIMONY	0.19	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X14SS006C0001	COPPER	8	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X14SS006C0001	TIN	1	MG/KG	B	A	LAB BLANK CONTAMINATION

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY MARINE RIFLE RANGE - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X14SS007C0001	ANTIMONY	0.16	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X14SS007C0001	COPPER	8.7	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X14SS007C0001	TIN	1.7	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS0330001	ANTIMONY	0.1	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X14SS0330001	TIN	2.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS0480001	TIN	2	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS0480001	ANTIMONY	0.14	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X14SS0620001	ANTIMONY	0.17	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X14SS0620001	TIN	2	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1300001	ANTIMONY	0.02	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1300001	TIN	0.49	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1310001	ANTIMONY	0.02	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1310001	TIN	0.58	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1320001	ANTIMONY	0.22	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X14SS1320001	TIN	0.54	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SB1110102	ANTIMONY	0.6	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS008C0001	ANTIMONY	0.19	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X14SS008C0001	COPPER	52.4	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X14SS008C0001	TIN	1.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS0220001	ANTIMONY	0.12	MG/KG	L	DE	MATRIX SPIKE AND LCS NONCOMPLIANCE
X14SS0220001	TIN	1.8	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS0350001	ANTIMONY	0.14	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY MARINE RIFLE RANGE - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

5 OF 5

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X14SS0580001	ANTIMONY	0.15	MG/KG	L	DE	MATRIX SPIKE AND LCS NONCOMPLIANCE
X14SS0870001	ANTIMONY	0.12	MG/KG	L	DE	MATRIX SPIKE AND LCS NONCOMPLIANCE
X14SS0870001	TIN	1.7	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1340001	ANTIMONY	0.32	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X14SS1390001	ANTIMONY	0.14	MG/KG	B	A	LAB BLANK CONTAMINATION
X14SS1170001	CATION EXCHANGE CAPACITY	15	MEQ/100	K	D	MATRIX SPIKE NONCOMPLIANCE
X14SS0220001	CATION EXCHANGE CAPACITY	20	MEQ/100	K	D	MATRIX SPIKE NONCOMPLIANCE
X14SS0580001	CATION EXCHANGE CAPACITY	13	MEQ/100	K	D	MATRIX SPIKE NONCOMPLIANCE
X14SS0870001	CATION EXCHANGE CAPACITY	23	MEQ/100	K	D	MATRIX SPIKE NONCOMPLIANCE

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY OLD SKEET RANGE - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X15SS077C0001	NITROGLYCERIN	3.7	MG/KG	J	H	HOLDING TIME NONCOMPLIANCE
X15SS078C0001	NITROGLYCERIN	0.49	MG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SB0050102	ANTIMONY	0.11	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X15SB0050102	COPPER	10.1	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X15SB0050102	TIN	1.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SD0330006	ANTIMONY	0.083	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SD0330006	COPPER	2.1	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SD0330006	LEAD	5	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SD0330006	TIN	0.64	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS0050001	ANTIMONY	0.99	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X15SS0050001	COPPER	10.6	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0050001	TIN	2	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS0350001	ANTIMONY	0.27	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X15SS0350001	COPPER	9.6	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0350001	TIN	3.9	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS0610001	ANTIMONY	0.17	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X15SS0610001	COPPER	8.2	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0610001	TIN	1.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS0720001	ANTIMONY	0.61	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY OLD SKEET RANGE - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X15SS0720001	TIN	1.3	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS0760001	ANTIMONY	0.47	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0760001	TIN	2.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SD0050006	ANTIMONY	0.04	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SD0050006	TIN	0.92	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SD0130006	ANTIMONY	0.05	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SD0130006	TIN	0.9	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SD0300006	ANTIMONY	0.28	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS0640001	ANTIMONY	4.8	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X15SS0640001	COPPER	22.2	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0640001	TIN	2.4	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SD0030006	TIN	1.9	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SD0030006	ANTIMONY	0.09	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SD0180006	TIN	1	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SD0180006	ANTIMONY	0.05	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS0700001	ANTIMONY	1.9	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X15SS0700001	COPPER	8.8	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0700001	TIN	1.3	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS0710001-D	ANTIMONY	0.28	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0710001-D	TIN	1.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS0730001	ANTIMONY	0.5	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0730001	TIN	1.3	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS077C0001	ANTIMONY	0.68	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X15SS077C0001	TIN	1.8	MG/KG	B	A	LAB BLANK CONTAMINATION

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY OLD SKEET RANGE - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X15SD0230006	TIN	0.87	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SD0230006	ANTIMONY	0.06	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS0070001	ANTIMONY	0.83	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X15SS0070001	COPPER	12.2	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0070001	TIN	1.7	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS0180001	ANTIMONY	0.69	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X15SS0180001	COPPER	8.8	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0180001	TIN	1.3	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS0370001	ANTIMONY	0.37	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X15SS0370001	COPPER	7.3	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0370001	TIN	1.4	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS0660001	ANTIMONY	0.16	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X15SS0660001	COPPER	11.5	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0660001	TIN	1.4	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS0680001	COPPER	37.6	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0680001	TIN	2.8	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS0680001	ANTIMONY	0.26	MG/KG	J	DF	MATRIX SPIKE NONCOMPLIANCE AND LAB DUPLICATE IMPRECISION
X15SS0710001	ANTIMONY	0.39	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY OLD SKEET RANGE - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X15SS0710001	TIN	1.7	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS078C0001	ANTIMONY	0.46	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X15SS078C0001	TIN	1.7	MG/KG	B	A	LAB BLANK CONTAMINATION
X15SS0330001	CATION EXCHANGE CAPACITY	13	MEQ/100	K	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0480001	CATION EXCHANGE CAPACITY	21	MEQ/100	K	D	MATRIX SPIKE NONCOMPLIANCE
X15SD0030006	CATION EXCHANGE CAPACITY	13	MEQ/100	K	D	MATRIX SPIKE NONCOMPLIANCE
X15SD0230006	CATION EXCHANGE CAPACITY	9.5	MEQ/100	K	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0110001	1-METHYLNAPHTHALENE	25	UG/KG	UJ	C	CALIBRATION NONCOMPLIANCE
X15SS0110001	2-METHYLNAPHTHALENE	25	UG/KG	UJ	C	CALIBRATION NONCOMPLIANCE
X15SS0110001	BENZO(A)ANTHRACENE	21	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0110001	BENZO(A)PYRENE	18	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0110001	BENZO(B)FLUORANTHENE	24	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0110001	BENZO(G,H,I)PERYLENE	13	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0110001	BENZO(K)FLUORANTHENE	11	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0110001	CHRYSENE	15	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0110001	DIBENZO(A,H)ANTHRACENE	9.4	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0110001	FLUORANTHENE	15	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0110001	INDENO(1,2,3-CD)PYRENE	11	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY OLD SKEET RANGE - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X15SS0110001	PHENANTHRENE	6.2	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0110001	PYRENE	15	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0290001	DIBENZO(A,H)ANTHRACENE	22	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0290001	1-METHYLNAPHTHALENE	27	UG/KG	UJ	C	CALIBRATION NONCOMPLIANCE
X15SS0290001	2-METHYLNAPHTHALENE	27	UG/KG	UJ	C	CALIBRATION NONCOMPLIANCE
X15SS0290001	ACENAPHTHENE	4.2	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0350001	1-METHYLNAPHTHALENE	25	UG/KG	UJ	C	CALIBRATION NONCOMPLIANCE
X15SS0350001	2-METHYLNAPHTHALENE	19	UG/KG	J	CP	CALIBRATION NONCOMPLIANCE AND UNCERTAINITY NEAR DETECTION LIMIT
X15SS0380001	ACENAPHTHENE	5000	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0380001	ANTHRACENE	7200	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0380001	DIBENZO(A,H)ANTHRACENE	7000	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0380001	FLUORENE	3100	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0490001	1-METHYLNAPHTHALENE	150	UG/KG	J	C	CALIBRATION NONCOMPLIANCE
X15SS0490001	ACENAPHTHENE	1800	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0490001	ANTHRACENE	2400	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY OLD SKEET RANGE - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X15SS0490001	DIBENZO(A,H)ANTHRACENE	2300	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0490001	FLUORENE	1000	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0520001	FLUORENE	1500	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0520001	1-METHYLNAPHTHALENE	230	UG/KG	J	C	CALIBRATION NONCOMPLIANCE
X15SS0520001	ACENAPHTHENE	2600	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0530001	ACENAPHTHENE	4200	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0530001	ANTHRACENE	5400	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0530001	DIBENZO(A,H)ANTHRACENE	7600	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SD0050006	ACENAPHTHYLENE	25	UG/KG	UL	HRE	HOLDING TIME, LCS, AND SURROGATE NONCOMPLIANCE
X15SD0050006	ANTHRACENE	25	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0050006	BENZO(A)ANTHRACENE	25	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0050006	BENZO(A)PYRENE	25	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0050006	BENZO(B)FLUORANTHENE	25	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0050006	BENZO(G,H,I)PERYLENE	25	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY OLD SKEET RANGE - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X15SD0050006	BENZO(K)FLUORANTHENE	25	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0050006	CHRYSENE	25	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0050006	DIBENZO(A,H)ANTHRACENE	25	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0050006	FLUORANTHENE	25	UG/KG	UL	HRE	HOLDING TIME, LCS, AND SURROGATE NONCOMPLIANCE
X15SD0050006	FLUORENE	25	UG/KG	UL	HRE	HOLDING TIME, LCS, AND SURROGATE NONCOMPLIANCE
X15SD0050006	INDENO(1,2,3-CD)PYRENE	25	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0050006	NAPHTHALENE	25	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0050006	PHENANTHRENE	25	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0050006	PYRENE	25	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0050006	1-METHYLNAPHTHALENE	25	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0050006	2-METHYLNAPHTHALENE	25	UG/KG	UL	HRE	HOLDING TIME, LCS, AND SURROGATE NONCOMPLIANCE
X15SD0050006	ACENAPHTHENE	25	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SS0010001	1-METHYLNAPHTHALENE	5.4	UG/KG	J	CP	CALIBRATION NONCOMPLIANCE AND UNCERTAINITY NEAR DETECTION LIMIT

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY OLD SKEET RANGE - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X15SS0010001	2-METHYLNAPHTHALENE	20	UG/KG	J	CP	CALIBRATION NONCOMPLIANCE AND UNCERTAINITY NEAR DETECTION LIMIT
X15SS0030001	1-METHYLNAPHTHALENE	24	UG/KG	UJ	C	CALIBRATION NONCOMPLIANCE
X15SS0030001	2-METHYLNAPHTHALENE	24	UG/KG	UJ	C	CALIBRATION NONCOMPLIANCE
X15SS0030001	ANTHRACENE	1.9	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0030001	BENZO(A)ANTHRACENE	20	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0030001	BENZO(A)PYRENE	20	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0030001	BENZO(G,H,I)PERYLENE	13	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0030001	BENZO(K)FLUORANTHENE	12	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0030001	CHRYSENE	13	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0030001	DIBENZO(A,H)ANTHRACENE	7.8	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0030001	FLUORANTHENE	13	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0030001	INDENO(1,2,3-CD)PYRENE	12	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0030001	PHENANTHRENE	5.4	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0030001	PYRENE	11	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY OLD SKEET RANGE - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X15SS0280001	FLUORENE	8.3	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0280001	1-METHYLNAPHTHALENE	23	UG/KG	UJ	C	CALIBRATION NONCOMPLIANCE
X15SS0280001	2-METHYLNAPHTHALENE	9.2	UG/KG	J	CP	CALIBRATION NONCOMPLIANCE AND UNCERTAINITY NEAR DETECTION LIMIT
X15SS0280001	ACENAPHTHENE	12	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SD0030006	BENZO(K)FLUORANTHENE	24	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0030006	CHRYSENE	3.5	UG/KG	B	A	LAB BLANK CONTAMINATION
X15SD0030006	DIBENZO(A,H)ANTHRACENE	24	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0030006	FLUORANTHENE	24	UG/KG	UL	HRE	HOLDING TIME, LCS, AND SURROGATE NONCOMPLIANCE
X15SD0030006	FLUORENE	24	UG/KG	UL	HRE	HOLDING TIME, LCS, AND SURROGATE NONCOMPLIANCE
X15SD0030006	INDENO(1,2,3-CD)PYRENE	24	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0030006	NAPHTHALENE	24	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0030006	PHENANTHRENE	24	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0030006	PYRENE	24	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0030006	1-METHYLNAPHTHALENE	24	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY OLD SKEET RANGE - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X15SD0030006	2-METHYLNAPHTHALENE	24	UG/KG	UL	HRE	HOLDING TIME, LCS, AND SURROGATE NONCOMPLIANCE
X15SD0030006	ACENAPHTHENE	24	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0030006	ACENAPHTHYLENE	24	UG/KG	UL	HRE	HOLDING TIME, LCS, AND SURROGATE NONCOMPLIANCE
X15SD0030006	ANTHRACENE	24	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0030006	BENZO(A)ANTHRACENE	24	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0030006	BENZO(A)PYRENE	24	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0030006	BENZO(B)FLUORANTHENE	24	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SD0030006	BENZO(G,H,I)PERYLENE	24	UG/KG	UL	HR	HOLDING TIME AND SURROGATE NONCOMPLIANCE
X15SS0020001	1-METHYLNAPHTHALENE	42	UG/KG	J	C	CALIBRATION NONCOMPLIANCE
X15SS0020001	2-METHYLNAPHTHALENE	64	UG/KG	J	C	CALIBRATION NONCOMPLIANCE
X15SS0020001	DIBENZO(A,H)ANTHRACENE	620	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0020001	FLUORANTHENE	5100	UG/KG	J	C	CALIBRATION NONCOMPLIANCE
X15SS0020001	FLUORENE	360	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0190001	1-METHYLNAPHTHALENE	26	UG/KG	UJ	C	CALIBRATION NONCOMPLIANCE
X15SS0190001	2-METHYLNAPHTHALENE	26	UG/KG	UJ	CD	CALIBRATION AND MATRIX SPIKE NONCOMPLIANCE
X15SS0190001	BENZO(A)ANTHRACENE	37	UG/KG	J	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0190001	BENZO(A)PYRENE	40	UG/KG	J	D	MATRIX SPIKE NONCOMPLIANCE

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY OLD SKEET RANGE - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X15SS0190001	BENZO(B)FLUORANTHENE	42	UG/KG	J	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0190001	BENZO(G,H,I)PERYLENE	27	UG/KG	J	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0190001	BENZO(K)FLUORANTHENE	25	UG/KG	J	DP	MATRIX SPIKE NONCOMPLIANCE AND UNCERTAINITY NEAR THE DETECTION LIMIT
X15SS0190001	CHRYSENE	35	UG/KG	J	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0190001	DIBENZO(A,H)ANTHRACENE	13	UG/KG	J	DP	MATRIX SPIKE NONCOMPLIANCE AND UNCERTAINITY NEAR THE DETECTION LIMIT
X15SS0190001	FLUORANTHENE	30	UG/KG	J	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0190001	INDENO(1,2,3-CD)PYRENE	24	UG/KG	J	DP	MATRIX SPIKE NONCOMPLIANCE AND UNCERTAINITY NEAR THE DETECTION LIMIT
X15SS0190001	PHENANTHRENE	11	UG/KG	J	DP	MATRIX SPIKE NONCOMPLIANCE AND UNCERTAINITY NEAR THE DETECTION LIMIT
X15SS0190001	PYRENE	28	UG/KG	J	D	MATRIX SPIKE NONCOMPLIANCE
X15SS0210001	2-METHYLNAPHTHALENE	17	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0210001	NAPHTHALENE	20	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0320001	1-METHYLNAPHTHALENE	25	UG/KG	UJ	C	CALIBRATION NONCOMPLIANCE
X15SS0320001	2-METHYLNAPHTHALENE	11	UG/KG	J	CP	CALIBRATION NONCOMPLIANCE AND UNCERTAINITY NEAR DETECTION LIMIT
X15SS0320001	NAPHTHALENE	8.6	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY OLD SKEET RANGE - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X15SS0540001	1-METHYLNAPHTHALENE	6.1	UG/KG	J	CP	CALIBRATION NONCOMPLIANCE AND UNCERTAINITY NEAR DETECTION LIMIT
X15SS0540001	2-METHYLNAPHTHALENE	20	UG/KG	J	CP	CALIBRATION NONCOMPLIANCE AND UNCERTAINITY NEAR DETECTION LIMIT
X15SD0230006	CHRYSENE	5.4	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SD0230006	INDENO(1,2,3-CD)PYRENE	2.9	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SD0230006	BENZO(A)ANTHRACENE	2.9	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SD0230006	BENZO(A)PYRENE	4.6	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SD0230006	BENZO(B)FLUORANTHENE	3.4	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SD0230006	BENZO(G,H,I)PERYLENE	2.8	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0150001	1-METHYLNAPHTHALENE	150	UG/KG	J	C	CALIBRATION NONCOMPLIANCE
X15SS0150001	ACENAPHTHENE	2000	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0150001	ANTHRACENE	2500	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0150001	DIBENZO(A,H)ANTHRACENE	3300	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0310001	ACENAPHTHENE	2600	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY OLD SKEET RANGE - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X15SS0310001	ANTHRACENE	3500	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0310001	DIBENZO(A,H)ANTHRACENE	4100	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0500001	1-METHYLNAPHTHALENE	86	UG/KG	J	C	CALIBRATION NONCOMPLIANCE
X15SS0500001	ACENAPHTHENE	1500	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0500001	ANTHRACENE	2000	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT
X15SS0500001	DIBENZO(A,H)ANTHRACENE	2600	UG/KG	J	P	UNCERTAINITY NEAR DETECTION LIMIT

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RANCH ROAD RIFLE RANGE - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X25SS0100001	ANTIMONY	0.48	MG/KG	J	DG	MATRIX SPIKE NONCOMPLIANCE AND FIELD DUPLICATE IMPRECISION
X25SS0100001	LEAD	84	MG/KG	J	DG	MATRIX SPIKE NONCOMPLIANCE AND FIELD DUPLICATE IMPRECISION
X25SS0100001	TIN	1.4	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0080001	ANTIMONY	0.27	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X25SS0080001	TIN	0.51	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0200001	ANTIMONY	12.2	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X25SS0200001	TIN	0.56	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0210001	ANTIMONY	0.3	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X25SS0220001	TIN	0.51	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0220001	ANTIMONY	0.19	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X25SS0240001	TIN	0.58	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0240001	ANTIMONY	1.7	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X25SS0210001	TIN	0.5	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0320001	TIN	1.8	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0320001	ANTIMONY	0.24	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X25SS0320001	ARSENIC	2.1	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0330001	ANTIMONY	0.13	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0330001	ARSENIC	1.9	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0330001	TIN	1.6	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS034C0001	ANTIMONY	0.1	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X25SS034C0001	TIN	1.6	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0040001	ANTIMONY	0.15	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0040001	TIN	0.49	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0190001	ANTIMONY	4.4	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X25SS0190001	TIN	0.43	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0300001	TIN	1.7	MG/KG	B	A	LAB BLANK CONTAMINATION

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RANCH ROAD RIFLE RANGE - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X25SS0300001	ANTIMONY	0.26	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X25SS0010001	ANTIMONY	0.02	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0010001	TIN	0.56	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0070001	ANTIMONY	0.02	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0070001	ARSENIC	2.3	MG/KG	J	G	FIELD DUPLICATE IMPRECISION
X25SS0070001	TIN	0.62	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0070001-D	TIN	0.68	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0070001-D	ANTIMONY	0.16	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0070001-D	ARSENIC	5.8	MG/KG	J	G	FIELD DUPLICATE IMPRECISION
X25SS0130001	ANTIMONY	0.2	MG/KG	J	CDG	CALIBRATION AND MATRIX SPIKE NONCOMPLIANCE AND FIELD DUPLICATE IMPRECISIION
X25SS0130001	LEAD	19.8	MG/KG	J	G	FIELD DUPLICATE IMPRECISION
X25SS0130001	TIN	1.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0160001	ANTIMONY	0.4	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X25SS0160001	TIN	0.52	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0180001	ANTIMONY	2.4	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X25SS0180001	TIN	0.55	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0210001-D	TIN	0.47	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0210001-D	ANTIMONY	0.27	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X25SS0230001	TIN	0.55	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0230001	ANTIMONY	1.3	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X25SS0250001	TIN	0.5	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0250001	ANTIMONY	0.27	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X25SS0280001	ANTIMONY	0.21	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X25SS0280001	TIN	1.5	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0310001	ANTIMONY	0.53	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X25SS0310001	ARSENIC	2.4	MG/KG	B	A	LAB BLANK CONTAMINATION
X25SS0310001	TIN	2.3	MG/KG	B	A	LAB BLANK CONTAMINATION

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RUM POINT SKEET RANGE - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X16SS080C0001	NITROGLYCERIN	1.2	MG/KG	UJ	H	HOLDING TIME NONCOMPLIANCE
X16SS081C0001	NITROGLYCERIN	1.2	MG/KG	UJ	H	HOLDING TIME NONCOMPLIANCE
X16SS0130001	ANTIMONY	0.55	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0130001	COPPER	11.4	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0130001	TIN	1.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0250001	ANTIMONY	0.73	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0250001	ARSENIC	4	MG/KG	J	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0250001	COPPER	8.8	MG/KG	J	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0250001	LEAD	159	MG/KG	J	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0250001	TIN	1.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0250001	ZINC	29.4	MG/KG	J	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0320001	ANTIMONY	0.14	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0320001	TIN	1.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0320001-D	ANTIMONY	0.14	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0320001-D	TIN	1.3	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0540001	ANTIMONY	0.32	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0540001	COPPER	5.3	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0540001	TIN	1.1	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0570001	TIN	1.3	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0570001	ANTIMONY	0.14	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0570001	COPPER	4.5	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0790001	ANTIMONY	1.2	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0790001	COPPER	10.6	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0790001	TIN	1.3	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0950001	COPPER	3	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0950001	TIN	0.92	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0950001	ANTIMONY	0.08	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0610001	ANTIMONY	0.2	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RUM POINT SKEET RANGE - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X16SS0610001	COPPER	6.5	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0610001	TIN	1.8	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS080C0001	ANTIMONY	0.14	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X16SS080C0001	TIN	1.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0910001	ANTIMONY	0.03	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0910001	COPPER	5.7	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0910001	TIN	1	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0930001	ANTIMONY	0.06	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0930001	COPPER	3.3	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0930001	TIN	1	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0170001	ANTIMONY	0.45	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0170001	COPPER	7.4	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0170001	TIN	1.5	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0730001	TIN	1.3	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0730001	ANTIMONY	0.92	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0730001	COPPER	4.7	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS081C0001	ANTIMONY	0.42	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X16SS081C0001	TIN	1.1	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0920001	ANTIMONY	1	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0920001	COPPER	5.7	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0920001	TIN	1.3	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0030001	ANTIMONY	0.62	MG/KG	L	DE	MATRIX SPIKE AND LCS NONCOMPLIANCE
X16SS0030001	TIN	1.1	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0080001	ANTIMONY	1	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0080001	COPPER	10.4	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0080001	TIN	1.9	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0200001	ANTIMONY	0.22	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RUM POINT SKEET RANGE - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X16SS0200001	ARSENIC	1.9	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0200001	TIN	1	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0420001	COPPER	3.9	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0420001	TIN	1	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0420001	ANTIMONY	0.11	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0870001	ANTIMONY	0.69	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0870001	COPPER	5.5	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0870001	TIN	1.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0900001	ANTIMONY	0.23	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0900001	COPPER	5.3	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0900001	TIN	1.1	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0900001-D	ANTIMONY	1.6	MG/KG	J	DG	MATRIX SPIKE NONCOMPLIANCE AND FIELD DUPLICATE IMPRECISION
X16SS0900001-D	LEAD	338	MG/KG	J	G	FIELD DUPLICATE IMPRECISION
X16SS0900001-D	TIN	1.1	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0940001	ANTIMONY	0.09	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0940001	COPPER	2.4	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0940001	TIN	0.75	MG/KG	B	A	LAB BLANK CONTAMINATION
X16SS0730001	CATION EXCHANGE CAPACITY	15	MEQ/100	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0080001	CATION EXCHANGE CAPACITY	31	MEQ/100	K	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0090001	ACENAPHTHYLENE	23	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0090001	ANTHRACENE	23	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0090001	BENZO(A)ANTHRACENE	8.8	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0090001	BENZO(A)PYRENE	8.7	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0090001	BENZO(B)FLUORANTHENE	11	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0090001	BENZO(G,H,I)PERYLENE	6.2	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0090001	BENZO(K)FLUORANTHENE	23	UG/KG	UL	R	SURROGATE NONCOMPLIANCE

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RUM POINT SKEET RANGE - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X16SS0090001	CHRYSENE	14	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0090001	DIBENZO(A,H)ANTHRACENE	23	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0090001	FLUORANTHENE	8	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0090001	FLUORENE	23	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0090001	INDENO(1,2,3-CD)PYRENE	5.9	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0090001	NAPHTHALENE	23	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0090001	PHENANTHRENE	23	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0090001	PYRENE	9.5	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0090001	1-METHYLNAPHTHALENE	23	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0090001	2-METHYLNAPHTHALENE	23	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0090001	ACENAPHTHENE	23	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0130001	ANTHRACENE	1.8	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0130001	BENZO(B)FLUORANTHENE	16	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0130001	BENZO(G,H,I)PERYLENE	22	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0130001	BENZO(K)FLUORANTHENE	4.3	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0130001	DIBENZO(A,H)ANTHRACENE	6.4	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0130001	FLUORANTHENE	7.4	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0130001	INDENO(1,2,3-CD)PYRENE	8.1	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0130001	PHENANTHRENE	5.3	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0230001	2-METHYLNAPHTHALENE	28	UG/KG	UL	E	LCS NONCOMPLIANCE

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RUM POINT SKEET RANGE - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X16SS0230001	ACENAPHTHENE	28	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0230001	ANTHRACENE	12	UG/KG	L	EP	LCS NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0230001	BENZO(A)ANTHRACENE	210	UG/KG	J	G	FIELD DUPLICATE IMPRECISION
X16SS0230001	BENZO(A)PYRENE	240	UG/KG	J	G	FIELD DUPLICATE IMPRECISION
X16SS0230001	BENZO(B)FLUORANTHENE	89	UG/KG	J	G	FIELD DUPLICATE IMPRECISION
X16SS0230001	BENZO(G,H,I)PERYLENE	130	UG/KG	J	G	FIELD DUPLICATE IMPRECISION
X16SS0230001	BENZO(K)FLUORANTHENE	13	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0230001	CHRYSENE	240	UG/KG	J	G	FIELD DUPLICATE IMPRECISION
X16SS0230001	DIBENZO(A,H)ANTHRACENE	41	UG/KG	J	G	FIELD DUPLICATE IMPRECISION
X16SS0230001	FLUORANTHENE	32	UG/KG	L	E	LCS NONCOMPLIANCE
X16SS0230001	FLUORENE	28	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0230001	PHENANTHRENE	40	UG/KG	L	E	LCS NONCOMPLIANCE
X16SS0230001	PYRENE	160	UG/KG	J	G	FIELD DUPLICATE IMPRECISION
X16SS0020001	1-METHYLNAPHTHALENE	2.6	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0020001	2-METHYLNAPHTHALENE	9.3	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0020001	ACENAPHTHENE	23	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0020001	ACENAPHTHYLENE	23	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0020001	ANTHRACENE	32	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0020001	BENZO(B)FLUORANTHENE	200	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0020001	BENZO(G,H,I)PERYLENE	260	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0020001	BENZO(K)FLUORANTHENE	40	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0020001	DIBENZO(A,H)ANTHRACENE	120	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0020001	FLUORANTHENE	79	UG/KG	L	R	SURROGATE NONCOMPLIANCE

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RUM POINT SKEET RANGE - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X16SS0020001	FLUORENE	4.2	UG/KG	L	CRP	CALIBRATION AND SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0020001	INDENO(1,2,3-CD)PYRENE	78	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0020001	NAPHTHALENE	23	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0020001	PHENANTHRENE	140	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0190001	ANTHRACENE	10	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0190001	BENZO(K)FLUORANTHENE	13	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0570001	PYRENE	3.9	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0570001	BENZO(A)ANTHRACENE	2.6	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0570001	CHRYSENE	5.6	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0570001	FLUORANTHENE	4.8	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0570001	INDENO(1,2,3-CD)PYRENE	3	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0260001	2-METHYLNAPHTHALENE	24	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0260001	ACENAPHTHENE	24	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0260001	ANTHRACENE	5.5	UG/KG	L	EP	LCS NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0260001	BENZO(K)FLUORANTHENE	6.6	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RUM POINT SKEET RANGE - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X16SS0260001	DIBENZO(A,H)ANTHRACENE	21	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0260001	FLUORANTHENE	17	UG/KG	L	EP	LCS NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0260001	FLUORENE	24	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0260001	INDENO(1,2,3-CD)PYRENE	18	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0260001	PHENANTHRENE	21	UG/KG	L	EP	LCS NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0400001	1-METHYLNAPHTHALENE	24	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0400001	2-METHYLNAPHTHALENE	24	UG/KG	UL	ER	LCS AND SURROGATE NONCOMPLIANCE
X16SS0400001	ACENAPHTHENE	24	UG/KG	UL	ER	LCS AND SURROGATE NONCOMPLIANCE
X16SS0400001	ACENAPHTHYLENE	24	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0400001	ANTHRACENE	1.6	UG/KG	L	ERP	LCS AND SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0400001	BENZO(A)ANTHRACENE	24	UG/KG	L	RP	SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0400001	BENZO(A)PYRENE	29	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0400001	BENZO(B)FLUORANTHENE	14	UG/KG	L	RP	SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RUM POINT SKEET RANGE - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X16SS0400001	BENZO(G,H,I)PERYLENE	18	UG/KG	L	RP	SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0400001	BENZO(K)FLUORANTHENE	24	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0400001	CHRYSENE	30	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0400001	DIBENZO(A,H)ANTHRACENE	6.1	UG/KG	L	RP	SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0400001	FLUORANTHENE	8.1	UG/KG	L	ERP	LCS AND SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0400001	FLUORENE	24	UG/KG	UL	ER	LCS AND SURROGATE NONCOMPLIANCE
X16SS0400001	INDENO(1,2,3-CD)PYRENE	6.9	UG/KG	L	RP	SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0400001	NAPHTHALENE	24	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0400001	PHENANTHRENE	6.5	UG/KG	L	ERP	LCS AND SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0400001	PYRENE	24	UG/KG	L	RP	SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0780001	BENZO(B)FLUORANTHENE	52	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0780001	BENZO(G,H,I)PERYLENE	65	UG/KG	L	R	SURROGATE NONCOMPLIANCE

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RUM POINT SKEET RANGE - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X16SS0780001	BENZO(K)FLUORANTHENE	10	UG/KG	L	RP	SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0780001	CHRYSENE	130	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0780001	DIBENZO(A,H)ANTHRACENE	22	UG/KG	L	RP	SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0780001	FLUORANTHENE	23	UG/KG	L	ERP	LCS AND SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0780001	FLUORENE	23	UG/KG	UL	ER	LCS AND SURROGATE NONCOMPLIANCE
X16SS0780001	INDENO(1,2,3-CD)PYRENE	24	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0780001	NAPHTHALENE	23	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0780001	PHENANTHRENE	22	UG/KG	L	ERP	LCS AND SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0780001	PYRENE	93	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0780001	1-METHYLNAPHTHALENE	23	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0780001	2-METHYLNAPHTHALENE	23	UG/KG	UL	ER	LCS AND SURROGATE NONCOMPLIANCE
X16SS0780001	ACENAPHTHENE	23	UG/KG	UL	ER	LCS AND SURROGATE NONCOMPLIANCE
X16SS0780001	ACENAPHTHYLENE	23	UG/KG	UL	R	SURROGATE NONCOMPLIANCE

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RUM POINT SKEET RANGE - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X16SS0780001	ANTHRACENE	5.2	UG/KG	L	ERP	LCS AND SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0780001	BENZO(A)ANTHRACENE	100	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0780001	BENZO(A)PYRENE	120	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS080C0001	2-METHYLNAPHTHALENE	3.5	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS080C0001	ANTHRACENE	4.1	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS080C0001	BENZO(K)FLUORANTHENE	5.8	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS080C0001	DIBENZO(A,H)ANTHRACENE	12	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS080C0001	FLUORANTHENE	9.8	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS080C0001	INDENO(1,2,3-CD)PYRENE	9.1	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS080C0001	PHENANTHRENE	21	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0140001	ANTHRACENE	7.3	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0140001	BENZO(K)FLUORANTHENE	9	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0140001	DIBENZO(A,H)ANTHRACENE	20	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0140001	FLUORANTHENE	20	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RUM POINT SKEET RANGE - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X16SS0140001	INDENO(1,2,3-CD)PYRENE	17	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0230001-D	BENZO(B)FLUORANTHENE	3.8	UG/KG	J	GP	FIELD DUPLICATE IMPRECISION AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0230001-D	BENZO(G,H,I)PERYLENE	4.3	UG/KG	J	GP	FIELD DUPLICATE IMPRECISION AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0230001-D	CHRYSENE	8.8	UG/KG	J	GP	FIELD DUPLICATE IMPRECISION AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0230001-D	DIBENZO(A,H)ANTHRACENE	23	UG/KG	UJ	G	FIELD DUPLICATE IMPRECISION
X16SS0230001-D	FLUORANTHENE	2.5	UG/KG	L	EP	LCS NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0230001-D	FLUORENE	23	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0230001-D	INDENO(1,2,3-CD)PYRENE	2.5	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0230001-D	PHENANTHRENE	23	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0230001-D	PYRENE	4.6	UG/KG	J	GP	FIELD DUPLICATE IMPRECISION AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0230001-D	2-METHYLNAPHTHALENE	23	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0230001-D	ACENAPHTHENE	23	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0230001-D	ANTHRACENE	23	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0230001-D	BENZO(A)ANTHRACENE	5.3	UG/KG	J	GP	FIELD DUPLICATE IMPRECISION AND UNCERTAINTY NEAR DETECTION LIMIT

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RUM POINT SKEET RANGE - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X16SS0230001-D	BENZO(A)PYRENE	7.6	UG/KG	J	GP	FIELD DUPLICATE IMPRECISION AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0310001	NAPHTHALENE	24	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0310001	PHENANTHRENE	89	UG/KG	L	ER	LCS AND SURROGATE NONCOMPLIANCE
X16SS0310001	PYRENE	280	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0310001	1-METHYLNAPHTHALENE	24	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0310001	2-METHYLNAPHTHALENE	6.4	UG/KG	L	EPR	LCS AND SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0310001	ACENAPHTHENE	24	UG/KG	UL	ER	LCS AND SURROGATE NONCOMPLIANCE
X16SS0310001	ACENAPHTHYLENE	24	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0310001	ANTHRACENE	19	UG/KG	L	ERP	LCS AND SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0310001	BENZO(A)ANTHRACENE	300	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0310001	BENZO(B)FLUORANTHENE	120	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0310001	BENZO(G,H,I)PERYLENE	170	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0310001	BENZO(K)FLUORANTHENE	20	UG/KG	L	RP	SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0310001	DIBENZO(A,H)ANTHRACENE	58	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0310001	FLUORANTHENE	48	UG/KG	L	ER	LCS AND SURROGATE NONCOMPLIANCE

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RUM POINT SKEET RANGE - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X16SS0310001	FLUORENE	24	UG/KG	UL	ER	LCS AND SURROGATE NONCOMPLIANCE
X16SS0310001	INDENO(1,2,3-CD)PYRENE	43	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0370001	2-METHYLNAPHTHALENE	22	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0370001	ACENAPHTHENE	22	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0370001	ANTHRACENE	22	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0370001	FLUORANTHENE	22	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0370001	FLUORENE	22	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0370001	PHENANTHRENE	22	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0370001-D	2-METHYLNAPHTHALENE	23	UG/KG	UL	DE	MATRIX SPIKE AND LCS NONCOMPLIANCE
X16SS0370001-D	ACENAPHTHENE	23	UG/KG	UL	DE	MATRIX SPIKE AND LCS NONCOMPLIANCE
X16SS0370001-D	ACENAPHTHYLENE	23	UG/KG	UL	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0370001-D	CHRYSENE	3.3	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0370001-D	FLUORENE	23	UG/KG	UL	DE	MATRIX SPIKE AND LCS NONCOMPLIANCE
X16SS0370001-D	INDENO(1,2,3-CD)PYRENE	2.7	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0370001-D	NAPHTHALENE	23	UG/KG	UL	DE	MATRIX SPIKE AND LCS NONCOMPLIANCE
X16SS0370001-D	PHENANTHRENE	23	UG/KG	UL	D	MATRIX SPIKE NONCOMPLIANCE
X16SS0510001	ANTHRACENE	18	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0510001	BENZO(K)FLUORANTHENE	21	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RUM POINT SKEET RANGE - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X16SS0560001	1-METHYLNAPHTHALENE	5.3	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0560001	ACENAPHTHENE	3.6	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0560001	FLUORENE	9.4	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0620001	1-METHYLNAPHTHALENE	6.3	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0620001	2-METHYLNAPHTHALENE	22	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0620001	ACENAPHTHENE	4.4	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0620001	FLUORENE	11	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0620001	NAPHTHALENE	3.1	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0710001	1-METHYLNAPHTHALENE	2.4	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0710001	2-METHYLNAPHTHALENE	10	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0710001	ANTHRACENE	17	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0730001	FLUORENE	6.2	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0730001	PYRENE	620	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0730001	1-METHYLNAPHTHALENE	4.8	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RUM POINT SKEET RANGE - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X16SS0730001	2-METHYLNAPHTHALENE	17	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0730001	ACENAPHTHENE	2.4	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0730001	BENZO(A)ANTHRACENE	690	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0730001	BENZO(A)PYRENE	820	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0730001	CHRYSENE	870	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0760001	BENZO(K)FLUORANTHENE	200	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0760001	FLUORANTHENE	210	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0760001	FLUORENE	21	UG/KG	J	RP	SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0760001	INDENO(1,2,3-CD)PYRENE	260	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0760001	NAPHTHALENE	7.2	UG/KG	L	RP	SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0760001	1-METHYLNAPHTHALENE	16	UG/KG	L	RP	SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0760001	2-METHYLNAPHTHALENE	68	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS0760001	ACENAPHTHENE	7.7	UG/KG	L	RP	SURROGATE NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0760001	ACENAPHTHYLENE	23	UG/KG	UL	R	SURROGATE NONCOMPLIANCE
X16SS0760001	ANTHRACENE	110	UG/KG	L	R	SURROGATE NONCOMPLIANCE
X16SS081C0001	ANTHRACENE	5.6	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RUM POINT SKEET RANGE - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X16SS081C0001	BENZO(K)FLUORANTHENE	7.7	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS081C0001	DIBENZO(A,H)ANTHRACENE	18	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS081C0001	FLUORANTHENE	13	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS081C0001	INDENO(1,2,3-CD)PYRENE	10	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0080001	2-METHYLNAPHTHALENE	23	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0080001	ACENAPHTHENE	23	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0080001	ANTHRACENE	23	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0080001	BENZO(A)ANTHRACENE	6	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0080001	BENZO(A)PYRENE	7.6	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0080001	BENZO(B)FLUORANTHENE	6	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0080001	BENZO(G,H,I)PERYLENE	4.6	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0080001	CHRYSENE	10	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0080001	FLUORANTHENE	8.9	UG/KG	L	EP	LCS NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0080001	FLUORENE	23	UG/KG	UL	E	LCS NONCOMPLIANCE
X16SS0080001	INDENO(1,2,3-CD)PYRENE	3.4	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY RUM POINT SKEET RANGE - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X16SS0080001	PHENANTHRENE	3.2	UG/KG	L	EP	LCS NONCOMPLIANCE AND UNCERTAINTY NEAR DETECTION LIMIT
X16SS0080001	PYRENE	6.1	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0420001	CHRYSENE	7.7	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0420001	PYRENE	4.6	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0420001	BENZO(A)ANTHRACENE	3.9	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0420001	BENZO(A)PYRENE	5.8	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0420001	BENZO(G,H,I)PERYLENE	3.4	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0460001	PYRENE	3.1	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0460001	BENZO(A)ANTHRACENE	2.6	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0460001	BENZO(B)FLUORANTHENE	3	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0460001	CHRYSENE	4.3	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0460001	FLUORANTHENE	5	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT
X16SS0460001	INDENO(1,2,3-CD)PYRENE	3.1	UG/KG	J	P	UNCERTAINTY NEAR DETECTION LIMIT

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY SMALL ARMS RANGE - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X17SB0020406	ANTIMONY	0.22	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X17SB0020406	TIN	0.92	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SB0030608	ANTIMONY	0.3	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X17SB0030608	TIN	1	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SB0040004	ANTIMONY	2.2	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X17SB0040004	TIN	1.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SB0060406	ANTIMONY	1	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X17SB0060406	ARSENIC	2.4	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SB0060406	TIN	1	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SB0070004	ANTIMONY	0.19	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X17SB0070004	TIN	1.3	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SB0130102	ANTIMONY	0.42	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X17SB0130102	TIN	0.86	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SB0140102	ANTIMONY	0.44	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SB0110102	ANTIMONY	0.52	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X17SB0110102	TIN	1.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS0220001-D	ANTIMONY	0.13	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS0220001-D	COPPER	8	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X17SS0220001-D	TIN	1	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS0160001	ANTIMONY	0.19	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS0160001	LEAD	12.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS0160001	TIN	1.3	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SB0250102	ANTIMONY	0.55	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SB0250102	TIN	1.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS0220001	ANTIMONY	0.13	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS0220001	LEAD	7	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS0220001	TIN	1	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS0250001	ANTIMONY	3.3	MG/KG	B	A	LAB BLANK CONTAMINATION

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY SMALL ARMS RANGE - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X17SS0250001	TIN	0.96	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS0280001	ANTIMONY	0.5	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X17SS0280001	COPPER	8.1	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X17SS0280001	TIN	1.1	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SB0010004	ANTIMONY	0.15	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X17SB0010004	TIN	1.1	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SB0040608	ANTIMONY	0.13	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SB0040608	TIN	0.76	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SB0050004	ANTIMONY	1.7	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X17SB0050004	COPPER	42	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X17SB0050004	TIN	1.6	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SB0050810	ANTIMONY	0.3	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X17SB0050810	ARSENIC	2.3	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SB0050810	TIN	0.99	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS008C0001	TIN	0.92	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS008C0001	ANTIMONY	0.39	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X17SS009C0001	ANTIMONY	0.43	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X17SS009C0001	TIN	1.4	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS010C0001	ANTIMONY	1.3	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X17SS010C0001	TIN	1.3	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS0140001	ANTIMONY	6	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X17SS0140001	TIN	1.5	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS0190001	ANTIMONY	0.26	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE
X17SS0190001	TIN	0.56	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS0240001	TIN	1.2	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS0240001	ANTIMONY	0.15	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS0240001	LEAD	10.3	MG/KG	B	A	LAB BLANK CONTAMINATION
X17SS0270001	ANTIMONY	2.1	MG/KG	L	D	MATRIX SPIKE NONCOMPLIANCE

TABLE 1

QUALIFIED DATA
NAVAL SUPPORT FACILITY SMALL ARMS RANGE - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

SAMPLE NUMBER	PARAMETER	SAMPLE RESULT	UNIT	VALIDATION QUALIFIER	QUALIFICATION CODE	REASON FOR QUALIFICATION
X17SS0270001	COPPER	5.6	MG/KG	K	D	MATRIX SPIKE NONCOMPLIANCE
X17SS0270001	TIN	0.58	MG/KG	B	A	LAB BLANK CONTAMINATION

APPENDIX E

HUMAN HEALTH RISK SCREENING SUPPORTING DOCUMENTATION

TABLE E-1
Human Health Risk-Based Screening Levels in Soil
All Ranges
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Parameter	Residential Direct Contact Risk-Based Screening Levels in Soil (1)			Risk-Based Screening Levels in Soil for Protection of Groundwater (2)		Lowest Risk-Based Screening Level
	Based on 10^{-6} Cancer Risk	Based on Hazard Index of 1	Based on Hazard Index of 0.1	Based on Tap Water RSL	Based on MCL	
Inorganics (mg/kg)						
Antimony		3.1E+01	3.1E+00	6.6E-01	2.7E-01	2.7E-01
Arsenic	3.9E-01	2.2E+01	2.2E+00	1.3E-03	2.9E-01	1.3E-03
Copper		3.1E+03	3.1E+02	5.1E+01	4.6E+01	4.6E+01
Lead		4.0E+02	4.0E+02			4.0E+02
Tin		4.7E+04	4.7E+03	5.5E+03		4.7E+03
Zinc		2.3E+04	2.3E+03	6.8E+02		6.8E+02
PAHs (ug/kg)						
1-Methylnaphthalene	2.2E+04	5.5E+06	5.5E+05	1.5E+01		1.5E+01
2-Methylnaphthalene		3.1E+05	3.1E+04	9.0E+02		9.0E+02
Acenaphthene		3.4E+06	3.4E+05	2.7E+04		2.7E+04
Acenaphthylene		3.4E+06	3.4E+05	2.7E+04		2.7E+04
Anthracene		1.7E+07	1.7E+06	4.5E+05		4.5E+05
Benzo(a)anthracene	1.5E+02			1.4E+01		1.4E+01
Benzo(a)pyrene	1.5E+01			4.6E+00	3.2E+02	4.6E+00
Benzo(b)fluoranthene	1.5E+02			4.7E+01		4.7E+01
Benzo(g,h,i)perylene		1.7E+06	1.7E+05	1.5E+05		1.5E+05
Benzo(k)fluoranthene	1.5E+03			4.6E+02		4.6E+02
Chrysene	1.5E+04			1.4E+03		1.4E+03
Dibenzo(a,h)anthracene	1.5E+01			1.6E+01		1.5E+01
Fluoranthene		2.3E+06	2.3E+05	2.1E+05		2.1E+05
Fluorene		2.3E+06	2.3E+05	3.3E+04		3.3E+04
Indeno(1,2,3-cd)pyrene	1.5E+02			1.6E+02		1.5E+02
Naphthalene	3.9E+03	1.5E+05	1.5E+04	5.6E-01		5.6E-01
Phenanthrene		1.7E+06	1.7E+05	1.5E+05		1.5E+05
Pyrene		1.7E+06	1.7E+05	1.5E+05		1.5E+05
Explosives (mg/kg)						
Nitroglycerin	2.9E+01	6.1E+00	6.1E-01	1.7E-03		1.7E-03

1) Based on Regional Screening Levels (RSLs) for residential direct contact exposures to soil
2) Based on Regional Screening Levels (RSLs) for soil for protection of groundwater

TABLE E-2
Human Health Risk-Based Screening Levels in Sediment Based on Fish Ingestion
All Ranges
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Parameter	Parameter Definition	Units	Value	Reference
Risk Management Parameters				
TRL	Target Risk Level	dimensionless	1E-06	
THI	Target Hazard Index	dimensionless	0.1	
Fish Ingestion Parameters				
IR	Ingestion Rate of fish	kg/meal	0.129	USEPA, August 1997
FI	Fraction ingested from source	unitless	1	Professional Judgement
EF	Exposure Frequency	meals/year	52	Professional Judgement
ED	Exposure Duration	years	30	USEPA, May 1993
BW	Body Weight	kg	70	USEPA, May 1993
AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989
AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA, December 1989
Intake Factor for Fish Ingestion				
IF-can	Intake Factor (Cancer Risks)	kg fish/kg BW-day	1.1E-04	
IF-noncan	Intake Factor (Noncancer Effects)	kg fish/kg BW-day	2.6E-04	
Sediment to Fish Parameters				
flip	Lipid Fraction in Fish	kg-lip/kg-tot	3	Professional Judgement
foc	Organic Carbon Frac. in Sed.	kg-OC/kg-tot	0.10	Calculated from sediment data
fdry	Fish Tiss. Dry to Wet Weight	kg-dry/kg-wet	0.16	Professional Judgement

TABLE E-2
Human Health Risk-Based Screening Levels in Sediment Based on Fish Ingestion
All Ranges
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	CSFo	RfDo	Cfish (Acceptable Fish Conc.)		BSAF	Csed (Acceptable Sediment Conc.)	
			Based on 10^{-6} Cancer Risk	Based on Hazard Index of 0.1		Based on 10^{-6} Cancer Risk	Based on Hazard Index of 0.1
	$(mg/kg/day)^{-1}$	(mg/kg/day)	mg/kg	mg/kg		mg/kg or ug/kg	mg/kg or ug/kg
Inorganics (mg/kg)							
Antimony		0.0004		1.5E-01	1		9.5E-01
Arsenic	1.5	0.0003	5.9E-03	1.1E-01	0.143	2.6E-01	5.0E+00
Copper		0.04		1.5E+01	1.556		6.1E+01
Lead					0.071		
Tin		0.6		2.3E+02	0.1		1.4E+04
Zinc		0.3		1.1E+02	1.936		3.7E+02
PAHs (ug/kg)							
1-Methylnaphthalene	2.9E-02	7.0E-02	3.1E-01	2.7E+01	1	1.0E+01	8.9E+02
2-Methylnaphthalene		0.004		1.5E+00	1		5.1E+01
Acenaphthene		0.06		2.3E+01	0.29		2.6E+03
Acenaphthylene		0.06		2.3E+01	0.29		2.6E+03
Anthracene		0.3		1.1E+02	0.29		1.3E+04
Benzo(a)anthracene	0.73		1.2E-02		0.29	1.4E+00	
Benzo(a)pyrene	7.3		1.2E-03		0.29	1.4E-01	
Benzo(b)fluoranthene	0.73		1.2E-02		0.29	1.4E+00	
Benzo(g,h,i)perylene		0.03		1.1E+01	0.29		1.3E+03
Benzo(k)fluoranthene	0.073		1.2E-01		0.29	1.4E+01	
Chrysene	0.0073		1.2E+00		0.29	1.4E+02	
Dibenzo(a,h)anthracene	7.3		1.2E-03		0.29	1.4E-01	
Fluoranthene		0.04		1.5E+01	0.29		1.8E+03
Fluorene		0.04		1.5E+01	0.29		1.8E+03
Indeno(1,2,3-cd)pyrene	0.73		1.2E-02		0.29	1.4E+00	
Naphthalene		0.02		7.6E+00	0.29		8.8E+02
Phenanthrene		0.03		1.1E+01	0.29		1.3E+03
Pyrene		0.03		1.1E+01	0.29		1.3E+03

TABLE E-3
Human Health Risk-Based Screening Levels in Sediment
All Ranges
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Parameter	Direct Contact Risk-Based Screening Levels in Sediment (1)		Risk-Based Screening Levels in Sediment Based on Fish Ingestion		Lowest Risk-Based Screening Level
	Based on 10^{-6} Cancer Risk	Based on Hazard Index of 0.1	Based on 10^{-6} Cancer Risk	Based on Hazard Index of 0.1	
Inorganics (mg/kg)					
Antimony		3.1E+01		9.5E-01	9.5E-01
Arsenic	3.9E+00	2.2E+01	6.5E+00	1.2E+02	3.9E+00
Copper		3.1E+03		6.1E+01	6.1E+01
Lead		4.0E+02			4.0E+02
Tin		4.7E+04		1.4E+04	1.4E+04
Zinc		2.3E+04		3.7E+02	3.7E+02
PAHs (ug/kg)					
1-Methylnaphthalene	2.2E+05	5.5E+06	1.0E+01	8.9E+02	1.0E+01
2-Methylnaphthalene		3.1E+05		5.1E+01	5.1E+01
Acenaphthene		3.4E+06		2.6E+03	2.6E+03
Acenaphthylene				2.6E+03	2.6E+03
Anthracene		1.7E+07		1.3E+04	1.3E+04
Benzo(a)anthracene	1.5E+03		1.4E+00		1.4E+00
Benzo(a)pyrene	1.5E+02		1.4E-01		1.4E-01
Benzo(b)fluoranthene	1.5E+03		1.4E+00		1.4E+00
Benzo(g,h,i)perylene				1.3E+03	1.3E+03
Benzo(k)fluoranthene	1.5E+04		1.4E+01		1.4E+01
Chrysene	1.5E+05		1.4E+02		1.4E+02
Dibenzo(a,h)anthracene	1.5E+02		1.4E-01		1.4E-01
Fluoranthene		2.3E+06		1.8E+03	1.8E+03
Fluorene		2.3E+06		1.8E+03	1.8E+03
Indeno(1,2,3-cd)pyrene	1.5E+03		1.4E+00		1.4E+00
Naphthalene	3.9E+04	1.5E+05		8.8E+02	8.8E+02
Phenanthrene				1.3E+03	1.3E+03
Pyrene		1.7E+06		1.3E+03	1.3E+03

1) Based on 10 times the residential direct contact risk-based screening levels in soil (except for lead)
The risk-based screening level for lead in sediment is the same as the residential direct contact risk-based screening levels in soil

TABLE E-4
Human Health Risk-Based Concentrations for Direct Contact Exposures to Soil
All Ranges
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Parameter	Residential Direct Contact Risk-Based Concentrations in Soil (1)		Non-residential Direct Contact Risk-Based Concentrations in Soil (2)	
	Based on 10^{-6} Cancer Risk	Based on Hazard Index of 1	Based on 10^{-6} Cancer Risk	Based on Hazard Index of 1
Inorganics (mg/kg)				
Antimony		3.1E+01		4.1E+02
Arsenic	3.9E-01	2.2E+01	1.6E+00	2.6E+02
Copper		3.1E+03		4.1E+04
Tin		4.7E+04		6.1E+05
Zinc		2.3E+04		2.3E+04
PAHs (ug/kg)				
1-Methylnaphthalene	2.2E+04	5.5E+06	9.9E+04	7.2E+07
2-Methylnaphthalene		3.1E+05		4.1E+06
Acenaphthene		3.4E+06		3.3E+07
Acenaphthylene		3.4E+06		3.3E+07
Anthracene		1.7E+07		1.7E+08
Benzo(a)anthracene	1.5E+02		2.1E+03	
Benzo(a)pyrene	1.5E+01		2.1E+02	
Benzo(b)fluoranthene	1.5E+02		2.1E+03	
Benzo(g,h,i)perylene		1.7E+06		1.7E+07
Benzo(k)fluoranthene	1.5E+03		2.1E+04	
Chrysene	1.5E+04		2.1E+05	
Dibenzo(a,h)anthracene	1.5E+01		2.1E+02	
Fluoranthene		2.3E+06		2.2E+07
Fluorene		2.3E+06		2.2E+07
Indeno(1,2,3-cd)pyrene	1.5E+02		2.1E+03	
Naphthalene	3.9E+03	1.5E+05	2.0E+04	6.7E+05
Phenanthrene		1.7E+06		1.7E+07
Pyrene		1.7E+06		1.7E+07
Explosives (mg/kg)				
Nitroglycerin	2.9E+01	6.1E+00	1.0E+02	6.2E+01

1) Based on Regional Screening Levels (RSLs) for residential direct contact exposures to soil
2) Based on RSLs for non-residential direct contact exposures to soil

TABLE E-5
Human Health Risk-Based Concentrations for Soil to Groundwater Pathway
All Ranges
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Risk-Based Concentrations in Soil for Protection of Groundwater Using Tap Water RSL and Different Dilution Attenuation Factors (DAFs)		Risk-Based Screening Levels in Soil for Protection of Groundwater Using MCL and Different Dilution Attenuation Factors (DAFs)	
	DAF = 1	DAF = 20	DAF = 1	DAF = 20
	Value	Value	Value	Value
Inorganics (mg/kg)				
Antimony	6.6E-01	1.3E+01	2.7E-01	5.4E+00
Arsenic	1.3E-03	2.6E-02	2.9E-01	5.8E+00
Copper	5.1E+01	1.0E+03	4.6E+01	9.2E+02
Lead				
Tin	5.5E+03	1.1E+05		
Zinc	6.8E+02	1.4E+04		
PAHs (ug/kg)				
1-Methylnaphthalene	1.5E+01	3.0E+02		
2-Methylnaphthalene	9.0E+02	1.8E+04		
Acenaphthene	2.7E+04	5.4E+05		
Acenaphthylene	2.7E+04	5.4E+05		
Anthracene	4.5E+05	9.0E+06		
Benzo(a)anthracene	1.4E+01	2.8E+02		
Benzo(a)pyrene	4.6E+00	9.2E+01	3.2E+02	6.4E+03
Benzo(b)fluoranthene	4.7E+01	9.4E+02		
Benzo(g,h,i)perylene	1.5E+05	3.0E+06		
Benzo(k)fluoranthene	4.6E+02	9.2E+03		
Chrysene	1.4E+03	2.8E+04		
Dibenzo(a,h)anthracene	1.6E+01	3.2E+02		
Fluoranthene	2.1E+05	4.2E+06		
Fluorene	3.3E+04	6.6E+05		
Indeno(1,2,3-cd)pyrene	1.6E+02	3.2E+03		
Naphthalene	5.6E-01	1.1E+01		
Phenanthrene	1.5E+05	3.0E+06		
Pyrene	1.5E+05	3.0E+06		
Explosives (mg/kg)				
Nitroglycerin	1.7E-03	3.4E-02		

TABLE 4-x1
Identification of Human Health COPCs in Composite Surface Soil Samples
Old Skeet and Trap Range (OSTR) - UXO 14
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Frequency of Detection	Minimum Non-Detect Concentra-tion	Maximum Non-Detect Concentra-tion	Minimum Detected Concentra-tion	Average of All Detected Samples	Maximum Detected Concentra-tion	Sample with Maximum Detected Concentration	Residential Direct Contact Risk-Based Screening Levels in Soil		Risk-Based Screening Levels in Soil for Protection of Groundwater		Lowest Risk-Based Screening Level	Possible Human Health COPC?	Is Chemical Present Above Back-ground?	Human Health COPC?
								Cancer Risk (10^{-6})	Noncancer Hazard Index (0.1)	Tap Water RSL	MCL				
Inorganics (mg/kg)															
Antimony	2/2	NA	NA	0.46	#NAME?	0.68	X15SS077C0001		3.1E+00	**6.6E-01**	**2.7E-01**	**2.7E-01**	Y	Y	Y
Arsenic	2/2	NA	NA	2.6	#NAME?	2.7	X15SS078C0001	**3.9E-01**	**2.2E+00**	**1.3E-03**	**2.9E-01**	**1.3E-03**	Y	n	n
Copper	2/2	NA	NA	14.8	#NAME?	23.3	X15SS077C0001		3.1E+02	5.1E+01	4.6E+01	4.6E+01	n		n
Tin	0/2	1.7	1.8	NA	NA	NA	NA		4.7E+03	5.5E+03		4.7E+03	n		n
Zinc	2/2	NA	NA	52.5	#NAME?	54.4	X15SS078C0001		2.3E+03	6.8E+02		6.8E+02	n		n
Explosives (mg/kg)															
Nitroglycerin	2/2	NA	NA	0.49	#NAME?	3.7	X15SS077C0001	2.9E+01	**6.1E-01**	**1.7E-03**		**1.7E-03**	Y		Y
Lead (mg/kg)															
Lead-Lab	2/2	NA	NA	66.7	#NAME?	77.2	X15SS078C0001		4.0E+02			4.0E+02	n		n
Lead-XRF Field	2/2	NA	NA	67.667	#NAME?	81.333	X15SS078C0001		4.0E+02			4.0E+02			

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 4-x2
Identification of Human Health COPCs in Discrete Surface Soil Samples
Old Skeet and Trap Range (OSTR) - UXO 14
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Frequency of Detection	Minimum Non-Detect Concentration	Maximum Non-Detect Concentration	Minimum Detected Concentration	Average of All Detected Samples	Maximum Detected Concentration	Sample with Maximum Detected Concentration	Residential Direct Contact Risk-Based Screening Levels in Soil		Risk-Based Screening Levels in Soil for Protection of Groundwater		Lowest Risk-Based Screening Level	Possible Human Health COPC?	Is Chemical Present Above Background?	Human Health COPC?
								Cancer Risk (10^{-6})	Noncancer Hazard Index (0.1)	Tap Water RSL	MCL				
Inorganics (mg/kg)															
Antimony	14/14	NA	NA	0.16	#NAME?	4.8	X15SS0640001		**3.1E+00**	**6.6E-01**	**2.7E-01**	**2.7E-01**	Y	Y	Y
Arsenic	14/14	NA	NA	1.6	#NAME?	7.2	X15SS0070001	**3.9E-01**	**2.2E+00**	**1.3E-03**	**2.9E-01**	**1.3E-03**	Y	n	n
Copper	14/14	NA	NA	5.4	#NAME?	37.6	X15SS0680001		3.1E+02	5.1E+01	4.6E+01	4.6E+01	n		n
Tin	0/14	1.2	3.9	NA	NA	NA	NA		4.7E+03	5.5E+03		4.7E+03	n		n
Zinc	14/14	NA	NA	25.1	#NAME?	53.3	X15SS0680001		2.3E+03	6.8E+02		6.8E+02	n		n
PAHs (ug/kg)															
1-Methylnaphthalene	7/18	23	10000	5.4	#NAME?	230	X15SS0520001	2.2E+04	5.5E+05	**1.5E+01**		**1.5E+01**	Y	Y	Y
2-Methylnaphthalene	10/18	24	10000	9.2	#NAME?	230	X15SS0150001		3.1E+04	9.0E+02		9.0E+02	n		n
Acenaphthene	15/18	24	26	4.2	#NAME?	5000	X15SS0380001		3.4E+05	2.7E+04		2.7E+04	n		n
Acenaphthylene	0/18	23	27	NA	NA	NA	NA		3.4E+05	2.7E+04		2.7E+04	n		n
Anthracene	15/18	25	27	1.9	#NAME?	7200	X15SS0380001		1.7E+06	4.5E+05		4.5E+05	n		n
Benzo(a)anthracene	18/18	NA	NA	20	#NAME?	33000	X15SS0530001	**1.5E+02**		**1.4E+01**		**1.4E+01**	Y	Y	Y
Benzo(a)pyrene	18/18	NA	NA	18	#NAME?	42000	X15SS0530001	**1.5E+01**		**4.6E+00**	**3.2E+02**	**4.6E+00**	Y	Y	Y
Benzo(b)fluoranthene	18/18	NA	NA	24	#NAME?	41000	X15SS0530001	**1.5E+02**		**4.7E+01**		**4.7E+01**	Y	Y	Y
Benzo(g,h,i)perylene	18/18	NA	NA	13	#NAME?	25000	X15SS0530001		1.7E+05	1.5E+05		1.5E+05	n		n
Benzo(k)fluoranthene	18/18	NA	NA	11	#NAME?	18000	X15SS0380001	**1.5E+03**		**4.6E+02**		**4.6E+02**	Y	Y	Y
Chrysene	18/18	NA	NA	13	#NAME?	43000	X15SS0530001	**1.5E+04**		**1.4E+03**		**1.4E+03**	Y	Y	Y
Dibenzo(a,h)anthracene	18/18	NA	NA	7.8	#NAME?	7600	X15SS0530001	**1.5E+01**		**1.6E+01**		**1.5E+01**	Y	Y	Y
Fluoranthene	18/18	NA	NA	13	#NAME?	38000	X15SS0380001		2.3E+05	2.1E+05		2.1E+05	n		n
Fluorene	10/18	24	10000	8.3	#NAME?	3100	X15SS0380001		2.3E+05	3.3E+04		3.3E+04	n		n
Indeno(1,2,3-cd)pyrene	18/18	NA	NA	11	#NAME?	27000	X15SS0380001, X15SS0530001	**1.5E+02**		**1.6E+02**		**1.5E+02**	Y	Y	Y
Naphthalene	7/18	23	10000	8.6	#NAME?	330	X15SS0500001	3.9E+03	1.5E+04	**5.6E-01**		**5.6E-01**	Y	Y	Y
Phenanthrene	18/18	NA	NA	5.4	#NAME?	30000	X15SS0380001		1.7E+05	1.5E+05		1.5E+05	n		n
Pyrene	18/18	NA	NA	11	#NAME?	45000	X15SS0380001		1.7E+05	1.5E+05		1.5E+05	n		n
Lead (mg/kg)															
Lead-Lab	14/14	NA	NA	32	#NAME?	940	X15SS0640001		**4.0E+02**			**4.0E+02**	Y	Y	Y
Lead-XRF Field	72/72	NA	NA	20.333	#NAME?	1260.333	X15SS0740001		**4.0E+02**			**4.0E+02**			
Lead-XRF Calc.	72/72	NA	NA	40.047	#NAME?	957.647	X15SS0740001		**4.0E+02**			**4.0E+02**			

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 4-x3
Identification of Human Health COPCs in Discrete Subsurface Soil Samples
Old Skeet and Trap Range (OSTR) - UXO 14
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Frequency of Detection	Minimum Non-Detect Concentra-tion	Maximum Non-Detect Concentra-tion	Minimum Detected Concentra-tion	Average of All Detected Samples	Maximum Detected Concentra-tion	Sample with Maximum Detected Concentration	Residential Direct Contact Risk-Based Screening Levels in Soil		Risk-Based Screening Levels in Soil for Protection of Groundwater		Lowest Risk-Based Screening Level	Possible Human Health COPC?	Is Chemical Present Above Back-ground?	Human Health COPC?
								Cancer Risk (10^{-6})	Noncancer Hazard Index (0.1)	Tap Water RSL	MCL				
Inorganics (mg/kg)															
Antimony	1/1	NA	NA	0.11	#NAME?	0.11	X15SB0050102		3.1E+00	6.6E-01	2.7E-01	2.7E-01	n		n
Arsenic	1/1	NA	NA	4.1	#NAME?	4.1	X15SB0050102	**3.9E-01**	**2.2E+00**	**1.3E-03**	**2.9E-01**	**1.3E-03**	Y	n	n
Copper	1/1	NA	NA	10.1	#NAME?	10.1	X15SB0050102		3.1E+02	5.1E+01	4.6E+01	4.6E+01	n		n
Tin	0/1	1.2	1.2	NA	NA	NA	NA		4.7E+03	5.5E+03		4.7E+03	n		n
Zinc	1/1	NA	NA	37.6	#NAME?	37.6	X15SB0050102		2.3E+03	6.8E+02		6.8E+02	n		n
Lead (mg/kg)															
Lead-Lab	1/1	NA	NA	12.2	#NAME?	12.2	X15SB0050102		4.0E+02			4.0E+02	n		n
Lead-XRF Field	6/6	NA	NA	14.667	#NAME?	85.333	X15SB0070102		4.0E+02			4.0E+02			
Lead-XRF Calc.	6/6	NA	NA	35.853	#NAME?	88.147	X15SB0070102		4.0E+02			4.0E+02			

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 4-x4
Identification of Human Health COPCs in Sediment Samples
Old Skeet and Trap Range (OSTR) - UXO 14
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Frequency of Detection	Minimum Non-Detect Concentration	Maximum Non-Detect Concentration	Minimum Detected Concentration	Average of All Detected Samples	Maximum Detected Concentration	Sample with Maximum Detected Concentration	Risk-Based Screening Levels in Sediment Based on Direct Contact Exposures		Risk-Based Screening Levels in Sediment Based on Fish Ingestion		Lowest Risk-Based Screening Level	Possible Human Health COPC?	Is Chemical Present Above Background?	Human Health COPC?
								Based on 10^{-6} Cancer Risk	Based on Hazard Index of 0.1	Based on 10^{-6} Cancer Risk	Based on Hazard Index of 0.1				
Inorganics (mg/kg)															
Antimony	0/7	0.04	0.28	NA	NA	NA	NA		3.1E+01		9.5E-01	9.5E-01	n		n
Arsenic	7/7	NA	NA	0.36	#NAME?	5.8	X15SD0300006	**3.9E+00**	2.2E+01	**2.6E-01**	**5.0E+00**	**2.6E-01**	Y	Y	Y
Copper	6/7	2.1	2.1	2.4	#NAME?	36.1	X15SD0300006		3.1E+03		6.1E+01	6.1E+01	n		n
Tin	1/7	0.64	1.9	3.4	#NAME?	3.4	X15SD0300006		4.7E+04		1.4E+04	1.4E+04	n		n
Zinc	7/7	NA	NA	8.1	#NAME?	164	X15SD0300006		2.3E+04		3.7E+02	3.7E+02	n		n
PAHs (ug/kg)															
1-Methylnaphthalene	0/3	24	26	NA	NA	NA	NA	2.2E+05	5.5E+06	1.0E+01	8.9E+02	1.0E+01	n		n
2-Methylnaphthalene	0/3	24	26	NA	NA	NA	NA		3.1E+05		5.1E+01	5.1E+01	n		n
Acenaphthene	0/3	24	26	NA	NA	NA	NA		3.4E+06		2.6E+03	2.6E+03	n		n
Acenaphthylene	0/3	24	26	NA	NA	NA	NA				2.6E+03	2.6E+03	n		n
Anthracene	0/3	24	26	NA	NA	NA	NA		1.7E+07		1.3E+04	1.3E+04	n		n
Benzo(a)anthracene	1/3	24	25	2.9	#NAME?	2.9	X15SD0230006	1.5E+03		**1.4E+00**		**1.4E+00**	Y	Y	Y
Benzo(a)pyrene	1/3	24	25	4.6	#NAME?	4.6	X15SD0230006	1.5E+02		**1.4E-01**		**1.4E-01**	Y	Y	Y
Benzo(b)fluoranthene	1/3	24	25	3.4	#NAME?	3.4	X15SD0230006	1.5E+03		**1.4E+00**		**1.4E+00**	Y	Y	Y
Benzo(g,h,i)perylene	1/3	24	25	2.8	#NAME?	2.8	X15SD0230006				1.3E+03	1.3E+03	n		n
Benzo(k)fluoranthene	0/3	24	26	NA	NA	NA	NA	1.5E+04		1.4E+01		1.4E+01	n		n
Chrysene	1/3	3.5	25	5.4	#NAME?	5.4	X15SD0230006	1.5E+05		1.4E+02		1.4E+02	n		n
Dibenzo(a,h)anthracene	0/3	24	26	NA	NA	NA	NA	1.5E+02		1.4E-01		1.4E-01	n		n
Fluoranthene	0/3	24	26	NA	NA	NA	NA		2.3E+06		1.8E+03	1.8E+03	n		n
Fluorene	0/3	24	26	NA	NA	NA	NA		2.3E+06		1.8E+03	1.8E+03	n		n
Indeno(1,2,3-cd)pyrene	1/3	24	25	2.9	#NAME?	2.9	X15SD0230006	1.5E+03		**1.4E+00**		**1.4E+00**	Y	Y	Y
Naphthalene	0/3	24	26	NA	NA	NA	NA	3.9E+04	1.5E+05		8.8E+02	8.8E+02	n		n
Phenanthrene	0/3	24	26	NA	NA	NA	NA				1.3E+03	1.3E+03	n		n
Pyrene	0/3	24	26	NA	NA	NA	NA		1.7E+06		1.3E+03	1.3E+03	n		n
Lead (mg/kg)															
Lead-Lab	6/7	5	5	6.7	#NAME?	37	X15SD0300006		4.0E+02			4.0E+02	n		n
Lead-XRF Field	26/27	0	0	2.667	#NAME?	185	X15SD0030006		4.0E+02			4.0E+02			

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 4-x5
Risks and Hazard Indices for Direct Contact Exposures to Composite Surface Soil Samples
Old Skeet and Trap Range (OSTR) - UXO 14
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Residential Risk/ Hazard Index Screening		Non-residential Direct Contact Risk-Based Concentration in Soil		Non-residential Risk/ Hazard Index Screening	
				Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index	Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index
Inorganics (mg/kg)											
Antimony	#NAME?	0.68	Y		3.1E+01		2.2E-02		4.1E+02		1.7E-03
Explosives (mg/kg)											
Nitroglycerin	#NAME?	3.7	Y	2.9E+01	6.1E+00	1.3E-07	6.1E-01	1.0E+02	6.2E+01	3.7E-08	6.0E-02
Total						1.3E-07	6.3E-01			3.7E-08	6.1E-02

TABLE 4-x6
Risks and Hazard Indices for Direct Contact Exposures to Discrete Surface Soil Samples
Old Skeet and Trap Range (OSTR) - UXO 14
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Residential Risk/ Hazard Index Screening			Non-residential Direct Contact Risk-Based Concentration in Soil		Non-residential Risk/ Hazard Index Screening		
				Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk (Using Max.)	Calculated Cancer Risk (Using Avg.)	Calculated Hazard Index (Using Max.)	Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk (Using Max.)	Calculated Cancer Risk (Using Avg.)	Calculated Hazard Index (Using Max.)
Inorganics (mg/kg)													
Antimony	#NAME?	4.8	Y		3.1E+01			1.5E-01		4.1E+02			1.2E-02
PAHs (ug/kg)													
1-Methylnaphthalene	#NAME?	230	Y	2.2E+04	5.5E+06	1.0E-08	#NAME?	4.2E-05	9.9E+04	7.2E+07	2.3E-09	#NAME?	3.2E-06
Benzo(a)anthracene	#NAME?	33000	Y	1.5E+02		2.2E-04	#NAME?		2.1E+03		1.6E-05	#NAME?	
Benzo(a)pyrene	#NAME?	42000	Y	1.5E+01		2.8E-03	#NAME?		2.1E+02		2.0E-04	#NAME?	
Benzo(b)fluoranthene	#NAME?	41000	Y	1.5E+02		2.7E-04	#NAME?		2.1E+03		2.0E-05	#NAME?	
Benzo(k)fluoranthene	#NAME?	18000	Y	1.5E+03		1.2E-05	#NAME?		2.1E+04		8.6E-07	#NAME?	
Chrysene	#NAME?	43000	Y	1.5E+04		2.9E-06	#NAME?		2.1E+05		2.0E-07	#NAME?	
Dibenzo(a,h)anthracene	#NAME?	7600	Y	1.5E+01		5.1E-04	#NAME?		2.1E+02		3.6E-05	#NAME?	
Indeno(1,2,3-cd)pyrene	#NAME?	27000	Y	1.5E+02		1.8E-04	#NAME?		2.1E+03		1.3E-05	#NAME?	
Naphthalene	#NAME?	330	Y	3.9E+03	1.5E+05	8.5E-08	#NAME?	2.2E-03	2.0E+04	6.7E+05	1.7E-08	#NAME?	4.9E-04
Total						4.0E-03	#NAME?	1.6E-01			2.9E-04	#NAME?	1.2E-02

TABLE 4-x7
Evaluation of Direct Contact Exposures to Lead in Discrete Surface Soil Samples
Old Skeet and Trap Range (OSTR) - UXO 14
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Non-residential Direct Contact Risk-Based Concentration in Soil	
				Value	Max. Exceeds Value?	Value	Max. Exceeds Value?
Lead (mg/kg)							
Lead-Lab	#NAME?	940	Y	4.0E+02	Y	8.0E+02	Y

TABLE 4-x8
Evaluation of Soil to Groundwater Pathway for Composite Surface Soil Samples
Old Skeet and Trap Range (OSTR) - UXO 14
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Risk-Based Concentrations in Soil for Protection of Groundwater Using Tap Water RSL and Different Dilution Attenuation Factors (DAFs)						Risk-Based Screening Levels in Soil for Protection of Groundwater Using MCL and Different Dilution Attenuation Factors (DAFs)					
				DAF = 1			DAF = 20			DAF = 1			DAF = 20		
				Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?
Inorganics (mg/kg)															
Antimony	#NAME?	0.68	Y	6.6E-01	Y	#NAME?	1.3E+01	n	#NAME?	2.7E-01	Y	#NAME?	5.4E+00	n	#NAME?
Explosives (mg/kg)															
Nitroglycerin	#NAME?	3.7	Y	1.7E-03	Y	#NAME?	3.4E-02	Y	#NAME?						

TABLE 4-x9
Evaluation of Soil to Groundwater Pathway for Discrete Surface Soil Samples
Old Skeet and Trap Range (OSTR) - UXO 14
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Risk-Based Concentrations in Soil for Protection of Groundwater Using Tap Water RSL and Different Dilution Attenuation Factors (DAFs)						Risk-Based Screening Levels in Soil for Protection of Groundwater Using MCL and Different Dilution Attenuation Factors (DAFs)					
				DAF = 1			DAF = 20			DAF = 1			DAF = 20		
				Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?
Inorganics (mg/kg)															
Antimony	#NAME?	4.8	Y	6.6E-01	Y	#NAME?	1.3E+01	n	#NAME?	2.7E-01	Y	#NAME?	5.4E+00	n	#NAME?
PAHs (ug/kg)															
1-Methylnaphthalene	#NAME?	230	Y	1.5E+01	Y	#NAME?	3.0E+02	n	#NAME?						
Benzo(a)anthracene	#NAME?	33000	Y	1.4E+01	Y	#NAME?	2.8E+02	Y	#NAME?						
Benzo(a)pyrene	#NAME?	42000	Y	4.6E+00	Y	#NAME?	9.2E+01	Y	#NAME?	3.2E+02	Y	#NAME?	6.4E+03	Y	#NAME?
Benzo(b)fluoranthene	#NAME?	41000	Y	4.7E+01	Y	#NAME?	9.4E+02	Y	#NAME?						
Benzo(k)fluoranthene	#NAME?	18000	Y	4.6E+02	Y	#NAME?	9.2E+03	Y	#NAME?						
Chrysene	#NAME?	43000	Y	1.4E+03	Y	#NAME?	2.8E+04	Y	#NAME?						
Dibenzo(a,h)anthracene	#NAME?	7600	Y	1.6E+01	Y	#NAME?	3.2E+02	Y	#NAME?						
Indeno(1,2,3-cd)pyrene	#NAME?	27000	Y	1.6E+02	Y	#NAME?	3.2E+03	Y	#NAME?						
Naphthalene	#NAME?	330	Y	5.6E-01	Y	#NAME?	1.1E+01	Y	#NAME?						
Lead (mg/kg)															
Lead-Lab	#NAME?	940	Y												

TABLE 4-x10
Risks and Hazard Indices for Direct Contact Exposures to Sediment
Old Skeet and Trap Range (OSTR) - UXO 14
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Risk-Based Screening Levels in Sediment Based on Direct Contact Exposures		Risk/ Hazard Index Screening	
				Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 0.1	Calculated Cancer Risk	Calculated Hazard Index
Inorganics (mg/kg)							
Arsenic	#NAME?	5.8	Y	3.9E+00	2.2E+01	1.5E-06	2.6E-02
PAHs (ug/kg)							
Benzo(a)anthracene	#NAME?	2.9	Y	1.5E+03		1.9E-09	
Benzo(a)pyrene	#NAME?	4.6	Y	1.5E+02		3.1E-08	
Benzo(b)fluoranthene	#NAME?	3.4	Y	1.5E+03		2.3E-09	
Indeno(1,2,3-cd)pyrene	#NAME?	2.9	Y	1.5E+03		1.9E-09	
Total						1.5E-06	2.6E-02

TABLE 4-x11
Risks and Hazard Indices for Fish Ingestion Exposure Following Uptake Into Fish from Sediment
Old Skeet and Trap Range (OSTR) - UXO 14
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Risk-Based Screening Levels in Sediment Based on Fish Ingestion		Risk/ Hazard Index Screening	
				Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 0.1	Calculated Cancer Risk	Calculated Hazard Index
Inorganics (mg/kg)							
Arsenic	#NAME?	5.8	Y	2.6E-01	5.0E+00	2.2E-05	1.2E-01
PAHs (ug/kg)							
Benzo(a)anthracene	#NAME?	2.9	Y	1.4E+00		2.1E-06	
Benzo(a)pyrene	#NAME?	4.6	Y	1.4E-01		3.3E-05	
Benzo(b)fluoranthene	#NAME?	3.4	Y	1.4E+00		2.4E-06	
Indeno(1,2,3-cd)pyrene	#NAME?	2.9	Y	1.4E+00		2.1E-06	
Total						6.2E-05	1.2E-01

Footnotes:
NA - Not applicable, statistic could not be calculated.

TABLE 5-x1
Identification of Human Health COPCs in Composite Surface Soil Samples from Firing Line
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Frequency of Detection	Minimum Non-Detect Concentra-tion	Maximum Non-Detect Concentra-tion	Minimum Detected Concentra-tion	Average of All Detected Samples	Maximum Detected Concentra-tion	Sample with Maximum Detected Concentration	Residential Direct Contact Risk-Based Screening Levels in Soil		Risk-Based Screening Levels in Soil for Protection of Groundwater		Lowest Risk-Based Screening Level	Possible Human Health COPC?	Is Chemical Present Above Back-ground?	Human Health COPC?
								Cancer Risk (10^{-6})	Noncancer Hazard Index (0.1)	Tap Water RSL	MCL				
Inorganics (mg/kg)															
Antimony	9/9	NA	NA	0.13	#NAME?	1.4	X14SS004C0001		3.1E+00	**6.6E-01**	**2.7E-01**	**2.7E-01**	Y	Y	Y
Arsenic	9/9	NA	NA	1.6	#NAME?	3.3	X14SS004C0001	**3.9E-01**	**2.2E+00**	**1.3E-03**	**2.9E-01**	**1.3E-03**	Y	n	n
Copper	9/9	NA	NA	8	#NAME?	52.4	X14SS008C0001		3.1E+02	**5.1E+01**	**4.6E+01**	**4.6E+01**	Y	Y	Y
Tin	0/9	1	3.2	NA	NA	NA	NA		4.7E+03	5.5E+03		4.7E+03	n		n
Zinc	9/9	NA	NA	25.1	#NAME?	66.5	X14SS004C0001		2.3E+03	6.8E+02		6.8E+02	n		n
Explosives (mg/kg)															
Nitroglycerin	1/9	1.2	1.2	0.8	#NAME?	0.8	X14SS009C0001	2.9E+01	**6.1E-01**	**1.7E-03**		**1.7E-03**	Y		Y
Lead (mg/kg)															
Lead-Lab	9/9	NA	NA	12	#NAME?	52.5	X14SS004C0001		4.0E+02			4.0E+02	n		n
Lead-XRF Field	9/9	NA	NA	15.667	#NAME?	82.333	X14SS004C0001		4.0E+02			4.0E+02			

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 5-x2
Identification of Human Health COPCs in Discrete Surface Soil Samples from Target Berm 1
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Frequency of Detection	Minimum Non-Detect Concentra-tion	Maximum Non-Detect Concentra-tion	Minimum Detected Concentra-tion	Average of All Detected Samples	Maximum Detected Concentra-tion	Sample with Maximum Detected Concentration	Residential Direct Contact Risk-Based Screening Levels in Soil		Risk-Based Screening Levels in Soil for Protection of Groundwater		Lowest Risk-Based Screening Level	Possible Human Health COPC?	Is Chemical Present Above Back-ground?	Human Health COPC?
								Cancer Risk (10^{-6})	Noncancer Hazard Index (0.1)	Tap Water RSL	MCL				
Inorganics (mg/kg)															
Antimony	5/5	NA	NA	0.1	#NAME?	0.16	X14SS0390001		3.1E+00	6.6E-01	2.7E-01	2.7E-01	n		n
Arsenic	5/5	NA	NA	1.3	#NAME?	4.2	X14SS0220001	**3.9E-01**	**2.2E+00**	**1.3E-03**	**2.9E-01**	**1.3E-03**	Y	n	n
Copper	5/5	NA	NA	9.2	#NAME?	107	X14SS0350001		3.1E+02	**5.1E+01**	**4.6E+01**	**4.6E+01**	Y	Y	Y
Tin	2/5	1.8	2.9	4.1	#NAME?	9.1	X14SS0350001		4.7E+03	5.5E+03		4.7E+03	n		n
Zinc	5/5	NA	NA	18.6	#NAME?	33.3	X14SS0350001		2.3E+03	6.8E+02		6.8E+02	n		n
Lead (mg/kg)															
Lead-Lab	5/5	NA	NA	9.6	#NAME?	543	X14SS0350001		**4.0E+02**			**4.0E+02**	Y	Y	Y
Lead-XRF Field	35/35	NA	NA	11.667	#NAME?	540.333	X14SS0350001		**4.0E+02**			**4.0E+02**			
Lead-XRF Calc.	35/35	NA	NA	29.383	#NAME?	468.177	X14SS0350001		**4.0E+02**			**4.0E+02**			

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 5-x3
Identification of Human Health COPCs in Discrete Surface Soil Samples from Target Berm 2
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Frequency of Detection	Minimum Non-Detect Concentra-tion	Maximum Non-Detect Concentra-tion	Minimum Detected Concentra-tion	Average of All Detected Samples	Maximum Detected Concentra-tion	Sample with Maximum Detected Concentration	Residential Direct Contact Risk-Based Screening Levels in Soil		Risk-Based Screening Levels in Soil for Protection of Groundwater		Lowest Risk-Based Screening Level	Possible Human Health COPC?	Is Chemical Present Above Back-ground?	Human Health COPC?
								Cancer Risk (10^{-6})	Noncancer Hazard Index (0.1)	Tap Water RSL	MCL				
Inorganics (mg/kg)															
Antimony	4/5	0.11	0.11	0.13	#NAME?	0.17	X14SS0620001		3.1E+00	6.6E-01	2.7E-01	2.7E-01	n		n
Arsenic	5/5	NA	NA	1.6	#NAME?	3.3	X14SS0720001	**3.9E-01**	**2.2E+00**	**1.3E-03**	**2.9E-01**	**1.3E-03**	Y	n	n
Copper	5/5	NA	NA	14.6	#NAME?	88.6	X14SS0580001		3.1E+02	**5.1E+01**	**4.6E+01**	**4.6E+01**	Y	Y	Y
Tin	1/5	2	3	10.1	#NAME?	10.1	X14SS0580001		4.7E+03	5.5E+03		4.7E+03	n		n
Zinc	5/5	NA	NA	18.2	#NAME?	35.2	X14SS0620001		2.3E+03	6.8E+02		6.8E+02	n		n
Lead (mg/kg)															
Lead-Lab	5/5	NA	NA	85.7	#NAME?	606	X14SS0580001		**4.0E+02**			**4.0E+02**	Y	Y	Y
Lead-XRF Field	35/35	NA	NA	21.333	#NAME?	783.667	X14SS0660001		**4.0E+02**			**4.0E+02**			
Lead-XRF Calc.	35/35	NA	NA	37.407	#NAME?	670.143	X14SS0660001		**4.0E+02**			**4.0E+02**			

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 5-x4
Identification of Human Health COPCs in Discrete Surface Soil Samples from Hillside Impact Area
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Frequency of Detection	Minimum Non-Detect Concentra-tion	Maximum Non-Detect Concentra-tion	Minimum Detected Concentra-tion	Average of All Detected Samples	Maximum Detected Concentra-tion	Sample with Maximum Detected Concentration	Residential Direct Contact Risk-Based Screening Levels in Soil		Risk-Based Screening Levels in Soil for Protection of Groundwater		Lowest Risk-Based Screening Level	Possible Human Health COPC?	Is Chemical Present Above Back-ground?	Human Health COPC?
								Cancer Risk (10^{-6})	Noncancer Hazard Index (0.1)	Tap Water RSL	MCL				
Inorganics (mg/kg)															
Antimony	5/17	0.02	0.32	0.12	#NAME?	0.32	X14SS1340001		3.1E+00	6.6E-01	**2.7E-01**	**2.7E-01**	Y	n	n
Arsenic	16/17	1.6	1.6	1.1	#NAME?	7.3	X14SS1340001	**3.9E-01**	**2.2E+00**	**1.3E-03**	**2.9E-01**	**1.3E-03**	Y	n	n
Copper	17/17	NA	NA	8.6	#NAME?	276	X14SS1200001		3.1E+02	**5.1E+01**	**4.6E+01**	**4.6E+01**	Y	Y	Y
Tin	11/17	0.49	1.7	1.6	#NAME?	81.8	X14SS1400001		4.7E+03	5.5E+03		4.7E+03	n		n
Zinc	17/17	NA	NA	7	#NAME?	60.3	X14SS1320001		2.3E+03	6.8E+02		6.8E+02	n		n
Lead (mg/kg)															
Lead-Lab	16/17	11	11	17.9	#NAME?	904	X14SS1340001		**4.0E+02**			**4.0E+02**	Y	Y	Y
Lead-XRF Field	64/64	NA	NA	19.333	#NAME?	19878	X14SS1020001		**4.0E+02**			**4.0E+02**			
Lead-XRF Calc.	44/44	NA	NA	35.747	#NAME?	2363.343	X14SS1280001		**4.0E+02**			**4.0E+02**			

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 5-x5
Identification of Human Health COPCs in Discrete Subsurface Soil Samples from Hillside Impact Area
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Frequency of Detection	Minimum Non-Detect Concentra-tion	Maximum Non-Detect Concentra-tion	Minimum Detected Concentra-tion	Average of All Detected Samples	Maximum Detected Concentra-tion	Sample with Maximum Detected Concentration	Residential Direct Contact Risk-Based Screening Levels in Soil		Risk-Based Screening Levels in Soil for Protection of Groundwater		Lowest Risk-Based Screening Level	Possible Human Health COPC?	Is Chemical Present Above Back-ground?	Human Health COPC?
								Cancer Risk (10^{-6})	Noncancer Hazard Index (0.1)	Tap Water RSL	MCL				
Inorganics (mg/kg)															
Antimony	0/3	0.18	0.88	NA	NA	NA	NA		3.1E+00	6.6E-01	2.7E-01	2.7E-01	n		n
Arsenic	3/3	NA	NA	2.2	#NAME?	7.8	X14SB0840102	**3.9E-01**	**2.2E+00**	**1.3E-03**	**2.9E-01**	**1.3E-03**	Y	n	n
Copper	3/3	NA	NA	113	#NAME?	849	X14SB0840102		**3.1E+02**	**5.1E+01**	**4.6E+01**	**4.6E+01**	Y	Y	Y
Tin	3/3	NA	NA	29.3	#NAME?	139	X14SB1110102		4.7E+03	5.5E+03		4.7E+03	n		n
Zinc	3/3	NA	NA	9.8	#NAME?	53.9	X14SB0840102		2.3E+03	6.8E+02		6.8E+02	n		n
Lead (mg/kg)															
Lead-Lab	3/3	NA	NA	1220	#NAME?	6620	X14SB0840102		**4.0E+02**			**4.0E+02**	Y	Y	Y
Lead-XRF Field	4/4	NA	NA	357.667	#NAME?	8931	X14SB1020102		**4.0E+02**			**4.0E+02**			
Lead-XRF Calc.	1/1	NA	NA	316.563	#NAME?	316.563	X14SB0840102, X14SB0840102-D		4.0E+02			4.0E+02			

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated.

TABLE 5-x6
Risks and Hazard Indices for Direct Contact Exposures to Composite Surface Soil Samples from Firing Lines
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Residential Risk/ Hazard Index Screening		Non-residential Direct Contact Risk-Based Concentration in Soil		Non-residential Risk/ Hazard Index Screening	
				Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index	Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index
Inorganics (mg/kg)											
Antimony	#NAME?	1.4	Y		3.1E+01		4.5E-02		4.1E+02		3.4E-03
Copper	#NAME?	52.4	Y		3.1E+03		1.7E-02		4.1E+04		1.3E-03
Explosives (mg/kg)											
Nitroglycerin	#NAME?	0.8	Y	2.9E+01	6.1E+00	2.8E-08	1.3E-01	1.0E+02	6.2E+01	8.0E-09	1.3E-02
Total						2.8E-08	1.9E-01			8.0E-09	1.8E-02

Footnotes:
NA - Not applicable, statistic could not be calculated.

TABLE 5-x7
Risks and Hazard Indices for Direct Contact Exposures to Discrete Surface Soil Samples from Target Berm 1
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Residential Risk/ Hazard Index Screening		Non-residential Direct Contact Risk-Based Concentration in Soil		Non-residential Risk/ Hazard Index Screening	
				Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index	Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index
Inorganics (mg/kg)											
Copper	#NAME?	107	Y		3.1E+03		3.5E-02		4.1E+04		2.6E-03
Total						0.0E+00	3.5E-02			0.0E+00	2.6E-03

Footnotes:
NA - Not applicable, statistic could not be calculated.

TABLE 5-x8
Evaluation of Direct Contact Exposures to Lead in Discrete Surface Soil Samples from Target Berm 1
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Non-residential Direct Contact Risk-Based Concentration in Soil	
				Value	Max. Exceeds Value?	Value	Max. Exceeds Value?
Lead (mg/kg)							
Lead-Lab	#NAME?	543	Y	4.0E+02	Y	8.0E+02	n

TABLE 5-x9
Risks and Hazard Indices for Direct Contact Exposures to Discrete Surface Soil Samples from Target Berm 2
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Residential Risk/ Hazard Index Screening		Non-residential Direct Contact Risk-Based Concentration in Soil		Non-residential Risk/ Hazard Index Screening	
				Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index	Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index
Inorganics (mg/kg)											
Copper	#NAME?	88.6	Y		3.1E+03		2.9E-02		4.1E+04		2.2E-03
Total						0.0E+00	2.9E-02			0.0E+00	2.2E-03

Footnotes:
NA - Not applicable, statistic could not be calculated.

TABLE 5-x10
Evaluation of Direct Contact Exposures to Lead in Discrete Surface Soil Samples from Target Berm 2
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Non-residential Direct Contact Risk-Based Concentration in Soil	
				Value	Max. Exceeds Value?	Value	Max. Exceeds Value?
Lead (mg/kg)							
Lead-Lab	#NAME?	606	Y	4.0E+02	Y	8.0E+02	n

TABLE 5-x11
Risks and Hazard Indices for Direct Contact Exposures to Discrete Surface Soil Samples from Hillside Impact Area
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Residential Risk/ Hazard Index Screening		Non-residential Direct Contact Risk-Based Concentration in Soil		Non-residential Risk/ Hazard Index Screening	
				Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index	Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index
Inorganics (mg/kg)											
Copper	#NAME?	276	Y		3.1E+03		8.9E-02		4.1E+04		6.7E-03
Total						0.0E+00	8.9E-02			0.0E+00	6.7E-03

Footnotes:
NA - Not applicable, statistic could not be calculated.

TABLE 5-x12
Evaluation of Direct Contact Exposures to Lead in Discrete Surface Soil Samples from Hillside Impact Area
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Non-residential Direct Contact Risk-Based Concentration in Soil	
				Value	Max. Exceeds Value?	Value	Max. Exceeds Value?
Lead (mg/kg)							
Lead-Lab	#NAME?	904	Y	4.0E+02	Y	8.0E+02	Y

TABLE 5-x13
Risks and Hazard Indices for Direct Contact Exposures to Discrete Subsurface Soil Samples from Hillside Impact Area
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Residential Risk/ Hazard Index Screening		Non-residential Direct Contact Risk-Based Concentration in Soil		Non-residential Risk/ Hazard Index Screening	
				Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index	Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index
Inorganics (mg/kg)											
Copper	#NAME?	849	Y		3.1E+03		2.7E-01		4.1E+04		2.1E-02
Total						0.0E+00	2.7E-01			0.0E+00	2.1E-02

Footnotes:
NA - Not applicable, statistic could not be calculated.

TABLE 5-x14
Evaluation of Direct Contact Exposures to Lead in Discrete Subsurface Soil Samples from Hillside Impact Area
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Non-residential Direct Contact Risk-Based Concentration in Soil	
				Value	Max. Exceeds Value?	Value	Max. Exceeds Value?
Lead (mg/kg)							
Lead-Lab	#NAME?	6620	Y	4.0E+02	Y	8.0E+02	Y

TABLE 5-x15
Evaluation of Soil to Groundwater Pathway for Composite Surface Soil Samples from Firing Lines
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Risk-Based Concentrations in Soil for Protection of Groundwater Using Tap Water RSL and Different Dilution Attenuation Factors (DAFs)						Risk-Based Screening Levels in Soil for Protection of Groundwater Using MCL and Different Dilution Attenuation Factors (DAFs)					
				DAF = 1			DAF = 20			DAF = 1			DAF = 20		
				Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?
Inorganics (mg/kg)															
Antimony	#NAME?	1.4	Y	6.6E-01	Y	#NAME?	1.3E+01	n	#NAME?	2.7E-01	Y	#NAME?	5.4E+00	n	#NAME?
Copper	#NAME?	52.4	Y	5.1E+01	Y	#NAME?	1.0E+03	n	#NAME?	4.6E+01	Y	#NAME?	9.2E+02	n	#NAME?
Explosives (mg/kg)															
Nitroglycerin	#NAME?	0.8	Y	1.7E-03	Y	#NAME?	3.4E-02	Y	#NAME?						

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 5-x16
Evaluation of Soil to Groundwater Pathway for Discrete Surface Soil Samples from Target Berm 1
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Risk-Based Concentrations in Soil for Protection of Groundwater Using Tap Water RSL and Different Dilution Attenuation Factors (DAFs)						Risk-Based Screening Levels in Soil for Protection of Groundwater Using MCL and Different Dilution Attenuation Factors (DAFs)					
				DAF = 1			DAF = 20			DAF = 1			DAF = 20		
				Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?
Inorganics (mg/kg)															
Copper	#NAME?	107	Y	5.1E+01	Y	#NAME?	1.0E+03	n	#NAME?	4.6E+01	Y	#NAME?	9.2E+02	n	#NAME?
Lead (mg/kg)															
Lead-Lab	#NAME?	543	Y												

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 5-x17
Evaluation of Soil to Groundwater Pathway for Discrete Surface Soil Samples from Target Berm 2
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Risk-Based Concentrations in Soil for Protection of Groundwater Using Tap Water RSL and Different Dilution Attenuation Factors (DAFs)						Risk-Based Screening Levels in Soil for Protection of Groundwater Using MCL and Different Dilution Attenuation Factors (DAFs)					
				DAF = 1			DAF = 20			DAF = 1			DAF = 20		
				Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?
Inorganics (mg/kg)															
Copper	#NAME?	88.6	Y	5.1E+01	Y	#NAME?	1.0E+03	n	#NAME?	4.6E+01	Y	#NAME?	9.2E+02	n	#NAME?
Lead (mg/kg)															
Lead-Lab	#NAME?	606	Y												

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 5-x18
Evaluation of Soil to Groundwater Pathway for Discrete Surface Soil Samples from Hillside Impact Area
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Risk-Based Concentrations in Soil for Protection of Groundwater Using Tap Water RSL and Different Dilution Attenuation Factors (DAFs)						Risk-Based Screening Levels in Soil for Protection of Groundwater Using MCL and Different Dilution Attenuation Factors (DAFs)					
				DAF = 1			DAF = 20			DAF = 1			DAF = 20		
				Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?
Inorganics (mg/kg)															
Copper	#NAME?	276	Y	5.1E+01	Y	#NAME?	1.0E+03	n	#NAME?	4.6E+01	Y	#NAME?	9.2E+02	n	#NAME?
Lead (mg/kg)															
Lead-Lab	#NAME?	904	Y												

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 5-x19
Evaluation of Soil to Groundwater Pathway for Discrete Subsurface Soil Samples from Hillside Impact Area
Marine Rifle Range (MRR) - UXO 15
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Risk-Based Concentrations in Soil for Protection of Groundwater Using Tap Water RSL and Different Dilution Attenuation Factors (DAFs)						Risk-Based Screening Levels in Soil for Protection of Groundwater Using MCL and Different Dilution Attenuation Factors (DAFs)					
				DAF = 1			DAF = 20			DAF = 1			DAF = 20		
				Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?
Inorganics (mg/kg)															
Copper	#NAME?	849	Y	5.1E+01	Y	#NAME?	1.0E+03	n	#NAME?	4.6E+01	Y	#NAME?	9.2E+02	n	#NAME?
Lead (mg/kg)															
Lead-Lab	#NAME?	6620	Y												

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 6-x1
Identification of Human Health COPCs in Composite Surface Soil Samples
Small Arms (Pistol) Range (SAR) - UXO 17
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Frequency of Detection	Minimum Non-Detect Concentra-tion	Maximum Non-Detect Concentra-tion	Minimum Detected Concentra-tion	Average of All Detected Samples	Maximum Detected Concentra-tion	Sample with Maximum Detected Concentration	Residential Direct Contact Risk-Based Screening Levels in Soil		Risk-Based Screening Levels in Soil for Protection of Groundwater		Lowest Risk-Based Screening Level	Possible Human Health COPC?	Is Chemical Present Above Back-ground?	Human Health COPC?
								Cancer Risk (10^{-6})	Noncancer Hazard Index (0.1)	Tap Water RSL	MCL				
Inorganics (mg/kg)															
Antimony	3/3	NA	NA	0.39	#NAME?	1.3	X17SS010C0001		3.1E+00	**6.6E-01**	**2.7E-01**	**2.7E-01**	Y	n	n
Arsenic	3/3	NA	NA	4.4	#NAME?	6.2	X17SS010C0001	**3.9E-01**	**2.2E+00**	**1.3E-03**	**2.9E-01**	**1.3E-03**	Y	n	n
Copper	3/3	NA	NA	11.2	#NAME?	24	X17SS010C0001		3.1E+02	5.1E+01	4.6E+01	4.6E+01	n		n
Tin	0/3	0.92	1.4	NA	NA	NA	NA		4.7E+03	5.5E+03		4.7E+03	n		n
Zinc	3/3	NA	NA	19	#NAME?	35.2	X17SS010C0001		2.3E+03	6.8E+02		6.8E+02	n		n
Explosives (mg/kg)															
Nitroglycerin	3/3	NA	NA	9.8	#NAME?	20.4	X17SS008C0001	2.9E+01	**6.1E-01**	**1.7E-03**		**1.7E-03**	Y		Y
Lead (mg/kg)															
Lead-Lab	3/3	NA	NA	21	#NAME?	200	X17SS010C0001		4.0E+02			4.0E+02	n		n
Lead-XRF Field	3/3	NA	NA	73.333	#NAME?	156.333	X17SS010C0001		4.0E+02			4.0E+02			

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 6-x2
Identification of Human Health COPCs in Discrete Surface Soil Samples
Small Arms (Pistol) Range (SAR) - UXO 17
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Frequency of Detection	Minimum Non-Detect Concentra-tion	Maximum Non-Detect Concentra-tion	Minimum Detected Concentra-tion	Average of All Detected Samples	Maximum Detected Concentra-tion	Sample with Maximum Detected Concentration	Residential Direct Contact Risk-Based Screening Levels in Soil		Risk-Based Screening Levels in Soil for Protection of Groundwater		Lowest Risk-Based Screening Level	Possible Human Health COPC?	Is Chemical Present Above Back-ground?	Human Health COPC?
								Cancer Risk (10^{-6})	Noncancer Hazard Index (0.1)	Tap Water RSL	MCL				
Inorganics (mg/kg)															
Antimony	8/12	0.13	3.3	0.15	#NAME?	6	X17SS0140001		**3.1E+00**	**6.6E-01**	**2.7E-01**	**2.7E-01**	Y	Y	Y
Arsenic	12/12	NA	NA	3.5	#NAME?	8.7	X17SS0140001	**3.9E-01**	**2.2E+00**	**1.3E-03**	**2.9E-01**	**1.3E-03**	Y	Y	Y
Copper	12/12	NA	NA	5.6	#NAME?	42	X17SB0050004		3.1E+02	5.1E+01	4.6E+01	4.6E+01	n		n
Tin	0/12	0.56	1.6	NA	NA	NA	NA		4.7E+03	5.5E+03		4.7E+03	n		n
Zinc	12/12	NA	NA	10	#NAME?	33.2	X17SB0040004		2.3E+03	6.8E+02		6.8E+02	n		n
Lead (mg/kg)															
Lead-Lab	10/12	7	12.2	7.2	#NAME?	706	X17SS0140001		**4.0E+02**			**4.0E+02**	Y	Y	Y
Lead-XRF Field	25/26	0	0	3.667	#NAME?	3247	X17SS0130001		**4.0E+02**			**4.0E+02**			

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 6-x3
Identification of Human Health COPCs in Discrete Subsurface Soil Samples
Small Arms (Pistol) Range (SAR) - UXO 17
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Frequency of Detection	Minimum Non-Detect Concentra-tion	Maximum Non-Detect Concentra-tion	Minimum Detected Concentra-tion	Average of All Detected Samples	Maximum Detected Concentra-tion	Sample with Maximum Detected Concentration	Residential Direct Contact Risk-Based Screening Levels in Soil		Risk-Based Screening Levels in Soil for Protection of Groundwater		Lowest Risk-Based Screening Level	Possible Human Health COPC?	Is Chemical Present Above Back-ground?	Human Health COPC?
								Cancer Risk (10^{-6})	Noncancer Hazard Index (0.1)	Tap Water RSL	MCL				
Inorganics (mg/kg)															
Antimony	6/9	0.13	0.55	0.22	#NAME?	1	X17SB0060406		3.1E+00	**6.6E-01**	**2.7E-01**	**2.7E-01**	Y	n	n
Arsenic	7/9	2.3	2.4	3.7	#NAME?	7.8	X17SB0020406	**3.9E-01**	**2.2E+00**	**1.3E-03**	**2.9E-01**	**1.3E-03**	Y	n	n
Copper	9/9	NA	NA	5.3	#NAME?	11.8	X17SB0140102		3.1E+02	5.1E+01	4.6E+01	4.6E+01	n		n
Tin	1/9	0.76	1.2	1.5	#NAME?	1.5	X17SB0140102		4.7E+03	5.5E+03		4.7E+03	n		n
Zinc	9/9	NA	NA	13.1	#NAME?	25.4	X17SB0140102		2.3E+03	6.8E+02		6.8E+02	n		n
Lead (mg/kg)															
Lead-Lab	9/9	NA	NA	8.1	#NAME?	132	X17SB0060406		4.0E+02			4.0E+02	n		n
Lead-XRF Field	20/24	0	0	4.667	#NAME?	371.333	X17SB0040406		4.0E+02			4.0E+02			

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 6-x4
Risks and Hazard Indices for Direct Contact Exposures to Composite Surface Soil Samples
Small Arms (Pistol) Range (SAR) - UXO 17
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Residential Risk/ Hazard Index Screening		Non-residential Direct Contact Risk-Based Concentration in Soil		Non-residential Risk/ Hazard Index Screening	
				Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index	Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index
Explosives (mg/kg)											
Nitroglycerin	#NAME?	20.4	Y	2.9E+01	6.1E+00	7.0E-07	3.3E+00	1.0E+02	6.2E+01	2.0E-07	3.3E-01
Total						7.0E-07	3.3E+00			2.0E-07	3.3E-01

Footnotes:
NA - Not applicable, statistic could not be calculated.

TABLE 6-x5
Risks and Hazard Indices for Direct Contact Exposures to Discrete Surface Soil Samples
Small Arms (Pistol) Range (SAR) - UXO 17
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Residential Risk/ Hazard Index Screening		Non-residential Direct Contact Risk-Based Concentration in Soil		Non-residential Risk/ Hazard Index Screening	
				Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index	Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index
Inorganics (mg/kg)											
Antimony	#NAME?	6	Y		3.1E+01		1.9E-01		4.1E+02		1.5E-02
Arsenic	#NAME?	8.7	Y	3.9E-01	2.2E+01	2.2E-05	4.0E-01	1.6E+00	2.6E+02	5.4E-06	3.3E-02
Total						2.2E-05	5.9E-01			5.4E-06	4.8E-02

Footnotes:
NA - Not applicable, statistic could not be calculated.

TABLE 6-x6
Evaluation of Direct Contact Exposures to Lead in Discrete Surface Soil Samples
Small Arms (Pistol) Range (SAR) - UXO 17
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Non-residential Direct Contact Risk-Based Concentration in Soil	
				Value	Max. Exceeds Value?	Value	Max. Exceeds Value?
Lead (mg/kg)							
Lead-Lab	#NAME?	706	Y	4.0E+02	Y	8.0E+02	n

TABLE 6-x7
Evaluation of Soil to Groundwater Pathway for Composite Surface Soil Samples
Small Arms (Pistol) Range (SAR) - UXO 17
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Risk-Based Concentrations in Soil for Protection of Groundwater Using Tap Water RSL and Different Dilution Attenuation Factors (DAFs)						Risk-Based Screening Levels in Soil for Protection of Groundwater Using MCL and Different Dilution Attenuation Factors (DAFs)					
				DAF = 1			DAF = 20			DAF = 1			DAF = 20		
				Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?
Explosives (mg/kg)															
Nitroglycerin	#NAME?	20.4	Y	1.7E-03	Y	#NAME?	3.4E-02	Y	#NAME?						

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 6-x8
Evaluation of Soil to Groundwater Pathway for Discrete Surface Soil Samples
Small Arms (Pistol) Range (SAR) - UXO 17
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Risk-Based Concentrations in Soil for Protection of Groundwater Using Tap Water RSL and Different Dilution Attenuation Factors (DAFs)						Risk-Based Screening Levels in Soil for Protection of Groundwater Using MCL and Different Dilution Attenuation Factors (DAFs)					
				DAF = 1			DAF = 20			DAF = 1			DAF = 20		
				Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?
Inorganics (mg/kg)															
Antimony	#NAME?	6	Y	6.6E-01	Y	#NAME?	1.3E+01	n	#NAME?	2.7E-01	Y	#NAME?	5.4E+00	Y	#NAME?
Arsenic	#NAME?	8.7	Y	1.3E-03	Y	#NAME?	2.6E-02	Y	#NAME?	2.9E-01	Y	#NAME?	5.8E+00	Y	#NAME?
Lead (mg/kg)															
Lead-Lab	#NAME?	706	Y												

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 7-x1
Identification of Human Health COPCs in Composite Surface Soil Samples
Rum Point Skeet Range (RPSR) - UXO 16
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Frequency of Detection	Minimum Non-Detect Concentration	Maximum Non-Detect Concentration	Minimum Detected Concentration	Average of All Detected Samples	Maximum Detected Concentration	Sample with Maximum Detected Concentration	Residential Direct Contact Risk-Based Screening Levels in Soil		Risk-Based Screening Levels in Soil for Protection of Groundwater		Lowest Risk-Based Screening Level	Possible Human Health COPC?	Is Chemical Present Above Background?	Human Health COPC?
								Cancer Risk (10^{-6})	Noncancer Hazard Index (0.1)	Tap Water RSL	MCL				
Inorganics (mg/kg)															
Antimony	2/2	NA	NA	0.14	#NAME?	0.42	X16SS081C0001		3.1E+00	6.6E-01	**2.7E-01**	**2.7E-01**	Y	Y	Y
Arsenic	2/2	NA	NA	3	#NAME?	4.2	X16SS081C0001	**3.9E-01**	**2.2E+00**	**1.3E-03**	**2.9E-01**	**1.3E-03**	Y	n	n
Copper	2/2	NA	NA	4.8	#NAME?	9.6	X16SS081C0001		3.1E+02	5.1E+01	4.6E+01	4.6E+01	n		n
Tin	0/2	1.1	1.2	NA	NA	NA	NA		4.7E+03	5.5E+03		4.7E+03	n		n
Zinc	2/2	NA	NA	18.7	#NAME?	29	X16SS081C0001		2.3E+03	6.8E+02		6.8E+02	n		n
PAHs (ug/kg)															
1-Methylnaphthalene	0/2	23	23	NA	NA	NA	NA	2.2E+04	5.5E+05	1.5E+01		1.5E+01	n		n
2-Methylnaphthalene	1/2	23	23	3.5	#NAME?	3.5	X16SS080C0001		3.1E+04	9.0E+02		9.0E+02	n		n
Acenaphthene	0/2	23	23	NA	NA	NA	NA		3.4E+05	2.7E+04		2.7E+04	n		n
Acenaphthylene	0/2	23	23	NA	NA	NA	NA		3.4E+05	2.7E+04		2.7E+04	n		n
Anthracene	2/2	NA	NA	4.1	#NAME?	5.6	X16SS081C0001		1.7E+06	4.5E+05		4.5E+05	n		n
Benzo(a)anthracene	2/2	NA	NA	78	#NAME?	94	X16SS081C0001	1.5E+02		**1.4E+01**		**1.4E+01**	Y	n	n
Benzo(a)pyrene	2/2	NA	NA	91	#NAME?	100	X16SS081C0001	**1.5E+01**		**4.6E+00**	3.2E+02	**4.6E+00**	Y	n	n
Benzo(b)fluoranthene	2/2	NA	NA	33	#NAME?	38	X16SS081C0001	1.5E+02		4.7E+01		4.7E+01	n		n
Benzo(g,h,i)perylene	2/2	NA	NA	41	#NAME?	50	X16SS081C0001		1.7E+05	1.5E+05		1.5E+05	n		n
Benzo(k)fluoranthene	2/2	NA	NA	5.8	#NAME?	7.7	X16SS081C0001	1.5E+03		4.6E+02		4.6E+02	n		n
Chrysene	2/2	NA	NA	97	#NAME?	130	X16SS081C0001	1.5E+04		1.4E+03		1.4E+03	n		n
Dibenzo(a,h)anthracene	2/2	NA	NA	12	#NAME?	18	X16SS081C0001	**1.5E+01**		**1.6E+01**		**1.5E+01**	Y	n	n
Fluoranthene	2/2	NA	NA	9.8	#NAME?	13	X16SS081C0001		2.3E+05	2.1E+05		2.1E+05	n		n
Fluorene	0/2	23	23	NA	NA	NA	NA		2.3E+05	3.3E+04		3.3E+04	n		n
Indeno(1,2,3-cd)pyrene	2/2	NA	NA	9.1	#NAME?	10	X16SS081C0001	1.5E+02		1.6E+02		1.5E+02	n		n
Naphthalene	0/2	23	23	NA	NA	NA	NA	3.9E+03	1.5E+04	5.6E-01		5.6E-01	n		n
Phenanthrene	2/2	NA	NA	21	#NAME?	24	X16SS081C0001		1.7E+05	1.5E+05		1.5E+05	n		n
Pyrene	2/2	NA	NA	92	#NAME?	110	X16SS081C0001		1.7E+05	1.5E+05		1.5E+05	n		n
Explosives (mg/kg)															
Nitroglycerin	0/2	1.2	1.2	NA	NA	NA	NA	2.9E+01	6.1E-01	1.7E-03		1.7E-03	n		n
Lead (mg/kg)															
Lead-Lab	2/2	NA	NA	9.1	#NAME?	48.7	X16SS081C0001		4.0E+02			4.0E+02	n		n
Lead-XRF Field	2/2	NA	NA	21	#NAME?	73.333	X16SS081C0001		4.0E+02			4.0E+02			

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 7-x2
Identification of Human Health COPCs in Discrete Surface Soil Samples
Rum Point Skeet Range (RPSR) - UXO 16
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Frequency of Detection	Minimum Non-Detect Concentration	Maximum Non-Detect Concentration	Minimum Detected Concentration	Average of All Detected Samples	Maximum Detected Concentration	Sample with Maximum Detected Concentration	Residential Direct Contact Risk-Based Screening Levels in Soil		Risk-Based Screening Levels in Soil for Protection of Groundwater		Lowest Risk-Based Screening Level	Possible Human Health COPC?	Is Chemical Present Above Background?	Human Health COPC?
								Cancer Risk (10^{-6})	Noncancer Hazard Index (0.1)	Tap Water RSL	MCL				
Inorganics (mg/kg)															
Antimony	12/20	0.03	0.73	0.2	#NAME?	1.6	X16SS0900001-D		3.1E+00	**6.6E-01**	**2.7E-01**	**2.7E-01**	Y	n	n
Arsenic	18/20	0.16	1.9	1.1	#NAME?	6.5	X16SS0610001	**3.9E-01**	**2.2E+00**	**1.3E-03**	**2.9E-01**	**1.3E-03**	Y	n	n
Copper	20/20	NA	NA	2.4	#NAME?	11.4	X16SS0130001		3.1E+02	5.1E+01	4.6E+01	4.6E+01	n		n
Tin	0/20	0.75	1.9	NA	NA	NA	NA		4.7E+03	5.5E+03		4.7E+03	n		n
Zinc	20/20	NA	NA	9.5	#NAME?	34.9	X16SS0130001		2.3E+03	6.8E+02		6.8E+02	n		n
PAHs (ug/kg)															
1-Methylnaphthalene	6/21	22	28	2.4	#NAME?	16	X16SS0760001	2.2E+04	5.5E+05	**1.5E+01**		**1.5E+01**	Y	n	n
2-Methylnaphthalene	7/21	22	28	6.4	#NAME?	68	X16SS0760001		3.1E+04	9.0E+02		9.0E+02	n		n
Acenaphthene	4/21	22	28	2.4	#NAME?	7.7	X16SS0760001		3.4E+05	2.7E+04		2.7E+04	n		n
Acenaphthylene	1/21	22	28	24	#NAME?	24	X16SS0310001		3.4E+05	2.7E+04		2.7E+04	n		n
Anthracene	15/21	22	26	1.6	#NAME?	110	X16SS0760001		1.7E+06	4.5E+05		4.5E+05	n		n
Benzo(a)anthracene	20/21	22	23	2.6	#NAME?	2400	X16SS0760001	**1.5E+02**		**1.4E+01**		**1.4E+01**	Y	Y	Y
Benzo(a)pyrene	18/21	22	26	5.8	#NAME?	3200	X16SS0760001	**1.5E+01**		**4.6E+00**	**3.2E+02**	**4.6E+00**	Y	Y	Y
Benzo(b)fluoranthene	18/21	22	26	3	#NAME?	1000	X16SS0760001	**1.5E+02**		**4.7E+01**		**4.7E+01**	Y	Y	Y
Benzo(g,h,i)perylene	18/21	22	26	3.4	#NAME?	1500	X16SS0760001		1.7E+05	1.5E+05		1.5E+05	n		n
Benzo(k)fluoranthene	14/21	22	26	4.3	#NAME?	200	X16SS0760001	1.5E+03		4.6E+02		4.6E+02	n		n
Chrysene	21/21	22	22	3.3	#NAME?	3000	X16SS0760001	1.5E+04		**1.4E+03**		**1.4E+03**	Y	Y	Y
Dibenzo(a,h)anthracene	15/21	22	26	6.1	#NAME?	540	X16SS0760001	**1.5E+01**		**1.6E+01**		**1.5E+01**	Y	Y	Y
Fluoranthene	19/21	22	26	2.5	#NAME?	210	X16SS0760001		2.3E+05	2.1E+05		2.1E+05	n		n
Fluorene	5/21	22	28	4.2	#NAME?	21	X16SS0760001		2.3E+05	3.3E+04		3.3E+04	n		n
Indeno(1,2,3-cd)pyrene	20/21	22	26	2.5	#NAME?	260	X16SS0760001	**1.5E+02**		**1.6E+02**		**1.5E+02**	Y	n	n
Naphthalene	2/21	22	28	3.1	#NAME?	7.2	X16SS0760001	3.9E+03	1.5E+04	**5.6E-01**		**5.6E-01**	Y	Y	Y
Phenanthrene	16/21	22	26	3.2	#NAME?	620	X16SS0760001		1.7E+05	1.5E+05		1.5E+05	n		n
Pyrene	20/21	22	23	3.1	#NAME?	2000	X16SS0760001		1.7E+05	1.5E+05		1.5E+05	n		n
Lead (mg/kg)															
Lead-Lab	20/20	NA	NA	6.7	#NAME?	616	X16SS0080001		**4.0E+02**			**4.0E+02**	Y	Y	Y
Lead-XRF Field	92/92	NA	NA	11.667	#NAME?	975.333	X16SS0080001		**4.0E+02**			**4.0E+02**			

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated.

TABLE 7-x3
Risks and Hazard Indices for Direct Contact Exposures to Composite Surface Soil Samples
Rum Point Skeet Range (RPSR) - UXO 16
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Residential Risk/ Hazard Index Screening		Non-residential Direct Contact Risk-Based Concentration in Soil		Non-residential Risk/ Hazard Index Screening	
				Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index	Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index
Inorganics (mg/kg)											
Antimony	#NAME?	0.42	Y		3.1E+01		1.4E-02		4.1E+02		1.0E-03
Total						0.0E+00	1.4E-02			0.0E+00	1.0E-03

Footnotes:
NA - Not applicable, statistic could not be calculated.

TABLE 7-x4
Risks and Hazard Indices for Direct Contact Exposures to Discrete Surface Soil Samples
Rum Point Skeet Range (RPSR) - UXO 16
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Residential Risk/ Hazard Index Screening			Non-residential Direct Contact Risk-Based Concentration in Soil		Non-residential Risk/ Hazard Index Screening		
				Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk (Using Max.)	Calculated Cancer Risk (Using Avg.)	Calculated Hazard Index (Using Max.)	Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk (Using Max.)	Calculated Cancer Risk (Using Avg.)	Calculated Hazard Index (Using Max.)
PAHs (ug/kg)													
Benzo(a)anthracene	#NAME?	2400	Y	1.5E+02		1.6E-05	#NAME?		2.1E+03		1.1E-06	#NAME?	
Benzo(a)pyrene	#NAME?	3200	Y	1.5E+01		2.1E-04	#NAME?		2.1E+02		1.5E-05	#NAME?	
Benzo(b)fluoranthene	#NAME?	1000	Y	1.5E+02		6.7E-06	#NAME?		2.1E+03		4.8E-07	#NAME?	
Chrysene	#NAME?	3000	Y	1.5E+04		2.0E-07	#NAME?		2.1E+05		1.4E-08	#NAME?	
Dibenzo(a,h)anthracene	#NAME?	540	Y	1.5E+01		3.6E-05	#NAME?		2.1E+02		2.6E-06	#NAME?	
Naphthalene	#NAME?	7.2	Y	3.9E+03	1.5E+05	1.8E-09	#NAME?	4.8E-05	2.0E+04	6.7E+05	3.6E-10	#NAME?	1.1E-05
Total						2.7E-04	#NAME?	4.8E-05			1.9E-05	#NAME?	1.1E-05

Footnotes:
NA - Not applicable, statistic could not be calculated.

TABLE 7-x5
Evaluation of Direct Contact Exposures to Lead in Discrete Surface Soil Samples
Rum Point Skeet Range (RPSR) - UXO 16
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Non-residential Direct Contact Risk-Based Concentration in Soil	
				Value	Max. Exceeds Value?	Value	Max. Exceeds Value?
Lead (mg/kg)							
Lead-Lab	#NAME?	616	Y	4.0E+02	Y	8.0E+02	n

TABLE 7-x6
Evaluation of Soil to Groundwater Pathway for Composite Surface Soil Samples
Rum Point Skeet Range (RPSR) - UXO 16
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Risk-Based Concentrations in Soil for Protection of Groundwater Using Tap Water RSL and Different Dilution Attenuation Factors (DAFs)						Risk-Based Screening Levels in Soil for Protection of Groundwater Using MCL and Different Dilution Attenuation Factors (DAFs)					
				DAF = 1			DAF = 20			DAF = 1			DAF = 20		
				Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?
Inorganics (mg/kg)															
Antimony	#NAME?	0.42	Y	6.6E-01	n	#NAME?	1.3E+01	n	#NAME?	2.7E-01	Y	#NAME?	5.4E+00	n	#NAME?

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 7-x7
Evaluation of Soil to Groundwater Pathway for Discrete Surface Soil Samples
Rum Point Skeet Range (RPSR) - UXO 16
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Risk-Based Concentrations in Soil for Protection of Groundwater Using Tap Water RSL and Different Dilution Attenuation Factors (DAFs)						Risk-Based Screening Levels in Soil for Protection of Groundwater Using MCL and Different Dilution Attenuation Factors (DAFs)					
				DAF = 1			DAF = 20			DAF = 1			DAF = 20		
				Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?
PAHs (ug/kg)															
Benzo(a)anthracene	#NAME?	2400	Y	1.4E+01	Y	#NAME?	2.8E+02	Y	#NAME?						
Benzo(a)pyrene	#NAME?	3200	Y	4.6E+00	Y	#NAME?	9.2E+01	Y	#NAME?	3.2E+02	Y	#NAME?	6.4E+03	n	#NAME?
Benzo(b)fluoranthene	#NAME?	1000	Y	4.7E+01	Y	#NAME?	9.4E+02	Y	#NAME?						
Chrysene	#NAME?	3000	Y	1.4E+03	Y	#NAME?	2.8E+04	n	#NAME?						
Dibenzo(a,h)anthracene	#NAME?	540	Y	1.6E+01	Y	#NAME?	3.2E+02	Y	#NAME?						
Naphthalene	#NAME?	7.2	Y	5.6E-01	Y	#NAME?	1.1E+01	n	#NAME?						
Lead (mg/kg)															
Lead-Lab	#NAME?	616	Y												

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 8-x1
Identification of Human Health COPCs in Composite Surface Soil Samples
Roach Road Rifle Range (RRRR) - UXO 25
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Frequency of Detection	Minimum Non-Detect Concentra-tion	Maximum Non-Detect Concentra-tion	Minimum Detected Concentra-tion	Average of All Detected Samples	Maximum Detected Concentra-tion	Sample with Maximum Detected Concentration	Residential Direct Contact Risk-Based Screening Levels in Soil		Risk-Based Screening Levels in Soil for Protection of Groundwater		Lowest Risk-Based Screening Level	Possible Human Health COPC?	Is Chemical Present Above Back-ground?	Human Health COPC?
								Cancer Risk (10^{-6})	Noncancer Hazard Index (0.1)	Tap Water RSL	MCL				
Inorganics (mg/kg)															
Antimony	1/1	NA	NA	0.1	#NAME?	0.1	X25SS0200001		3.1E+00	6.6E-01	2.7E-01	2.7E-01	n		n
Arsenic	1/1	NA	NA	4.3	#NAME?	4.3	X25SS0160001	**3.9E-01**	**2.2E+00**	**1.3E-03**	**2.9E-01**	**1.3E-03**	Y	n	n
Copper	1/1	NA	NA	8.5	#NAME?	8.5	X25SS0200001		3.1E+02	5.1E+01	4.6E+01	4.6E+01	n		n
Tin	0/1	1.6	1.6	NA	NA	NA	NA		4.7E+03	5.5E+03		4.7E+03	n		n
Zinc	1/1	NA	NA	30.2	#NAME?	30.2	X25SS0200001		2.3E+03	6.8E+02		6.8E+02	n		n
Explosives (mg/kg)															
Nitroglycerin	0/1	1.2	1.2	NA	NA	NA	NA	2.9E+01	6.1E-01	1.7E-03		1.7E-03	n		n
Lead (mg/kg)															
Lead-Lab	1/1	NA	NA	9.4	#NAME?	9.4	X25SS0200001		4.0E+02			4.0E+02	n		n

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 8-x2
Identification of Human Health COPCs in Discrete Surface Soil Samples
Roach Road Rifle Range (RRRR) - UXO 25
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Frequency of Detection	Minimum Non-Detect Concentra-tion	Maximum Non-Detect Concentra-tion	Minimum Detected Concentra-tion	Average of All Detected Samples	Maximum Detected Concentra-tion	Sample with Maximum Detected Concentration	Residential Direct Contact Risk-Based Screening Levels in Soil		Risk-Based Screening Levels in Soil for Protection of Groundwater		Lowest Risk-Based Screening Level	Possible Human Health COPC?	Is Chemical Present Above Back-ground?	Human Health COPC?
								Cancer Risk (10^{-6})	Noncancer Hazard Index (0.1)	Tap Water RSL	MCL				
Inorganics (mg/kg)															
Antimony	16/20	0.02	0.16	0.19	#NAME?	12.2	X25SS0200001		**3.1E+00**	**6.6E-01**	**2.7E-01**	**2.7E-01**	Y	Y	Y
Arsenic	17/20	1.9	2.4	2.3	#NAME?	22.6	X25SS0160001	**3.9E-01**	**2.2E+00**	**1.3E-03**	**2.9E-01**	**1.3E-03**	Y	n	n
Copper	20/20	NA	NA	7.4	#NAME?	370	X25SS0200001		**3.1E+02**	**5.1E+01**	**4.6E+01**	**4.6E+01**	Y	Y	Y
Tin	0/20	0.43	2.3	NA	NA	NA	NA		4.7E+03	5.5E+03		4.7E+03	n		n
Zinc	20/20	NA	NA	22	#NAME?	63.9	X25SS0200001		2.3E+03	6.8E+02		6.8E+02	n		n
Lead (mg/kg)															
Lead-Lab	20/20	NA	NA	6.3	#NAME?	3450	X25SS0200001		**4.0E+02**			**4.0E+02**	Y	Y	Y
Lead-XRF Field	32/33	0	0	8.333	#NAME?	3877	X25SS0200001		**4.0E+02**			**4.0E+02**			
Lead-XRF Calc.	33/33	NA	NA	1.49	#NAME?	2754.83	X25SS0200001		**4.0E+02**			**4.0E+02**			

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

TABLE 8-x3
Risks and Hazard Indices for Direct Contact Exposures to Discrete Surface Soil Samples
Roach Road Rifle Range (RRRR) - UXO 25
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Residential Risk/ Hazard Index Screening		Non-residential Direct Contact Risk-Based Concentration in Soil		Non-residential Risk/ Hazard Index Screening	
				Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index	Based on Cancer Risk of 10^{-6}	Based on Hazard Index of 1	Calculated Cancer Risk	Calculated Hazard Index
Inorganics (mg/kg)											
Antimony	#NAME?	12.2	Y		3.1E+01		3.9E-01		4.1E+02		3.0E-02
Copper	#NAME?	370	Y		3.1E+03		1.2E-01		4.1E+04		9.0E-03
Total						0.0E+00	5.1E-01			0.0E+00	3.9E-02

Footnotes:
NA - Not applicable, statistic could not be calculated.

TABLE 8-x4
Evaluation of Direct Contact Exposures to Lead in Discrete Surface Soil Samples
Roach Road Rifle Range (RRRR) - UXO 25
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Residential Direct Contact Risk-Based Concentration in Soil		Non-residential Direct Contact Risk-Based Concentration in Soil	
				Value	Max. Exceeds Value?	Value	Max. Exceeds Value?
Lead (mg/kg)							
Lead-Lab	#NAME?	3450	Y	4.0E+02	Y	8.0E+02	Y

TABLE 8-x5
Evaluation of Soil to Groundwater Pathway for Discrete Surface Soil Samples
Roach Road Rifle Range (RRRR) - UXO 25
Site Investigation
NSF Indian Head - Stump Neck Annex
Indian Head, Maryland

Chemical	Average of All Detected Samples	Maximum Detected Concentra-tion	Human Health COPC?	Risk-Based Concentrations in Soil for Protection of Groundwater Using Tap Water RSL and Different Dilution Attenuation Factors (DAFs)						Risk-Based Screening Levels in Soil for Protection of Groundwater Using MCL and Different Dilution Attenuation Factors (DAFs)					
				DAF = 1			DAF = 20			DAF = 1			DAF = 20		
				Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?	Value	Max. Exceeds Value?	Avg. Exceeds Value?
Inorganics (mg/kg)															
Antimony	#NAME?	12.2	Y	6.6E-01	Y	#NAME?	1.3E+01	n	#NAME?	2.7E-01	Y	#NAME?	5.4E+00	Y	#NAME?
Copper	#NAME?	370	Y	5.1E+01	Y	#NAME?	1.0E+03	n	#NAME?	4.6E+01	Y	#NAME?	9.2E+02	n	#NAME?
Lead (mg/kg)															
Lead-Lab	#NAME?	3450	Y												

Footnotes:
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.
NA - Not applicable, statistic could not be calculated..

APPENDIX F

ECOLOGICAL RISK SCREENING SUPPORTING DOCUMENTATION

APPENDIX F

CHEMICAL CONCENTRATIONS IN SURFACE SOIL AND TISSUE - COMPOSITE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Surface Soil Concentrations (mg/kg)				Surface Water Concentrations (mg/L)		Earthworm Bioaccumulation Factors		Earthworm Concentrations (mg/kg)		Plant Bioaccumulation Factors		Plant Concentrations (mg/kg)	
	Maximum Detection	Average All	Average of Positive Detections	Average [1]	Maximum Detection	Average Concentration[1]	Conservative	Average	Maximum Detection	Average	Conservative	Average	Maximum Detection	Average
Inorganics														
ANTIMONY	6.80E-01	5.70E-01	5.70E-01	5.70E-01	0.00E+00	0.00E+00	1.00E+00	1.00E+00	6.80E-01	5.70E-01	1.14E-02	1.02E-02	2.75E-02	2.33E-02
COPPER	2.33E+01	1.91E+01	1.91E+01	1.91E+01	0.00E+00	0.00E+00	5.15E-01	5.15E-01	1.20E+01	9.81E+00	Regression from Eco SSL		6.74E+00	6.23E+00
LEAD	7.72E+01	7.20E+01	7.20E+01	7.20E+01	0.00E+00	0.00E+00	Regression from Eco SSL		2.68E+01	2.53E+01	Regression from Eco SSL		3.04E+00	2.92E+00
ZINC	5.44E+01	5.35E+01	5.35E+01	5.35E+01	0.00E+00	0.00E+00	Regression from Eco SSL		3.17E+02	3.15E+02	Regression from Eco SSL		4.42E+01	4.38E+01
Explosives														
NITROGLYCERIN	3.70E+00	2.10E+00	2.10E+00	2.10E+00	0.00E+00	0.00E+00	1.00E+00	1.00E+00	3.70E+00	2.10E+00	1.00E+00	1.00E+00	3.70E+00	2.10E+00

1 - If the average of all value is the greater than the maximum detection, the average of the positive detections was used as the average value.

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal NOAEL	Mammal LOAEL	Bird NOAEL	Bird LOAEL
VOLATILES				
1,1,1-Trichloroethane	1000	1000	NV	NV
1,1,2,2-Tetrachloroethane	76	108	NV	NV
1,1,2-Trichloroethane	0.39	4.4	NV	NV
1,1-Dichloroethane	475	4750	NV	NV
1,1-Dichloroethene	30	300	NV	NV
1,2,4-Trichlorobenzene	1.48	14.8	NV	NV
1,2-Dichlorobenzene	120	1200	NV	NV
1,2-Dichloroethane	50	500	17.2	34.4
1,2-Dichloroethene (total)	45.2	452	NV	NV
1,4-Dichlorobenzene	30	300	NV	NV
2-Butanone	1771	4571	NV	NV
2-Hexanone	NV	NV	NV	NV
4-Methyl-2-pentanone	NV	NV	NV	NV
Acetone	10	50	20089	200890
Benzene	26.36	263.6	NV	NV
Bromodichloromethane	1.79	17.9	NV	NV
Carbon Disulfide	12.6	25.6	NV	NV
Carbon Tetrachloride	16	160	NV	NV
Chlorobenzene	2.725	5.45	NV	NV
Chloroform	15	41	NV	NV
Chloromethane	NV	NV	NV	NV
cis-1,2-Dichloroethene	45.2	452	NV	NV
Dichlorodifluoromethane	2310	23100	NV	NV
Ethylbenzene	9.71	29.1	NV	NV
Isopropylbenzene	11	33.1	NV	NV
m,p-Xylene	2.06	2.58	107	1070
Methyl acetate	NV	NV	NV	NV
o-Xylene	2.06	2.58	107	1070
Methylene Chloride	5.85	50	NV	NV
Styrene	20	40	NV	NV
Tetrachloroethene	1.4	7	NV	NV
Toluene	26	260	NV	NV
Trichloroethene	0.7	7	NV	NV
Trichlorofluoromethane	34.9	349	NV	NV
Vinyl chloride	17	1.7	NV	NV
Xylenes, Total	2.06	2.58	107	1070
SEMIVOLATILES				
1,1'-Biphenyl	5	25	NV	NV
2,2'-Oxybis(1-chloropropane)	NV	NV	NV	NV
2,3,4,6-Tetrachlorophenol	2.5	10	NV	NV
2,4,5-Trichlorophenol	10	30	NV	NV
2,4,6-Trichlorophenol	0.42	4.2	NV	NV
2,4-Dimethylphenol	5	25	NV	NV
2-Methylnaphthalene	65.6	356	2	20
2-Methylphenol	5	15	NV	NV
3-Nitroaniline	NV	NV	NV	NV
4-Chloroaniline	1.25	12.5	NV	NV
4-Chloro-3-methylphenol	NV	NV	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
4-Methylphenol	NV	NV	NV	NV
4-Nitroaniline	NV	NV	NV	NV
4-Nitrophenol	NV	NV	NV	NV
7,12-Dimethylbenz(a)anthracene	NV	NV	2	20
Acenaphthene	65.6	356	2	20
Acenaphthylene	65.6	356	2	20
Anthracene	65.6	356	2	20
Benzaldehyde	20	40	NV	NV
Benzo(a)anthracene	0.615	38.4	2	20
Benzo(a)pyrene	0.615	38.4	2	20

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Benzo(b)fluoranthene	0.615	38.4	2	20
Benzo(g,h,i)perylene	0.615	38.4	2	20
Benzo(k)fluoranthene	0.615	38.4	2	20
Bis(2-Ethylhexyl)phthalate	18.3	183	1.11	11.1
Butyl benzyl phthalate	15.9	47	NV	NV
Caprolactam	50	500	NV	NV
Carbazole	1	10	2	20
Chrysene	0.615	38.4	2	20
Dibenzo(a,h)anthracene	0.615	38.4	2	20
Dibenzofuran	NV	NV	2	20
1,4-Dichlorobenzene	30	300	NV	NV
Diethylphthalate	4583	45830	NV	NV
Di-n-butyl phthalate	550	1833	0.111	1.11
Di-n-octyl phthalate	NV	NV	NV	NV
Fluoranthene	65.6	356	2	20
Fluorene	65.6	356	2	20
Hexachloroethane	0.1	1.5	NV	NV
Indeno(1,2,3-cd)pyrene	0.615	38.4	2	20
Isophorone	15	179	NV	NV
Naphthalene	65.6	356	2	20
n-Nitrosodiphenylamine	NV	NV	NV	NV
Pentachlorophenol	8.42	22.65	6.73	52.01
Phenanthrene	65.6	356	2	20
Phenol	6	12	NV	NV
Pyrene	0.615	38.4	2	20
Perylene	0.615	38.4	2	20
HERBICIDES				
Dinoseb	0.1	1	NV	NV
2,4-D	1	5	NV	NV
2,4,5-T	3	10	NV	NV
PESTICIDES/PCBs				
2,4'-DDD	0.147	5.56	0.227	2.7
2,4'-DDE	0.147	5.56	0.227	2.7
2,4'-DDT	0.147	5.56	0.227	2.7
4,4'-DDD	0.147	5.56	0.227	2.7
4,4'-DDE	0.147	5.56	0.227	2.7
4,4'-DDT	0.147	5.56	0.227	2.7
Aldrin	0.2	1	NV	NV
Alpha-BHC	0.014	0.14	0.56	2.25
Alpha-Chlordane	4.58	9.16	2.14	10.7
Aroclor-1232	0.068	0.68	0.18	1.8
Aroclor-1242	0.069	0.69	0.41	4.1
Aroclor-1248	0.01	0.1	NV	NV
Aroclor-1254	0.068	0.68	0.18	1.8
Aroclor-1260	0.068	0.68	0.18	1.8
Aroclor-1268	0.068	0.68	0.18	1.8
PCB-28	0.068	0.68	0.18	1.8
PCB-44	0.068	0.68	0.18	1.8
PCB-52	0.068	0.68	0.18	1.8

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
PCB-66	0.068	0.68	0.18	1.8
PCB-101	0.068	0.68	0.18	1.8
PCB-105	0.068	0.68	0.18	1.8
PCB-118	0.068	0.68	0.18	1.8
PCB-128	0.068	0.68	0.18	1.8
PCB-138	0.068	0.68	0.18	1.8
PCB-153	0.068	0.68	0.18	1.8
PCB-170	0.068	0.68	0.18	1.8
PCB-180	0.068	0.68	0.18	1.8
PCB-187	0.068	0.68	0.18	1.8
PCB-195	0.068	0.68	0.18	1.8
PCB-206	0.068	0.68	0.18	1.8
PCB-209	0.068	0.68	0.18	1.8
beta-BHC	0.4	2	0.56	2.25
delta-BHC	0.014	0.14	0.56	2.25
Dieldrin	0.015	1.27	0.0709	0.8
Endosulfan I	0.15	1.5	10	100
Endosulfan II	0.15	1.5	10	100
Endosulfan Sulfate	0.15	1.5	10	100
Endrin	0.092	0.92	0.01035	0.1035
Endrin Aldehyde	0.092	0.92	0.01	0.1
Endrin Ketone	0.092	0.92	0.01	0.1
Gamma-BHC (Lindane)	8	80	2	20
Gamma-Chlordane	4.58	9.16	2.14	10.7
Heptachlor	0.1	1	NV	NV
Heptachlor Epoxide	0.1	1	NV	NV
Methoxychlor	4	8	NV	NV
Toxaphene	8	80	NV	NV
Total Aroclor	0.068	0.68	0.18	1.8
Total DDT	0.147	5.56	0.227	2.7
DIOXINS AND FURANS (mg/kg)				
1,2,3,4,6,7,8-HpCDD	0.0001	0.001	0.014	0.14
1,2,3,4,6,7,8-HpCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8,9-HPCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8-HXCDD	0.00001	0.0001	0.00028	0.0028
1,2,3,4,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,6,7,8-HxCDD	0.00001	0.0001	0.0014	0.014
1,2,3,6,7,8-HxCDF	0.00016	0.0016	0.00014	0.0014
1,2,3,7,8,9-HxCDD	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8,9-HxCDF	0.00001	0.0001	0.00014	0.0014
2,3,4,6,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8-PECDD	0.000001	0.00001	0.000014	0.00014
1,2,3,7,8-PECDF	0.00016	0.0016	0.00014	0.0014
2,3,4,7,8-PECDF	0.000016	0.00016	0.000014	0.00014
2,3,7,8-TCDD	0.000001	0.00001	0.000014	0.00014
2,3,7,8-TCDF	0.00001	0.0001	0.000014	0.00014
OCDD	0.01	0.1	0.14	1.4
OCDF	0.01	0.1	0.14	1.4
TOTAL HpCDD	0.0001	0.001	0.014	0.14

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
TOTAL HxCDD	0.00001	0.0001	0.00014	0.0014
TOTAL PeCDD	0.000001	0.00001	0.000014	0.00014
Total HpCDF	0.0001	0.001	0.0014	0.014
Total HxCDF	0.00001	0.0001	0.00014	0.0014
Total PeCDF	0.000002	0.00002	0.000014	0.00014
Total TCDD	0.000001	0.00001	0.000014	0.00014
Total TCDF	0.00001	0.0001	0.000014	0.00014
EXPLOSIVES (mg/kg)				
1,3 Dinitrobenzene	0.4	1.07	NV	NV
1,3,5-Trinitrobenzene	2.68	13.31	NV	NV
2,4-Dinitrotoluene	0.67	1.4	0.1	0.5
2,6-Dinitrotoluene	0.7	7	NV	NV
2,4,6-Trinitrotoluene	1.6	16	0.7	17.8
2-Amino-4,6-dinitrotoluene	NV	NV	NV	NV
2-Nitrotoluene	20	200	NV	NV
3-Nitrotoluene	20	200	NV	NV
4-Amino-2,6-dinitrotoluene	NV	NV	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal NOAEL	Mammal LOAEL	Bird NOAEL	Bird LOAEL
4-Nitrotoluene	20	200	NV	NV
Ammonia	NV	NV	NV	NV
HMX	3	7.5	NV	NV
Nitrobenzene (exp)	NV	NV	NV	NV
Nitroglycerin	3	32	NV	NV
RDX	7	35	NV	NV
Tetryl	1.3	6.2	NV	NV
INORGANICS				
Aluminum	1.93	19.3	109.7	1097
Antimony	0.059	2.76	NV	NV
Arsenic	1.04	4.55	2.24	4.51
Barium	51.8	82.7	20.8	41.7
Beryllium	0.532	0.673	NV	NV
Cadmium	0.77	6.9	1.47	6.35
Chromium	2.40	58.17	2.66	15.63
Hexavalent Chromium	5.66	38.37	NV	NV
Cobalt	7.33	18.90	7.61	18.34
Copper	5.6	82.7	4.05	34.87
Cyanide	68.7	687	NV	NV
Iron	50	500	100	1000
Lead	4.7	186.4	1.63	44.63
Manganese	51.5	145.67	179	376.6
Mercury	0.032	0.16	0.0064	0.064
Nickel	1.70	14.77	6.71	18.57
Selenium	0.143	0.661	0.29	0.819

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
Volatile Organics				
1,1,1-Trichloroethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
2-Butanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Methyl-2-pentanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Acetone	5.20E+00	5.20E+00	1.00E+00	1.00E+00
Carbon Disulfide	2.00E+00	2.00E+00	1.00E+00	1.00E+00
Chlorobenzene	9.00E-01	9.00E-01	1.00E+00	1.00E+00
Ethylbenzene	6.10E-01	6.10E-01	1.00E+00	1.00E+00
Isopropylbenzene	1.00E+00	1.00E+00	1.00E+00	1.00E+00
M,p-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Methyl Acetate	2.99E+01	2.99E+01	1.00E+00	1.00E+00
Methylene Chloride	6.70E+00	6.70E+00	1.00E+00	1.00E+00
O-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Tetrachloroethene	1.20E+00	1.20E+00	1.00E+00	1.00E+00
Toluene	1.03E+00	1.03E+00	1.00E+00	1.00E+00
Total Xylenes	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Trichloroethene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
Trichlorofluoromethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
Semivolatile Organics				
1,1'-Biphenyl	1.59E-01	1.59E-01	1.00E+00	1.00E+00
1,2-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
1,4-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
2,2'-Oxybis(1-Chloropropane)	???	???	1.00E+00	1.00E+00
2,3,4,6-Tetrachlorophenol	1.59E-01	1.59E-01	1.00E+00	1.00E+00
2,4-D	???	???		
2-Methylnaphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
2-Methylphenol	???	???	1.00E+00	1.00E+00
3-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Chloro-3-Methylphenol	???	???	1.00E+00	1.00E+00
4-Chloroaniline	9.03E-01	9.03E-01	1.00E+00	1.00E+00
4-Methylphenol	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitrophenol	3.00E+00	3.00E+00	1.00E+00	1.00E+00
2,4,5-Trichlorophenol	2.40E-01	2.40E-01	1.00E+00	1.00E+00
2,4,6-Trichlorophenol	2.70E-01	2.70E-01	1.00E+00	1.00E+00
2,4,5-T	???	???	???	???
Acenaphthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Acenaphthylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzaldehyde	1.76E+00	1.76E+00	1.00E+00	1.00E+00
Benzo(a)anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(a)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(b)fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(g,h,i)perylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(k)Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Bis(2-ethylhexyl)phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Butyl benzyl Phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Caprolactam	4.90E+01	4.90E+01	1.00E+00	1.00E+00
Carbazole	2.40E-01	2.40E-01	Eco-SSL	Eco-SSL
Chrysene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzo(a,h)Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzofuran	1.50E-01	1.50E-01	Eco-SSL	Eco-SSL
Diethylphthalate	1.30E+00	1.30E+00	1.00E+00	1.00E+00
Di-n-butyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Di-n-octyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Dinoseb	???	???	???	???
Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Fluorene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexachloroethane	2.10E-01	2.10E-01	1.00E+00	1.00E+00
Indeno(1,2,3-cd)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Isophorone	3.92E+00	3.92E+00	1.00E+00	1.00E+00
N-Nitrosodiphenylamine	6.05E-01	6.05E-01	1.00E+00	1.00E+00
Naphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pentachlorophenol	1.40E-02	1.40E-02	1.00E+00	1.00E+00
Phenanthrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Phenol	5.10E+00	5.10E+00	1.00E+00	1.00E+00
Pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pesticides/ PCBs				
4,4'-DDD	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDE	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Aldrin	6.90E-01	6.90E-01	3.30E+00	3.30E+00
Alpha-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Aroclor-1232	5.30E-01	5.30E-01	1.59E+01	6.67E+00
Aroclor-1242	1.60E-01	1.60E-01	1.59E+01	6.67E+00
Aroclor-1248	1.60E-02	1.60E-02	1.59E+01	6.67E+00
Aroclor-1254	1.30E-02	1.30E-02	1.59E+01	6.67E+00
Aroclor-1260	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Aroclor-1268	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Dieldrin	8.20E-02	8.20E-02	6.64E+00	6.64E+00
Gamma-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Heptachlor	1.20E-01	1.20E-01	1.00E+01	1.00E+01
Endosulfan I	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan II	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan Sulfate	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endrin	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Aldehyde	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Ketone	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Heptachlor Epoxide	2.80E-02	2.80E-02	3.00E+00	3.00E+00
Methoxychlor	1.10E-01	1.10E-01	1.00E+00	1.00E+00
alpha-BHC	2.10E-01	2.10E-01	5.00E+00	5.00E+00

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
beta-BHC	1.80E-01	1.80E-01	5.00E+00	5.00E+00
delta-BHC	9.00E-01	9.00E-01	5.00E+00	5.00E+00
gamma-BHC (Lindane)	2.70E-01	2.70E-01	5.00E+00	5.00E+00
Toxaphene	6.20E-02	6.20E-02	1.00E+00	1.00E+00
Total Aroclor	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Total DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Explosives				
2,4,6-Trinitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
2-Nitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
1,3,5-Trinitrobenzene	7.70E+00	7.70E+00	1.00E+00	1.00E+00
4-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
RDX	4.60E-01	4.60E-01	1.00E+00	1.00E+00
4-Amino-2,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
HMX	1.70E+01	1.70E+01	1.00E+00	1.00E+00
Nitrobenzene (exp)	3.40E+00	3.40E+00	1.00E+00	1.00E+00
1,3 Dinitrobenzene	4.50E+00	4.50E+00	1.00E+00	1.00E+00
2-Amino-4,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
Tetryl	???	???	1.00E+00	1.00E+00
3-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
2,4-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
2,6-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
NITROGLYCERIN	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Dioxins				
1,2,3,4,6,7,8-HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,6,7,8-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8,9-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HxCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8-PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
1,2,3,7,8-Pecdf	4.40E-03	4.40E-03	2.22E+01	1.10E+01
2,3,4,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
2,3,4,7,8-PECDF	3.70E-03	3.70E-03	2.22E+01	1.10E+01
2,3,7,8-TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ HALFND	4.30E-03	4.30E-03	2.22E+01	1.10E+01
2,3,7,8-TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDD	???	???	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDF	???	???	2.22E+01	1.10E+01
TOTAL HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
Total HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total PECDF	4.40E-03	4.40E-03	2.22E+01	1.10E+01
Total TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
Total TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
Inorganics				
Aluminum	5.00E-03	2.87E-03	1.18E-01	4.30E-02
Antimony	1.14E-02	1.02E-02	1.00E+00	1.00E+00
Arsenic	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Barium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Beryllium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cadmium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cobalt	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Copper	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexavalent Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cyanide	1.80E+00	1.00E+00	1.00E+00	1.00E+00
Iron	1.00E-02	4.25E-03	7.80E-02	3.60E-02
Lead	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Manganese	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Mercury	5.00E+00	6.52E-01	ORNL Reg.	ORNL Reg.
Nickel	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Selenium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Silver	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Thallium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Tin	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Vanadium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Zinc	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL

Notes:
BAF - Bioaccumulation Factor
BSAF - Biota Sediment Accumulation Factor
1 - ORNL (2001) for organics; only one value is available for conservative and average exposures
2 - Sample et al., (1997) for inorganics; conservative value is 90th percentile; average value is median v
3 - ORNL (September, 1998) for all chemicals; conservative value is 90th percentile; average value is m
4 - U.S. EPA, September 1997; only one value is available for conservative and average exposures. Va
5 - Conservative and average refers to the exposure scenarios for which the uptake factors are used
6 - Where "Eco-SSL" is given, values were calculated using equations from USEPA (2005), Attachment
Tables 4a (for inorganics) and 4b (for organics).

Default value of 1 is assigned to parameters without uptake factors

TABLE X-X

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

Species/Exposure Inputs	Conservative Inputs		Average Inputs	
	Values	Units	Values	Units
Bobwhite Quail				
Body Weight = BW	1.540E-01	kg	1.751E-01	kg
Food Ingestion Rate = If	2.442E-03	kg/day	2.042E-03	kg/day
Water Ingestion Rate = Iw	2.276E-02	L/day	1.926E-02	L/day
Soil Ingestion Rate = Is	3.395E-04	kg/day	1.246E-04	kg/day
Home Range = HR	Assume 100% on site		1.880E+01	acres
Meadow Vole				
Body Weight = BW	1.700E-02	kg	3.580E-02	kg
Food Ingestion Rate = If	1.878E-03	kg/day	1.744E-03	kg/day
Water Ingestion Rate = Iw	7.513E-03	L/day	6.261E-03	L/day
Soil Ingestion Rate = Is	6.010E-05	kg/day	2.093E-05	kg/day
Home Range = HR	Assume 100% on site		6.590E-02	acres
American Robin				
Body Weight = BW	7.73E-02	kg	8.04E-02	kg
Food Ingestion Rate = If	1.25E-02	kg/day	1.19E-02	kg/day
Water Ingestion Rate = Iw	1.21E-02	L/day	1.13E-02	L/day
Soil Ingestion Rate - Is	2.046E-03	kg/day	7.601E-04	kg/day
Home Range = HR	Assume 100% on site		6.095E-01	acres
Short-Tailed Shrew				
Body Weight = BW	1.500E-02	kg	1.610E-02	kg
Food Ingestion Rate = If	1.600E-03	kg/day	1.433E-03	kg/day
Water Ingestion Rate = Iw	4.280E-03	L/day	3.600E-03	L/day
Soil Ingestion Rate - Is	4.801E-05	kg/day	1.289E-05	kg/day
Home Range = HR	Assume 100% on site		9.699E-01	acres
Mink				
Body Weight = BW	5.500E-01	kg	1.103E+00	kg
Food Ingestion Rate = If	6.067E-02	kg/day	4.504E-02	kg/day
Water Ingestion Rate = Iw	1.213E-01	L/day	7.308E-02	L/day
Sediment Ingestion Rate = Is	5.703E-03	kg/day	4.234E-03	kg/day
Home Range = HR	Assume 100% on site		1.558E+03	acres
Green Heron				
Body Weight = BW	2.00E-01	kg	2.12E-01	kg
Food Ingestion Rate = If	3.10E-02	kg/day	3.00E-02	kg/day
Water Ingestion Rate = Iw	2.20E-02	L/day	2.10E-02	L/day
Sediment Ingestion Rate = Is	1.600E-03	kg/day	1.500E-03	kg/day
Home Range = HR	Assume 100% on site		1.000E+01	km-radius

Notes:
The exposure factors were derived as presented in Appendix I.

The soil/sediment ingestion rates were calculated by multiplying the food ingestion rates by the following incidental soil/sediment ingestion rates:

	Conservative	Average	Source
Bobwhite quail	13.90%	6.10%	1, 2
Meadow Vole	3.20%	1.20%	1
American Robin	16.40%	6.40%	1,4
Short-tailed Shrew	3%	0.90%	1
Mink	9.4%	9.4%	3, 5
Green Heron	5%	5%	6

1 - USEPA (U.S. Environmental Protection Agency), 2005. Ecological Soil Screening Level Guidance, Office of Emergency and Remedial Response. February.
2 - Based on the mourning dove.
3 - Beyer, N., E. Connor, and S. Gerould. 1994. Estimates of Soil Ingestion by Wildlife. Journal of Wildlife Management 58(2) pp. 375-382.
4 - Based on the American woodcock
5 - Based on the raccoon
6 - Based on piscivorous birds

APPENDIX F

MEADOW VOLE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	6.80E-01	0.00E+00	2.75E-02	2.40E-03	0.00E+00	3.03E-03	5.44E-03	5.90E-02	2.76E+00	9.22E-02	1.97E-03
COPPER	2.33E+01	0.00E+00	6.74E+00	8.24E-02	0.00E+00	7.45E-01	8.27E-01	5.60E+00	8.27E+01	1.48E-01	1.00E-02
LEAD	7.72E+01	0.00E+00	3.04E+00	2.73E-01	0.00E+00	3.35E-01	6.08E-01	4.70E+00	1.86E+02	1.29E-01	3.26E-03
ZINC	5.44E+01	0.00E+00	4.42E+01	1.92E-01	0.00E+00	4.88E+00	5.08E+00	7.54E+01	2.98E+02	6.73E-02	1.71E-02
Explosives											
NITROGLYCERIN	3.70E+00	0.00E+00	3.70E+00	1.31E-02	0.00E+00	4.09E-01	4.22E-01	3.00E+00	3.20E+01	1.41E-01	1.32E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.70E-02	kg
Food Ingestion Rate = (If)	1.88E-03	kg/day
Water Ingestion Rate = (Iw)	7.51E-03	L/day
Soil Ingestion Rate = (Is)	6.01E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

MEADOW VOLE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	5.70E-01	0.00E+00	2.33E-02	3.33E-04	0.00E+00	1.13E-03	1.47E-03	5.90E-02	2.76E+00	2.49E-02	5.32E-04
COPPER	1.91E+01	0.00E+00	6.23E+00	1.11E-02	0.00E+00	3.03E-01	3.15E-01	5.60E+00	8.27E+01	5.62E-02	3.80E-03
LEAD	7.20E+01	0.00E+00	2.92E+00	4.21E-02	0.00E+00	1.42E-01	1.84E-01	4.70E+00	1.86E+02	3.92E-02	9.88E-04
ZINC	5.35E+01	0.00E+00	4.38E+01	3.12E-02	0.00E+00	2.13E+00	2.16E+00	7.54E+01	2.98E+02	2.87E-02	7.27E-03
Explosives											
NITROGLYCERIN	2.10E+00	0.00E+00	2.10E+00	1.22E-03	0.00E+00	1.02E-01	1.03E-01	3.00E+00	3.20E+01	3.44E-02	3.23E-03

Body Weight = (BW)	3.58E-02	kg
Food Ingestion Rate = (If)	1.74E-03	kg/day
Water Ingestion Rate = (Iw)	6.26E-03	L/day
Soil Ingestion Rate = (Is)	2.09E-05	kg/day
Home Range = (HR)	6.59E-02	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	6.80E-01	0.00E+00	2.75E-02	1.50E-03	0.00E+00	4.36E-04	1.93E-03	NV	NV	#VALUE!	#VALUE!
COPPER	2.33E+01	0.00E+00	6.74E+00	5.14E-02	0.00E+00	1.07E-01	1.58E-01	4.05E+00	3.49E+01	3.9E-02	4.5E-03
LEAD	7.72E+01	0.00E+00	3.04E+00	1.70E-01	0.00E+00	4.81E-02	2.18E-01	1.63E+00	4.46E+01	1.3E-01	4.9E-03
ZINC	5.44E+01	0.00E+00	4.42E+01	1.20E-01	0.00E+00	7.01E-01	8.21E-01	6.61E+01	1.71E+02	1.2E-02	4.8E-03
Explosives											
NITROGLYCERIN	3.70E+00	0.00E+00	3.70E+00	8.16E-03	0.00E+00	5.87E-02	6.68E-02	NV	NV	#VALUE!	#VALUE!

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.54E-01	kg
Food Ingestion Rate = (If)	2.44E-03	kg/day
Water Ingestion Rate = (Iw)	2.28E-02	L/day
Soil Ingestion Rate = (Is)	3.40E-04	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	5.70E-01	0.00E+00	2.33E-02	4.05E-04	0.00E+00	2.71E-04	6.77E-04	NV	NV	#VALUE!	#VALUE!
COPPER	1.91E+01	0.00E+00	6.23E+00	1.36E-02	0.00E+00	7.26E-02	8.62E-02	4.05E+00	3.49E+01	2.1E-02	2.5E-03
LEAD	7.20E+01	0.00E+00	2.92E+00	5.12E-02	0.00E+00	3.40E-02	8.52E-02	1.63E+00	4.46E+01	5.2E-02	1.9E-03
ZINC	5.35E+01	0.00E+00	4.38E+01	3.80E-02	0.00E+00	5.11E-01	5.49E-01	6.61E+01	1.71E+02	8.3E-03	3.2E-03
Explosives											
NITROGLYCERIN	2.10E+00	2.00E+00	2.10E+00	1.49E-03	2.20E-01	2.44E-02	2.46E-01	NV	NV	#VALUE!	#VALUE!

Body Weight = (BW)	1.75E-01	kg	Dose (soil) = (Cs * Is)(H)/BW	Conc = Concentration
Food Ingestion Rate = (If)	2.04E-03	kg/day	Dose (vegetation) = (Cv * If)(H)/BW	LOAEL = Lowest Observed Adverse Effects Concentration
Water Ingestion Rate = (Iw)	1.93E-02	L/day	Dose (water) = (Cw * Iw)(H)/BW	NOAEL = No Observed Adverse Effects Concentration
Soil Ingestion Rate = (Is)	1.25E-04	kg/day	Cv = Contaminant concentration in vegetation	SW = Surface Water
Home Range = (HR)	1.88E+01	acres	Cs = Contaminant concentration in soil	
Contaminated Area = (CA)	Assume equal to home range		Cw = Contaminant concentration in water	
			Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)	
			H=CA/HR (Assume = to 1)	

APPENDIX F

SHORT-TAILED SHREW - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	6.80E-01	0.00E+00	6.80E-01	2.18E-03	0.00E+00	7.25E-02	7.47E-02	5.90E-02	2.76E+00	1.3E+00	2.7E-02
COPPER	2.33E+01	0.00E+00	1.20E+01	7.46E-02	0.00E+00	1.28E+00	1.35E+00	5.60E+00	8.27E+01	2.4E-01	1.6E-02
LEAD	7.72E+01	0.00E+00	2.68E+01	2.47E-01	0.00E+00	2.86E+00	3.11E+00	4.70E+00	1.86E+02	6.6E-01	1.7E-02
ZINC	5.44E+01	0.00E+00	3.17E+02	1.74E-01	0.00E+00	3.39E+01	3.40E+01	7.54E+01	2.98E+02	4.5E-01	1.1E-01
Explosives											
NITROGLYCERIN	3.70E+00	0.00E+00	3.70E+00	1.18E-02	0.00E+00	3.95E-01	4.07E-01	3.00E+00	3.20E+01	1.4E-01	1.3E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.50E-02	kg
Food Ingestion Rate = (If)	1.60E-03	kg/day
Water Ingestion Rate = (Iw)	4.28E-03	L/day
Soil Ingestion Rate = (Is)	4.80E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	5.70E-01	0.00E+00	5.70E-01	4.56E-04	0.00E+00	5.07E-02	5.12E-02	5.90E-02	2.76E+00	8.7E-01	1.9E-02
COPPER	1.91E+01	0.00E+00	9.81E+00	1.53E-02	0.00E+00	8.73E-01	8.88E-01	5.60E+00	8.27E+01	1.6E-01	1.1E-02
LEAD	7.20E+01	0.00E+00	2.53E+01	5.76E-02	0.00E+00	2.26E+00	2.31E+00	4.70E+00	1.86E+02	4.9E-01	1.2E-02
ZINC	5.35E+01	0.00E+00	3.15E+02	4.28E-02	0.00E+00	2.81E+01	2.81E+01	7.54E+01	2.98E+02	3.7E-01	9.4E-02
Explosives											
NITROGLYCERIN	2.10E+00	0.00E+00	2.10E+00	1.68E-03	0.00E+00	1.86E-01	1.88E-01	3.00E+00	3.20E+01	6.3E-02	5.9E-03

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.61E-02	kg
Food Ingestion Rate = (If)	1.43E-03	kg/day
Water Ingestion Rate = (Iw)	3.60E-03	L/day
Soil Ingestion Rate = (Is)	1.29E-05	kg/day
Home Range = (HR)	9.70E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	6.80E-01	0.00E+00	6.80E-01	1.80E-02	0.00E+00	1.10E-01	1.28E-01	NV	NV	#VALUE!	#VALUE!
COPPER	2.33E+01	0.00E+00	1.20E+01	6.17E-01	0.00E+00	1.94E+00	2.55E+00	4.05E+00	3.49E+01	6.3E-01	7.3E-02
LEAD	7.72E+01	0.00E+00	2.68E+01	2.04E+00	0.00E+00	4.33E+00	6.37E+00	1.63E+00	4.46E+01	3.9E+00	1.4E-01
ZINC	5.44E+01	0.00E+00	3.17E+02	1.44E+00	0.00E+00	5.12E+01	5.26E+01	6.61E+01	1.71E+02	8.0E-01	3.1E-01
Explosives											
NITROGLYCERIN	3.70E+00	0.00E+00	3.70E+00	9.79E-02	0.00E+00	5.97E-01	6.95E-01	NV	NV	#VALUE!	#VALUE!

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	7.73E-02	kg
Food Ingestion Rate = (If)	1.25E-02	kg/day
Water Ingestion Rate = (Iw)	1.21E-02	L/day
Soil Ingestion Rate = (Is)	2.05E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	5.70E-01	0.00E+00	5.70E-01	5.39E-03	0.00E+00	8.42E-02	8.96E-02	NV	NV	#VALUE!	#VALUE!
COPPER	1.91E+01	0.00E+00	9.81E+00	1.80E-01	0.00E+00	1.45E+00	1.63E+00	4.05E+00	3.49E+01	4.0E-01	4.7E-02
LEAD	7.20E+01	0.00E+00	2.53E+01	6.80E-01	0.00E+00	3.74E+00	4.42E+00	1.63E+00	4.46E+01	2.7E+00	9.9E-02
ZINC	5.35E+01	0.00E+00	3.15E+02	5.05E-01	0.00E+00	4.66E+01	4.71E+01	6.61E+01	1.71E+02	7.1E-01	2.7E-01
Explosives											
NITROGLYCERIN	2.10E+00	0.00E+00	2.10E+00	1.98E-02	0.00E+00	3.09E-01	3.29E-01	NV	NV	#VALUE!	#VALUE!

Body Weight = (BW)	8.04E-02	kg	Dose (soil) = (Cs * Is)(H)/BW	Conc = Concentration
Food Ingestion Rate = (If)	1.19E-02	kg/day	Dose (invertebrate) = (Ci * If)(H)/BW	LOAEL = Lowest Observed Adverse Effects Concentration
Water Ingestion Rate = (Iw)	1.13E-02	L/day	Dose (water) = (Cw * Iw)(H)/BW	NOAEL = No Observed Adverse Effects Concentration
Soil Ingestion Rate = (Is)	7.60E-04	kg/day	Ci = Contaminant concentration in invertebrate	SW = Surface Water
Home Range = (HR)	6.10E-01	acres	Cs = Contaminant concentration in soil	
Contaminated Area = (CA)	Assume equal to home range		Cw = Contaminant concentration in water	
			Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)	
			H=CA/HR (Assume = to 1)	

TABLE 4-6.3.5

TERRESTRIAL FOOD CHAIN MODEL - CONSERVATIVE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - COMPOSITE SOIL
OLD SKEET AND TRAP RANGE (OSTR) -UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	9.2E-02	2.0E-03	#VALUE!	#VALUE!	1.3E+00	2.7E-02
COPPER	3.9E-02	4.5E-03	1.5E-01	1.0E-02	6.3E-01	7.3E-02	2.4E-01	1.6E-02
LEAD	1.3E-01	4.9E-03	1.3E-01	3.3E-03	3.9E+00	1.4E-01	6.6E-01	1.7E-02
ZINC	1.2E-02	4.8E-03	6.7E-02	1.7E-02	8.0E-01	3.1E-01	4.5E-01	1.1E-01
Explosives								
NITROGLYCERIN	#VALUE!	#VALUE!	1.4E-01	1.3E-02	#VALUE!	#VALUE!	1.4E-01	1.3E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

TABLE 4-6.3.8

TERRESTRIAL FOOD CHAIN MODEL - AVERAGE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS-COMPOSITE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	2.5E-02	5.3E-04	#VALUE!	#VALUE!	8.7E-01	1.9E-02
COPPER	2.1E-02	2.5E-03	5.6E-02	3.8E-03	4.0E-01	4.7E-02	1.6E-01	1.1E-02
LEAD	5.2E-02	1.9E-03	3.9E-02	9.9E-04	2.7E+00	9.9E-02	4.9E-01	1.2E-02
ZINC	8.3E-03	3.2E-03	2.9E-02	7.3E-03	7.1E-01	2.7E-01	3.7E-01	9.4E-02
Explosives								
NITROGLYCERIN	#VALUE!	#VALUE!	3.4E-02	3.2E-03	#VALUE!	#VALUE!	6.3E-02	5.9E-03

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

APPENDIX F

CHEMICAL CONCENTRATIONS IN SEDIMENT AND TISSUE - SEDIMENT
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Sediment Concentrations (mg/kg)				Surface Water Concentrations (mg/L)		Fish/Invertebrate Bioaccumulation Factors		Fish Concentrations (mg/kg)	
	Maximum Detection	Average All	Average of Positive Detections	Average [1]	Maximum Detection	Average Concentration[1]	Conservative	Average	Maximum Detection	Average
Semivolatile Organics										
BENZO(A)ANTHRACENE	2.90E-03	9.13E-03	2.90E-03	2.90E-03	0.00E+00	0.00E+00	0.29	0.29	1.21E-02	1.21E-02
BENZO(A)PYRENE	4.60E-03	9.70E-03	4.60E-03	4.60E-03	0.00E+00	0.00E+00	0.29	0.29	1.92E-02	1.92E-02
BENZO(B)FLUORANTHENE	3.40E-03	9.30E-03	3.40E-03	3.40E-03	0.00E+00	0.00E+00	0.29	0.29	1.42E-02	1.42E-02
BENZO(G,H,I)PERYLENE	2.80E-03	9.10E-03	2.80E-03	2.80E-03	0.00E+00	0.00E+00	0.29	0.29	1.17E-02	1.17E-02
CHRYSENE	5.40E-03	6.55E-03	5.40E-03	5.40E-03	0.00E+00	0.00E+00	0.29	0.29	2.26E-02	2.26E-02
INDENO(1,2,3-CD)PYRENE	2.90E-03	9.13E-03	2.90E-03	2.90E-03	0.00E+00	0.00E+00	0.29	0.29	1.21E-02	1.21E-02
Inorganics										
ARSENIC	5.80E+00	1.49E+00	1.49E+00	1.49E+00	0.00E+00	0.00E+00	0.69	0.143	4.00E+00	2.13E-01
COPPER	3.61E+01	7.36E+00	8.42E+00	7.36E+00	0.00E+00	0.00E+00	5.25	1.556	1.90E+02	1.15E+01
LEAD	3.70E+01	1.36E+01	1.54E+01	1.36E+01	0.00E+00	0.00E+00	0.607	0.071	2.25E+01	9.63E-01
TIN	3.40E+00	9.31E-01	3.40E+00	9.31E-01	0.00E+00	0.00E+00	1	1	3.40E+00	9.31E-01
ZINC	1.64E+02	3.32E+01	3.32E+01	3.32E+01	0.00E+00	0.00E+00	7.527	1.936	1.23E+03	6.44E+01

Percent TOC 1.00E+00
percent Lipids 1.44E+01
Invertebrate BSAFs used for inorganics

1 - If the average of all value is the greater than the maximum detection, the average of the positive detections was used as the average value.

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal		Bird	
	NOAEL	LOAEL	NOAEL	LOAEL
VOLATILES				
1,1,1-Trichloroethane	1000	1000	NV	NV
1,1,2,2-Tetrachloroethane	76	108	NV	NV
1,1,2-Trichloroethane	0.39	4.4	NV	NV
1,1-Dichloroethane	475	4750	NV	NV
1,1-Dichloroethene	30	300	NV	NV
1,2,4-Trichlorobenzene	1.48	14.8	NV	NV
1,2-Dichlorobenzene	120	1200	NV	NV
1,2-Dichloroethane	50	500	17.2	34.4
1,2-Dichloroethene (total)	45.2	452	NV	NV
1,4-Dichlorobenzene	30	300	NV	NV
2-Butanone	1771	4571	NV	NV
2-Hexanone	NV	NV	NV	NV
4-Methyl-2-pentanone	NV	NV	NV	NV
Acetone	10	50	20089	200890
Benzene	26.36	263.6	NV	NV
Bromodichloromethane	1.79	17.9	NV	NV
Carbon Disulfide	12.6	25.6	NV	NV
Carbon Tetrachloride	16	160	NV	NV
Chlorobenzene	2.725	5.45	NV	NV
Chloroform	15	41	NV	NV
Chloromethane	NV	NV	NV	NV
cis-1,2-Dichloroethene	45.2	452	NV	NV
Dichlorodifluoromethane	2310	23100	NV	NV
Ethylbenzene	9.71	29.1	NV	NV
Isopropylbenzene	11	33.1	NV	NV
m,p-Xylene	2.06	2.58	107	1070
Methyl acetate	NV	NV	NV	NV
o-Xylene	2.06	2.58	107	1070
Methylene Chloride	5.85	50	NV	NV
Styrene	20	40	NV	NV
Tetrachloroethene	1.4	7	NV	NV
Toluene	26	260	NV	NV
Trichloroethene	0.7	7	NV	NV
Trichlorofluoromethane	34.9	349	NV	NV
Vinyl chloride	17	1.7	NV	NV
Xylenes, Total	2.06	2.58	107	1070
SEMIVOLATILES				
1,1'-Biphenyl	5	25	NV	NV
2,2'-Oxybis(1-chloropropane)	NV	NV	NV	NV
2,3,4,6-Tetrachlorophenol	2.5	10	NV	NV
2,4,5-Trichlorophenol	10	30	NV	NV
2,4,6-Trichlorophenol	0.42	4.2	NV	NV
2,4-Dimethylphenol	5	25	NV	NV
2-Methylnaphthalene	65.6	356	2	20
2-Methylphenol	5	15	NV	NV
3-Nitroaniline	NV	NV	NV	NV
4-Chloroaniline	1.25	12.5	NV	NV
4-Chloro-3-methylphenol	NV	NV	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal		Bird	
	NOAEL	LOAEL	NOAEL	LOAEL
4-Methylphenol	NV	NV	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal		Bird	
	NOAEL	LOAEL	NOAEL	LOAEL
4-Nitroaniline	NV	NV	NV	NV
4-Nitrophenol	NV	NV	NV	NV
7,12-Dimethylbenz(a)anthracene	NV	NV	2	20
Acenaphthene	65.6	356	2	20
Acenaphthylene	65.6	356	2	20
Anthracene	65.6	356	2	20
Benzaldehyde	20	40	NV	NV
Benzo(a)anthracene	0.615	38.4	2	20
Benzo(a)pyrene	0.615	38.4	2	20
Benzo(b)fluoranthene	0.615	38.4	2	20
Benzo(g,h,i)perylene	0.615	38.4	2	20
Benzo(k)fluoranthene	0.615	38.4	2	20
Bis(2-Ethylhexyl)phthalate	18.3	183	1.11	11.1
Butyl benzyl phthalate	15.9	47	NV	NV
Caprolactam	50	500	NV	NV
Carbazole	1	10	2	20
Chrysene	0.615	38.4	2	20
Dibenzo(a,h)anthracene	0.615	38.4	2	20
Dibenzofuran	NV	NV	2	20
1,4-Dichlorobenzene	30	300	NV	NV
Diethylphthalate	4583	45830	NV	NV
Di-n-butyl phthalate	550	1833	0.111	1.11
Di-n-octyl phthalate	NV	NV	NV	NV
Fluoranthene	65.6	356	2	20
Fluorene	65.6	356	2	20
Hexachloroethane	0.1	1.5	NV	NV
Indeno(1,2,3-cd)pyrene	0.615	38.4	2	20
Isophorone	15	179	NV	NV
Naphthalene	65.6	356	2	20
n-Nitrosodiphenylamine	NV	NV	NV	NV
Pentachlorophenol	8.42	22.65	6.73	52.01
Phenanthrene	65.6	356	2	20
Phenol	6	12	NV	NV
Pyrene	0.615	38.4	2	20
Perylene	0.615	38.4	2	20
HERBICIDES				
Dinoseb	0.1	1	NV	NV
2,4-D	1	5	NV	NV
2,4,5-T	3	10	NV	NV
PESTICIDES/PCBs				
2,4'-DDD	0.147	5.56	0.227	2.7
2,4'-DDE	0.147	5.56	0.227	2.7
2,4'-DDT	0.147	5.56	0.227	2.7
4,4'-DDD	0.147	5.56	0.227	2.7
4,4'-DDE	0.147	5.56	0.227	2.7
4,4'-DDT	0.147	5.56	0.227	2.7
Aldrin	0.2	1	NV	NV
Alpha-BHC	0.014	0.14	0.56	2.25
Alpha-Chlordane	4.58	9.16	2.14	10.7

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal		Bird	
	NOAEL	LOAEL	NOAEL	LOAEL
Aroclor-1232	0.068	0.68	0.18	1.8
Aroclor-1242	0.069	0.69	0.41	4.1
Aroclor-1248	0.01	0.1	NV	NV
Aroclor-1254	0.068	0.68	0.18	1.8
Aroclor-1260	0.068	0.68	0.18	1.8
Aroclor-1268	0.068	0.68	0.18	1.8
PCB-28	0.068	0.68	0.18	1.8
PCB-44	0.068	0.68	0.18	1.8
PCB-52	0.068	0.68	0.18	1.8
PCB-66	0.068	0.68	0.18	1.8
PCB-101	0.068	0.68	0.18	1.8
PCB-105	0.068	0.68	0.18	1.8
PCB-118	0.068	0.68	0.18	1.8
PCB-128	0.068	0.68	0.18	1.8
PCB-138	0.068	0.68	0.18	1.8
PCB-153	0.068	0.68	0.18	1.8
PCB-170	0.068	0.68	0.18	1.8
PCB-180	0.068	0.68	0.18	1.8
PCB-187	0.068	0.68	0.18	1.8
PCB-195	0.068	0.68	0.18	1.8
PCB-206	0.068	0.68	0.18	1.8
PCB-209	0.068	0.68	0.18	1.8
beta-BHC	0.4	2	0.56	2.25
delta-BHC	0.014	0.14	0.56	2.25
Dieldrin	0.015	1.27	0.0709	0.8
Endosulfan I	0.15	1.5	10	100
Endosulfan II	0.15	1.5	10	100
Endosulfan Sulfate	0.15	1.5	10	100
Endrin	0.092	0.92	0.01035	0.1035
Endrin Aldehyde	0.092	0.92	0.01	0.1
Endrin Ketone	0.092	0.92	0.01	0.1
Gamma-BHC (Lindane)	8	80	2	20
Gamma-Chlordane	4.58	9.16	2.14	10.7
Heptachlor	0.1	1	NV	NV
Heptachlor Epoxide	0.1	1	NV	NV
Methoxychlor	4	8	NV	NV
Toxaphene	8	80	NV	NV
Total Aroclor	0.068	0.68	0.18	1.8
Total DDT	0.147	5.56	0.227	2.7
DIOXINS AND FURANS (mg/kg)				
1,2,3,4,6,7,8-HpCDD	0.0001	0.001	0.014	0.14
1,2,3,4,6,7,8-HpCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8,9-HPCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8-HXCDD	0.00001	0.0001	0.00028	0.0028
1,2,3,4,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,6,7,8-HxCDD	0.00001	0.0001	0.0014	0.014
1,2,3,6,7,8-HxCDF	0.00016	0.0016	0.00014	0.0014
1,2,3,7,8,9-HxCDD	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8,9-HxCDF	0.00001	0.0001	0.00014	0.0014

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal		Bird	
	NOAEL	LOAEL	NOAEL	LOAEL
2,3,4,6,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8-PECDD	0.000001	0.00001	0.000014	0.00014
1,2,3,7,8-PECDF	0.00016	0.0016	0.00014	0.0014
2,3,4,7,8-PECDF	0.000016	0.00016	0.000014	0.00014
2,3,7,8-TCDD	0.000001	0.00001	0.000014	0.00014
2,3,7,8-TCDF	0.00001	0.0001	0.000014	0.00014
OCDD	0.01	0.1	0.14	1.4
OCDF	0.01	0.1	0.14	1.4
TOTAL HpCDD	0.0001	0.001	0.014	0.14
TOTAL HxCDD	0.00001	0.0001	0.00014	0.0014
TOTAL PeCDD	0.000001	0.00001	0.000014	0.00014
Total HpCDF	0.0001	0.001	0.0014	0.014
Total HxCDF	0.00001	0.0001	0.00014	0.0014

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal		Bird	
	NOAEL	LOAEL	NOAEL	LOAEL
Total PeCDF	0.000002	0.00002	0.000014	0.00014
Total TCDD	0.000001	0.00001	0.000014	0.00014
Total TCDF	0.00001	0.0001	0.000014	0.00014
EXPLOSIVES (mg/kg)				
1,3 Dinitrobenzene	0.4	1.07	NV	NV
1,3,5-Trinitrobenzene	2.68	13.31	NV	NV
2,4-Dinitrotoluene	0.67	1.4	0.1	0.5
2,6-Dinitrotoluene	0.7	7	NV	NV
2,4,6-Trinitrotoluene	1.6	16	0.7	17.8
2-Amino-4,6-dinitrotoluene	NV	NV	NV	NV
2-Nitrotoluene	20	200	NV	NV
3-Nitrotoluene	20	200	NV	NV
4-Amino-2,6-dinitrotoluene	NV	NV	NV	NV
4-Nitrotoluene	20	200	NV	NV
Ammonia	NV	NV	NV	NV
HMX	3	7.5	NV	NV
Nitrobenzene (exp)	NV	NV	NV	NV
Nitroglycerin	3	32	NV	NV
RDX	7	35	NV	NV
Tetryl	1.3	6.2	NV	NV
INORGANICS				
Aluminum	1.93	19.3	109.7	1097
Antimony	0.059	2.76	NV	NV
Arsenic	1.04	4.55	2.24	4.51
Barium	51.8	82.7	20.8	41.7

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

Chemicals	Fish BSAFs[4]		Sediment Invertebrate BSAFs[5]	
	Conservative[5]	Average[5]	Conservative[5]	Average[5]
Volatile Organics				
2-Butanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Acetone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Carbon Disulfide	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Toluene	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Total Xylenes	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Trichloroethene	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Trichlorofluoromethane	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Semivolatile Organics				
Acenaphthene	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Acenaphthylene	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Acetophenone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Anthracene	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Benzo(a)anthracene	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Benzo(a)pyrene	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Benzo(b)fluoranthene	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Benzo(g,h,i)perylene	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Benzo(k)Fluoranthene	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Chrysene	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Dibenzo(a,h)Anthracene	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Fluoranthene	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Fluorene	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Indeno(1,2,3-cd)pyrene	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Pentachlorophenol	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Phenanthrene	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Pyrene	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Total PAHs	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Pesticides/ PCBs				
4,4'-DDD	2.80E-01	2.80E-01	1.00E+00	1.00E+00
4,4'-DDE	7.70E+00	7.70E+00	1.00E+00	1.00E+00
4,4'-DDT	1.67E+00	1.67E+00	1.00E+00	1.00E+00
Aldrin	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Alpha-Chlordane	4.77E+00	4.77E+00	1.00E+00	1.00E+00
Aroclor-1254	1.85E+00	1.85E+00	6.41E+01	3.62E+01
Aroclor-1260	1.85E+00	1.85E+00	6.41E+01	3.62E+01
Dieldrin	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Gamma-Chlordane	2.22E+00	2.22E+00	1.00E+00	1.00E+00
Heptachlor	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Endosulfan I	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Endosulfan II	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Endosulfan Sulfate	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Endrin	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Endrin Aldehyde	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Endrin Ketone	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Heptachlor Epoxide	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Methoxychlor	1.80E+00	1.80E+00	1.00E+00	1.00E+00
alpha-BHC	1.80E+00	1.80E+00	1.00E+00	1.00E+00
beta-BHC	1.80E+00	1.80E+00	1.00E+00	1.00E+00

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Fish BSAFs[4]		Sediment Invertebrate BSAFs[5]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
delta-BHC	1.80E+00	1.80E+00	1.00E+00	1.00E+00
gamma-BHC (Lindane)	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Total Aroclor	1.85E+00	1.85E+00	6.41E+01	3.62E+01
Total DDT	7.70E+00	7.70E+00	1.00E+00	1.00E+00
Toxaphene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Inorganics				
Aluminum	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Antimony	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Arsenic	1.00E+00	1.00E+00	6.90E-01	1.43E-01
Barium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Beryllium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Cadmium	1.00E+00	1.00E+00	7.99E+00	6.00E-01
Chromium	1.00E+00	1.00E+00	4.68E-01	1.00E-01
Cobalt	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Copper	1.00E+00	1.00E+00	5.25E+00	1.56E+00
Hexavalent Chromium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Cyanide	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Iron	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Lead	1.00E+00	1.00E+00	6.07E-01	7.10E-02
Manganese	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Mercury	1.00E+00	1.00E+00	2.87E+00	1.14E+00
Nickel	1.00E+00	1.00E+00	2.32E+00	4.86E-01
Selenium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Silver	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Thallium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Tin	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Vanadium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Zinc	1.00E+00	1.00E+00	7.53E+00	1.94E+00

Notes:
BAF - Bioaccumulation Factor
BSAF - Biota Sediment Accumulation Factor
1 - ORNL (2001) for organics; only one value is available for conservative and average exposures
2 - Sample et al., (1997) for inorganics; conservative value is 90th percentile; average value is median value
3 - ORNL (September, 1998) for all chemicals; conservative value is 90th percentile; average value is median v
4 - U.S. EPA, September 1997; only one value is available for conservative and average exposures. Values for
5 - Conservative and average refers to the exposure scenarios for which the uptake factors are used
6 - Where "Eco-SSL" is given, values were calculated using equations from USEPA (2005), Attachment 4-1, Tables 4a (for inorganics) and 4b (for organics).

Default value of 1 is assigned to parameters without uptake factors

TABLE X-X

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

Species/Exposure Inputs	Conservative Inputs		Average Inputs	
	Values	Units	Values	Units
Bobwhite Quail				
Body Weight = BW	1.540E-01	kg	1.751E-01	kg
Food Ingestion Rate = If	4.880E-03	kg/day	4.080E-03	kg/day
Water Ingestion Rate = Iw	2.276E-02	L/day	1.926E-02	L/day
Soil Ingestion Rate = Is	6.783E-04	kg/day	2.489E-04	kg/day
Home Range = HR	Assume 100% on site		1.880E+01	acres
Meadow Vole				
Body Weight = BW	1.700E-02	kg	3.580E-02	kg
Food Ingestion Rate = If	3.756E-03	kg/day	3.488E-03	kg/day
Water Ingestion Rate = Iw	7.513E-03	L/day	6.261E-03	L/day
Soil Ingestion Rate = Is	1.202E-04	kg/day	4.186E-05	kg/day
Home Range = HR	Assume 100% on site		6.590E-02	acres
American Robin				
Body Weight = BW	7.73E-02	kg	8.04E-02	kg
Food Ingestion Rate = If	1.25E-02	kg/day	1.19E-02	kg/day
Water Ingestion Rate = Iw	1.21E-02	L/day	1.13E-02	L/day
Soil Ingestion Rate - Is	2.046E-03	kg/day	7.601E-04	kg/day
Home Range = HR	Assume 100% on site		6.095E-01	acres
Short-Tailed Shrew				
Body Weight = BW	1.500E-02	kg	1.610E-02	kg
Food Ingestion Rate = If	1.600E-03	kg/day	1.433E-03	kg/day
Water Ingestion Rate = Iw	4.280E-03	L/day	3.600E-03	L/day
Soil Ingestion Rate - Is	4.801E-05	kg/day	1.289E-05	kg/day
Home Range = HR	Assume 100% on site		9.699E-01	acres
Mink				
Body Weight = BW	5.500E-01	kg	1.103E+00	kg
Food Ingestion Rate = If	6.067E-02	kg/day	4.504E-02	kg/day
Water Ingestion Rate = Iw	1.213E-01	L/day	7.308E-02	L/day
Sediment Ingestion Rate = Is	5.703E-03	kg/day	4.234E-03	kg/day
Home Range = HR	Assume 100% on site		1.558E+03	acres
Great Blue Heron				
Body Weight = BW	2.20E+00	kg	2.31E+00	kg
Food Ingestion Rate = If	1.16E-01	kg/day	1.04E-01	kg/day
Water Ingestion Rate = Iw	1.16E-01	L/day	1.04E-01	L/day
Sediment Ingestion Rate = Is	3.825E-03	kg/day	3.430E-03	kg/day
Home Range = HR	Assume 100% on site			km-radius

Notes:
The exposure factors were derived as presented in Appendix I.

The soil/sediment ingestion rates were calculated by multiplying the food ingestion rates by the following incidental soil/sediment ingestion rates:

	Conservative	Average	Source
Bobwhite quail	13.90%	6.10%	1, 2
Meadow Vole	3.20%	1.20%	1
American Robin	16.40%	6.40%	1,4
Short-tailed Shrew	3%	0.90%	1
Mink	9.4%	9.4%	3, 5
Great Blue Heron	3.3%	3.3%	3, 7

1 - USEPA (U.S. Environmental Protection Agency), 2005. Ecological Soil Screening Level Guidance, Office of Emergency and Remedial Response. February.
2 - Based on the mourning dove.
3 - Beyer, N., E. Connor, and S. Gerould. 1994. Estimates of Soil Ingestion by Wildlife. Journal of Wildlife Management 58(2) pp. 375-382.
4 - Based on the American woodcock
5 - Based on the raccoon
6 - Based on piscivorous birds
7 - Based on a Mallard Duck

APPENDIX F

GREAT BLUE HERON - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SEDIMENT
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Sed. Conc. (mg/kg)	Max SW Conc. (mg/L)	Fish Conc. (mg/kg)	Dose (mg/kg/d) from: Sediment	Surface Water	Fish	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
BENZO(A)ANTHRACENE	2.90E-03	0.00E+00	1.21E-02	2.32E-05	0.00E+00	1.88E-03	1.90E-03	2.00E+00	2.00E+01	9.5E-04	9.5E-05
BENZO(A)PYRENE	4.60E-03	0.00E+00	1.92E-02	3.68E-05	0.00E+00	2.98E-03	3.01E-03	2.00E+00	2.00E+01	1.5E-03	1.5E-04
BENZO(B)FLUORANTHENE	3.40E-03	0.00E+00	1.42E-02	2.72E-05	0.00E+00	2.20E-03	2.23E-03	2.00E+00	2.00E+01	1.1E-03	1.1E-04
BENZO(G,H,I)PERYLENE	2.80E-03	0.00E+00	1.17E-02	2.24E-05	0.00E+00	1.81E-03	1.83E-03	2.00E+00	2.00E+01	9.2E-04	9.2E-05
CHRYSENE	5.40E-03	0.00E+00	2.26E-02	4.32E-05	0.00E+00	3.50E-03	3.54E-03	2.00E+00	2.00E+01	1.8E-03	1.8E-04
INDENO(1,2,3-CD)PYRENE	2.90E-03	0.00E+00	1.21E-02	2.32E-05	0.00E+00	1.88E-03	1.90E-03	2.00E+00	2.00E+01	9.5E-04	9.5E-05
Inorganics											
ARSENIC	5.80E+00	0.00E+00	4.00E+00	4.64E-02	0.00E+00	6.20E-01	6.67E-01	2.24E+00	4.51E+00	3.0E-01	1.5E-01
COPPER	3.61E+01	0.00E+00	1.90E+02	2.89E-01	0.00E+00	2.94E+01	2.97E+01	4.05E+00	3.49E+01	7.3E+00	8.5E-01
LEAD	3.70E+01	0.00E+00	2.25E+01	2.96E-01	0.00E+00	3.48E+00	3.78E+00	1.63E+00	4.46E+01	2.3E+00	8.5E-02
TIN	3.40E+00	0.00E+00	3.40E+00	2.72E-02	0.00E+00	5.27E-01	5.54E-01	6.76E+00	1.69E+01	8.2E-02	3.3E-02
ZINC	1.64E+02	0.00E+00	1.23E+03	1.31E+00	0.00E+00	1.91E+02	1.93E+02	6.61E+01	1.71E+02	2.9E+00	1.1E+00

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	2.00E-01	kg
Food Ingestion Rate = (If)	3.10E-02	kg/day
Water Ingestion Rate = (Iw)	2.20E-02	L/day
Sediment Ingestion Rate = (Is)	1.60E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (sediment) = (Cs * Is)(H)/BW
Dose (fish) = (Cf * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cf = Contaminant concentration in fish
Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Total Dose = Dose (sediment) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
Sed = Sediment
SW = Surface Water

APPENDIX F

GREAT BLUE HERON - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SEDIMENT
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Sed. Conc. (mg/kg)	Avg SW Conc. (mg/L)	Fish Conc. (mg/kg)	Dose (mg/kg/d) from: Sediment	Surface Water	Fish	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
BENZO(A)ANTHRACENE	2.90E-03	0.00E+00	1.21E-02	2.05E-05	0.00E+00	1.71E-03	1.73E-03	2.00E+00	2.00E+01	8.7E-04	8.7E-05
BENZO(A)PYRENE	4.60E-03	0.00E+00	1.92E-02	3.25E-05	0.00E+00	2.72E-03	2.75E-03	2.00E+00	2.00E+01	1.4E-03	1.4E-04
BENZO(B)FLUORANTHENE	3.40E-03	0.00E+00	1.42E-02	2.41E-05	0.00E+00	2.01E-03	2.03E-03	2.00E+00	2.00E+01	1.0E-03	1.0E-04
BENZO(G,H,I)PERYLENE	2.80E-03	0.00E+00	1.17E-02	1.98E-05	0.00E+00	1.65E-03	1.67E-03	2.00E+00	2.00E+01	8.4E-04	8.4E-05
CHRYSENE	5.40E-03	0.00E+00	2.26E-02	3.82E-05	0.00E+00	3.19E-03	3.23E-03	2.00E+00	2.00E+01	1.6E-03	1.6E-04
INDENO(1,2,3-CD)PYRENE	2.90E-03	0.00E+00	1.21E-02	2.05E-05	0.00E+00	1.71E-03	1.73E-03	2.00E+00	2.00E+01	8.7E-04	8.7E-05
Inorganics											
ARSENIC	1.49E+00	0.00E+00	2.13E-01	1.06E-02	0.00E+00	3.02E-02	4.08E-02	2.24E+00	4.51E+00	1.8E-02	9.0E-03
COPPER	7.36E+00	0.00E+00	1.15E+01	5.21E-02	0.00E+00	1.62E+00	1.67E+00	4.05E+00	3.49E+01	4.1E-01	4.8E-02
LEAD	1.36E+01	0.00E+00	9.63E-01	9.59E-02	0.00E+00	1.36E-01	2.32E-01	1.63E+00	4.46E+01	1.4E-01	5.2E-03
TIN	9.31E-01	0.00E+00	9.31E-01	6.59E-03	0.00E+00	1.32E-01	1.38E-01	6.76E+00	1.69E+01	2.0E-02	8.2E-03
ZINC	3.32E+01	0.00E+00	6.44E+01	2.35E-01	0.00E+00	9.11E+00	9.34E+00	6.61E+01	1.71E+02	1.4E-01	5.4E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	2.12E-01	kg
Food Ingestion Rate = (If)	3.00E-02	kg/day
Water Ingestion Rate = (Iw)	2.10E-02	L/day
Sediment Ingestion Rate = (Is)	1.50E-03	kg/day
Home Range = (HR)	1.00E+01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (sediment) = (Cs * Is)(H)/BW
Dose (fish) = (Cf * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cf = Contaminant concentration in fish
Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Total Dose = Dose (sediment) + Dose (fish) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
Sed = Sediment
SW = Surface Water

APPENDIX F

MINK - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SEDIMENT
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Sed Conc. (mg/kg)	Max SW Conc. (mg/L)	Fish Conc. (mg/kg)	Dose (mg/kg/d) from: Sediment	Surface Water	Fish	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
BENZO(A)ANTHRACENE	2.90E-03	0.00E+00	1.21E-02	3.01E-05	0.00E+00	1.34E-03	1.37E-03	6.15E-01	3.84E+01	2.2E-03	3.6E-05
BENZO(A)PYRENE	4.60E-03	0.00E+00	1.92E-02	4.77E-05	0.00E+00	2.12E-03	2.17E-03	6.15E-01	3.84E+01	3.5E-03	5.6E-05
BENZO(B)FLUORANTHENE	3.40E-03	0.00E+00	1.42E-02	3.53E-05	0.00E+00	1.57E-03	1.60E-03	6.15E-01	3.84E+01	2.6E-03	4.2E-05
BENZO(G,H,I)PERYLENE	2.80E-03	0.00E+00	1.17E-02	2.90E-05	0.00E+00	1.29E-03	1.32E-03	6.15E-01	3.84E+01	2.1E-03	3.4E-05
CHRYSENE	5.40E-03	0.00E+00	2.26E-02	5.60E-05	0.00E+00	2.49E-03	2.54E-03	6.15E-01	3.84E+01	4.1E-03	6.6E-05
INDENO(1,2,3-CD)PYRENE	2.90E-03	0.00E+00	1.21E-02	3.01E-05	0.00E+00	1.34E-03	1.37E-03	6.15E-01	3.84E+01	2.2E-03	3.6E-05
Inorganics											
ARSENIC	5.80E+00	0.00E+00	4.00E+00	6.01E-02	0.00E+00	4.41E-01	5.02E-01	1.04E+00	4.55E+00	4.8E-01	1.1E-01
COPPER	3.61E+01	0.00E+00	1.90E+02	3.74E-01	0.00E+00	2.09E+01	2.13E+01	5.60E+00	8.27E+01	3.8E+00	2.6E-01
LEAD	3.70E+01	0.00E+00	2.25E+01	3.84E-01	0.00E+00	2.48E+00	2.86E+00	4.70E+00	1.86E+02	6.1E-01	1.5E-02
TIN	3.40E+00	0.00E+00	3.40E+00	3.53E-02	0.00E+00	3.75E-01	4.10E-01	2.34E+01	3.50E+01	1.8E-02	1.2E-02
ZINC	1.64E+02	0.00E+00	1.23E+03	1.70E+00	0.00E+00	1.36E+02	1.38E+02	7.54E+01	2.98E+02	1.8E+00	4.6E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	5.50E-01	kg
Food Ingestion Rate = (If)	6.07E-02	kg/day
Water Ingestion Rate = (Iw)	1.21E-01	L/day
Sediment Ingestion Rate = (Is)	5.70E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (sediment) = (Cs * Is)(H)/BW
Dose (fish) = (Cf * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cf = Contaminant concentration in fish
Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Total Dose = Dose (sediment) + Dose (fish) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
Sed = Sediment
SW = Surface Water

APPENDIX F

MINK - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SEDIMENT
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Sed Conc. (mg/kg)	Avg SW Conc. (mg/L)	Fish Conc. (mg/kg)	Dose (mg/kg/d) from:			Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients	
				Sediment	Surface Water	Fish				NOAEL	LOAEL
Semivolatile Organics											
BENZO(A)ANTHRACENE	2.90E-03	0.00E+00	1.21E-02	1.11E-05	0.00E+00	4.95E-04	5.06E-04	6.15E-01	3.84E+01	8.2E-04	1.3E-05
BENZO(A)PYRENE	4.60E-03	0.00E+00	1.92E-02	1.77E-05	0.00E+00	7.84E-04	8.02E-04	6.15E-01	3.84E+01	1.3E-03	2.1E-05
BENZO(B)FLUORANTHENE	3.40E-03	0.00E+00	1.42E-02	1.31E-05	0.00E+00	5.80E-04	5.93E-04	6.15E-01	3.84E+01	9.6E-04	1.5E-05
BENZO(G,H,I)PERYLENE	2.80E-03	0.00E+00	1.17E-02	1.07E-05	0.00E+00	4.77E-04	4.88E-04	6.15E-01	3.84E+01	7.9E-04	1.3E-05
CHRYSENE	5.40E-03	0.00E+00	2.26E-02	2.07E-05	0.00E+00	9.21E-04	9.42E-04	6.15E-01	3.84E+01	1.5E-03	2.5E-05
INDENO(1,2,3-CD)PYRENE	2.90E-03	0.00E+00	1.21E-02	1.11E-05	0.00E+00	4.95E-04	5.06E-04	6.15E-01	3.84E+01	8.2E-04	1.3E-05
Inorganics											
ARSENIC	1.49E+00	0.00E+00	2.13E-01	5.73E-03	0.00E+00	8.72E-03	1.44E-02	1.04E+00	4.55E+00	1.4E-02	3.2E-03
COPPER	7.36E+00	0.00E+00	1.15E+01	2.83E-02	0.00E+00	4.68E-01	4.96E-01	5.60E+00	8.27E+01	8.9E-02	6.0E-03
LEAD	1.36E+01	0.00E+00	9.63E-01	5.20E-02	0.00E+00	3.93E-02	9.13E-02	4.70E+00	1.86E+02	1.9E-02	4.9E-04
TIN	9.31E-01	0.00E+00	9.31E-01	3.57E-03	0.00E+00	3.80E-02	4.16E-02	2.34E+01	3.50E+01	1.8E-03	1.2E-03
ZINC	3.32E+01	0.00E+00	6.44E+01	1.28E-01	0.00E+00	2.63E+00	2.76E+00	7.54E+01	2.98E+02	3.7E-02	9.3E-03

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.10E+00	kg
Food Ingestion Rate = (If)	4.50E-02	kg/day
Water Ingestion Rate = (Iw)	7.31E-02	L/day
Sediment Ingestion Rate = (Is)	4.23E-03	kg/day
Home Range = (HR)	3.49E+01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (sediment) = (Cs * Is)(H)/BW
Dose (fish) = (Cf * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cf = Contaminant concentration in fish
Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Total Dose = Dose (sediment) + Dose (fish) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
Sed = Sediment
SW = Surface Water

TABLE 4-6.3.6

TERRESTRIAL FOOD CHAIN MODEL - CONSERVATIVE SCENARIO
PISCIVOROUS RECEPTORS - SEDIMENT
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Piscivorous Receptor EEQs			
	Great Blue Heron		Mink	
	NOAEL	LOAEL	NOAEL	LOAEL
Semivolatile Organics				
BENZO(A)ANTHRACENE	9.5E-04	9.5E-05	2.2E-03	3.6E-05
BENZO(A)PYRENE	1.5E-03	1.5E-04	3.5E-03	5.6E-05
BENZO(B)FLUORANTHENE	1.1E-03	1.1E-04	2.6E-03	4.2E-05
BENZO(G,H,I)PERYLENE	9.2E-04	9.2E-05	2.1E-03	3.4E-05
CHRYSENE	1.8E-03	1.8E-04	4.1E-03	6.6E-05
INDENO(1,2,3-CD)PYRENE	9.5E-04	9.5E-05	2.2E-03	3.6E-05
Inorganics				
ARSENIC	3.0E-01	1.5E-01	4.8E-01	1.1E-01
COPPER	7.3E+00	8.5E-01	3.8E+00	2.6E-01
LEAD	2.3E+00	8.5E-02	6.1E-01	1.5E-02
TIN	8.2E-02	3.3E-02	1.8E-02	1.2E-02
ZINC	2.9E+00	1.1E+00	1.8E+00	4.6E-01

Cells are shaded if the value is greater than 1.0

#VALUE! - Value Not Available
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

TABLE 4-6.3.9

TERRESTRIAL FOOD CHAIN MODEL - AVERAGE SCENARIO
PISCIVOROUS RECEPTORS - SEDIMENT
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Piscivorous Receptor EEQs			
	Great Blue Heron		Mink	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL
Semivolatile Organics				
BENZO(A)ANTHRACENE	8.7E-04	8.7E-05	8.2E-04	1.3E-05
BENZO(A)PYRENE	1.4E-03	1.4E-04	1.3E-03	2.1E-05
BENZO(B)FLUORANTHENE	1.0E-03	1.0E-04	9.6E-04	1.5E-05
BENZO(G,H,I)PERYLENE	8.4E-04	8.4E-05	7.9E-04	1.3E-05
CHRYSENE	1.6E-03	1.6E-04	1.5E-03	2.5E-05
INDENO(1,2,3-CD)PYRENE	8.7E-04	8.7E-05	8.2E-04	1.3E-05
Inorganics				
ARSENIC	1.8E-02	9.0E-03	1.4E-02	3.2E-03
COPPER	4.1E-01	4.8E-02	8.9E-02	6.0E-03
LEAD	1.4E-01	5.2E-03	1.9E-02	4.9E-04
TIN	2.0E-02	8.2E-03	1.8E-03	1.2E-03
ZINC	1.4E-01	5.4E-02	3.7E-02	9.3E-03

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

APPENDIX F

CHEMICAL CONCENTRATIONS IN SURFACE SOIL AND TISSUE - SURFACE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Surface Soil Concentrations (mg/kg)				Surface Water Concentrations (mg/L)		Earthworm Bioaccumulation Factors		Earthworm Concentrations (mg/kg)		Plant Bioaccumulation Factors		Plant Concentrations (mg/kg)	
	Maximum Detection	Average All	Average of Positive Detections	Average [1]	Maximum Detection	Average Concentration[1]	Conservative	Average	Maximum Detection	Average	Conservative	Average	Maximum Detection	Average
Semivolatile Organics														
1-METHYLNAPHTHALENE	2.30E-01	8.12E-01	9.56E-02	9.56E-02	0.00E+00	0.00E+00	3.04E+00	3.04E+00	6.99E-01	2.91E-01	Regression from Eco SSL		1.37E-01	9.19E-02
2-METHYLNAPHTHALENE	2.30E-01	9.17E-01	7.10E-02	7.10E-02	0.00E+00	0.00E+00	3.04E+00	3.04E+00	6.99E-01	2.16E-01	Regression from Eco SSL		1.37E-01	8.03E-02
ACENAPHTHENE	5.00E+00	1.17E+00	1.40E+00	1.17E+00	0.00E+00	0.00E+00	1.47E+00	1.47E+00	7.35E+00	1.72E+00	Regression from Eco SSL		9.69E-04	3.36E-03
ANTHRACENE	7.20E+00	1.61E+00	1.94E+00	1.61E+00	0.00E+00	0.00E+00	2.42E+00	2.42E+00	1.74E+01	3.91E+00	Regression from Eco SSL		1.73E+00	5.40E-01
BENZO(A)ANTHRACENE	3.30E+01	8.34E+00	8.34E+00	8.34E+00	0.00E+00	0.00E+00	1.59E+00	1.59E+00	5.25E+01	1.33E+01	Regression from Eco SSL		5.33E-01	2.35E-01
BENZO(A)PYRENE	4.20E+01	1.07E+01	1.07E+01	1.07E+01	0.00E+00	0.00E+00	1.33E+00	1.33E+00	5.59E+01	1.43E+01	Regression from Eco SSL		4.87E+00	1.29E+00
BENZO(B)FLUORANTHENE	4.10E+01	1.07E+01	1.07E+01	1.07E+01	0.00E+00	0.00E+00	2.60E+00	2.60E+00	1.07E+02	2.78E+01	3.10E-01	3.10E-01	1.27E+01	3.32E+00
BENZO(G,H,I)PERYLENE	2.50E+01	6.29E+00	6.29E+00	6.29E+00	0.00E+00	0.00E+00	2.94E+00	2.94E+00	7.35E+01	1.85E+01	Regression from Eco SSL		1.77E+01	3.47E+00
BENZO(K)FLUORANTHENE	1.80E+01	4.50E+00	4.50E+00	4.50E+00	0.00E+00	0.00E+00	2.60E+00	2.60E+00	4.68E+01	1.17E+01	Regression from Eco SSL		1.39E+00	4.21E-01
CHRYSENE	4.30E+01	1.07E+01	1.07E+01	1.07E+01	0.00E+00	0.00E+00	2.29E+00	2.29E+00	9.85E+01	2.45E+01	Regression from Eco SSL		6.24E-01	2.73E-01
DIBENZO(A,H)ANTHRACENE	7.60E+00	1.95E+00	1.95E+00	1.95E+00	0.00E+00	0.00E+00	2.31E+00	2.31E+00	1.76E+01	4.52E+00	1.30E-01	1.30E-01	9.88E-01	2.54E-01
FLUORANTHENE	3.80E+01	9.72E+00	9.72E+00	9.72E+00	0.00E+00	0.00E+00	3.04E+00	3.04E+00	1.16E+02	2.96E+01	5.00E-01	5.00E-01	1.90E+01	4.86E+00
FLUORENE	3.10E+00	1.08E+00	6.29E-01	1.08E+00	0.00E+00	0.00E+00	9.57E+00	9.57E+00	2.97E+01	1.03E+01	Regression from Eco SSL		1.46E-03	3.60E-03
INDENO(1,2,3-CD)PYRENE	2.70E+01	6.97E+00	6.97E+00	6.97E+00	0.00E+00	0.00E+00	2.86E+00	2.86E+00	7.72E+01	1.99E+01	1.10E-01	1.10E-01	2.97E+00	7.67E-01
NAPHTHALENE	3.30E-01	1.15E+00	1.18E-01	1.18E-01	0.00E+00	0.00E+00	4.40E+00	4.40E+00	1.45E+00	5.19E-01	1.22E+01	1.22E+01	4.03E+00	1.44E+00
PHENANTHRENE	3.00E+01	6.82E+00	6.82E+00	6.82E+00	0.00E+00	0.00E+00	1.72E+00	1.72E+00	5.16E+01	1.17E+01	Regression from Eco SSL		6.98E+00	2.79E+00
PYRENE	4.50E+01	1.14E+01	1.14E+01	1.14E+01	0.00E+00	0.00E+00	1.75E+00	1.75E+00	7.88E+01	1.99E+01	7.20E-01	7.20E-01	3.24E+01	8.18E+00
Inorganics														
ANTIMONY	4.80E+00	8.83E-01	8.83E-01	8.83E-01	0.00E+00	0.00E+00	1.00E+00	1.00E+00	4.80E+00	8.83E-01	1.14E-02	1.02E-02	1.72E-01	3.51E-02
COPPER	3.76E+01	1.33E+01	1.33E+01	1.33E+01	0.00E+00	0.00E+00	5.15E-01	5.15E-01	1.94E+01	6.84E+00	Regression from Eco SSL		8.14E+00	5.40E+00
LEAD	9.40E+02	3.20E+02	3.20E+02	3.20E+02	0.00E+00	0.00E+00	Regression from Eco SSL		2.02E+02	8.45E+01	Regression from Eco SSL		1.23E+01	6.74E+00
ZINC	5.33E+01	3.55E+01	3.55E+01	3.55E+01	0.00E+00	0.00E+00	Regression from Eco SSL		3.15E+02	2.76E+02	Regression from Eco SSL		4.37E+01	3.49E+01

1 - If the average of all value is the greater than the maximum detection, the average of the positive detections was used as the average value.

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
VOLATILES				
1,1,1-Trichloroethane	1000	1000	NV	NV
1,1,2,2-Tetrachloroethane	76	108	NV	NV
1,1,2-Trichloroethane	0.39	4.4	NV	NV
1,1-Dichloroethane	475	4750	NV	NV
1,1-Dichloroethene	30	300	NV	NV
1,2,4-Trichlorobenzene	1.48	14.8	NV	NV
1,2-Dichlorobenzene	120	1200	NV	NV
1,2-Dichloroethane	50	500	17.2	34.4
1,2-Dichloroethene (total)	45.2	452	NV	NV
1,4-Dichlorobenzene	30	300	NV	NV
2-Butanone	1771	4571	NV	NV
2-Hexanone	NV	NV	NV	NV
4-Methyl-2-pentanone	NV	NV	NV	NV
Acetone	10	50	20089	200890
Benzene	26.36	263.6	NV	NV
Bromodichloromethane	1.79	17.9	NV	NV
Carbon Disulfide	12.6	25.6	NV	NV
Carbon Tetrachloride	16	160	NV	NV
Chlorobenzene	2.725	5.45	NV	NV
Chloroform	15	41	NV	NV
Chloromethane	NV	NV	NV	NV
cis-1,2-Dichloroethene	45.2	452	NV	NV
Dichlorodifluoromethane	2310	23100	NV	NV
Ethylbenzene	9.71	29.1	NV	NV
Isopropylbenzene	11	33.1	NV	NV
m,p-Xylene	2.06	2.58	107	1070
Methyl acetate	NV	NV	NV	NV
o-Xylene	2.06	2.58	107	1070
Methylene Chloride	5.85	50	NV	NV
Styrene	20	40	NV	NV
Tetrachloroethene	1.4	7	NV	NV
Toluene	26	260	NV	NV
Trichloroethene	0.7	7	NV	NV
Trichlorofluoromethane	34.9	349	NV	NV
Vinyl chloride	17	1.7	NV	NV
Xylenes, Total	2.06	2.58	107	1070
SEMIVOLATILES				
1,1'-Biphenyl	5	25	NV	NV
2,2'-Oxybis(1-chloropropane)	NV	NV	NV	NV
2,3,4,6-Tetrachlorophenol	2.5	10	NV	NV
2,4,5-Trichlorophenol	10	30	NV	NV
2,4,6-Trichlorophenol	0.42	4.2	NV	NV
2,4-Dimethylphenol	5	25	NV	NV
1-Methylnaphthalene	65.6	356	2	20
2-Methylnaphthalene	65.6	356	2	20
2-Methylphenol	5	15	NV	NV
3-Nitroaniline	NV	NV	NV	NV
4-Chloroaniline	1.25	12.5	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
4-Chloro-3-methylphenol	NV	NV	NV	NV
4-Methylphenol	NV	NV	NV	NV
4-Nitroaniline	NV	NV	NV	NV
4-Nitrophenol	NV	NV	NV	NV
7,12-Dimethylbenz(a)anthracene	NV	NV	2	20
Acenaphthene	65.6	356	2	20
Acenaphthylene	65.6	356	2	20
Anthracene	65.6	356	2	20
Benzaldehyde	20	40	NV	NV
Benzo(a)anthracene	0.615	38.4	2	20
Benzo(a)pyrene	0.615	38.4	2	20

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Benzo(b)fluoranthene	0.615	38.4	2	20
Benzo(g,h,i)perylene	0.615	38.4	2	20
Benzo(k)fluoranthene	0.615	38.4	2	20
Bis(2-Ethylhexyl)phthalate	18.3	183	1.11	11.1
Butyl benzyl phthalate	15.9	47	NV	NV
Caprolactam	50	500	NV	NV
Carbazole	1	10	2	20
Chrysene	0.615	38.4	2	20
Dibenzo(a,h)anthracene	0.615	38.4	2	20
Dibenzofuran	NV	NV	2	20
1,4-Dichlorobenzene	30	300	NV	NV
Diethylphthalate	4583	45830	NV	NV
Di-n-butyl phthalate	550	1833	0.111	1.11
Di-n-octyl phthalate	NV	NV	NV	NV
Fluoranthene	65.6	356	2	20
Fluorene	65.6	356	2	20
Hexachloroethane	0.1	1.5	NV	NV
Indeno(1,2,3-cd)pyrene	0.615	38.4	2	20
Isophorone	15	179	NV	NV
Naphthalene	65.6	356	2	20
n-Nitrosodiphenylamine	NV	NV	NV	NV
Pentachlorophenol	8.42	22.65	6.73	52.01
Phenanthrene	65.6	356	2	20
Phenol	6	12	NV	NV
Pyrene	0.615	38.4	2	20
Perylene	0.615	38.4	2	20
HERBICIDES				
Dinoseb	0.1	1	NV	NV
2,4-D	1	5	NV	NV
2,4,5-T	3	10	NV	NV
PESTICIDES/PCBs				
2,4'-DDD	0.147	5.56	0.227	2.7
2,4'-DDE	0.147	5.56	0.227	2.7
2,4'-DDT	0.147	5.56	0.227	2.7
4,4'-DDD	0.147	5.56	0.227	2.7
4,4'-DDE	0.147	5.56	0.227	2.7
4,4'-DDT	0.147	5.56	0.227	2.7
Aldrin	0.2	1	NV	NV
Alpha-BHC	0.014	0.14	0.56	2.25
Alpha-Chlordane	4.58	9.16	2.14	10.7
Aroclor-1232	0.068	0.68	0.18	1.8
Aroclor-1242	0.069	0.69	0.41	4.1
Aroclor-1248	0.01	0.1	NV	NV
Aroclor-1254	0.068	0.68	0.18	1.8
Aroclor-1260	0.068	0.68	0.18	1.8
Aroclor-1268	0.068	0.68	0.18	1.8
PCB-28	0.068	0.68	0.18	1.8
PCB-44	0.068	0.68	0.18	1.8
PCB-52	0.068	0.68	0.18	1.8

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
PCB-66	0.068	0.68	0.18	1.8
PCB-101	0.068	0.68	0.18	1.8
PCB-105	0.068	0.68	0.18	1.8
PCB-118	0.068	0.68	0.18	1.8
PCB-128	0.068	0.68	0.18	1.8
PCB-138	0.068	0.68	0.18	1.8
PCB-153	0.068	0.68	0.18	1.8
PCB-170	0.068	0.68	0.18	1.8
PCB-180	0.068	0.68	0.18	1.8
PCB-187	0.068	0.68	0.18	1.8
PCB-195	0.068	0.68	0.18	1.8
PCB-206	0.068	0.68	0.18	1.8
PCB-209	0.068	0.68	0.18	1.8
beta-BHC	0.4	2	0.56	2.25
delta-BHC	0.014	0.14	0.56	2.25
Dieldrin	0.015	1.27	0.0709	0.8
Endosulfan I	0.15	1.5	10	100
Endosulfan II	0.15	1.5	10	100
Endosulfan Sulfate	0.15	1.5	10	100
Endrin	0.092	0.92	0.01035	0.1035
Endrin Aldehyde	0.092	0.92	0.01	0.1
Endrin Ketone	0.092	0.92	0.01	0.1
Gamma-BHC (Lindane)	8	80	2	20
Gamma-Chlordane	4.58	9.16	2.14	10.7
Heptachlor	0.1	1	NV	NV
Heptachlor Epoxide	0.1	1	NV	NV
Methoxychlor	4	8	NV	NV
Toxaphene	8	80	NV	NV
Total Aroclor	0.068	0.68	0.18	1.8
Total DDT	0.147	5.56	0.227	2.7
DIOXINS AND FURANS (mg/kg)				
1,2,3,4,6,7,8-HpCDD	0.0001	0.001	0.014	0.14
1,2,3,4,6,7,8-HpCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8,9-HPCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8-HXCDD	0.00001	0.0001	0.00028	0.0028
1,2,3,4,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,6,7,8-HxCDD	0.00001	0.0001	0.0014	0.014
1,2,3,6,7,8-HxCDF	0.00016	0.0016	0.00014	0.0014
1,2,3,7,8,9-HxCDD	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8,9-HxCDF	0.00001	0.0001	0.00014	0.0014
2,3,4,6,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8-PECDD	0.000001	0.00001	0.000014	0.00014
1,2,3,7,8-PECDF	0.00016	0.0016	0.00014	0.0014
2,3,4,7,8-PECDF	0.000016	0.00016	0.000014	0.00014
2,3,7,8-TCDD	0.000001	0.00001	0.000014	0.00014
2,3,7,8-TCDF	0.00001	0.0001	0.000014	0.00014
OCDD	0.01	0.1	0.14	1.4
OCDF	0.01	0.1	0.14	1.4
TOTAL HpCDD	0.0001	0.001	0.014	0.14

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
TOTAL HxCDD	0.00001	0.0001	0.00014	0.0014
TOTAL PeCDD	0.000001	0.00001	0.000014	0.00014
Total HpCDF	0.0001	0.001	0.0014	0.014
Total HxCDF	0.00001	0.0001	0.00014	0.0014
Total PeCDF	0.000002	0.00002	0.000014	0.00014
Total TCDD	0.000001	0.00001	0.000014	0.00014
Total TCDF	0.00001	0.0001	0.000014	0.00014
EXPLOSIVES (mg/kg)				
1,3 Dinitrobenzene	0.4	1.07	NV	NV
1,3,5-Trinitrobenzene	2.68	13.31	NV	NV
2,4-Dinitrotoluene	0.67	1.4	0.1	0.5
2,6-Dinitrotoluene	0.7	7	NV	NV
2,4,6-Trinitrotoluene	1.6	16	0.7	17.8
2-Amino-4,6-dinitrotoluene	NV	NV	NV	NV
2-Nitrotoluene	20	200	NV	NV
3-Nitrotoluene	20	200	NV	NV
4-Amino-2,6-dinitrotoluene	NV	NV	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal NOAEL	Mammal LOAEL	Bird NOAEL	Bird LOAEL
4-Nitrotoluene	20	200	NV	NV
Ammonia	NV	NV	NV	NV
HMX	3	7.5	NV	NV
Nitrobenzene (exp)	NV	NV	NV	NV
Nitroglycerin	3	32	NV	NV
RDX	7	35	NV	NV
Tetryl	1.3	6.2	NV	NV
INORGANICS				
Aluminum	1.93	19.3	109.7	1097
Antimony	0.059	2.76	NV	NV
Arsenic	1.04	4.55	2.24	4.51
Barium	51.8	82.7	20.8	41.7
Beryllium	0.532	0.673	NV	NV
Cadmium	0.77	6.9	1.47	6.35
Chromium	2.40	58.17	2.66	15.63
Hexavalent Chromium	5.66	38.37	NV	NV
Cobalt	7.33	18.90	7.61	18.34
Copper	5.6	82.7	4.05	34.87
Cyanide	68.7	687	NV	NV
Iron	50	500	100	1000
Lead	4.7	186.4	1.63	44.63
Manganese	51.5	145.67	179	376.6
Mercury	0.032	0.16	0.0064	0.064
Nickel	1.70	14.77	6.71	18.57
Selenium	0.143	0.661	0.29	0.819

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
Volatile Organics				
1,1,1-Trichloroethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
2-Butanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Methyl-2-pentanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Acetone	5.20E+00	5.20E+00	1.00E+00	1.00E+00
Carbon Disulfide	2.00E+00	2.00E+00	1.00E+00	1.00E+00
Chlorobenzene	9.00E-01	9.00E-01	1.00E+00	1.00E+00
Ethylbenzene	6.10E-01	6.10E-01	1.00E+00	1.00E+00
Isopropylbenzene	1.00E+00	1.00E+00	1.00E+00	1.00E+00
M,p-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Methyl Acetate	2.99E+01	2.99E+01	1.00E+00	1.00E+00
Methylene Chloride	6.70E+00	6.70E+00	1.00E+00	1.00E+00
O-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Tetrachloroethene	1.20E+00	1.20E+00	1.00E+00	1.00E+00
Toluene	1.03E+00	1.03E+00	1.00E+00	1.00E+00
Total Xylenes	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Trichloroethene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
Trichlorofluoromethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
Semivolatile Organics				
1,1'-Biphenyl	1.59E-01	1.59E-01	1.00E+00	1.00E+00
1,2-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
1,4-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
2,2'-Oxybis(1-Chloropropane)	???	???	1.00E+00	1.00E+00
2,3,4,6-Tetrachlorophenol	1.59E-01	1.59E-01	1.00E+00	1.00E+00
2,4-D	???	???		
2-Methylnaphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
2-Methylphenol	???	???	1.00E+00	1.00E+00
3-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Chloro-3-Methylphenol	???	???	1.00E+00	1.00E+00
4-Chloroaniline	9.03E-01	9.03E-01	1.00E+00	1.00E+00
4-Methylphenol	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitrophenol	3.00E+00	3.00E+00	1.00E+00	1.00E+00
2,4,5-Trichlorophenol	2.40E-01	2.40E-01	1.00E+00	1.00E+00
2,4,6-Trichlorophenol	2.70E-01	2.70E-01	1.00E+00	1.00E+00
2,4,5-T	???	???	???	???
Acenaphthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Acenaphthylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzaldehyde	1.76E+00	1.76E+00	1.00E+00	1.00E+00
Benzo(a)anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(a)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(b)fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(g,h,i)perylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(k)Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Bis(2-ethylhexyl)phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Butyl benzyl Phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Caprolactam	4.90E+01	4.90E+01	1.00E+00	1.00E+00
Carbazole	2.40E-01	2.40E-01	Eco-SSL	Eco-SSL
Chrysene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzo(a,h)Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzofuran	1.50E-01	1.50E-01	Eco-SSL	Eco-SSL
Diethylphthalate	1.30E+00	1.30E+00	1.00E+00	1.00E+00
Di-n-butyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Di-n-octyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Dinoseb	???	???	???	???
Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Fluorene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexachloroethane	2.10E-01	2.10E-01	1.00E+00	1.00E+00
Indeno(1,2,3-cd)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Isophorone	3.92E+00	3.92E+00	1.00E+00	1.00E+00
N-Nitrosodiphenylamine	6.05E-01	6.05E-01	1.00E+00	1.00E+00
Naphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pentachlorophenol	1.40E-02	1.40E-02	1.00E+00	1.00E+00
Phenanthrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Phenol	5.10E+00	5.10E+00	1.00E+00	1.00E+00
Pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pesticides/ PCBs				
4,4'-DDD	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDE	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Aldrin	6.90E-01	6.90E-01	3.30E+00	3.30E+00
Alpha-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Aroclor-1232	5.30E-01	5.30E-01	1.59E+01	6.67E+00
Aroclor-1242	1.60E-01	1.60E-01	1.59E+01	6.67E+00
Aroclor-1248	1.60E-02	1.60E-02	1.59E+01	6.67E+00
Aroclor-1254	1.30E-02	1.30E-02	1.59E+01	6.67E+00
Aroclor-1260	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Aroclor-1268	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Dieldrin	8.20E-02	8.20E-02	6.64E+00	6.64E+00
Gamma-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Heptachlor	1.20E-01	1.20E-01	1.00E+01	1.00E+01
Endosulfan I	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan II	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan Sulfate	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endrin	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Aldehyde	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Ketone	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Heptachlor Epoxide	2.80E-02	2.80E-02	3.00E+00	3.00E+00
Methoxychlor	1.10E-01	1.10E-01	1.00E+00	1.00E+00
alpha-BHC	2.10E-01	2.10E-01	5.00E+00	5.00E+00

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
beta-BHC	1.80E-01	1.80E-01	5.00E+00	5.00E+00
delta-BHC	9.00E-01	9.00E-01	5.00E+00	5.00E+00
gamma-BHC (Lindane)	2.70E-01	2.70E-01	5.00E+00	5.00E+00
Toxaphene	6.20E-02	6.20E-02	1.00E+00	1.00E+00
Total Aroclor	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Total DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Explosives				
2,4,6-Trinitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
2-Nitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
1,3,5-Trinitrobenzene	7.70E+00	7.70E+00	1.00E+00	1.00E+00
4-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
RDX	4.60E-01	4.60E-01	1.00E+00	1.00E+00
4-Amino-2,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
HMX	1.70E+01	1.70E+01	1.00E+00	1.00E+00
Nitrobenzene (exp)	3.40E+00	3.40E+00	1.00E+00	1.00E+00
1,3 Dinitrobenzene	4.50E+00	4.50E+00	1.00E+00	1.00E+00
2-Amino-4,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
Tetryl	???	???	1.00E+00	1.00E+00
3-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
2,4-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
2,6-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
Dioxins				
1,2,3,4,6,7,8-HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,6,7,8-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8,9-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HxCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8-PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
1,2,3,7,8-Pecdf	4.40E-03	4.40E-03	2.22E+01	1.10E+01
2,3,4,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
2,3,4,7,8-PECDF	3.70E-03	3.70E-03	2.22E+01	1.10E+01
2,3,7,8-TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ HALFND	4.30E-03	4.30E-03	2.22E+01	1.10E+01
2,3,7,8-TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDD	???	???	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDF	???	???	2.22E+01	1.10E+01
TOTAL HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
Total HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total PECDF	4.40E-03	4.40E-03	2.22E+01	1.10E+01
Total TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
Total TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
Inorganics				
Aluminum	5.00E-03	2.87E-03	1.18E-01	4.30E-02
Antimony	1.14E-02	1.02E-02	1.00E+00	1.00E+00
Arsenic	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Barium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Beryllium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cadmium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cobalt	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Copper	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexavalent Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cyanide	1.80E+00	1.00E+00	1.00E+00	1.00E+00
Iron	1.00E-02	4.25E-03	7.80E-02	3.60E-02
Lead	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Manganese	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Mercury	5.00E+00	6.52E-01	ORNL Reg.	ORNL Reg.
Nickel	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Selenium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Silver	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Thallium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Tin	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Vanadium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Zinc	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL

Notes:
BAF - Bioaccumulation Factor
BSAF - Biota Sediment Accumulation Factor
1 - ORNL (2001) for organics; only one value is available for conservative and average exposures
2 - Sample et al., (1997) for inorganics; conservative value is 90th percentile; average value is median v
3 - ORNL (September, 1998) for all chemicals; conservative value is 90th percentile; average value is m
4 - U.S. EPA, September 1997; only one value is available for conservative and average exposures. Va
5 - Conservative and average refers to the exposure scenarios for which the uptake factors are used
6 - Where "Eco-SSL" is given, values were calculated using equations from USEPA (2005), Attachment
Tables 4a (for inorganics) and 4b (for organics).

Default value of 1 is assigned to parameters without uptake factors

TABLE X-X

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

Species/Exposure Inputs	Conservative Inputs		Average Inputs	
	Values	Units	Values	Units
Bobwhite Quail				
Body Weight = BW	1.540E-01	kg	1.751E-01	kg
Food Ingestion Rate = If	2.442E-03	kg/day	2.042E-03	kg/day
Water Ingestion Rate = Iw	2.276E-02	L/day	1.926E-02	L/day
Soil Ingestion Rate = Is	3.395E-04	kg/day	1.246E-04	kg/day
Home Range = HR	Assume 100% on site		1.880E+01	acres
Meadow Vole				
Body Weight = BW	1.700E-02	kg	3.580E-02	kg
Food Ingestion Rate = If	1.878E-03	kg/day	1.744E-03	kg/day
Water Ingestion Rate = Iw	7.513E-03	L/day	6.261E-03	L/day
Soil Ingestion Rate = Is	6.010E-05	kg/day	2.093E-05	kg/day
Home Range = HR	Assume 100% on site		6.590E-02	acres
American Robin				
Body Weight = BW	7.73E-02	kg	8.04E-02	kg
Food Ingestion Rate = If	1.25E-02	kg/day	1.19E-02	kg/day
Water Ingestion Rate = Iw	1.21E-02	L/day	1.13E-02	L/day
Soil Ingestion Rate - Is	2.046E-03	kg/day	7.601E-04	kg/day
Home Range = HR	Assume 100% on site		6.095E-01	acres
Short-Tailed Shrew				
Body Weight = BW	1.500E-02	kg	1.610E-02	kg
Food Ingestion Rate = If	1.600E-03	kg/day	1.433E-03	kg/day
Water Ingestion Rate = Iw	4.280E-03	L/day	3.600E-03	L/day
Soil Ingestion Rate - Is	4.801E-05	kg/day	1.289E-05	kg/day
Home Range = HR	Assume 100% on site		9.699E-01	acres
Mink				
Body Weight = BW	5.500E-01	kg	1.103E+00	kg
Food Ingestion Rate = If	6.067E-02	kg/day	4.504E-02	kg/day
Water Ingestion Rate = Iw	1.213E-01	L/day	7.308E-02	L/day
Sediment Ingestion Rate = Is	5.703E-03	kg/day	4.234E-03	kg/day
Home Range = HR	Assume 100% on site		1.558E+03	acres
Green Heron				
Body Weight = BW	2.00E-01	kg	2.12E-01	kg
Food Ingestion Rate = If	3.10E-02	kg/day	3.00E-02	kg/day
Water Ingestion Rate = Iw	2.20E-02	L/day	2.10E-02	L/day
Sediment Ingestion Rate = Is	1.600E-03	kg/day	1.500E-03	kg/day
Home Range = HR	Assume 100% on site		1.000E+01	km-radius

Notes:
The exposure factors were derived as presented in Appendix I.

The soil/sediment ingestion rates were calculated by multiplying the food ingestion rates by the following incidental soil/sediment ingestion rates:

	Conservative	Average	Source
Bobwhite quail	13.90%	6.10%	1, 2
Meadow Vole	3.20%	1.20%	1
American Robin	16.40%	6.40%	1,4
Short-tailed Shrew	3%	0.90%	1
Mink	9.4%	9.4%	3, 5
Green Heron	5%	5%	6

1 - USEPA (U.S. Environmental Protection Agency), 2005. Ecological Soil Screening Level Guidance, Office of Emergency and Remedial Response. February.
2 - Based on the mourning dove.
3 - Beyer, N., E. Connor, and S. Gerould. 1994. Estimates of Soil Ingestion by Wildlife. Journal of Wildlife Management 58(2) pp. 375-382.
4 - Based on the American woodcock
5 - Based on the raccoon
6 - Based on piscivorous birds

APPENDIX F

MEADOW VOLE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from:			Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients	
				Soil	Surface Water	Veget.				NOAEL	LOAEL
Semivolatile Organics											
1-METHYLNAPHTHALENE	2.30E-01	0.00E+00	1.37E-01	8.13E-04	0.00E+00	1.51E-02	1.59E-02	6.56E+01	3.56E+02	2.43E-04	4.48E-05
2-METHYLNAPHTHALENE	2.30E-01	0.00E+00	1.37E-01	8.13E-04	0.00E+00	1.51E-02	1.59E-02	6.56E+01	3.56E+02	2.43E-04	4.48E-05
ACENAPHTHENE	5.00E+00	0.00E+00	9.69E-04	1.77E-02	0.00E+00	1.07E-04	1.78E-02	6.56E+01	3.56E+02	2.71E-04	5.00E-05
ANTHRACENE	7.20E+00	0.00E+00	1.73E+00	2.55E-02	0.00E+00	1.91E-01	2.17E-01	6.56E+01	3.56E+02	3.30E-03	6.08E-04
BENZO(A)ANTHRACENE	3.30E+01	0.00E+00	5.33E-01	1.17E-01	0.00E+00	5.89E-02	1.76E-01	6.15E-01	3.84E+01	2.85E-01	4.57E-03
BENZO(A)PYRENE	4.20E+01	0.00E+00	4.87E+00	1.48E-01	0.00E+00	5.38E-01	6.86E-01	6.15E-01	3.84E+01	1.12E+00	1.79E-02
BENZO(B)FLUORANTHENE	4.10E+01	0.00E+00	1.27E+01	1.45E-01	0.00E+00	1.40E+00	1.55E+00	6.15E-01	3.84E+01	2.52E+00	4.03E-02
BENZO(G,H,I)PERYLENE	2.50E+01	0.00E+00	1.77E+01	8.84E-02	0.00E+00	1.96E+00	2.05E+00	6.15E-01	3.84E+01	3.33E+00	5.34E-02
BENZO(K)FLUORANTHENE	1.80E+01	0.00E+00	1.39E+00	6.36E-02	0.00E+00	1.53E-01	2.17E-01	6.15E-01	3.84E+01	3.52E-01	5.64E-03
CHRYSENE	4.30E+01	0.00E+00	6.24E-01	1.52E-01	0.00E+00	6.89E-02	2.21E-01	6.15E-01	3.84E+01	3.59E-01	5.75E-03
DIBENZO(A,H)ANTHRACENE	7.60E+00	0.00E+00	9.88E-01	2.69E-02	0.00E+00	1.09E-01	1.36E-01	6.15E-01	3.84E+01	2.21E-01	3.54E-03
FLUORANTHENE	3.80E+01	0.00E+00	1.90E+01	1.34E-01	0.00E+00	2.10E+00	2.23E+00	6.56E+01	3.56E+02	3.40E-02	6.27E-03
FLUORENE	3.10E+00	0.00E+00	1.46E-03	1.10E-02	0.00E+00	1.61E-04	1.11E-02	6.56E+01	3.56E+02	1.70E-04	3.12E-05
INDENO(1,2,3-CD)PYRENE	2.70E+01	0.00E+00	2.97E+00	9.55E-02	0.00E+00	3.28E-01	4.24E-01	6.15E-01	3.84E+01	6.89E-01	1.10E-02
NAPHTHALENE	3.30E-01	0.00E+00	4.03E+00	1.17E-03	0.00E+00	4.45E-01	4.46E-01	6.56E+01	3.56E+02	6.80E-03	1.25E-03
PHENANTHRENE	3.00E+01	0.00E+00	6.98E+00	1.06E-01	0.00E+00	7.71E-01	8.77E-01	6.56E+01	3.56E+02	1.34E-02	2.46E-03
PYRENE	4.50E+01	0.00E+00	3.24E+01	1.59E-01	0.00E+00	3.58E+00	3.74E+00	6.15E-01	3.84E+01	6.08E+00	9.74E-02
Inorganics											
ANTIMONY	4.80E+00	0.00E+00	1.72E-01	1.70E-02	0.00E+00	1.90E-02	3.59E-02	5.90E-02	2.76E+00	6.09E-01	1.30E-02
COPPER	3.76E+01	0.00E+00	8.14E+00	1.33E-01	0.00E+00	9.00E-01	1.03E+00	5.60E+00	8.27E+01	1.84E-01	1.25E-02
LEAD	9.40E+02	0.00E+00	1.23E+01	3.32E+00	0.00E+00	1.36E+00	4.69E+00	4.70E+00	1.86E+02	9.97E-01	2.51E-02
ZINC	5.33E+01	0.00E+00	4.37E+01	1.88E-01	0.00E+00	4.83E+00	5.02E+00	7.54E+01	2.98E+02	6.66E-02	1.69E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.70E-02	kg
Food Ingestion Rate = (If)	1.88E-03	kg/day
Water Ingestion Rate = (Iw)	7.51E-03	L/day
Soil Ingestion Rate = (Is)	6.01E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

MEADOW VOLE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
1-METHYLNAPHTHALENE	9.56E-02	0.00E+00	9.19E-02	5.59E-05	0.00E+00	4.48E-03	4.53E-03	6.56E+01	3.56E+02	6.91E-05	1.27E-05
2-METHYLNAPHTHALENE	7.10E-02	0.00E+00	8.03E-02	4.15E-05	0.00E+00	3.91E-03	3.95E-03	6.56E+01	3.56E+02	6.02E-05	1.11E-05
ACENAPHTHENE	1.17E+00	0.00E+00	3.36E-03	6.83E-04	0.00E+00	1.64E-04	8.47E-04	6.56E+01	3.56E+02	1.29E-05	2.38E-06
ANTHRACENE	1.61E+00	0.00E+00	5.40E-01	9.44E-04	0.00E+00	2.63E-02	2.73E-02	6.56E+01	3.56E+02	4.16E-04	7.66E-05
BENZO(A)ANTHRACENE	8.34E+00	0.00E+00	2.35E-01	4.88E-03	0.00E+00	1.15E-02	1.63E-02	6.15E-01	3.84E+01	2.66E-02	4.25E-04
BENZO(A)PYRENE	1.07E+01	0.00E+00	1.29E+00	6.27E-03	0.00E+00	6.26E-02	6.89E-02	6.15E-01	3.84E+01	1.12E-01	1.79E-03
BENZO(B)FLUORANTHENE	1.07E+01	0.00E+00	3.32E+00	6.26E-03	0.00E+00	1.62E-01	1.68E-01	6.15E-01	3.84E+01	2.73E-01	4.37E-03
BENZO(G,H,I)PERYLENE	6.29E+00	0.00E+00	3.47E+00	3.68E-03	0.00E+00	1.69E-01	1.73E-01	6.15E-01	3.84E+01	2.81E-01	4.50E-03
BENZO(K)FLUORANTHENE	4.50E+00	0.00E+00	4.21E-01	2.63E-03	0.00E+00	2.05E-02	2.31E-02	6.15E-01	3.84E+01	3.76E-02	6.03E-04
CHRYSENE	1.07E+01	0.00E+00	2.73E-01	6.27E-03	0.00E+00	1.33E-02	1.96E-02	6.15E-01	3.84E+01	3.18E-02	5.10E-04
DIBENZO(A,H)ANTHRACENE	1.95E+00	0.00E+00	2.54E-01	1.14E-03	0.00E+00	1.24E-02	1.35E-02	6.15E-01	3.84E+01	2.20E-02	3.52E-04
FLUORANTHENE	9.72E+00	0.00E+00	4.86E+00	5.68E-03	0.00E+00	2.37E-01	2.43E-01	6.56E+01	3.56E+02	3.70E-03	6.81E-04
FLUORENE	1.08E+00	0.00E+00	3.60E-03	6.30E-04	0.00E+00	1.76E-04	8.05E-04	6.56E+01	3.56E+02	1.23E-05	2.26E-06
INDENO(1,2,3-CD)PYRENE	6.97E+00	0.00E+00	7.67E-01	4.07E-03	0.00E+00	3.73E-02	4.14E-02	6.15E-01	3.84E+01	6.73E-02	1.08E-03
NAPHTHALENE	1.18E-01	0.00E+00	1.44E+00	6.89E-05	0.00E+00	7.01E-02	7.02E-02	6.56E+01	3.56E+02	1.07E-03	1.97E-04
PHENANTHRENE	6.82E+00	0.00E+00	2.79E+00	3.99E-03	0.00E+00	1.36E-01	1.40E-01	6.56E+01	3.56E+02	2.13E-03	3.92E-04
PYRENE	1.14E+01	0.00E+00	8.18E+00	6.64E-03	0.00E+00	3.99E-01	4.05E-01	6.15E-01	3.84E+01	6.59E-01	1.06E-02
Inorganics											
ANTIMONY	8.83E-01	0.00E+00	3.51E-02	5.16E-04	0.00E+00	1.71E-03	2.22E-03	5.90E-02	2.76E+00	3.77E-02	8.06E-04
COPPER	1.33E+01	0.00E+00	5.40E+00	7.76E-03	0.00E+00	2.63E-01	2.71E-01	5.60E+00	8.27E+01	4.84E-02	3.28E-03
LEAD	3.20E+02	0.00E+00	6.74E+00	1.87E-01	0.00E+00	3.28E-01	5.15E-01	4.70E+00	1.86E+02	1.10E-01	2.76E-03
ZINC	3.55E+01	0.00E+00	3.49E+01	2.08E-02	0.00E+00	1.70E+00	1.72E+00	7.54E+01	2.98E+02	2.28E-02	5.78E-03

Body Weight = (BW)	3.58E-02	kg
Food Ingestion Rate = (If)	1.74E-03	kg/day
Water Ingestion Rate = (Iw)	6.26E-03	L/day
Soil Ingestion Rate = (Is)	2.09E-05	kg/day
Home Range = (HR)	6.59E-02	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
1-METHYLNAPHTHALENE	2.30E-01	0.00E+00	1.37E-01	5.07E-04	0.00E+00	2.17E-03	2.68E-03	2.00E+00	2.00E+01	1.3E-03	1.3E-04
2-METHYLNAPHTHALENE	2.30E-01	0.00E+00	1.37E-01	5.07E-04	0.00E+00	2.17E-03	2.68E-03	2.00E+00	2.00E+01	1.3E-03	1.3E-04
ACENAPHTHENE	5.00E+00	0.00E+00	9.69E-04	1.10E-02	0.00E+00	1.54E-05	1.10E-02	2.00E+00	2.00E+01	5.5E-03	5.5E-04
ANTHRACENE	7.20E+00	0.00E+00	1.73E+00	1.59E-02	0.00E+00	2.74E-02	4.33E-02	2.00E+00	2.00E+01	2.2E-02	2.2E-03
BENZO(A)ANTHRACENE	3.30E+01	0.00E+00	5.33E-01	7.28E-02	0.00E+00	8.45E-03	8.12E-02	2.00E+00	2.00E+01	4.1E-02	4.1E-03
BENZO(A)PYRENE	4.20E+01	0.00E+00	4.87E+00	9.26E-02	0.00E+00	7.72E-02	1.70E-01	2.00E+00	2.00E+01	8.5E-02	8.5E-03
BENZO(B)FLUORANTHENE	4.10E+01	0.00E+00	1.27E+01	9.04E-02	0.00E+00	2.02E-01	2.92E-01	2.00E+00	2.00E+01	1.5E-01	1.5E-02
BENZO(G,H,I)PERYLENE	2.50E+01	0.00E+00	1.77E+01	5.51E-02	0.00E+00	2.81E-01	3.37E-01	2.00E+00	2.00E+01	1.7E-01	1.7E-02
BENZO(K)FLUORANTHENE	1.80E+01	0.00E+00	1.39E+00	3.97E-02	0.00E+00	2.20E-02	6.17E-02	2.00E+00	2.00E+01	3.1E-02	3.1E-03
CHRYSENE	4.30E+01	0.00E+00	6.24E-01	9.48E-02	0.00E+00	9.89E-03	1.05E-01	2.00E+00	2.00E+01	5.2E-02	5.2E-03
DIBENZO(A,H)ANTHRACENE	7.60E+00	0.00E+00	9.88E-01	1.68E-02	0.00E+00	1.57E-02	3.24E-02	2.00E+00	2.00E+01	1.6E-02	1.6E-03
FLUORANTHENE	3.80E+01	0.00E+00	1.90E+01	8.38E-02	0.00E+00	3.01E-01	3.85E-01	2.00E+00	2.00E+01	1.9E-01	1.9E-02
FLUORENE	3.10E+00	0.00E+00	1.46E-03	6.83E-03	0.00E+00	2.31E-05	6.86E-03	2.00E+00	2.00E+01	3.4E-03	3.4E-04
INDENO(1,2,3-CD)PYRENE	2.70E+01	0.00E+00	2.97E+00	5.95E-02	0.00E+00	4.71E-02	1.07E-01	2.00E+00	2.00E+01	5.3E-02	5.3E-03
NAPHTHALENE	3.30E-01	0.00E+00	4.03E+00	7.28E-04	0.00E+00	6.39E-02	6.46E-02	2.00E+00	2.00E+01	3.2E-02	3.2E-03
PHENANTHRENE	3.00E+01	0.00E+00	6.98E+00	6.61E-02	0.00E+00	1.11E-01	1.77E-01	2.00E+00	2.00E+01	8.8E-02	8.8E-03
PYRENE	4.50E+01	0.00E+00	3.24E+01	9.92E-02	0.00E+00	5.14E-01	6.13E-01	2.00E+00	2.00E+01	3.1E-01	3.1E-02
Inorganics											
ANTIMONY	4.80E+00	0.00E+00	1.72E-01	1.06E-02	0.00E+00	2.72E-03	1.33E-02	NV	NV	#VALUE!	#VALUE!
COPPER	3.76E+01	0.00E+00	8.14E+00	8.29E-02	0.00E+00	1.29E-01	2.12E-01	4.05E+00	3.49E+01	5.2E-02	6.1E-03
LEAD	9.40E+02	0.00E+00	1.23E+01	2.07E+00	0.00E+00	1.96E-01	2.27E+00	1.63E+00	4.46E+01	1.4E+00	5.1E-02
ZINC	5.33E+01	0.00E+00	4.37E+01	1.18E-01	0.00E+00	6.93E-01	8.11E-01	6.61E+01	1.71E+02	1.2E-02	4.7E-03

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.54E-01	kg
Food Ingestion Rate = (If)	2.44E-03	kg/day
Water Ingestion Rate = (Iw)	2.28E-02	L/day
Soil Ingestion Rate = (Is)	3.40E-04	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
1-METHYLNAPHTHALENE	9.56E-02	0.00E+00	9.19E-02	6.80E-05	0.00E+00	1.07E-03	1.14E-03	2.00E+00	2.00E+01	5.7E-04	5.7E-05
2-METHYLNAPHTHALENE	7.10E-02	0.00E+00	8.03E-02	5.05E-05	0.00E+00	9.36E-04	9.87E-04	2.00E+00	2.00E+01	4.9E-04	4.9E-05
ACENAPHTHENE	1.17E+00	0.00E+00	3.36E-03	8.31E-04	0.00E+00	3.92E-05	8.70E-04	2.00E+00	2.00E+01	4.4E-04	4.4E-05
ANTHRACENE	1.61E+00	0.00E+00	5.40E-01	1.15E-03	0.00E+00	6.30E-03	7.45E-03	2.00E+00	2.00E+01	3.7E-03	3.7E-04
BENZO(A)ANTHRACENE	8.34E+00	0.00E+00	2.35E-01	5.93E-03	0.00E+00	2.74E-03	8.68E-03	2.00E+00	2.00E+01	4.3E-03	4.3E-04
BENZO(A)PYRENE	1.07E+01	0.00E+00	1.29E+00	7.63E-03	0.00E+00	1.50E-02	2.26E-02	2.00E+00	2.00E+01	1.1E-02	1.1E-03
BENZO(B)FLUORANTHENE	1.07E+01	0.00E+00	3.32E+00	7.62E-03	0.00E+00	3.87E-02	4.63E-02	2.00E+00	2.00E+01	2.3E-02	2.3E-03
BENZO(G,H,I)PERYLENE	6.29E+00	0.00E+00	3.47E+00	4.48E-03	0.00E+00	4.05E-02	4.50E-02	2.00E+00	2.00E+01	2.2E-02	2.2E-03
BENZO(K)FLUORANTHENE	4.50E+00	0.00E+00	4.21E-01	3.20E-03	0.00E+00	4.91E-03	8.11E-03	2.00E+00	2.00E+01	4.1E-03	4.1E-04
CHRYSENE	1.07E+01	0.00E+00	2.73E-01	7.62E-03	0.00E+00	3.18E-03	1.08E-02	2.00E+00	2.00E+01	5.4E-03	5.4E-04
DIBENZO(A,H)ANTHRACENE	1.95E+00	0.00E+00	2.54E-01	1.39E-03	0.00E+00	2.96E-03	4.35E-03	2.00E+00	2.00E+01	2.2E-03	2.2E-04
FLUORANTHENE	9.72E+00	0.00E+00	4.86E+00	6.92E-03	0.00E+00	5.67E-02	6.36E-02	2.00E+00	2.00E+01	3.2E-02	3.2E-03
FLUORENE	1.08E+00	0.00E+00	3.60E-03	7.66E-04	0.00E+00	4.20E-05	8.08E-04	2.00E+00	2.00E+01	4.0E-04	4.0E-05
INDENO(1,2,3-CD)PYRENE	6.97E+00	0.00E+00	7.67E-01	4.96E-03	0.00E+00	8.94E-03	1.39E-02	2.00E+00	2.00E+01	6.9E-03	6.9E-04
NAPHTHALENE	1.18E-01	0.00E+00	1.44E+00	8.39E-05	0.00E+00	1.68E-02	1.69E-02	2.00E+00	2.00E+01	8.4E-03	8.4E-04
PHENANTHRENE	6.82E+00	0.00E+00	2.79E+00	4.85E-03	0.00E+00	3.25E-02	3.73E-02	2.00E+00	2.00E+01	1.9E-02	1.9E-03
PYRENE	1.14E+01	0.00E+00	8.18E+00	8.08E-03	0.00E+00	9.54E-02	1.03E-01	2.00E+00	2.00E+01	5.2E-02	5.2E-03
Inorganics											
ANTIMONY	8.83E-01	0.00E+00	3.51E-02	6.28E-04	0.00E+00	4.09E-04	1.04E-03	NV	NV	#VALUE!	#VALUE!
COPPER	1.33E+01	0.00E+00	5.40E+00	9.45E-03	0.00E+00	6.30E-02	7.25E-02	4.05E+00	3.49E+01	1.8E-02	2.1E-03
LEAD	3.20E+02	0.00E+00	6.74E+00	2.28E-01	0.00E+00	7.86E-02	3.06E-01	1.63E+00	4.46E+01	1.9E-01	6.9E-03
ZINC	3.55E+01	0.00E+00	3.49E+01	2.53E-02	0.00E+00	4.07E-01	4.32E-01	6.61E+01	1.71E+02	6.5E-03	2.5E-03

Body Weight = (BW)	1.75E-01	kg	Dose (soil) = (Cs * Is)(H)/BW	Conc = Concentration
Food Ingestion Rate = (If)	2.04E-03	kg/day	Dose (vegetation) = (Cv * If)(H)/BW	LOAEL = Lowest Observed Adverse Effects Concentration
Water Ingestion Rate = (Iw)	1.93E-02	L/day	Dose (water) = (Cw * Iw)(H)/BW	NOAEL = No Observed Adverse Effects Concentration
Soil Ingestion Rate = (Is)	1.25E-04	kg/day	Cv = Contaminant concentration in vegetation	SW = Surface Water
Home Range = (HR)	1.88E+01	acres	Cs = Contaminant concentration in soil	
Contaminated Area = (CA)	Assume equal to home range		Cw = Contaminant concentration in water	
			Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)	
			H=CA/HR (Assume = to 1)	

APPENDIX F

SHORT-TAILED SHREW - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
1-METHYLNAPHTHALENE	2.30E-01	0.00E+00	6.99E-01	7.36E-04	0.00E+00	7.46E-02	7.53E-02	6.56E+01	3.56E+02	1.1E-03	2.1E-04
2-METHYLNAPHTHALENE	2.30E-01	0.00E+00	6.99E-01	7.36E-04	0.00E+00	7.46E-02	7.53E-02	6.56E+01	3.56E+02	1.1E-03	2.1E-04
ACENAPHTHENE	5.00E+00	0.00E+00	7.35E+00	1.60E-02	0.00E+00	7.84E-01	8.00E-01	6.56E+01	3.56E+02	1.2E-02	2.2E-03
ANTHRACENE	7.20E+00	0.00E+00	1.74E+01	2.30E-02	0.00E+00	1.86E+00	1.88E+00	6.56E+01	3.56E+02	2.9E-02	5.3E-03
BENZO(A)ANTHRACENE	3.30E+01	0.00E+00	5.25E+01	1.06E-01	0.00E+00	5.60E+00	5.70E+00	6.15E-01	3.84E+01	9.3E+00	1.5E-01
BENZO(A)PYRENE	4.20E+01	0.00E+00	5.59E+01	1.34E-01	0.00E+00	5.96E+00	6.09E+00	6.15E-01	3.84E+01	9.9E+00	1.6E-01
BENZO(B)FLUORANTHENE	4.10E+01	0.00E+00	1.07E+02	1.31E-01	0.00E+00	1.14E+01	1.15E+01	6.15E-01	3.84E+01	1.9E+01	3.0E-01
BENZO(G,H,I)PERYLENE	2.50E+01	0.00E+00	7.35E+01	8.00E-02	0.00E+00	7.84E+00	7.92E+00	6.15E-01	3.84E+01	1.3E+01	2.1E-01
BENZO(K)FLUORANTHENE	1.80E+01	0.00E+00	4.68E+01	5.76E-02	0.00E+00	4.99E+00	5.05E+00	6.15E-01	3.84E+01	8.2E+00	1.3E-01
CHRYSENE	4.30E+01	0.00E+00	9.85E+01	1.38E-01	0.00E+00	1.05E+01	1.06E+01	6.15E-01	3.84E+01	1.7E+01	2.8E-01
DIBENZO(A,H)ANTHRACENE	7.60E+00	0.00E+00	1.76E+01	2.43E-02	0.00E+00	1.87E+00	1.90E+00	6.15E-01	3.84E+01	3.1E+00	4.9E-02
FLUORANTHENE	3.80E+01	0.00E+00	1.16E+02	1.22E-01	0.00E+00	1.23E+01	1.24E+01	6.56E+01	3.56E+02	1.9E-01	3.5E-02
FLUORENE	3.10E+00	0.00E+00	2.97E+01	9.92E-03	0.00E+00	3.17E+00	3.18E+00	6.56E+01	3.56E+02	4.8E-02	8.9E-03
INDENO(1,2,3-CD)PYRENE	2.70E+01	0.00E+00	7.72E+01	8.64E-02	0.00E+00	8.24E+00	8.32E+00	6.15E-01	3.84E+01	1.4E+01	2.2E-01
NAPHTHALENE	3.30E-01	0.00E+00	1.45E+00	1.06E-03	0.00E+00	1.55E-01	1.56E-01	6.56E+01	3.56E+02	2.4E-03	4.4E-04
PHENANTHRENE	3.00E+01	0.00E+00	5.16E+01	9.60E-02	0.00E+00	5.51E+00	5.60E+00	6.56E+01	3.56E+02	8.5E-02	1.6E-02
PYRENE	4.50E+01	0.00E+00	7.88E+01	1.44E-01	0.00E+00	8.40E+00	8.55E+00	6.15E-01	3.84E+01	1.4E+01	2.2E-01
Inorganics											
ANTIMONY	4.80E+00	0.00E+00	4.80E+00	1.54E-02	0.00E+00	5.12E-01	5.27E-01	5.90E-02	2.76E+00	8.9E+00	1.9E-01
COPPER	3.76E+01	0.00E+00	1.94E+01	1.20E-01	0.00E+00	2.07E+00	2.19E+00	5.60E+00	8.27E+01	3.9E-01	2.6E-02
LEAD	9.40E+02	0.00E+00	2.02E+02	3.01E+00	0.00E+00	2.15E+01	2.45E+01	4.70E+00	1.86E+02	5.2E+00	1.3E-01
ZINC	5.33E+01	0.00E+00	3.15E+02	1.71E-01	0.00E+00	3.36E+01	3.38E+01	7.54E+01	2.98E+02	4.5E-01	1.1E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.50E-02	kg
Food Ingestion Rate = (If)	1.60E-03	kg/day
Water Ingestion Rate = (Iw)	4.28E-03	L/day
Soil Ingestion Rate = (Is)	4.80E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
1-METHYLNAPHTHALENE	9.56E-02	0.00E+00	2.91E-01	7.66E-05	0.00E+00	2.59E-02	2.59E-02	6.56E+01	3.56E+02	4.0E-04	7.3E-05
2-METHYLNAPHTHALENE	7.10E-02	0.00E+00	2.16E-01	5.69E-05	0.00E+00	1.92E-02	1.93E-02	6.56E+01	3.56E+02	2.9E-04	5.4E-05
ACENAPHTHENE	1.17E+00	0.00E+00	1.72E+00	9.36E-04	0.00E+00	1.53E-01	1.54E-01	6.56E+01	3.56E+02	2.3E-03	4.3E-04
ANTHRACENE	1.61E+00	0.00E+00	3.91E+00	1.29E-03	0.00E+00	3.48E-01	3.49E-01	6.56E+01	3.56E+02	5.3E-03	9.8E-04
BENZO(A)ANTHRACENE	8.34E+00	0.00E+00	1.33E+01	6.68E-03	0.00E+00	1.18E+00	1.19E+00	6.15E-01	3.84E+01	1.9E+00	3.1E-02
BENZO(A)PYRENE	1.07E+01	0.00E+00	1.43E+01	8.59E-03	0.00E+00	1.27E+00	1.28E+00	6.15E-01	3.84E+01	2.1E+00	3.3E-02
BENZO(B)FLUORANTHENE	1.07E+01	0.00E+00	2.78E+01	8.57E-03	0.00E+00	2.48E+00	2.49E+00	6.15E-01	3.84E+01	4.0E+00	6.5E-02
BENZO(G,H,I)PERYLENE	6.29E+00	0.00E+00	1.85E+01	5.04E-03	0.00E+00	1.65E+00	1.65E+00	6.15E-01	3.84E+01	2.7E+00	4.3E-02
BENZO(K)FLUORANTHENE	4.50E+00	0.00E+00	1.17E+01	3.60E-03	0.00E+00	1.04E+00	1.04E+00	6.15E-01	3.84E+01	1.7E+00	2.7E-02
CHRYSENE	1.07E+01	0.00E+00	2.45E+01	8.58E-03	0.00E+00	2.18E+00	2.19E+00	6.15E-01	3.84E+01	3.6E+00	5.7E-02
DIBENZO(A,H)ANTHRACENE	1.95E+00	0.00E+00	4.52E+00	1.57E-03	0.00E+00	4.02E-01	4.03E-01	6.15E-01	3.84E+01	6.6E-01	1.1E-02
FLUORANTHENE	9.72E+00	0.00E+00	2.96E+01	7.79E-03	0.00E+00	2.63E+00	2.64E+00	6.56E+01	3.56E+02	4.0E-02	7.4E-03
FLUORENE	1.08E+00	0.00E+00	1.03E+01	8.63E-04	0.00E+00	9.17E-01	9.18E-01	6.56E+01	3.56E+02	1.4E-02	2.6E-03
INDENO(1,2,3-CD)PYRENE	6.97E+00	0.00E+00	1.99E+01	5.58E-03	0.00E+00	1.77E+00	1.78E+00	6.15E-01	3.84E+01	2.9E+00	4.6E-02
NAPHTHALENE	1.18E-01	0.00E+00	5.19E-01	9.45E-05	0.00E+00	4.62E-02	4.63E-02	6.56E+01	3.56E+02	7.1E-04	1.3E-04
PHENANTHRENE	6.82E+00	0.00E+00	1.17E+01	5.46E-03	0.00E+00	1.04E+00	1.05E+00	6.56E+01	3.56E+02	1.6E-02	2.9E-03
PYRENE	1.14E+01	0.00E+00	1.99E+01	9.10E-03	0.00E+00	1.77E+00	1.78E+00	6.15E-01	3.84E+01	2.9E+00	4.6E-02
Inorganics											
ANTIMONY	8.83E-01	0.00E+00	8.83E-01	7.07E-04	0.00E+00	7.85E-02	7.92E-02	5.90E-02	2.76E+00	1.3E+00	2.9E-02
COPPER	1.33E+01	0.00E+00	6.84E+00	1.06E-02	0.00E+00	6.08E-01	6.19E-01	5.60E+00	8.27E+01	1.1E-01	7.5E-03
LEAD	3.20E+02	0.00E+00	8.45E+01	2.56E-01	0.00E+00	7.52E+00	7.78E+00	4.70E+00	1.86E+02	1.7E+00	4.2E-02
ZINC	3.55E+01	0.00E+00	2.76E+02	2.84E-02	0.00E+00	2.45E+01	2.46E+01	7.54E+01	2.98E+02	3.3E-01	8.3E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.61E-02	kg
Food Ingestion Rate = (If)	1.43E-03	kg/day
Water Ingestion Rate = (Iw)	3.60E-03	L/day
Soil Ingestion Rate = (Is)	1.29E-05	kg/day
Home Range = (HR)	9.70E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
1-METHYLNAPHTHALENE	2.30E-01	0.00E+00	6.99E-01	6.09E-03	0.00E+00	1.13E-01	1.19E-01	2.00E+00	2.00E+01	5.9E-02	5.9E-03
2-METHYLNAPHTHALENE	2.30E-01	0.00E+00	6.99E-01	6.09E-03	0.00E+00	1.13E-01	1.19E-01	2.00E+00	2.00E+01	5.9E-02	5.9E-03
ACENAPHTHENE	5.00E+00	0.00E+00	7.35E+00	1.32E-01	0.00E+00	1.19E+00	1.32E+00	2.00E+00	2.00E+01	6.6E-01	6.6E-02
ANTHRACENE	7.20E+00	0.00E+00	1.74E+01	1.91E-01	0.00E+00	2.81E+00	3.00E+00	2.00E+00	2.00E+01	1.5E+00	1.5E-01
BENZO(A)ANTHRACENE	3.30E+01	0.00E+00	5.25E+01	8.73E-01	0.00E+00	8.47E+00	9.34E+00	2.00E+00	2.00E+01	4.7E+00	4.7E-01
BENZO(A)PYRENE	4.20E+01	0.00E+00	5.59E+01	1.11E+00	0.00E+00	9.01E+00	1.01E+01	2.00E+00	2.00E+01	5.1E+00	5.1E-01
BENZO(B)FLUORANTHENE	4.10E+01	0.00E+00	1.07E+02	1.09E+00	0.00E+00	1.72E+01	1.83E+01	2.00E+00	2.00E+01	9.1E+00	9.1E-01
BENZO(G,H,I)PERYLENE	2.50E+01	0.00E+00	7.35E+01	6.62E-01	0.00E+00	1.19E+01	1.25E+01	2.00E+00	2.00E+01	6.3E+00	6.3E-01
BENZO(K)FLUORANTHENE	1.80E+01	0.00E+00	4.68E+01	4.76E-01	0.00E+00	7.55E+00	8.03E+00	2.00E+00	2.00E+01	4.0E+00	4.0E-01
CHRYSENE	4.30E+01	0.00E+00	9.85E+01	1.14E+00	0.00E+00	1.59E+01	1.70E+01	2.00E+00	2.00E+01	8.5E+00	8.5E-01
DIBENZO(A,H)ANTHRACENE	7.60E+00	0.00E+00	1.76E+01	2.01E-01	0.00E+00	2.83E+00	3.03E+00	2.00E+00	2.00E+01	1.5E+00	1.5E-01
FLUORANTHENE	3.80E+01	0.00E+00	1.16E+02	1.01E+00	0.00E+00	1.86E+01	1.96E+01	2.00E+00	2.00E+01	9.8E+00	9.8E-01
FLUORENE	3.10E+00	0.00E+00	2.97E+01	8.20E-02	0.00E+00	4.79E+00	4.87E+00	2.00E+00	2.00E+01	2.4E+00	2.4E-01
INDENO(1,2,3-CD)PYRENE	2.70E+01	0.00E+00	7.72E+01	7.15E-01	0.00E+00	1.25E+01	1.32E+01	2.00E+00	2.00E+01	6.6E+00	6.6E-01
NAPHTHALENE	3.30E-01	0.00E+00	1.45E+00	8.73E-03	0.00E+00	2.34E-01	2.43E-01	2.00E+00	2.00E+01	1.2E-01	1.2E-02
PHENANTHRENE	3.00E+01	0.00E+00	5.16E+01	7.94E-01	0.00E+00	8.33E+00	9.12E+00	2.00E+00	2.00E+01	4.6E+00	4.6E-01
PYRENE	4.50E+01	0.00E+00	7.88E+01	1.19E+00	0.00E+00	1.27E+01	1.39E+01	2.00E+00	2.00E+01	6.9E+00	6.9E-01
Inorganics											
ANTIMONY	4.80E+00	0.00E+00	4.80E+00	1.27E-01	0.00E+00	7.75E-01	9.02E-01	NV	NV	#VALUE!	#VALUE!
COPPER	3.76E+01	0.00E+00	1.94E+01	9.95E-01	0.00E+00	3.12E+00	4.12E+00	4.05E+00	3.49E+01	1.0E+00	1.2E-01
LEAD	9.40E+02	0.00E+00	2.02E+02	2.49E+01	0.00E+00	3.25E+01	5.74E+01	1.63E+00	4.46E+01	3.5E+01	1.3E+00
ZINC	5.33E+01	0.00E+00	3.15E+02	1.41E+00	0.00E+00	5.09E+01	5.23E+01	6.61E+01	1.71E+02	7.9E-01	3.0E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	7.73E-02	kg
Food Ingestion Rate = (If)	1.25E-02	kg/day
Water Ingestion Rate = (Iw)	1.21E-02	L/day
Soil Ingestion Rate = (Is)	2.05E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
1-METHYLNAPHTHALENE	9.56E-02	0.00E+00	2.91E-01	9.04E-04	0.00E+00	4.30E-02	4.39E-02	2.00E+00	2.00E+01	2.2E-02	2.2E-03
2-METHYLNAPHTHALENE	7.10E-02	0.00E+00	2.16E-01	6.71E-04	0.00E+00	3.19E-02	3.26E-02	2.00E+00	2.00E+01	1.6E-02	1.6E-03
ACENAPHTHENE	1.17E+00	0.00E+00	1.72E+00	1.10E-02	0.00E+00	2.54E-01	2.65E-01	2.00E+00	2.00E+01	1.3E-01	1.3E-02
ANTHRACENE	1.61E+00	0.00E+00	3.91E+00	1.53E-02	0.00E+00	5.77E-01	5.93E-01	2.00E+00	2.00E+01	3.0E-01	3.0E-02
BENZO(A)ANTHRACENE	8.34E+00	0.00E+00	1.33E+01	7.89E-02	0.00E+00	1.96E+00	2.04E+00	2.00E+00	2.00E+01	1.0E+00	1.0E-01
BENZO(A)PYRENE	1.07E+01	0.00E+00	1.43E+01	1.01E-01	0.00E+00	2.11E+00	2.21E+00	2.00E+00	2.00E+01	1.1E+00	1.1E-01
BENZO(B)FLUORANTHENE	1.07E+01	0.00E+00	2.78E+01	1.01E-01	0.00E+00	4.11E+00	4.21E+00	2.00E+00	2.00E+01	2.1E+00	2.1E-01
BENZO(G,H,I)PERYLENE	6.29E+00	0.00E+00	1.85E+01	5.95E-02	0.00E+00	2.73E+00	2.79E+00	2.00E+00	2.00E+01	1.4E+00	1.4E-01
BENZO(K)FLUORANTHENE	4.50E+00	0.00E+00	1.17E+01	4.26E-02	0.00E+00	1.73E+00	1.77E+00	2.00E+00	2.00E+01	8.9E-01	8.9E-02
CHRYSENE	1.07E+01	0.00E+00	2.45E+01	1.01E-01	0.00E+00	3.63E+00	3.73E+00	2.00E+00	2.00E+01	1.9E+00	1.9E-01
DIBENZO(A,H)ANTHRACENE	1.95E+00	0.00E+00	4.52E+00	1.85E-02	0.00E+00	6.67E-01	6.85E-01	2.00E+00	2.00E+01	3.4E-01	3.4E-02
FLUORANTHENE	9.72E+00	0.00E+00	2.96E+01	9.19E-02	0.00E+00	4.37E+00	4.46E+00	2.00E+00	2.00E+01	2.2E+00	2.2E-01
FLUORENE	1.08E+00	0.00E+00	1.03E+01	1.02E-02	0.00E+00	1.52E+00	1.53E+00	2.00E+00	2.00E+01	7.7E-01	7.7E-02
INDENO(1,2,3-CD)PYRENE	6.97E+00	0.00E+00	1.99E+01	6.59E-02	0.00E+00	2.94E+00	3.01E+00	2.00E+00	2.00E+01	1.5E+00	1.5E-01
NAPHTHALENE	1.18E-01	0.00E+00	5.19E-01	1.12E-03	0.00E+00	7.67E-02	7.78E-02	2.00E+00	2.00E+01	3.9E-02	3.9E-03
PHENANTHRENE	6.82E+00	0.00E+00	1.17E+01	6.45E-02	0.00E+00	1.73E+00	1.80E+00	2.00E+00	2.00E+01	9.0E-01	9.0E-02
PYRENE	1.14E+01	0.00E+00	1.99E+01	1.07E-01	0.00E+00	2.94E+00	3.04E+00	2.00E+00	2.00E+01	1.5E+00	1.5E-01
Inorganics											
ANTIMONY	8.83E-01	0.00E+00	8.83E-01	8.34E-03	0.00E+00	1.30E-01	1.39E-01	NV	NV	#VALUE!	#VALUE!
COPPER	1.33E+01	0.00E+00	6.84E+00	1.26E-01	0.00E+00	1.01E+00	1.14E+00	4.05E+00	3.49E+01	2.8E-01	3.3E-02
LEAD	3.20E+02	0.00E+00	8.45E+01	3.02E+00	0.00E+00	1.25E+01	1.55E+01	1.63E+00	4.46E+01	9.5E+00	3.5E-01
ZINC	3.55E+01	0.00E+00	2.76E+02	3.36E-01	0.00E+00	4.07E+01	4.11E+01	6.61E+01	1.71E+02	6.2E-01	2.4E-01

Body Weight = (BW)	8.04E-02	kg
Food Ingestion Rate = (If)	1.19E-02	kg/day
Water Ingestion Rate = (Iw)	1.13E-02	L/day
Soil Ingestion Rate = (Is)	7.60E-04	kg/day
Home Range = (HR)	6.10E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

TABLE 4-6.3.4

TERRESTRIAL FOOD CHAIN MODEL - CONSERVATIVE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - SURFACE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Semivolatile Organics								
1-METHYLNAPHTHALENE	1.3E-03	1.3E-04	2.4E-04	4.5E-05	5.9E-02	5.9E-03	1.1E-03	2.1E-04
2-METHYLNAPHTHALENE	1.3E-03	1.3E-04	2.4E-04	4.5E-05	5.9E-02	5.9E-03	1.1E-03	2.1E-04
ACENAPHTHENE	5.5E-03	5.5E-04	2.7E-04	5.0E-05	6.6E-01	6.6E-02	1.2E-02	2.2E-03
ANTHRACENE	2.2E-02	2.2E-03	3.3E-03	6.1E-04	1.5E+00	1.5E-01	2.9E-02	5.3E-03
BENZO(A)ANTHRACENE	4.1E-02	4.1E-03	2.9E-01	4.6E-03	4.7E+00	4.7E-01	9.3E+00	1.5E-01
BENZO(A)PYRENE	8.5E-02	8.5E-03	1.1E+00	1.8E-02	5.1E+00	5.1E-01	9.9E+00	1.6E-01
BENZO(B)FLUORANTHENE	1.5E-01	1.5E-02	2.5E+00	4.0E-02	9.1E+00	9.1E-01	1.9E+01	3.0E-01
BENZO(G,H,I)PERYLENE	1.7E-01	1.7E-02	3.3E+00	5.3E-02	6.3E+00	6.3E-01	1.3E+01	2.1E-01
BENZO(K)FLUORANTHENE	3.1E-02	3.1E-03	3.5E-01	5.6E-03	4.0E+00	4.0E-01	8.2E+00	1.3E-01
CHRYSENE	5.2E-02	5.2E-03	3.6E-01	5.8E-03	8.5E+00	8.5E-01	1.7E+01	2.8E-01
DIBENZO(A,H)ANTHRACENE	1.6E-02	1.6E-03	2.2E-01	3.5E-03	1.5E+00	1.5E-01	3.1E+00	4.9E-02
FLUORANTHENE	1.9E-01	1.9E-02	3.4E-02	6.3E-03	9.8E+00	9.8E-01	1.9E-01	3.5E-02
FLUORENE	3.4E-03	3.4E-04	1.7E-04	3.1E-05	2.4E+00	2.4E-01	4.8E-02	8.9E-03
INDENO(1,2,3-CD)PYRENE	5.3E-02	5.3E-03	6.9E-01	1.1E-02	6.6E+00	6.6E-01	1.4E+01	2.2E-01
NAPHTHALENE	3.2E-02	3.2E-03	6.8E-03	1.3E-03	1.2E-01	1.2E-02	2.4E-03	4.4E-04
PHENANTHRENE	8.8E-02	8.8E-03	1.3E-02	2.5E-03	4.6E+00	4.6E-01	8.5E-02	1.6E-02
PYRENE	3.1E-01	3.1E-02	6.1E+00	9.7E-02	6.9E+00	6.9E-01	1.4E+01	2.2E-01
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	6.1E-01	1.3E-02	#VALUE!	#VALUE!	8.9E+00	1.9E-01
COPPER	5.2E-02	6.1E-03	1.8E-01	1.2E-02	1.0E+00	1.2E-01	3.9E-01	2.6E-02
LEAD	1.4E+00	5.1E-02	1.0E+00	2.5E-02	3.5E+01	1.3E+00	5.2E+00	1.3E-01
ZINC	1.2E-02	4.7E-03	6.7E-02	1.7E-02	7.9E-01	3.0E-01	4.5E-01	1.1E-01

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

TABLE 4-6.3.7

TERRESTRIAL FOOD CHAIN MODEL - AVERAGE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - SURFACE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Semivolatile Organics								
1-METHYLNAPHTHALENE	5.7E-04	5.7E-05	6.9E-05	1.3E-05	2.2E-02	2.2E-03	4.0E-04	7.3E-05
2-METHYLNAPHTHALENE	4.9E-04	4.9E-05	6.0E-05	1.1E-05	1.6E-02	1.6E-03	2.9E-04	5.4E-05
ACENAPHTHENE	4.4E-04	4.4E-05	1.3E-05	2.4E-06	1.3E-01	1.3E-02	2.3E-03	4.3E-04
ANTHRACENE	3.7E-03	3.7E-04	4.2E-04	7.7E-05	3.0E-01	3.0E-02	5.3E-03	9.8E-04
BENZO(A)ANTHRACENE	4.3E-03	4.3E-04	2.7E-02	4.3E-04	1.0E+00	1.0E-01	1.9E+00	3.1E-02
BENZO(A)PYRENE	1.1E-02	1.1E-03	1.1E-01	1.8E-03	1.1E+00	1.1E-01	2.1E+00	3.3E-02
BENZO(B)FLUORANTHENE	2.3E-02	2.3E-03	2.7E-01	4.4E-03	2.1E+00	2.1E-01	4.0E+00	6.5E-02
BENZO(G,H,I)PERYLENE	2.2E-02	2.2E-03	2.8E-01	4.5E-03	1.4E+00	1.4E-01	2.7E+00	4.3E-02
BENZO(K)FLUORANTHENE	4.1E-03	4.1E-04	3.8E-02	6.0E-04	8.9E-01	8.9E-02	1.7E+00	2.7E-02
CHRYSENE	5.4E-03	5.4E-04	3.2E-02	5.1E-04	1.9E+00	1.9E-01	3.6E+00	5.7E-02
DIBENZO(A,H)ANTHRACENE	2.2E-03	2.2E-04	2.2E-02	3.5E-04	3.4E-01	3.4E-02	6.6E-01	1.1E-02
FLUORANTHENE	3.2E-02	3.2E-03	3.7E-03	6.8E-04	2.2E+00	2.2E-01	4.0E-02	7.4E-03
FLUORENE	4.0E-04	4.0E-05	1.2E-05	2.3E-06	7.7E-01	7.7E-02	1.4E-02	2.6E-03
INDENO(1,2,3-CD)PYRENE	6.9E-03	6.9E-04	6.7E-02	1.1E-03	1.5E+00	1.5E-01	2.9E+00	4.6E-02
NAPHTHALENE	8.4E-03	8.4E-04	1.1E-03	2.0E-04	3.9E-02	3.9E-03	7.1E-04	1.3E-04
PHENANTHRENE	1.9E-02	1.9E-03	2.1E-03	3.9E-04	9.0E-01	9.0E-02	1.6E-02	2.9E-03
PYRENE	5.2E-02	5.2E-03	6.6E-01	1.1E-02	1.5E+00	1.5E-01	2.9E+00	4.6E-02
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	3.8E-02	8.1E-04	#VALUE!	#VALUE!	1.3E+00	2.9E-02
COPPER	1.8E-02	2.1E-03	4.8E-02	3.3E-03	2.8E-01	3.3E-02	1.1E-01	7.5E-03
LEAD	1.9E-01	6.9E-03	1.1E-01	2.8E-03	9.5E+00	3.5E-01	1.7E+00	4.2E-02
ZINC	6.5E-03	2.5E-03	2.3E-02	5.8E-03	6.2E-01	2.4E-01	3.3E-01	8.3E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

APPENDIX F

CHEMICAL CONCENTRATIONS IN SURFACE SOIL AND TISSUE - COMPOSITE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Surface Soil Concentrations (mg/kg)				Surface Water Concentrations (mg/L)		Earthworm Bioaccumulation Factors		Earthworm Concentrations (mg/kg)		Plant Bioaccumulation Factors		Plant Concentrations (mg/kg)	
	Maximum Detection	Average All	Average of Positive Detections	Average [1]	Maximum Detection	Average Concentration[1]	Conservative	Average	Maximum Detection	Average	Conservative	Average	Maximum Detection	Average
Inorganics														
ANTIMONY	1.40E+00	3.21E-01	3.21E-01	3.21E-01	0.00E+00	0.00E+00	1.00E+00	1.00E+00	1.40E+00	3.21E-01	1.14E-02	1.02E-02	5.41E-02	1.36E-02
ARSENIC	3.30E+00	2.67E+00	2.67E+00	2.67E+00	0.00E+00	0.00E+00	Regression from Eco SSL		5.61E-01	4.83E-01	Regression from Eco SSL		1.24E-01	1.00E-01
COPPER	5.24E+01	1.68E+01	1.68E+01	1.68E+01	0.00E+00	0.00E+00	5.15E-01	5.15E-01	2.70E+01	8.63E+00	Regression from Eco SSL		9.28E+00	5.92E+00
LEAD	5.25E+01	2.45E+01	2.45E+01	2.45E+01	0.00E+00	0.00E+00	Regression from Eco SSL		1.97E+01	1.06E+01	Regression from Eco SSL		2.44E+00	1.59E+00
ZINC	6.65E+01	4.02E+01	4.02E+01	4.02E+01	0.00E+00	0.00E+00	Regression from Eco SSL		3.39E+02	2.87E+02	Regression from Eco SSL		4.94E+01	3.74E+01
Explosives														
NITROGLYCERIN	8.00E-01	6.22E-01	8.00E-01	6.22E-01	0.00E+00	0.00E+00	1.00E+00	1.00E+00	8.00E-01	6.22E-01	1.00E+00	1.00E+00	8.00E-01	6.22E-01

1 - If the average of all value is the greater than the maximum detection, the average of the positive detections was used as the average value.

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal NOAEL	Mammal LOAEL	Bird NOAEL	Bird LOAEL
VOLATILES				
1,1,1-Trichloroethane	1000	1000	NV	NV
1,1,2,2-Tetrachloroethane	76	108	NV	NV
1,1,2-Trichloroethane	0.39	4.4	NV	NV
1,1-Dichloroethane	475	4750	NV	NV
1,1-Dichloroethene	30	300	NV	NV
1,2,4-Trichlorobenzene	1.48	14.8	NV	NV
1,2-Dichlorobenzene	120	1200	NV	NV
1,2-Dichloroethane	50	500	17.2	34.4
1,2-Dichloroethene (total)	45.2	452	NV	NV
1,4-Dichlorobenzene	30	300	NV	NV
2-Butanone	1771	4571	NV	NV
2-Hexanone	NV	NV	NV	NV
4-Methyl-2-pentanone	NV	NV	NV	NV
Acetone	10	50	20089	200890
Benzene	26.36	263.6	NV	NV
Bromodichloromethane	1.79	17.9	NV	NV
Carbon Disulfide	12.6	25.6	NV	NV
Carbon Tetrachloride	16	160	NV	NV
Chlorobenzene	2.725	5.45	NV	NV
Chloroform	15	41	NV	NV
Chloromethane	NV	NV	NV	NV
cis-1,2-Dichloroethene	45.2	452	NV	NV
Dichlorodifluoromethane	2310	23100	NV	NV
Ethylbenzene	9.71	29.1	NV	NV
Isopropylbenzene	11	33.1	NV	NV
m,p-Xylene	2.06	2.58	107	1070
Methyl acetate	NV	NV	NV	NV
o-Xylene	2.06	2.58	107	1070
Methylene Chloride	5.85	50	NV	NV
Styrene	20	40	NV	NV
Tetrachloroethene	1.4	7	NV	NV
Toluene	26	260	NV	NV
Trichloroethene	0.7	7	NV	NV
Trichlorofluoromethane	34.9	349	NV	NV
Vinyl chloride	17	1.7	NV	NV
Xylenes, Total	2.06	2.58	107	1070
SEMIVOLATILES				
1,1'-Biphenyl	5	25	NV	NV
2,2'-Oxybis(1-chloropropane)	NV	NV	NV	NV
2,3,4,6-Tetrachlorophenol	2.5	10	NV	NV
2,4,5-Trichlorophenol	10	30	NV	NV
2,4,6-Trichlorophenol	0.42	4.2	NV	NV
2,4-Dimethylphenol	5	25	NV	NV
2-Methylnaphthalene	65.6	356	2	20
2-Methylphenol	5	15	NV	NV
3-Nitroaniline	NV	NV	NV	NV
4-Chloroaniline	1.25	12.5	NV	NV
4-Chloro-3-methylphenol	NV	NV	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
4-Methylphenol	NV	NV	NV	NV
4-Nitroaniline	NV	NV	NV	NV
4-Nitrophenol	NV	NV	NV	NV
7,12-Dimethylbenz(a)anthracene	NV	NV	2	20
Acenaphthene	65.6	356	2	20
Acenaphthylene	65.6	356	2	20
Anthracene	65.6	356	2	20
Benzaldehyde	20	40	NV	NV
Benzo(a)anthracene	0.615	38.4	2	20
Benzo(a)pyrene	0.615	38.4	2	20

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Benzo(b)fluoranthene	0.615	38.4	2	20
Benzo(g,h,i)perylene	0.615	38.4	2	20
Benzo(k)fluoranthene	0.615	38.4	2	20
Bis(2-Ethylhexyl)phthalate	18.3	183	1.11	11.1
Butyl benzyl phthalate	15.9	47	NV	NV
Caprolactam	50	500	NV	NV
Carbazole	1	10	2	20
Chrysene	0.615	38.4	2	20
Dibenzo(a,h)anthracene	0.615	38.4	2	20
Dibenzofuran	NV	NV	2	20
1,4-Dichlorobenzene	30	300	NV	NV
Diethylphthalate	4583	45830	NV	NV
Di-n-butyl phthalate	550	1833	0.111	1.11
Di-n-octyl phthalate	NV	NV	NV	NV
Fluoranthene	65.6	356	2	20
Fluorene	65.6	356	2	20
Hexachloroethane	0.1	1.5	NV	NV
Indeno(1,2,3-cd)pyrene	0.615	38.4	2	20
Isophorone	15	179	NV	NV
Naphthalene	65.6	356	2	20
n-Nitrosodiphenylamine	NV	NV	NV	NV
Pentachlorophenol	8.42	22.65	6.73	52.01
Phenanthrene	65.6	356	2	20
Phenol	6	12	NV	NV
Pyrene	0.615	38.4	2	20
Perylene	0.615	38.4	2	20
HERBICIDES				
Dinoseb	0.1	1	NV	NV
2,4-D	1	5	NV	NV
2,4,5-T	3	10	NV	NV
PESTICIDES/PCBs				
2,4'-DDD	0.147	5.56	0.227	2.7
2,4'-DDE	0.147	5.56	0.227	2.7
2,4'-DDT	0.147	5.56	0.227	2.7
4,4'-DDD	0.147	5.56	0.227	2.7
4,4'-DDE	0.147	5.56	0.227	2.7
4,4'-DDT	0.147	5.56	0.227	2.7
Aldrin	0.2	1	NV	NV
Alpha-BHC	0.014	0.14	0.56	2.25
Alpha-Chlordane	4.58	9.16	2.14	10.7
Aroclor-1232	0.068	0.68	0.18	1.8
Aroclor-1242	0.069	0.69	0.41	4.1
Aroclor-1248	0.01	0.1	NV	NV
Aroclor-1254	0.068	0.68	0.18	1.8
Aroclor-1260	0.068	0.68	0.18	1.8
Aroclor-1268	0.068	0.68	0.18	1.8
PCB-28	0.068	0.68	0.18	1.8
PCB-44	0.068	0.68	0.18	1.8
PCB-52	0.068	0.68	0.18	1.8

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
PCB-66	0.068	0.68	0.18	1.8
PCB-101	0.068	0.68	0.18	1.8
PCB-105	0.068	0.68	0.18	1.8
PCB-118	0.068	0.68	0.18	1.8
PCB-128	0.068	0.68	0.18	1.8
PCB-138	0.068	0.68	0.18	1.8
PCB-153	0.068	0.68	0.18	1.8
PCB-170	0.068	0.68	0.18	1.8
PCB-180	0.068	0.68	0.18	1.8
PCB-187	0.068	0.68	0.18	1.8
PCB-195	0.068	0.68	0.18	1.8
PCB-206	0.068	0.68	0.18	1.8
PCB-209	0.068	0.68	0.18	1.8
beta-BHC	0.4	2	0.56	2.25
delta-BHC	0.014	0.14	0.56	2.25
Dieldrin	0.015	1.27	0.0709	0.8
Endosulfan I	0.15	1.5	10	100
Endosulfan II	0.15	1.5	10	100
Endosulfan Sulfate	0.15	1.5	10	100
Endrin	0.092	0.92	0.01035	0.1035
Endrin Aldehyde	0.092	0.92	0.01	0.1
Endrin Ketone	0.092	0.92	0.01	0.1
Gamma-BHC (Lindane)	8	80	2	20
Gamma-Chlordane	4.58	9.16	2.14	10.7
Heptachlor	0.1	1	NV	NV
Heptachlor Epoxide	0.1	1	NV	NV
Methoxychlor	4	8	NV	NV
Toxaphene	8	80	NV	NV
Total Aroclor	0.068	0.68	0.18	1.8
Total DDT	0.147	5.56	0.227	2.7
DIOXINS AND FURANS (mg/kg)				
1,2,3,4,6,7,8-HpCDD	0.0001	0.001	0.014	0.14
1,2,3,4,6,7,8-HpCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8,9-HPCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8-HXCDD	0.00001	0.0001	0.00028	0.0028
1,2,3,4,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,6,7,8-HxCDD	0.00001	0.0001	0.0014	0.014
1,2,3,6,7,8-HxCDF	0.00016	0.0016	0.00014	0.0014
1,2,3,7,8,9-HxCDD	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8,9-HxCDF	0.00001	0.0001	0.00014	0.0014
2,3,4,6,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8-PECDD	0.000001	0.00001	0.000014	0.00014
1,2,3,7,8-PECDF	0.00016	0.0016	0.00014	0.0014
2,3,4,7,8-PECDF	0.000016	0.00016	0.000014	0.00014
2,3,7,8-TCDD	0.000001	0.00001	0.000014	0.00014
2,3,7,8-TCDF	0.00001	0.0001	0.000014	0.00014
OCDD	0.01	0.1	0.14	1.4
OCDF	0.01	0.1	0.14	1.4
TOTAL HpCDD	0.0001	0.001	0.014	0.14

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
TOTAL HxCDD	0.00001	0.0001	0.00014	0.0014
TOTAL PeCDD	0.000001	0.00001	0.000014	0.00014
Total HpCDF	0.0001	0.001	0.0014	0.014
Total HxCDF	0.00001	0.0001	0.00014	0.0014
Total PeCDF	0.000002	0.00002	0.000014	0.00014
Total TCDD	0.000001	0.00001	0.000014	0.00014
Total TCDF	0.00001	0.0001	0.000014	0.00014
EXPLOSIVES (mg/kg)				
1,3 Dinitrobenzene	0.4	1.07	NV	NV
1,3,5-Trinitrobenzene	2.68	13.31	NV	NV
2,4-Dinitrotoluene	0.67	1.4	0.1	0.5
2,6-Dinitrotoluene	0.7	7	NV	NV
2,4,6-Trinitrotoluene	1.6	16	0.7	17.8
2-Amino-4,6-dinitrotoluene	NV	NV	NV	NV
2-Nitrotoluene	20	200	NV	NV
3-Nitrotoluene	20	200	NV	NV
4-Amino-2,6-dinitrotoluene	NV	NV	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal NOAEL	Mammal LOAEL	Bird NOAEL	Bird LOAEL
4-Nitrotoluene	20	200	NV	NV
Ammonia	NV	NV	NV	NV
HMX	3	7.5	NV	NV
Nitrobenzene (exp)	NV	NV	NV	NV
Nitroglycerin	3	32	NV	NV
RDX	7	35	NV	NV
Tetryl	1.3	6.2	NV	NV
INORGANICS				
Aluminum	1.93	19.3	109.7	1097
Antimony	0.059	2.76	NV	NV
Arsenic	1.04	4.55	2.24	4.51
Barium	51.8	82.7	20.8	41.7
Beryllium	0.532	0.673	NV	NV
Cadmium	0.77	6.9	1.47	6.35
Chromium	2.40	58.17	2.66	15.63
Hexavalent Chromium	5.66	38.37	NV	NV
Cobalt	7.33	18.90	7.61	18.34
Copper	5.6	82.7	4.05	34.87
Cyanide	68.7	687	NV	NV
Iron	50	500	100	1000
Lead	4.7	186.4	1.63	44.63
Manganese	51.5	145.67	179	376.6
Mercury	0.032	0.16	0.0064	0.064
Nickel	1.70	14.77	6.71	18.57
Selenium	0.143	0.661	0.29	0.819

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
Volatile Organics				
1,1,1-Trichloroethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
2-Butanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Methyl-2-pentanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Acetone	5.20E+00	5.20E+00	1.00E+00	1.00E+00
Carbon Disulfide	2.00E+00	2.00E+00	1.00E+00	1.00E+00
Chlorobenzene	9.00E-01	9.00E-01	1.00E+00	1.00E+00
Ethylbenzene	6.10E-01	6.10E-01	1.00E+00	1.00E+00
Isopropylbenzene	1.00E+00	1.00E+00	1.00E+00	1.00E+00
M,p-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Methyl Acetate	2.99E+01	2.99E+01	1.00E+00	1.00E+00
Methylene Chloride	6.70E+00	6.70E+00	1.00E+00	1.00E+00
O-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Tetrachloroethene	1.20E+00	1.20E+00	1.00E+00	1.00E+00
Toluene	1.03E+00	1.03E+00	1.00E+00	1.00E+00
Total Xylenes	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Trichloroethene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
Trichlorofluoromethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
Semivolatile Organics				
1,1'-Biphenyl	1.59E-01	1.59E-01	1.00E+00	1.00E+00
1,2-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
1,4-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
2,2'-Oxybis(1-Chloropropane)	???	???	1.00E+00	1.00E+00
2,3,4,6-Tetrachlorophenol	1.59E-01	1.59E-01	1.00E+00	1.00E+00
2,4-D	???	???		
2-Methylnaphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
2-Methylphenol	???	???	1.00E+00	1.00E+00
3-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Chloro-3-Methylphenol	???	???	1.00E+00	1.00E+00
4-Chloroaniline	9.03E-01	9.03E-01	1.00E+00	1.00E+00
4-Methylphenol	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitrophenol	3.00E+00	3.00E+00	1.00E+00	1.00E+00
2,4,5-Trichlorophenol	2.40E-01	2.40E-01	1.00E+00	1.00E+00
2,4,6-Trichlorophenol	2.70E-01	2.70E-01	1.00E+00	1.00E+00
2,4,5-T	???	???	???	???
Acenaphthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Acenaphthylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzaldehyde	1.76E+00	1.76E+00	1.00E+00	1.00E+00
Benzo(a)anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(a)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(b)fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(g,h,i)perylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(k)Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Bis(2-ethylhexyl)phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Butyl benzyl Phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Caprolactam	4.90E+01	4.90E+01	1.00E+00	1.00E+00
Carbazole	2.40E-01	2.40E-01	Eco-SSL	Eco-SSL
Chrysene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzo(a,h)Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzofuran	1.50E-01	1.50E-01	Eco-SSL	Eco-SSL
Diethylphthalate	1.30E+00	1.30E+00	1.00E+00	1.00E+00
Di-n-butyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Di-n-octyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Dinoseb	???	???	???	???
Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Fluorene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexachloroethane	2.10E-01	2.10E-01	1.00E+00	1.00E+00
Indeno(1,2,3-cd)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Isophorone	3.92E+00	3.92E+00	1.00E+00	1.00E+00
N-Nitrosodiphenylamine	6.05E-01	6.05E-01	1.00E+00	1.00E+00
Naphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pentachlorophenol	1.40E-02	1.40E-02	1.00E+00	1.00E+00
Phenanthrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Phenol	5.10E+00	5.10E+00	1.00E+00	1.00E+00
Pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pesticides/ PCBs				
4,4'-DDD	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDE	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Aldrin	6.90E-01	6.90E-01	3.30E+00	3.30E+00
Alpha-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Aroclor-1232	5.30E-01	5.30E-01	1.59E+01	6.67E+00
Aroclor-1242	1.60E-01	1.60E-01	1.59E+01	6.67E+00
Aroclor-1248	1.60E-02	1.60E-02	1.59E+01	6.67E+00
Aroclor-1254	1.30E-02	1.30E-02	1.59E+01	6.67E+00
Aroclor-1260	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Aroclor-1268	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Dieldrin	8.20E-02	8.20E-02	6.64E+00	6.64E+00
Gamma-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Heptachlor	1.20E-01	1.20E-01	1.00E+01	1.00E+01
Endosulfan I	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan II	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan Sulfate	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endrin	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Aldehyde	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Ketone	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Heptachlor Epoxide	2.80E-02	2.80E-02	3.00E+00	3.00E+00
Methoxychlor	1.10E-01	1.10E-01	1.00E+00	1.00E+00
alpha-BHC	2.10E-01	2.10E-01	5.00E+00	5.00E+00

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
beta-BHC	1.80E-01	1.80E-01	5.00E+00	5.00E+00
delta-BHC	9.00E-01	9.00E-01	5.00E+00	5.00E+00
gamma-BHC (Lindane)	2.70E-01	2.70E-01	5.00E+00	5.00E+00
Toxaphene	6.20E-02	6.20E-02	1.00E+00	1.00E+00
Total Aroclor	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Total DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Explosives				
2,4,6-Trinitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
2-Nitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
1,3,5-Trinitrobenzene	7.70E+00	7.70E+00	1.00E+00	1.00E+00
4-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
RDX	4.60E-01	4.60E-01	1.00E+00	1.00E+00
4-Amino-2,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
HMX	1.70E+01	1.70E+01	1.00E+00	1.00E+00
Nitrobenzene (exp)	3.40E+00	3.40E+00	1.00E+00	1.00E+00
1,3 Dinitrobenzene	4.50E+00	4.50E+00	1.00E+00	1.00E+00
2-Amino-4,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
Tetryl	???	???	1.00E+00	1.00E+00
3-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
2,4-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
2,6-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
NITROGLYCERIN	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Dioxins				
1,2,3,4,6,7,8-HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,6,7,8-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8,9-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HxCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8-PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
1,2,3,7,8-Pecdf	4.40E-03	4.40E-03	2.22E+01	1.10E+01
2,3,4,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
2,3,4,7,8-PECDF	3.70E-03	3.70E-03	2.22E+01	1.10E+01
2,3,7,8-TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ HALFND	4.30E-03	4.30E-03	2.22E+01	1.10E+01
2,3,7,8-TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDD	???	???	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDF	???	???	2.22E+01	1.10E+01
TOTAL HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
Total HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total PECDF	4.40E-03	4.40E-03	2.22E+01	1.10E+01
Total TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
Total TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
Inorganics				
Aluminum	5.00E-03	2.87E-03	1.18E-01	4.30E-02
Antimony	1.14E-02	1.02E-02	1.00E+00	1.00E+00
Arsenic	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Barium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Beryllium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cadmium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cobalt	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Copper	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexavalent Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cyanide	1.80E+00	1.00E+00	1.00E+00	1.00E+00
Iron	1.00E-02	4.25E-03	7.80E-02	3.60E-02
Lead	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Manganese	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Mercury	5.00E+00	6.52E-01	ORNL Reg.	ORNL Reg.
Nickel	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Selenium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Silver	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Thallium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Tin	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Vanadium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Zinc	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL

Notes:
BAF - Bioaccumulation Factor
BSAF - Biota Sediment Accumulation Factor
1 - ORNL (2001) for organics; only one value is available for conservative and average exposures
2 - Sample et al., (1997) for inorganics; conservative value is 90th percentile; average value is median v
3 - ORNL (September, 1998) for all chemicals; conservative value is 90th percentile; average value is m
4 - U.S. EPA, September 1997; only one value is available for conservative and average exposures. Va
5 - Conservative and average refers to the exposure scenarios for which the uptake factors are used
6 - Where "Eco-SSL" is given, values were calculated using equations from USEPA (2005), Attachment
Tables 4a (for inorganics) and 4b (for organics).

Default value of 1 is assigned to parameters without uptake factors

TABLE X-X

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

Species/Exposure Inputs	Conservative Inputs		Average Inputs	
	Values	Units	Values	Units
Bobwhite Quail				
Body Weight = BW	1.540E-01	kg	1.751E-01	kg
Food Ingestion Rate = If	2.442E-03	kg/day	2.042E-03	kg/day
Water Ingestion Rate = Iw	2.276E-02	L/day	1.926E-02	L/day
Soil Ingestion Rate = Is	3.395E-04	kg/day	1.246E-04	kg/day
Home Range = HR	Assume 100% on site		1.880E+01	acres
Meadow Vole				
Body Weight = BW	1.700E-02	kg	3.580E-02	kg
Food Ingestion Rate = If	1.878E-03	kg/day	1.744E-03	kg/day
Water Ingestion Rate = Iw	7.513E-03	L/day	6.261E-03	L/day
Soil Ingestion Rate = Is	6.010E-05	kg/day	2.093E-05	kg/day
Home Range = HR	Assume 100% on site		6.590E-02	acres
American Robin				
Body Weight = BW	7.73E-02	kg	8.04E-02	kg
Food Ingestion Rate = If	1.25E-02	kg/day	1.19E-02	kg/day
Water Ingestion Rate = Iw	1.21E-02	L/day	1.13E-02	L/day
Soil Ingestion Rate - Is	2.046E-03	kg/day	7.601E-04	kg/day
Home Range = HR	Assume 100% on site		6.095E-01	acres
Short-Tailed Shrew				
Body Weight = BW	1.500E-02	kg	1.610E-02	kg
Food Ingestion Rate = If	1.600E-03	kg/day	1.433E-03	kg/day
Water Ingestion Rate = Iw	4.280E-03	L/day	3.600E-03	L/day
Soil Ingestion Rate - Is	4.801E-05	kg/day	1.289E-05	kg/day
Home Range = HR	Assume 100% on site		9.699E-01	acres
Mink				
Body Weight = BW	5.500E-01	kg	1.103E+00	kg
Food Ingestion Rate = If	6.067E-02	kg/day	4.504E-02	kg/day
Water Ingestion Rate = Iw	1.213E-01	L/day	7.308E-02	L/day
Sediment Ingestion Rate = Is	5.703E-03	kg/day	4.234E-03	kg/day
Home Range = HR	Assume 100% on site		1.558E+03	acres
Green Heron				
Body Weight = BW	2.00E-01	kg	2.12E-01	kg
Food Ingestion Rate = If	3.10E-02	kg/day	3.00E-02	kg/day
Water Ingestion Rate = Iw	2.20E-02	L/day	2.10E-02	L/day
Sediment Ingestion Rate = Is	1.600E-03	kg/day	1.500E-03	kg/day
Home Range = HR	Assume 100% on site		1.000E+01	km-radius

Notes:
The exposure factors were derived as presented in Appendix I.

The soil/sediment ingestion rates were calculated by multiplying the food ingestion rates by the following incidental soil/sediment ingestion rates:

	Conservative	Average	Source
Bobwhite quail	13.90%	6.10%	1, 2
Meadow Vole	3.20%	1.20%	1
American Robin	16.40%	6.40%	1,4
Short-tailed Shrew	3%	0.90%	1
Mink	9.4%	9.4%	3, 5
Green Heron	5%	5%	6

1 - USEPA (U.S. Environmental Protection Agency), 2005. Ecological Soil Screening Level Guidance, Office of Emergency and Remedial Response. February.
2 - Based on the mourning dove.
3 - Beyer, N., E. Connor, and S. Gerould. 1994. Estimates of Soil Ingestion by Wildlife. Journal of Wildlife Management 58(2) pp. 375-382.
4 - Based on the American woodcock
5 - Based on the raccoon
6 - Based on piscivorous birds

APPENDIX F

MEADOW VOLE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.40E+00	0.00E+00	5.41E-02	4.95E-03	0.00E+00	5.97E-03	1.09E-02	5.90E-02	2.76E+00	1.85E-01	3.96E-03
ARSENIC	3.30E+00	0.00E+00	1.24E-01	1.17E-02	0.00E+00	1.37E-02	2.53E-02	1.04E+00	4.55E+00	2.44E-02	5.57E-03
COPPER	5.24E+01	0.00E+00	9.28E+00	1.85E-01	0.00E+00	1.03E+00	1.21E+00	5.60E+00	8.27E+01	2.16E-01	1.46E-02
LEAD	5.25E+01	0.00E+00	2.44E+00	1.86E-01	0.00E+00	2.70E-01	4.56E-01	4.70E+00	1.86E+02	9.70E-02	2.44E-03
ZINC	6.65E+01	0.00E+00	4.94E+01	2.35E-01	0.00E+00	5.46E+00	5.69E+00	7.54E+01	2.98E+02	7.55E-02	1.91E-02
Explosives											
NITROGLYCERIN	8.00E-01	0.00E+00	8.00E-01	2.83E-03	0.00E+00	8.84E-02	9.12E-02	3.00E+00	3.20E+01	3.04E-02	2.85E-03

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.70E-02	kg	Dose (soil) = (Cs * Is)(H)/BW
Food Ingestion Rate = (If)	1.88E-03	kg/day	Dose (vegetation) = (Cv * If)(H)/BW
Water Ingestion Rate = (Iw)	7.51E-03	L/day	Dose (water) = (Cw * Iw)(H)/BW
Soil Ingestion Rate = (Is)	6.01E-05	kg/day	Cv = Contaminant concentration in vegetation
Home Range = (HR)	Assume 100% on site		Cs = Contaminant concentration in soil
Contaminated Area = (CA)	Assume equal to home range		Cw = Contaminant concentration in water
			Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
			H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

MEADOW VOLE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	3.21E-01	0.00E+00	1.36E-02	1.88E-04	0.00E+00	6.62E-04	8.50E-04	5.90E-02	2.76E+00	1.44E-02	3.08E-04
ARSENIC	2.67E+00	0.00E+00	1.00E-01	1.56E-03	0.00E+00	4.87E-03	6.43E-03	1.04E+00	4.55E+00	6.19E-03	1.41E-03
COPPER	1.68E+01	0.00E+00	5.92E+00	9.80E-03	0.00E+00	2.88E-01	2.98E-01	5.60E+00	8.27E+01	5.33E-02	3.61E-03
LEAD	2.45E+01	0.00E+00	1.59E+00	1.43E-02	0.00E+00	7.76E-02	9.20E-02	4.70E+00	1.86E+02	1.96E-02	4.93E-04
ZINC	4.02E+01	0.00E+00	3.74E+01	2.35E-02	0.00E+00	1.82E+00	1.85E+00	7.54E+01	2.98E+02	2.45E-02	6.20E-03
Explosives											
NITROGLYCERIN	6.22E-01	0.00E+00	6.22E-01	3.64E-04	0.00E+00	3.03E-02	3.07E-02	3.00E+00	3.20E+01	1.02E-02	9.59E-04

Body Weight = (BW)	3.58E-02	kg
Food Ingestion Rate = (If)	1.74E-03	kg/day
Water Ingestion Rate = (Iw)	6.26E-03	L/day
Soil Ingestion Rate = (Is)	2.09E-05	kg/day
Home Range = (HR)	6.59E-02	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.40E+00	0.00E+00	5.41E-02	3.09E-03	0.00E+00	8.58E-04	3.94E-03	NV	NV	#VALUE!	#VALUE!
ARSENIC	3.30E+00	0.00E+00	1.24E-01	7.28E-03	0.00E+00	1.96E-03	9.24E-03	2.24E+00	4.51E+00	4.1E-03	2.0E-03
COPPER	5.24E+01	0.00E+00	9.28E+00	1.16E-01	0.00E+00	1.47E-01	2.63E-01	4.05E+00	3.49E+01	6.5E-02	7.5E-03
LEAD	5.25E+01	0.00E+00	2.44E+00	1.16E-01	0.00E+00	3.88E-02	1.55E-01	1.63E+00	4.46E+01	9.5E-02	3.5E-03
ZINC	6.65E+01	0.00E+00	4.94E+01	1.47E-01	0.00E+00	7.84E-01	9.30E-01	6.61E+01	1.71E+02	1.4E-02	5.4E-03
Explosives											
NITROGLYCERIN	8.00E-01	0.00E+00	8.00E-01	1.76E-03	0.00E+00	1.27E-02	1.45E-02	NV	NV	#VALUE!	#VALUE!

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.54E-01	kg
Food Ingestion Rate = (If)	2.44E-03	kg/day
Water Ingestion Rate = (Iw)	2.28E-02	L/day
Soil Ingestion Rate = (Is)	3.40E-04	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	3.21E-01	0.00E+00	1.36E-02	2.28E-04	0.00E+00	1.58E-04	3.87E-04	NV	NV	#VALUE!	#VALUE!
ARSENIC	2.67E+00	0.00E+00	1.00E-01	1.90E-03	0.00E+00	1.17E-03	3.06E-03	2.24E+00	4.51E+00	1.4E-03	6.8E-04
COPPER	1.68E+01	0.00E+00	5.92E+00	1.19E-02	0.00E+00	6.91E-02	8.10E-02	4.05E+00	3.49E+01	2.0E-02	2.3E-03
LEAD	2.45E+01	0.00E+00	1.59E+00	1.74E-02	0.00E+00	1.86E-02	3.60E-02	1.63E+00	4.46E+01	2.2E-02	8.1E-04
ZINC	4.02E+01	0.00E+00	3.74E+01	2.86E-02	0.00E+00	4.36E-01	4.65E-01	6.61E+01	1.71E+02	7.0E-03	2.7E-03
Explosives											
NITROGLYCERIN	6.22E-01	2.00E+00	6.22E-01	4.43E-04	2.20E-01	7.26E-03	2.28E-01	NV	NV	#VALUE!	#VALUE!

Body Weight = (BW)	1.75E-01	kg	Dose (soil) = (Cs * Is)(H)/BW	Conc = Concentration
Food Ingestion Rate = (If)	2.04E-03	kg/day	Dose (vegetation) = (Cv * If)(H)/BW	LOAEL = Lowest Observed Adverse Effects Concentration
Water Ingestion Rate = (Iw)	1.93E-02	L/day	Dose (water) = (Cw * Iw)(H)/BW	NOAEL = No Observed Adverse Effects Concentration
Soil Ingestion Rate = (Is)	1.25E-04	kg/day	Cv = Contaminant concentration in vegetation	SW = Surface Water
Home Range = (HR)	1.88E+01	acres	Cs = Contaminant concentration in soil	
Contaminated Area = (CA)	Assume equal to home range		Cw = Contaminant concentration in water	
			Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)	
			H=CA/HR (Assume = to 1)	

APPENDIX F

SHORT-TAILED SHREW - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.40E+00	0.00E+00	1.40E+00	4.48E-03	0.00E+00	1.49E-01	1.54E-01	5.90E-02	2.76E+00	2.6E+00	5.6E-02
ARSENIC	3.30E+00	0.00E+00	5.61E-01	1.06E-02	0.00E+00	5.98E-02	7.04E-02	1.04E+00	4.55E+00	6.8E-02	1.5E-02
COPPER	5.24E+01	0.00E+00	2.70E+01	1.68E-01	0.00E+00	2.88E+00	3.05E+00	5.60E+00	8.27E+01	5.4E-01	3.7E-02
LEAD	5.25E+01	0.00E+00	1.97E+01	1.68E-01	0.00E+00	2.10E+00	2.27E+00	4.70E+00	1.86E+02	4.8E-01	1.2E-02
ZINC	6.65E+01	0.00E+00	3.39E+02	2.13E-01	0.00E+00	3.62E+01	3.64E+01	7.54E+01	2.98E+02	4.8E-01	1.2E-01
Explosives											
NITROGLYCERIN	8.00E-01	0.00E+00	8.00E-01	2.56E-03	0.00E+00	8.54E-02	8.79E-02	3.00E+00	3.20E+01	2.9E-02	2.7E-03

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.50E-02	kg
Food Ingestion Rate = (If)	1.60E-03	kg/day
Water Ingestion Rate = (Iw)	4.28E-03	L/day
Soil Ingestion Rate = (Is)	4.80E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	3.21E-01	0.00E+00	3.21E-01	2.57E-04	0.00E+00	2.86E-02	2.88E-02	5.90E-02	2.76E+00	4.9E-01	1.0E-02
ARSENIC	2.67E+00	0.00E+00	4.83E-01	2.14E-03	0.00E+00	4.29E-02	4.51E-02	1.04E+00	4.55E+00	4.3E-02	9.9E-03
COPPER	1.68E+01	0.00E+00	8.63E+00	1.34E-02	0.00E+00	7.68E-01	7.81E-01	5.60E+00	8.27E+01	1.4E-01	9.4E-03
LEAD	2.45E+01	0.00E+00	1.06E+01	1.96E-02	0.00E+00	9.45E-01	9.65E-01	4.70E+00	1.86E+02	2.1E-01	5.2E-03
ZINC	4.02E+01	0.00E+00	2.87E+02	3.22E-02	0.00E+00	2.56E+01	2.56E+01	7.54E+01	2.98E+02	3.4E-01	8.6E-02
Explosives											
NITROGLYCERIN	6.22E-01	0.00E+00	6.22E-01	4.98E-04	0.00E+00	5.54E-02	5.59E-02	3.00E+00	3.20E+01	1.9E-02	1.7E-03

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.61E-02	kg
Food Ingestion Rate = (If)	1.43E-03	kg/day
Water Ingestion Rate = (Iw)	3.60E-03	L/day
Soil Ingestion Rate = (Is)	1.29E-05	kg/day
Home Range = (HR)	9.70E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.40E+00	0.00E+00	1.40E+00	3.71E-02	0.00E+00	2.26E-01	2.63E-01	NV	NV	#VALUE!	#VALUE!
ARSENIC	3.30E+00	0.00E+00	5.61E-01	8.73E-02	0.00E+00	9.05E-02	1.78E-01	2.24E+00	4.51E+00	7.9E-02	3.9E-02
COPPER	5.24E+01	0.00E+00	2.70E+01	1.39E+00	0.00E+00	4.36E+00	5.74E+00	4.05E+00	3.49E+01	1.4E+00	1.6E-01
LEAD	5.25E+01	0.00E+00	1.97E+01	1.39E+00	0.00E+00	3.17E+00	4.56E+00	1.63E+00	4.46E+01	2.8E+00	1.0E-01
ZINC	6.65E+01	0.00E+00	3.39E+02	1.76E+00	0.00E+00	5.47E+01	5.65E+01	6.61E+01	1.71E+02	8.5E-01	3.3E-01
Explosives											
NITROGLYCERIN	8.00E-01	0.00E+00	8.00E-01	2.12E-02	0.00E+00	1.29E-01	1.50E-01	NV	NV	#VALUE!	#VALUE!

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	7.73E-02	kg
Food Ingestion Rate = (If)	1.25E-02	kg/day
Water Ingestion Rate = (Iw)	1.21E-02	L/day
Soil Ingestion Rate = (Is)	2.05E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	3.21E-01	0.00E+00	3.21E-01	3.04E-03	0.00E+00	4.74E-02	5.05E-02	NV	NV	#VALUE!	#VALUE!
ARSENIC	2.67E+00	0.00E+00	4.83E-01	2.52E-02	0.00E+00	7.13E-02	9.65E-02	2.24E+00	4.51E+00	4.3E-02	2.1E-02
COPPER	1.68E+01	0.00E+00	8.63E+00	1.58E-01	0.00E+00	1.27E+00	1.43E+00	4.05E+00	3.49E+01	3.5E-01	4.1E-02
LEAD	2.45E+01	0.00E+00	1.06E+01	2.32E-01	0.00E+00	1.57E+00	1.80E+00	1.63E+00	4.46E+01	1.1E+00	4.0E-02
ZINC	4.02E+01	0.00E+00	2.87E+02	3.80E-01	0.00E+00	4.25E+01	4.28E+01	6.61E+01	1.71E+02	6.5E-01	2.5E-01
Explosives											
NITROGLYCERIN	6.22E-01	0.00E+00	6.22E-01	5.88E-03	0.00E+00	9.19E-02	9.78E-02	NV	NV	#VALUE!	#VALUE!

Body Weight = (BW)	8.04E-02	kg	Dose (soil) = (Cs * Is)(H)/BW	Conc = Concentration
Food Ingestion Rate = (If)	1.19E-02	kg/day	Dose (invertebrate) = (Ci * If)(H)/BW	LOAEL = Lowest Observed Adverse Effects Concentration
Water Ingestion Rate = (Iw)	1.13E-02	L/day	Dose (water) = (Cw * Iw)(H)/BW	NOAEL = No Observed Adverse Effects Concentration
Soil Ingestion Rate = (Is)	7.60E-04	kg/day	Ci = Contaminant concentration in invertebrate	SW = Surface Water
Home Range = (HR)	6.10E-01	acres	Cs = Contaminant concentration in soil	
Contaminated Area = (CA)	Assume equal to home range		Cw = Contaminant concentration in water	
			Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)	
			H=CA/HR (Assume = to 1)	

TABLE 5-6.3.8

TERRESTRIAL FOOD CHAIN MODEL - CONSERVATIVE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS
COMPOSITE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	1.9E-01	4.0E-03	#VALUE!	#VALUE!	2.6E+00	5.6E-02
ARSENIC	4.1E-03	2.0E-03	2.4E-02	5.6E-03	7.9E-02	3.9E-02	6.8E-02	1.5E-02
COPPER	6.5E-02	7.5E-03	2.2E-01	1.5E-02	1.4E+00	1.6E-01	5.4E-01	3.7E-02
LEAD	9.5E-02	3.5E-03	9.7E-02	2.4E-03	2.8E+00	1.0E-01	4.8E-01	1.2E-02
ZINC	1.4E-02	5.4E-03	7.6E-02	1.9E-02	8.5E-01	3.3E-01	4.8E-01	1.2E-01
Explosives								
NITROGLYCERIN	#VALUE!	#VALUE!	3.0E-02	2.9E-03	#VALUE!	#VALUE!	2.9E-02	2.7E-03

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

TABLE 5-6.3.12

TERRESTRIAL FOOD CHAIN MODEL - AVERAGE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS
COMPOSITE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	1.4E-02	3.1E-04	#VALUE!	#VALUE!	4.9E-01	1.0E-02
ARSENIC	1.4E-03	6.8E-04	6.2E-03	1.4E-03	4.3E-02	2.1E-02	4.3E-02	9.9E-03
COPPER	2.0E-02	2.3E-03	5.3E-02	3.6E-03	3.5E-01	4.1E-02	1.4E-01	9.4E-03
LEAD	2.2E-02	8.1E-04	2.0E-02	4.9E-04	1.1E+00	4.0E-02	2.1E-01	5.2E-03
ZINC	7.0E-03	2.7E-03	2.4E-02	6.2E-03	6.5E-01	2.5E-01	3.4E-01	8.6E-02
Explosives								
NITROGLYCERIN	#VALUE!	#VALUE!	1.0E-02	9.6E-04	#VALUE!	#VALUE!	1.9E-02	1.7E-03

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

APPENDIX F

CHEMICAL CONCENTRATIONS IN SURFACE SOIL AND TISSUE - BERM 1 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Surface Soil Concentrations (mg/kg)				Surface Water Concentrations (mg/L)		Earthworm Bioaccumulation Factors		Earthworm Concentrations (mg/kg)		Plant Bioaccumulation Factors		Plant Concentrations (mg/kg)	
	Maximum Detection	Average All	Average of Positive Detections	Average [1]	Maximum Detection	Average Concentration[1]	Conservative	Average	Maximum Detection	Average	Conservative	Average	Maximum Detection	Average
Inorganics														
ANTIMONY	1.60E-01	1.30E-01	1.30E-01	1.30E-01	0.00E+00	0.00E+00	1.00E+00	1.00E+00	1.60E-01	1.30E-01	1.14E-02	1.02E-02	7.07E-03	5.82E-03
ARSENIC	4.20E+00	2.52E+00	2.52E+00	2.52E+00	0.00E+00	0.00E+00	Regression from Eco SSL		6.65E-01	4.64E-01	Regression from Eco SSL		1.58E-01	9.46E-02
COPPER	1.07E+02	5.16E+01	5.16E+01	5.16E+01	0.00E+00	0.00E+00	5.15E-01	5.15E-01	5.51E+01	2.66E+01	Regression from Eco SSL		1.23E+01	9.22E+00
LEAD	5.43E+02	2.22E+02	2.22E+02	2.22E+02	0.00E+00	0.00E+00	Regression from Eco SSL		1.30E+02	6.30E+01	Regression from Eco SSL		9.07E+00	5.49E+00
TIN	9.10E+00	3.33E+00	6.60E+00	3.33E+00	0.00E+00	0.00E+00	1.00E+00	1.00E+00	9.10E+00	3.33E+00	1.00E+00	1.00E+00	9.10E+00	3.33E+00
ZINC	3.33E+01	2.51E+01	2.51E+01	2.51E+01	0.00E+00	0.00E+00	Regression from Eco SSL		2.70E+02	2.46E+02	Regression from Eco SSL		3.37E+01	2.88E+01

1 - If the average of all value is the greater than the maximum detection, the average of the positive detections was used as the average value.

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
VOLATILES				
1,1,1-Trichloroethane	1000	1000	NV	NV
1,1,2,2-Tetrachloroethane	76	108	NV	NV
1,1,2-Trichloroethane	0.39	4.4	NV	NV
1,1-Dichloroethane	475	4750	NV	NV
1,1-Dichloroethene	30	300	NV	NV
1,2,4-Trichlorobenzene	1.48	14.8	NV	NV
1,2-Dichlorobenzene	120	1200	NV	NV
1,2-Dichloroethane	50	500	17.2	34.4
1,2-Dichloroethene (total)	45.2	452	NV	NV
1,4-Dichlorobenzene	30	300	NV	NV
2-Butanone	1771	4571	NV	NV
2-Hexanone	NV	NV	NV	NV
4-Methyl-2-pentanone	NV	NV	NV	NV
Acetone	10	50	20089	200890
Benzene	26.36	263.6	NV	NV
Bromodichloromethane	1.79	17.9	NV	NV
Carbon Disulfide	12.6	25.6	NV	NV
Carbon Tetrachloride	16	160	NV	NV
Chlorobenzene	2.725	5.45	NV	NV
Chloroform	15	41	NV	NV
Chloromethane	NV	NV	NV	NV
cis-1,2-Dichloroethene	45.2	452	NV	NV
Dichlorodifluoromethane	2310	23100	NV	NV
Ethylbenzene	9.71	29.1	NV	NV
Isopropylbenzene	11	33.1	NV	NV
m,p-Xylene	2.06	2.58	107	1070
Methyl acetate	NV	NV	NV	NV
o-Xylene	2.06	2.58	107	1070
Methylene Chloride	5.85	50	NV	NV
Styrene	20	40	NV	NV
Tetrachloroethene	1.4	7	NV	NV
Toluene	26	260	NV	NV
Trichloroethene	0.7	7	NV	NV
Trichlorofluoromethane	34.9	349	NV	NV
Vinyl chloride	17	1.7	NV	NV
Xylenes, Total	2.06	2.58	107	1070
SEMIVOLATILES				
1,1'-Biphenyl	5	25	NV	NV
2,2'-Oxybis(1-chloropropane)	NV	NV	NV	NV
2,3,4,6-Tetrachlorophenol	2.5	10	NV	NV
2,4,5-Trichlorophenol	10	30	NV	NV
2,4,6-Trichlorophenol	0.42	4.2	NV	NV
2,4-Dimethylphenol	5	25	NV	NV
1-Methylnaphthalene	65.6	356	2	20
2-Methylnaphthalene	65.6	356	2	20
2-Methylphenol	5	15	NV	NV
3-Nitroaniline	NV	NV	NV	NV
4-Chloroaniline	1.25	12.5	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
4-Chloro-3-methylphenol	NV	NV	NV	NV
4-Methylphenol	NV	NV	NV	NV
4-Nitroaniline	NV	NV	NV	NV
4-Nitrophenol	NV	NV	NV	NV
7,12-Dimethylbenz(a)anthracene	NV	NV	2	20
Acenaphthene	65.6	356	2	20
Acenaphthylene	65.6	356	2	20
Anthracene	65.6	356	2	20
Benzaldehyde	20	40	NV	NV
Benzo(a)anthracene	0.615	38.4	2	20
Benzo(a)pyrene	0.615	38.4	2	20

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Benzo(b)fluoranthene	0.615	38.4	2	20
Benzo(g,h,i)perylene	0.615	38.4	2	20
Benzo(k)fluoranthene	0.615	38.4	2	20
Bis(2-Ethylhexyl)phthalate	18.3	183	1.11	11.1
Butyl benzyl phthalate	15.9	47	NV	NV
Caprolactam	50	500	NV	NV
Carbazole	1	10	2	20
Chrysene	0.615	38.4	2	20
Dibenzo(a,h)anthracene	0.615	38.4	2	20
Dibenzofuran	NV	NV	2	20
1,4-Dichlorobenzene	30	300	NV	NV
Diethylphthalate	4583	45830	NV	NV
Di-n-butyl phthalate	550	1833	0.111	1.11
Di-n-octyl phthalate	NV	NV	NV	NV
Fluoranthene	65.6	356	2	20
Fluorene	65.6	356	2	20
Hexachloroethane	0.1	1.5	NV	NV
Indeno(1,2,3-cd)pyrene	0.615	38.4	2	20
Isophorone	15	179	NV	NV
Naphthalene	65.6	356	2	20
n-Nitrosodiphenylamine	NV	NV	NV	NV
Pentachlorophenol	8.42	22.65	6.73	52.01
Phenanthrene	65.6	356	2	20
Phenol	6	12	NV	NV
Pyrene	0.615	38.4	2	20
Perylene	0.615	38.4	2	20
HERBICIDES				
Dinoseb	0.1	1	NV	NV
2,4-D	1	5	NV	NV
2,4,5-T	3	10	NV	NV
PESTICIDES/PCBs				
2,4'-DDD	0.147	5.56	0.227	2.7
2,4'-DDE	0.147	5.56	0.227	2.7
2,4'-DDT	0.147	5.56	0.227	2.7
4,4'-DDD	0.147	5.56	0.227	2.7
4,4'-DDE	0.147	5.56	0.227	2.7
4,4'-DDT	0.147	5.56	0.227	2.7
Aldrin	0.2	1	NV	NV
Alpha-BHC	0.014	0.14	0.56	2.25
Alpha-Chlordane	4.58	9.16	2.14	10.7
Aroclor-1232	0.068	0.68	0.18	1.8
Aroclor-1242	0.069	0.69	0.41	4.1
Aroclor-1248	0.01	0.1	NV	NV
Aroclor-1254	0.068	0.68	0.18	1.8
Aroclor-1260	0.068	0.68	0.18	1.8
Aroclor-1268	0.068	0.68	0.18	1.8
PCB-28	0.068	0.68	0.18	1.8
PCB-44	0.068	0.68	0.18	1.8
PCB-52	0.068	0.68	0.18	1.8

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
PCB-66	0.068	0.68	0.18	1.8
PCB-101	0.068	0.68	0.18	1.8
PCB-105	0.068	0.68	0.18	1.8
PCB-118	0.068	0.68	0.18	1.8
PCB-128	0.068	0.68	0.18	1.8
PCB-138	0.068	0.68	0.18	1.8
PCB-153	0.068	0.68	0.18	1.8
PCB-170	0.068	0.68	0.18	1.8
PCB-180	0.068	0.68	0.18	1.8
PCB-187	0.068	0.68	0.18	1.8
PCB-195	0.068	0.68	0.18	1.8
PCB-206	0.068	0.68	0.18	1.8
PCB-209	0.068	0.68	0.18	1.8
beta-BHC	0.4	2	0.56	2.25
delta-BHC	0.014	0.14	0.56	2.25
Dieldrin	0.015	1.27	0.0709	0.8
Endosulfan I	0.15	1.5	10	100
Endosulfan II	0.15	1.5	10	100
Endosulfan Sulfate	0.15	1.5	10	100
Endrin	0.092	0.92	0.01035	0.1035
Endrin Aldehyde	0.092	0.92	0.01	0.1
Endrin Ketone	0.092	0.92	0.01	0.1
Gamma-BHC (Lindane)	8	80	2	20
Gamma-Chlordane	4.58	9.16	2.14	10.7
Heptachlor	0.1	1	NV	NV
Heptachlor Epoxide	0.1	1	NV	NV
Methoxychlor	4	8	NV	NV
Toxaphene	8	80	NV	NV
Total Aroclor	0.068	0.68	0.18	1.8
Total DDT	0.147	5.56	0.227	2.7
DIOXINS AND FURANS (mg/kg)				
1,2,3,4,6,7,8-HpCDD	0.0001	0.001	0.014	0.14
1,2,3,4,6,7,8-HpCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8,9-HPCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8-HXCDD	0.00001	0.0001	0.00028	0.0028
1,2,3,4,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,6,7,8-HxCDD	0.00001	0.0001	0.0014	0.014
1,2,3,6,7,8-HxCDF	0.00016	0.0016	0.00014	0.0014
1,2,3,7,8,9-HxCDD	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8,9-HxCDF	0.00001	0.0001	0.00014	0.0014
2,3,4,6,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8-PECDD	0.000001	0.00001	0.000014	0.00014
1,2,3,7,8-PECDF	0.00016	0.0016	0.00014	0.0014
2,3,4,7,8-PECDF	0.000016	0.00016	0.000014	0.00014
2,3,7,8-TCDD	0.000001	0.00001	0.000014	0.00014
2,3,7,8-TCDF	0.00001	0.0001	0.000014	0.00014
OCDD	0.01	0.1	0.14	1.4
OCDF	0.01	0.1	0.14	1.4
TOTAL HpCDD	0.0001	0.001	0.014	0.14

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
TOTAL HxCDD	0.00001	0.0001	0.00014	0.0014
TOTAL PeCDD	0.000001	0.00001	0.000014	0.00014
Total HpCDF	0.0001	0.001	0.0014	0.014
Total HxCDF	0.00001	0.0001	0.00014	0.0014
Total PeCDF	0.000002	0.00002	0.000014	0.00014
Total TCDD	0.000001	0.00001	0.000014	0.00014
Total TCDF	0.00001	0.0001	0.000014	0.00014
EXPLOSIVES (mg/kg)				
1,3 Dinitrobenzene	0.4	1.07	NV	NV
1,3,5-Trinitrobenzene	2.68	13.31	NV	NV
2,4-Dinitrotoluene	0.67	1.4	0.1	0.5
2,6-Dinitrotoluene	0.7	7	NV	NV
2,4,6-Trinitrotoluene	1.6	16	0.7	17.8
2-Amino-4,6-dinitrotoluene	NV	NV	NV	NV
2-Nitrotoluene	20	200	NV	NV
3-Nitrotoluene	20	200	NV	NV
4-Amino-2,6-dinitrotoluene	NV	NV	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal NOAEL	Mammal LOAEL	Bird NOAEL	Bird LOAEL
4-Nitrotoluene	20	200	NV	NV
Ammonia	NV	NV	NV	NV
HMX	3	7.5	NV	NV
Nitrobenzene (exp)	NV	NV	NV	NV
Nitroglycerin	3	32	NV	NV
RDX	7	35	NV	NV
Tetryl	1.3	6.2	NV	NV
INORGANICS				
Aluminum	1.93	19.3	109.7	1097
Antimony	0.059	2.76	NV	NV
Arsenic	1.04	4.55	2.24	4.51
Barium	51.8	82.7	20.8	41.7
Beryllium	0.532	0.673	NV	NV
Cadmium	0.77	6.9	1.47	6.35
Chromium	2.40	58.17	2.66	15.63
Hexavalent Chromium	5.66	38.37	NV	NV
Cobalt	7.33	18.90	7.61	18.34
Copper	5.6	82.7	4.05	34.87
Cyanide	68.7	687	NV	NV
Iron	50	500	100	1000
Lead	4.7	186.4	1.63	44.63
Manganese	51.5	145.67	179	376.6
Mercury	0.032	0.16	0.0064	0.064
Nickel	1.70	14.77	6.71	18.57
Selenium	0.143	0.661	0.29	0.819

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
Volatile Organics				
1,1,1-Trichloroethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
2-Butanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Methyl-2-pentanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Acetone	5.20E+00	5.20E+00	1.00E+00	1.00E+00
Carbon Disulfide	2.00E+00	2.00E+00	1.00E+00	1.00E+00
Chlorobenzene	9.00E-01	9.00E-01	1.00E+00	1.00E+00
Ethylbenzene	6.10E-01	6.10E-01	1.00E+00	1.00E+00
Isopropylbenzene	1.00E+00	1.00E+00	1.00E+00	1.00E+00
M,p-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Methyl Acetate	2.99E+01	2.99E+01	1.00E+00	1.00E+00
Methylene Chloride	6.70E+00	6.70E+00	1.00E+00	1.00E+00
O-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Tetrachloroethene	1.20E+00	1.20E+00	1.00E+00	1.00E+00
Toluene	1.03E+00	1.03E+00	1.00E+00	1.00E+00
Total Xylenes	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Trichloroethene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
Trichlorofluoromethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
Semivolatile Organics				
1,1'-Biphenyl	1.59E-01	1.59E-01	1.00E+00	1.00E+00
1,2-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
1,4-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
2,2'-Oxybis(1-Chloropropane)	???	???	1.00E+00	1.00E+00
2,3,4,6-Tetrachlorophenol	1.59E-01	1.59E-01	1.00E+00	1.00E+00
2,4-D	???	???		
2-Methylnaphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
2-Methylphenol	???	???	1.00E+00	1.00E+00
3-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Chloro-3-Methylphenol	???	???	1.00E+00	1.00E+00
4-Chloroaniline	9.03E-01	9.03E-01	1.00E+00	1.00E+00
4-Methylphenol	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitrophenol	3.00E+00	3.00E+00	1.00E+00	1.00E+00
2,4,5-Trichlorophenol	2.40E-01	2.40E-01	1.00E+00	1.00E+00
2,4,6-Trichlorophenol	2.70E-01	2.70E-01	1.00E+00	1.00E+00
2,4,5-T	???	???	???	???
Acenaphthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Acenaphthylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzaldehyde	1.76E+00	1.76E+00	1.00E+00	1.00E+00
Benzo(a)anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(a)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(b)fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(g,h,i)perylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(k)Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Bis(2-ethylhexyl)phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Butyl benzyl Phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Caprolactam	4.90E+01	4.90E+01	1.00E+00	1.00E+00
Carbazole	2.40E-01	2.40E-01	Eco-SSL	Eco-SSL
Chrysene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzo(a,h)Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzofuran	1.50E-01	1.50E-01	Eco-SSL	Eco-SSL
Diethylphthalate	1.30E+00	1.30E+00	1.00E+00	1.00E+00
Di-n-butyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Di-n-octyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Dinoseb	???	???	???	???
Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Fluorene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexachloroethane	2.10E-01	2.10E-01	1.00E+00	1.00E+00
Indeno(1,2,3-cd)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Isophorone	3.92E+00	3.92E+00	1.00E+00	1.00E+00
N-Nitrosodiphenylamine	6.05E-01	6.05E-01	1.00E+00	1.00E+00
Naphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pentachlorophenol	1.40E-02	1.40E-02	1.00E+00	1.00E+00
Phenanthrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Phenol	5.10E+00	5.10E+00	1.00E+00	1.00E+00
Pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pesticides/ PCBs				
4,4'-DDD	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDE	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Aldrin	6.90E-01	6.90E-01	3.30E+00	3.30E+00
Alpha-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Aroclor-1232	5.30E-01	5.30E-01	1.59E+01	6.67E+00
Aroclor-1242	1.60E-01	1.60E-01	1.59E+01	6.67E+00
Aroclor-1248	1.60E-02	1.60E-02	1.59E+01	6.67E+00
Aroclor-1254	1.30E-02	1.30E-02	1.59E+01	6.67E+00
Aroclor-1260	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Aroclor-1268	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Dieldrin	8.20E-02	8.20E-02	6.64E+00	6.64E+00
Gamma-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Heptachlor	1.20E-01	1.20E-01	1.00E+01	1.00E+01
Endosulfan I	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan II	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan Sulfate	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endrin	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Aldehyde	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Ketone	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Heptachlor Epoxide	2.80E-02	2.80E-02	3.00E+00	3.00E+00
Methoxychlor	1.10E-01	1.10E-01	1.00E+00	1.00E+00
alpha-BHC	2.10E-01	2.10E-01	5.00E+00	5.00E+00

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
beta-BHC	1.80E-01	1.80E-01	5.00E+00	5.00E+00
delta-BHC	9.00E-01	9.00E-01	5.00E+00	5.00E+00
gamma-BHC (Lindane)	2.70E-01	2.70E-01	5.00E+00	5.00E+00
Toxaphene	6.20E-02	6.20E-02	1.00E+00	1.00E+00
Total Aroclor	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Total DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Explosives				
2,4,6-Trinitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
2-Nitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
1,3,5-Trinitrobenzene	7.70E+00	7.70E+00	1.00E+00	1.00E+00
4-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
RDX	4.60E-01	4.60E-01	1.00E+00	1.00E+00
4-Amino-2,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
HMX	1.70E+01	1.70E+01	1.00E+00	1.00E+00
Nitrobenzene (exp)	3.40E+00	3.40E+00	1.00E+00	1.00E+00
1,3 Dinitrobenzene	4.50E+00	4.50E+00	1.00E+00	1.00E+00
2-Amino-4,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
Tetryl	???	???	1.00E+00	1.00E+00
3-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
2,4-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
2,6-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
Dioxins				
1,2,3,4,6,7,8-HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,6,7,8-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8,9-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HxCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8-PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
1,2,3,7,8-Pecdf	4.40E-03	4.40E-03	2.22E+01	1.10E+01
2,3,4,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
2,3,4,7,8-PECDF	3.70E-03	3.70E-03	2.22E+01	1.10E+01
2,3,7,8-TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ HALFND	4.30E-03	4.30E-03	2.22E+01	1.10E+01
2,3,7,8-TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDD	???	???	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDF	???	???	2.22E+01	1.10E+01
TOTAL HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
Total HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total PECDF	4.40E-03	4.40E-03	2.22E+01	1.10E+01
Total TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
Total TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
Inorganics				
Aluminum	5.00E-03	2.87E-03	1.18E-01	4.30E-02
Antimony	1.14E-02	1.02E-02	1.00E+00	1.00E+00
Arsenic	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Barium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Beryllium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cadmium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cobalt	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Copper	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexavalent Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cyanide	1.80E+00	1.00E+00	1.00E+00	1.00E+00
Iron	1.00E-02	4.25E-03	7.80E-02	3.60E-02
Lead	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Manganese	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Mercury	5.00E+00	6.52E-01	ORNL Reg.	ORNL Reg.
Nickel	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Selenium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Silver	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Thallium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Tin	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Vanadium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Zinc	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL

Notes:
BAF - Bioaccumulation Factor
BSAF - Biota Sediment Accumulation Factor
1 - ORNL (2001) for organics; only one value is available for conservative and average exposures
2 - Sample et al., (1997) for inorganics; conservative value is 90th percentile; average value is median v
3 - ORNL (September, 1998) for all chemicals; conservative value is 90th percentile; average value is m
4 - U.S. EPA, September 1997; only one value is available for conservative and average exposures. Va
5 - Conservative and average refers to the exposure scenarios for which the uptake factors are used
6 - Where "Eco-SSL" is given, values were calculated using equations from USEPA (2005), Attachment
Tables 4a (for inorganics) and 4b (for organics).

Default value of 1 is assigned to parameters without uptake factors

TABLE X-X

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

Species/Exposure Inputs	Conservative Inputs		Average Inputs	
	Values	Units	Values	Units
Bobwhite Quail				
Body Weight = BW	1.540E-01	kg	1.751E-01	kg
Food Ingestion Rate = If	2.442E-03	kg/day	2.042E-03	kg/day
Water Ingestion Rate = Iw	2.276E-02	L/day	1.926E-02	L/day
Soil Ingestion Rate = Is	3.395E-04	kg/day	1.246E-04	kg/day
Home Range = HR	Assume 100% on site		1.880E+01	acres
Meadow Vole				
Body Weight = BW	1.700E-02	kg	3.580E-02	kg
Food Ingestion Rate = If	1.878E-03	kg/day	1.744E-03	kg/day
Water Ingestion Rate = Iw	7.513E-03	L/day	6.261E-03	L/day
Soil Ingestion Rate = Is	6.010E-05	kg/day	2.093E-05	kg/day
Home Range = HR	Assume 100% on site		6.590E-02	acres
American Robin				
Body Weight = BW	7.73E-02	kg	8.04E-02	kg
Food Ingestion Rate = If	1.25E-02	kg/day	1.19E-02	kg/day
Water Ingestion Rate = Iw	1.21E-02	L/day	1.13E-02	L/day
Soil Ingestion Rate - Is	2.046E-03	kg/day	7.601E-04	kg/day
Home Range = HR	Assume 100% on site		6.095E-01	acres
Short-Tailed Shrew				
Body Weight = BW	1.500E-02	kg	1.610E-02	kg
Food Ingestion Rate = If	1.600E-03	kg/day	1.433E-03	kg/day
Water Ingestion Rate = Iw	4.280E-03	L/day	3.600E-03	L/day
Soil Ingestion Rate - Is	4.801E-05	kg/day	1.289E-05	kg/day
Home Range = HR	Assume 100% on site		9.699E-01	acres
Mink				
Body Weight = BW	5.500E-01	kg	1.103E+00	kg
Food Ingestion Rate = If	6.067E-02	kg/day	4.504E-02	kg/day
Water Ingestion Rate = Iw	1.213E-01	L/day	7.308E-02	L/day
Sediment Ingestion Rate = Is	5.703E-03	kg/day	4.234E-03	kg/day
Home Range = HR	Assume 100% on site		1.558E+03	acres
Green Heron				
Body Weight = BW	2.00E-01	kg	2.12E-01	kg
Food Ingestion Rate = If	3.10E-02	kg/day	3.00E-02	kg/day
Water Ingestion Rate = Iw	2.20E-02	L/day	2.10E-02	L/day
Sediment Ingestion Rate = Is	1.600E-03	kg/day	1.500E-03	kg/day
Home Range = HR	Assume 100% on site		1.000E+01	km-radius

Notes:
The exposure factors were derived as presented in Appendix I.

The soil/sediment ingestion rates were calculated by multiplying the food ingestion rates by the following incidental soil/sediment ingestion rates:

	Conservative	Average	Source
Bobwhite quail	13.90%	6.10%	1, 2
Meadow Vole	3.20%	1.20%	1
American Robin	16.40%	6.40%	1,4
Short-tailed Shrew	3%	0.90%	1
Mink	9.4%	9.4%	3, 5
Green Heron	5%	5%	6

1 - USEPA (U.S. Environmental Protection Agency), 2005. Ecological Soil Screening Level Guidance, Office of Emergency and Remedial Response. February.
2 - Based on the mourning dove.
3 - Beyer, N., E. Connor, and S. Gerould. 1994. Estimates of Soil Ingestion by Wildlife. Journal of Wildlife Management 58(2) pp. 375-382.
4 - Based on the American woodcock
5 - Based on the raccoon
6 - Based on piscivorous birds

APPENDIX F

MEADOW VOLE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - BERM 1 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.60E-01	0.00E+00	7.07E-03	5.66E-04	0.00E+00	7.81E-04	1.35E-03	5.90E-02	2.76E+00	2.28E-02	4.88E-04
ARSENIC	4.20E+00	0.00E+00	1.58E-01	1.48E-02	0.00E+00	1.74E-02	3.23E-02	1.04E+00	4.55E+00	3.10E-02	7.09E-03
COPPER	1.07E+02	0.00E+00	1.23E+01	3.78E-01	0.00E+00	1.36E+00	1.74E+00	5.60E+00	8.27E+01	3.10E-01	2.10E-02
LEAD	5.43E+02	0.00E+00	9.07E+00	1.92E+00	0.00E+00	1.00E+00	2.92E+00	4.70E+00	1.86E+02	6.22E-01	1.57E-02
TIN	9.10E+00	0.00E+00	9.10E+00	3.22E-02	0.00E+00	1.01E+00	1.04E+00	2.34E+01	3.50E+01	4.43E-02	2.96E-02
ZINC	3.33E+01	0.00E+00	3.37E+01	1.18E-01	0.00E+00	3.72E+00	3.84E+00	7.54E+01	2.98E+02	5.09E-02	1.29E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.70E-02	kg
Food Ingestion Rate = (If)	1.88E-03	kg/day
Water Ingestion Rate = (Iw)	7.51E-03	L/day
Soil Ingestion Rate = (Is)	6.01E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

MEADOW VOLE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - BERM 1 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.30E-01	0.00E+00	5.82E-03	7.60E-05	0.00E+00	2.83E-04	3.59E-04	5.90E-02	2.76E+00	6.09E-03	1.30E-04
ARSENIC	2.52E+00	0.00E+00	9.46E-02	1.47E-03	0.00E+00	4.61E-03	6.08E-03	1.04E+00	4.55E+00	5.85E-03	1.34E-03
COPPER	5.16E+01	0.00E+00	9.22E+00	3.02E-02	0.00E+00	4.49E-01	4.80E-01	5.60E+00	8.27E+01	8.56E-02	5.80E-03
LEAD	2.22E+02	0.00E+00	5.49E+00	1.30E-01	0.00E+00	2.68E-01	3.98E-01	4.70E+00	1.86E+02	8.46E-02	2.13E-03
TIN	3.33E+00	0.00E+00	3.33E+00	1.95E-03	0.00E+00	1.62E-01	1.64E-01	2.34E+01	3.50E+01	7.02E-03	4.69E-03
ZINC	2.51E+01	0.00E+00	2.88E+01	1.47E-02	0.00E+00	1.40E+00	1.42E+00	7.54E+01	2.98E+02	1.88E-02	4.76E-03

Body Weight = (BW)	3.58E-02	kg
Food Ingestion Rate = (If)	1.74E-03	kg/day
Water Ingestion Rate = (Iw)	6.26E-03	L/day
Soil Ingestion Rate = (Is)	2.09E-05	kg/day
Home Range = (HR)	6.59E-02	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - BERM 1 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.60E-01	0.00E+00	7.07E-03	3.53E-04	0.00E+00	1.12E-04	4.65E-04	NV	NV	#VALUE!	#VALUE!
ARSENIC	4.20E+00	0.00E+00	1.58E-01	9.26E-03	0.00E+00	2.50E-03	1.18E-02	2.24E+00	4.51E+00	5.2E-03	2.6E-03
COPPER	1.07E+02	0.00E+00	1.23E+01	2.36E-01	0.00E+00	1.95E-01	4.31E-01	4.05E+00	3.49E+01	1.1E-01	1.2E-02
LEAD	5.43E+02	0.00E+00	9.07E+00	1.20E+00	0.00E+00	1.44E-01	1.34E+00	1.63E+00	4.46E+01	8.2E-01	3.0E-02
TIN	9.10E+00	0.00E+00	9.10E+00	2.01E-02	0.00E+00	1.44E-01	1.64E-01	6.76E+00	1.69E+01	2.4E-02	9.7E-03
ZINC	3.33E+01	0.00E+00	3.37E+01	7.34E-02	0.00E+00	5.34E-01	6.08E-01	6.61E+01	1.71E+02	9.2E-03	3.5E-03

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.54E-01	kg
Food Ingestion Rate = (If)	2.44E-03	kg/day
Water Ingestion Rate = (Iw)	2.28E-02	L/day
Soil Ingestion Rate = (Is)	3.40E-04	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - BERM 1 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.30E-01	0.00E+00	5.82E-03	9.25E-05	0.00E+00	6.79E-05	1.60E-04	NV	NV	#VALUE!	#VALUE!
ARSENIC	2.52E+00	0.00E+00	9.46E-02	1.79E-03	0.00E+00	1.10E-03	2.90E-03	2.24E+00	4.51E+00	1.3E-03	6.4E-04
COPPER	5.16E+01	0.00E+00	9.22E+00	3.67E-02	0.00E+00	1.08E-01	1.44E-01	4.05E+00	3.49E+01	3.6E-02	4.1E-03
LEAD	2.22E+02	0.00E+00	5.49E+00	1.58E-01	0.00E+00	6.41E-02	2.22E-01	1.63E+00	4.46E+01	1.4E-01	5.0E-03
TIN	3.33E+00	0.00E+00	3.33E+00	2.37E-03	0.00E+00	3.88E-02	4.12E-02	6.76E+00	1.69E+01	6.1E-03	2.4E-03
ZINC	2.51E+01	0.00E+00	2.88E+01	1.78E-02	0.00E+00	3.36E-01	3.54E-01	6.61E+01	1.71E+02	5.3E-03	2.1E-03

Body Weight = (BW)	1.75E-01	kg
Food Ingestion Rate = (If)	2.04E-03	kg/day
Water Ingestion Rate = (Iw)	1.93E-02	L/day
Soil Ingestion Rate = (Is)	1.25E-04	kg/day
Home Range = (HR)	1.88E+01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - BERM 1 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.60E-01	0.00E+00	1.60E-01	5.12E-04	0.00E+00	1.71E-02	1.76E-02	5.90E-02	2.76E+00	3.0E-01	6.4E-03
ARSENIC	4.20E+00	0.00E+00	6.65E-01	1.34E-02	0.00E+00	7.10E-02	8.44E-02	1.04E+00	4.55E+00	8.1E-02	1.9E-02
COPPER	1.07E+02	0.00E+00	5.51E+01	3.42E-01	0.00E+00	5.88E+00	6.22E+00	5.60E+00	8.27E+01	1.1E+00	7.5E-02
LEAD	5.43E+02	0.00E+00	1.30E+02	1.74E+00	0.00E+00	1.38E+01	1.56E+01	4.70E+00	1.86E+02	3.3E+00	8.3E-02
TIN	9.10E+00	0.00E+00	9.10E+00	2.91E-02	0.00E+00	9.71E-01	1.00E+00	2.34E+01	3.50E+01	4.3E-02	2.9E-02
ZINC	3.33E+01	0.00E+00	2.70E+02	1.07E-01	0.00E+00	2.88E+01	2.89E+01	7.54E+01	2.98E+02	3.8E-01	9.7E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.50E-02	kg
Food Ingestion Rate = (If)	1.60E-03	kg/day
Water Ingestion Rate = (Iw)	4.28E-03	L/day
Soil Ingestion Rate = (Is)	4.80E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - BERM 1 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.30E-01	0.00E+00	1.30E-01	1.04E-04	0.00E+00	1.16E-02	1.17E-02	5.90E-02	2.76E+00	2.0E-01	4.2E-03
ARSENIC	2.52E+00	0.00E+00	4.64E-01	2.02E-03	0.00E+00	4.13E-02	4.33E-02	1.04E+00	4.55E+00	4.2E-02	9.5E-03
COPPER	5.16E+01	0.00E+00	2.66E+01	4.13E-02	0.00E+00	2.37E+00	2.41E+00	5.60E+00	8.27E+01	4.3E-01	2.9E-02
LEAD	2.22E+02	0.00E+00	6.30E+01	1.78E-01	0.00E+00	5.61E+00	5.78E+00	4.70E+00	1.86E+02	1.2E+00	3.1E-02
TIN	3.33E+00	0.00E+00	3.33E+00	2.67E-03	0.00E+00	2.96E-01	2.99E-01	2.34E+01	3.50E+01	1.3E-02	8.5E-03
ZINC	2.51E+01	0.00E+00	2.46E+02	2.01E-02	0.00E+00	2.19E+01	2.19E+01	7.54E+01	2.98E+02	2.9E-01	7.4E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.61E-02	kg
Food Ingestion Rate = (If)	1.43E-03	kg/day
Water Ingestion Rate = (Iw)	3.60E-03	L/day
Soil Ingestion Rate = (Is)	1.29E-05	kg/day
Home Range = (HR)	9.70E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - BERM 1 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.60E-01	0.00E+00	1.60E-01	4.23E-03	0.00E+00	2.58E-02	3.01E-02	NV	NV	#VALUE!	#VALUE!
ARSENIC	4.20E+00	0.00E+00	6.65E-01	1.11E-01	0.00E+00	1.07E-01	2.18E-01	2.24E+00	4.51E+00	9.8E-02	4.8E-02
COPPER	1.07E+02	0.00E+00	5.51E+01	2.83E+00	0.00E+00	8.89E+00	1.17E+01	4.05E+00	3.49E+01	2.9E+00	3.4E-01
LEAD	5.43E+02	0.00E+00	1.30E+02	1.44E+01	0.00E+00	2.09E+01	3.53E+01	1.63E+00	4.46E+01	2.2E+01	7.9E-01
TIN	9.10E+00	0.00E+00	9.10E+00	2.41E-01	0.00E+00	1.47E+00	1.71E+00	6.76E+00	1.69E+01	2.5E-01	1.0E-01
ZINC	3.33E+01	0.00E+00	2.70E+02	8.81E-01	0.00E+00	4.36E+01	4.45E+01	6.61E+01	1.71E+02	6.7E-01	2.6E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	7.73E-02	kg
Food Ingestion Rate = (If)	1.25E-02	kg/day
Water Ingestion Rate = (Iw)	1.21E-02	L/day
Soil Ingestion Rate = (Is)	2.05E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - BERM 1 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.30E-01	0.00E+00	1.30E-01	1.23E-03	0.00E+00	1.92E-02	2.04E-02	NV	NV	#VALUE!	#VALUE!
ARSENIC	2.52E+00	0.00E+00	4.64E-01	2.38E-02	0.00E+00	6.85E-02	9.23E-02	2.24E+00	4.51E+00	4.1E-02	2.0E-02
COPPER	5.16E+01	0.00E+00	2.66E+01	4.88E-01	0.00E+00	3.93E+00	4.42E+00	4.05E+00	3.49E+01	1.1E+00	1.3E-01
LEAD	2.22E+02	0.00E+00	6.30E+01	2.10E+00	0.00E+00	9.31E+00	1.14E+01	1.63E+00	4.46E+01	7.0E+00	2.6E-01
TIN	3.33E+00	0.00E+00	3.33E+00	3.15E-02	0.00E+00	4.92E-01	5.23E-01	6.76E+00	1.69E+01	7.7E-02	3.1E-02
ZINC	2.51E+01	0.00E+00	2.46E+02	2.37E-01	0.00E+00	3.64E+01	3.66E+01	6.61E+01	1.71E+02	5.5E-01	2.1E-01

Body Weight = (BW)	8.04E-02	kg	Dose (soil) = (Cs * Is)(H)/BW	Conc = Concentration
Food Ingestion Rate = (If)	1.19E-02	kg/day	Dose (invertebrate) = (Ci * If)(H)/BW	LOAEL = Lowest Observed Adverse Effects Concentration
Water Ingestion Rate = (Iw)	1.13E-02	L/day	Dose (water) = (Cw * Iw)(H)/BW	NOAEL = No Observed Adverse Effects Concentration
Soil Ingestion Rate = (Is)	7.60E-04	kg/day	Ci = Contaminant concentration in invertebrate	SW = Surface Water
Home Range = (HR)	6.10E-01	acres	Cs = Contaminant concentration in soil	
Contaminated Area = (CA)	Assume equal to home range		Cw = Contaminant concentration in water	
			Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)	
			H=CA/HR (Assume = to 1)	

TABLE 5-6.3.5

TERRESTRIAL FOOD CHAIN MODEL - CONSERVATIVE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - BERM 1 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	2.3E-02	4.9E-04	#VALUE!	#VALUE!	3.0E-01	6.4E-03
ARSENIC	5.2E-03	2.6E-03	3.1E-02	7.1E-03	9.8E-02	4.8E-02	8.1E-02	1.9E-02
COPPER	1.1E-01	1.2E-02	3.1E-01	2.1E-02	2.9E+00	3.4E-01	1.1E+00	7.5E-02
LEAD	8.2E-01	3.0E-02	6.2E-01	1.6E-02	2.2E+01	7.9E-01	3.3E+00	8.3E-02
TIN	2.4E-02	9.7E-03	4.4E-02	3.0E-02	2.5E-01	1.0E-01	4.3E-02	2.9E-02
ZINC	9.2E-03	3.5E-03	5.1E-02	1.3E-02	6.7E-01	2.6E-01	3.8E-01	9.7E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

TABLE 5-6.3.9

TERRESTRIAL FOOD CHAIN MODEL - AVERAGE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - BERM 1 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	6.1E-03	1.3E-04	#VALUE!	#VALUE!	2.0E-01	4.2E-03
ARSENIC	1.3E-03	6.4E-04	5.8E-03	1.3E-03	4.1E-02	2.0E-02	4.2E-02	9.5E-03
COPPER	3.6E-02	4.1E-03	8.6E-02	5.8E-03	1.1E+00	1.3E-01	4.3E-01	2.9E-02
LEAD	1.4E-01	5.0E-03	8.5E-02	2.1E-03	7.0E+00	2.6E-01	1.2E+00	3.1E-02
TIN	6.1E-03	2.4E-03	7.0E-03	4.7E-03	7.7E-02	3.1E-02	1.3E-02	8.5E-03
ZINC	5.3E-03	2.1E-03	1.9E-02	4.8E-03	5.5E-01	2.1E-01	2.9E-01	7.4E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

APPENDIX F

CHEMICAL CONCENTRATIONS IN SURFACE SOIL AND TISSUE - BERM 2 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Surface Soil Concentrations (mg/kg)				Surface Water Concentrations (mg/L)		Earthworm Bioaccumulation Factors		Earthworm Concentrations (mg/kg)		Plant Bioaccumulation Factors		Plant Concentrations (mg/kg)	
	Maximum Detection	Average All	Average of Positive Detections	Average [1]	Maximum Detection	Average Concentration[1]	Conservative	Average	Maximum Detection	Average	Conservative	Average	Maximum Detection	Average
Inorganics														
ANTIMONY	1.70E-01	1.29E-01	1.48E-01	1.29E-01	0.00E+00	0.00E+00	1.00E+00	1.00E+00	1.70E-01	1.29E-01	1.14E-02	1.02E-02	7.48E-03	5.78E-03
ARSENIC	3.30E+00	2.56E+00	2.56E+00	2.56E+00	0.00E+00	0.00E+00	Regression from Eco SSL		5.61E-01	4.69E-01	Regression from Eco SSL		1.24E-01	9.61E-02
COPPER	8.86E+01	5.17E+01	5.17E+01	5.17E+01	0.00E+00	0.00E+00	5.15E-01	5.15E-01	4.56E+01	2.66E+01	Regression from Eco SSL		1.14E+01	9.23E+00
LEAD	6.06E+02	2.88E+02	2.88E+02	2.88E+02	0.00E+00	0.00E+00	Regression from Eco SSL		1.42E+02	7.77E+01	Regression from Eco SSL		9.64E+00	6.35E+00
TIN	1.01E+01	2.97E+00	1.01E+01	2.97E+00	0.00E+00	0.00E+00	1.00E+00	1.00E+00	1.01E+01	2.97E+00	1.00E+00	1.00E+00	1.01E+01	2.97E+00
ZINC	3.52E+01	2.86E+01	2.86E+01	2.86E+01	0.00E+00	0.00E+00	Regression from Eco SSL		2.75E+02	2.57E+02	Regression from Eco SSL		3.47E+01	3.09E+01

1 - If the average of all value is the greater than the maximum detection, the average of the positive detections was used as the average value.

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
VOLATILES				
1,1,1-Trichloroethane	1000	1000	NV	NV
1,1,2,2-Tetrachloroethane	76	108	NV	NV
1,1,2-Trichloroethane	0.39	4.4	NV	NV
1,1-Dichloroethane	475	4750	NV	NV
1,1-Dichloroethene	30	300	NV	NV
1,2,4-Trichlorobenzene	1.48	14.8	NV	NV
1,2-Dichlorobenzene	120	1200	NV	NV
1,2-Dichloroethane	50	500	17.2	34.4
1,2-Dichloroethene (total)	45.2	452	NV	NV
1,4-Dichlorobenzene	30	300	NV	NV
2-Butanone	1771	4571	NV	NV
2-Hexanone	NV	NV	NV	NV
4-Methyl-2-pentanone	NV	NV	NV	NV
Acetone	10	50	20089	200890
Benzene	26.36	263.6	NV	NV
Bromodichloromethane	1.79	17.9	NV	NV
Carbon Disulfide	12.6	25.6	NV	NV
Carbon Tetrachloride	16	160	NV	NV
Chlorobenzene	2.725	5.45	NV	NV
Chloroform	15	41	NV	NV
Chloromethane	NV	NV	NV	NV
cis-1,2-Dichloroethene	45.2	452	NV	NV
Dichlorodifluoromethane	2310	23100	NV	NV
Ethylbenzene	9.71	29.1	NV	NV
Isopropylbenzene	11	33.1	NV	NV
m,p-Xylene	2.06	2.58	107	1070
Methyl acetate	NV	NV	NV	NV
o-Xylene	2.06	2.58	107	1070
Methylene Chloride	5.85	50	NV	NV
Styrene	20	40	NV	NV
Tetrachloroethene	1.4	7	NV	NV
Toluene	26	260	NV	NV
Trichloroethene	0.7	7	NV	NV
Trichlorofluoromethane	34.9	349	NV	NV
Vinyl chloride	17	1.7	NV	NV
Xylenes, Total	2.06	2.58	107	1070
SEMIVOLATILES				
1,1'-Biphenyl	5	25	NV	NV
2,2'-Oxybis(1-chloropropane)	NV	NV	NV	NV
2,3,4,6-Tetrachlorophenol	2.5	10	NV	NV
2,4,5-Trichlorophenol	10	30	NV	NV
2,4,6-Trichlorophenol	0.42	4.2	NV	NV
2,4-Dimethylphenol	5	25	NV	NV
1-Methylnaphthalene	65.6	356	2	20
2-Methylnaphthalene	65.6	356	2	20
2-Methylphenol	5	15	NV	NV
3-Nitroaniline	NV	NV	NV	NV
4-Chloroaniline	1.25	12.5	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
4-Chloro-3-methylphenol	NV	NV	NV	NV
4-Methylphenol	NV	NV	NV	NV
4-Nitroaniline	NV	NV	NV	NV
4-Nitrophenol	NV	NV	NV	NV
7,12-Dimethylbenz(a)anthracene	NV	NV	2	20
Acenaphthene	65.6	356	2	20
Acenaphthylene	65.6	356	2	20
Anthracene	65.6	356	2	20
Benzaldehyde	20	40	NV	NV
Benzo(a)anthracene	0.615	38.4	2	20
Benzo(a)pyrene	0.615	38.4	2	20

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Benzo(b)fluoranthene	0.615	38.4	2	20
Benzo(g,h,i)perylene	0.615	38.4	2	20
Benzo(k)fluoranthene	0.615	38.4	2	20
Bis(2-Ethylhexyl)phthalate	18.3	183	1.11	11.1
Butyl benzyl phthalate	15.9	47	NV	NV
Caprolactam	50	500	NV	NV
Carbazole	1	10	2	20
Chrysene	0.615	38.4	2	20
Dibenzo(a,h)anthracene	0.615	38.4	2	20
Dibenzofuran	NV	NV	2	20
1,4-Dichlorobenzene	30	300	NV	NV
Diethylphthalate	4583	45830	NV	NV
Di-n-butyl phthalate	550	1833	0.111	1.11
Di-n-octyl phthalate	NV	NV	NV	NV
Fluoranthene	65.6	356	2	20
Fluorene	65.6	356	2	20
Hexachloroethane	0.1	1.5	NV	NV
Indeno(1,2,3-cd)pyrene	0.615	38.4	2	20
Isophorone	15	179	NV	NV
Naphthalene	65.6	356	2	20
n-Nitrosodiphenylamine	NV	NV	NV	NV
Pentachlorophenol	8.42	22.65	6.73	52.01
Phenanthrene	65.6	356	2	20
Phenol	6	12	NV	NV
Pyrene	0.615	38.4	2	20
Perylene	0.615	38.4	2	20
HERBICIDES				
Dinoseb	0.1	1	NV	NV
2,4-D	1	5	NV	NV
2,4,5-T	3	10	NV	NV
PESTICIDES/PCBs				
2,4'-DDD	0.147	5.56	0.227	2.7
2,4'-DDE	0.147	5.56	0.227	2.7
2,4'-DDT	0.147	5.56	0.227	2.7
4,4'-DDD	0.147	5.56	0.227	2.7
4,4'-DDE	0.147	5.56	0.227	2.7
4,4'-DDT	0.147	5.56	0.227	2.7
Aldrin	0.2	1	NV	NV
Alpha-BHC	0.014	0.14	0.56	2.25
Alpha-Chlordane	4.58	9.16	2.14	10.7
Aroclor-1232	0.068	0.68	0.18	1.8
Aroclor-1242	0.069	0.69	0.41	4.1
Aroclor-1248	0.01	0.1	NV	NV
Aroclor-1254	0.068	0.68	0.18	1.8
Aroclor-1260	0.068	0.68	0.18	1.8
Aroclor-1268	0.068	0.68	0.18	1.8
PCB-28	0.068	0.68	0.18	1.8
PCB-44	0.068	0.68	0.18	1.8
PCB-52	0.068	0.68	0.18	1.8

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
PCB-66	0.068	0.68	0.18	1.8
PCB-101	0.068	0.68	0.18	1.8
PCB-105	0.068	0.68	0.18	1.8
PCB-118	0.068	0.68	0.18	1.8
PCB-128	0.068	0.68	0.18	1.8
PCB-138	0.068	0.68	0.18	1.8
PCB-153	0.068	0.68	0.18	1.8
PCB-170	0.068	0.68	0.18	1.8
PCB-180	0.068	0.68	0.18	1.8
PCB-187	0.068	0.68	0.18	1.8
PCB-195	0.068	0.68	0.18	1.8
PCB-206	0.068	0.68	0.18	1.8
PCB-209	0.068	0.68	0.18	1.8
beta-BHC	0.4	2	0.56	2.25
delta-BHC	0.014	0.14	0.56	2.25
Dieldrin	0.015	1.27	0.0709	0.8
Endosulfan I	0.15	1.5	10	100
Endosulfan II	0.15	1.5	10	100
Endosulfan Sulfate	0.15	1.5	10	100
Endrin	0.092	0.92	0.01035	0.1035
Endrin Aldehyde	0.092	0.92	0.01	0.1
Endrin Ketone	0.092	0.92	0.01	0.1
Gamma-BHC (Lindane)	8	80	2	20
Gamma-Chlordane	4.58	9.16	2.14	10.7
Heptachlor	0.1	1	NV	NV
Heptachlor Epoxide	0.1	1	NV	NV
Methoxychlor	4	8	NV	NV
Toxaphene	8	80	NV	NV
Total Aroclor	0.068	0.68	0.18	1.8
Total DDT	0.147	5.56	0.227	2.7
DIOXINS AND FURANS (mg/kg)				
1,2,3,4,6,7,8-HpCDD	0.0001	0.001	0.014	0.14
1,2,3,4,6,7,8-HpCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8,9-HPCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8-HXCDD	0.00001	0.0001	0.00028	0.0028
1,2,3,4,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,6,7,8-HxCDD	0.00001	0.0001	0.0014	0.014
1,2,3,6,7,8-HxCDF	0.00016	0.0016	0.00014	0.0014
1,2,3,7,8,9-HxCDD	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8,9-HxCDF	0.00001	0.0001	0.00014	0.0014
2,3,4,6,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8-PECDD	0.000001	0.00001	0.000014	0.00014
1,2,3,7,8-PECDF	0.00016	0.0016	0.00014	0.0014
2,3,4,7,8-PECDF	0.000016	0.00016	0.000014	0.00014
2,3,7,8-TCDD	0.000001	0.00001	0.000014	0.00014
2,3,7,8-TCDF	0.00001	0.0001	0.000014	0.00014
OCDD	0.01	0.1	0.14	1.4
OCDF	0.01	0.1	0.14	1.4
TOTAL HpCDD	0.0001	0.001	0.014	0.14

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
TOTAL HxCDD	0.00001	0.0001	0.00014	0.0014
TOTAL PeCDD	0.000001	0.00001	0.000014	0.00014
Total HpCDF	0.0001	0.001	0.0014	0.014
Total HxCDF	0.00001	0.0001	0.00014	0.0014
Total PeCDF	0.000002	0.00002	0.000014	0.00014
Total TCDD	0.000001	0.00001	0.000014	0.00014
Total TCDF	0.00001	0.0001	0.000014	0.00014
EXPLOSIVES (mg/kg)				
1,3 Dinitrobenzene	0.4	1.07	NV	NV
1,3,5-Trinitrobenzene	2.68	13.31	NV	NV
2,4-Dinitrotoluene	0.67	1.4	0.1	0.5
2,6-Dinitrotoluene	0.7	7	NV	NV
2,4,6-Trinitrotoluene	1.6	16	0.7	17.8
2-Amino-4,6-dinitrotoluene	NV	NV	NV	NV
2-Nitrotoluene	20	200	NV	NV
3-Nitrotoluene	20	200	NV	NV
4-Amino-2,6-dinitrotoluene	NV	NV	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal NOAEL	Mammal LOAEL	Bird NOAEL	Bird LOAEL
4-Nitrotoluene	20	200	NV	NV
Ammonia	NV	NV	NV	NV
HMX	3	7.5	NV	NV
Nitrobenzene (exp)	NV	NV	NV	NV
Nitroglycerin	3	32	NV	NV
RDX	7	35	NV	NV
Tetryl	1.3	6.2	NV	NV
INORGANICS				
Aluminum	1.93	19.3	109.7	1097
Antimony	0.059	2.76	NV	NV
Arsenic	1.04	4.55	2.24	4.51
Barium	51.8	82.7	20.8	41.7
Beryllium	0.532	0.673	NV	NV
Cadmium	0.77	6.9	1.47	6.35
Chromium	2.40	58.17	2.66	15.63
Hexavalent Chromium	5.66	38.37	NV	NV
Cobalt	7.33	18.90	7.61	18.34
Copper	5.6	82.7	4.05	34.87
Cyanide	68.7	687	NV	NV
Iron	50	500	100	1000
Lead	4.7	186.4	1.63	44.63
Manganese	51.5	145.67	179	376.6
Mercury	0.032	0.16	0.0064	0.064
Nickel	1.70	14.77	6.71	18.57
Selenium	0.143	0.661	0.29	0.819

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
Volatile Organics				
1,1,1-Trichloroethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
2-Butanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Methyl-2-pentanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Acetone	5.20E+00	5.20E+00	1.00E+00	1.00E+00
Carbon Disulfide	2.00E+00	2.00E+00	1.00E+00	1.00E+00
Chlorobenzene	9.00E-01	9.00E-01	1.00E+00	1.00E+00
Ethylbenzene	6.10E-01	6.10E-01	1.00E+00	1.00E+00
Isopropylbenzene	1.00E+00	1.00E+00	1.00E+00	1.00E+00
M,p-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Methyl Acetate	2.99E+01	2.99E+01	1.00E+00	1.00E+00
Methylene Chloride	6.70E+00	6.70E+00	1.00E+00	1.00E+00
O-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Tetrachloroethene	1.20E+00	1.20E+00	1.00E+00	1.00E+00
Toluene	1.03E+00	1.03E+00	1.00E+00	1.00E+00
Total Xylenes	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Trichloroethene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
Trichlorofluoromethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
Semivolatile Organics				
1,1'-Biphenyl	1.59E-01	1.59E-01	1.00E+00	1.00E+00
1,2-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
1,4-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
2,2'-Oxybis(1-Chloropropane)	???	???	1.00E+00	1.00E+00
2,3,4,6-Tetrachlorophenol	1.59E-01	1.59E-01	1.00E+00	1.00E+00
2,4-D	???	???		
2-Methylnaphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
2-Methylphenol	???	???	1.00E+00	1.00E+00
3-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Chloro-3-Methylphenol	???	???	1.00E+00	1.00E+00
4-Chloroaniline	9.03E-01	9.03E-01	1.00E+00	1.00E+00
4-Methylphenol	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitrophenol	3.00E+00	3.00E+00	1.00E+00	1.00E+00
2,4,5-Trichlorophenol	2.40E-01	2.40E-01	1.00E+00	1.00E+00
2,4,6-Trichlorophenol	2.70E-01	2.70E-01	1.00E+00	1.00E+00
2,4,5-T	???	???	???	???
Acenaphthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Acenaphthylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzaldehyde	1.76E+00	1.76E+00	1.00E+00	1.00E+00
Benzo(a)anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(a)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(b)fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(g,h,i)perylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(k)Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Bis(2-ethylhexyl)phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Butyl benzyl Phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Caprolactam	4.90E+01	4.90E+01	1.00E+00	1.00E+00
Carbazole	2.40E-01	2.40E-01	Eco-SSL	Eco-SSL
Chrysene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzo(a,h)Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzofuran	1.50E-01	1.50E-01	Eco-SSL	Eco-SSL
Diethylphthalate	1.30E+00	1.30E+00	1.00E+00	1.00E+00
Di-n-butyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Di-n-octyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Dinoseb	???	???	???	???
Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Fluorene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexachloroethane	2.10E-01	2.10E-01	1.00E+00	1.00E+00
Indeno(1,2,3-cd)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Isophorone	3.92E+00	3.92E+00	1.00E+00	1.00E+00
N-Nitrosodiphenylamine	6.05E-01	6.05E-01	1.00E+00	1.00E+00
Naphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pentachlorophenol	1.40E-02	1.40E-02	1.00E+00	1.00E+00
Phenanthrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Phenol	5.10E+00	5.10E+00	1.00E+00	1.00E+00
Pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pesticides/ PCBs				
4,4'-DDD	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDE	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Aldrin	6.90E-01	6.90E-01	3.30E+00	3.30E+00
Alpha-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Aroclor-1232	5.30E-01	5.30E-01	1.59E+01	6.67E+00
Aroclor-1242	1.60E-01	1.60E-01	1.59E+01	6.67E+00
Aroclor-1248	1.60E-02	1.60E-02	1.59E+01	6.67E+00
Aroclor-1254	1.30E-02	1.30E-02	1.59E+01	6.67E+00
Aroclor-1260	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Aroclor-1268	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Dieldrin	8.20E-02	8.20E-02	6.64E+00	6.64E+00
Gamma-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Heptachlor	1.20E-01	1.20E-01	1.00E+01	1.00E+01
Endosulfan I	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan II	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan Sulfate	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endrin	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Aldehyde	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Ketone	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Heptachlor Epoxide	2.80E-02	2.80E-02	3.00E+00	3.00E+00
Methoxychlor	1.10E-01	1.10E-01	1.00E+00	1.00E+00
alpha-BHC	2.10E-01	2.10E-01	5.00E+00	5.00E+00

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
beta-BHC	1.80E-01	1.80E-01	5.00E+00	5.00E+00
delta-BHC	9.00E-01	9.00E-01	5.00E+00	5.00E+00
gamma-BHC (Lindane)	2.70E-01	2.70E-01	5.00E+00	5.00E+00
Toxaphene	6.20E-02	6.20E-02	1.00E+00	1.00E+00
Total Aroclor	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Total DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Explosives				
2,4,6-Trinitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
2-Nitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
1,3,5-Trinitrobenzene	7.70E+00	7.70E+00	1.00E+00	1.00E+00
4-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
RDX	4.60E-01	4.60E-01	1.00E+00	1.00E+00
4-Amino-2,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
HMX	1.70E+01	1.70E+01	1.00E+00	1.00E+00
Nitrobenzene (exp)	3.40E+00	3.40E+00	1.00E+00	1.00E+00
1,3 Dinitrobenzene	4.50E+00	4.50E+00	1.00E+00	1.00E+00
2-Amino-4,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
Tetryl	???	???	1.00E+00	1.00E+00
3-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
2,4-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
2,6-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
Dioxins				
1,2,3,4,6,7,8-HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,6,7,8-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8,9-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HxCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8-PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
1,2,3,7,8-Pecdf	4.40E-03	4.40E-03	2.22E+01	1.10E+01
2,3,4,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
2,3,4,7,8-PECDF	3.70E-03	3.70E-03	2.22E+01	1.10E+01
2,3,7,8-TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ HALFND	4.30E-03	4.30E-03	2.22E+01	1.10E+01
2,3,7,8-TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDD	???	???	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDF	???	???	2.22E+01	1.10E+01
TOTAL HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
Total HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total PECDF	4.40E-03	4.40E-03	2.22E+01	1.10E+01
Total TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
Total TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
Inorganics				
Aluminum	5.00E-03	2.87E-03	1.18E-01	4.30E-02
Antimony	1.14E-02	1.02E-02	1.00E+00	1.00E+00
Arsenic	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Barium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Beryllium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cadmium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cobalt	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Copper	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexavalent Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cyanide	1.80E+00	1.00E+00	1.00E+00	1.00E+00
Iron	1.00E-02	4.25E-03	7.80E-02	3.60E-02
Lead	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Manganese	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Mercury	5.00E+00	6.52E-01	ORNL Reg.	ORNL Reg.
Nickel	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Selenium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Silver	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Thallium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Tin	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Vanadium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Zinc	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL

Notes:
BAF - Bioaccumulation Factor
BSAF - Biota Sediment Accumulation Factor
1 - ORNL (2001) for organics; only one value is available for conservative and average exposures
2 - Sample et al., (1997) for inorganics; conservative value is 90th percentile; average value is median v
3 - ORNL (September, 1998) for all chemicals; conservative value is 90th percentile; average value is m
4 - U.S. EPA, September 1997; only one value is available for conservative and average exposures. Va
5 - Conservative and average refers to the exposure scenarios for which the uptake factors are used
6 - Where "Eco-SSL" is given, values were calculated using equations from USEPA (2005), Attachment
Tables 4a (for inorganics) and 4b (for organics).

Default value of 1 is assigned to parameters without uptake factors

TABLE X-X

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

Species/Exposure Inputs	Conservative Inputs		Average Inputs	
	Values	Units	Values	Units
Bobwhite Quail				
Body Weight = BW	1.540E-01	kg	1.751E-01	kg
Food Ingestion Rate = If	2.442E-03	kg/day	2.042E-03	kg/day
Water Ingestion Rate = Iw	2.276E-02	L/day	1.926E-02	L/day
Soil Ingestion Rate = Is	3.395E-04	kg/day	1.246E-04	kg/day
Home Range = HR	Assume 100% on site		1.880E+01	acres
Meadow Vole				
Body Weight = BW	1.700E-02	kg	3.580E-02	kg
Food Ingestion Rate = If	1.878E-03	kg/day	1.744E-03	kg/day
Water Ingestion Rate = Iw	7.513E-03	L/day	6.261E-03	L/day
Soil Ingestion Rate = Is	6.010E-05	kg/day	2.093E-05	kg/day
Home Range = HR	Assume 100% on site		6.590E-02	acres
American Robin				
Body Weight = BW	7.73E-02	kg	8.04E-02	kg
Food Ingestion Rate = If	1.25E-02	kg/day	1.19E-02	kg/day
Water Ingestion Rate = Iw	1.21E-02	L/day	1.13E-02	L/day
Soil Ingestion Rate - Is	2.046E-03	kg/day	7.601E-04	kg/day
Home Range = HR	Assume 100% on site		6.095E-01	acres
Short-Tailed Shrew				
Body Weight = BW	1.500E-02	kg	1.610E-02	kg
Food Ingestion Rate = If	1.600E-03	kg/day	1.433E-03	kg/day
Water Ingestion Rate = Iw	4.280E-03	L/day	3.600E-03	L/day
Soil Ingestion Rate - Is	4.801E-05	kg/day	1.289E-05	kg/day
Home Range = HR	Assume 100% on site		9.699E-01	acres
Mink				
Body Weight = BW	5.500E-01	kg	1.103E+00	kg
Food Ingestion Rate = If	6.067E-02	kg/day	4.504E-02	kg/day
Water Ingestion Rate = Iw	1.213E-01	L/day	7.308E-02	L/day
Sediment Ingestion Rate = Is	5.703E-03	kg/day	4.234E-03	kg/day
Home Range = HR	Assume 100% on site		1.558E+03	acres
Green Heron				
Body Weight = BW	2.00E-01	kg	2.12E-01	kg
Food Ingestion Rate = If	3.10E-02	kg/day	3.00E-02	kg/day
Water Ingestion Rate = Iw	2.20E-02	L/day	2.10E-02	L/day
Sediment Ingestion Rate = Is	1.600E-03	kg/day	1.500E-03	kg/day
Home Range = HR	Assume 100% on site		1.000E+01	km-radius

Notes:
The exposure factors were derived as presented in Appendix I.

The soil/sediment ingestion rates were calculated by multiplying the food ingestion rates by the following incidental soil/sediment ingestion rates:

	Conservative	Average	Source
Bobwhite quail	13.90%	6.10%	1, 2
Meadow Vole	3.20%	1.20%	1
American Robin	16.40%	6.40%	1,4
Short-tailed Shrew	3%	0.90%	1
Mink	9.4%	9.4%	3, 5
Green Heron	5%	5%	6

1 - USEPA (U.S. Environmental Protection Agency), 2005. Ecological Soil Screening Level Guidance, Office of Emergency and Remedial Response. February.
2 - Based on the mourning dove.
3 - Beyer, N., E. Connor, and S. Gerould. 1994. Estimates of Soil Ingestion by Wildlife. Journal of Wildlife Management 58(2) pp. 375-382.
4 - Based on the American woodcock
5 - Based on the raccoon
6 - Based on piscivorous birds

APPENDIX F

MEADOW VOLE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - BERM 2 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.70E-01	0.00E+00	7.48E-03	6.01E-04	0.00E+00	8.27E-04	1.43E-03	5.90E-02	2.76E+00	2.42E-02	5.17E-04
ARSENIC	3.30E+00	0.00E+00	1.24E-01	1.17E-02	0.00E+00	1.37E-02	2.53E-02	1.04E+00	4.55E+00	2.44E-02	5.57E-03
COPPER	8.86E+01	0.00E+00	1.14E+01	3.13E-01	0.00E+00	1.26E+00	1.57E+00	5.60E+00	8.27E+01	2.81E-01	1.90E-02
LEAD	6.06E+02	0.00E+00	9.64E+00	2.14E+00	0.00E+00	1.07E+00	3.21E+00	4.70E+00	1.86E+02	6.83E-01	1.72E-02
TIN	1.01E+01	0.00E+00	1.01E+01	3.57E-02	0.00E+00	1.12E+00	1.15E+00	2.34E+01	3.50E+01	4.92E-02	3.29E-02
ZINC	3.52E+01	0.00E+00	3.47E+01	1.24E-01	0.00E+00	3.84E+00	3.96E+00	7.54E+01	2.98E+02	5.26E-02	1.33E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.70E-02	kg
Food Ingestion Rate = (If)	1.88E-03	kg/day
Water Ingestion Rate = (Iw)	7.51E-03	L/day
Soil Ingestion Rate = (Is)	6.01E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

MEADOW VOLE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - BERM 2 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.29E-01	0.00E+00	5.78E-03	7.54E-05	0.00E+00	2.81E-04	3.57E-04	5.90E-02	2.76E+00	6.05E-03	1.29E-04
ARSENIC	2.56E+00	0.00E+00	9.61E-02	1.50E-03	0.00E+00	4.68E-03	6.18E-03	1.04E+00	4.55E+00	5.94E-03	1.36E-03
COPPER	5.17E+01	0.00E+00	9.23E+00	3.02E-02	0.00E+00	4.50E-01	4.80E-01	5.60E+00	8.27E+01	8.57E-02	5.80E-03
LEAD	2.88E+02	0.00E+00	6.35E+00	1.68E-01	0.00E+00	3.10E-01	4.78E-01	4.70E+00	1.86E+02	1.02E-01	2.56E-03
TIN	2.97E+00	0.00E+00	2.97E+00	1.74E-03	0.00E+00	1.45E-01	1.46E-01	2.34E+01	3.50E+01	6.26E-03	4.18E-03
ZINC	2.86E+01	0.00E+00	3.09E+01	1.67E-02	0.00E+00	1.51E+00	1.52E+00	7.54E+01	2.98E+02	2.02E-02	5.12E-03

Body Weight = (BW)	3.58E-02	kg
Food Ingestion Rate = (If)	1.74E-03	kg/day
Water Ingestion Rate = (Iw)	6.26E-03	L/day
Soil Ingestion Rate = (Is)	2.09E-05	kg/day
Home Range = (HR)	6.59E-02	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - BERM 2 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.70E-01	0.00E+00	7.48E-03	3.75E-04	0.00E+00	1.19E-04	4.93E-04	NV	NV	#VALUE!	#VALUE!
ARSENIC	3.30E+00	0.00E+00	1.24E-01	7.28E-03	0.00E+00	1.96E-03	9.24E-03	2.24E+00	4.51E+00	4.1E-03	2.0E-03
COPPER	8.86E+01	0.00E+00	1.14E+01	1.95E-01	0.00E+00	1.81E-01	3.76E-01	4.05E+00	3.49E+01	9.3E-02	1.1E-02
LEAD	6.06E+02	0.00E+00	9.64E+00	1.34E+00	0.00E+00	1.53E-01	1.49E+00	1.63E+00	4.46E+01	9.1E-01	3.3E-02
TIN	1.01E+01	0.00E+00	1.01E+01	2.23E-02	0.00E+00	1.60E-01	1.82E-01	6.76E+00	1.69E+01	2.7E-02	1.1E-02
ZINC	3.52E+01	0.00E+00	3.47E+01	7.76E-02	0.00E+00	5.51E-01	6.29E-01	6.61E+01	1.71E+02	9.5E-03	3.7E-03

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.54E-01	kg
Food Ingestion Rate = (If)	2.44E-03	kg/day
Water Ingestion Rate = (Iw)	2.28E-02	L/day
Soil Ingestion Rate = (Is)	3.40E-04	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - BERM 2 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.29E-01	0.00E+00	5.78E-03	9.18E-05	0.00E+00	6.74E-05	1.59E-04	NV	NV	#VALUE!	#VALUE!
ARSENIC	2.56E+00	0.00E+00	9.61E-02	1.82E-03	0.00E+00	1.12E-03	2.94E-03	2.24E+00	4.51E+00	1.3E-03	6.5E-04
COPPER	5.17E+01	0.00E+00	9.23E+00	3.68E-02	0.00E+00	1.08E-01	1.44E-01	4.05E+00	3.49E+01	3.6E-02	4.1E-03
LEAD	2.88E+02	0.00E+00	6.35E+00	2.05E-01	0.00E+00	7.41E-02	2.79E-01	1.63E+00	4.46E+01	1.7E-01	6.3E-03
TIN	2.97E+00	0.00E+00	2.97E+00	2.11E-03	0.00E+00	3.46E-02	3.67E-02	6.76E+00	1.69E+01	5.4E-03	2.2E-03
ZINC	2.86E+01	0.00E+00	3.09E+01	2.03E-02	0.00E+00	3.61E-01	3.81E-01	6.61E+01	1.71E+02	5.8E-03	2.2E-03

Body Weight = (BW)	1.75E-01	kg
Food Ingestion Rate = (If)	2.04E-03	kg/day
Water Ingestion Rate = (Iw)	1.93E-02	L/day
Soil Ingestion Rate = (Is)	1.25E-04	kg/day
Home Range = (HR)	1.88E+01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - BERM 2 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.70E-01	0.00E+00	1.70E-01	5.44E-04	0.00E+00	1.81E-02	1.87E-02	5.90E-02	2.76E+00	3.2E-01	6.8E-03
ARSENIC	3.30E+00	0.00E+00	5.61E-01	1.06E-02	0.00E+00	5.98E-02	7.04E-02	1.04E+00	4.55E+00	6.8E-02	1.5E-02
COPPER	8.86E+01	0.00E+00	4.56E+01	2.84E-01	0.00E+00	4.87E+00	5.15E+00	5.60E+00	8.27E+01	9.2E-01	6.2E-02
LEAD	6.06E+02	0.00E+00	1.42E+02	1.94E+00	0.00E+00	1.51E+01	1.70E+01	4.70E+00	1.86E+02	3.6E+00	9.1E-02
TIN	1.01E+01	0.00E+00	1.01E+01	3.23E-02	0.00E+00	1.08E+00	1.11E+00	2.34E+01	3.50E+01	4.7E-02	3.2E-02
ZINC	3.52E+01	0.00E+00	2.75E+02	1.13E-01	0.00E+00	2.93E+01	2.95E+01	7.54E+01	2.98E+02	3.9E-01	9.9E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.50E-02	kg
Food Ingestion Rate = (If)	1.60E-03	kg/day
Water Ingestion Rate = (Iw)	4.28E-03	L/day
Soil Ingestion Rate = (Is)	4.80E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - BERM 2 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.29E-01	0.00E+00	1.29E-01	1.03E-04	0.00E+00	1.15E-02	1.16E-02	5.90E-02	2.76E+00	2.0E-01	4.2E-03
ARSENIC	2.56E+00	0.00E+00	4.69E-01	2.05E-03	0.00E+00	4.17E-02	4.38E-02	1.04E+00	4.55E+00	4.2E-02	9.6E-03
COPPER	5.17E+01	0.00E+00	2.66E+01	4.14E-02	0.00E+00	2.37E+00	2.41E+00	5.60E+00	8.27E+01	4.3E-01	2.9E-02
LEAD	2.88E+02	0.00E+00	7.77E+01	2.31E-01	0.00E+00	6.91E+00	7.14E+00	4.70E+00	1.86E+02	1.5E+00	3.8E-02
TIN	2.97E+00	0.00E+00	2.97E+00	2.38E-03	0.00E+00	2.64E-01	2.67E-01	2.34E+01	3.50E+01	1.1E-02	7.6E-03
ZINC	2.86E+01	0.00E+00	2.57E+02	2.29E-02	0.00E+00	2.29E+01	2.29E+01	7.54E+01	2.98E+02	3.0E-01	7.7E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.61E-02	kg
Food Ingestion Rate = (If)	1.43E-03	kg/day
Water Ingestion Rate = (Iw)	3.60E-03	L/day
Soil Ingestion Rate = (Is)	1.29E-05	kg/day
Home Range = (HR)	9.70E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - BERM 2 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.70E-01	0.00E+00	1.70E-01	4.50E-03	0.00E+00	2.74E-02	3.19E-02	NV	NV	#VALUE!	#VALUE!
ARSENIC	3.30E+00	0.00E+00	5.61E-01	8.73E-02	0.00E+00	9.05E-02	1.78E-01	2.24E+00	4.51E+00	7.9E-02	3.9E-02
COPPER	8.86E+01	0.00E+00	4.56E+01	2.34E+00	0.00E+00	7.36E+00	9.71E+00	4.05E+00	3.49E+01	2.4E+00	2.8E-01
LEAD	6.06E+02	0.00E+00	1.42E+02	1.60E+01	0.00E+00	2.28E+01	3.89E+01	1.63E+00	4.46E+01	2.4E+01	8.7E-01
TIN	1.01E+01	0.00E+00	1.01E+01	2.67E-01	0.00E+00	1.63E+00	1.90E+00	6.76E+00	1.69E+01	2.8E-01	1.1E-01
ZINC	3.52E+01	0.00E+00	2.75E+02	9.32E-01	0.00E+00	4.44E+01	4.53E+01	6.61E+01	1.71E+02	6.9E-01	2.6E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	7.73E-02	kg
Food Ingestion Rate = (If)	1.25E-02	kg/day
Water Ingestion Rate = (Iw)	1.21E-02	L/day
Soil Ingestion Rate = (Is)	2.05E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - BERM 2 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.29E-01	0.00E+00	1.29E-01	1.22E-03	0.00E+00	1.91E-02	2.03E-02	NV	NV	#VALUE!	#VALUE!
ARSENIC	2.56E+00	0.00E+00	4.69E-01	2.42E-02	0.00E+00	6.93E-02	9.35E-02	2.24E+00	4.51E+00	4.2E-02	2.1E-02
COPPER	5.17E+01	0.00E+00	2.66E+01	4.89E-01	0.00E+00	3.94E+00	4.43E+00	4.05E+00	3.49E+01	1.1E+00	1.3E-01
LEAD	2.88E+02	0.00E+00	7.77E+01	2.72E+00	0.00E+00	1.15E+01	1.42E+01	1.63E+00	4.46E+01	8.7E+00	3.2E-01
TIN	2.97E+00	0.00E+00	2.97E+00	2.81E-02	0.00E+00	4.39E-01	4.67E-01	6.76E+00	1.69E+01	6.9E-02	2.8E-02
ZINC	2.86E+01	0.00E+00	2.57E+02	2.70E-01	0.00E+00	3.79E+01	3.82E+01	6.61E+01	1.71E+02	5.8E-01	2.2E-01

Body Weight = (BW)	8.04E-02	kg
Food Ingestion Rate = (If)	1.19E-02	kg/day
Water Ingestion Rate = (Iw)	1.13E-02	L/day
Soil Ingestion Rate = (Is)	7.60E-04	kg/day
Home Range = (HR)	6.10E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

TABLE 5-6.3.6

TERRESTRIAL FOOD CHAIN MODEL - CONSERVATIVE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS
- BERM 2 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	2.4E-02	5.2E-04	#VALUE!	#VALUE!	3.2E-01	6.8E-03
ARSENIC	4.1E-03	2.0E-03	2.4E-02	5.6E-03	7.9E-02	3.9E-02	6.8E-02	1.5E-02
COPPER	9.3E-02	1.1E-02	2.8E-01	1.9E-02	2.4E+00	2.8E-01	9.2E-01	6.2E-02
LEAD	9.1E-01	3.3E-02	6.8E-01	1.7E-02	2.4E+01	8.7E-01	3.6E+00	9.1E-02
TIN	2.7E-02	1.1E-02	4.9E-02	3.3E-02	2.8E-01	1.1E-01	4.7E-02	3.2E-02
ZINC	9.5E-03	3.7E-03	5.3E-02	1.3E-02	6.9E-01	2.6E-01	3.9E-01	9.9E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

TABLE 5-6.3.10

TERRESTRIAL FOOD CHAIN MODEL - AVERAGE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - BERM 2 SURFACE SOIL
MARINE RIFLE RANGE (MRR) -UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	6.0E-03	1.3E-04	#VALUE!	#VALUE!	2.0E-01	4.2E-03
ARSENIC	1.3E-03	6.5E-04	5.9E-03	1.4E-03	4.2E-02	2.1E-02	4.2E-02	9.6E-03
COPPER	3.6E-02	4.1E-03	8.6E-02	5.8E-03	1.1E+00	1.3E-01	4.3E-01	2.9E-02
LEAD	1.7E-01	6.3E-03	1.0E-01	2.6E-03	8.7E+00	3.2E-01	1.5E+00	3.8E-02
TIN	5.4E-03	2.2E-03	6.3E-03	4.2E-03	6.9E-02	2.8E-02	1.1E-02	7.6E-03
ZINC	5.8E-03	2.2E-03	2.0E-02	5.1E-03	5.8E-01	2.2E-01	3.0E-01	7.7E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

APPENDIX F

CHEMICAL CONCENTRATIONS IN SURFACE SOIL AND TISSUE
- HILLSIDE SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Surface Soil Concentrations (mg/kg)				Surface Water Concentrations (mg/L)		Earthworm Bioaccumulation Factors		Earthworm Concentrations (mg/kg)		Plant Bioaccumulation Factors		Plant Concentrations (mg/kg)	
	Maximum Detection	Average All	Average of Positive Detections	Average [1]	Maximum Detection	Average Concentration[1]	Conservative	Average	Maximum Detection	Average	Conservative	Average	Maximum Detection	Average
Inorganics														
ANTIMONY	3.20E-01	1.02E-01	1.88E-01	1.02E-01	0.00E+00	0.00E+00	1.00E+00	1.00E+00	3.20E-01	1.02E-01	1.14E-02	1.02E-02	1.35E-02	4.62E-03
ARSENIC	7.30E+00	3.13E+00	3.28E+00	3.13E+00	0.00E+00	0.00E+00	Regression from Eco SSL		9.83E-01	5.40E-01	Regression from Eco SSL		2.74E-01	1.17E-01
COPPER	2.76E+02	5.89E+01	5.89E+01	5.89E+01	0.00E+00	0.00E+00	5.15E-01	5.15E-01	1.42E+02	3.03E+01	Regression from Eco SSL		1.79E+01	9.72E+00
LEAD	9.04E+02	2.98E+02	3.16E+02	2.98E+02	0.00E+00	0.00E+00	Regression from Eco SSL		1.95E+02	7.98E+01	Regression from Eco SSL		1.21E+01	6.48E+00
TIN	8.18E+01	1.04E+01	1.57E+01	1.04E+01	0.00E+00	0.00E+00	1.00E+00	1.00E+00	8.18E+01	1.04E+01	1.00E+00	1.00E+00	8.18E+01	1.04E+01
ZINC	6.03E+01	2.83E+01	2.83E+01	2.83E+01	0.00E+00	0.00E+00	Regression from Eco SSL		3.28E+02	2.56E+02	Regression from Eco SSL		4.68E+01	3.08E+01

1 - If the average of all value is the greater than the maximum detection, the average of the positive detections was used as the average value.

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
VOLATILES				
1,1,1-Trichloroethane	1000	1000	NV	NV
1,1,2,2-Tetrachloroethane	76	108	NV	NV
1,1,2-Trichloroethane	0.39	4.4	NV	NV
1,1-Dichloroethane	475	4750	NV	NV
1,1-Dichloroethene	30	300	NV	NV
1,2,4-Trichlorobenzene	1.48	14.8	NV	NV
1,2-Dichlorobenzene	120	1200	NV	NV
1,2-Dichloroethane	50	500	17.2	34.4
1,2-Dichloroethene (total)	45.2	452	NV	NV
1,4-Dichlorobenzene	30	300	NV	NV
2-Butanone	1771	4571	NV	NV
2-Hexanone	NV	NV	NV	NV
4-Methyl-2-pentanone	NV	NV	NV	NV
Acetone	10	50	20089	200890
Benzene	26.36	263.6	NV	NV
Bromodichloromethane	1.79	17.9	NV	NV
Carbon Disulfide	12.6	25.6	NV	NV
Carbon Tetrachloride	16	160	NV	NV
Chlorobenzene	2.725	5.45	NV	NV
Chloroform	15	41	NV	NV
Chloromethane	NV	NV	NV	NV
cis-1,2-Dichloroethene	45.2	452	NV	NV
Dichlorodifluoromethane	2310	23100	NV	NV
Ethylbenzene	9.71	29.1	NV	NV
Isopropylbenzene	11	33.1	NV	NV
m,p-Xylene	2.06	2.58	107	1070
Methyl acetate	NV	NV	NV	NV
o-Xylene	2.06	2.58	107	1070
Methylene Chloride	5.85	50	NV	NV
Styrene	20	40	NV	NV
Tetrachloroethene	1.4	7	NV	NV
Toluene	26	260	NV	NV
Trichloroethene	0.7	7	NV	NV
Trichlorofluoromethane	34.9	349	NV	NV
Vinyl chloride	17	1.7	NV	NV
Xylenes, Total	2.06	2.58	107	1070
SEMIVOLATILES				
1,1'-Biphenyl	5	25	NV	NV
2,2'-Oxybis(1-chloropropane)	NV	NV	NV	NV
2,3,4,6-Tetrachlorophenol	2.5	10	NV	NV
2,4,5-Trichlorophenol	10	30	NV	NV
2,4,6-Trichlorophenol	0.42	4.2	NV	NV
2,4-Dimethylphenol	5	25	NV	NV
1-Methylnaphthalene	65.6	356	2	20
2-Methylnaphthalene	65.6	356	2	20
2-Methylphenol	5	15	NV	NV
3-Nitroaniline	NV	NV	NV	NV
4-Chloroaniline	1.25	12.5	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
4-Chloro-3-methylphenol	NV	NV	NV	NV
4-Methylphenol	NV	NV	NV	NV
4-Nitroaniline	NV	NV	NV	NV
4-Nitrophenol	NV	NV	NV	NV
7,12-Dimethylbenz(a)anthracene	NV	NV	2	20
Acenaphthene	65.6	356	2	20
Acenaphthylene	65.6	356	2	20
Anthracene	65.6	356	2	20
Benzaldehyde	20	40	NV	NV
Benzo(a)anthracene	0.615	38.4	2	20
Benzo(a)pyrene	0.615	38.4	2	20

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Benzo(b)fluoranthene	0.615	38.4	2	20
Benzo(g,h,i)perylene	0.615	38.4	2	20
Benzo(k)fluoranthene	0.615	38.4	2	20
Bis(2-Ethylhexyl)phthalate	18.3	183	1.11	11.1
Butyl benzyl phthalate	15.9	47	NV	NV
Caprolactam	50	500	NV	NV
Carbazole	1	10	2	20
Chrysene	0.615	38.4	2	20
Dibenzo(a,h)anthracene	0.615	38.4	2	20
Dibenzofuran	NV	NV	2	20
1,4-Dichlorobenzene	30	300	NV	NV
Diethylphthalate	4583	45830	NV	NV
Di-n-butyl phthalate	550	1833	0.111	1.11
Di-n-octyl phthalate	NV	NV	NV	NV
Fluoranthene	65.6	356	2	20
Fluorene	65.6	356	2	20
Hexachloroethane	0.1	1.5	NV	NV
Indeno(1,2,3-cd)pyrene	0.615	38.4	2	20
Isophorone	15	179	NV	NV
Naphthalene	65.6	356	2	20
n-Nitrosodiphenylamine	NV	NV	NV	NV
Pentachlorophenol	8.42	22.65	6.73	52.01
Phenanthrene	65.6	356	2	20
Phenol	6	12	NV	NV
Pyrene	0.615	38.4	2	20
Perylene	0.615	38.4	2	20
HERBICIDES				
Dinoseb	0.1	1	NV	NV
2,4-D	1	5	NV	NV
2,4,5-T	3	10	NV	NV
PESTICIDES/PCBs				
2,4'-DDD	0.147	5.56	0.227	2.7
2,4'-DDE	0.147	5.56	0.227	2.7
2,4'-DDT	0.147	5.56	0.227	2.7
4,4'-DDD	0.147	5.56	0.227	2.7
4,4'-DDE	0.147	5.56	0.227	2.7
4,4'-DDT	0.147	5.56	0.227	2.7
Aldrin	0.2	1	NV	NV
Alpha-BHC	0.014	0.14	0.56	2.25
Alpha-Chlordane	4.58	9.16	2.14	10.7
Aroclor-1232	0.068	0.68	0.18	1.8
Aroclor-1242	0.069	0.69	0.41	4.1
Aroclor-1248	0.01	0.1	NV	NV
Aroclor-1254	0.068	0.68	0.18	1.8
Aroclor-1260	0.068	0.68	0.18	1.8
Aroclor-1268	0.068	0.68	0.18	1.8
PCB-28	0.068	0.68	0.18	1.8
PCB-44	0.068	0.68	0.18	1.8
PCB-52	0.068	0.68	0.18	1.8

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
PCB-66	0.068	0.68	0.18	1.8
PCB-101	0.068	0.68	0.18	1.8
PCB-105	0.068	0.68	0.18	1.8
PCB-118	0.068	0.68	0.18	1.8
PCB-128	0.068	0.68	0.18	1.8
PCB-138	0.068	0.68	0.18	1.8
PCB-153	0.068	0.68	0.18	1.8
PCB-170	0.068	0.68	0.18	1.8
PCB-180	0.068	0.68	0.18	1.8
PCB-187	0.068	0.68	0.18	1.8
PCB-195	0.068	0.68	0.18	1.8
PCB-206	0.068	0.68	0.18	1.8
PCB-209	0.068	0.68	0.18	1.8
beta-BHC	0.4	2	0.56	2.25
delta-BHC	0.014	0.14	0.56	2.25
Dieldrin	0.015	1.27	0.0709	0.8
Endosulfan I	0.15	1.5	10	100
Endosulfan II	0.15	1.5	10	100
Endosulfan Sulfate	0.15	1.5	10	100
Endrin	0.092	0.92	0.01035	0.1035
Endrin Aldehyde	0.092	0.92	0.01	0.1
Endrin Ketone	0.092	0.92	0.01	0.1
Gamma-BHC (Lindane)	8	80	2	20
Gamma-Chlordane	4.58	9.16	2.14	10.7
Heptachlor	0.1	1	NV	NV
Heptachlor Epoxide	0.1	1	NV	NV
Methoxychlor	4	8	NV	NV
Toxaphene	8	80	NV	NV
Total Aroclor	0.068	0.68	0.18	1.8
Total DDT	0.147	5.56	0.227	2.7
DIOXINS AND FURANS (mg/kg)				
1,2,3,4,6,7,8-HpCDD	0.0001	0.001	0.014	0.14
1,2,3,4,6,7,8-HpCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8,9-HPCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8-HXCDD	0.00001	0.0001	0.00028	0.0028
1,2,3,4,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,6,7,8-HxCDD	0.00001	0.0001	0.0014	0.014
1,2,3,6,7,8-HxCDF	0.00016	0.0016	0.00014	0.0014
1,2,3,7,8,9-HxCDD	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8,9-HxCDF	0.00001	0.0001	0.00014	0.0014
2,3,4,6,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8-PECDD	0.000001	0.00001	0.000014	0.00014
1,2,3,7,8-PECDF	0.00016	0.0016	0.00014	0.0014
2,3,4,7,8-PECDF	0.000016	0.00016	0.000014	0.00014
2,3,7,8-TCDD	0.000001	0.00001	0.000014	0.00014
2,3,7,8-TCDF	0.00001	0.0001	0.000014	0.00014
OCDD	0.01	0.1	0.14	1.4
OCDF	0.01	0.1	0.14	1.4
TOTAL HpCDD	0.0001	0.001	0.014	0.14

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
TOTAL HxCDD	0.00001	0.0001	0.00014	0.0014
TOTAL PeCDD	0.000001	0.00001	0.000014	0.00014
Total HpCDF	0.0001	0.001	0.0014	0.014
Total HxCDF	0.00001	0.0001	0.00014	0.0014
Total PeCDF	0.000002	0.00002	0.000014	0.00014
Total TCDD	0.000001	0.00001	0.000014	0.00014
Total TCDF	0.00001	0.0001	0.000014	0.00014
EXPLOSIVES (mg/kg)				
1,3 Dinitrobenzene	0.4	1.07	NV	NV
1,3,5-Trinitrobenzene	2.68	13.31	NV	NV
2,4-Dinitrotoluene	0.67	1.4	0.1	0.5
2,6-Dinitrotoluene	0.7	7	NV	NV
2,4,6-Trinitrotoluene	1.6	16	0.7	17.8
2-Amino-4,6-dinitrotoluene	NV	NV	NV	NV
2-Nitrotoluene	20	200	NV	NV
3-Nitrotoluene	20	200	NV	NV
4-Amino-2,6-dinitrotoluene	NV	NV	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal NOAEL	Mammal LOAEL	Bird NOAEL	Bird LOAEL
4-Nitrotoluene	20	200	NV	NV
Ammonia	NV	NV	NV	NV
HMX	3	7.5	NV	NV
Nitrobenzene (exp)	NV	NV	NV	NV
Nitroglycerin	3	32	NV	NV
RDX	7	35	NV	NV
Tetryl	1.3	6.2	NV	NV
INORGANICS				
Aluminum	1.93	19.3	109.7	1097
Antimony	0.059	2.76	NV	NV
Arsenic	1.04	4.55	2.24	4.51
Barium	51.8	82.7	20.8	41.7
Beryllium	0.532	0.673	NV	NV
Cadmium	0.77	6.9	1.47	6.35
Chromium	2.40	58.17	2.66	15.63
Hexavalent Chromium	5.66	38.37	NV	NV
Cobalt	7.33	18.90	7.61	18.34
Copper	5.6	82.7	4.05	34.87
Cyanide	68.7	687	NV	NV
Iron	50	500	100	1000
Lead	4.7	186.4	1.63	44.63
Manganese	51.5	145.67	179	376.6
Mercury	0.032	0.16	0.0064	0.064
Nickel	1.70	14.77	6.71	18.57
Selenium	0.143	0.661	0.29	0.819

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
Volatile Organics				
1,1,1-Trichloroethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
2-Butanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Methyl-2-pentanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Acetone	5.20E+00	5.20E+00	1.00E+00	1.00E+00
Carbon Disulfide	2.00E+00	2.00E+00	1.00E+00	1.00E+00
Chlorobenzene	9.00E-01	9.00E-01	1.00E+00	1.00E+00
Ethylbenzene	6.10E-01	6.10E-01	1.00E+00	1.00E+00
Isopropylbenzene	1.00E+00	1.00E+00	1.00E+00	1.00E+00
M,p-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Methyl Acetate	2.99E+01	2.99E+01	1.00E+00	1.00E+00
Methylene Chloride	6.70E+00	6.70E+00	1.00E+00	1.00E+00
O-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Tetrachloroethene	1.20E+00	1.20E+00	1.00E+00	1.00E+00
Toluene	1.03E+00	1.03E+00	1.00E+00	1.00E+00
Total Xylenes	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Trichloroethene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
Trichlorofluoromethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
Semivolatile Organics				
1,1'-Biphenyl	1.59E-01	1.59E-01	1.00E+00	1.00E+00
1,2-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
1,4-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
2,2'-Oxybis(1-Chloropropane)	???	???	1.00E+00	1.00E+00
2,3,4,6-Tetrachlorophenol	1.59E-01	1.59E-01	1.00E+00	1.00E+00
2,4-D	???	???		
2-Methylnaphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
2-Methylphenol	???	???	1.00E+00	1.00E+00
3-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Chloro-3-Methylphenol	???	???	1.00E+00	1.00E+00
4-Chloroaniline	9.03E-01	9.03E-01	1.00E+00	1.00E+00
4-Methylphenol	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitrophenol	3.00E+00	3.00E+00	1.00E+00	1.00E+00
2,4,5-Trichlorophenol	2.40E-01	2.40E-01	1.00E+00	1.00E+00
2,4,6-Trichlorophenol	2.70E-01	2.70E-01	1.00E+00	1.00E+00
2,4,5-T	???	???	???	???
Acenaphthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Acenaphthylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzaldehyde	1.76E+00	1.76E+00	1.00E+00	1.00E+00
Benzo(a)anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(a)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(b)fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(g,h,i)perylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(k)Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Bis(2-ethylhexyl)phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Butyl benzyl Phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Caprolactam	4.90E+01	4.90E+01	1.00E+00	1.00E+00
Carbazole	2.40E-01	2.40E-01	Eco-SSL	Eco-SSL
Chrysene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzo(a,h)Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzofuran	1.50E-01	1.50E-01	Eco-SSL	Eco-SSL
Diethylphthalate	1.30E+00	1.30E+00	1.00E+00	1.00E+00
Di-n-butyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Di-n-octyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Dinoseb	???	???	???	???
Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Fluorene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexachloroethane	2.10E-01	2.10E-01	1.00E+00	1.00E+00
Indeno(1,2,3-cd)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Isophorone	3.92E+00	3.92E+00	1.00E+00	1.00E+00
N-Nitrosodiphenylamine	6.05E-01	6.05E-01	1.00E+00	1.00E+00
Naphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pentachlorophenol	1.40E-02	1.40E-02	1.00E+00	1.00E+00
Phenanthrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Phenol	5.10E+00	5.10E+00	1.00E+00	1.00E+00
Pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pesticides/ PCBs				
4,4'-DDD	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDE	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Aldrin	6.90E-01	6.90E-01	3.30E+00	3.30E+00
Alpha-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Aroclor-1232	5.30E-01	5.30E-01	1.59E+01	6.67E+00
Aroclor-1242	1.60E-01	1.60E-01	1.59E+01	6.67E+00
Aroclor-1248	1.60E-02	1.60E-02	1.59E+01	6.67E+00
Aroclor-1254	1.30E-02	1.30E-02	1.59E+01	6.67E+00
Aroclor-1260	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Aroclor-1268	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Dieldrin	8.20E-02	8.20E-02	6.64E+00	6.64E+00
Gamma-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Heptachlor	1.20E-01	1.20E-01	1.00E+01	1.00E+01
Endosulfan I	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan II	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan Sulfate	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endrin	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Aldehyde	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Ketone	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Heptachlor Epoxide	2.80E-02	2.80E-02	3.00E+00	3.00E+00
Methoxychlor	1.10E-01	1.10E-01	1.00E+00	1.00E+00
alpha-BHC	2.10E-01	2.10E-01	5.00E+00	5.00E+00

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
beta-BHC	1.80E-01	1.80E-01	5.00E+00	5.00E+00
delta-BHC	9.00E-01	9.00E-01	5.00E+00	5.00E+00
gamma-BHC (Lindane)	2.70E-01	2.70E-01	5.00E+00	5.00E+00
Toxaphene	6.20E-02	6.20E-02	1.00E+00	1.00E+00
Total Aroclor	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Total DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Explosives				
2,4,6-Trinitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
2-Nitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
1,3,5-Trinitrobenzene	7.70E+00	7.70E+00	1.00E+00	1.00E+00
4-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
RDX	4.60E-01	4.60E-01	1.00E+00	1.00E+00
4-Amino-2,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
HMX	1.70E+01	1.70E+01	1.00E+00	1.00E+00
Nitrobenzene (exp)	3.40E+00	3.40E+00	1.00E+00	1.00E+00
1,3 Dinitrobenzene	4.50E+00	4.50E+00	1.00E+00	1.00E+00
2-Amino-4,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
Tetryl	???	???	1.00E+00	1.00E+00
3-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
2,4-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
2,6-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
Dioxins				
1,2,3,4,6,7,8-HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,6,7,8-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8,9-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HxCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8-PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
1,2,3,7,8-Pecdf	4.40E-03	4.40E-03	2.22E+01	1.10E+01
2,3,4,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
2,3,4,7,8-PECDF	3.70E-03	3.70E-03	2.22E+01	1.10E+01
2,3,7,8-TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ HALFND	4.30E-03	4.30E-03	2.22E+01	1.10E+01
2,3,7,8-TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDD	???	???	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDF	???	???	2.22E+01	1.10E+01
TOTAL HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
Total HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total PECDF	4.40E-03	4.40E-03	2.22E+01	1.10E+01
Total TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
Total TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
Inorganics				
Aluminum	5.00E-03	2.87E-03	1.18E-01	4.30E-02
Antimony	1.14E-02	1.02E-02	1.00E+00	1.00E+00
Arsenic	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Barium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Beryllium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cadmium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cobalt	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Copper	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexavalent Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cyanide	1.80E+00	1.00E+00	1.00E+00	1.00E+00
Iron	1.00E-02	4.25E-03	7.80E-02	3.60E-02
Lead	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Manganese	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Mercury	5.00E+00	6.52E-01	ORNL Reg.	ORNL Reg.
Nickel	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Selenium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Silver	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Thallium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Tin	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Vanadium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Zinc	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL

Notes:
BAF - Bioaccumulation Factor
BSAF - Biota Sediment Accumulation Factor
1 - ORNL (2001) for organics; only one value is available for conservative and average exposures
2 - Sample et al., (1997) for inorganics; conservative value is 90th percentile; average value is median v
3 - ORNL (September, 1998) for all chemicals; conservative value is 90th percentile; average value is m
4 - U.S. EPA, September 1997; only one value is available for conservative and average exposures. Va
5 - Conservative and average refers to the exposure scenarios for which the uptake factors are used
6 - Where "Eco-SSL" is given, values were calculated using equations from USEPA (2005), Attachment
Tables 4a (for inorganics) and 4b (for organics).

Default value of 1 is assigned to parameters without uptake factors

TABLE X-X

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

Species/Exposure Inputs	Conservative Inputs		Average Inputs	
	Values	Units	Values	Units
Bobwhite Quail				
Body Weight = BW	1.540E-01	kg	1.751E-01	kg
Food Ingestion Rate = If	2.442E-03	kg/day	2.042E-03	kg/day
Water Ingestion Rate = Iw	2.276E-02	L/day	1.926E-02	L/day
Soil Ingestion Rate = Is	3.395E-04	kg/day	1.246E-04	kg/day
Home Range = HR	Assume 100% on site		1.880E+01	acres
Meadow Vole				
Body Weight = BW	1.700E-02	kg	3.580E-02	kg
Food Ingestion Rate = If	1.878E-03	kg/day	1.744E-03	kg/day
Water Ingestion Rate = Iw	7.513E-03	L/day	6.261E-03	L/day
Soil Ingestion Rate = Is	6.010E-05	kg/day	2.093E-05	kg/day
Home Range = HR	Assume 100% on site		6.590E-02	acres
American Robin				
Body Weight = BW	7.73E-02	kg	8.04E-02	kg
Food Ingestion Rate = If	1.25E-02	kg/day	1.19E-02	kg/day
Water Ingestion Rate = Iw	1.21E-02	L/day	1.13E-02	L/day
Soil Ingestion Rate - Is	2.046E-03	kg/day	7.601E-04	kg/day
Home Range = HR	Assume 100% on site		6.095E-01	acres
Short-Tailed Shrew				
Body Weight = BW	1.500E-02	kg	1.610E-02	kg
Food Ingestion Rate = If	1.600E-03	kg/day	1.433E-03	kg/day
Water Ingestion Rate = Iw	4.280E-03	L/day	3.600E-03	L/day
Soil Ingestion Rate - Is	4.801E-05	kg/day	1.289E-05	kg/day
Home Range = HR	Assume 100% on site		9.699E-01	acres
Mink				
Body Weight = BW	5.500E-01	kg	1.103E+00	kg
Food Ingestion Rate = If	6.067E-02	kg/day	4.504E-02	kg/day
Water Ingestion Rate = Iw	1.213E-01	L/day	7.308E-02	L/day
Sediment Ingestion Rate = Is	5.703E-03	kg/day	4.234E-03	kg/day
Home Range = HR	Assume 100% on site		1.558E+03	acres
Green Heron				
Body Weight = BW	2.00E-01	kg	2.12E-01	kg
Food Ingestion Rate = If	3.10E-02	kg/day	3.00E-02	kg/day
Water Ingestion Rate = Iw	2.20E-02	L/day	2.10E-02	L/day
Sediment Ingestion Rate = Is	1.600E-03	kg/day	1.500E-03	kg/day
Home Range = HR	Assume 100% on site		1.000E+01	km-radius

Notes:
The exposure factors were derived as presented in Appendix I.

The soil/sediment ingestion rates were calculated by multiplying the food ingestion rates by the following incidental soil/sediment ingestion rates:

	Conservative	Average	Source
Bobwhite quail	13.90%	6.10%	1, 2
Meadow Vole	3.20%	1.20%	1
American Robin	16.40%	6.40%	1,4
Short-tailed Shrew	3%	0.90%	1
Mink	9.4%	9.4%	3, 5
Green Heron	5%	5%	6

1 - USEPA (U.S. Environmental Protection Agency), 2005. Ecological Soil Screening Level Guidance, Office of Emergency and Remedial Response. February.
2 - Based on the mourning dove.
3 - Beyer, N., E. Connor, and S. Gerould. 1994. Estimates of Soil Ingestion by Wildlife. Journal of Wildlife Management 58(2) pp. 375-382.
4 - Based on the American woodcock
5 - Based on the raccoon
6 - Based on piscivorous birds

APPENDIX F

MEADOW VOLE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - HILLSIDE SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	3.20E-01	0.00E+00	1.35E-02	1.13E-03	0.00E+00	1.50E-03	2.63E-03	5.90E-02	2.76E+00	4.45E-02	9.52E-04
ARSENIC	7.30E+00	0.00E+00	2.74E-01	2.58E-02	0.00E+00	3.03E-02	5.61E-02	1.04E+00	4.55E+00	5.39E-02	1.23E-02
COPPER	2.76E+02	0.00E+00	1.79E+01	9.76E-01	0.00E+00	1.97E+00	2.95E+00	5.60E+00	8.27E+01	5.27E-01	3.57E-02
LEAD	9.04E+02	0.00E+00	1.21E+01	3.20E+00	0.00E+00	1.33E+00	4.53E+00	4.70E+00	1.86E+02	9.64E-01	2.43E-02
TIN	8.18E+01	0.00E+00	8.18E+01	2.89E-01	0.00E+00	9.04E+00	9.33E+00	2.34E+01	3.50E+01	3.99E-01	2.66E-01
ZINC	6.03E+01	0.00E+00	4.68E+01	2.13E-01	0.00E+00	5.17E+00	5.38E+00	7.54E+01	2.98E+02	7.14E-02	1.81E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.70E-02	kg
Food Ingestion Rate = (If)	1.88E-03	kg/day
Water Ingestion Rate = (Iw)	7.51E-03	L/day
Soil Ingestion Rate = (Is)	6.01E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

MEADOW VOLE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - HILLSIDE SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.02E-01	0.00E+00	4.62E-03	5.95E-05	0.00E+00	2.25E-04	2.85E-04	5.90E-02	2.76E+00	4.83E-03	1.03E-04
ARSENIC	3.13E+00	0.00E+00	1.17E-01	1.83E-03	0.00E+00	5.72E-03	7.55E-03	1.04E+00	4.55E+00	7.26E-03	1.66E-03
COPPER	5.89E+01	0.00E+00	9.72E+00	3.44E-02	0.00E+00	4.73E-01	5.08E-01	5.60E+00	8.27E+01	9.07E-02	6.14E-03
LEAD	2.98E+02	0.00E+00	6.48E+00	1.74E-01	0.00E+00	3.16E-01	4.90E-01	4.70E+00	1.86E+02	1.04E-01	2.63E-03
TIN	1.04E+01	0.00E+00	1.04E+01	6.05E-03	0.00E+00	5.04E-01	5.10E-01	2.34E+01	3.50E+01	2.18E-02	1.46E-02
ZINC	2.83E+01	0.00E+00	3.08E+01	1.66E-02	0.00E+00	1.50E+00	1.52E+00	7.54E+01	2.98E+02	2.01E-02	5.10E-03

Body Weight = (BW)	3.58E-02	kg	Dose (soil) = (Cs * Is)(H)/BW
Food Ingestion Rate = (If)	1.74E-03	kg/day	Dose (vegetation) = (Cv * If)(H)/BW
Water Ingestion Rate = (Iw)	6.26E-03	L/day	Dose (water) = (Cw * Iw)(H)/BW
Soil Ingestion Rate = (Is)	2.09E-05	kg/day	Cv = Contaminant concentration in vegetation
Home Range = (HR)	6.59E-02	acres	Cs = Contaminant concentration in soil
Contaminated Area = (CA)	Assume equal to home range		Cw = Contaminant concentration in water
			Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
			H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - HILLSIDE SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	3.20E-01	0.00E+00	1.35E-02	7.05E-04	0.00E+00	2.15E-04	9.20E-04	NV	NV	#VALUE!	#VALUE!
ARSENIC	7.30E+00	0.00E+00	2.74E-01	1.61E-02	0.00E+00	4.34E-03	2.04E-02	2.24E+00	4.51E+00	9.1E-03	4.5E-03
COPPER	2.76E+02	0.00E+00	1.79E+01	6.08E-01	0.00E+00	2.83E-01	8.92E-01	4.05E+00	3.49E+01	2.2E-01	2.6E-02
LEAD	9.04E+02	0.00E+00	1.21E+01	1.99E+00	0.00E+00	1.91E-01	2.18E+00	1.63E+00	4.46E+01	1.3E+00	4.9E-02
TIN	8.18E+01	0.00E+00	8.18E+01	1.80E-01	0.00E+00	1.30E+00	1.48E+00	6.76E+00	1.69E+01	2.2E-01	8.7E-02
ZINC	6.03E+01	0.00E+00	4.68E+01	1.33E-01	0.00E+00	7.42E-01	8.75E-01	6.61E+01	1.71E+02	1.3E-02	5.1E-03

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.54E-01	kg
Food Ingestion Rate = (If)	2.44E-03	kg/day
Water Ingestion Rate = (Iw)	2.28E-02	L/day
Soil Ingestion Rate = (Is)	3.40E-04	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - HILLSIDE SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.02E-01	0.00E+00	4.62E-03	7.24E-05	0.00E+00	5.39E-05	1.26E-04	NV	NV	#VALUE!	#VALUE!
ARSENIC	3.13E+00	0.00E+00	1.17E-01	2.23E-03	0.00E+00	1.37E-03	3.60E-03	2.24E+00	4.51E+00	1.6E-03	8.0E-04
COPPER	5.89E+01	0.00E+00	9.72E+00	4.19E-02	0.00E+00	1.13E-01	1.55E-01	4.05E+00	3.49E+01	3.8E-02	4.5E-03
LEAD	2.98E+02	0.00E+00	6.48E+00	2.12E-01	0.00E+00	7.55E-02	2.88E-01	1.63E+00	4.46E+01	1.8E-01	6.4E-03
TIN	1.04E+01	0.00E+00	1.04E+01	7.36E-03	0.00E+00	1.21E-01	1.28E-01	6.76E+00	1.69E+01	1.9E-02	7.6E-03
ZINC	2.83E+01	0.00E+00	3.08E+01	2.02E-02	0.00E+00	3.59E-01	3.79E-01	6.61E+01	1.71E+02	5.7E-03	2.2E-03

Body Weight = (BW)	1.75E-01	kg
Food Ingestion Rate = (If)	2.04E-03	kg/day
Water Ingestion Rate = (Iw)	1.93E-02	L/day
Soil Ingestion Rate = (Is)	1.25E-04	kg/day
Home Range = (HR)	1.88E+01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - HILLSIDE SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	3.20E-01	0.00E+00	3.20E-01	1.02E-03	0.00E+00	3.41E-02	3.52E-02	5.90E-02	2.76E+00	6.0E-01	1.3E-02
ARSENIC	7.30E+00	0.00E+00	9.83E-01	2.34E-02	0.00E+00	1.05E-01	1.28E-01	1.04E+00	4.55E+00	1.2E-01	2.8E-02
COPPER	2.76E+02	0.00E+00	1.42E+02	8.83E-01	0.00E+00	1.52E+01	1.60E+01	5.60E+00	8.27E+01	2.9E+00	1.9E-01
LEAD	9.04E+02	0.00E+00	1.95E+02	2.89E+00	0.00E+00	2.08E+01	2.37E+01	4.70E+00	1.86E+02	5.1E+00	1.3E-01
TIN	8.18E+01	0.00E+00	8.18E+01	2.62E-01	0.00E+00	8.73E+00	8.99E+00	2.34E+01	3.50E+01	3.8E-01	2.6E-01
ZINC	6.03E+01	0.00E+00	3.28E+02	1.93E-01	0.00E+00	3.50E+01	3.52E+01	7.54E+01	2.98E+02	4.7E-01	1.2E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.50E-02	kg
Food Ingestion Rate = (If)	1.60E-03	kg/day
Water Ingestion Rate = (Iw)	4.28E-03	L/day
Soil Ingestion Rate = (Is)	4.80E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - HILLSIDE SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.02E-01	0.00E+00	1.02E-01	8.15E-05	0.00E+00	9.05E-03	9.14E-03	5.90E-02	2.76E+00	1.5E-01	3.3E-03
ARSENIC	3.13E+00	0.00E+00	5.40E-01	2.51E-03	0.00E+00	4.81E-02	5.06E-02	1.04E+00	4.55E+00	4.9E-02	1.1E-02
COPPER	5.89E+01	0.00E+00	3.03E+01	4.72E-02	0.00E+00	2.70E+00	2.75E+00	5.60E+00	8.27E+01	4.9E-01	3.3E-02
LEAD	2.98E+02	0.00E+00	7.98E+01	2.39E-01	0.00E+00	7.10E+00	7.34E+00	4.70E+00	1.86E+02	1.6E+00	3.9E-02
TIN	1.04E+01	0.00E+00	1.04E+01	8.29E-03	0.00E+00	9.21E-01	9.30E-01	2.34E+01	3.50E+01	4.0E-02	2.7E-02
ZINC	2.83E+01	0.00E+00	2.56E+02	2.27E-02	0.00E+00	2.28E+01	2.28E+01	7.54E+01	2.98E+02	3.0E-01	7.7E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.61E-02	kg
Food Ingestion Rate = (If)	1.43E-03	kg/day
Water Ingestion Rate = (Iw)	3.60E-03	L/day
Soil Ingestion Rate = (Is)	1.29E-05	kg/day
Home Range = (HR)	9.70E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - HILLSIDE SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	3.20E-01	0.00E+00	3.20E-01	8.47E-03	0.00E+00	5.16E-02	6.01E-02	NV	NV	#VALUE!	#VALUE!
ARSENIC	7.30E+00	0.00E+00	9.83E-01	1.93E-01	0.00E+00	1.59E-01	3.52E-01	2.24E+00	4.51E+00	1.6E-01	7.8E-02
COPPER	2.76E+02	0.00E+00	1.42E+02	7.30E+00	0.00E+00	2.29E+01	3.02E+01	4.05E+00	3.49E+01	7.5E+00	8.7E-01
LEAD	9.04E+02	0.00E+00	1.95E+02	2.39E+01	0.00E+00	3.15E+01	5.55E+01	1.63E+00	4.46E+01	3.4E+01	1.2E+00
TIN	8.18E+01	0.00E+00	8.18E+01	2.16E+00	0.00E+00	1.32E+01	1.54E+01	6.76E+00	1.69E+01	2.3E+00	9.1E-01
ZINC	6.03E+01	0.00E+00	3.28E+02	1.60E+00	0.00E+00	5.30E+01	5.46E+01	6.61E+01	1.71E+02	8.3E-01	3.2E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	7.73E-02	kg
Food Ingestion Rate = (If)	1.25E-02	kg/day
Water Ingestion Rate = (Iw)	1.21E-02	L/day
Soil Ingestion Rate = (Is)	2.05E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - HILLSIDE SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.02E-01	0.00E+00	1.02E-01	9.62E-04	0.00E+00	1.50E-02	1.60E-02	NV	NV	#VALUE!	#VALUE!
ARSENIC	3.13E+00	0.00E+00	5.40E-01	2.96E-02	0.00E+00	7.98E-02	1.09E-01	2.24E+00	4.51E+00	4.9E-02	2.4E-02
COPPER	5.89E+01	0.00E+00	3.03E+01	5.57E-01	0.00E+00	4.48E+00	5.04E+00	4.05E+00	3.49E+01	1.2E+00	1.4E-01
LEAD	2.98E+02	0.00E+00	7.98E+01	2.82E+00	0.00E+00	1.18E+01	1.46E+01	1.63E+00	4.46E+01	9.0E+00	3.3E-01
TIN	1.04E+01	0.00E+00	1.04E+01	9.79E-02	0.00E+00	1.53E+00	1.63E+00	6.76E+00	1.69E+01	2.4E-01	9.6E-02
ZINC	2.83E+01	0.00E+00	2.56E+02	2.68E-01	0.00E+00	3.78E+01	3.81E+01	6.61E+01	1.71E+02	5.8E-01	2.2E-01

Body Weight = (BW)	8.04E-02	kg	Dose (soil) = (Cs * Is)(H)/BW	Conc = Concentration
Food Ingestion Rate = (If)	1.19E-02	kg/day	Dose (invertebrate) = (Ci * If)(H)/BW	LOAEL = Lowest Observed Adverse Effects Concentration
Water Ingestion Rate = (Iw)	1.13E-02	L/day	Dose (water) = (Cw * Iw)(H)/BW	NOAEL = No Observed Adverse Effects Concentration
Soil Ingestion Rate = (Is)	7.60E-04	kg/day	Ci = Contaminant concentration in invertebrate	SW = Surface Water
Home Range = (HR)	6.10E-01	acres	Cs = Contaminant concentration in soil	
Contaminated Area = (CA)	Assume equal to home range		Cw = Contaminant concentration in water	
			Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)	
			H=CA/HR (Assume = to 1)	

TABLE 5-6.3.7

TERRESTRIAL FOOD CHAIN MODEL -CONSERVATIVE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS
-HILLSIDE SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	4.5E-02	9.5E-04	#VALUE!	#VALUE!	6.0E-01	1.3E-02
ARSENIC	9.1E-03	4.5E-03	5.4E-02	1.2E-02	1.6E-01	7.8E-02	1.2E-01	2.8E-02
COPPER	2.2E-01	2.6E-02	5.3E-01	3.6E-02	7.5E+00	8.7E-01	2.9E+00	1.9E-01
LEAD	1.3E+00	4.9E-02	9.6E-01	2.4E-02	3.4E+01	1.2E+00	5.1E+00	1.3E-01
TIN	2.2E-01	8.7E-02	4.0E-01	2.7E-01	2.3E+00	9.1E-01	3.8E-01	2.6E-01
ZINC	1.3E-02	5.1E-03	7.1E-02	1.8E-02	8.3E-01	3.2E-01	4.7E-01	1.2E-01

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

TABLE 5-6.3.11

TERRESTRIAL FOOD CHAIN MODEL - AVERAGE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS
- HILLSIDE SURFACE SOIL
MARINE RIFLE RANGE (MRR) -UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD -STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	4.8E-03	1.0E-04	#VALUE!	#VALUE!	1.5E-01	3.3E-03
ARSENIC	1.6E-03	8.0E-04	7.3E-03	1.7E-03	4.9E-02	2.4E-02	4.9E-02	1.1E-02
COPPER	3.8E-02	4.5E-03	9.1E-02	6.1E-03	1.2E+00	1.4E-01	4.9E-01	3.3E-02
LEAD	1.8E-01	6.4E-03	1.0E-01	2.6E-03	9.0E+00	3.3E-01	1.6E+00	3.9E-02
TIN	1.9E-02	7.6E-03	2.2E-02	1.5E-02	2.4E-01	9.6E-02	4.0E-02	2.7E-02
ZINC	5.7E-03	2.2E-03	2.0E-02	5.1E-03	5.8E-01	2.2E-01	3.0E-01	7.7E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

APPENDIX F

CHEMICAL CONCENTRATIONS IN SURFACE SOIL AND TISSUE - COMPOSITE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Surface Soil Concentrations (mg/kg)				Surface Water Concentrations (mg/L)		Earthworm Bioaccumulation Factors		Earthworm Concentrations (mg/kg)		Plant Bioaccumulation Factors		Plant Concentrations (mg/kg)	
	Maximum Detection	Average All	Average of Positive Detections	Average [1]	Maximum Detection	Average Concentration[1]	Conservative	Average	Maximum Detection	Average	Conservative	Average	Maximum Detection	Average
Inorganics														
ANTIMONY	1.30E+00	7.07E-01	7.07E-01	7.07E-01	0.00E+00	0.00E+00	1.00E+00	1.00E+00	1.30E+00	7.07E-01	1.14E-02	1.02E-02	5.04E-02	2.85E-02
ARSENIC	6.20E+00	5.20E+00	5.20E+00	5.20E+00	0.00E+00	0.00E+00	Regression from Eco SSL		8.76E-01	7.73E-01	Regression from Eco SSL		2.33E-01	1.95E-01
COPPER	2.40E+01	1.57E+01	1.57E+01	1.57E+01	0.00E+00	0.00E+00	5.15E-01	5.15E-01	1.24E+01	8.10E+00	Regression from Eco SSL		6.82E+00	5.78E+00
LEAD	2.00E+02	8.66E+01	8.66E+01	8.66E+01	0.00E+00	0.00E+00	Regression from Eco SSL		5.78E+01	2.94E+01	Regression from Eco SSL		5.18E+00	3.24E+00
ZINC	3.52E+01	2.58E+01	2.58E+01	2.58E+01	0.00E+00	0.00E+00	Regression from Eco SSL		2.75E+02	2.48E+02	Regression from Eco SSL		3.47E+01	2.92E+01
Explosives														
NITROGLYCERIN	2.04E+01	1.44E+01	1.44E+01	1.44E+01	0.00E+00	0.00E+00	1.00E+00	1.00E+00	2.04E+01	1.44E+01	1.00E+00	1.00E+00	2.04E+01	1.44E+01

1 - If the average of all value is the greater than the maximum detection, the average of the positive detections was used as the average value.

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal NOAEL	Mammal LOAEL	Bird NOAEL	Bird LOAEL
VOLATILES				
1,1,1-Trichloroethane	1000	1000	NV	NV
1,1,2,2-Tetrachloroethane	76	108	NV	NV
1,1,2-Trichloroethane	0.39	4.4	NV	NV
1,1-Dichloroethane	475	4750	NV	NV
1,1-Dichloroethene	30	300	NV	NV
1,2,4-Trichlorobenzene	1.48	14.8	NV	NV
1,2-Dichlorobenzene	120	1200	NV	NV
1,2-Dichloroethane	50	500	17.2	34.4
1,2-Dichloroethene (total)	45.2	452	NV	NV
1,4-Dichlorobenzene	30	300	NV	NV
2-Butanone	1771	4571	NV	NV
2-Hexanone	NV	NV	NV	NV
4-Methyl-2-pentanone	NV	NV	NV	NV
Acetone	10	50	20089	200890
Benzene	26.36	263.6	NV	NV
Bromodichloromethane	1.79	17.9	NV	NV
Carbon Disulfide	12.6	25.6	NV	NV
Carbon Tetrachloride	16	160	NV	NV
Chlorobenzene	2.725	5.45	NV	NV
Chloroform	15	41	NV	NV
Chloromethane	NV	NV	NV	NV
cis-1,2-Dichloroethene	45.2	452	NV	NV
Dichlorodifluoromethane	2310	23100	NV	NV
Ethylbenzene	9.71	29.1	NV	NV
Isopropylbenzene	11	33.1	NV	NV
m,p-Xylene	2.06	2.58	107	1070
Methyl acetate	NV	NV	NV	NV
o-Xylene	2.06	2.58	107	1070
Methylene Chloride	5.85	50	NV	NV
Styrene	20	40	NV	NV
Tetrachloroethene	1.4	7	NV	NV
Toluene	26	260	NV	NV
Trichloroethene	0.7	7	NV	NV
Trichlorofluoromethane	34.9	349	NV	NV
Vinyl chloride	17	1.7	NV	NV
Xylenes, Total	2.06	2.58	107	1070
SEMIVOLATILES				
1,1'-Biphenyl	5	25	NV	NV
2,2'-Oxybis(1-chloropropane)	NV	NV	NV	NV
2,3,4,6-Tetrachlorophenol	2.5	10	NV	NV
2,4,5-Trichlorophenol	10	30	NV	NV
2,4,6-Trichlorophenol	0.42	4.2	NV	NV
2,4-Dimethylphenol	5	25	NV	NV
2-Methylnaphthalene	65.6	356	2	20
2-Methylphenol	5	15	NV	NV
3-Nitroaniline	NV	NV	NV	NV
4-Chloroaniline	1.25	12.5	NV	NV
4-Chloro-3-methylphenol	NV	NV	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
4-Methylphenol	NV	NV	NV	NV
4-Nitroaniline	NV	NV	NV	NV
4-Nitrophenol	NV	NV	NV	NV
7,12-Dimethylbenz(a)anthracene	NV	NV	2	20
Acenaphthene	65.6	356	2	20
Acenaphthylene	65.6	356	2	20
Anthracene	65.6	356	2	20
Benzaldehyde	20	40	NV	NV
Benzo(a)anthracene	0.615	38.4	2	20
Benzo(a)pyrene	0.615	38.4	2	20

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Benzo(b)fluoranthene	0.615	38.4	2	20
Benzo(g,h,i)perylene	0.615	38.4	2	20
Benzo(k)fluoranthene	0.615	38.4	2	20
Bis(2-Ethylhexyl)phthalate	18.3	183	1.11	11.1
Butyl benzyl phthalate	15.9	47	NV	NV
Caprolactam	50	500	NV	NV
Carbazole	1	10	2	20
Chrysene	0.615	38.4	2	20
Dibenzo(a,h)anthracene	0.615	38.4	2	20
Dibenzofuran	NV	NV	2	20
1,4-Dichlorobenzene	30	300	NV	NV
Diethylphthalate	4583	45830	NV	NV
Di-n-butyl phthalate	550	1833	0.111	1.11
Di-n-octyl phthalate	NV	NV	NV	NV
Fluoranthene	65.6	356	2	20
Fluorene	65.6	356	2	20
Hexachloroethane	0.1	1.5	NV	NV
Indeno(1,2,3-cd)pyrene	0.615	38.4	2	20
Isophorone	15	179	NV	NV
Naphthalene	65.6	356	2	20
n-Nitrosodiphenylamine	NV	NV	NV	NV
Pentachlorophenol	8.42	22.65	6.73	52.01
Phenanthrene	65.6	356	2	20
Phenol	6	12	NV	NV
Pyrene	0.615	38.4	2	20
Perylene	0.615	38.4	2	20
HERBICIDES				
Dinoseb	0.1	1	NV	NV
2,4-D	1	5	NV	NV
2,4,5-T	3	10	NV	NV
PESTICIDES/PCBs				
2,4'-DDD	0.147	5.56	0.227	2.7
2,4'-DDE	0.147	5.56	0.227	2.7
2,4'-DDT	0.147	5.56	0.227	2.7
4,4'-DDD	0.147	5.56	0.227	2.7
4,4'-DDE	0.147	5.56	0.227	2.7
4,4'-DDT	0.147	5.56	0.227	2.7
Aldrin	0.2	1	NV	NV
Alpha-BHC	0.014	0.14	0.56	2.25
Alpha-Chlordane	4.58	9.16	2.14	10.7
Aroclor-1232	0.068	0.68	0.18	1.8
Aroclor-1242	0.069	0.69	0.41	4.1
Aroclor-1248	0.01	0.1	NV	NV
Aroclor-1254	0.068	0.68	0.18	1.8
Aroclor-1260	0.068	0.68	0.18	1.8
Aroclor-1268	0.068	0.68	0.18	1.8
PCB-28	0.068	0.68	0.18	1.8
PCB-44	0.068	0.68	0.18	1.8
PCB-52	0.068	0.68	0.18	1.8

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
PCB-66	0.068	0.68	0.18	1.8
PCB-101	0.068	0.68	0.18	1.8
PCB-105	0.068	0.68	0.18	1.8
PCB-118	0.068	0.68	0.18	1.8
PCB-128	0.068	0.68	0.18	1.8
PCB-138	0.068	0.68	0.18	1.8
PCB-153	0.068	0.68	0.18	1.8
PCB-170	0.068	0.68	0.18	1.8
PCB-180	0.068	0.68	0.18	1.8
PCB-187	0.068	0.68	0.18	1.8
PCB-195	0.068	0.68	0.18	1.8
PCB-206	0.068	0.68	0.18	1.8
PCB-209	0.068	0.68	0.18	1.8
beta-BHC	0.4	2	0.56	2.25
delta-BHC	0.014	0.14	0.56	2.25
Dieldrin	0.015	1.27	0.0709	0.8
Endosulfan I	0.15	1.5	10	100
Endosulfan II	0.15	1.5	10	100
Endosulfan Sulfate	0.15	1.5	10	100
Endrin	0.092	0.92	0.01035	0.1035
Endrin Aldehyde	0.092	0.92	0.01	0.1
Endrin Ketone	0.092	0.92	0.01	0.1
Gamma-BHC (Lindane)	8	80	2	20
Gamma-Chlordane	4.58	9.16	2.14	10.7
Heptachlor	0.1	1	NV	NV
Heptachlor Epoxide	0.1	1	NV	NV
Methoxychlor	4	8	NV	NV
Toxaphene	8	80	NV	NV
Total Aroclor	0.068	0.68	0.18	1.8
Total DDT	0.147	5.56	0.227	2.7
DIOXINS AND FURANS (mg/kg)				
1,2,3,4,6,7,8-HpCDD	0.0001	0.001	0.014	0.14
1,2,3,4,6,7,8-HpCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8,9-HPCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8-HXCDD	0.00001	0.0001	0.00028	0.0028
1,2,3,4,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,6,7,8-HxCDD	0.00001	0.0001	0.0014	0.014
1,2,3,6,7,8-HxCDF	0.00016	0.0016	0.00014	0.0014
1,2,3,7,8,9-HxCDD	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8,9-HxCDF	0.00001	0.0001	0.00014	0.0014
2,3,4,6,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8-PECDD	0.000001	0.00001	0.000014	0.00014
1,2,3,7,8-PECDF	0.00016	0.0016	0.00014	0.0014
2,3,4,7,8-PECDF	0.000016	0.00016	0.000014	0.00014
2,3,7,8-TCDD	0.000001	0.00001	0.000014	0.00014
2,3,7,8-TCDF	0.00001	0.0001	0.000014	0.00014
OCDD	0.01	0.1	0.14	1.4
OCDF	0.01	0.1	0.14	1.4
TOTAL HpCDD	0.0001	0.001	0.014	0.14

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
TOTAL HxCDD	0.00001	0.0001	0.00014	0.0014
TOTAL PeCDD	0.000001	0.00001	0.000014	0.00014
Total HpCDF	0.0001	0.001	0.0014	0.014
Total HxCDF	0.00001	0.0001	0.00014	0.0014
Total PeCDF	0.000002	0.00002	0.000014	0.00014
Total TCDD	0.000001	0.00001	0.000014	0.00014
Total TCDF	0.00001	0.0001	0.000014	0.00014
EXPLOSIVES (mg/kg)				
1,3 Dinitrobenzene	0.4	1.07	NV	NV
1,3,5-Trinitrobenzene	2.68	13.31	NV	NV
2,4-Dinitrotoluene	0.67	1.4	0.1	0.5
2,6-Dinitrotoluene	0.7	7	NV	NV
2,4,6-Trinitrotoluene	1.6	16	0.7	17.8
2-Amino-4,6-dinitrotoluene	NV	NV	NV	NV
2-Nitrotoluene	20	200	NV	NV
3-Nitrotoluene	20	200	NV	NV
4-Amino-2,6-dinitrotoluene	NV	NV	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal NOAEL	Mammal LOAEL	Bird NOAEL	Bird LOAEL
4-Nitrotoluene	20	200	NV	NV
Ammonia	NV	NV	NV	NV
HMX	3	7.5	NV	NV
Nitrobenzene (exp)	NV	NV	NV	NV
Nitroglycerin	3	32	NV	NV
RDX	7	35	NV	NV
Tetryl	1.3	6.2	NV	NV
INORGANICS				
Aluminum	1.93	19.3	109.7	1097
Antimony	0.059	2.76	NV	NV
Arsenic	1.04	4.55	2.24	4.51
Barium	51.8	82.7	20.8	41.7
Beryllium	0.532	0.673	NV	NV
Cadmium	0.77	6.9	1.47	6.35
Chromium	2.40	58.17	2.66	15.63
Hexavalent Chromium	5.66	38.37	NV	NV
Cobalt	7.33	18.90	7.61	18.34
Copper	5.6	82.7	4.05	34.87
Cyanide	68.7	687	NV	NV
Iron	50	500	100	1000
Lead	4.7	186.4	1.63	44.63
Manganese	51.5	145.67	179	376.6
Mercury	0.032	0.16	0.0064	0.064
Nickel	1.70	14.77	6.71	18.57
Selenium	0.143	0.661	0.29	0.819

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
Volatile Organics				
1,1,1-Trichloroethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
2-Butanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Methyl-2-pentanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Acetone	5.20E+00	5.20E+00	1.00E+00	1.00E+00
Carbon Disulfide	2.00E+00	2.00E+00	1.00E+00	1.00E+00
Chlorobenzene	9.00E-01	9.00E-01	1.00E+00	1.00E+00
Ethylbenzene	6.10E-01	6.10E-01	1.00E+00	1.00E+00
Isopropylbenzene	1.00E+00	1.00E+00	1.00E+00	1.00E+00
M,p-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Methyl Acetate	2.99E+01	2.99E+01	1.00E+00	1.00E+00
Methylene Chloride	6.70E+00	6.70E+00	1.00E+00	1.00E+00
O-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Tetrachloroethene	1.20E+00	1.20E+00	1.00E+00	1.00E+00
Toluene	1.03E+00	1.03E+00	1.00E+00	1.00E+00
Total Xylenes	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Trichloroethene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
Trichlorofluoromethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
Semivolatile Organics				
1,1'-Biphenyl	1.59E-01	1.59E-01	1.00E+00	1.00E+00
1,2-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
1,4-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
2,2'-Oxybis(1-Chloropropane)	???	???	1.00E+00	1.00E+00
2,3,4,6-Tetrachlorophenol	1.59E-01	1.59E-01	1.00E+00	1.00E+00
2,4-D	???	???		
2-Methylnaphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
2-Methylphenol	???	???	1.00E+00	1.00E+00
3-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Chloro-3-Methylphenol	???	???	1.00E+00	1.00E+00
4-Chloroaniline	9.03E-01	9.03E-01	1.00E+00	1.00E+00
4-Methylphenol	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitrophenol	3.00E+00	3.00E+00	1.00E+00	1.00E+00
2,4,5-Trichlorophenol	2.40E-01	2.40E-01	1.00E+00	1.00E+00
2,4,6-Trichlorophenol	2.70E-01	2.70E-01	1.00E+00	1.00E+00
2,4,5-T	???	???	???	???
Acenaphthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Acenaphthylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzaldehyde	1.76E+00	1.76E+00	1.00E+00	1.00E+00
Benzo(a)anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(a)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(b)fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(g,h,i)perylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(k)Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Bis(2-ethylhexyl)phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Butyl benzyl Phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Caprolactam	4.90E+01	4.90E+01	1.00E+00	1.00E+00
Carbazole	2.40E-01	2.40E-01	Eco-SSL	Eco-SSL
Chrysene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzo(a,h)Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzofuran	1.50E-01	1.50E-01	Eco-SSL	Eco-SSL
Diethylphthalate	1.30E+00	1.30E+00	1.00E+00	1.00E+00
Di-n-butyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Di-n-octyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Dinoseb	???	???	???	???
Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Fluorene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexachloroethane	2.10E-01	2.10E-01	1.00E+00	1.00E+00
Indeno(1,2,3-cd)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Isophorone	3.92E+00	3.92E+00	1.00E+00	1.00E+00
N-Nitrosodiphenylamine	6.05E-01	6.05E-01	1.00E+00	1.00E+00
Naphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pentachlorophenol	1.40E-02	1.40E-02	1.00E+00	1.00E+00
Phenanthrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Phenol	5.10E+00	5.10E+00	1.00E+00	1.00E+00
Pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pesticides/ PCBs				
4,4'-DDD	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDE	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Aldrin	6.90E-01	6.90E-01	3.30E+00	3.30E+00
Alpha-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Aroclor-1232	5.30E-01	5.30E-01	1.59E+01	6.67E+00
Aroclor-1242	1.60E-01	1.60E-01	1.59E+01	6.67E+00
Aroclor-1248	1.60E-02	1.60E-02	1.59E+01	6.67E+00
Aroclor-1254	1.30E-02	1.30E-02	1.59E+01	6.67E+00
Aroclor-1260	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Aroclor-1268	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Dieldrin	8.20E-02	8.20E-02	6.64E+00	6.64E+00
Gamma-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Heptachlor	1.20E-01	1.20E-01	1.00E+01	1.00E+01
Endosulfan I	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan II	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan Sulfate	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endrin	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Aldehyde	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Ketone	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Heptachlor Epoxide	2.80E-02	2.80E-02	3.00E+00	3.00E+00
Methoxychlor	1.10E-01	1.10E-01	1.00E+00	1.00E+00
alpha-BHC	2.10E-01	2.10E-01	5.00E+00	5.00E+00

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
beta-BHC	1.80E-01	1.80E-01	5.00E+00	5.00E+00
delta-BHC	9.00E-01	9.00E-01	5.00E+00	5.00E+00
gamma-BHC (Lindane)	2.70E-01	2.70E-01	5.00E+00	5.00E+00
Toxaphene	6.20E-02	6.20E-02	1.00E+00	1.00E+00
Total Aroclor	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Total DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Explosives				
2,4,6-Trinitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
2-Nitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
1,3,5-Trinitrobenzene	7.70E+00	7.70E+00	1.00E+00	1.00E+00
4-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
RDX	4.60E-01	4.60E-01	1.00E+00	1.00E+00
4-Amino-2,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
HMX	1.70E+01	1.70E+01	1.00E+00	1.00E+00
Nitrobenzene (exp)	3.40E+00	3.40E+00	1.00E+00	1.00E+00
1,3 Dinitrobenzene	4.50E+00	4.50E+00	1.00E+00	1.00E+00
2-Amino-4,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
Tetryl	???	???	1.00E+00	1.00E+00
3-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
2,4-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
2,6-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
NITROGLYCERIN	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Dioxins				
1,2,3,4,6,7,8-HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,6,7,8-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8,9-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HxCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8-PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
1,2,3,7,8-Pecdf	4.40E-03	4.40E-03	2.22E+01	1.10E+01
2,3,4,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
2,3,4,7,8-PECDF	3.70E-03	3.70E-03	2.22E+01	1.10E+01
2,3,7,8-TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ HALFND	4.30E-03	4.30E-03	2.22E+01	1.10E+01
2,3,7,8-TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDD	???	???	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDF	???	???	2.22E+01	1.10E+01
TOTAL HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
Total HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total PECDF	4.40E-03	4.40E-03	2.22E+01	1.10E+01
Total TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
Total TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
Inorganics				
Aluminum	5.00E-03	2.87E-03	1.18E-01	4.30E-02
Antimony	1.14E-02	1.02E-02	1.00E+00	1.00E+00
Arsenic	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Barium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Beryllium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cadmium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cobalt	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Copper	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexavalent Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cyanide	1.80E+00	1.00E+00	1.00E+00	1.00E+00
Iron	1.00E-02	4.25E-03	7.80E-02	3.60E-02
Lead	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Manganese	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Mercury	5.00E+00	6.52E-01	ORNL Reg.	ORNL Reg.
Nickel	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Selenium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Silver	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Thallium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Tin	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Vanadium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Zinc	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL

Notes:
BAF - Bioaccumulation Factor
BSAF - Biota Sediment Accumulation Factor
1 - ORNL (2001) for organics; only one value is available for conservative and average exposures
2 - Sample et al., (1997) for inorganics; conservative value is 90th percentile; average value is median v
3 - ORNL (September, 1998) for all chemicals; conservative value is 90th percentile; average value is m
4 - U.S. EPA, September 1997; only one value is available for conservative and average exposures. Va
5 - Conservative and average refers to the exposure scenarios for which the uptake factors are used
6 - Where "Eco-SSL" is given, values were calculated using equations from USEPA (2005), Attachment
Tables 4a (for inorganics) and 4b (for organics).

Default value of 1 is assigned to parameters without uptake factors

TABLE X-X

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

Species/Exposure Inputs	Conservative Inputs		Average Inputs	
	Values	Units	Values	Units
Bobwhite Quail				
Body Weight = BW	1.540E-01	kg	1.751E-01	kg
Food Ingestion Rate = If	2.442E-03	kg/day	2.042E-03	kg/day
Water Ingestion Rate = Iw	2.276E-02	L/day	1.926E-02	L/day
Soil Ingestion Rate = Is	3.395E-04	kg/day	1.246E-04	kg/day
Home Range = HR	Assume 100% on site		1.880E+01	acres
Meadow Vole				
Body Weight = BW	1.700E-02	kg	3.580E-02	kg
Food Ingestion Rate = If	1.878E-03	kg/day	1.744E-03	kg/day
Water Ingestion Rate = Iw	7.513E-03	L/day	6.261E-03	L/day
Soil Ingestion Rate = Is	6.010E-05	kg/day	2.093E-05	kg/day
Home Range = HR	Assume 100% on site		6.590E-02	acres
American Robin				
Body Weight = BW	7.73E-02	kg	8.04E-02	kg
Food Ingestion Rate = If	1.25E-02	kg/day	1.19E-02	kg/day
Water Ingestion Rate = Iw	1.21E-02	L/day	1.13E-02	L/day
Soil Ingestion Rate - Is	2.046E-03	kg/day	7.601E-04	kg/day
Home Range = HR	Assume 100% on site		6.095E-01	acres
Short-Tailed Shrew				
Body Weight = BW	1.500E-02	kg	1.610E-02	kg
Food Ingestion Rate = If	1.600E-03	kg/day	1.433E-03	kg/day
Water Ingestion Rate = Iw	4.280E-03	L/day	3.600E-03	L/day
Soil Ingestion Rate - Is	4.801E-05	kg/day	1.289E-05	kg/day
Home Range = HR	Assume 100% on site		9.699E-01	acres
Mink				
Body Weight = BW	5.500E-01	kg	1.103E+00	kg
Food Ingestion Rate = If	6.067E-02	kg/day	4.504E-02	kg/day
Water Ingestion Rate = Iw	1.213E-01	L/day	7.308E-02	L/day
Sediment Ingestion Rate = Is	5.703E-03	kg/day	4.234E-03	kg/day
Home Range = HR	Assume 100% on site		1.558E+03	acres
Green Heron				
Body Weight = BW	2.00E-01	kg	2.12E-01	kg
Food Ingestion Rate = If	3.10E-02	kg/day	3.00E-02	kg/day
Water Ingestion Rate = Iw	2.20E-02	L/day	2.10E-02	L/day
Sediment Ingestion Rate = Is	1.600E-03	kg/day	1.500E-03	kg/day
Home Range = HR	Assume 100% on site		1.000E+01	km-radius

Notes:
The exposure factors were derived as presented in Appendix I.

The soil/sediment ingestion rates were calculated by multiplying the food ingestion rates by the following incidental soil/sediment ingestion rates:

	Conservative	Average	Source
Bobwhite quail	13.90%	6.10%	1, 2
Meadow Vole	3.20%	1.20%	1
American Robin	16.40%	6.40%	1,4
Short-tailed Shrew	3%	0.90%	1
Mink	9.4%	9.4%	3, 5
Green Heron	5%	5%	6

1 - USEPA (U.S. Environmental Protection Agency), 2005. Ecological Soil Screening Level Guidance, Office of Emergency and Remedial Response. February.
2 - Based on the mourning dove.
3 - Beyer, N., E. Connor, and S. Gerould. 1994. Estimates of Soil Ingestion by Wildlife. Journal of Wildlife Management 58(2) pp. 375-382.
4 - Based on the American woodcock
5 - Based on the raccoon
6 - Based on piscivorous birds

APPENDIX F

MEADOW VOLE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.30E+00	0.00E+00	5.04E-02	4.60E-03	0.00E+00	5.57E-03	1.02E-02	5.90E-02	2.76E+00	1.72E-01	3.68E-03
ARSENIC	6.20E+00	0.00E+00	2.33E-01	2.19E-02	0.00E+00	2.57E-02	4.76E-02	1.04E+00	4.55E+00	4.58E-02	1.05E-02
COPPER	2.40E+01	0.00E+00	6.82E+00	8.48E-02	0.00E+00	7.54E-01	8.39E-01	5.60E+00	8.27E+01	1.50E-01	1.01E-02
LEAD	2.00E+02	0.00E+00	5.18E+00	7.07E-01	0.00E+00	5.72E-01	1.28E+00	4.70E+00	1.86E+02	2.72E-01	6.86E-03
ZINC	3.52E+01	0.00E+00	3.47E+01	1.24E-01	0.00E+00	3.84E+00	3.96E+00	7.54E+01	2.98E+02	5.26E-02	1.33E-02
Explosives											
NITROGLYCERIN	2.04E+01	0.00E+00	2.04E+01	7.21E-02	0.00E+00	2.25E+00	2.33E+00	3.00E+00	3.20E+01	7.75E-01	7.27E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.70E-02	kg	Dose (soil) = (Cs * Is)(H)/BW	Conc = Concentration
Food Ingestion Rate = (If)	1.88E-03	kg/day	Dose (vegetation) = (Cv * If)(H)/BW	LOAEL = Lowest Observed Adverse Effects Concentration
Water Ingestion Rate = (Iw)	7.51E-03	L/day	Dose (water) = (Cw * Iw)(H)/BW	NOAEL = No Observed Adverse Effects Concentration
Soil Ingestion Rate = (Is)	6.01E-05	kg/day	Cv = Contaminant concentration in vegetation	SW = Surface Water
Home Range = (HR)	Assume 100% on site		Cs = Contaminant concentration in soil	
Contaminated Area = (CA)	Assume equal to home range		Cw = Contaminant concentration in water	
			Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)	
			H=CA/HR (Assume = to 1)	

APPENDIX F

MEADOW VOLE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	7.07E-01	0.00E+00	2.85E-02	4.13E-04	0.00E+00	1.39E-03	1.80E-03	5.90E-02	2.76E+00	3.05E-02	6.52E-04
ARSENIC	5.20E+00	0.00E+00	1.95E-01	3.04E-03	0.00E+00	9.50E-03	1.25E-02	1.04E+00	4.55E+00	1.21E-02	2.76E-03
COPPER	1.57E+01	0.00E+00	5.78E+00	9.20E-03	0.00E+00	2.81E-01	2.91E-01	5.60E+00	8.27E+01	5.19E-02	3.51E-03
LEAD	8.66E+01	0.00E+00	3.24E+00	5.06E-02	0.00E+00	1.58E-01	2.08E-01	4.70E+00	1.86E+02	4.43E-02	1.12E-03
ZINC	2.58E+01	0.00E+00	2.92E+01	1.51E-02	0.00E+00	1.42E+00	1.44E+00	7.54E+01	2.98E+02	1.91E-02	4.83E-03
Explosives											
NITROGLYCERIN	1.44E+01	0.00E+00	1.44E+01	8.42E-03	0.00E+00	7.02E-01	7.10E-01	3.00E+00	3.20E+01	2.37E-01	2.22E-02

Body Weight = (BW)	3.58E-02	kg
Food Ingestion Rate = (If)	1.74E-03	kg/day
Water Ingestion Rate = (Iw)	6.26E-03	L/day
Soil Ingestion Rate = (Is)	2.09E-05	kg/day
Home Range = (HR)	6.59E-02	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.30E+00	0.00E+00	5.04E-02	2.87E-03	0.00E+00	8.00E-04	3.67E-03	NV	NV	#VALUE!	#VALUE!
ARSENIC	6.20E+00	0.00E+00	2.33E-01	1.37E-02	0.00E+00	3.69E-03	1.74E-02	2.24E+00	4.51E+00	7.7E-03	3.8E-03
COPPER	2.40E+01	0.00E+00	6.82E+00	5.29E-02	0.00E+00	1.08E-01	1.61E-01	4.05E+00	3.49E+01	4.0E-02	4.6E-03
LEAD	2.00E+02	0.00E+00	5.18E+00	4.41E-01	0.00E+00	8.21E-02	5.23E-01	1.63E+00	4.46E+01	3.2E-01	1.2E-02
ZINC	3.52E+01	0.00E+00	3.47E+01	7.76E-02	0.00E+00	5.51E-01	6.29E-01	6.61E+01	1.71E+02	9.5E-03	3.7E-03
Explosives											
NITROGLYCERIN	2.04E+01	0.00E+00	2.04E+01	4.50E-02	0.00E+00	3.24E-01	3.69E-01	NV	NV	#VALUE!	#VALUE!

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.54E-01	kg
Food Ingestion Rate = (If)	2.44E-03	kg/day
Water Ingestion Rate = (Iw)	2.28E-02	L/day
Soil Ingestion Rate = (Is)	3.40E-04	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	7.07E-01	0.00E+00	2.85E-02	5.03E-04	0.00E+00	3.32E-04	8.35E-04	NV	NV	#VALUE!	#VALUE!
ARSENIC	5.20E+00	0.00E+00	1.95E-01	3.70E-03	0.00E+00	2.28E-03	5.97E-03	2.24E+00	4.51E+00	2.7E-03	1.3E-03
COPPER	1.57E+01	0.00E+00	5.78E+00	1.12E-02	0.00E+00	6.74E-02	7.86E-02	4.05E+00	3.49E+01	1.9E-02	2.3E-03
LEAD	8.66E+01	0.00E+00	3.24E+00	6.16E-02	0.00E+00	3.77E-02	9.93E-02	1.63E+00	4.46E+01	6.1E-02	2.2E-03
ZINC	2.58E+01	0.00E+00	2.92E+01	1.83E-02	0.00E+00	3.41E-01	3.59E-01	6.61E+01	1.71E+02	5.4E-03	2.1E-03
Explosives											
NITROGLYCERIN	1.44E+01	2.00E+00	1.44E+01	1.02E-02	2.20E-01	1.68E-01	3.98E-01	NV	NV	#VALUE!	#VALUE!

Body Weight = (BW)	1.75E-01	kg	Dose (soil) = (Cs * Is)(H)/BW
Food Ingestion Rate = (If)	2.04E-03	kg/day	Dose (vegetation) = (Cv * If)(H)/BW
Water Ingestion Rate = (Iw)	1.93E-02	L/day	Dose (water) = (Cw * Iw)(H)/BW
Soil Ingestion Rate = (Is)	1.25E-04	kg/day	Cv = Contaminant concentration in vegetation
Home Range = (HR)	1.88E+01	acres	Cs = Contaminant concentration in soil
Contaminated Area = (CA)	Assume equal to home range		Cw = Contaminant concentration in water
			Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
			H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.30E+00	0.00E+00	1.30E+00	4.16E-03	0.00E+00	1.39E-01	1.43E-01	5.90E-02	2.76E+00	2.4E+00	5.2E-02
ARSENIC	6.20E+00	0.00E+00	8.76E-01	1.98E-02	0.00E+00	9.34E-02	1.13E-01	1.04E+00	4.55E+00	1.1E-01	2.5E-02
COPPER	2.40E+01	0.00E+00	1.24E+01	7.68E-02	0.00E+00	1.32E+00	1.40E+00	5.60E+00	8.27E+01	2.5E-01	1.7E-02
LEAD	2.00E+02	0.00E+00	5.78E+01	6.40E-01	0.00E+00	6.17E+00	6.81E+00	4.70E+00	1.86E+02	1.4E+00	3.7E-02
ZINC	3.52E+01	0.00E+00	2.75E+02	1.13E-01	0.00E+00	2.93E+01	2.95E+01	7.54E+01	2.98E+02	3.9E-01	9.9E-02
Explosives											
NITROGLYCERIN	2.04E+01	0.00E+00	2.04E+01	6.53E-02	0.00E+00	2.18E+00	2.24E+00	3.00E+00	3.20E+01	7.5E-01	7.0E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.50E-02	kg
Food Ingestion Rate = (If)	1.60E-03	kg/day
Water Ingestion Rate = (Iw)	4.28E-03	L/day
Soil Ingestion Rate = (Is)	4.80E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	7.07E-01	0.00E+00	7.07E-01	5.66E-04	0.00E+00	6.29E-02	6.34E-02	5.90E-02	2.76E+00	1.1E+00	2.3E-02
ARSENIC	5.20E+00	0.00E+00	7.73E-01	4.16E-03	0.00E+00	6.88E-02	7.30E-02	1.04E+00	4.55E+00	7.0E-02	1.6E-02
COPPER	1.57E+01	0.00E+00	8.10E+00	1.26E-02	0.00E+00	7.21E-01	7.34E-01	5.60E+00	8.27E+01	1.3E-01	8.9E-03
LEAD	8.66E+01	0.00E+00	2.94E+01	6.93E-02	0.00E+00	2.62E+00	2.69E+00	4.70E+00	1.86E+02	5.7E-01	1.4E-02
ZINC	2.58E+01	0.00E+00	2.48E+02	2.06E-02	0.00E+00	2.21E+01	2.21E+01	7.54E+01	2.98E+02	2.9E-01	7.4E-02
Explosives											
NITROGLYCERIN	1.44E+01	0.00E+00	1.44E+01	1.15E-02	0.00E+00	1.28E+00	1.29E+00	3.00E+00	3.20E+01	4.3E-01	4.0E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.61E-02	kg
Food Ingestion Rate = (If)	1.43E-03	kg/day
Water Ingestion Rate = (Iw)	3.60E-03	L/day
Soil Ingestion Rate = (Is)	1.29E-05	kg/day
Home Range = (HR)	9.70E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.30E+00	0.00E+00	1.30E+00	3.44E-02	0.00E+00	2.10E-01	2.44E-01	NV	NV	#VALUE!	#VALUE!
ARSENIC	6.20E+00	0.00E+00	8.76E-01	1.64E-01	0.00E+00	1.41E-01	3.05E-01	2.24E+00	4.51E+00	1.4E-01	6.8E-02
COPPER	2.40E+01	0.00E+00	1.24E+01	6.35E-01	0.00E+00	1.99E+00	2.63E+00	4.05E+00	3.49E+01	6.5E-01	7.5E-02
LEAD	2.00E+02	0.00E+00	5.78E+01	5.29E+00	0.00E+00	9.33E+00	1.46E+01	1.63E+00	4.46E+01	9.0E+00	3.3E-01
ZINC	3.52E+01	0.00E+00	2.75E+02	9.32E-01	0.00E+00	4.44E+01	4.53E+01	6.61E+01	1.71E+02	6.9E-01	2.6E-01
Explosives											
NITROGLYCERIN	2.04E+01	0.00E+00	2.04E+01	5.40E-01	0.00E+00	3.29E+00	3.83E+00	NV	NV	#VALUE!	#VALUE!

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	7.73E-02	kg
Food Ingestion Rate = (If)	1.25E-02	kg/day
Water Ingestion Rate = (Iw)	1.21E-02	L/day
Soil Ingestion Rate = (Is)	2.05E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	7.07E-01	0.00E+00	7.07E-01	6.68E-03	0.00E+00	1.04E-01	1.11E-01	NV	NV	#VALUE!	#VALUE!
ARSENIC	5.20E+00	0.00E+00	7.73E-01	4.92E-02	0.00E+00	1.14E-01	1.63E-01	2.24E+00	4.51E+00	7.3E-02	3.6E-02
COPPER	1.57E+01	0.00E+00	8.10E+00	1.49E-01	0.00E+00	1.20E+00	1.35E+00	4.05E+00	3.49E+01	3.3E-01	3.9E-02
LEAD	8.66E+01	0.00E+00	2.94E+01	8.18E-01	0.00E+00	4.35E+00	5.17E+00	1.63E+00	4.46E+01	3.2E+00	1.2E-01
ZINC	2.58E+01	0.00E+00	2.48E+02	2.44E-01	0.00E+00	3.67E+01	3.69E+01	6.61E+01	1.71E+02	5.6E-01	2.2E-01
Explosives											
NITROGLYCERIN	1.44E+01	0.00E+00	1.44E+01	1.36E-01	0.00E+00	2.13E+00	2.26E+00	NV	NV	#VALUE!	#VALUE!

Body Weight = (BW)	8.04E-02	kg	Dose (soil) = (Cs * Is)(H)/BW	Conc = Concentration
Food Ingestion Rate = (If)	1.19E-02	kg/day	Dose (invertebrate) = (Ci * If)(H)/BW	LOAEL = Lowest Observed Adverse Effects Concentration
Water Ingestion Rate = (Iw)	1.13E-02	L/day	Dose (water) = (Cw * Iw)(H)/BW	NOAEL = No Observed Adverse Effects Concentration
Soil Ingestion Rate = (Is)	7.60E-04	kg/day	Ci = Contaminant concentration in invertebrate	SW = Surface Water
Home Range = (HR)	6.10E-01	acres	Cs = Contaminant concentration in soil	
Contaminated Area = (CA)	Assume equal to home range		Cw = Contaminant concentration in water	
			Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)	
			H=CA/HR (Assume = to 1)	

TABLE 6-6.3.4

TERRESTRIAL FOOD CHAIN MODEL - CONSERVATIVE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - COMPOSITE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	1.7E-01	3.7E-03	#VALUE!	#VALUE!	2.4E+00	5.2E-02
ARSENIC	7.7E-03	3.8E-03	4.6E-02	1.0E-02	1.4E-01	6.8E-02	1.1E-01	2.5E-02
COPPER	4.0E-02	4.6E-03	1.5E-01	1.0E-02	6.5E-01	7.5E-02	2.5E-01	1.7E-02
LEAD	3.2E-01	1.2E-02	2.7E-01	6.9E-03	9.0E+00	3.3E-01	1.4E+00	3.7E-02
ZINC	9.5E-03	3.7E-03	5.3E-02	1.3E-02	6.9E-01	2.6E-01	3.9E-01	9.9E-02
Explosives								
NITROGLYCERIN	#VALUE!	#VALUE!	7.8E-01	7.3E-02	#VALUE!	#VALUE!	7.5E-01	7.0E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

TABLE 6-6.3.6

TERRESTRIAL FOOD CHAIN MODEL - AVERAGE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - COMPOSITE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	3.1E-02	6.5E-04	#VALUE!	#VALUE!	1.1E+00	2.3E-02
ARSENIC	2.7E-03	1.3E-03	1.2E-02	2.8E-03	7.3E-02	3.6E-02	7.0E-02	1.6E-02
COPPER	1.9E-02	2.3E-03	5.2E-02	3.5E-03	3.3E-01	3.9E-02	1.3E-01	8.9E-03
LEAD	6.1E-02	2.2E-03	4.4E-02	1.1E-03	3.2E+00	1.2E-01	5.7E-01	1.4E-02
ZINC	5.4E-03	2.1E-03	1.9E-02	4.8E-03	5.6E-01	2.2E-01	2.9E-01	7.4E-02
Explosives								
NITROGLYCERIN	#VALUE!	#VALUE!	2.4E-01	2.2E-02	#VALUE!	#VALUE!	4.3E-01	4.0E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

APPENDIX F

CHEMICAL CONCENTRATIONS IN SURFACE SOIL AND TISSUE - SURFACE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Surface Soil Concentrations (mg/kg)				Surface Water Concentrations (mg/L)		Earthworm Bioaccumulation Factors		Earthworm Concentrations (mg/kg)		Plant Bioaccumulation Factors		Plant Concentrations (mg/kg)	
	Maximum Detection	Average All	Average of Positive Detections	Average [1]	Maximum Detection	Average Concentration[1]	Conservative	Average	Maximum Detection	Average	Conservative	Average	Maximum Detection	Average
Inorganics														
ANTIMONY	6.00E+00	1.25E+00	1.64E+00	1.25E+00	0.00E+00	0.00E+00	1.00E+00	1.00E+00	6.00E+00	1.25E+00	1.14E-02	1.02E-02	2.12E-01	4.86E-02
ARSENIC	8.70E+00	5.40E+00	5.40E+00	5.40E+00	0.00E+00	0.00E+00	Regression from Eco SSL		1.11E+00	7.94E-01	Regression from Eco SSL		3.26E-01	2.02E-01
COPPER	4.20E+01	1.72E+01	1.72E+01	1.72E+01	0.00E+00	0.00E+00	5.15E-01	5.15E-01	2.16E+01	8.85E+00	Regression from Eco SSL		8.50E+00	5.98E+00
LEAD	7.06E+02	2.63E+02	3.14E+02	2.63E+02	0.00E+00	0.00E+00	Regression from Eco SSL		1.60E+02	7.21E+01	Regression from Eco SSL		1.05E+01	6.03E+00
ZINC	3.32E+01	1.91E+01	1.91E+01	1.91E+01	0.00E+00	0.00E+00	Regression from Eco SSL		2.70E+02	2.25E+02	Regression from Eco SSL		3.36E+01	2.48E+01

1 - If the average of all value is the greater than the maximum detection, the average of the positive detections was used as the average value.

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
VOLATILES				
1,1,1-Trichloroethane	1000	1000	NV	NV
1,1,2,2-Tetrachloroethane	76	108	NV	NV
1,1,2-Trichloroethane	0.39	4.4	NV	NV
1,1-Dichloroethane	475	4750	NV	NV
1,1-Dichloroethene	30	300	NV	NV
1,2,4-Trichlorobenzene	1.48	14.8	NV	NV
1,2-Dichlorobenzene	120	1200	NV	NV
1,2-Dichloroethane	50	500	17.2	34.4
1,2-Dichloroethene (total)	45.2	452	NV	NV
1,4-Dichlorobenzene	30	300	NV	NV
2-Butanone	1771	4571	NV	NV
2-Hexanone	NV	NV	NV	NV
4-Methyl-2-pentanone	NV	NV	NV	NV
Acetone	10	50	20089	200890
Benzene	26.36	263.6	NV	NV
Bromodichloromethane	1.79	17.9	NV	NV
Carbon Disulfide	12.6	25.6	NV	NV
Carbon Tetrachloride	16	160	NV	NV
Chlorobenzene	2.725	5.45	NV	NV
Chloroform	15	41	NV	NV
Chloromethane	NV	NV	NV	NV
cis-1,2-Dichloroethene	45.2	452	NV	NV
Dichlorodifluoromethane	2310	23100	NV	NV
Ethylbenzene	9.71	29.1	NV	NV
Isopropylbenzene	11	33.1	NV	NV
m,p-Xylene	2.06	2.58	107	1070
Methyl acetate	NV	NV	NV	NV
o-Xylene	2.06	2.58	107	1070
Methylene Chloride	5.85	50	NV	NV
Styrene	20	40	NV	NV
Tetrachloroethene	1.4	7	NV	NV
Toluene	26	260	NV	NV
Trichloroethene	0.7	7	NV	NV
Trichlorofluoromethane	34.9	349	NV	NV
Vinyl chloride	17	1.7	NV	NV
Xylenes, Total	2.06	2.58	107	1070
SEMIVOLATILES				
1,1'-Biphenyl	5	25	NV	NV
2,2'-Oxybis(1-chloropropane)	NV	NV	NV	NV
2,3,4,6-Tetrachlorophenol	2.5	10	NV	NV
2,4,5-Trichlorophenol	10	30	NV	NV
2,4,6-Trichlorophenol	0.42	4.2	NV	NV
2,4-Dimethylphenol	5	25	NV	NV
1-Methylnaphthalene	65.6	356	2	20
2-Methylnaphthalene	65.6	356	2	20
2-Methylphenol	5	15	NV	NV
3-Nitroaniline	NV	NV	NV	NV
4-Chloroaniline	1.25	12.5	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
4-Chloro-3-methylphenol	NV	NV	NV	NV
4-Methylphenol	NV	NV	NV	NV
4-Nitroaniline	NV	NV	NV	NV
4-Nitrophenol	NV	NV	NV	NV
7,12-Dimethylbenz(a)anthracene	NV	NV	2	20
Acenaphthene	65.6	356	2	20
Acenaphthylene	65.6	356	2	20
Anthracene	65.6	356	2	20
Benzaldehyde	20	40	NV	NV
Benzo(a)anthracene	0.615	38.4	2	20
Benzo(a)pyrene	0.615	38.4	2	20

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Benzo(b)fluoranthene	0.615	38.4	2	20
Benzo(g,h,i)perylene	0.615	38.4	2	20
Benzo(k)fluoranthene	0.615	38.4	2	20
Bis(2-Ethylhexyl)phthalate	18.3	183	1.11	11.1
Butyl benzyl phthalate	15.9	47	NV	NV
Caprolactam	50	500	NV	NV
Carbazole	1	10	2	20
Chrysene	0.615	38.4	2	20
Dibenzo(a,h)anthracene	0.615	38.4	2	20
Dibenzofuran	NV	NV	2	20
1,4-Dichlorobenzene	30	300	NV	NV
Diethylphthalate	4583	45830	NV	NV
Di-n-butyl phthalate	550	1833	0.111	1.11
Di-n-octyl phthalate	NV	NV	NV	NV
Fluoranthene	65.6	356	2	20
Fluorene	65.6	356	2	20
Hexachloroethane	0.1	1.5	NV	NV
Indeno(1,2,3-cd)pyrene	0.615	38.4	2	20
Isophorone	15	179	NV	NV
Naphthalene	65.6	356	2	20
n-Nitrosodiphenylamine	NV	NV	NV	NV
Pentachlorophenol	8.42	22.65	6.73	52.01
Phenanthrene	65.6	356	2	20
Phenol	6	12	NV	NV
Pyrene	0.615	38.4	2	20
Perylene	0.615	38.4	2	20
HERBICIDES				
Dinoseb	0.1	1	NV	NV
2,4-D	1	5	NV	NV
2,4,5-T	3	10	NV	NV
PESTICIDES/PCBs				
2,4'-DDD	0.147	5.56	0.227	2.7
2,4'-DDE	0.147	5.56	0.227	2.7
2,4'-DDT	0.147	5.56	0.227	2.7
4,4'-DDD	0.147	5.56	0.227	2.7
4,4'-DDE	0.147	5.56	0.227	2.7
4,4'-DDT	0.147	5.56	0.227	2.7
Aldrin	0.2	1	NV	NV
Alpha-BHC	0.014	0.14	0.56	2.25
Alpha-Chlordane	4.58	9.16	2.14	10.7
Aroclor-1232	0.068	0.68	0.18	1.8
Aroclor-1242	0.069	0.69	0.41	4.1
Aroclor-1248	0.01	0.1	NV	NV
Aroclor-1254	0.068	0.68	0.18	1.8
Aroclor-1260	0.068	0.68	0.18	1.8
Aroclor-1268	0.068	0.68	0.18	1.8
PCB-28	0.068	0.68	0.18	1.8
PCB-44	0.068	0.68	0.18	1.8
PCB-52	0.068	0.68	0.18	1.8

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
PCB-66	0.068	0.68	0.18	1.8
PCB-101	0.068	0.68	0.18	1.8
PCB-105	0.068	0.68	0.18	1.8
PCB-118	0.068	0.68	0.18	1.8
PCB-128	0.068	0.68	0.18	1.8
PCB-138	0.068	0.68	0.18	1.8
PCB-153	0.068	0.68	0.18	1.8
PCB-170	0.068	0.68	0.18	1.8
PCB-180	0.068	0.68	0.18	1.8
PCB-187	0.068	0.68	0.18	1.8
PCB-195	0.068	0.68	0.18	1.8
PCB-206	0.068	0.68	0.18	1.8
PCB-209	0.068	0.68	0.18	1.8
beta-BHC	0.4	2	0.56	2.25
delta-BHC	0.014	0.14	0.56	2.25
Dieldrin	0.015	1.27	0.0709	0.8
Endosulfan I	0.15	1.5	10	100
Endosulfan II	0.15	1.5	10	100
Endosulfan Sulfate	0.15	1.5	10	100
Endrin	0.092	0.92	0.01035	0.1035
Endrin Aldehyde	0.092	0.92	0.01	0.1
Endrin Ketone	0.092	0.92	0.01	0.1
Gamma-BHC (Lindane)	8	80	2	20
Gamma-Chlordane	4.58	9.16	2.14	10.7
Heptachlor	0.1	1	NV	NV
Heptachlor Epoxide	0.1	1	NV	NV
Methoxychlor	4	8	NV	NV
Toxaphene	8	80	NV	NV
Total Aroclor	0.068	0.68	0.18	1.8
Total DDT	0.147	5.56	0.227	2.7
DIOXINS AND FURANS (mg/kg)				
1,2,3,4,6,7,8-HpCDD	0.0001	0.001	0.014	0.14
1,2,3,4,6,7,8-HpCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8,9-HPCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8-HXCDD	0.00001	0.0001	0.00028	0.0028
1,2,3,4,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,6,7,8-HxCDD	0.00001	0.0001	0.0014	0.014
1,2,3,6,7,8-HxCDF	0.00016	0.0016	0.00014	0.0014
1,2,3,7,8,9-HxCDD	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8,9-HxCDF	0.00001	0.0001	0.00014	0.0014
2,3,4,6,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8-PECDD	0.000001	0.00001	0.000014	0.00014
1,2,3,7,8-PECDF	0.00016	0.0016	0.00014	0.0014
2,3,4,7,8-PECDF	0.000016	0.00016	0.000014	0.00014
2,3,7,8-TCDD	0.000001	0.00001	0.000014	0.00014
2,3,7,8-TCDF	0.00001	0.0001	0.000014	0.00014
OCDD	0.01	0.1	0.14	1.4
OCDF	0.01	0.1	0.14	1.4
TOTAL HpCDD	0.0001	0.001	0.014	0.14

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
TOTAL HxCDD	0.00001	0.0001	0.00014	0.0014
TOTAL PeCDD	0.000001	0.00001	0.000014	0.00014
Total HpCDF	0.0001	0.001	0.0014	0.014
Total HxCDF	0.00001	0.0001	0.00014	0.0014
Total PeCDF	0.000002	0.00002	0.000014	0.00014
Total TCDD	0.000001	0.00001	0.000014	0.00014
Total TCDF	0.00001	0.0001	0.000014	0.00014
EXPLOSIVES (mg/kg)				
1,3 Dinitrobenzene	0.4	1.07	NV	NV
1,3,5-Trinitrobenzene	2.68	13.31	NV	NV
2,4-Dinitrotoluene	0.67	1.4	0.1	0.5
2,6-Dinitrotoluene	0.7	7	NV	NV
2,4,6-Trinitrotoluene	1.6	16	0.7	17.8
2-Amino-4,6-dinitrotoluene	NV	NV	NV	NV
2-Nitrotoluene	20	200	NV	NV
3-Nitrotoluene	20	200	NV	NV
4-Amino-2,6-dinitrotoluene	NV	NV	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal NOAEL	Mammal LOAEL	Bird NOAEL	Bird LOAEL
4-Nitrotoluene	20	200	NV	NV
Ammonia	NV	NV	NV	NV
HMX	3	7.5	NV	NV
Nitrobenzene (exp)	NV	NV	NV	NV
Nitroglycerin	3	32	NV	NV
RDX	7	35	NV	NV
Tetryl	1.3	6.2	NV	NV
INORGANICS				
Aluminum	1.93	19.3	109.7	1097
Antimony	0.059	2.76	NV	NV
Arsenic	1.04	4.55	2.24	4.51
Barium	51.8	82.7	20.8	41.7
Beryllium	0.532	0.673	NV	NV
Cadmium	0.77	6.9	1.47	6.35
Chromium	2.40	58.17	2.66	15.63
Hexavalent Chromium	5.66	38.37	NV	NV
Cobalt	7.33	18.90	7.61	18.34
Copper	5.6	82.7	4.05	34.87
Cyanide	68.7	687	NV	NV
Iron	50	500	100	1000
Lead	4.7	186.4	1.63	44.63
Manganese	51.5	145.67	179	376.6
Mercury	0.032	0.16	0.0064	0.064
Nickel	1.70	14.77	6.71	18.57
Selenium	0.143	0.661	0.29	0.819

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
Volatile Organics				
1,1,1-Trichloroethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
2-Butanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Methyl-2-pentanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Acetone	5.20E+00	5.20E+00	1.00E+00	1.00E+00
Carbon Disulfide	2.00E+00	2.00E+00	1.00E+00	1.00E+00
Chlorobenzene	9.00E-01	9.00E-01	1.00E+00	1.00E+00
Ethylbenzene	6.10E-01	6.10E-01	1.00E+00	1.00E+00
Isopropylbenzene	1.00E+00	1.00E+00	1.00E+00	1.00E+00
M,p-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Methyl Acetate	2.99E+01	2.99E+01	1.00E+00	1.00E+00
Methylene Chloride	6.70E+00	6.70E+00	1.00E+00	1.00E+00
O-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Tetrachloroethene	1.20E+00	1.20E+00	1.00E+00	1.00E+00
Toluene	1.03E+00	1.03E+00	1.00E+00	1.00E+00
Total Xylenes	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Trichloroethene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
Trichlorofluoromethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
Semivolatile Organics				
1,1'-Biphenyl	1.59E-01	1.59E-01	1.00E+00	1.00E+00
1,2-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
1,4-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
2,2'-Oxybis(1-Chloropropane)	???	???	1.00E+00	1.00E+00
2,3,4,6-Tetrachlorophenol	1.59E-01	1.59E-01	1.00E+00	1.00E+00
2,4-D	???	???		
2-Methylnaphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
2-Methylphenol	???	???	1.00E+00	1.00E+00
3-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Chloro-3-Methylphenol	???	???	1.00E+00	1.00E+00
4-Chloroaniline	9.03E-01	9.03E-01	1.00E+00	1.00E+00
4-Methylphenol	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitrophenol	3.00E+00	3.00E+00	1.00E+00	1.00E+00
2,4,5-Trichlorophenol	2.40E-01	2.40E-01	1.00E+00	1.00E+00
2,4,6-Trichlorophenol	2.70E-01	2.70E-01	1.00E+00	1.00E+00
2,4,5-T	???	???	???	???
Acenaphthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Acenaphthylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzaldehyde	1.76E+00	1.76E+00	1.00E+00	1.00E+00
Benzo(a)anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(a)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(b)fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(g,h,i)perylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(k)Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Bis(2-ethylhexyl)phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Butyl benzyl Phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Caprolactam	4.90E+01	4.90E+01	1.00E+00	1.00E+00
Carbazole	2.40E-01	2.40E-01	Eco-SSL	Eco-SSL
Chrysene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzo(a,h)Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzofuran	1.50E-01	1.50E-01	Eco-SSL	Eco-SSL
Diethylphthalate	1.30E+00	1.30E+00	1.00E+00	1.00E+00
Di-n-butyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Di-n-octyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Dinoseb	???	???	???	???
Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Fluorene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexachloroethane	2.10E-01	2.10E-01	1.00E+00	1.00E+00
Indeno(1,2,3-cd)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Isophorone	3.92E+00	3.92E+00	1.00E+00	1.00E+00
N-Nitrosodiphenylamine	6.05E-01	6.05E-01	1.00E+00	1.00E+00
Naphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pentachlorophenol	1.40E-02	1.40E-02	1.00E+00	1.00E+00
Phenanthrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Phenol	5.10E+00	5.10E+00	1.00E+00	1.00E+00
Pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pesticides/ PCBs				
4,4'-DDD	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDE	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Aldrin	6.90E-01	6.90E-01	3.30E+00	3.30E+00
Alpha-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Aroclor-1232	5.30E-01	5.30E-01	1.59E+01	6.67E+00
Aroclor-1242	1.60E-01	1.60E-01	1.59E+01	6.67E+00
Aroclor-1248	1.60E-02	1.60E-02	1.59E+01	6.67E+00
Aroclor-1254	1.30E-02	1.30E-02	1.59E+01	6.67E+00
Aroclor-1260	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Aroclor-1268	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Dieldrin	8.20E-02	8.20E-02	6.64E+00	6.64E+00
Gamma-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Heptachlor	1.20E-01	1.20E-01	1.00E+01	1.00E+01
Endosulfan I	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan II	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan Sulfate	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endrin	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Aldehyde	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Ketone	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Heptachlor Epoxide	2.80E-02	2.80E-02	3.00E+00	3.00E+00
Methoxychlor	1.10E-01	1.10E-01	1.00E+00	1.00E+00
alpha-BHC	2.10E-01	2.10E-01	5.00E+00	5.00E+00

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
beta-BHC	1.80E-01	1.80E-01	5.00E+00	5.00E+00
delta-BHC	9.00E-01	9.00E-01	5.00E+00	5.00E+00
gamma-BHC (Lindane)	2.70E-01	2.70E-01	5.00E+00	5.00E+00
Toxaphene	6.20E-02	6.20E-02	1.00E+00	1.00E+00
Total Aroclor	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Total DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Explosives				
2,4,6-Trinitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
2-Nitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
1,3,5-Trinitrobenzene	7.70E+00	7.70E+00	1.00E+00	1.00E+00
4-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
RDX	4.60E-01	4.60E-01	1.00E+00	1.00E+00
4-Amino-2,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
HMX	1.70E+01	1.70E+01	1.00E+00	1.00E+00
Nitrobenzene (exp)	3.40E+00	3.40E+00	1.00E+00	1.00E+00
1,3 Dinitrobenzene	4.50E+00	4.50E+00	1.00E+00	1.00E+00
2-Amino-4,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
Tetryl	???	???	1.00E+00	1.00E+00
3-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
2,4-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
2,6-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
Dioxins				
1,2,3,4,6,7,8-HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,6,7,8-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8,9-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HxCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8-PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
1,2,3,7,8-Pecdf	4.40E-03	4.40E-03	2.22E+01	1.10E+01
2,3,4,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
2,3,4,7,8-PECDF	3.70E-03	3.70E-03	2.22E+01	1.10E+01
2,3,7,8-TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ HALFND	4.30E-03	4.30E-03	2.22E+01	1.10E+01
2,3,7,8-TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDD	???	???	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDF	???	???	2.22E+01	1.10E+01
TOTAL HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
Total HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total PECDF	4.40E-03	4.40E-03	2.22E+01	1.10E+01
Total TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
Total TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
Inorganics				
Aluminum	5.00E-03	2.87E-03	1.18E-01	4.30E-02
Antimony	1.14E-02	1.02E-02	1.00E+00	1.00E+00
Arsenic	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Barium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Beryllium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cadmium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cobalt	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Copper	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexavalent Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cyanide	1.80E+00	1.00E+00	1.00E+00	1.00E+00
Iron	1.00E-02	4.25E-03	7.80E-02	3.60E-02
Lead	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Manganese	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Mercury	5.00E+00	6.52E-01	ORNL Reg.	ORNL Reg.
Nickel	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Selenium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Silver	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Thallium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Tin	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Vanadium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Zinc	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL

Notes:
BAF - Bioaccumulation Factor
BSAF - Biota Sediment Accumulation Factor
1 - ORNL (2001) for organics; only one value is available for conservative and average exposures
2 - Sample et al., (1997) for inorganics; conservative value is 90th percentile; average value is median v
3 - ORNL (September, 1998) for all chemicals; conservative value is 90th percentile; average value is m
4 - U.S. EPA, September 1997; only one value is available for conservative and average exposures. Va
5 - Conservative and average refers to the exposure scenarios for which the uptake factors are used
6 - Where "Eco-SSL" is given, values were calculated using equations from USEPA (2005), Attachment
Tables 4a (for inorganics) and 4b (for organics).

Default value of 1 is assigned to parameters without uptake factors

TABLE X-X

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

Species/Exposure Inputs	Conservative Inputs		Average Inputs	
	Values	Units	Values	Units
Bobwhite Quail				
Body Weight = BW	1.540E-01	kg	1.751E-01	kg
Food Ingestion Rate = If	2.442E-03	kg/day	2.042E-03	kg/day
Water Ingestion Rate = Iw	2.276E-02	L/day	1.926E-02	L/day
Soil Ingestion Rate = Is	3.395E-04	kg/day	1.246E-04	kg/day
Home Range = HR	Assume 100% on site		1.880E+01	acres
Meadow Vole				
Body Weight = BW	1.700E-02	kg	3.580E-02	kg
Food Ingestion Rate = If	1.878E-03	kg/day	1.744E-03	kg/day
Water Ingestion Rate = Iw	7.513E-03	L/day	6.261E-03	L/day
Soil Ingestion Rate = Is	6.010E-05	kg/day	2.093E-05	kg/day
Home Range = HR	Assume 100% on site		6.590E-02	acres
American Robin				
Body Weight = BW	7.73E-02	kg	8.04E-02	kg
Food Ingestion Rate = If	1.25E-02	kg/day	1.19E-02	kg/day
Water Ingestion Rate = Iw	1.21E-02	L/day	1.13E-02	L/day
Soil Ingestion Rate - Is	2.046E-03	kg/day	7.601E-04	kg/day
Home Range = HR	Assume 100% on site		6.095E-01	acres
Short-Tailed Shrew				
Body Weight = BW	1.500E-02	kg	1.610E-02	kg
Food Ingestion Rate = If	1.600E-03	kg/day	1.433E-03	kg/day
Water Ingestion Rate = Iw	4.280E-03	L/day	3.600E-03	L/day
Soil Ingestion Rate - Is	4.801E-05	kg/day	1.289E-05	kg/day
Home Range = HR	Assume 100% on site		9.699E-01	acres
Mink				
Body Weight = BW	5.500E-01	kg	1.103E+00	kg
Food Ingestion Rate = If	6.067E-02	kg/day	4.504E-02	kg/day
Water Ingestion Rate = Iw	1.213E-01	L/day	7.308E-02	L/day
Sediment Ingestion Rate = Is	5.703E-03	kg/day	4.234E-03	kg/day
Home Range = HR	Assume 100% on site		1.558E+03	acres
Green Heron				
Body Weight = BW	2.00E-01	kg	2.12E-01	kg
Food Ingestion Rate = If	3.10E-02	kg/day	3.00E-02	kg/day
Water Ingestion Rate = Iw	2.20E-02	L/day	2.10E-02	L/day
Sediment Ingestion Rate = Is	1.600E-03	kg/day	1.500E-03	kg/day
Home Range = HR	Assume 100% on site		1.000E+01	km-radius

Notes:
The exposure factors were derived as presented in Appendix I.

The soil/sediment ingestion rates were calculated by multiplying the food ingestion rates by the following incidental soil/sediment ingestion rates:

	Conservative	Average	Source
Bobwhite quail	13.90%	6.10%	1, 2
Meadow Vole	3.20%	1.20%	1
American Robin	16.40%	6.40%	1,4
Short-tailed Shrew	3%	0.90%	1
Mink	9.4%	9.4%	3, 5
Green Heron	5%	5%	6

1 - USEPA (U.S. Environmental Protection Agency), 2005. Ecological Soil Screening Level Guidance, Office of Emergency and Remedial Response. February.
2 - Based on the mourning dove.
3 - Beyer, N., E. Connor, and S. Gerould. 1994. Estimates of Soil Ingestion by Wildlife. Journal of Wildlife Management 58(2) pp. 375-382.
4 - Based on the American woodcock
5 - Based on the raccoon
6 - Based on piscivorous birds

APPENDIX F

MEADOW VOLE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	6.00E+00	0.00E+00	2.12E-01	2.12E-02	0.00E+00	2.34E-02	4.46E-02	5.90E-02	2.76E+00	7.56E-01	1.62E-02
ARSENIC	8.70E+00	0.00E+00	3.26E-01	3.08E-02	0.00E+00	3.61E-02	6.68E-02	1.04E+00	4.55E+00	6.43E-02	1.47E-02
COPPER	4.20E+01	0.00E+00	8.50E+00	1.48E-01	0.00E+00	9.40E-01	1.09E+00	5.60E+00	8.27E+01	1.94E-01	1.32E-02
LEAD	7.06E+02	0.00E+00	1.05E+01	2.50E+00	0.00E+00	1.16E+00	3.66E+00	4.70E+00	1.86E+02	7.78E-01	1.96E-02
ZINC	3.32E+01	0.00E+00	3.36E+01	1.17E-01	0.00E+00	3.72E+00	3.83E+00	7.54E+01	2.98E+02	5.08E-02	1.29E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.70E-02	kg
Food Ingestion Rate = (If)	1.88E-03	kg/day
Water Ingestion Rate = (Iw)	7.51E-03	L/day
Soil Ingestion Rate = (Is)	6.01E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

MEADOW VOLE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.25E+00	0.00E+00	4.86E-02	7.30E-04	0.00E+00	2.37E-03	3.10E-03	5.90E-02	2.76E+00	5.25E-02	1.12E-03
ARSENIC	5.40E+00	0.00E+00	2.02E-01	3.15E-03	0.00E+00	9.86E-03	1.30E-02	1.04E+00	4.55E+00	1.25E-02	2.86E-03
COPPER	1.72E+01	0.00E+00	5.98E+00	1.01E-02	0.00E+00	2.91E-01	3.01E-01	5.60E+00	8.27E+01	5.38E-02	3.65E-03
LEAD	2.63E+02	0.00E+00	6.03E+00	1.54E-01	0.00E+00	2.94E-01	4.47E-01	4.70E+00	1.86E+02	9.52E-02	2.40E-03
ZINC	1.91E+01	0.00E+00	2.48E+01	1.12E-02	0.00E+00	1.21E+00	1.22E+00	7.54E+01	2.98E+02	1.61E-02	4.09E-03

Body Weight = (BW)	3.58E-02	kg
Food Ingestion Rate = (If)	1.74E-03	kg/day
Water Ingestion Rate = (Iw)	6.26E-03	L/day
Soil Ingestion Rate = (Is)	2.09E-05	kg/day
Home Range = (HR)	6.59E-02	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	6.00E+00	0.00E+00	2.12E-01	1.32E-02	0.00E+00	3.36E-03	1.66E-02	NV	NV	#VALUE!	#VALUE!
ARSENIC	8.70E+00	0.00E+00	3.26E-01	1.92E-02	0.00E+00	5.18E-03	2.44E-02	2.24E+00	4.51E+00	1.1E-02	5.4E-03
COPPER	4.20E+01	0.00E+00	8.50E+00	9.26E-02	0.00E+00	1.35E-01	2.27E-01	4.05E+00	3.49E+01	5.6E-02	6.5E-03
LEAD	7.06E+02	0.00E+00	1.05E+01	1.56E+00	0.00E+00	1.67E-01	1.72E+00	1.63E+00	4.46E+01	1.1E+00	3.9E-02
ZINC	3.32E+01	0.00E+00	3.36E+01	7.32E-02	0.00E+00	5.33E-01	6.07E-01	6.61E+01	1.71E+02	9.2E-03	3.5E-03

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.54E-01	kg
Food Ingestion Rate = (If)	2.44E-03	kg/day
Water Ingestion Rate = (Iw)	2.28E-02	L/day
Soil Ingestion Rate = (Is)	3.40E-04	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.25E+00	0.00E+00	4.86E-02	8.88E-04	0.00E+00	5.66E-04	1.45E-03	NV	NV	#VALUE!	#VALUE!
ARSENIC	5.40E+00	0.00E+00	2.02E-01	3.84E-03	0.00E+00	2.36E-03	6.20E-03	2.24E+00	4.51E+00	2.8E-03	1.4E-03
COPPER	1.72E+01	0.00E+00	5.98E+00	1.22E-02	0.00E+00	6.98E-02	8.20E-02	4.05E+00	3.49E+01	2.0E-02	2.4E-03
LEAD	2.63E+02	0.00E+00	6.03E+00	1.87E-01	0.00E+00	7.03E-02	2.57E-01	1.63E+00	4.46E+01	1.6E-01	5.8E-03
ZINC	1.91E+01	0.00E+00	2.48E+01	1.36E-02	0.00E+00	2.89E-01	3.02E-01	6.61E+01	1.71E+02	4.6E-03	1.8E-03

Body Weight = (BW)	1.75E-01	kg
Food Ingestion Rate = (If)	2.04E-03	kg/day
Water Ingestion Rate = (Iw)	1.93E-02	L/day
Soil Ingestion Rate = (Is)	1.25E-04	kg/day
Home Range = (HR)	1.88E+01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	6.00E+00	0.00E+00	6.00E+00	1.92E-02	0.00E+00	6.40E-01	6.59E-01	5.90E-02	2.76E+00	1.1E+01	2.4E-01
ARSENIC	8.70E+00	0.00E+00	1.11E+00	2.78E-02	0.00E+00	1.19E-01	1.47E-01	1.04E+00	4.55E+00	1.4E-01	3.2E-02
COPPER	4.20E+01	0.00E+00	2.16E+01	1.34E-01	0.00E+00	2.31E+00	2.44E+00	5.60E+00	8.27E+01	4.4E-01	3.0E-02
LEAD	7.06E+02	0.00E+00	1.60E+02	2.26E+00	0.00E+00	1.71E+01	1.93E+01	4.70E+00	1.86E+02	4.1E+00	1.0E-01
ZINC	3.32E+01	0.00E+00	2.70E+02	1.06E-01	0.00E+00	2.88E+01	2.89E+01	7.54E+01	2.98E+02	3.8E-01	9.7E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.50E-02	kg
Food Ingestion Rate = (If)	1.60E-03	kg/day
Water Ingestion Rate = (Iw)	4.28E-03	L/day
Soil Ingestion Rate = (Is)	4.80E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.25E+00	0.00E+00	1.25E+00	1.00E-03	0.00E+00	1.11E-01	1.12E-01	5.90E-02	2.76E+00	1.9E+00	4.1E-02
ARSENIC	5.40E+00	0.00E+00	7.94E-01	4.32E-03	0.00E+00	7.06E-02	7.50E-02	1.04E+00	4.55E+00	7.2E-02	1.6E-02
COPPER	1.72E+01	0.00E+00	8.85E+00	1.38E-02	0.00E+00	7.88E-01	8.02E-01	5.60E+00	8.27E+01	1.4E-01	9.7E-03
LEAD	2.63E+02	0.00E+00	7.21E+01	2.10E-01	0.00E+00	6.41E+00	6.62E+00	4.70E+00	1.86E+02	1.4E+00	3.6E-02
ZINC	1.91E+01	0.00E+00	2.25E+02	1.53E-02	0.00E+00	2.00E+01	2.00E+01	7.54E+01	2.98E+02	2.7E-01	6.7E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.61E-02	kg
Food Ingestion Rate = (If)	1.43E-03	kg/day
Water Ingestion Rate = (Iw)	3.60E-03	L/day
Soil Ingestion Rate = (Is)	1.29E-05	kg/day
Home Range = (HR)	9.70E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	6.00E+00	0.00E+00	6.00E+00	1.59E-01	0.00E+00	9.68E-01	1.13E+00	NV	NV	#VALUE!	#VALUE!
ARSENIC	8.70E+00	0.00E+00	1.11E+00	2.30E-01	0.00E+00	1.79E-01	4.10E-01	2.24E+00	4.51E+00	1.8E-01	9.1E-02
COPPER	4.20E+01	0.00E+00	2.16E+01	1.11E+00	0.00E+00	3.49E+00	4.60E+00	4.05E+00	3.49E+01	1.1E+00	1.3E-01
LEAD	7.06E+02	0.00E+00	1.60E+02	1.87E+01	0.00E+00	2.58E+01	4.45E+01	1.63E+00	4.46E+01	2.7E+01	1.0E+00
ZINC	3.32E+01	0.00E+00	2.70E+02	8.79E-01	0.00E+00	4.35E+01	4.44E+01	6.61E+01	1.71E+02	6.7E-01	2.6E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	7.73E-02	kg
Food Ingestion Rate = (If)	1.25E-02	kg/day
Water Ingestion Rate = (Iw)	1.21E-02	L/day
Soil Ingestion Rate = (Is)	2.05E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.25E+00	0.00E+00	1.25E+00	1.18E-02	0.00E+00	1.84E-01	1.96E-01	NV	NV	#VALUE!	#VALUE!
ARSENIC	5.40E+00	0.00E+00	7.94E-01	5.10E-02	0.00E+00	1.17E-01	1.68E-01	2.24E+00	4.51E+00	7.5E-02	3.7E-02
COPPER	1.72E+01	0.00E+00	8.85E+00	1.63E-01	0.00E+00	1.31E+00	1.47E+00	4.05E+00	3.49E+01	3.6E-01	4.2E-02
LEAD	2.63E+02	0.00E+00	7.21E+01	2.48E+00	0.00E+00	1.06E+01	1.31E+01	1.63E+00	4.46E+01	8.1E+00	2.9E-01
ZINC	1.91E+01	0.00E+00	2.25E+02	1.81E-01	0.00E+00	3.32E+01	3.34E+01	6.61E+01	1.71E+02	5.1E-01	1.9E-01

Body Weight = (BW)	8.04E-02	kg
Food Ingestion Rate = (If)	1.19E-02	kg/day
Water Ingestion Rate = (Iw)	1.13E-02	L/day
Soil Ingestion Rate = (Is)	7.60E-04	kg/day
Home Range = (HR)	6.10E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

TABLE 6-6.3.3

TERRESTRIAL FOOD CHAIN MODEL - CONSERVATIVE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - SURFACE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	7.6E-01	1.6E-02	#VALUE!	#VALUE!	1.1E+01	2.4E-01
ARSENIC	1.1E-02	5.4E-03	6.4E-02	1.5E-02	1.8E-01	9.1E-02	1.4E-01	3.2E-02
COPPER	5.6E-02	6.5E-03	1.9E-01	1.3E-02	1.1E+00	1.3E-01	4.4E-01	3.0E-02
LEAD	1.1E+00	3.9E-02	7.8E-01	2.0E-02	2.7E+01	1.0E+00	4.1E+00	1.0E-01
ZINC	9.2E-03	3.5E-03	5.1E-02	1.3E-02	6.7E-01	2.6E-01	3.8E-01	9.7E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

TABLE 6-6.3.5

TERRESTRIAL FOOD CHAIN MODEL - AVERAGE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - SURFACE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	5.2E-02	1.1E-03	#VALUE!	#VALUE!	1.9E+00	4.1E-02
ARSENIC	2.8E-03	1.4E-03	1.3E-02	2.9E-03	7.5E-02	3.7E-02	7.2E-02	1.6E-02
COPPER	2.0E-02	2.4E-03	5.4E-02	3.6E-03	3.6E-01	4.2E-02	1.4E-01	9.7E-03
LEAD	1.6E-01	5.8E-03	9.5E-02	2.4E-03	8.1E+00	2.9E-01	1.4E+00	3.6E-02
ZINC	4.6E-03	1.8E-03	1.6E-02	4.1E-03	5.1E-01	1.9E-01	2.7E-01	6.7E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

APPENDIX F

CHEMICAL CONCENTRATIONS IN SURFACE SOIL AND TISSUE - COMPOSITE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Surface Soil Concentrations (mg/kg)				Surface Water Concentrations (mg/L)		Earthworm Bioaccumulation Factors		Earthworm Concentrations (mg/kg)		Plant Bioaccumulation Factors		Plant Concentrations (mg/kg)	
	Maximum Detection	Average All	Average of Positive Detections	Average [1]	Maximum Detection	Average Concentration[1]	Conservative	Average	Maximum Detection	Average	Conservative	Average	Maximum Detection	Average
Semivolatile Organics														
2-METHYLNAPHTHALENE	3.50E-03	7.50E-03	3.50E-03	3.50E-03	0.00E+00	0.00E+00	3.04E+00	3.04E+00	1.06E-02	1.06E-02	Regression from Eco SSL		2.04E-02	2.04E-02
ANTHRACENE	5.60E-03	4.85E-03	4.85E-03	4.85E-03	0.00E+00	0.00E+00	2.42E+00	2.42E+00	1.36E-02	1.17E-02	Regression from Eco SSL		6.57E-03	5.88E-03
BENZO(A)ANTHRACENE	9.40E-02	8.60E-02	8.60E-02	8.60E-02	0.00E+00	0.00E+00	1.59E+00	1.59E+00	1.49E-01	1.37E-01	Regression from Eco SSL		1.64E-02	1.55E-02
BENZO(A)PYRENE	1.00E-01	9.55E-02	9.55E-02	9.55E-02	0.00E+00	0.00E+00	1.33E+00	1.33E+00	1.33E-01	1.27E-01	Regression from Eco SSL		1.35E-02	1.29E-02
BENZO(B)FLUORANTHENE	3.80E-02	3.55E-02	3.55E-02	3.55E-02	0.00E+00	0.00E+00	2.60E+00	2.60E+00	9.88E-02	9.23E-02	3.10E-01	3.10E-01	1.18E-02	1.10E-02
BENZO(G,H,I)PERYLENE	5.00E-02	4.55E-02	4.55E-02	4.55E-02	0.00E+00	0.00E+00	2.94E+00	2.94E+00	1.47E-01	1.34E-01	Regression from Eco SSL		1.14E-02	1.02E-02
BENZO(K)FLUORANTHENE	7.70E-03	6.75E-03	6.75E-03	6.75E-03	0.00E+00	0.00E+00	2.60E+00	2.60E+00	2.00E-02	1.76E-02	Regression from Eco SSL		1.76E-03	1.57E-03
CHRYSENE	1.30E-01	1.14E-01	1.14E-01	1.14E-01	0.00E+00	0.00E+00	2.29E+00	2.29E+00	2.98E-01	2.60E-01	Regression from Eco SSL		1.98E-02	1.83E-02
DIBENZO(A,H)ANTHRACENE	1.80E-02	1.50E-02	1.50E-02	1.50E-02	0.00E+00	0.00E+00	2.31E+00	2.31E+00	4.16E-02	3.47E-02	1.30E-01	1.30E-01	2.34E-03	1.95E-03
FLUORANTHENE	1.30E-02	1.14E-02	1.14E-02	1.14E-02	0.00E+00	0.00E+00	3.04E+00	3.04E+00	3.95E-02	3.47E-02	5.00E-01	5.00E-01	6.50E-03	5.70E-03
INDENO(1,2,3-CD)PYRENE	1.00E-02	9.55E-03	9.55E-03	9.55E-03	0.00E+00	0.00E+00	2.86E+00	2.86E+00	2.86E-02	2.73E-02	1.10E-01	1.10E-01	1.10E-03	1.05E-03
PHENANTHRENE	2.40E-02	2.25E-02	2.25E-02	2.25E-02	0.00E+00	0.00E+00	1.72E+00	1.72E+00	4.13E-02	3.87E-02	Regression from Eco SSL		8.37E-02	8.05E-02
PYRENE	1.10E-01	1.01E-01	1.01E-01	1.01E-01	0.00E+00	0.00E+00	1.75E+00	1.75E+00	1.93E-01	1.77E-01	7.20E-01	7.20E-01	7.92E-02	7.27E-02
Inorganics														
ANTIMONY	4.20E-01	2.80E-01	2.80E-01	2.80E-01	0.00E+00	0.00E+00	1.00E+00	1.00E+00	4.20E-01	2.80E-01	1.14E-02	1.02E-02	1.75E-02	1.19E-02
ARSENIC	4.20E+00	3.60E+00	3.60E+00	3.60E+00	0.00E+00	0.00E+00	Regression from Eco SSL		6.65E-01	5.97E-01	Regression from Eco SSL		1.58E-01	1.35E-01
COPPER	9.60E+00	7.20E+00	7.20E+00	7.20E+00	0.00E+00	0.00E+00	5.15E-01	5.15E-01	4.94E+00	3.71E+00	Regression from Eco SSL		4.75E+00	4.25E+00
LEAD	4.87E+01	2.89E+01	2.89E+01	2.89E+01	0.00E+00	0.00E+00	Regression from Eco SSL		1.85E+01	1.21E+01	Regression from Eco SSL		2.34E+00	1.75E+00
ZINC	2.90E+01	2.39E+01	2.39E+01	2.39E+01	0.00E+00	0.00E+00	Regression from Eco SSL		2.58E+02	2.42E+02	Regression from Eco SSL		3.12E+01	2.80E+01

1 - If the average of all value is the greater than the maximum detection, the average of the positive detections was used as the average value.

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
VOLATILES				
1,1,1-Trichloroethane	1000	1000	NV	NV
1,1,2,2-Tetrachloroethane	76	108	NV	NV
1,1,2-Trichloroethane	0.39	4.4	NV	NV
1,1-Dichloroethane	475	4750	NV	NV
1,1-Dichloroethene	30	300	NV	NV
1,2,4-Trichlorobenzene	1.48	14.8	NV	NV
1,2-Dichlorobenzene	120	1200	NV	NV
1,2-Dichloroethane	50	500	17.2	34.4
1,2-Dichloroethene (total)	45.2	452	NV	NV
1,4-Dichlorobenzene	30	300	NV	NV
2-Butanone	1771	4571	NV	NV
2-Hexanone	NV	NV	NV	NV
4-Methyl-2-pentanone	NV	NV	NV	NV
Acetone	10	50	20089	200890
Benzene	26.36	263.6	NV	NV
Bromodichloromethane	1.79	17.9	NV	NV
Carbon Disulfide	12.6	25.6	NV	NV
Carbon Tetrachloride	16	160	NV	NV
Chlorobenzene	2.725	5.45	NV	NV
Chloroform	15	41	NV	NV
Chloromethane	NV	NV	NV	NV
cis-1,2-Dichloroethene	45.2	452	NV	NV
Dichlorodifluoromethane	2310	23100	NV	NV
Ethylbenzene	9.71	29.1	NV	NV
Isopropylbenzene	11	33.1	NV	NV
m,p-Xylene	2.06	2.58	107	1070
Methyl acetate	NV	NV	NV	NV
o-Xylene	2.06	2.58	107	1070
Methylene Chloride	5.85	50	NV	NV
Styrene	20	40	NV	NV
Tetrachloroethene	1.4	7	NV	NV
Toluene	26	260	NV	NV
Trichloroethene	0.7	7	NV	NV
Trichlorofluoromethane	34.9	349	NV	NV
Vinyl chloride	17	1.7	NV	NV
Xylenes, Total	2.06	2.58	107	1070
SEMIVOLATILES				
1,1'-Biphenyl	5	25	NV	NV
2,2'-Oxybis(1-chloropropane)	NV	NV	NV	NV
2,3,4,6-Tetrachlorophenol	2.5	10	NV	NV
2,4,5-Trichlorophenol	10	30	NV	NV
2,4,6-Trichlorophenol	0.42	4.2	NV	NV
2,4-Dimethylphenol	5	25	NV	NV
1-Methylnaphthalene	65.6	356	2	20
2-Methylnaphthalene	65.6	356	2	20
2-Methylphenol	5	15	NV	NV
3-Nitroaniline	NV	NV	NV	NV
4-Chloroaniline	1.25	12.5	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
4-Chloro-3-methylphenol	NV	NV	NV	NV
4-Methylphenol	NV	NV	NV	NV
4-Nitroaniline	NV	NV	NV	NV
4-Nitrophenol	NV	NV	NV	NV
7,12-Dimethylbenz(a)anthracene	NV	NV	2	20
Acenaphthene	65.6	356	2	20
Acenaphthylene	65.6	356	2	20
Anthracene	65.6	356	2	20
Benzaldehyde	20	40	NV	NV
Benzo(a)anthracene	0.615	38.4	2	20
Benzo(a)pyrene	0.615	38.4	2	20

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Benzo(b)fluoranthene	0.615	38.4	2	20
Benzo(g,h,i)perylene	0.615	38.4	2	20
Benzo(k)fluoranthene	0.615	38.4	2	20
Bis(2-Ethylhexyl)phthalate	18.3	183	1.11	11.1
Butyl benzyl phthalate	15.9	47	NV	NV
Caprolactam	50	500	NV	NV
Carbazole	1	10	2	20
Chrysene	0.615	38.4	2	20
Dibenzo(a,h)anthracene	0.615	38.4	2	20
Dibenzofuran	NV	NV	2	20
1,4-Dichlorobenzene	30	300	NV	NV
Diethylphthalate	4583	45830	NV	NV
Di-n-butyl phthalate	550	1833	0.111	1.11
Di-n-octyl phthalate	NV	NV	NV	NV
Fluoranthene	65.6	356	2	20
Fluorene	65.6	356	2	20
Hexachloroethane	0.1	1.5	NV	NV
Indeno(1,2,3-cd)pyrene	0.615	38.4	2	20
Isophorone	15	179	NV	NV
Naphthalene	65.6	356	2	20
n-Nitrosodiphenylamine	NV	NV	NV	NV
Pentachlorophenol	8.42	22.65	6.73	52.01
Phenanthrene	65.6	356	2	20
Phenol	6	12	NV	NV
Pyrene	0.615	38.4	2	20
Perylene	0.615	38.4	2	20
HERBICIDES				
Dinoseb	0.1	1	NV	NV
2,4-D	1	5	NV	NV
2,4,5-T	3	10	NV	NV
PESTICIDES/PCBs				
2,4'-DDD	0.147	5.56	0.227	2.7
2,4'-DDE	0.147	5.56	0.227	2.7
2,4'-DDT	0.147	5.56	0.227	2.7
4,4'-DDD	0.147	5.56	0.227	2.7
4,4'-DDE	0.147	5.56	0.227	2.7
4,4'-DDT	0.147	5.56	0.227	2.7
Aldrin	0.2	1	NV	NV
Alpha-BHC	0.014	0.14	0.56	2.25
Alpha-Chlordane	4.58	9.16	2.14	10.7
Aroclor-1232	0.068	0.68	0.18	1.8
Aroclor-1242	0.069	0.69	0.41	4.1
Aroclor-1248	0.01	0.1	NV	NV
Aroclor-1254	0.068	0.68	0.18	1.8
Aroclor-1260	0.068	0.68	0.18	1.8
Aroclor-1268	0.068	0.68	0.18	1.8
PCB-28	0.068	0.68	0.18	1.8
PCB-44	0.068	0.68	0.18	1.8
PCB-52	0.068	0.68	0.18	1.8

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
PCB-66	0.068	0.68	0.18	1.8
PCB-101	0.068	0.68	0.18	1.8
PCB-105	0.068	0.68	0.18	1.8
PCB-118	0.068	0.68	0.18	1.8
PCB-128	0.068	0.68	0.18	1.8
PCB-138	0.068	0.68	0.18	1.8
PCB-153	0.068	0.68	0.18	1.8
PCB-170	0.068	0.68	0.18	1.8
PCB-180	0.068	0.68	0.18	1.8
PCB-187	0.068	0.68	0.18	1.8
PCB-195	0.068	0.68	0.18	1.8
PCB-206	0.068	0.68	0.18	1.8
PCB-209	0.068	0.68	0.18	1.8
beta-BHC	0.4	2	0.56	2.25
delta-BHC	0.014	0.14	0.56	2.25
Dieldrin	0.015	1.27	0.0709	0.8
Endosulfan I	0.15	1.5	10	100
Endosulfan II	0.15	1.5	10	100
Endosulfan Sulfate	0.15	1.5	10	100
Endrin	0.092	0.92	0.01035	0.1035
Endrin Aldehyde	0.092	0.92	0.01	0.1
Endrin Ketone	0.092	0.92	0.01	0.1
Gamma-BHC (Lindane)	8	80	2	20
Gamma-Chlordane	4.58	9.16	2.14	10.7
Heptachlor	0.1	1	NV	NV
Heptachlor Epoxide	0.1	1	NV	NV
Methoxychlor	4	8	NV	NV
Toxaphene	8	80	NV	NV
Total Aroclor	0.068	0.68	0.18	1.8
Total DDT	0.147	5.56	0.227	2.7
DIOXINS AND FURANS (mg/kg)				
1,2,3,4,6,7,8-HpCDD	0.0001	0.001	0.014	0.14
1,2,3,4,6,7,8-HpCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8,9-HPCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8-HXCDD	0.00001	0.0001	0.00028	0.0028
1,2,3,4,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,6,7,8-HxCDD	0.00001	0.0001	0.0014	0.014
1,2,3,6,7,8-HxCDF	0.00016	0.0016	0.00014	0.0014
1,2,3,7,8,9-HxCDD	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8,9-HxCDF	0.00001	0.0001	0.00014	0.0014
2,3,4,6,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8-PECDD	0.000001	0.00001	0.000014	0.00014
1,2,3,7,8-PECDF	0.00016	0.0016	0.00014	0.0014
2,3,4,7,8-PECDF	0.000016	0.00016	0.000014	0.00014
2,3,7,8-TCDD	0.000001	0.00001	0.000014	0.00014
2,3,7,8-TCDF	0.00001	0.0001	0.000014	0.00014
OCDD	0.01	0.1	0.14	1.4
OCDF	0.01	0.1	0.14	1.4
TOTAL HpCDD	0.0001	0.001	0.014	0.14

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
TOTAL HxCDD	0.00001	0.0001	0.00014	0.0014
TOTAL PeCDD	0.000001	0.00001	0.000014	0.00014
Total HpCDF	0.0001	0.001	0.0014	0.014
Total HxCDF	0.00001	0.0001	0.00014	0.0014
Total PeCDF	0.000002	0.00002	0.000014	0.00014
Total TCDD	0.000001	0.00001	0.000014	0.00014
Total TCDF	0.00001	0.0001	0.000014	0.00014
EXPLOSIVES (mg/kg)				
1,3 Dinitrobenzene	0.4	1.07	NV	NV
1,3,5-Trinitrobenzene	2.68	13.31	NV	NV
2,4-Dinitrotoluene	0.67	1.4	0.1	0.5
2,6-Dinitrotoluene	0.7	7	NV	NV
2,4,6-Trinitrotoluene	1.6	16	0.7	17.8
2-Amino-4,6-dinitrotoluene	NV	NV	NV	NV
2-Nitrotoluene	20	200	NV	NV
3-Nitrotoluene	20	200	NV	NV
4-Amino-2,6-dinitrotoluene	NV	NV	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal NOAEL	Mammal LOAEL	Bird NOAEL	Bird LOAEL
4-Nitrotoluene	20	200	NV	NV
Ammonia	NV	NV	NV	NV
HMX	3	7.5	NV	NV
Nitrobenzene (exp)	NV	NV	NV	NV
Nitroglycerin	3	32	NV	NV
RDX	7	35	NV	NV
Tetryl	1.3	6.2	NV	NV
INORGANICS				
Aluminum	1.93	19.3	109.7	1097
Antimony	0.059	2.76	NV	NV
Arsenic	1.04	4.55	2.24	4.51
Barium	51.8	82.7	20.8	41.7
Beryllium	0.532	0.673	NV	NV
Cadmium	0.77	6.9	1.47	6.35
Chromium	2.40	58.17	2.66	15.63
Hexavalent Chromium	5.66	38.37	NV	NV
Cobalt	7.33	18.90	7.61	18.34
Copper	5.6	82.7	4.05	34.87
Cyanide	68.7	687	NV	NV
Iron	50	500	100	1000
Lead	4.7	186.4	1.63	44.63
Manganese	51.5	145.67	179	376.6
Mercury	0.032	0.16	0.0064	0.064
Nickel	1.70	14.77	6.71	18.57
Selenium	0.143	0.661	0.29	0.819

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
Volatile Organics				
1,1,1-Trichloroethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
2-Butanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Methyl-2-pentanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Acetone	5.20E+00	5.20E+00	1.00E+00	1.00E+00
Carbon Disulfide	2.00E+00	2.00E+00	1.00E+00	1.00E+00
Chlorobenzene	9.00E-01	9.00E-01	1.00E+00	1.00E+00
Ethylbenzene	6.10E-01	6.10E-01	1.00E+00	1.00E+00
Isopropylbenzene	1.00E+00	1.00E+00	1.00E+00	1.00E+00
M,p-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Methyl Acetate	2.99E+01	2.99E+01	1.00E+00	1.00E+00
Methylene Chloride	6.70E+00	6.70E+00	1.00E+00	1.00E+00
O-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Tetrachloroethene	1.20E+00	1.20E+00	1.00E+00	1.00E+00
Toluene	1.03E+00	1.03E+00	1.00E+00	1.00E+00
Total Xylenes	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Trichloroethene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
Trichlorofluoromethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
Semivolatile Organics				
1,1'-Biphenyl	1.59E-01	1.59E-01	1.00E+00	1.00E+00
1,2-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
1,4-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
2,2'-Oxybis(1-Chloropropane)	???	???	1.00E+00	1.00E+00
2,3,4,6-Tetrachlorophenol	1.59E-01	1.59E-01	1.00E+00	1.00E+00
2,4-D	???	???		
2-Methylnaphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
2-Methylphenol	???	???	1.00E+00	1.00E+00
3-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Chloro-3-Methylphenol	???	???	1.00E+00	1.00E+00
4-Chloroaniline	9.03E-01	9.03E-01	1.00E+00	1.00E+00
4-Methylphenol	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitrophenol	3.00E+00	3.00E+00	1.00E+00	1.00E+00
2,4,5-Trichlorophenol	2.40E-01	2.40E-01	1.00E+00	1.00E+00
2,4,6-Trichlorophenol	2.70E-01	2.70E-01	1.00E+00	1.00E+00
2,4,5-T	???	???	???	???
Acenaphthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Acenaphthylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzaldehyde	1.76E+00	1.76E+00	1.00E+00	1.00E+00
Benzo(a)anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(a)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(b)fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(g,h,i)perylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(k)Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Bis(2-ethylhexyl)phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Butyl benzyl Phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Caprolactam	4.90E+01	4.90E+01	1.00E+00	1.00E+00
Carbazole	2.40E-01	2.40E-01	Eco-SSL	Eco-SSL
Chrysene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzo(a,h)Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzofuran	1.50E-01	1.50E-01	Eco-SSL	Eco-SSL
Diethylphthalate	1.30E+00	1.30E+00	1.00E+00	1.00E+00
Di-n-butyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Di-n-octyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Dinoseb	???	???	???	???
Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Fluorene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexachloroethane	2.10E-01	2.10E-01	1.00E+00	1.00E+00
Indeno(1,2,3-cd)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Isophorone	3.92E+00	3.92E+00	1.00E+00	1.00E+00
N-Nitrosodiphenylamine	6.05E-01	6.05E-01	1.00E+00	1.00E+00
Naphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pentachlorophenol	1.40E-02	1.40E-02	1.00E+00	1.00E+00
Phenanthrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Phenol	5.10E+00	5.10E+00	1.00E+00	1.00E+00
Pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pesticides/ PCBs				
4,4'-DDD	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDE	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Aldrin	6.90E-01	6.90E-01	3.30E+00	3.30E+00
Alpha-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Aroclor-1232	5.30E-01	5.30E-01	1.59E+01	6.67E+00
Aroclor-1242	1.60E-01	1.60E-01	1.59E+01	6.67E+00
Aroclor-1248	1.60E-02	1.60E-02	1.59E+01	6.67E+00
Aroclor-1254	1.30E-02	1.30E-02	1.59E+01	6.67E+00
Aroclor-1260	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Aroclor-1268	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Dieldrin	8.20E-02	8.20E-02	6.64E+00	6.64E+00
Gamma-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Heptachlor	1.20E-01	1.20E-01	1.00E+01	1.00E+01
Endosulfan I	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan II	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan Sulfate	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endrin	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Aldehyde	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Ketone	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Heptachlor Epoxide	2.80E-02	2.80E-02	3.00E+00	3.00E+00
Methoxychlor	1.10E-01	1.10E-01	1.00E+00	1.00E+00
alpha-BHC	2.10E-01	2.10E-01	5.00E+00	5.00E+00

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
beta-BHC	1.80E-01	1.80E-01	5.00E+00	5.00E+00
delta-BHC	9.00E-01	9.00E-01	5.00E+00	5.00E+00
gamma-BHC (Lindane)	2.70E-01	2.70E-01	5.00E+00	5.00E+00
Toxaphene	6.20E-02	6.20E-02	1.00E+00	1.00E+00
Total Aroclor	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Total DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Explosives				
2,4,6-Trinitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
2-Nitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
1,3,5-Trinitrobenzene	7.70E+00	7.70E+00	1.00E+00	1.00E+00
4-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
RDX	4.60E-01	4.60E-01	1.00E+00	1.00E+00
4-Amino-2,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
HMX	1.70E+01	1.70E+01	1.00E+00	1.00E+00
Nitrobenzene (exp)	3.40E+00	3.40E+00	1.00E+00	1.00E+00
1,3 Dinitrobenzene	4.50E+00	4.50E+00	1.00E+00	1.00E+00
2-Amino-4,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
Tetryl	???	???	1.00E+00	1.00E+00
3-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
2,4-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
2,6-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
Dioxins				
1,2,3,4,6,7,8-HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,6,7,8-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8,9-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HxCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8-PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
1,2,3,7,8-Pecdf	4.40E-03	4.40E-03	2.22E+01	1.10E+01
2,3,4,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
2,3,4,7,8-PECDF	3.70E-03	3.70E-03	2.22E+01	1.10E+01
2,3,7,8-TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ HALFND	4.30E-03	4.30E-03	2.22E+01	1.10E+01
2,3,7,8-TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDD	???	???	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDF	???	???	2.22E+01	1.10E+01
TOTAL HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
Total HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total PECDF	4.40E-03	4.40E-03	2.22E+01	1.10E+01
Total TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
Total TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
Inorganics				
Aluminum	5.00E-03	2.87E-03	1.18E-01	4.30E-02
Antimony	1.14E-02	1.02E-02	1.00E+00	1.00E+00
Arsenic	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Barium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Beryllium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cadmium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cobalt	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Copper	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexavalent Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cyanide	1.80E+00	1.00E+00	1.00E+00	1.00E+00
Iron	1.00E-02	4.25E-03	7.80E-02	3.60E-02
Lead	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Manganese	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Mercury	5.00E+00	6.52E-01	ORNL Reg.	ORNL Reg.
Nickel	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Selenium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Silver	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Thallium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Tin	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Vanadium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Zinc	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL

Notes:
BAF - Bioaccumulation Factor
BSAF - Biota Sediment Accumulation Factor
1 - ORNL (2001) for organics; only one value is available for conservative and average exposures
2 - Sample et al., (1997) for inorganics; conservative value is 90th percentile; average value is median v
3 - ORNL (September, 1998) for all chemicals; conservative value is 90th percentile; average value is m
4 - U.S. EPA, September 1997; only one value is available for conservative and average exposures. Va
5 - Conservative and average refers to the exposure scenarios for which the uptake factors are used
6 - Where "Eco-SSL" is given, values were calculated using equations from USEPA (2005), Attachment
Tables 4a (for inorganics) and 4b (for organics).

Default value of 1 is assigned to parameters without uptake factors

TABLE X-X

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

Species/Exposure Inputs	Conservative Inputs		Average Inputs	
	Values	Units	Values	Units
Bobwhite Quail				
Body Weight = BW	1.540E-01	kg	1.751E-01	kg
Food Ingestion Rate = If	2.442E-03	kg/day	2.042E-03	kg/day
Water Ingestion Rate = Iw	2.276E-02	L/day	1.926E-02	L/day
Soil Ingestion Rate = Is	3.395E-04	kg/day	1.246E-04	kg/day
Home Range = HR	Assume 100% on site		1.880E+01	acres
Meadow Vole				
Body Weight = BW	1.700E-02	kg	3.580E-02	kg
Food Ingestion Rate = If	1.878E-03	kg/day	1.744E-03	kg/day
Water Ingestion Rate = Iw	7.513E-03	L/day	6.261E-03	L/day
Soil Ingestion Rate = Is	6.010E-05	kg/day	2.093E-05	kg/day
Home Range = HR	Assume 100% on site		6.590E-02	acres
American Robin				
Body Weight = BW	7.73E-02	kg	8.04E-02	kg
Food Ingestion Rate = If	1.25E-02	kg/day	1.19E-02	kg/day
Water Ingestion Rate = Iw	1.21E-02	L/day	1.13E-02	L/day
Soil Ingestion Rate - Is	2.046E-03	kg/day	7.601E-04	kg/day
Home Range = HR	Assume 100% on site		6.095E-01	acres
Short-Tailed Shrew				
Body Weight = BW	1.500E-02	kg	1.610E-02	kg
Food Ingestion Rate = If	1.600E-03	kg/day	1.433E-03	kg/day
Water Ingestion Rate = Iw	4.280E-03	L/day	3.600E-03	L/day
Soil Ingestion Rate - Is	4.801E-05	kg/day	1.289E-05	kg/day
Home Range = HR	Assume 100% on site		9.699E-01	acres
Mink				
Body Weight = BW	5.500E-01	kg	1.103E+00	kg
Food Ingestion Rate = If	6.067E-02	kg/day	4.504E-02	kg/day
Water Ingestion Rate = Iw	1.213E-01	L/day	7.308E-02	L/day
Sediment Ingestion Rate = Is	5.703E-03	kg/day	4.234E-03	kg/day
Home Range = HR	Assume 100% on site		1.558E+03	acres
Green Heron				
Body Weight = BW	2.00E-01	kg	2.12E-01	kg
Food Ingestion Rate = If	3.10E-02	kg/day	3.00E-02	kg/day
Water Ingestion Rate = Iw	2.20E-02	L/day	2.10E-02	L/day
Sediment Ingestion Rate = Is	1.600E-03	kg/day	1.500E-03	kg/day
Home Range = HR	Assume 100% on site		1.000E+01	km-radius

Notes:
The exposure factors were derived as presented in Appendix I.

The soil/sediment ingestion rates were calculated by multiplying the food ingestion rates by the following incidental soil/sediment ingestion rates:

	Conservative	Average	Source
Bobwhite quail	13.90%	6.10%	1, 2
Meadow Vole	3.20%	1.20%	1
American Robin	16.40%	6.40%	1,4
Short-tailed Shrew	3%	0.90%	1
Mink	9.4%	9.4%	3, 5
Green Heron	5%	5%	6

1 - USEPA (U.S. Environmental Protection Agency), 2005. Ecological Soil Screening Level Guidance, Office of Emergency and Remedial Response. February.
2 - Based on the mourning dove.
3 - Beyer, N., E. Connor, and S. Gerould. 1994. Estimates of Soil Ingestion by Wildlife. Journal of Wildlife Management 58(2) pp. 375-382.
4 - Based on the American woodcock
5 - Based on the raccoon
6 - Based on piscivorous birds

APPENDIX F

MEADOW VOLE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
2-METHYLNAPHTHALENE	3.50E-03	0.00E+00	2.04E-02	1.24E-05	0.00E+00	2.26E-03	2.27E-03	6.56E+01	3.56E+02	3.46E-05	6.38E-06
ANTHRACENE	5.60E-03	0.00E+00	6.57E-03	1.98E-05	0.00E+00	7.26E-04	7.46E-04	6.56E+01	3.56E+02	1.14E-05	2.10E-06
BENZO(A)ANTHRACENE	9.40E-02	0.00E+00	1.64E-02	3.32E-04	0.00E+00	1.81E-03	2.14E-03	6.15E-01	3.84E+01	3.48E-03	5.57E-05
BENZO(A)PYRENE	1.00E-01	0.00E+00	1.35E-02	3.54E-04	0.00E+00	1.49E-03	1.84E-03	6.15E-01	3.84E+01	3.00E-03	4.80E-05
BENZO(B)FLUORANTHENE	3.80E-02	0.00E+00	1.18E-02	1.34E-04	0.00E+00	1.30E-03	1.44E-03	6.15E-01	3.84E+01	2.33E-03	3.74E-05
BENZO(G,H,I)PERYLENE	5.00E-02	0.00E+00	1.14E-02	1.77E-04	0.00E+00	1.26E-03	1.44E-03	6.15E-01	3.84E+01	2.33E-03	3.74E-05
BENZO(K)FLUORANTHENE	7.70E-03	0.00E+00	1.76E-03	2.72E-05	0.00E+00	1.95E-04	2.22E-04	6.15E-01	3.84E+01	3.61E-04	5.78E-06
CHRYSENE	1.30E-01	0.00E+00	1.98E-02	4.60E-04	0.00E+00	2.19E-03	2.65E-03	6.15E-01	3.84E+01	4.31E-03	6.90E-05
DIBENZO(A,H)ANTHRACENE	1.80E-02	0.00E+00	2.34E-03	6.36E-05	0.00E+00	2.59E-04	3.22E-04	6.15E-01	3.84E+01	5.24E-04	8.39E-06
FLUORANTHENE	1.30E-02	0.00E+00	6.50E-03	4.60E-05	0.00E+00	7.18E-04	7.64E-04	6.56E+01	3.56E+02	1.16E-05	2.15E-06
INDENO(1,2,3-CD)PYRENE	1.00E-02	0.00E+00	1.10E-03	3.54E-05	0.00E+00	1.22E-04	1.57E-04	6.15E-01	3.84E+01	2.55E-04	4.09E-06
PHENANTHRENE	2.40E-02	0.00E+00	8.37E-02	8.48E-05	0.00E+00	9.25E-03	9.34E-03	6.56E+01	3.56E+02	1.42E-04	2.62E-05
PYRENE	1.10E-01	0.00E+00	7.92E-02	3.89E-04	0.00E+00	8.75E-03	9.14E-03	6.15E-01	3.84E+01	1.49E-02	2.38E-04
Inorganics											
ANTIMONY	4.20E-01	0.00E+00	1.75E-02	1.48E-03	0.00E+00	1.93E-03	3.42E-03	5.90E-02	2.76E+00	5.79E-02	1.24E-03
ARSENIC	4.20E+00	0.00E+00	1.58E-01	1.48E-02	0.00E+00	1.74E-02	3.23E-02	1.04E+00	4.55E+00	3.10E-02	7.09E-03
COPPER	9.60E+00	0.00E+00	4.75E+00	3.39E-02	0.00E+00	5.25E-01	5.59E-01	5.60E+00	8.27E+01	9.99E-02	6.76E-03
LEAD	4.87E+01	0.00E+00	2.34E+00	1.72E-01	0.00E+00	2.59E-01	4.31E-01	4.70E+00	1.86E+02	9.17E-02	2.31E-03
ZINC	2.90E+01	0.00E+00	3.12E+01	1.03E-01	0.00E+00	3.45E+00	3.55E+00	7.54E+01	2.98E+02	4.71E-02	1.19E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.70E-02	kg
Food Ingestion Rate = (If)	1.88E-03	kg/day
Water Ingestion Rate = (Iw)	7.51E-03	L/day
Soil Ingestion Rate = (Is)	6.01E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

MEADOW VOLE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
2-METHYLNAPHTHALENE	3.50E-03	0.00E+00	2.04E-02	2.05E-06	0.00E+00	9.96E-04	9.98E-04	6.56E+01	3.56E+02	1.52E-05	2.80E-06
ANTHRACENE	4.85E-03	0.00E+00	5.88E-03	2.84E-06	0.00E+00	2.86E-04	2.89E-04	6.56E+01	3.56E+02	4.41E-06	8.12E-07
BENZO(A)ANTHRACENE	8.60E-02	0.00E+00	1.55E-02	5.03E-05	0.00E+00	7.56E-04	8.06E-04	6.15E-01	3.84E+01	1.31E-03	2.10E-05
BENZO(A)PYRENE	9.55E-02	0.00E+00	1.29E-02	5.58E-05	0.00E+00	6.28E-04	6.84E-04	6.15E-01	3.84E+01	1.11E-03	1.78E-05
BENZO(B)FLUORANTHENE	3.55E-02	0.00E+00	1.10E-02	2.08E-05	0.00E+00	5.36E-04	5.57E-04	6.15E-01	3.84E+01	9.05E-04	1.45E-05
BENZO(G,H,I)PERYLENE	4.55E-02	0.00E+00	1.02E-02	2.66E-05	0.00E+00	4.96E-04	5.23E-04	6.15E-01	3.84E+01	8.50E-04	1.36E-05
BENZO(K)FLUORANTHENE	6.75E-03	0.00E+00	1.57E-03	3.95E-06	0.00E+00	7.67E-05	8.06E-05	6.15E-01	3.84E+01	1.31E-04	2.10E-06
CHRYSENE	1.14E-01	0.00E+00	1.83E-02	6.64E-05	0.00E+00	8.91E-04	9.58E-04	6.15E-01	3.84E+01	1.56E-03	2.49E-05
DIBENZO(A,H)ANTHRACENE	1.50E-02	0.00E+00	1.95E-03	8.77E-06	0.00E+00	9.50E-05	1.04E-04	6.15E-01	3.84E+01	1.69E-04	2.70E-06
FLUORANTHENE	1.14E-02	0.00E+00	5.70E-03	6.66E-06	0.00E+00	2.78E-04	2.84E-04	6.56E+01	3.56E+02	4.33E-06	7.99E-07
INDENO(1,2,3-CD)PYRENE	9.55E-03	0.00E+00	1.05E-03	5.58E-06	0.00E+00	5.12E-05	5.68E-05	6.15E-01	3.84E+01	9.23E-05	1.48E-06
PHENANTHRENE	2.25E-02	0.00E+00	8.05E-02	1.32E-05	0.00E+00	3.92E-03	3.93E-03	6.56E+01	3.56E+02	5.99E-05	1.10E-05
PYRENE	1.01E-01	0.00E+00	7.27E-02	5.90E-05	0.00E+00	3.54E-03	3.60E-03	6.15E-01	3.84E+01	5.86E-03	9.38E-05
Inorganics											
ANTIMONY	2.80E-01	0.00E+00	1.19E-02	1.64E-04	0.00E+00	5.82E-04	7.46E-04	5.90E-02	2.76E+00	1.26E-02	2.70E-04
ARSENIC	3.60E+00	0.00E+00	1.35E-01	2.10E-03	0.00E+00	6.58E-03	8.68E-03	1.04E+00	4.55E+00	8.35E-03	1.91E-03
COPPER	7.20E+00	0.00E+00	4.25E+00	4.21E-03	0.00E+00	2.07E-01	2.11E-01	5.60E+00	8.27E+01	3.77E-02	2.55E-03
LEAD	2.89E+01	0.00E+00	1.75E+00	1.69E-02	0.00E+00	8.52E-02	1.02E-01	4.70E+00	1.86E+02	2.17E-02	5.48E-04
ZINC	2.39E+01	0.00E+00	2.80E+01	1.39E-02	0.00E+00	1.36E+00	1.38E+00	7.54E+01	2.98E+02	1.83E-02	4.63E-03

Body Weight = (BW)	3.58E-02	kg
Food Ingestion Rate = (If)	1.74E-03	kg/day
Water Ingestion Rate = (Iw)	6.26E-03	L/day
Soil Ingestion Rate = (Is)	2.09E-05	kg/day
Home Range = (HR)	6.59E-02	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
2-METHYLNAPHTHALENE	3.50E-03	0.00E+00	2.04E-02	7.72E-06	0.00E+00	3.24E-04	3.32E-04	2.00E+00	2.00E+01	1.7E-04	1.7E-05
ANTHRACENE	5.60E-03	0.00E+00	6.57E-03	1.23E-05	0.00E+00	1.04E-04	1.17E-04	2.00E+00	2.00E+01	5.8E-05	5.8E-06
BENZO(A)ANTHRACENE	9.40E-02	0.00E+00	1.64E-02	2.07E-04	0.00E+00	2.59E-04	4.67E-04	2.00E+00	2.00E+01	2.3E-04	2.3E-05
BENZO(A)PYRENE	1.00E-01	0.00E+00	1.35E-02	2.20E-04	0.00E+00	2.14E-04	4.34E-04	2.00E+00	2.00E+01	2.2E-04	2.2E-05
BENZO(B)FLUORANTHENE	3.80E-02	0.00E+00	1.18E-02	8.38E-05	0.00E+00	1.87E-04	2.71E-04	2.00E+00	2.00E+01	1.4E-04	1.4E-05
BENZO(G,H,I)PERYLENE	5.00E-02	0.00E+00	1.14E-02	1.10E-04	0.00E+00	1.81E-04	2.91E-04	2.00E+00	2.00E+01	1.5E-04	1.5E-05
BENZO(K)FLUORANTHENE	7.70E-03	0.00E+00	1.76E-03	1.70E-05	0.00E+00	2.80E-05	4.49E-05	2.00E+00	2.00E+01	2.2E-05	2.2E-06
CHRYSENE	1.30E-01	0.00E+00	1.98E-02	2.87E-04	0.00E+00	3.15E-04	6.01E-04	2.00E+00	2.00E+01	3.0E-04	3.0E-05
DIBENZO(A,H)ANTHRACENE	1.80E-02	0.00E+00	2.34E-03	3.97E-05	0.00E+00	3.71E-05	7.68E-05	2.00E+00	2.00E+01	3.8E-05	3.8E-06
FLUORANTHENE	1.30E-02	0.00E+00	6.50E-03	2.87E-05	0.00E+00	1.03E-04	1.32E-04	2.00E+00	2.00E+01	6.6E-05	6.6E-06
INDENO(1,2,3-CD)PYRENE	1.00E-02	0.00E+00	1.10E-03	2.20E-05	0.00E+00	1.74E-05	3.95E-05	2.00E+00	2.00E+01	2.0E-05	2.0E-06
PHENANTHRENE	2.40E-02	0.00E+00	8.37E-02	5.29E-05	0.00E+00	1.33E-03	1.38E-03	2.00E+00	2.00E+01	6.9E-04	6.9E-05
PYRENE	1.10E-01	0.00E+00	7.92E-02	2.43E-04	0.00E+00	1.26E-03	1.50E-03	2.00E+00	2.00E+01	7.5E-04	7.5E-05
Inorganics											
ANTIMONY	4.20E-01	0.00E+00	1.75E-02	9.26E-04	0.00E+00	2.77E-04	1.20E-03	NV	NV	#VALUE!	#VALUE!
ARSENIC	4.20E+00	0.00E+00	1.58E-01	9.26E-03	0.00E+00	2.50E-03	1.18E-02	2.24E+00	4.51E+00	5.2E-03	2.6E-03
COPPER	9.60E+00	0.00E+00	4.75E+00	2.12E-02	0.00E+00	7.54E-02	9.66E-02	4.05E+00	3.49E+01	2.4E-02	2.8E-03
LEAD	4.87E+01	0.00E+00	2.34E+00	1.07E-01	0.00E+00	3.72E-02	1.45E-01	1.63E+00	4.46E+01	8.9E-02	3.2E-03
ZINC	2.90E+01	0.00E+00	3.12E+01	6.39E-02	0.00E+00	4.95E-01	5.59E-01	6.61E+01	1.71E+02	8.5E-03	3.3E-03

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.54E-01	kg
Food Ingestion Rate = (If)	2.44E-03	kg/day
Water Ingestion Rate = (Iw)	2.28E-02	L/day
Soil Ingestion Rate = (Is)	3.40E-04	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
2-METHYLNAPHTHALENE	3.50E-03	0.00E+00	2.04E-02	2.49E-06	0.00E+00	2.38E-04	2.41E-04	2.00E+00	2.00E+01	1.2E-04	1.2E-05
ANTHRACENE	4.85E-03	0.00E+00	5.88E-03	3.45E-06	0.00E+00	6.85E-05	7.20E-05	2.00E+00	2.00E+01	3.6E-05	3.6E-06
BENZO(A)ANTHRACENE	8.60E-02	0.00E+00	1.55E-02	6.12E-05	0.00E+00	1.81E-04	2.42E-04	2.00E+00	2.00E+01	1.2E-04	1.2E-05
BENZO(A)PYRENE	9.55E-02	0.00E+00	1.29E-02	6.79E-05	0.00E+00	1.50E-04	2.18E-04	2.00E+00	2.00E+01	1.1E-04	1.1E-05
BENZO(B)FLUORANTHENE	3.55E-02	0.00E+00	1.10E-02	2.53E-05	0.00E+00	1.28E-04	1.54E-04	2.00E+00	2.00E+01	7.7E-05	7.7E-06
BENZO(G,H,I)PERYLENE	4.55E-02	0.00E+00	1.02E-02	3.24E-05	0.00E+00	1.19E-04	1.51E-04	2.00E+00	2.00E+01	7.6E-05	7.6E-06
BENZO(K)FLUORANTHENE	6.75E-03	0.00E+00	1.57E-03	4.80E-06	0.00E+00	1.84E-05	2.32E-05	2.00E+00	2.00E+01	1.2E-05	1.2E-06
CHRYSENE	1.14E-01	0.00E+00	1.83E-02	8.07E-05	0.00E+00	2.13E-04	2.94E-04	2.00E+00	2.00E+01	1.5E-04	1.5E-05
DIBENZO(A,H)ANTHRACENE	1.50E-02	0.00E+00	1.95E-03	1.07E-05	0.00E+00	2.27E-05	3.34E-05	2.00E+00	2.00E+01	1.7E-05	1.7E-06
FLUORANTHENE	1.14E-02	0.00E+00	5.70E-03	8.11E-06	0.00E+00	6.65E-05	7.46E-05	2.00E+00	2.00E+01	3.7E-05	3.7E-06
INDENO(1,2,3-CD)PYRENE	9.55E-03	0.00E+00	1.05E-03	6.79E-06	0.00E+00	1.23E-05	1.90E-05	2.00E+00	2.00E+01	9.5E-06	9.5E-07
PHENANTHRENE	2.25E-02	0.00E+00	8.05E-02	1.60E-05	0.00E+00	9.38E-04	9.54E-04	2.00E+00	2.00E+01	4.8E-04	4.8E-05
PYRENE	1.01E-01	0.00E+00	7.27E-02	7.18E-05	0.00E+00	8.48E-04	9.20E-04	2.00E+00	2.00E+01	4.6E-04	4.6E-05
Inorganics											
ANTIMONY	2.80E-01	0.00E+00	1.19E-02	1.99E-04	0.00E+00	1.39E-04	3.39E-04	NV	NV	#VALUE!	#VALUE!
ARSENIC	3.60E+00	0.00E+00	1.35E-01	2.56E-03	0.00E+00	1.58E-03	4.14E-03	2.24E+00	4.51E+00	1.8E-03	9.2E-04
COPPER	7.20E+00	0.00E+00	4.25E+00	5.12E-03	0.00E+00	4.95E-02	5.46E-02	4.05E+00	3.49E+01	1.3E-02	1.6E-03
LEAD	2.89E+01	0.00E+00	1.75E+00	2.06E-02	0.00E+00	2.04E-02	4.10E-02	1.63E+00	4.46E+01	2.5E-02	9.2E-04
ZINC	2.39E+01	0.00E+00	2.80E+01	1.70E-02	0.00E+00	3.27E-01	3.43E-01	6.61E+01	1.71E+02	5.2E-03	2.0E-03

Body Weight = (BW)	1.75E-01	kg
Food Ingestion Rate = (If)	2.04E-03	kg/day
Water Ingestion Rate = (Iw)	1.93E-02	L/day
Soil Ingestion Rate = (Is)	1.25E-04	kg/day
Home Range = (HR)	1.88E+01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
2-METHYLNAPHTHALENE	3.50E-03	0.00E+00	1.06E-02	1.12E-05	0.00E+00	1.14E-03	1.15E-03	6.56E+01	3.56E+02	1.7E-05	3.2E-06
ANTHRACENE	5.60E-03	0.00E+00	1.36E-02	1.79E-05	0.00E+00	1.45E-03	1.46E-03	6.56E+01	3.56E+02	2.2E-05	4.1E-06
BENZO(A)ANTHRACENE	9.40E-02	0.00E+00	1.49E-01	3.01E-04	0.00E+00	1.59E-02	1.62E-02	6.15E-01	3.84E+01	2.6E-02	4.2E-04
BENZO(A)PYRENE	1.00E-01	0.00E+00	1.33E-01	3.20E-04	0.00E+00	1.42E-02	1.45E-02	6.15E-01	3.84E+01	2.4E-02	3.8E-04
BENZO(B)FLUORANTHENE	3.80E-02	0.00E+00	9.88E-02	1.22E-04	0.00E+00	1.05E-02	1.07E-02	6.15E-01	3.84E+01	1.7E-02	2.8E-04
BENZO(G,H,I)PERYLENE	5.00E-02	0.00E+00	1.47E-01	1.60E-04	0.00E+00	1.57E-02	1.58E-02	6.15E-01	3.84E+01	2.6E-02	4.1E-04
BENZO(K)FLUORANTHENE	7.70E-03	0.00E+00	2.00E-02	2.46E-05	0.00E+00	2.14E-03	2.16E-03	6.15E-01	3.84E+01	3.5E-03	5.6E-05
CHRYSENE	1.30E-01	0.00E+00	2.98E-01	4.16E-04	0.00E+00	3.18E-02	3.22E-02	6.15E-01	3.84E+01	5.2E-02	8.4E-04
DIBENZO(A,H)ANTHRACENE	1.80E-02	0.00E+00	4.16E-02	5.76E-05	0.00E+00	4.44E-03	4.49E-03	6.15E-01	3.84E+01	7.3E-03	1.2E-04
FLUORANTHENE	1.30E-02	0.00E+00	3.95E-02	4.16E-05	0.00E+00	4.22E-03	4.26E-03	6.56E+01	3.56E+02	6.5E-05	1.2E-05
INDENO(1,2,3-CD)PYRENE	1.00E-02	0.00E+00	2.86E-02	3.20E-05	0.00E+00	3.05E-03	3.08E-03	6.15E-01	3.84E+01	5.0E-03	8.0E-05
PHENANTHRENE	2.40E-02	0.00E+00	4.13E-02	7.68E-05	0.00E+00	4.40E-03	4.48E-03	6.56E+01	3.56E+02	6.8E-05	1.3E-05
PYRENE	1.10E-01	0.00E+00	1.93E-01	3.52E-04	0.00E+00	2.05E-02	2.09E-02	6.15E-01	3.84E+01	3.4E-02	5.4E-04
Inorganics											
ANTIMONY	4.20E-01	0.00E+00	4.20E-01	1.34E-03	0.00E+00	4.48E-02	4.62E-02	5.90E-02	2.76E+00	7.8E-01	1.7E-02
ARSENIC	4.20E+00	0.00E+00	6.65E-01	1.34E-02	0.00E+00	7.10E-02	8.44E-02	1.04E+00	4.55E+00	8.1E-02	1.9E-02
COPPER	9.60E+00	0.00E+00	4.94E+00	3.07E-02	0.00E+00	5.27E-01	5.58E-01	5.60E+00	8.27E+01	1.0E-01	6.7E-03
LEAD	4.87E+01	0.00E+00	1.85E+01	1.56E-01	0.00E+00	1.97E+00	2.13E+00	4.70E+00	1.86E+02	4.5E-01	1.1E-02
ZINC	2.90E+01	0.00E+00	2.58E+02	9.28E-02	0.00E+00	2.75E+01	2.76E+01	7.54E+01	2.98E+02	3.7E-01	9.3E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.50E-02	kg
Food Ingestion Rate = (If)	1.60E-03	kg/day
Water Ingestion Rate = (Iw)	4.28E-03	L/day
Soil Ingestion Rate = (Is)	4.80E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
2-METHYLNAPHTHALENE	3.50E-03	0.00E+00	1.06E-02	2.80E-06	0.00E+00	9.47E-04	9.50E-04	6.56E+01	3.56E+02	1.4E-05	2.7E-06
ANTHRACENE	4.85E-03	0.00E+00	1.17E-02	3.88E-06	0.00E+00	1.04E-03	1.05E-03	6.56E+01	3.56E+02	1.6E-05	2.9E-06
BENZO(A)ANTHRACENE	8.60E-02	0.00E+00	1.37E-01	6.89E-05	0.00E+00	1.22E-02	1.22E-02	6.15E-01	3.84E+01	2.0E-02	3.2E-04
BENZO(A)PYRENE	9.55E-02	0.00E+00	1.27E-01	7.65E-05	0.00E+00	1.13E-02	1.14E-02	6.15E-01	3.84E+01	1.9E-02	3.0E-04
BENZO(B)FLUORANTHENE	3.55E-02	0.00E+00	9.23E-02	2.84E-05	0.00E+00	8.21E-03	8.24E-03	6.15E-01	3.84E+01	1.3E-02	2.1E-04
BENZO(G,H,I)PERYLENE	4.55E-02	0.00E+00	1.34E-01	3.64E-05	0.00E+00	1.19E-02	1.19E-02	6.15E-01	3.84E+01	1.9E-02	3.1E-04
BENZO(K)FLUORANTHENE	6.75E-03	0.00E+00	1.76E-02	5.41E-06	0.00E+00	1.56E-03	1.57E-03	6.15E-01	3.84E+01	2.5E-03	4.1E-05
CHRYSENE	1.14E-01	0.00E+00	2.60E-01	9.09E-05	0.00E+00	2.31E-02	2.32E-02	6.15E-01	3.84E+01	3.8E-02	6.0E-04
DIBENZO(A,H)ANTHRACENE	1.50E-02	0.00E+00	3.47E-02	1.20E-05	0.00E+00	3.08E-03	3.10E-03	6.15E-01	3.84E+01	5.0E-03	8.1E-05
FLUORANTHENE	1.14E-02	0.00E+00	3.47E-02	9.13E-06	0.00E+00	3.08E-03	3.09E-03	6.56E+01	3.56E+02	4.7E-05	8.7E-06
INDENO(1,2,3-CD)PYRENE	9.55E-03	0.00E+00	2.73E-02	7.65E-06	0.00E+00	2.43E-03	2.44E-03	6.15E-01	3.84E+01	4.0E-03	6.3E-05
PHENANTHRENE	2.25E-02	0.00E+00	3.87E-02	1.80E-05	0.00E+00	3.44E-03	3.46E-03	6.56E+01	3.56E+02	5.3E-05	9.7E-06
PYRENE	1.01E-01	0.00E+00	1.77E-01	8.09E-05	0.00E+00	1.57E-02	1.58E-02	6.15E-01	3.84E+01	2.6E-02	4.1E-04
Inorganics											
ANTIMONY	2.80E-01	0.00E+00	2.80E-01	2.24E-04	0.00E+00	2.49E-02	2.51E-02	5.90E-02	2.76E+00	4.3E-01	9.1E-03
ARSENIC	3.60E+00	0.00E+00	5.97E-01	2.88E-03	0.00E+00	5.31E-02	5.60E-02	1.04E+00	4.55E+00	5.4E-02	1.2E-02
COPPER	7.20E+00	0.00E+00	3.71E+00	5.77E-03	0.00E+00	3.30E-01	3.36E-01	5.60E+00	8.27E+01	6.0E-02	4.1E-03
LEAD	2.89E+01	0.00E+00	1.21E+01	2.31E-02	0.00E+00	1.08E+00	1.10E+00	4.70E+00	1.86E+02	2.3E-01	5.9E-03
ZINC	2.39E+01	0.00E+00	2.42E+02	1.91E-02	0.00E+00	2.15E+01	2.16E+01	7.54E+01	2.98E+02	2.9E-01	7.2E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.61E-02	kg
Food Ingestion Rate = (If)	1.43E-03	kg/day
Water Ingestion Rate = (Iw)	3.60E-03	L/day
Soil Ingestion Rate = (Is)	1.29E-05	kg/day
Home Range = (HR)	9.70E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
2-METHYLNAPHTHALENE	3.50E-03	0.00E+00	1.06E-02	9.26E-05	0.00E+00	1.72E-03	1.81E-03	2.00E+00	2.00E+01	9.0E-04	9.0E-05
ANTHRACENE	5.60E-03	0.00E+00	1.36E-02	1.48E-04	0.00E+00	2.19E-03	2.34E-03	2.00E+00	2.00E+01	1.2E-03	1.2E-04
BENZO(A)ANTHRACENE	9.40E-02	0.00E+00	1.49E-01	2.49E-03	0.00E+00	2.41E-02	2.66E-02	2.00E+00	2.00E+01	1.3E-02	1.3E-03
BENZO(A)PYRENE	1.00E-01	0.00E+00	1.33E-01	2.65E-03	0.00E+00	2.15E-02	2.41E-02	2.00E+00	2.00E+01	1.2E-02	1.2E-03
BENZO(B)FLUORANTHENE	3.80E-02	0.00E+00	9.88E-02	1.01E-03	0.00E+00	1.59E-02	1.70E-02	2.00E+00	2.00E+01	8.5E-03	8.5E-04
BENZO(G,H,I)PERYLENE	5.00E-02	0.00E+00	1.47E-01	1.32E-03	0.00E+00	2.37E-02	2.50E-02	2.00E+00	2.00E+01	1.3E-02	1.3E-03
BENZO(K)FLUORANTHENE	7.70E-03	0.00E+00	2.00E-02	2.04E-04	0.00E+00	3.23E-03	3.43E-03	2.00E+00	2.00E+01	1.7E-03	1.7E-04
CHRYSENE	1.30E-01	0.00E+00	2.98E-01	3.44E-03	0.00E+00	4.80E-02	5.15E-02	2.00E+00	2.00E+01	2.6E-02	2.6E-03
DIBENZO(A,H)ANTHRACENE	1.80E-02	0.00E+00	4.16E-02	4.76E-04	0.00E+00	6.71E-03	7.19E-03	2.00E+00	2.00E+01	3.6E-03	3.6E-04
FLUORANTHENE	1.30E-02	0.00E+00	3.95E-02	3.44E-04	0.00E+00	6.38E-03	6.72E-03	2.00E+00	2.00E+01	3.4E-03	3.4E-04
INDENO(1,2,3-CD)PYRENE	1.00E-02	0.00E+00	2.86E-02	2.65E-04	0.00E+00	4.62E-03	4.88E-03	2.00E+00	2.00E+01	2.4E-03	2.4E-04
PHENANTHRENE	2.40E-02	0.00E+00	4.13E-02	6.35E-04	0.00E+00	6.66E-03	7.30E-03	2.00E+00	2.00E+01	3.6E-03	3.6E-04
PYRENE	1.10E-01	0.00E+00	1.93E-01	2.91E-03	0.00E+00	3.11E-02	3.40E-02	2.00E+00	2.00E+01	1.7E-02	1.7E-03
Inorganics											
ANTIMONY	4.20E-01	0.00E+00	4.20E-01	1.11E-02	0.00E+00	6.78E-02	7.89E-02	NV	NV	#VALUE!	#VALUE!
ARSENIC	4.20E+00	0.00E+00	6.65E-01	1.11E-01	0.00E+00	1.07E-01	2.18E-01	2.24E+00	4.51E+00	9.8E-02	4.8E-02
COPPER	9.60E+00	0.00E+00	4.94E+00	2.54E-01	0.00E+00	7.98E-01	1.05E+00	4.05E+00	3.49E+01	2.6E-01	3.0E-02
LEAD	4.87E+01	0.00E+00	1.85E+01	1.29E+00	0.00E+00	2.99E+00	4.27E+00	1.63E+00	4.46E+01	2.6E+00	9.6E-02
ZINC	2.90E+01	0.00E+00	2.58E+02	7.68E-01	0.00E+00	4.17E+01	4.24E+01	6.61E+01	1.71E+02	6.4E-01	2.5E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	7.73E-02	kg
Food Ingestion Rate = (If)	1.25E-02	kg/day
Water Ingestion Rate = (Iw)	1.21E-02	L/day
Soil Ingestion Rate = (Is)	2.05E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
2-METHYLNAPHTHALENE	3.50E-03	0.00E+00	1.06E-02	3.31E-05	0.00E+00	1.57E-03	1.60E-03	2.00E+00	2.00E+01	8.0E-04	8.0E-05
ANTHRACENE	4.85E-03	0.00E+00	1.17E-02	4.59E-05	0.00E+00	1.73E-03	1.78E-03	2.00E+00	2.00E+01	8.9E-04	8.9E-05
BENZO(A)ANTHRACENE	8.60E-02	0.00E+00	1.37E-01	8.13E-04	0.00E+00	2.02E-02	2.10E-02	2.00E+00	2.00E+01	1.1E-02	1.1E-03
BENZO(A)PYRENE	9.55E-02	0.00E+00	1.27E-01	9.03E-04	0.00E+00	1.88E-02	1.97E-02	2.00E+00	2.00E+01	9.8E-03	9.8E-04
BENZO(B)FLUORANTHENE	3.55E-02	0.00E+00	9.23E-02	3.36E-04	0.00E+00	1.36E-02	1.40E-02	2.00E+00	2.00E+01	7.0E-03	7.0E-04
BENZO(G,H,I)PERYLENE	4.55E-02	0.00E+00	1.34E-01	4.30E-04	0.00E+00	1.98E-02	2.02E-02	2.00E+00	2.00E+01	1.0E-02	1.0E-03
BENZO(K)FLUORANTHENE	6.75E-03	0.00E+00	1.76E-02	6.38E-05	0.00E+00	2.59E-03	2.66E-03	2.00E+00	2.00E+01	1.3E-03	1.3E-04
CHRYSENE	1.14E-01	0.00E+00	2.60E-01	1.07E-03	0.00E+00	3.84E-02	3.95E-02	2.00E+00	2.00E+01	2.0E-02	2.0E-03
DIBENZO(A,H)ANTHRACENE	1.50E-02	0.00E+00	3.47E-02	1.42E-04	0.00E+00	5.12E-03	5.26E-03	2.00E+00	2.00E+01	2.6E-03	2.6E-04
FLUORANTHENE	1.14E-02	0.00E+00	3.47E-02	1.08E-04	0.00E+00	5.12E-03	5.23E-03	2.00E+00	2.00E+01	2.6E-03	2.6E-04
INDENO(1,2,3-CD)PYRENE	9.55E-03	0.00E+00	2.73E-02	9.03E-05	0.00E+00	4.03E-03	4.13E-03	2.00E+00	2.00E+01	2.1E-03	2.1E-04
PHENANTHRENE	2.25E-02	0.00E+00	3.87E-02	2.13E-04	0.00E+00	5.72E-03	5.93E-03	2.00E+00	2.00E+01	3.0E-03	3.0E-04
PYRENE	1.01E-01	0.00E+00	1.77E-01	9.55E-04	0.00E+00	2.61E-02	2.71E-02	2.00E+00	2.00E+01	1.4E-02	1.4E-03
Inorganics											
ANTIMONY	2.80E-01	0.00E+00	2.80E-01	2.65E-03	0.00E+00	4.14E-02	4.40E-02	NV	NV	#VALUE!	#VALUE!
ARSENIC	3.60E+00	0.00E+00	5.97E-01	3.40E-02	0.00E+00	8.81E-02	1.22E-01	2.24E+00	4.51E+00	5.5E-02	2.7E-02
COPPER	7.20E+00	0.00E+00	3.71E+00	6.81E-02	0.00E+00	5.48E-01	6.16E-01	4.05E+00	3.49E+01	1.5E-01	1.8E-02
LEAD	2.89E+01	0.00E+00	1.21E+01	2.73E-01	0.00E+00	1.79E+00	2.07E+00	1.63E+00	4.46E+01	1.3E+00	4.6E-02
ZINC	2.39E+01	0.00E+00	2.42E+02	2.25E-01	0.00E+00	3.58E+01	3.60E+01	6.61E+01	1.71E+02	5.4E-01	2.1E-01

Body Weight = (BW)	8.04E-02	kg
Food Ingestion Rate = (If)	1.19E-02	kg/day
Water Ingestion Rate = (Iw)	1.13E-02	L/day
Soil Ingestion Rate = (Is)	7.60E-04	kg/day
Home Range = (HR)	6.10E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

TABLE 7-6.3.4

TERRESTRIAL FOOD CHAIN MODEL - CONSERVATIVE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - COMPOSITE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Semivolatile Organics								
2-METHYLNAPHTHALENE	1.7E-04	1.7E-05	3.5E-05	6.4E-06	9.0E-04	9.0E-05	1.7E-05	3.2E-06
ANTHRACENE	5.8E-05	5.8E-06	1.1E-05	2.1E-06	1.2E-03	1.2E-04	2.2E-05	4.1E-06
BENZO(A)ANTHRACENE	2.3E-04	2.3E-05	3.5E-03	5.6E-05	1.3E-02	1.3E-03	2.6E-02	4.2E-04
BENZO(A)PYRENE	2.2E-04	2.2E-05	3.0E-03	4.8E-05	1.2E-02	1.2E-03	2.4E-02	3.8E-04
BENZO(B)FLUORANTHENE	1.4E-04	1.4E-05	2.3E-03	3.7E-05	8.5E-03	8.5E-04	1.7E-02	2.8E-04
BENZO(G,H,I)PERYLENE	1.5E-04	1.5E-05	2.3E-03	3.7E-05	1.3E-02	1.3E-03	2.6E-02	4.1E-04
BENZO(K)FLUORANTHENE	2.2E-05	2.2E-06	3.6E-04	5.8E-06	1.7E-03	1.7E-04	3.5E-03	5.6E-05
CHRYSENE	3.0E-04	3.0E-05	4.3E-03	6.9E-05	2.6E-02	2.6E-03	5.2E-02	8.4E-04
DIBENZO(A,H)ANTHRACENE	3.8E-05	3.8E-06	5.2E-04	8.4E-06	3.6E-03	3.6E-04	7.3E-03	1.2E-04
FLUORANTHENE	6.6E-05	6.6E-06	1.2E-05	2.1E-06	3.4E-03	3.4E-04	6.5E-05	1.2E-05
INDENO(1,2,3-CD)PYRENE	2.0E-05	2.0E-06	2.6E-04	4.1E-06	2.4E-03	2.4E-04	5.0E-03	8.0E-05
PHENANTHRENE	6.9E-04	6.9E-05	1.4E-04	2.6E-05	3.6E-03	3.6E-04	6.8E-05	1.3E-05
PYRENE	7.5E-04	7.5E-05	1.5E-02	2.4E-04	1.7E-02	1.7E-03	3.4E-02	5.4E-04
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	5.8E-02	1.2E-03	#VALUE!	#VALUE!	7.8E-01	1.7E-02
ARSENIC	5.2E-03	2.6E-03	3.1E-02	7.1E-03	9.8E-02	4.8E-02	8.1E-02	1.9E-02
COPPER	2.4E-02	2.8E-03	1.0E-01	6.8E-03	2.6E-01	3.0E-02	1.0E-01	6.7E-03
LEAD	8.9E-02	3.2E-03	9.2E-02	2.3E-03	2.6E+00	9.6E-02	4.5E-01	1.1E-02
ZINC	8.5E-03	3.3E-03	4.7E-02	1.2E-02	6.4E-01	2.5E-01	3.7E-01	9.3E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

TABLE 7-6.3.6

TERRESTRIAL FOOD CHAIN MODEL - AVERAGE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - COMPOSITE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Semivolatile Organics								
2-METHYLNAPHTHALENE	1.2E-04	1.2E-05	1.5E-05	2.8E-06	8.0E-04	8.0E-05	1.4E-05	2.7E-06
ANTHRACENE	3.6E-05	3.6E-06	4.4E-06	8.1E-07	8.9E-04	8.9E-05	1.6E-05	2.9E-06
BENZO(A)ANTHRACENE	1.2E-04	1.2E-05	1.3E-03	2.1E-05	1.1E-02	1.1E-03	2.0E-02	3.2E-04
BENZO(A)PYRENE	1.1E-04	1.1E-05	1.1E-03	1.8E-05	9.8E-03	9.8E-04	1.9E-02	3.0E-04
BENZO(B)FLUORANTHENE	7.7E-05	7.7E-06	9.1E-04	1.5E-05	7.0E-03	7.0E-04	1.3E-02	2.1E-04
BENZO(G,H,I)PERYLENE	7.6E-05	7.6E-06	8.5E-04	1.4E-05	1.0E-02	1.0E-03	1.9E-02	3.1E-04
BENZO(K)FLUORANTHENE	1.2E-05	1.2E-06	1.3E-04	2.1E-06	1.3E-03	1.3E-04	2.5E-03	4.1E-05
CHRYSENE	1.5E-04	1.5E-05	1.6E-03	2.5E-05	2.0E-02	2.0E-03	3.8E-02	6.0E-04
DIBENZO(A,H)ANTHRACENE	1.7E-05	1.7E-06	1.7E-04	2.7E-06	2.6E-03	2.6E-04	5.0E-03	8.1E-05
FLUORANTHENE	3.7E-05	3.7E-06	4.3E-06	8.0E-07	2.6E-03	2.6E-04	4.7E-05	8.7E-06
INDENO(1,2,3-CD)PYRENE	9.5E-06	9.5E-07	9.2E-05	1.5E-06	2.1E-03	2.1E-04	4.0E-03	6.3E-05
PHENANTHRENE	4.8E-04	4.8E-05	6.0E-05	1.1E-05	3.0E-03	3.0E-04	5.3E-05	9.7E-06
PYRENE	4.6E-04	4.6E-05	5.9E-03	9.4E-05	1.4E-02	1.4E-03	2.6E-02	4.1E-04
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	1.3E-02	2.7E-04	#VALUE!	#VALUE!	4.3E-01	9.1E-03
ARSENIC	1.8E-03	9.2E-04	8.4E-03	1.9E-03	5.5E-02	2.7E-02	5.4E-02	1.2E-02
COPPER	1.3E-02	1.6E-03	3.8E-02	2.6E-03	1.5E-01	1.8E-02	6.0E-02	4.1E-03
LEAD	2.5E-02	9.2E-04	2.2E-02	5.5E-04	1.3E+00	4.6E-02	2.3E-01	5.9E-03
ZINC	5.2E-03	2.0E-03	1.8E-02	4.6E-03	5.4E-01	2.1E-01	2.9E-01	7.2E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

APPENDIX F

CHEMICAL CONCENTRATIONS IN SURFACE SOIL AND TISSUE - SURFACE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Surface Soil Concentrations (mg/kg)				Surface Water Concentrations (mg/L)		Earthworm Bioaccumulation Factors		Earthworm Concentrations (mg/kg)		Plant Bioaccumulation Factors		Plant Concentrations (mg/kg)	
	Maximum Detection	Average All	Average of Positive Detections	Average [1]	Maximum Detection	Average Concentration[1]	Conservative	Average	Maximum Detection	Average	Conservative	Average	Maximum Detection	Average
Semivolatile Organics														
1-METHYLNAPHTHALENE	1.60E-02	1.03E-02	6.23E-03	1.03E-02	0.00E+00	0.00E+00	3.04E+00	3.04E+00	4.86E-02	3.13E-02	Regression from Eco SSL		4.08E-02	3.34E-02
2-METHYLNAPHTHALENE	6.80E-02	1.55E-02	2.25E-02	1.55E-02	0.00E+00	0.00E+00	3.04E+00	3.04E+00	2.07E-01	4.70E-02	Regression from Eco SSL		7.87E-02	4.02E-02
ACENAPHTHENE	7.70E-03	1.05E-02	4.53E-03	4.53E-03	0.00E+00	0.00E+00	1.47E+00	1.47E+00	1.13E-02	6.65E-03	Regression from Eco SSL		2.47E-01	3.89E-01
ACENAPHTHYLENE	2.40E-02	1.24E-02	2.40E-02	1.24E-02	0.00E+00	0.00E+00	2.29E+01	2.29E+01	5.50E-01	2.85E-01	Regression from Eco SSL		1.67E-02	9.90E-03
ANTHRACENE	1.10E-01	2.35E-02	2.80E-02	2.35E-02	0.00E+00	0.00E+00	2.42E+00	2.42E+00	2.66E-01	5.68E-02	Regression from Eco SSL		6.67E-02	2.00E-02
BENZO(A)ANTHRACENE	2.40E+00	4.06E-01	4.26E-01	4.06E-01	0.00E+00	0.00E+00	1.59E+00	1.59E+00	3.82E+00	6.45E-01	Regression from Eco SSL		1.12E-01	3.90E-02
BENZO(A)PYRENE	3.20E+00	4.72E-01	5.48E-01	4.72E-01	0.00E+00	0.00E+00	1.33E+00	1.33E+00	4.26E+00	6.28E-01	Regression from Eco SSL		3.96E-01	6.12E-02
BENZO(B)FLUORANTHENE	1.00E+00	1.61E-01	1.85E-01	1.61E-01	0.00E+00	0.00E+00	2.60E+00	2.60E+00	2.60E+00	4.17E-01	3.10E-01	3.10E-01	3.10E-01	4.98E-02
BENZO(G,H,I)PERYLENE	1.50E+00	2.06E-01	2.39E-01	2.06E-01	0.00E+00	0.00E+00	2.94E+00	2.94E+00	4.41E+00	6.06E-01	Regression from Eco SSL		6.37E-01	6.09E-02
BENZO(K)FLUORANTHENE	2.00E-01	3.21E-02	4.21E-02	3.21E-02	0.00E+00	0.00E+00	2.60E+00	2.60E+00	5.20E-01	8.33E-02	Regression from Eco SSL		2.90E-02	6.01E-03
CHRYSENE	3.00E+00	5.10E-01	5.10E-01	5.10E-01	0.00E+00	0.00E+00	2.29E+00	2.29E+00	6.87E+00	1.17E+00	Regression from Eco SSL		1.28E-01	4.47E-02
DIBENZO(A,H)ANTHRACENE	5.40E-01	7.52E-02	1.01E-01	7.52E-02	0.00E+00	0.00E+00	2.31E+00	2.31E+00	1.25E+00	1.74E-01	1.30E-01	1.30E-01	7.02E-02	9.78E-03
FLUORANTHENE	2.10E-01	4.84E-02	5.22E-02	4.84E-02	0.00E+00	0.00E+00	3.04E+00	3.04E+00	6.38E-01	1.47E-01	5.00E-01	5.00E-01	1.05E-01	2.42E-02
FLUORENE	2.10E-02	1.15E-02	1.04E-02	1.15E-02	0.00E+00	0.00E+00	9.57E+00	9.57E+00	2.01E-01	1.10E-01	Regression from Eco SSL		1.05E-01	1.75E-01
INDENO(1,2,3-CD)PYRENE	2.60E-01	4.98E-02	5.16E-02	4.98E-02	0.00E+00	0.00E+00	2.86E+00	2.86E+00	7.44E-01	1.42E-01	1.10E-01	1.10E-01	2.86E-02	5.48E-03
NAPHTHALENE	7.20E-03	1.12E-02	5.15E-03	5.15E-03	0.00E+00	0.00E+00	4.40E+00	4.40E+00	3.17E-02	2.27E-02	1.22E+01	1.22E+01	8.78E-02	6.28E-02
PHENANTHRENE	6.20E-01	9.88E-02	1.26E-01	9.88E-02	0.00E+00	0.00E+00	1.72E+00	1.72E+00	1.07E+00	1.70E-01	Regression from Eco SSL		6.29E-01	2.01E-01
PYRENE	2.00E+00	3.52E-01	3.69E-01	3.52E-01	0.00E+00	0.00E+00	1.75E+00	1.75E+00	3.50E+00	6.16E-01	7.20E-01	7.20E-01	1.44E+00	2.54E-01
Inorganics														
ANTIMONY	1.60E+00	4.39E-01	6.74E-01	4.39E-01	0.00E+00	0.00E+00	1.00E+00	1.00E+00	1.60E+00	4.39E-01	1.14E-02	1.02E-02	6.13E-02	1.82E-02
ARSENIC	6.50E+00	3.00E+00	3.27E+00	3.00E+00	0.00E+00	0.00E+00	Regression from Eco SSL		9.05E-01	5.24E-01	Regression from Eco SSL		2.44E-01	1.12E-01
COPPER	1.14E+01	6.28E+00	6.28E+00	6.28E+00	0.00E+00	0.00E+00	5.15E-01	5.15E-01	5.87E+00	3.23E+00	Regression from Eco SSL		5.09E+00	4.02E+00
LEAD	6.16E+02	9.09E+01	9.09E+01	9.09E+01	0.00E+00	0.00E+00	Regression from Eco SSL		1.43E+02	3.06E+01	Regression from Eco SSL		9.73E+00	3.33E+00
ZINC	3.49E+01	2.30E+01	2.30E+01	2.30E+01	0.00E+00	0.00E+00	Regression from Eco SSL		2.74E+02	2.39E+02	Regression from Eco SSL		3.46E+01	2.75E+01

1 - If the average of all value is the greater than the maximum detection, the average of the positive detections was used as the average value.

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
VOLATILES				
1,1,1-Trichloroethane	1000	1000	NV	NV
1,1,2,2-Tetrachloroethane	76	108	NV	NV
1,1,2-Trichloroethane	0.39	4.4	NV	NV
1,1-Dichloroethane	475	4750	NV	NV
1,1-Dichloroethene	30	300	NV	NV
1,2,4-Trichlorobenzene	1.48	14.8	NV	NV
1,2-Dichlorobenzene	120	1200	NV	NV
1,2-Dichloroethane	50	500	17.2	34.4
1,2-Dichloroethene (total)	45.2	452	NV	NV
1,4-Dichlorobenzene	30	300	NV	NV
2-Butanone	1771	4571	NV	NV
2-Hexanone	NV	NV	NV	NV
4-Methyl-2-pentanone	NV	NV	NV	NV
Acetone	10	50	20089	200890
Benzene	26.36	263.6	NV	NV
Bromodichloromethane	1.79	17.9	NV	NV
Carbon Disulfide	12.6	25.6	NV	NV
Carbon Tetrachloride	16	160	NV	NV
Chlorobenzene	2.725	5.45	NV	NV
Chloroform	15	41	NV	NV
Chloromethane	NV	NV	NV	NV
cis-1,2-Dichloroethene	45.2	452	NV	NV
Dichlorodifluoromethane	2310	23100	NV	NV
Ethylbenzene	9.71	29.1	NV	NV
Isopropylbenzene	11	33.1	NV	NV
m,p-Xylene	2.06	2.58	107	1070
Methyl acetate	NV	NV	NV	NV
o-Xylene	2.06	2.58	107	1070
Methylene Chloride	5.85	50	NV	NV
Styrene	20	40	NV	NV
Tetrachloroethene	1.4	7	NV	NV
Toluene	26	260	NV	NV
Trichloroethene	0.7	7	NV	NV
Trichlorofluoromethane	34.9	349	NV	NV
Vinyl chloride	17	1.7	NV	NV
Xylenes, Total	2.06	2.58	107	1070
SEMIVOLATILES				
1,1'-Biphenyl	5	25	NV	NV
2,2'-Oxybis(1-chloropropane)	NV	NV	NV	NV
2,3,4,6-Tetrachlorophenol	2.5	10	NV	NV
2,4,5-Trichlorophenol	10	30	NV	NV
2,4,6-Trichlorophenol	0.42	4.2	NV	NV
2,4-Dimethylphenol	5	25	NV	NV
1-Methylnaphthalene	65.6	356	2	20
2-Methylnaphthalene	65.6	356	2	20
2-Methylphenol	5	15	NV	NV
3-Nitroaniline	NV	NV	NV	NV
4-Chloroaniline	1.25	12.5	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
4-Chloro-3-methylphenol	NV	NV	NV	NV
4-Methylphenol	NV	NV	NV	NV
4-Nitroaniline	NV	NV	NV	NV
4-Nitrophenol	NV	NV	NV	NV
7,12-Dimethylbenz(a)anthracene	NV	NV	2	20
Acenaphthene	65.6	356	2	20
Acenaphthylene	65.6	356	2	20
Anthracene	65.6	356	2	20
Benzaldehyde	20	40	NV	NV
Benzo(a)anthracene	0.615	38.4	2	20
Benzo(a)pyrene	0.615	38.4	2	20

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Benzo(b)fluoranthene	0.615	38.4	2	20
Benzo(g,h,i)perylene	0.615	38.4	2	20
Benzo(k)fluoranthene	0.615	38.4	2	20
Bis(2-Ethylhexyl)phthalate	18.3	183	1.11	11.1
Butyl benzyl phthalate	15.9	47	NV	NV
Caprolactam	50	500	NV	NV
Carbazole	1	10	2	20
Chrysene	0.615	38.4	2	20
Dibenzo(a,h)anthracene	0.615	38.4	2	20
Dibenzofuran	NV	NV	2	20
1,4-Dichlorobenzene	30	300	NV	NV
Diethylphthalate	4583	45830	NV	NV
Di-n-butyl phthalate	550	1833	0.111	1.11
Di-n-octyl phthalate	NV	NV	NV	NV
Fluoranthene	65.6	356	2	20
Fluorene	65.6	356	2	20
Hexachloroethane	0.1	1.5	NV	NV
Indeno(1,2,3-cd)pyrene	0.615	38.4	2	20
Isophorone	15	179	NV	NV
Naphthalene	65.6	356	2	20
n-Nitrosodiphenylamine	NV	NV	NV	NV
Pentachlorophenol	8.42	22.65	6.73	52.01
Phenanthrene	65.6	356	2	20
Phenol	6	12	NV	NV
Pyrene	0.615	38.4	2	20
Perylene	0.615	38.4	2	20
HERBICIDES				
Dinoseb	0.1	1	NV	NV
2,4-D	1	5	NV	NV
2,4,5-T	3	10	NV	NV
PESTICIDES/PCBs				
2,4'-DDD	0.147	5.56	0.227	2.7
2,4'-DDE	0.147	5.56	0.227	2.7
2,4'-DDT	0.147	5.56	0.227	2.7
4,4'-DDD	0.147	5.56	0.227	2.7
4,4'-DDE	0.147	5.56	0.227	2.7
4,4'-DDT	0.147	5.56	0.227	2.7
Aldrin	0.2	1	NV	NV
Alpha-BHC	0.014	0.14	0.56	2.25
Alpha-Chlordane	4.58	9.16	2.14	10.7
Aroclor-1232	0.068	0.68	0.18	1.8
Aroclor-1242	0.069	0.69	0.41	4.1
Aroclor-1248	0.01	0.1	NV	NV
Aroclor-1254	0.068	0.68	0.18	1.8
Aroclor-1260	0.068	0.68	0.18	1.8
Aroclor-1268	0.068	0.68	0.18	1.8
PCB-28	0.068	0.68	0.18	1.8
PCB-44	0.068	0.68	0.18	1.8
PCB-52	0.068	0.68	0.18	1.8

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
PCB-66	0.068	0.68	0.18	1.8
PCB-101	0.068	0.68	0.18	1.8
PCB-105	0.068	0.68	0.18	1.8
PCB-118	0.068	0.68	0.18	1.8
PCB-128	0.068	0.68	0.18	1.8
PCB-138	0.068	0.68	0.18	1.8
PCB-153	0.068	0.68	0.18	1.8
PCB-170	0.068	0.68	0.18	1.8
PCB-180	0.068	0.68	0.18	1.8
PCB-187	0.068	0.68	0.18	1.8
PCB-195	0.068	0.68	0.18	1.8
PCB-206	0.068	0.68	0.18	1.8
PCB-209	0.068	0.68	0.18	1.8
beta-BHC	0.4	2	0.56	2.25
delta-BHC	0.014	0.14	0.56	2.25
Dieldrin	0.015	1.27	0.0709	0.8
Endosulfan I	0.15	1.5	10	100
Endosulfan II	0.15	1.5	10	100
Endosulfan Sulfate	0.15	1.5	10	100
Endrin	0.092	0.92	0.01035	0.1035
Endrin Aldehyde	0.092	0.92	0.01	0.1
Endrin Ketone	0.092	0.92	0.01	0.1
Gamma-BHC (Lindane)	8	80	2	20
Gamma-Chlordane	4.58	9.16	2.14	10.7
Heptachlor	0.1	1	NV	NV
Heptachlor Epoxide	0.1	1	NV	NV
Methoxychlor	4	8	NV	NV
Toxaphene	8	80	NV	NV
Total Aroclor	0.068	0.68	0.18	1.8
Total DDT	0.147	5.56	0.227	2.7
DIOXINS AND FURANS (mg/kg)				
1,2,3,4,6,7,8-HpCDD	0.0001	0.001	0.014	0.14
1,2,3,4,6,7,8-HpCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8,9-HPCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8-HXCDD	0.00001	0.0001	0.00028	0.0028
1,2,3,4,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,6,7,8-HxCDD	0.00001	0.0001	0.0014	0.014
1,2,3,6,7,8-HxCDF	0.00016	0.0016	0.00014	0.0014
1,2,3,7,8,9-HxCDD	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8,9-HxCDF	0.00001	0.0001	0.00014	0.0014
2,3,4,6,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8-PECDD	0.000001	0.00001	0.000014	0.00014
1,2,3,7,8-PECDF	0.00016	0.0016	0.00014	0.0014
2,3,4,7,8-PECDF	0.000016	0.00016	0.000014	0.00014
2,3,7,8-TCDD	0.000001	0.00001	0.000014	0.00014
2,3,7,8-TCDF	0.00001	0.0001	0.000014	0.00014
OCDD	0.01	0.1	0.14	1.4
OCDF	0.01	0.1	0.14	1.4
TOTAL HpCDD	0.0001	0.001	0.014	0.14

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
TOTAL HxCDD	0.00001	0.0001	0.00014	0.0014
TOTAL PeCDD	0.000001	0.00001	0.000014	0.00014
Total HpCDF	0.0001	0.001	0.0014	0.014
Total HxCDF	0.00001	0.0001	0.00014	0.0014
Total PeCDF	0.000002	0.00002	0.000014	0.00014
Total TCDD	0.000001	0.00001	0.000014	0.00014
Total TCDF	0.00001	0.0001	0.000014	0.00014
EXPLOSIVES (mg/kg)				
1,3 Dinitrobenzene	0.4	1.07	NV	NV
1,3,5-Trinitrobenzene	2.68	13.31	NV	NV
2,4-Dinitrotoluene	0.67	1.4	0.1	0.5
2,6-Dinitrotoluene	0.7	7	NV	NV
2,4,6-Trinitrotoluene	1.6	16	0.7	17.8
2-Amino-4,6-dinitrotoluene	NV	NV	NV	NV
2-Nitrotoluene	20	200	NV	NV
3-Nitrotoluene	20	200	NV	NV
4-Amino-2,6-dinitrotoluene	NV	NV	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal NOAEL	Mammal LOAEL	Bird NOAEL	Bird LOAEL
4-Nitrotoluene	20	200	NV	NV
Ammonia	NV	NV	NV	NV
HMX	3	7.5	NV	NV
Nitrobenzene (exp)	NV	NV	NV	NV
Nitroglycerin	3	32	NV	NV
RDX	7	35	NV	NV
Tetryl	1.3	6.2	NV	NV
INORGANICS				
Aluminum	1.93	19.3	109.7	1097
Antimony	0.059	2.76	NV	NV
Arsenic	1.04	4.55	2.24	4.51
Barium	51.8	82.7	20.8	41.7
Beryllium	0.532	0.673	NV	NV
Cadmium	0.77	6.9	1.47	6.35
Chromium	2.40	58.17	2.66	15.63
Hexavalent Chromium	5.66	38.37	NV	NV
Cobalt	7.33	18.90	7.61	18.34
Copper	5.6	82.7	4.05	34.87
Cyanide	68.7	687	NV	NV
Iron	50	500	100	1000
Lead	4.7	186.4	1.63	44.63
Manganese	51.5	145.67	179	376.6
Mercury	0.032	0.16	0.0064	0.064
Nickel	1.70	14.77	6.71	18.57
Selenium	0.143	0.661	0.29	0.819

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
Volatile Organics				
1,1,1-Trichloroethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
2-Butanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Methyl-2-pentanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Acetone	5.20E+00	5.20E+00	1.00E+00	1.00E+00
Carbon Disulfide	2.00E+00	2.00E+00	1.00E+00	1.00E+00
Chlorobenzene	9.00E-01	9.00E-01	1.00E+00	1.00E+00
Ethylbenzene	6.10E-01	6.10E-01	1.00E+00	1.00E+00
Isopropylbenzene	1.00E+00	1.00E+00	1.00E+00	1.00E+00
M,p-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Methyl Acetate	2.99E+01	2.99E+01	1.00E+00	1.00E+00
Methylene Chloride	6.70E+00	6.70E+00	1.00E+00	1.00E+00
O-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Tetrachloroethene	1.20E+00	1.20E+00	1.00E+00	1.00E+00
Toluene	1.03E+00	1.03E+00	1.00E+00	1.00E+00
Total Xylenes	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Trichloroethene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
Trichlorofluoromethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
Semivolatile Organics				
1,1'-Biphenyl	1.59E-01	1.59E-01	1.00E+00	1.00E+00
1,2-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
1,4-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
2,2'-Oxybis(1-Chloropropane)	???	???	1.00E+00	1.00E+00
2,3,4,6-Tetrachlorophenol	1.59E-01	1.59E-01	1.00E+00	1.00E+00
2,4-D	???	???		
2-Methylnaphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
2-Methylphenol	???	???	1.00E+00	1.00E+00
3-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Chloro-3-Methylphenol	???	???	1.00E+00	1.00E+00
4-Chloroaniline	9.03E-01	9.03E-01	1.00E+00	1.00E+00
4-Methylphenol	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitrophenol	3.00E+00	3.00E+00	1.00E+00	1.00E+00
2,4,5-Trichlorophenol	2.40E-01	2.40E-01	1.00E+00	1.00E+00
2,4,6-Trichlorophenol	2.70E-01	2.70E-01	1.00E+00	1.00E+00
2,4,5-T	???	???	???	???
Acenaphthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Acenaphthylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzaldehyde	1.76E+00	1.76E+00	1.00E+00	1.00E+00
Benzo(a)anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(a)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(b)fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(g,h,i)perylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(k)Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Bis(2-ethylhexyl)phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Butyl benzyl Phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Caprolactam	4.90E+01	4.90E+01	1.00E+00	1.00E+00
Carbazole	2.40E-01	2.40E-01	Eco-SSL	Eco-SSL
Chrysene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzo(a,h)Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzofuran	1.50E-01	1.50E-01	Eco-SSL	Eco-SSL
Diethylphthalate	1.30E+00	1.30E+00	1.00E+00	1.00E+00
Di-n-butyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Di-n-octyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Dinoseb	???	???	???	???
Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Fluorene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexachloroethane	2.10E-01	2.10E-01	1.00E+00	1.00E+00
Indeno(1,2,3-cd)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Isophorone	3.92E+00	3.92E+00	1.00E+00	1.00E+00
N-Nitrosodiphenylamine	6.05E-01	6.05E-01	1.00E+00	1.00E+00
Naphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pentachlorophenol	1.40E-02	1.40E-02	1.00E+00	1.00E+00
Phenanthrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Phenol	5.10E+00	5.10E+00	1.00E+00	1.00E+00
Pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pesticides/ PCBs				
4,4'-DDD	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDE	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Aldrin	6.90E-01	6.90E-01	3.30E+00	3.30E+00
Alpha-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Aroclor-1232	5.30E-01	5.30E-01	1.59E+01	6.67E+00
Aroclor-1242	1.60E-01	1.60E-01	1.59E+01	6.67E+00
Aroclor-1248	1.60E-02	1.60E-02	1.59E+01	6.67E+00
Aroclor-1254	1.30E-02	1.30E-02	1.59E+01	6.67E+00
Aroclor-1260	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Aroclor-1268	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Dieldrin	8.20E-02	8.20E-02	6.64E+00	6.64E+00
Gamma-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Heptachlor	1.20E-01	1.20E-01	1.00E+01	1.00E+01
Endosulfan I	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan II	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan Sulfate	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endrin	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Aldehyde	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Ketone	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Heptachlor Epoxide	2.80E-02	2.80E-02	3.00E+00	3.00E+00
Methoxychlor	1.10E-01	1.10E-01	1.00E+00	1.00E+00
alpha-BHC	2.10E-01	2.10E-01	5.00E+00	5.00E+00

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
beta-BHC	1.80E-01	1.80E-01	5.00E+00	5.00E+00
delta-BHC	9.00E-01	9.00E-01	5.00E+00	5.00E+00
gamma-BHC (Lindane)	2.70E-01	2.70E-01	5.00E+00	5.00E+00
Toxaphene	6.20E-02	6.20E-02	1.00E+00	1.00E+00
Total Aroclor	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Total DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Explosives				
2,4,6-Trinitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
2-Nitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
1,3,5-Trinitrobenzene	7.70E+00	7.70E+00	1.00E+00	1.00E+00
4-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
RDX	4.60E-01	4.60E-01	1.00E+00	1.00E+00
4-Amino-2,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
HMX	1.70E+01	1.70E+01	1.00E+00	1.00E+00
Nitrobenzene (exp)	3.40E+00	3.40E+00	1.00E+00	1.00E+00
1,3 Dinitrobenzene	4.50E+00	4.50E+00	1.00E+00	1.00E+00
2-Amino-4,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
Tetryl	???	???	1.00E+00	1.00E+00
3-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
2,4-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
2,6-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
Dioxins				
1,2,3,4,6,7,8-HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,6,7,8-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8,9-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HxCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8-PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
1,2,3,7,8-Pecdf	4.40E-03	4.40E-03	2.22E+01	1.10E+01
2,3,4,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
2,3,4,7,8-PECDF	3.70E-03	3.70E-03	2.22E+01	1.10E+01
2,3,7,8-TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ HALFND	4.30E-03	4.30E-03	2.22E+01	1.10E+01
2,3,7,8-TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDD	???	???	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDF	???	???	2.22E+01	1.10E+01
TOTAL HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
Total HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total PECDF	4.40E-03	4.40E-03	2.22E+01	1.10E+01
Total TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
Total TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
Inorganics				
Aluminum	5.00E-03	2.87E-03	1.18E-01	4.30E-02
Antimony	1.14E-02	1.02E-02	1.00E+00	1.00E+00
Arsenic	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Barium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Beryllium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cadmium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cobalt	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Copper	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexavalent Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cyanide	1.80E+00	1.00E+00	1.00E+00	1.00E+00
Iron	1.00E-02	4.25E-03	7.80E-02	3.60E-02
Lead	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Manganese	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Mercury	5.00E+00	6.52E-01	ORNL Reg.	ORNL Reg.
Nickel	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Selenium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Silver	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Thallium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Tin	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Vanadium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Zinc	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL

Notes:
BAF - Bioaccumulation Factor
BSAF - Biota Sediment Accumulation Factor
1 - ORNL (2001) for organics; only one value is available for conservative and average exposures
2 - Sample et al., (1997) for inorganics; conservative value is 90th percentile; average value is median v
3 - ORNL (September, 1998) for all chemicals; conservative value is 90th percentile; average value is m
4 - U.S. EPA, September 1997; only one value is available for conservative and average exposures. Va
5 - Conservative and average refers to the exposure scenarios for which the uptake factors are used
6 - Where "Eco-SSL" is given, values were calculated using equations from USEPA (2005), Attachment
Tables 4a (for inorganics) and 4b (for organics).

Default value of 1 is assigned to parameters without uptake factors

TABLE X-X

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

Species/Exposure Inputs	Conservative Inputs		Average Inputs	
	Values	Units	Values	Units
Bobwhite Quail				
Body Weight = BW	1.540E-01	kg	1.751E-01	kg
Food Ingestion Rate = If	2.442E-03	kg/day	2.042E-03	kg/day
Water Ingestion Rate = Iw	2.276E-02	L/day	1.926E-02	L/day
Soil Ingestion Rate = Is	3.395E-04	kg/day	1.246E-04	kg/day
Home Range = HR	Assume 100% on site		1.880E+01	acres
Meadow Vole				
Body Weight = BW	1.700E-02	kg	3.580E-02	kg
Food Ingestion Rate = If	1.878E-03	kg/day	1.744E-03	kg/day
Water Ingestion Rate = Iw	7.513E-03	L/day	6.261E-03	L/day
Soil Ingestion Rate = Is	6.010E-05	kg/day	2.093E-05	kg/day
Home Range = HR	Assume 100% on site		6.590E-02	acres
American Robin				
Body Weight = BW	7.73E-02	kg	8.04E-02	kg
Food Ingestion Rate = If	1.25E-02	kg/day	1.19E-02	kg/day
Water Ingestion Rate = Iw	1.21E-02	L/day	1.13E-02	L/day
Soil Ingestion Rate - Is	2.046E-03	kg/day	7.601E-04	kg/day
Home Range = HR	Assume 100% on site		6.095E-01	acres
Short-Tailed Shrew				
Body Weight = BW	1.500E-02	kg	1.610E-02	kg
Food Ingestion Rate = If	1.600E-03	kg/day	1.433E-03	kg/day
Water Ingestion Rate = Iw	4.280E-03	L/day	3.600E-03	L/day
Soil Ingestion Rate - Is	4.801E-05	kg/day	1.289E-05	kg/day
Home Range = HR	Assume 100% on site		9.699E-01	acres
Mink				
Body Weight = BW	5.500E-01	kg	1.103E+00	kg
Food Ingestion Rate = If	6.067E-02	kg/day	4.504E-02	kg/day
Water Ingestion Rate = Iw	1.213E-01	L/day	7.308E-02	L/day
Sediment Ingestion Rate = Is	5.703E-03	kg/day	4.234E-03	kg/day
Home Range = HR	Assume 100% on site		1.558E+03	acres
Green Heron				
Body Weight = BW	2.00E-01	kg	2.12E-01	kg
Food Ingestion Rate = If	3.10E-02	kg/day	3.00E-02	kg/day
Water Ingestion Rate = Iw	2.20E-02	L/day	2.10E-02	L/day
Sediment Ingestion Rate = Is	1.600E-03	kg/day	1.500E-03	kg/day
Home Range = HR	Assume 100% on site		1.000E+01	km-radius

Notes:
The exposure factors were derived as presented in Appendix I.

The soil/sediment ingestion rates were calculated by multiplying the food ingestion rates by the following incidental soil/sediment ingestion rates:

	Conservative	Average	Source
Bobwhite quail	13.90%	6.10%	1, 2
Meadow Vole	3.20%	1.20%	1
American Robin	16.40%	6.40%	1,4
Short-tailed Shrew	3%	0.90%	1
Mink	9.4%	9.4%	3, 5
Green Heron	5%	5%	6

1 - USEPA (U.S. Environmental Protection Agency), 2005. Ecological Soil Screening Level Guidance, Office of Emergency and Remedial Response. February.
2 - Based on the mourning dove.
3 - Beyer, N., E. Connor, and S. Gerould. 1994. Estimates of Soil Ingestion by Wildlife. Journal of Wildlife Management 58(2) pp. 375-382.
4 - Based on the American woodcock
5 - Based on the raccoon
6 - Based on piscivorous birds

APPENDIX F

MEADOW VOLE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
1-METHYLNAPHTHALENE	1.60E-02	0.00E+00	4.08E-02	5.66E-05	0.00E+00	4.51E-03	4.56E-03	6.56E+01	3.56E+02	6.95E-05	1.28E-05
2-METHYLNAPHTHALENE	6.80E-02	0.00E+00	7.87E-02	2.40E-04	0.00E+00	8.70E-03	8.94E-03	6.56E+01	3.56E+02	1.36E-04	2.51E-05
ACENAPHTHENE	7.70E-03	0.00E+00	2.47E-01	2.72E-05	0.00E+00	2.73E-02	2.73E-02	6.56E+01	3.56E+02	4.16E-04	7.67E-05
ACENAPHTHYLENE	2.40E-02	0.00E+00	1.67E-02	8.48E-05	0.00E+00	1.84E-03	1.93E-03	6.56E+01	3.56E+02	2.94E-05	5.41E-06
ANTHRACENE	1.10E-01	0.00E+00	6.67E-02	3.89E-04	0.00E+00	7.37E-03	7.76E-03	6.56E+01	3.56E+02	1.18E-04	2.18E-05
BENZO(A)ANTHRACENE	2.40E+00	0.00E+00	1.12E-01	8.48E-03	0.00E+00	1.24E-02	2.09E-02	6.15E-01	3.84E+01	3.40E-02	5.44E-04
BENZO(A)PYRENE	3.20E+00	0.00E+00	3.96E-01	1.13E-02	0.00E+00	4.37E-02	5.50E-02	6.15E-01	3.84E+01	8.95E-02	1.43E-03
BENZO(B)FLUORANTHENE	1.00E+00	0.00E+00	3.10E-01	3.54E-03	0.00E+00	3.42E-02	3.78E-02	6.15E-01	3.84E+01	6.14E-02	9.84E-04
BENZO(G,H,I)PERYLENE	1.50E+00	0.00E+00	6.37E-01	5.30E-03	0.00E+00	7.03E-02	7.56E-02	6.15E-01	3.84E+01	1.23E-01	1.97E-03
BENZO(K)FLUORANTHENE	2.00E-01	0.00E+00	2.90E-02	7.07E-04	0.00E+00	3.20E-03	3.91E-03	6.15E-01	3.84E+01	6.36E-03	1.02E-04
CHRYSENE	3.00E+00	0.00E+00	1.28E-01	1.06E-02	0.00E+00	1.42E-02	2.48E-02	6.15E-01	3.84E+01	4.03E-02	6.45E-04
DIBENZO(A,H)ANTHRACENE	5.40E-01	0.00E+00	7.02E-02	1.91E-03	0.00E+00	7.76E-03	9.66E-03	6.15E-01	3.84E+01	1.57E-02	2.52E-04
FLUORANTHENE	2.10E-01	0.00E+00	1.05E-01	7.42E-04	0.00E+00	1.16E-02	1.23E-02	6.56E+01	3.56E+02	1.88E-04	3.47E-05
FLUORENE	2.10E-02	0.00E+00	1.05E-01	7.42E-05	0.00E+00	1.16E-02	1.16E-02	6.56E+01	3.56E+02	1.77E-04	3.27E-05
INDENO(1,2,3-CD)PYRENE	2.60E-01	0.00E+00	2.86E-02	9.19E-04	0.00E+00	3.16E-03	4.08E-03	6.15E-01	3.84E+01	6.63E-03	1.06E-04
NAPHTHALENE	7.20E-03	0.00E+00	8.78E-02	2.55E-05	0.00E+00	9.70E-03	9.73E-03	6.56E+01	3.56E+02	1.48E-04	2.73E-05
PHENANTHRENE	6.20E-01	0.00E+00	6.29E-01	2.19E-03	0.00E+00	6.95E-02	7.17E-02	6.56E+01	3.56E+02	1.09E-03	2.01E-04
PYRENE	2.00E+00	0.00E+00	1.44E+00	7.07E-03	0.00E+00	1.59E-01	1.66E-01	6.15E-01	3.84E+01	2.70E-01	4.33E-03
Inorganics											
ANTIMONY	1.60E+00	0.00E+00	6.13E-02	5.66E-03	0.00E+00	6.77E-03	1.24E-02	5.90E-02	2.76E+00	2.11E-01	4.50E-03
ARSENIC	6.50E+00	0.00E+00	2.44E-01	2.30E-02	0.00E+00	2.69E-02	4.99E-02	1.04E+00	4.55E+00	4.80E-02	1.10E-02
COPPER	1.14E+01	0.00E+00	5.09E+00	4.03E-02	0.00E+00	5.62E-01	6.02E-01	5.60E+00	8.27E+01	1.08E-01	7.28E-03
LEAD	6.16E+02	0.00E+00	9.73E+00	2.18E+00	0.00E+00	1.08E+00	3.25E+00	4.70E+00	1.86E+02	6.92E-01	1.75E-02
ZINC	3.49E+01	0.00E+00	3.46E+01	1.23E-01	0.00E+00	3.82E+00	3.94E+00	7.54E+01	2.98E+02	5.23E-02	1.33E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.70E-02	kg
Food Ingestion Rate = (If)	1.88E-03	kg/day
Water Ingestion Rate = (Iw)	7.51E-03	L/day
Soil Ingestion Rate = (Is)	6.01E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

MEADOW VOLE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
1-METHYLNAPHTHALENE	1.03E-02	0.00E+00	3.34E-02	6.02E-06	0.00E+00	1.63E-03	1.63E-03	6.56E+01	3.56E+02	2.49E-05	4.59E-06
2-METHYLNAPHTHALENE	1.55E-02	0.00E+00	4.02E-02	9.04E-06	0.00E+00	1.96E-03	1.97E-03	6.56E+01	3.56E+02	3.00E-05	5.52E-06
ACENAPHTHENE	4.53E-03	0.00E+00	3.89E-01	2.65E-06	0.00E+00	1.90E-02	1.90E-02	6.56E+01	3.56E+02	2.89E-04	5.33E-05
ACENAPHTHYLENE	1.24E-02	0.00E+00	9.90E-03	7.27E-06	0.00E+00	4.83E-04	4.90E-04	6.56E+01	3.56E+02	7.47E-06	1.38E-06
ANTHRACENE	2.35E-02	0.00E+00	2.00E-02	1.37E-05	0.00E+00	9.77E-04	9.90E-04	6.56E+01	3.56E+02	1.51E-05	2.78E-06
BENZO(A)ANTHRACENE	4.06E-01	0.00E+00	3.90E-02	2.37E-04	0.00E+00	1.90E-03	2.14E-03	6.15E-01	3.84E+01	3.48E-03	5.57E-05
BENZO(A)PYRENE	4.72E-01	0.00E+00	6.12E-02	2.76E-04	0.00E+00	2.98E-03	3.26E-03	6.15E-01	3.84E+01	5.30E-03	8.48E-05
BENZO(B)FLUORANTHENE	1.61E-01	0.00E+00	4.98E-02	9.38E-05	0.00E+00	2.42E-03	2.52E-03	6.15E-01	3.84E+01	4.09E-03	6.56E-05
BENZO(G,H,I)PERYLENE	2.06E-01	0.00E+00	6.09E-02	1.21E-04	0.00E+00	2.97E-03	3.09E-03	6.15E-01	3.84E+01	5.02E-03	8.04E-05
BENZO(K)FLUORANTHENE	3.21E-02	0.00E+00	6.01E-03	1.87E-05	0.00E+00	2.93E-04	3.11E-04	6.15E-01	3.84E+01	5.06E-04	8.11E-06
CHRYSENE	5.10E-01	0.00E+00	4.47E-02	2.98E-04	0.00E+00	2.18E-03	2.48E-03	6.15E-01	3.84E+01	4.02E-03	6.45E-05
DIBENZO(A,H)ANTHRACENE	7.52E-02	0.00E+00	9.78E-03	4.40E-05	0.00E+00	4.76E-04	5.20E-04	6.15E-01	3.84E+01	8.46E-04	1.36E-05
FLUORANTHENE	4.84E-02	0.00E+00	2.42E-02	2.83E-05	0.00E+00	1.18E-03	1.21E-03	6.56E+01	3.56E+02	1.84E-05	3.39E-06
FLUORENE	1.15E-02	0.00E+00	1.75E-01	6.75E-06	0.00E+00	8.51E-03	8.52E-03	6.56E+01	3.56E+02	1.30E-04	2.39E-05
INDENO(1,2,3-CD)PYRENE	4.98E-02	0.00E+00	5.48E-03	2.91E-05	0.00E+00	2.67E-04	2.96E-04	6.15E-01	3.84E+01	4.81E-04	7.70E-06
NAPHTHALENE	5.15E-03	0.00E+00	6.28E-02	3.01E-06	0.00E+00	3.06E-03	3.06E-03	6.56E+01	3.56E+02	4.67E-05	8.61E-06
PHENANTHRENE	9.88E-02	0.00E+00	2.01E-01	5.77E-05	0.00E+00	9.81E-03	9.87E-03	6.56E+01	3.56E+02	1.50E-04	2.77E-05
PYRENE	3.52E-01	0.00E+00	2.54E-01	2.06E-04	0.00E+00	1.24E-02	1.26E-02	6.15E-01	3.84E+01	2.04E-02	3.27E-04
Inorganics											
ANTIMONY	4.39E-01	0.00E+00	1.82E-02	2.56E-04	0.00E+00	8.87E-04	1.14E-03	5.90E-02	2.76E+00	1.94E-02	4.14E-04
ARSENIC	3.00E+00	0.00E+00	1.12E-01	1.75E-03	0.00E+00	5.48E-03	7.23E-03	1.04E+00	4.55E+00	6.95E-03	1.59E-03
COPPER	6.28E+00	0.00E+00	4.02E+00	3.67E-03	0.00E+00	1.96E-01	2.00E-01	5.60E+00	8.27E+01	3.56E-02	2.41E-03
LEAD	9.09E+01	0.00E+00	3.33E+00	5.32E-02	0.00E+00	1.62E-01	2.15E-01	4.70E+00	1.86E+02	4.58E-02	1.15E-03
ZINC	2.30E+01	0.00E+00	2.75E+01	1.35E-02	0.00E+00	1.34E+00	1.35E+00	7.54E+01	2.98E+02	1.79E-02	4.54E-03

Body Weight = (BW)	3.58E-02	kg	Dose (soil) = (Cs * Is)(H)/BW
Food Ingestion Rate = (If)	1.74E-03	kg/day	Dose (vegetation) = (Cv * If)(H)/BW
Water Ingestion Rate = (Iw)	6.26E-03	L/day	Dose (water) = (Cw * Iw)(H)/BW
Soil Ingestion Rate = (Is)	2.09E-05	kg/day	Cv = Contaminant concentration in vegetation
Home Range = (HR)	6.59E-02	acres	Cs = Contaminant concentration in soil
Contaminated Area = (CA)	Assume equal to home range		Cw = Contaminant concentration in water
			Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
			H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
1-METHYLNAPHTHALENE	1.60E-02	0.00E+00	4.08E-02	3.53E-05	0.00E+00	6.47E-04	6.82E-04	2.00E+00	2.00E+01	3.4E-04	3.4E-05
2-METHYLNAPHTHALENE	6.80E-02	0.00E+00	7.87E-02	1.50E-04	0.00E+00	1.25E-03	1.40E-03	2.00E+00	2.00E+01	7.0E-04	7.0E-05
ACENAPHTHENE	7.70E-03	0.00E+00	2.47E-01	1.70E-05	0.00E+00	3.92E-03	3.94E-03	2.00E+00	2.00E+01	2.0E-03	2.0E-04
ACENAPHTHYLENE	2.40E-02	0.00E+00	1.67E-02	5.29E-05	0.00E+00	2.64E-04	3.17E-04	2.00E+00	2.00E+01	1.6E-04	1.6E-05
ANTHRACENE	1.10E-01	0.00E+00	6.67E-02	2.43E-04	0.00E+00	1.06E-03	1.30E-03	2.00E+00	2.00E+01	6.5E-04	6.5E-05
BENZO(A)ANTHRACENE	2.40E+00	0.00E+00	1.12E-01	5.29E-03	0.00E+00	1.78E-03	7.07E-03	2.00E+00	2.00E+01	3.5E-03	3.5E-04
BENZO(A)PYRENE	3.20E+00	0.00E+00	3.96E-01	7.05E-03	0.00E+00	6.27E-03	1.33E-02	2.00E+00	2.00E+01	6.7E-03	6.7E-04
BENZO(B)FLUORANTHENE	1.00E+00	0.00E+00	3.10E-01	2.20E-03	0.00E+00	4.92E-03	7.12E-03	2.00E+00	2.00E+01	3.6E-03	3.6E-04
BENZO(G,H,I)PERYLENE	1.50E+00	0.00E+00	6.37E-01	3.31E-03	0.00E+00	1.01E-02	1.34E-02	2.00E+00	2.00E+01	6.7E-03	6.7E-04
BENZO(K)FLUORANTHENE	2.00E-01	0.00E+00	2.90E-02	4.41E-04	0.00E+00	4.60E-04	9.01E-04	2.00E+00	2.00E+01	4.5E-04	4.5E-05
CHRYSENE	3.00E+00	0.00E+00	1.28E-01	6.61E-03	0.00E+00	2.03E-03	8.65E-03	2.00E+00	2.00E+01	4.3E-03	4.3E-04
DIBENZO(A,H)ANTHRACENE	5.40E-01	0.00E+00	7.02E-02	1.19E-03	0.00E+00	1.11E-03	2.30E-03	2.00E+00	2.00E+01	1.2E-03	1.2E-04
FLUORANTHENE	2.10E-01	0.00E+00	1.05E-01	4.63E-04	0.00E+00	1.67E-03	2.13E-03	2.00E+00	2.00E+01	1.1E-03	1.1E-04
FLUORENE	2.10E-02	0.00E+00	1.05E-01	4.63E-05	0.00E+00	1.66E-03	1.71E-03	2.00E+00	2.00E+01	8.5E-04	8.5E-05
INDENO(1,2,3-CD)PYRENE	2.60E-01	0.00E+00	2.86E-02	5.73E-04	0.00E+00	4.54E-04	1.03E-03	2.00E+00	2.00E+01	5.1E-04	5.1E-05
NAPHTHALENE	7.20E-03	0.00E+00	8.78E-02	1.59E-05	0.00E+00	1.39E-03	1.41E-03	2.00E+00	2.00E+01	7.0E-04	7.0E-05
PHENANTHRENE	6.20E-01	0.00E+00	6.29E-01	1.37E-03	0.00E+00	9.98E-03	1.13E-02	2.00E+00	2.00E+01	5.7E-03	5.7E-04
PYRENE	2.00E+00	0.00E+00	1.44E+00	4.41E-03	0.00E+00	2.28E-02	2.72E-02	2.00E+00	2.00E+01	1.4E-02	1.4E-03
Inorganics											
ANTIMONY	1.60E+00	0.00E+00	6.13E-02	3.53E-03	0.00E+00	9.72E-04	4.50E-03	NV	NV	#VALUE!	#VALUE!
ARSENIC	6.50E+00	0.00E+00	2.44E-01	1.43E-02	0.00E+00	3.87E-03	1.82E-02	2.24E+00	4.51E+00	8.1E-03	4.0E-03
COPPER	1.14E+01	0.00E+00	5.09E+00	2.51E-02	0.00E+00	8.07E-02	1.06E-01	4.05E+00	3.49E+01	2.6E-02	3.0E-03
LEAD	6.16E+02	0.00E+00	9.73E+00	1.36E+00	0.00E+00	1.54E-01	1.51E+00	1.63E+00	4.46E+01	9.3E-01	3.4E-02
ZINC	3.49E+01	0.00E+00	3.46E+01	7.69E-02	0.00E+00	5.48E-01	6.25E-01	6.61E+01	1.71E+02	9.5E-03	3.6E-03

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.54E-01	kg
Food Ingestion Rate = (If)	2.44E-03	kg/day
Water Ingestion Rate = (Iw)	2.28E-02	L/day
Soil Ingestion Rate = (Is)	3.40E-04	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
1-METHYLNAPHTHALENE	1.03E-02	0.00E+00	3.34E-02	7.33E-06	0.00E+00	3.89E-04	3.97E-04	2.00E+00	2.00E+01	2.0E-04	2.0E-05
2-METHYLNAPHTHALENE	1.55E-02	0.00E+00	4.02E-02	1.10E-05	0.00E+00	4.68E-04	4.79E-04	2.00E+00	2.00E+01	2.4E-04	2.4E-05
ACENAPHTHENE	4.53E-03	0.00E+00	3.89E-01	3.22E-06	0.00E+00	4.54E-03	4.54E-03	2.00E+00	2.00E+01	2.3E-03	2.3E-04
ACENAPHTHYLENE	1.24E-02	0.00E+00	9.90E-03	8.84E-06	0.00E+00	1.16E-04	1.24E-04	2.00E+00	2.00E+01	6.2E-05	6.2E-06
ANTHRACENE	2.35E-02	0.00E+00	2.00E-02	1.67E-05	0.00E+00	2.34E-04	2.50E-04	2.00E+00	2.00E+01	1.3E-04	1.3E-05
BENZO(A)ANTHRACENE	4.06E-01	0.00E+00	3.90E-02	2.89E-04	0.00E+00	4.55E-04	7.44E-04	2.00E+00	2.00E+01	3.7E-04	3.7E-05
BENZO(A)PYRENE	4.72E-01	0.00E+00	6.12E-02	3.36E-04	0.00E+00	7.14E-04	1.05E-03	2.00E+00	2.00E+01	5.2E-04	5.2E-05
BENZO(B)FLUORANTHENE	1.61E-01	0.00E+00	4.98E-02	1.14E-04	0.00E+00	5.80E-04	6.94E-04	2.00E+00	2.00E+01	3.5E-04	3.5E-05
BENZO(G,H,I)PERYLENE	2.06E-01	0.00E+00	6.09E-02	1.47E-04	0.00E+00	7.10E-04	8.57E-04	2.00E+00	2.00E+01	4.3E-04	4.3E-05
BENZO(K)FLUORANTHENE	3.21E-02	0.00E+00	6.01E-03	2.28E-05	0.00E+00	7.01E-05	9.29E-05	2.00E+00	2.00E+01	4.6E-05	4.6E-06
CHRYSENE	5.10E-01	0.00E+00	4.47E-02	3.63E-04	0.00E+00	5.21E-04	8.84E-04	2.00E+00	2.00E+01	4.4E-04	4.4E-05
DIBENZO(A,H)ANTHRACENE	7.52E-02	0.00E+00	9.78E-03	5.35E-05	0.00E+00	1.14E-04	1.68E-04	2.00E+00	2.00E+01	8.4E-05	8.4E-06
FLUORANTHENE	4.84E-02	0.00E+00	2.42E-02	3.44E-05	0.00E+00	2.82E-04	3.16E-04	2.00E+00	2.00E+01	1.6E-04	1.6E-05
FLUORENE	1.15E-02	0.00E+00	1.75E-01	8.21E-06	0.00E+00	2.04E-03	2.05E-03	2.00E+00	2.00E+01	1.0E-03	1.0E-04
INDENO(1,2,3-CD)PYRENE	4.98E-02	0.00E+00	5.48E-03	3.54E-05	0.00E+00	6.39E-05	9.93E-05	2.00E+00	2.00E+01	5.0E-05	5.0E-06
NAPHTHALENE	5.15E-03	0.00E+00	6.28E-02	3.66E-06	0.00E+00	7.33E-04	7.36E-04	2.00E+00	2.00E+01	3.7E-04	3.7E-05
PHENANTHRENE	9.88E-02	0.00E+00	2.01E-01	7.03E-05	0.00E+00	2.35E-03	2.42E-03	2.00E+00	2.00E+01	1.2E-03	1.2E-04
PYRENE	3.52E-01	0.00E+00	2.54E-01	2.50E-04	0.00E+00	2.96E-03	3.21E-03	2.00E+00	2.00E+01	1.6E-03	1.6E-04
Inorganics											
ANTIMONY	4.39E-01	0.00E+00	1.82E-02	3.12E-04	0.00E+00	2.12E-04	5.24E-04	NV	NV	#VALUE!	#VALUE!
ARSENIC	3.00E+00	0.00E+00	1.12E-01	2.13E-03	0.00E+00	1.31E-03	3.44E-03	2.24E+00	4.51E+00	1.5E-03	7.6E-04
COPPER	6.28E+00	0.00E+00	4.02E+00	4.46E-03	0.00E+00	4.69E-02	5.14E-02	4.05E+00	3.49E+01	1.3E-02	1.5E-03
LEAD	9.09E+01	0.00E+00	3.33E+00	6.47E-02	0.00E+00	3.88E-02	1.03E-01	1.63E+00	4.46E+01	6.3E-02	2.3E-03
ZINC	2.30E+01	0.00E+00	2.75E+01	1.64E-02	0.00E+00	3.20E-01	3.37E-01	6.61E+01	1.71E+02	5.1E-03	2.0E-03

Body Weight = (BW)	1.75E-01	kg	Dose (soil) = (Cs * Is)(H)/BW	Conc = Concentration
Food Ingestion Rate = (If)	2.04E-03	kg/day	Dose (vegetation) = (Cv * If)(H)/BW	LOAEL = Lowest Observed Adverse Effects Concentration
Water Ingestion Rate = (Iw)	1.93E-02	L/day	Dose (water) = (Cw * Iw)(H)/BW	NOAEL = No Observed Adverse Effects Concentration
Soil Ingestion Rate = (Is)	1.25E-04	kg/day	Cv = Contaminant concentration in vegetation	SW = Surface Water
Home Range = (HR)	1.88E+01	acres	Cs = Contaminant concentration in soil	
Contaminated Area = (CA)	Assume equal to home range		Cw = Contaminant concentration in water	
			Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)	
			H=CA/HR (Assume = to 1)	

APPENDIX F

SHORT-TAILED SHREW - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
1-METHYLNAPHTHALENE	1.60E-02	0.00E+00	4.86E-02	5.12E-05	0.00E+00	5.19E-03	5.24E-03	6.56E+01	3.56E+02	8.0E-05	1.5E-05
2-METHYLNAPHTHALENE	6.80E-02	0.00E+00	2.07E-01	2.18E-04	0.00E+00	2.21E-02	2.23E-02	6.56E+01	3.56E+02	3.4E-04	6.3E-05
ACENAPHTHENE	7.70E-03	0.00E+00	1.13E-02	2.46E-05	0.00E+00	1.21E-03	1.23E-03	6.56E+01	3.56E+02	1.9E-05	3.5E-06
ACENAPHTHYLENE	2.40E-02	0.00E+00	5.50E-01	7.68E-05	0.00E+00	5.86E-02	5.87E-02	6.56E+01	3.56E+02	9.0E-04	1.6E-04
ANTHRACENE	1.10E-01	0.00E+00	2.66E-01	3.52E-04	0.00E+00	2.84E-02	2.88E-02	6.56E+01	3.56E+02	4.4E-04	8.1E-05
BENZO(A)ANTHRACENE	2.40E+00	0.00E+00	3.82E+00	7.68E-03	0.00E+00	4.07E-01	4.15E-01	6.15E-01	3.84E+01	6.7E-01	1.1E-02
BENZO(A)PYRENE	3.20E+00	0.00E+00	4.26E+00	1.02E-02	0.00E+00	4.54E-01	4.64E-01	6.15E-01	3.84E+01	7.5E-01	1.2E-02
BENZO(B)FLUORANTHENE	1.00E+00	0.00E+00	2.60E+00	3.20E-03	0.00E+00	2.77E-01	2.81E-01	6.15E-01	3.84E+01	4.6E-01	7.3E-03
BENZO(G,H,I)PERYLENE	1.50E+00	0.00E+00	4.41E+00	4.80E-03	0.00E+00	4.71E-01	4.75E-01	6.15E-01	3.84E+01	7.7E-01	1.2E-02
BENZO(K)FLUORANTHENE	2.00E-01	0.00E+00	5.20E-01	6.40E-04	0.00E+00	5.55E-02	5.61E-02	6.15E-01	3.84E+01	9.1E-02	1.5E-03
CHRYSENE	3.00E+00	0.00E+00	6.87E+00	9.60E-03	0.00E+00	7.33E-01	7.43E-01	6.15E-01	3.84E+01	1.2E+00	1.9E-02
DIBENZO(A,H)ANTHRACENE	5.40E-01	0.00E+00	1.25E+00	1.73E-03	0.00E+00	1.33E-01	1.35E-01	6.15E-01	3.84E+01	2.2E-01	3.5E-03
FLUORANTHENE	2.10E-01	0.00E+00	6.38E-01	6.72E-04	0.00E+00	6.81E-02	6.88E-02	6.56E+01	3.56E+02	1.0E-03	1.9E-04
FLUORENE	2.10E-02	0.00E+00	2.01E-01	6.72E-05	0.00E+00	2.14E-02	2.15E-02	6.56E+01	3.56E+02	3.3E-04	6.0E-05
INDENO(1,2,3-CD)PYRENE	2.60E-01	0.00E+00	7.44E-01	8.32E-04	0.00E+00	7.93E-02	8.02E-02	6.15E-01	3.84E+01	1.3E-01	2.1E-03
NAPHTHALENE	7.20E-03	0.00E+00	3.17E-02	2.30E-05	0.00E+00	3.38E-03	3.40E-03	6.56E+01	3.56E+02	5.2E-05	9.6E-06
PHENANTHRENE	6.20E-01	0.00E+00	1.07E+00	1.98E-03	0.00E+00	1.14E-01	1.16E-01	6.56E+01	3.56E+02	1.8E-03	3.3E-04
PYRENE	2.00E+00	0.00E+00	3.50E+00	6.40E-03	0.00E+00	3.73E-01	3.80E-01	6.15E-01	3.84E+01	6.2E-01	9.9E-03
Inorganics											
ANTIMONY	1.60E+00	0.00E+00	1.60E+00	5.12E-03	0.00E+00	1.71E-01	1.76E-01	5.90E-02	2.76E+00	3.0E+00	6.4E-02
ARSENIC	6.50E+00	0.00E+00	9.05E-01	2.08E-02	0.00E+00	9.66E-02	1.17E-01	1.04E+00	4.55E+00	1.1E-01	2.6E-02
COPPER	1.14E+01	0.00E+00	5.87E+00	3.65E-02	0.00E+00	6.26E-01	6.63E-01	5.60E+00	8.27E+01	1.2E-01	8.0E-03
LEAD	6.16E+02	0.00E+00	1.43E+02	1.97E+00	0.00E+00	1.53E+01	1.73E+01	4.70E+00	1.86E+02	3.7E+00	9.3E-02
ZINC	3.49E+01	0.00E+00	2.74E+02	1.12E-01	0.00E+00	2.93E+01	2.94E+01	7.54E+01	2.98E+02	3.9E-01	9.9E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.50E-02	kg
Food Ingestion Rate = (If)	1.60E-03	kg/day
Water Ingestion Rate = (Iw)	4.28E-03	L/day
Soil Ingestion Rate = (Is)	4.80E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
1-METHYLNAPHTHALENE	1.03E-02	0.00E+00	3.13E-02	8.25E-06	0.00E+00	2.79E-03	2.80E-03	6.56E+01	3.56E+02	4.3E-05	7.9E-06
2-METHYLNAPHTHALENE	1.55E-02	0.00E+00	4.70E-02	1.24E-05	0.00E+00	4.18E-03	4.19E-03	6.56E+01	3.56E+02	6.4E-05	1.2E-05
ACENAPHTHENE	4.53E-03	0.00E+00	6.65E-03	3.62E-06	0.00E+00	5.92E-04	5.95E-04	6.56E+01	3.56E+02	9.1E-06	1.7E-06
ACENAPHTHYLENE	1.24E-02	0.00E+00	2.85E-01	9.95E-06	0.00E+00	2.53E-02	2.53E-02	6.56E+01	3.56E+02	3.9E-04	7.1E-05
ANTHRACENE	2.35E-02	0.00E+00	5.68E-02	1.88E-05	0.00E+00	5.05E-03	5.07E-03	6.56E+01	3.56E+02	7.7E-05	1.4E-05
BENZO(A)ANTHRACENE	4.06E-01	0.00E+00	6.45E-01	3.25E-04	0.00E+00	5.74E-02	5.77E-02	6.15E-01	3.84E+01	9.4E-02	1.5E-03
BENZO(A)PYRENE	4.72E-01	0.00E+00	6.28E-01	3.78E-04	0.00E+00	5.58E-02	5.62E-02	6.15E-01	3.84E+01	9.1E-02	1.5E-03
BENZO(B)FLUORANTHENE	1.61E-01	0.00E+00	4.17E-01	1.29E-04	0.00E+00	3.71E-02	3.73E-02	6.15E-01	3.84E+01	6.1E-02	9.7E-04
BENZO(G,H,I)PERYLENE	2.06E-01	0.00E+00	6.06E-01	1.65E-04	0.00E+00	5.39E-02	5.41E-02	6.15E-01	3.84E+01	8.8E-02	1.4E-03
BENZO(K)FLUORANTHENE	3.21E-02	0.00E+00	8.33E-02	2.57E-05	0.00E+00	7.42E-03	7.44E-03	6.15E-01	3.84E+01	1.2E-02	1.9E-04
CHRYSENE	5.10E-01	0.00E+00	1.17E+00	4.08E-04	0.00E+00	1.04E-01	1.04E-01	6.15E-01	3.84E+01	1.7E-01	2.7E-03
DIBENZO(A,H)ANTHRACENE	7.52E-02	0.00E+00	1.74E-01	6.03E-05	0.00E+00	1.55E-02	1.55E-02	6.15E-01	3.84E+01	2.5E-02	4.0E-04
FLUORANTHENE	4.84E-02	0.00E+00	1.47E-01	3.87E-05	0.00E+00	1.31E-02	1.31E-02	6.56E+01	3.56E+02	2.0E-04	3.7E-05
FLUORENE	1.15E-02	0.00E+00	1.10E-01	9.24E-06	0.00E+00	9.83E-03	9.83E-03	6.56E+01	3.56E+02	1.5E-04	2.8E-05
INDENO(1,2,3-CD)PYRENE	4.98E-02	0.00E+00	1.42E-01	3.99E-05	0.00E+00	1.27E-02	1.27E-02	6.15E-01	3.84E+01	2.1E-02	3.3E-04
NAPHTHALENE	5.15E-03	0.00E+00	2.27E-02	4.12E-06	0.00E+00	2.02E-03	2.02E-03	6.56E+01	3.56E+02	3.1E-05	5.7E-06
PHENANTHRENE	9.88E-02	0.00E+00	1.70E-01	7.91E-05	0.00E+00	1.51E-02	1.52E-02	6.56E+01	3.56E+02	2.3E-04	4.3E-05
PYRENE	3.52E-01	0.00E+00	6.16E-01	2.82E-04	0.00E+00	5.48E-02	5.51E-02	6.15E-01	3.84E+01	9.0E-02	1.4E-03
Inorganics											
ANTIMONY	4.39E-01	0.00E+00	4.39E-01	3.51E-04	0.00E+00	3.90E-02	3.94E-02	5.90E-02	2.76E+00	6.7E-01	1.4E-02
ARSENIC	3.00E+00	0.00E+00	5.24E-01	2.40E-03	0.00E+00	4.66E-02	4.90E-02	1.04E+00	4.55E+00	4.7E-02	1.1E-02
COPPER	6.28E+00	0.00E+00	3.23E+00	5.03E-03	0.00E+00	2.88E-01	2.93E-01	5.60E+00	8.27E+01	5.2E-02	3.5E-03
LEAD	9.09E+01	0.00E+00	3.06E+01	7.28E-02	0.00E+00	2.72E+00	2.80E+00	4.70E+00	1.86E+02	6.0E-01	1.5E-02
ZINC	2.30E+01	0.00E+00	2.39E+02	1.84E-02	0.00E+00	2.13E+01	2.13E+01	7.54E+01	2.98E+02	2.8E-01	7.2E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.61E-02	kg
Food Ingestion Rate = (If)	1.43E-03	kg/day
Water Ingestion Rate = (Iw)	3.60E-03	L/day
Soil Ingestion Rate = (Is)	1.29E-05	kg/day
Home Range = (HR)	9.70E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
1-METHYLNAPHTHALENE	1.60E-02	0.00E+00	4.86E-02	4.23E-04	0.00E+00	7.85E-03	8.27E-03	2.00E+00	2.00E+01	4.1E-03	4.1E-04
2-METHYLNAPHTHALENE	6.80E-02	0.00E+00	2.07E-01	1.80E-03	0.00E+00	3.34E-02	3.52E-02	2.00E+00	2.00E+01	1.8E-02	1.8E-03
ACENAPHTHENE	7.70E-03	0.00E+00	1.13E-02	2.04E-04	0.00E+00	1.83E-03	2.03E-03	2.00E+00	2.00E+01	1.0E-03	1.0E-04
ACENAPHTHYLENE	2.40E-02	0.00E+00	5.50E-01	6.35E-04	0.00E+00	8.87E-02	8.93E-02	2.00E+00	2.00E+01	4.5E-02	4.5E-03
ANTHRACENE	1.10E-01	0.00E+00	2.66E-01	2.91E-03	0.00E+00	4.30E-02	4.59E-02	2.00E+00	2.00E+01	2.3E-02	2.3E-03
BENZO(A)ANTHRACENE	2.40E+00	0.00E+00	3.82E+00	6.35E-02	0.00E+00	6.16E-01	6.79E-01	2.00E+00	2.00E+01	3.4E-01	3.4E-02
BENZO(A)PYRENE	3.20E+00	0.00E+00	4.26E+00	8.47E-02	0.00E+00	6.87E-01	7.72E-01	2.00E+00	2.00E+01	3.9E-01	3.9E-02
BENZO(B)FLUORANTHENE	1.00E+00	0.00E+00	2.60E+00	2.65E-02	0.00E+00	4.20E-01	4.46E-01	2.00E+00	2.00E+01	2.2E-01	2.2E-02
BENZO(G,H,I)PERYLENE	1.50E+00	0.00E+00	4.41E+00	3.97E-02	0.00E+00	7.12E-01	7.51E-01	2.00E+00	2.00E+01	3.8E-01	3.8E-02
BENZO(K)FLUORANTHENE	2.00E-01	0.00E+00	5.20E-01	5.29E-03	0.00E+00	8.39E-02	8.92E-02	2.00E+00	2.00E+01	4.5E-02	4.5E-03
CHRYSENE	3.00E+00	0.00E+00	6.87E+00	7.94E-02	0.00E+00	1.11E+00	1.19E+00	2.00E+00	2.00E+01	5.9E-01	5.9E-02
DIBENZO(A,H)ANTHRACENE	5.40E-01	0.00E+00	1.25E+00	1.43E-02	0.00E+00	2.01E-01	2.16E-01	2.00E+00	2.00E+01	1.1E-01	1.1E-02
FLUORANTHENE	2.10E-01	0.00E+00	6.38E-01	5.56E-03	0.00E+00	1.03E-01	1.09E-01	2.00E+00	2.00E+01	5.4E-02	5.4E-03
FLUORENE	2.10E-02	0.00E+00	2.01E-01	5.56E-04	0.00E+00	3.24E-02	3.30E-02	2.00E+00	2.00E+01	1.6E-02	1.6E-03
INDENO(1,2,3-CD)PYRENE	2.60E-01	0.00E+00	7.44E-01	6.88E-03	0.00E+00	1.20E-01	1.27E-01	2.00E+00	2.00E+01	6.3E-02	6.3E-03
NAPHTHALENE	7.20E-03	0.00E+00	3.17E-02	1.91E-04	0.00E+00	5.11E-03	5.30E-03	2.00E+00	2.00E+01	2.7E-03	2.7E-04
PHENANTHRENE	6.20E-01	0.00E+00	1.07E+00	1.64E-02	0.00E+00	1.72E-01	1.89E-01	2.00E+00	2.00E+01	9.4E-02	9.4E-03
PYRENE	2.00E+00	0.00E+00	3.50E+00	5.29E-02	0.00E+00	5.65E-01	6.18E-01	2.00E+00	2.00E+01	3.1E-01	3.1E-02
Inorganics											
ANTIMONY	1.60E+00	0.00E+00	1.60E+00	4.23E-02	0.00E+00	2.58E-01	3.01E-01	NV	NV	#VALUE!	#VALUE!
ARSENIC	6.50E+00	0.00E+00	9.05E-01	1.72E-01	0.00E+00	1.46E-01	3.18E-01	2.24E+00	4.51E+00	1.4E-01	7.1E-02
COPPER	1.14E+01	0.00E+00	5.87E+00	3.02E-01	0.00E+00	9.47E-01	1.25E+00	4.05E+00	3.49E+01	3.1E-01	3.6E-02
LEAD	6.16E+02	0.00E+00	1.43E+02	1.63E+01	0.00E+00	2.31E+01	3.94E+01	1.63E+00	4.46E+01	2.4E+01	8.8E-01
ZINC	3.49E+01	0.00E+00	2.74E+02	9.24E-01	0.00E+00	4.43E+01	4.52E+01	6.61E+01	1.71E+02	6.8E-01	2.6E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	7.73E-02	kg
Food Ingestion Rate = (If)	1.25E-02	kg/day
Water Ingestion Rate = (Iw)	1.21E-02	L/day
Soil Ingestion Rate = (Is)	2.05E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
1-METHYLNAPHTHALENE	1.03E-02	0.00E+00	3.13E-02	9.74E-05	0.00E+00	4.63E-03	4.73E-03	2.00E+00	2.00E+01	2.4E-03	2.4E-04
2-METHYLNAPHTHALENE	1.55E-02	0.00E+00	4.70E-02	1.46E-04	0.00E+00	6.94E-03	7.09E-03	2.00E+00	2.00E+01	3.5E-03	3.5E-04
ACENAPHTHENE	4.53E-03	0.00E+00	6.65E-03	4.28E-05	0.00E+00	9.83E-04	1.03E-03	2.00E+00	2.00E+01	5.1E-04	5.1E-05
ACENAPHTHYLENE	1.24E-02	0.00E+00	2.85E-01	1.18E-04	0.00E+00	4.20E-02	4.22E-02	2.00E+00	2.00E+01	2.1E-02	2.1E-03
ANTHRACENE	2.35E-02	0.00E+00	5.68E-02	2.22E-04	0.00E+00	8.39E-03	8.61E-03	2.00E+00	2.00E+01	4.3E-03	4.3E-04
BENZO(A)ANTHRACENE	4.06E-01	0.00E+00	6.45E-01	3.84E-03	0.00E+00	9.53E-02	9.92E-02	2.00E+00	2.00E+01	5.0E-02	5.0E-03
BENZO(A)PYRENE	4.72E-01	0.00E+00	6.28E-01	4.46E-03	0.00E+00	9.27E-02	9.72E-02	2.00E+00	2.00E+01	4.9E-02	4.9E-03
BENZO(B)FLUORANTHENE	1.61E-01	0.00E+00	4.17E-01	1.52E-03	0.00E+00	6.16E-02	6.32E-02	2.00E+00	2.00E+01	3.2E-02	3.2E-03
BENZO(G,H,I)PERYLENE	2.06E-01	0.00E+00	6.06E-01	1.95E-03	0.00E+00	8.96E-02	9.15E-02	2.00E+00	2.00E+01	4.6E-02	4.6E-03
BENZO(K)FLUORANTHENE	3.21E-02	0.00E+00	8.33E-02	3.03E-04	0.00E+00	1.23E-02	1.26E-02	2.00E+00	2.00E+01	6.3E-03	6.3E-04
CHRYSENE	5.10E-01	0.00E+00	1.17E+00	4.82E-03	0.00E+00	1.73E-01	1.77E-01	2.00E+00	2.00E+01	8.9E-02	8.9E-03
DIBENZO(A,H)ANTHRACENE	7.52E-02	0.00E+00	1.74E-01	7.11E-04	0.00E+00	2.57E-02	2.64E-02	2.00E+00	2.00E+01	1.3E-02	1.3E-03
FLUORANTHENE	4.84E-02	0.00E+00	1.47E-01	4.57E-04	0.00E+00	2.17E-02	2.22E-02	2.00E+00	2.00E+01	1.1E-02	1.1E-03
FLUORENE	1.15E-02	0.00E+00	1.10E-01	1.09E-04	0.00E+00	1.63E-02	1.64E-02	2.00E+00	2.00E+01	8.2E-03	8.2E-04
INDENO(1,2,3-CD)PYRENE	4.98E-02	0.00E+00	1.42E-01	4.71E-04	0.00E+00	2.10E-02	2.15E-02	2.00E+00	2.00E+01	1.1E-02	1.1E-03
NAPHTHALENE	5.15E-03	0.00E+00	2.27E-02	4.87E-05	0.00E+00	3.35E-03	3.40E-03	2.00E+00	2.00E+01	1.7E-03	1.7E-04
PHENANTHRENE	9.88E-02	0.00E+00	1.70E-01	9.34E-04	0.00E+00	2.51E-02	2.60E-02	2.00E+00	2.00E+01	1.3E-02	1.3E-03
PYRENE	3.52E-01	0.00E+00	6.16E-01	3.33E-03	0.00E+00	9.10E-02	9.44E-02	2.00E+00	2.00E+01	4.7E-02	4.7E-03
Inorganics											
ANTIMONY	4.39E-01	0.00E+00	4.39E-01	4.15E-03	0.00E+00	6.48E-02	6.90E-02	NV	NV	#VALUE!	#VALUE!
ARSENIC	3.00E+00	0.00E+00	5.24E-01	2.83E-02	0.00E+00	7.74E-02	1.06E-01	2.24E+00	4.51E+00	4.7E-02	2.3E-02
COPPER	6.28E+00	0.00E+00	3.23E+00	5.93E-02	0.00E+00	4.77E-01	5.37E-01	4.05E+00	3.49E+01	1.3E-01	1.5E-02
LEAD	9.09E+01	0.00E+00	3.06E+01	8.60E-01	0.00E+00	4.52E+00	5.38E+00	1.63E+00	4.46E+01	3.3E+00	1.2E-01
ZINC	2.30E+01	0.00E+00	2.39E+02	2.18E-01	0.00E+00	3.54E+01	3.56E+01	6.61E+01	1.71E+02	5.4E-01	2.1E-01

Body Weight = (BW)	8.04E-02	kg	Dose (soil) = (Cs * Is)(H)/BW	Conc = Concentration
Food Ingestion Rate = (If)	1.19E-02	kg/day	Dose (invertebrate) = (Ci * If)(H)/BW	LOAEL = Lowest Observed Adverse Effects Concentration
Water Ingestion Rate = (Iw)	1.13E-02	L/day	Dose (water) = (Cw * Iw)(H)/BW	NOAEL = No Observed Adverse Effects Concentration
Soil Ingestion Rate = (Is)	7.60E-04	kg/day	Ci = Contaminant concentration in invertebrate	SW = Surface Water
Home Range = (HR)	6.10E-01	acres	Cs = Contaminant concentration in soil	
Contaminated Area = (CA)	Assume equal to home range		Cw = Contaminant concentration in water	
			Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)	
			H=CA/HR (Assume = to 1)	

TABLE 7-6.3.3

TERRESTRIAL FOOD CHAIN MODEL - CONSERVATIVE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - SURFACE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Semivolatile Organics								
1-METHYLNAPHTHALENE	3.4E-04	3.4E-05	7.0E-05	1.3E-05	4.1E-03	4.1E-04	8.0E-05	1.5E-05
2-METHYLNAPHTHALENE	7.0E-04	7.0E-05	1.4E-04	2.5E-05	1.8E-02	1.8E-03	3.4E-04	6.3E-05
ACENAPHTHENE	2.0E-03	2.0E-04	4.2E-04	7.7E-05	1.0E-03	1.0E-04	1.9E-05	3.5E-06
ACENAPHTHYLENE	1.6E-04	1.6E-05	2.9E-05	5.4E-06	4.5E-02	4.5E-03	9.0E-04	1.6E-04
ANTHRACENE	6.5E-04	6.5E-05	1.2E-04	2.2E-05	2.3E-02	2.3E-03	4.4E-04	8.1E-05
BENZO(A)ANTHRACENE	3.5E-03	3.5E-04	3.4E-02	5.4E-04	3.4E-01	3.4E-02	6.7E-01	1.1E-02
BENZO(A)PYRENE	6.7E-03	6.7E-04	8.9E-02	1.4E-03	3.9E-01	3.9E-02	7.5E-01	1.2E-02
BENZO(B)FLUORANTHENE	3.6E-03	3.6E-04	6.1E-02	9.8E-04	2.2E-01	2.2E-02	4.6E-01	7.3E-03
BENZO(G,H,I)PERYLENE	6.7E-03	6.7E-04	1.2E-01	2.0E-03	3.8E-01	3.8E-02	7.7E-01	1.2E-02
BENZO(K)FLUORANTHENE	4.5E-04	4.5E-05	6.4E-03	1.0E-04	4.5E-02	4.5E-03	9.1E-02	1.5E-03
CHRYSENE	4.3E-03	4.3E-04	4.0E-02	6.4E-04	5.9E-01	5.9E-02	1.2E+00	1.9E-02
DIBENZO(A,H)ANTHRACENE	1.2E-03	1.2E-04	1.6E-02	2.5E-04	1.1E-01	1.1E-02	2.2E-01	3.5E-03
FLUORANTHENE	1.1E-03	1.1E-04	1.9E-04	3.5E-05	5.4E-02	5.4E-03	1.0E-03	1.9E-04
FLUORENE	8.5E-04	8.5E-05	1.8E-04	3.3E-05	1.6E-02	1.6E-03	3.3E-04	6.0E-05
INDENO(1,2,3-CD)PYRENE	5.1E-04	5.1E-05	6.6E-03	1.1E-04	6.3E-02	6.3E-03	1.3E-01	2.1E-03
NAPHTHALENE	7.0E-04	7.0E-05	1.5E-04	2.7E-05	2.7E-03	2.7E-04	5.2E-05	9.6E-06
PHENANTHRENE	5.7E-03	5.7E-04	1.1E-03	2.0E-04	9.4E-02	9.4E-03	1.8E-03	3.3E-04
PYRENE	1.4E-02	1.4E-03	2.7E-01	4.3E-03	3.1E-01	3.1E-02	6.2E-01	9.9E-03
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	2.1E-01	4.5E-03	#VALUE!	#VALUE!	3.0E+00	6.4E-02
ARSENIC	8.1E-03	4.0E-03	4.8E-02	1.1E-02	1.4E-01	7.1E-02	1.1E-01	2.6E-02
COPPER	2.6E-02	3.0E-03	1.1E-01	7.3E-03	3.1E-01	3.6E-02	1.2E-01	8.0E-03
LEAD	9.3E-01	3.4E-02	6.9E-01	1.7E-02	2.4E+01	8.8E-01	3.7E+00	9.3E-02
ZINC	9.5E-03	3.6E-03	5.2E-02	1.3E-02	6.8E-01	2.6E-01	3.9E-01	9.9E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

TABLE 7-6.3.5

TERRESTRIAL FOOD CHAIN MODEL - AVERAGE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - SURFACE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Semivolatile Organics								
1-METHYLNAPHTHALENE	2.0E-04	2.0E-05	2.5E-05	4.6E-06	2.4E-03	2.4E-04	4.3E-05	7.9E-06
2-METHYLNAPHTHALENE	2.4E-04	2.4E-05	3.0E-05	5.5E-06	3.5E-03	3.5E-04	6.4E-05	1.2E-05
ACENAPHTHENE	2.3E-03	2.3E-04	2.9E-04	5.3E-05	5.1E-04	5.1E-05	9.1E-06	1.7E-06
ACENAPHTHYLENE	6.2E-05	6.2E-06	7.5E-06	1.4E-06	2.1E-02	2.1E-03	3.9E-04	7.1E-05
ANTHRACENE	1.3E-04	1.3E-05	1.5E-05	2.8E-06	4.3E-03	4.3E-04	7.7E-05	1.4E-05
BENZO(A)ANTHRACENE	3.7E-04	3.7E-05	3.5E-03	5.6E-05	5.0E-02	5.0E-03	9.4E-02	1.5E-03
BENZO(A)PYRENE	5.2E-04	5.2E-05	5.3E-03	8.5E-05	4.9E-02	4.9E-03	9.1E-02	1.5E-03
BENZO(B)FLUORANTHENE	3.5E-04	3.5E-05	4.1E-03	6.6E-05	3.2E-02	3.2E-03	6.1E-02	9.7E-04
BENZO(G,H,I)PERYLENE	4.3E-04	4.3E-05	5.0E-03	8.0E-05	4.6E-02	4.6E-03	8.8E-02	1.4E-03
BENZO(K)FLUORANTHENE	4.6E-05	4.6E-06	5.1E-04	8.1E-06	6.3E-03	6.3E-04	1.2E-02	1.9E-04
CHRYSENE	4.4E-04	4.4E-05	4.0E-03	6.4E-05	8.9E-02	8.9E-03	1.7E-01	2.7E-03
DIBENZO(A,H)ANTHRACENE	8.4E-05	8.4E-06	8.5E-04	1.4E-05	1.3E-02	1.3E-03	2.5E-02	4.0E-04
FLUORANTHENE	1.6E-04	1.6E-05	1.8E-05	3.4E-06	1.1E-02	1.1E-03	2.0E-04	3.7E-05
FLUORENE	1.0E-03	1.0E-04	1.3E-04	2.4E-05	8.2E-03	8.2E-04	1.5E-04	2.8E-05
INDENO(1,2,3-CD)PYRENE	5.0E-05	5.0E-06	4.8E-04	7.7E-06	1.1E-02	1.1E-03	2.1E-02	3.3E-04
NAPHTHALENE	3.7E-04	3.7E-05	4.7E-05	8.6E-06	1.7E-03	1.7E-04	3.1E-05	5.7E-06
PHENANTHRENE	1.2E-03	1.2E-04	1.5E-04	2.8E-05	1.3E-02	1.3E-03	2.3E-04	4.3E-05
PYRENE	1.6E-03	1.6E-04	2.0E-02	3.3E-04	4.7E-02	4.7E-03	9.0E-02	1.4E-03
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	1.9E-02	4.1E-04	#VALUE!	#VALUE!	6.7E-01	1.4E-02
ARSENIC	1.5E-03	7.6E-04	7.0E-03	1.6E-03	4.7E-02	2.3E-02	4.7E-02	1.1E-02
COPPER	1.3E-02	1.5E-03	3.6E-02	2.4E-03	1.3E-01	1.5E-02	5.2E-02	3.5E-03
LEAD	6.3E-02	2.3E-03	4.6E-02	1.2E-03	3.3E+00	1.2E-01	6.0E-01	1.5E-02
ZINC	5.1E-03	2.0E-03	1.8E-02	4.5E-03	5.4E-01	2.1E-01	2.8E-01	7.2E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

APPENDIX F

CHEMICAL CONCENTRATIONS IN SURFACE SOIL AND TISSUE - COMPOSITE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Surface Soil Concentrations (mg/kg)				Surface Water Concentrations (mg/L)		Earthworm Bioaccumulation Factors		Earthworm Concentrations (mg/kg)		Plant Bioaccumulation Factors		Plant Concentrations (mg/kg)	
	Maximum Detection	Average All	Average of Positive Detections	Average [1]	Maximum Detection	Average Concentration[1]	Conservative	Average	Maximum Detection	Average	Conservative	Average	Maximum Detection	Average
Inorganics														
ANTIMONY	1.00E-01	1.00E-01	1.00E-01	1.00E-01	0.00E+00	0.00E+00	1.00E+00	1.00E+00	1.00E-01	1.00E-01	1.14E-02	1.02E-02	4.55E-03	4.55E-03
ARSENIC	4.30E+00	4.30E+00	4.30E+00	4.30E+00	0.00E+00	0.00E+00	Regression from Eco SSL		6.76E-01	6.76E-01	Regression from Eco SSL		1.61E-01	1.61E-01
COPPER	8.50E+00	8.50E+00	8.50E+00	8.50E+00	0.00E+00	0.00E+00	5.15E-01	5.15E-01	4.38E+00	4.38E+00	Regression from Eco SSL		4.53E+00	4.53E+00
LEAD	9.40E+00	9.40E+00	9.40E+00	9.40E+00	0.00E+00	0.00E+00	Regression from Eco SSL		4.90E+00	4.90E+00	Regression from Eco SSL		9.31E-01	9.31E-01
TIN	1.60E+00	1.60E+00	1.60E+00	1.60E+00	0.00E+00	0.00E+00	1.00E+00	1.00E+00	1.60E+00	1.60E+00	1.00E+00	1.00E+00	1.60E+00	1.60E+00
ZINC	3.02E+01	3.02E+01	3.02E+01	3.02E+01	0.00E+00	0.00E+00	Regression from Eco SSL		2.62E+02	2.62E+02	Regression from Eco SSL		3.19E+01	3.19E+01

1 - If the average of all value is the greater than the maximum detection, the average of the positive detections was used as the average value.

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
VOLATILES				
1,1,1-Trichloroethane	1000	1000	NV	NV
1,1,2,2-Tetrachloroethane	76	108	NV	NV
1,1,2-Trichloroethane	0.39	4.4	NV	NV
1,1-Dichloroethane	475	4750	NV	NV
1,1-Dichloroethene	30	300	NV	NV
1,2,4-Trichlorobenzene	1.48	14.8	NV	NV
1,2-Dichlorobenzene	120	1200	NV	NV
1,2-Dichloroethane	50	500	17.2	34.4
1,2-Dichloroethene (total)	45.2	452	NV	NV
1,4-Dichlorobenzene	30	300	NV	NV
2-Butanone	1771	4571	NV	NV
2-Hexanone	NV	NV	NV	NV
4-Methyl-2-pentanone	NV	NV	NV	NV
Acetone	10	50	20089	200890
Benzene	26.36	263.6	NV	NV
Bromodichloromethane	1.79	17.9	NV	NV
Carbon Disulfide	12.6	25.6	NV	NV
Carbon Tetrachloride	16	160	NV	NV
Chlorobenzene	2.725	5.45	NV	NV
Chloroform	15	41	NV	NV
Chloromethane	NV	NV	NV	NV
cis-1,2-Dichloroethene	45.2	452	NV	NV
Dichlorodifluoromethane	2310	23100	NV	NV
Ethylbenzene	9.71	29.1	NV	NV
Isopropylbenzene	11	33.1	NV	NV
m,p-Xylene	2.06	2.58	107	1070
Methyl acetate	NV	NV	NV	NV
o-Xylene	2.06	2.58	107	1070
Methylene Chloride	5.85	50	NV	NV
Styrene	20	40	NV	NV
Tetrachloroethene	1.4	7	NV	NV
Toluene	26	260	NV	NV
Trichloroethene	0.7	7	NV	NV
Trichlorofluoromethane	34.9	349	NV	NV
Vinyl chloride	17	1.7	NV	NV
Xylenes, Total	2.06	2.58	107	1070
SEMIVOLATILES				
1,1'-Biphenyl	5	25	NV	NV
2,2'-Oxybis(1-chloropropane)	NV	NV	NV	NV
2,3,4,6-Tetrachlorophenol	2.5	10	NV	NV
2,4,5-Trichlorophenol	10	30	NV	NV
2,4,6-Trichlorophenol	0.42	4.2	NV	NV
2,4-Dimethylphenol	5	25	NV	NV
1-Methylnaphthalene	65.6	356	2	20
2-Methylnaphthalene	65.6	356	2	20
2-Methylphenol	5	15	NV	NV
3-Nitroaniline	NV	NV	NV	NV
4-Chloroaniline	1.25	12.5	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
4-Chloro-3-methylphenol	NV	NV	NV	NV
4-Methylphenol	NV	NV	NV	NV
4-Nitroaniline	NV	NV	NV	NV
4-Nitrophenol	NV	NV	NV	NV
7,12-Dimethylbenz(a)anthracene	NV	NV	2	20
Acenaphthene	65.6	356	2	20
Acenaphthylene	65.6	356	2	20
Anthracene	65.6	356	2	20
Benzaldehyde	20	40	NV	NV
Benzo(a)anthracene	0.615	38.4	2	20
Benzo(a)pyrene	0.615	38.4	2	20

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Benzo(b)fluoranthene	0.615	38.4	2	20
Benzo(g,h,i)perylene	0.615	38.4	2	20
Benzo(k)fluoranthene	0.615	38.4	2	20
Bis(2-Ethylhexyl)phthalate	18.3	183	1.11	11.1
Butyl benzyl phthalate	15.9	47	NV	NV
Caprolactam	50	500	NV	NV
Carbazole	1	10	2	20
Chrysene	0.615	38.4	2	20
Dibenzo(a,h)anthracene	0.615	38.4	2	20
Dibenzofuran	NV	NV	2	20
1,4-Dichlorobenzene	30	300	NV	NV
Diethylphthalate	4583	45830	NV	NV
Di-n-butyl phthalate	550	1833	0.111	1.11
Di-n-octyl phthalate	NV	NV	NV	NV
Fluoranthene	65.6	356	2	20
Fluorene	65.6	356	2	20
Hexachloroethane	0.1	1.5	NV	NV
Indeno(1,2,3-cd)pyrene	0.615	38.4	2	20
Isophorone	15	179	NV	NV
Naphthalene	65.6	356	2	20
n-Nitrosodiphenylamine	NV	NV	NV	NV
Pentachlorophenol	8.42	22.65	6.73	52.01
Phenanthrene	65.6	356	2	20
Phenol	6	12	NV	NV
Pyrene	0.615	38.4	2	20
Perylene	0.615	38.4	2	20
HERBICIDES				
Dinoseb	0.1	1	NV	NV
2,4-D	1	5	NV	NV
2,4,5-T	3	10	NV	NV
PESTICIDES/PCBs				
2,4'-DDD	0.147	5.56	0.227	2.7
2,4'-DDE	0.147	5.56	0.227	2.7
2,4'-DDT	0.147	5.56	0.227	2.7
4,4'-DDD	0.147	5.56	0.227	2.7
4,4'-DDE	0.147	5.56	0.227	2.7
4,4'-DDT	0.147	5.56	0.227	2.7
Aldrin	0.2	1	NV	NV
Alpha-BHC	0.014	0.14	0.56	2.25
Alpha-Chlordane	4.58	9.16	2.14	10.7
Aroclor-1232	0.068	0.68	0.18	1.8
Aroclor-1242	0.069	0.69	0.41	4.1
Aroclor-1248	0.01	0.1	NV	NV
Aroclor-1254	0.068	0.68	0.18	1.8
Aroclor-1260	0.068	0.68	0.18	1.8
Aroclor-1268	0.068	0.68	0.18	1.8
PCB-28	0.068	0.68	0.18	1.8
PCB-44	0.068	0.68	0.18	1.8
PCB-52	0.068	0.68	0.18	1.8

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
PCB-66	0.068	0.68	0.18	1.8
PCB-101	0.068	0.68	0.18	1.8
PCB-105	0.068	0.68	0.18	1.8
PCB-118	0.068	0.68	0.18	1.8
PCB-128	0.068	0.68	0.18	1.8
PCB-138	0.068	0.68	0.18	1.8
PCB-153	0.068	0.68	0.18	1.8
PCB-170	0.068	0.68	0.18	1.8
PCB-180	0.068	0.68	0.18	1.8
PCB-187	0.068	0.68	0.18	1.8
PCB-195	0.068	0.68	0.18	1.8
PCB-206	0.068	0.68	0.18	1.8
PCB-209	0.068	0.68	0.18	1.8
beta-BHC	0.4	2	0.56	2.25
delta-BHC	0.014	0.14	0.56	2.25
Dieldrin	0.015	1.27	0.0709	0.8
Endosulfan I	0.15	1.5	10	100
Endosulfan II	0.15	1.5	10	100
Endosulfan Sulfate	0.15	1.5	10	100
Endrin	0.092	0.92	0.01035	0.1035
Endrin Aldehyde	0.092	0.92	0.01	0.1
Endrin Ketone	0.092	0.92	0.01	0.1
Gamma-BHC (Lindane)	8	80	2	20
Gamma-Chlordane	4.58	9.16	2.14	10.7
Heptachlor	0.1	1	NV	NV
Heptachlor Epoxide	0.1	1	NV	NV
Methoxychlor	4	8	NV	NV
Toxaphene	8	80	NV	NV
Total Aroclor	0.068	0.68	0.18	1.8
Total DDT	0.147	5.56	0.227	2.7
DIOXINS AND FURANS (mg/kg)				
1,2,3,4,6,7,8-HpCDD	0.0001	0.001	0.014	0.14
1,2,3,4,6,7,8-HpCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8,9-HPCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8-HXCDD	0.00001	0.0001	0.00028	0.0028
1,2,3,4,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,6,7,8-HxCDD	0.00001	0.0001	0.0014	0.014
1,2,3,6,7,8-HxCDF	0.00016	0.0016	0.00014	0.0014
1,2,3,7,8,9-HxCDD	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8,9-HxCDF	0.00001	0.0001	0.00014	0.0014
2,3,4,6,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8-PECDD	0.000001	0.00001	0.000014	0.00014
1,2,3,7,8-PECDF	0.00016	0.0016	0.00014	0.0014
2,3,4,7,8-PECDF	0.000016	0.00016	0.000014	0.00014
2,3,7,8-TCDD	0.000001	0.00001	0.000014	0.00014
2,3,7,8-TCDF	0.00001	0.0001	0.000014	0.00014
OCDD	0.01	0.1	0.14	1.4
OCDF	0.01	0.1	0.14	1.4
TOTAL HpCDD	0.0001	0.001	0.014	0.14

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
TOTAL HxCDD	0.00001	0.0001	0.00014	0.0014
TOTAL PeCDD	0.000001	0.00001	0.000014	0.00014
Total HpCDF	0.0001	0.001	0.0014	0.014
Total HxCDF	0.00001	0.0001	0.00014	0.0014
Total PeCDF	0.000002	0.00002	0.000014	0.00014
Total TCDD	0.000001	0.00001	0.000014	0.00014
Total TCDF	0.00001	0.0001	0.000014	0.00014
EXPLOSIVES (mg/kg)				
1,3 Dinitrobenzene	0.4	1.07	NV	NV
1,3,5-Trinitrobenzene	2.68	13.31	NV	NV
2,4-Dinitrotoluene	0.67	1.4	0.1	0.5
2,6-Dinitrotoluene	0.7	7	NV	NV
2,4,6-Trinitrotoluene	1.6	16	0.7	17.8
2-Amino-4,6-dinitrotoluene	NV	NV	NV	NV
2-Nitrotoluene	20	200	NV	NV
3-Nitrotoluene	20	200	NV	NV
4-Amino-2,6-dinitrotoluene	NV	NV	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal NOAEL	Mammal LOAEL	Bird NOAEL	Bird LOAEL
4-Nitrotoluene	20	200	NV	NV
Ammonia	NV	NV	NV	NV
HMX	3	7.5	NV	NV
Nitrobenzene (exp)	NV	NV	NV	NV
Nitroglycerin	3	32	NV	NV
RDX	7	35	NV	NV
Tetryl	1.3	6.2	NV	NV
INORGANICS				
Aluminum	1.93	19.3	109.7	1097
Antimony	0.059	2.76	NV	NV
Arsenic	1.04	4.55	2.24	4.51
Barium	51.8	82.7	20.8	41.7
Beryllium	0.532	0.673	NV	NV
Cadmium	0.77	6.9	1.47	6.35
Chromium	2.40	58.17	2.66	15.63
Hexavalent Chromium	5.66	38.37	NV	NV
Cobalt	7.33	18.90	7.61	18.34
Copper	5.6	82.7	4.05	34.87
Cyanide	68.7	687	NV	NV
Iron	50	500	100	1000
Lead	4.7	186.4	1.63	44.63
Manganese	51.5	145.67	179	376.6
Mercury	0.032	0.16	0.0064	0.064
Nickel	1.70	14.77	6.71	18.57
Selenium	0.143	0.661	0.29	0.819

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
Volatile Organics				
1,1,1-Trichloroethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
2-Butanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Methyl-2-pentanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Acetone	5.20E+00	5.20E+00	1.00E+00	1.00E+00
Carbon Disulfide	2.00E+00	2.00E+00	1.00E+00	1.00E+00
Chlorobenzene	9.00E-01	9.00E-01	1.00E+00	1.00E+00
Ethylbenzene	6.10E-01	6.10E-01	1.00E+00	1.00E+00
Isopropylbenzene	1.00E+00	1.00E+00	1.00E+00	1.00E+00
M,p-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Methyl Acetate	2.99E+01	2.99E+01	1.00E+00	1.00E+00
Methylene Chloride	6.70E+00	6.70E+00	1.00E+00	1.00E+00
O-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Tetrachloroethene	1.20E+00	1.20E+00	1.00E+00	1.00E+00
Toluene	1.03E+00	1.03E+00	1.00E+00	1.00E+00
Total Xylenes	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Trichloroethene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
Trichlorofluoromethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
Semivolatile Organics				
1,1'-Biphenyl	1.59E-01	1.59E-01	1.00E+00	1.00E+00
1,2-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
1,4-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
2,2'-Oxybis(1-Chloropropane)	???	???	1.00E+00	1.00E+00
2,3,4,6-Tetrachlorophenol	1.59E-01	1.59E-01	1.00E+00	1.00E+00
2,4-D	???	???		
2-Methylnaphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
2-Methylphenol	???	???	1.00E+00	1.00E+00
3-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Chloro-3-Methylphenol	???	???	1.00E+00	1.00E+00
4-Chloroaniline	9.03E-01	9.03E-01	1.00E+00	1.00E+00
4-Methylphenol	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitrophenol	3.00E+00	3.00E+00	1.00E+00	1.00E+00
2,4,5-Trichlorophenol	2.40E-01	2.40E-01	1.00E+00	1.00E+00
2,4,6-Trichlorophenol	2.70E-01	2.70E-01	1.00E+00	1.00E+00
2,4,5-T	???	???	???	???
Acenaphthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Acenaphthylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzaldehyde	1.76E+00	1.76E+00	1.00E+00	1.00E+00
Benzo(a)anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(a)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(b)fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(g,h,i)perylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(k)Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Bis(2-ethylhexyl)phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Butyl benzyl Phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Caprolactam	4.90E+01	4.90E+01	1.00E+00	1.00E+00
Carbazole	2.40E-01	2.40E-01	Eco-SSL	Eco-SSL
Chrysene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzo(a,h)Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzofuran	1.50E-01	1.50E-01	Eco-SSL	Eco-SSL
Diethylphthalate	1.30E+00	1.30E+00	1.00E+00	1.00E+00
Di-n-butyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Di-n-octyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Dinoseb	???	???	???	???
Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Fluorene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexachloroethane	2.10E-01	2.10E-01	1.00E+00	1.00E+00
Indeno(1,2,3-cd)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Isophorone	3.92E+00	3.92E+00	1.00E+00	1.00E+00
N-Nitrosodiphenylamine	6.05E-01	6.05E-01	1.00E+00	1.00E+00
Naphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pentachlorophenol	1.40E-02	1.40E-02	1.00E+00	1.00E+00
Phenanthrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Phenol	5.10E+00	5.10E+00	1.00E+00	1.00E+00
Pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pesticides/ PCBs				
4,4'-DDD	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDE	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Aldrin	6.90E-01	6.90E-01	3.30E+00	3.30E+00
Alpha-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Aroclor-1232	5.30E-01	5.30E-01	1.59E+01	6.67E+00
Aroclor-1242	1.60E-01	1.60E-01	1.59E+01	6.67E+00
Aroclor-1248	1.60E-02	1.60E-02	1.59E+01	6.67E+00
Aroclor-1254	1.30E-02	1.30E-02	1.59E+01	6.67E+00
Aroclor-1260	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Aroclor-1268	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Dieldrin	8.20E-02	8.20E-02	6.64E+00	6.64E+00
Gamma-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Heptachlor	1.20E-01	1.20E-01	1.00E+01	1.00E+01
Endosulfan I	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan II	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan Sulfate	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endrin	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Aldehyde	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Ketone	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Heptachlor Epoxide	2.80E-02	2.80E-02	3.00E+00	3.00E+00
Methoxychlor	1.10E-01	1.10E-01	1.00E+00	1.00E+00
alpha-BHC	2.10E-01	2.10E-01	5.00E+00	5.00E+00

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
beta-BHC	1.80E-01	1.80E-01	5.00E+00	5.00E+00
delta-BHC	9.00E-01	9.00E-01	5.00E+00	5.00E+00
gamma-BHC (Lindane)	2.70E-01	2.70E-01	5.00E+00	5.00E+00
Toxaphene	6.20E-02	6.20E-02	1.00E+00	1.00E+00
Total Aroclor	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Total DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Explosives				
2,4,6-Trinitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
2-Nitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
1,3,5-Trinitrobenzene	7.70E+00	7.70E+00	1.00E+00	1.00E+00
4-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
RDX	4.60E-01	4.60E-01	1.00E+00	1.00E+00
4-Amino-2,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
HMX	1.70E+01	1.70E+01	1.00E+00	1.00E+00
Nitrobenzene (exp)	3.40E+00	3.40E+00	1.00E+00	1.00E+00
1,3 Dinitrobenzene	4.50E+00	4.50E+00	1.00E+00	1.00E+00
2-Amino-4,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
Tetryl	???	???	1.00E+00	1.00E+00
3-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
2,4-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
2,6-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
Dioxins				
1,2,3,4,6,7,8-HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,6,7,8-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8,9-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HxCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8-PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
1,2,3,7,8-Pecdf	4.40E-03	4.40E-03	2.22E+01	1.10E+01
2,3,4,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
2,3,4,7,8-PECDF	3.70E-03	3.70E-03	2.22E+01	1.10E+01
2,3,7,8-TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ HALFND	4.30E-03	4.30E-03	2.22E+01	1.10E+01
2,3,7,8-TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDD	???	???	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDF	???	???	2.22E+01	1.10E+01
TOTAL HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
Total HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total PECDF	4.40E-03	4.40E-03	2.22E+01	1.10E+01
Total TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
Total TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
Inorganics				
Aluminum	5.00E-03	2.87E-03	1.18E-01	4.30E-02
Antimony	1.14E-02	1.02E-02	1.00E+00	1.00E+00
Arsenic	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Barium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Beryllium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cadmium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cobalt	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Copper	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexavalent Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cyanide	1.80E+00	1.00E+00	1.00E+00	1.00E+00
Iron	1.00E-02	4.25E-03	7.80E-02	3.60E-02
Lead	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Manganese	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Mercury	5.00E+00	6.52E-01	ORNL Reg.	ORNL Reg.
Nickel	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Selenium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Silver	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Thallium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Tin	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Vanadium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Zinc	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL

Notes:
BAF - Bioaccumulation Factor
BSAF - Biota Sediment Accumulation Factor
1 - ORNL (2001) for organics; only one value is available for conservative and average exposures
2 - Sample et al., (1997) for inorganics; conservative value is 90th percentile; average value is median v
3 - ORNL (September, 1998) for all chemicals; conservative value is 90th percentile; average value is m
4 - U.S. EPA, September 1997; only one value is available for conservative and average exposures. Va
5 - Conservative and average refers to the exposure scenarios for which the uptake factors are used
6 - Where "Eco-SSL" is given, values were calculated using equations from USEPA (2005), Attachment
Tables 4a (for inorganics) and 4b (for organics).

Default value of 1 is assigned to parameters without uptake factors

TABLE X-X

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

Species/Exposure Inputs	Conservative Inputs		Average Inputs	
	Values	Units	Values	Units
Bobwhite Quail				
Body Weight = BW	1.540E-01	kg	1.751E-01	kg
Food Ingestion Rate = If	2.442E-03	kg/day	2.042E-03	kg/day
Water Ingestion Rate = Iw	2.276E-02	L/day	1.926E-02	L/day
Soil Ingestion Rate = Is	3.395E-04	kg/day	1.246E-04	kg/day
Home Range = HR	Assume 100% on site		1.880E+01	acres
Meadow Vole				
Body Weight = BW	1.700E-02	kg	3.580E-02	kg
Food Ingestion Rate = If	1.878E-03	kg/day	1.744E-03	kg/day
Water Ingestion Rate = Iw	7.513E-03	L/day	6.261E-03	L/day
Soil Ingestion Rate = Is	6.010E-05	kg/day	2.093E-05	kg/day
Home Range = HR	Assume 100% on site		6.590E-02	acres
American Robin				
Body Weight = BW	7.73E-02	kg	8.04E-02	kg
Food Ingestion Rate = If	1.25E-02	kg/day	1.19E-02	kg/day
Water Ingestion Rate = Iw	1.21E-02	L/day	1.13E-02	L/day
Soil Ingestion Rate - Is	2.046E-03	kg/day	7.601E-04	kg/day
Home Range = HR	Assume 100% on site		6.095E-01	acres
Short-Tailed Shrew				
Body Weight = BW	1.500E-02	kg	1.610E-02	kg
Food Ingestion Rate = If	1.600E-03	kg/day	1.433E-03	kg/day
Water Ingestion Rate = Iw	4.280E-03	L/day	3.600E-03	L/day
Soil Ingestion Rate - Is	4.801E-05	kg/day	1.289E-05	kg/day
Home Range = HR	Assume 100% on site		9.699E-01	acres
Mink				
Body Weight = BW	5.500E-01	kg	1.103E+00	kg
Food Ingestion Rate = If	6.067E-02	kg/day	4.504E-02	kg/day
Water Ingestion Rate = Iw	1.213E-01	L/day	7.308E-02	L/day
Sediment Ingestion Rate = Is	5.703E-03	kg/day	4.234E-03	kg/day
Home Range = HR	Assume 100% on site		1.558E+03	acres
Green Heron				
Body Weight = BW	2.00E-01	kg	2.12E-01	kg
Food Ingestion Rate = If	3.10E-02	kg/day	3.00E-02	kg/day
Water Ingestion Rate = Iw	2.20E-02	L/day	2.10E-02	L/day
Sediment Ingestion Rate = Is	1.600E-03	kg/day	1.500E-03	kg/day
Home Range = HR	Assume 100% on site		1.000E+01	km-radius

Notes:
The exposure factors were derived as presented in Appendix I.

The soil/sediment ingestion rates were calculated by multiplying the food ingestion rates by the following incidental soil/sediment ingestion rates:

	Conservative	Average	Source
Bobwhite quail	13.90%	6.10%	1, 2
Meadow Vole	3.20%	1.20%	1
American Robin	16.40%	6.40%	1,4
Short-tailed Shrew	3%	0.90%	1
Mink	9.4%	9.4%	3, 5
Green Heron	5%	5%	6

1 - USEPA (U.S. Environmental Protection Agency), 2005. Ecological Soil Screening Level Guidance, Office of Emergency and Remedial Response. February.
2 - Based on the mourning dove.
3 - Beyer, N., E. Connor, and S. Gerould. 1994. Estimates of Soil Ingestion by Wildlife. Journal of Wildlife Management 58(2) pp. 375-382.
4 - Based on the American woodcock
5 - Based on the raccoon
6 - Based on piscivorous birds

APPENDIX F

MEADOW VOLE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.00E-01	0.00E+00	4.55E-03	3.54E-04	0.00E+00	5.03E-04	8.56E-04	5.90E-02	2.76E+00	1.45E-02	3.10E-04
ARSENIC	4.30E+00	0.00E+00	1.61E-01	1.52E-02	0.00E+00	1.78E-02	3.30E-02	1.04E+00	4.55E+00	3.18E-02	7.26E-03
COPPER	8.50E+00	0.00E+00	4.53E+00	3.01E-02	0.00E+00	5.01E-01	5.31E-01	5.60E+00	8.27E+01	9.48E-02	6.42E-03
LEAD	9.40E+00	0.00E+00	9.31E-01	3.32E-02	0.00E+00	1.03E-01	1.36E-01	4.70E+00	1.86E+02	2.90E-02	7.30E-04
TIN	1.60E+00	0.00E+00	1.60E+00	5.66E-03	0.00E+00	1.77E-01	1.82E-01	2.34E+01	3.50E+01	7.80E-03	5.21E-03
ZINC	3.02E+01	0.00E+00	3.19E+01	1.07E-01	0.00E+00	3.53E+00	3.63E+00	7.54E+01	2.98E+02	4.82E-02	1.22E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.70E-02	kg
Food Ingestion Rate = (If)	1.88E-03	kg/day
Water Ingestion Rate = (Iw)	7.51E-03	L/day
Soil Ingestion Rate = (Is)	6.01E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

MEADOW VOLE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.00E-01	0.00E+00	4.55E-03	5.85E-05	0.00E+00	2.22E-04	2.80E-04	5.90E-02	2.76E+00	4.75E-03	1.01E-04
ARSENIC	4.30E+00	0.00E+00	1.61E-01	2.51E-03	0.00E+00	7.86E-03	1.04E-02	1.04E+00	4.55E+00	9.97E-03	2.28E-03
COPPER	8.50E+00	0.00E+00	4.53E+00	4.97E-03	0.00E+00	2.21E-01	2.26E-01	5.60E+00	8.27E+01	4.03E-02	2.73E-03
LEAD	9.40E+00	0.00E+00	9.31E-01	5.50E-03	0.00E+00	4.54E-02	5.09E-02	4.70E+00	1.86E+02	1.08E-02	2.73E-04
TIN	1.60E+00	0.00E+00	1.60E+00	9.35E-04	0.00E+00	7.79E-02	7.89E-02	2.34E+01	3.50E+01	3.37E-03	2.25E-03
ZINC	3.02E+01	0.00E+00	3.19E+01	1.77E-02	0.00E+00	1.55E+00	1.57E+00	7.54E+01	2.98E+02	2.09E-02	5.28E-03

Body Weight = (BW)	3.58E-02	kg
Food Ingestion Rate = (If)	1.74E-03	kg/day
Water Ingestion Rate = (Iw)	6.26E-03	L/day
Soil Ingestion Rate = (Is)	2.09E-05	kg/day
Home Range = (HR)	6.59E-02	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.00E-01	0.00E+00	4.55E-03	2.20E-04	0.00E+00	7.22E-05	2.93E-04	NV	NV	#VALUE!	#VALUE!
ARSENIC	4.30E+00	0.00E+00	1.61E-01	9.48E-03	0.00E+00	2.56E-03	1.20E-02	2.24E+00	4.51E+00	5.4E-03	2.7E-03
COPPER	8.50E+00	0.00E+00	4.53E+00	1.87E-02	0.00E+00	7.19E-02	9.06E-02	4.05E+00	3.49E+01	2.2E-02	2.6E-03
LEAD	9.40E+00	0.00E+00	9.31E-01	2.07E-02	0.00E+00	1.48E-02	3.55E-02	1.63E+00	4.46E+01	2.2E-02	8.0E-04
TIN	1.60E+00	0.00E+00	1.60E+00	3.53E-03	0.00E+00	2.54E-02	2.89E-02	6.76E+00	1.69E+01	4.3E-03	1.7E-03
ZINC	3.02E+01	0.00E+00	3.19E+01	6.66E-02	0.00E+00	5.06E-01	5.73E-01	6.61E+01	1.71E+02	8.7E-03	3.3E-03

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.54E-01	kg
Food Ingestion Rate = (If)	2.44E-03	kg/day
Water Ingestion Rate = (Iw)	2.28E-02	L/day
Soil Ingestion Rate = (Is)	3.40E-04	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.00E-01	0.00E+00	4.55E-03	7.11E-05	0.00E+00	5.31E-05	1.24E-04	NV	NV	#VALUE!	#VALUE!
ARSENIC	4.30E+00	0.00E+00	1.61E-01	3.06E-03	0.00E+00	1.88E-03	4.94E-03	2.24E+00	4.51E+00	2.2E-03	1.1E-03
COPPER	8.50E+00	0.00E+00	4.53E+00	6.05E-03	0.00E+00	5.29E-02	5.89E-02	4.05E+00	3.49E+01	1.5E-02	1.7E-03
LEAD	9.40E+00	0.00E+00	9.31E-01	6.69E-03	0.00E+00	1.09E-02	1.75E-02	1.63E+00	4.46E+01	1.1E-02	3.9E-04
TIN	1.60E+00	0.00E+00	1.60E+00	1.14E-03	0.00E+00	1.87E-02	1.98E-02	6.76E+00	1.69E+01	2.9E-03	1.2E-03
ZINC	3.02E+01	0.00E+00	3.19E+01	2.15E-02	0.00E+00	3.72E-01	3.94E-01	6.61E+01	1.71E+02	6.0E-03	2.3E-03

Body Weight = (BW)	1.75E-01	kg
Food Ingestion Rate = (If)	2.04E-03	kg/day
Water Ingestion Rate = (Iw)	1.93E-02	L/day
Soil Ingestion Rate = (Is)	1.25E-04	kg/day
Home Range = (HR)	1.88E+01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.00E-01	0.00E+00	1.00E-01	3.20E-04	0.00E+00	1.07E-02	1.10E-02	5.90E-02	2.76E+00	1.9E-01	4.0E-03
ARSENIC	4.30E+00	0.00E+00	6.76E-01	1.38E-02	0.00E+00	7.21E-02	8.59E-02	1.04E+00	4.55E+00	8.3E-02	1.9E-02
COPPER	8.50E+00	0.00E+00	4.38E+00	2.72E-02	0.00E+00	4.67E-01	4.94E-01	5.60E+00	8.27E+01	8.8E-02	6.0E-03
LEAD	9.40E+00	0.00E+00	4.90E+00	3.01E-02	0.00E+00	5.23E-01	5.53E-01	4.70E+00	1.86E+02	1.2E-01	3.0E-03
TIN	1.60E+00	0.00E+00	1.60E+00	5.12E-03	0.00E+00	1.71E-01	1.76E-01	2.34E+01	3.50E+01	7.5E-03	5.0E-03
ZINC	3.02E+01	0.00E+00	2.62E+02	9.67E-02	0.00E+00	2.79E+01	2.80E+01	7.54E+01	2.98E+02	3.7E-01	9.4E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.50E-02	kg
Food Ingestion Rate = (If)	1.60E-03	kg/day
Water Ingestion Rate = (Iw)	4.28E-03	L/day
Soil Ingestion Rate = (Is)	4.80E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.00E-01	0.00E+00	1.00E-01	8.01E-05	0.00E+00	8.90E-03	8.98E-03	5.90E-02	2.76E+00	1.5E-01	3.3E-03
ARSENIC	4.30E+00	0.00E+00	6.76E-01	3.44E-03	0.00E+00	6.02E-02	6.36E-02	1.04E+00	4.55E+00	6.1E-02	1.4E-02
COPPER	8.50E+00	0.00E+00	4.38E+00	6.81E-03	0.00E+00	3.90E-01	3.96E-01	5.60E+00	8.27E+01	7.1E-02	4.8E-03
LEAD	9.40E+00	0.00E+00	4.90E+00	7.53E-03	0.00E+00	4.36E-01	4.44E-01	4.70E+00	1.86E+02	9.4E-02	2.4E-03
TIN	1.60E+00	0.00E+00	1.60E+00	1.28E-03	0.00E+00	1.42E-01	1.44E-01	2.34E+01	3.50E+01	6.1E-03	4.1E-03
ZINC	3.02E+01	0.00E+00	2.62E+02	2.42E-02	0.00E+00	2.33E+01	2.33E+01	7.54E+01	2.98E+02	3.1E-01	7.8E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.61E-02	kg
Food Ingestion Rate = (If)	1.43E-03	kg/day
Water Ingestion Rate = (Iw)	3.60E-03	L/day
Soil Ingestion Rate = (Is)	1.29E-05	kg/day
Home Range = (HR)	9.70E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.00E-01	0.00E+00	1.00E-01	2.65E-03	0.00E+00	1.61E-02	1.88E-02	NV	NV	#VALUE!	#VALUE!
ARSENIC	4.30E+00	0.00E+00	6.76E-01	1.14E-01	0.00E+00	1.09E-01	2.23E-01	2.24E+00	4.51E+00	1.0E-01	4.9E-02
COPPER	8.50E+00	0.00E+00	4.38E+00	2.25E-01	0.00E+00	7.06E-01	9.31E-01	4.05E+00	3.49E+01	2.3E-01	2.7E-02
LEAD	9.40E+00	0.00E+00	4.90E+00	2.49E-01	0.00E+00	7.92E-01	1.04E+00	1.63E+00	4.46E+01	6.4E-01	2.3E-02
TIN	1.60E+00	0.00E+00	1.60E+00	4.23E-02	0.00E+00	2.58E-01	3.01E-01	6.76E+00	1.69E+01	4.4E-02	1.8E-02
ZINC	3.02E+01	0.00E+00	2.62E+02	7.99E-01	0.00E+00	4.22E+01	4.30E+01	6.61E+01	1.71E+02	6.5E-01	2.5E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	7.73E-02	kg
Food Ingestion Rate = (If)	1.25E-02	kg/day
Water Ingestion Rate = (Iw)	1.21E-02	L/day
Soil Ingestion Rate = (Is)	2.05E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - COMPOSITE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.00E-01	0.00E+00	1.00E-01	9.45E-04	0.00E+00	1.48E-02	1.57E-02	NV	NV	#VALUE!	#VALUE!
ARSENIC	4.30E+00	0.00E+00	6.76E-01	4.07E-02	0.00E+00	9.99E-02	1.41E-01	2.24E+00	4.51E+00	6.3E-02	3.1E-02
COPPER	8.50E+00	0.00E+00	4.38E+00	8.04E-02	0.00E+00	6.47E-01	7.27E-01	4.05E+00	3.49E+01	1.8E-01	2.1E-02
LEAD	9.40E+00	0.00E+00	4.90E+00	8.89E-02	0.00E+00	7.25E-01	8.13E-01	1.63E+00	4.46E+01	5.0E-01	1.8E-02
TIN	1.60E+00	0.00E+00	1.60E+00	1.51E-02	0.00E+00	2.36E-01	2.51E-01	6.76E+00	1.69E+01	3.7E-02	1.5E-02
ZINC	3.02E+01	0.00E+00	2.62E+02	2.86E-01	0.00E+00	3.86E+01	3.89E+01	6.61E+01	1.71E+02	5.9E-01	2.3E-01

Body Weight = (BW)	8.04E-02	kg
Food Ingestion Rate = (If)	1.19E-02	kg/day
Water Ingestion Rate = (Iw)	1.13E-02	L/day
Soil Ingestion Rate = (Is)	7.60E-04	kg/day
Home Range = (HR)	6.10E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

TABLE 8-6.3.4

TERRESTRIAL FOOD CHAIN MODEL - CONSERVATIVE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - COMPOSITE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	1.5E-02	3.1E-04	#VALUE!	#VALUE!	1.9E-01	4.0E-03
ARSENIC	5.4E-03	2.7E-03	3.2E-02	7.3E-03	1.0E-01	4.9E-02	8.3E-02	1.9E-02
COPPER	2.2E-02	2.6E-03	9.5E-02	6.4E-03	2.3E-01	2.7E-02	8.8E-02	6.0E-03
LEAD	2.2E-02	8.0E-04	2.9E-02	7.3E-04	6.4E-01	2.3E-02	1.2E-01	3.0E-03
TIN	4.3E-03	1.7E-03	7.8E-03	5.2E-03	4.4E-02	1.8E-02	7.5E-03	5.0E-03
ZINC	8.7E-03	3.3E-03	4.8E-02	1.2E-02	6.5E-01	2.5E-01	3.7E-01	9.4E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

TABLE 8-6.3.6

TERRESTRIAL FOOD CHAIN MODEL - AVERAGE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - COMPOSITE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	4.7E-03	1.0E-04	#VALUE!	#VALUE!	1.5E-01	3.3E-03
ARSENIC	2.2E-03	1.1E-03	1.0E-02	2.3E-03	6.3E-02	3.1E-02	6.1E-02	1.4E-02
COPPER	1.5E-02	1.7E-03	4.0E-02	2.7E-03	1.8E-01	2.1E-02	7.1E-02	4.8E-03
LEAD	1.1E-02	3.9E-04	1.1E-02	2.7E-04	5.0E-01	1.8E-02	9.4E-02	2.4E-03
TIN	2.9E-03	1.2E-03	3.4E-03	2.3E-03	3.7E-02	1.5E-02	6.1E-03	4.1E-03
ZINC	6.0E-03	2.3E-03	2.1E-02	5.3E-03	5.9E-01	2.3E-01	3.1E-01	7.8E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

APPENDIX F

CHEMICAL CONCENTRATIONS IN SURFACE SOIL AND TISSUE - SURFACE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Surface Soil Concentrations (mg/kg)				Surface Water Concentrations (mg/L)		Earthworm Bioaccumulation Factors		Earthworm Concentrations (mg/kg)		Plant Bioaccumulation Factors		Plant Concentrations (mg/kg)	
	Maximum Detection	Average All	Average of Positive Detections	Average [1]	Maximum Detection	Average Concentration[1]	Conservative	Average	Maximum Detection	Average	Conservative	Average	Maximum Detection	Average
Inorganics														
ANTIMONY	1.22E+01	1.28E+00	1.58E+00	1.28E+00	0.00E+00	0.00E+00	1.00E+00	1.00E+00	1.22E+01	1.28E+00	1.14E-02	1.02E-02	4.12E-01	4.96E-02
ARSENIC	2.26E+01	4.42E+00	5.01E+00	4.42E+00	0.00E+00	0.00E+00	Regression from Eco SSL		2.18E+00	6.89E-01	Regression from Eco SSL		8.48E-01	1.66E-01
COPPER	3.70E+02	4.11E+01	4.11E+01	4.11E+01	0.00E+00	0.00E+00	5.15E-01	5.15E-01	1.91E+02	2.12E+01	Regression from Eco SSL		2.00E+01	8.43E+00
LEAD	3.45E+03	3.49E+02	3.49E+02	3.49E+02	0.00E+00	0.00E+00	Regression from Eco SSL		5.76E+02	9.07E+01	Regression from Eco SSL		2.56E+01	7.08E+00
ZINC	6.39E+01	3.39E+01	3.39E+01	3.39E+01	0.00E+00	0.00E+00	Regression from Eco SSL		3.34E+02	2.72E+02	Regression from Eco SSL		4.83E+01	3.40E+01

1 - If the average of all value is the greater than the maximum detection, the average of the positive detections was used as the average value.

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
VOLATILES				
1,1,1-Trichloroethane	1000	1000	NV	NV
1,1,2,2-Tetrachloroethane	76	108	NV	NV
1,1,2-Trichloroethane	0.39	4.4	NV	NV
1,1-Dichloroethane	475	4750	NV	NV
1,1-Dichloroethene	30	300	NV	NV
1,2,4-Trichlorobenzene	1.48	14.8	NV	NV
1,2-Dichlorobenzene	120	1200	NV	NV
1,2-Dichloroethane	50	500	17.2	34.4
1,2-Dichloroethene (total)	45.2	452	NV	NV
1,4-Dichlorobenzene	30	300	NV	NV
2-Butanone	1771	4571	NV	NV
2-Hexanone	NV	NV	NV	NV
4-Methyl-2-pentanone	NV	NV	NV	NV
Acetone	10	50	20089	200890
Benzene	26.36	263.6	NV	NV
Bromodichloromethane	1.79	17.9	NV	NV
Carbon Disulfide	12.6	25.6	NV	NV
Carbon Tetrachloride	16	160	NV	NV
Chlorobenzene	2.725	5.45	NV	NV
Chloroform	15	41	NV	NV
Chloromethane	NV	NV	NV	NV
cis-1,2-Dichloroethene	45.2	452	NV	NV
Dichlorodifluoromethane	2310	23100	NV	NV
Ethylbenzene	9.71	29.1	NV	NV
Isopropylbenzene	11	33.1	NV	NV
m,p-Xylene	2.06	2.58	107	1070
Methyl acetate	NV	NV	NV	NV
o-Xylene	2.06	2.58	107	1070
Methylene Chloride	5.85	50	NV	NV
Styrene	20	40	NV	NV
Tetrachloroethene	1.4	7	NV	NV
Toluene	26	260	NV	NV
Trichloroethene	0.7	7	NV	NV
Trichlorofluoromethane	34.9	349	NV	NV
Vinyl chloride	17	1.7	NV	NV
Xylenes, Total	2.06	2.58	107	1070
SEMIVOLATILES				
1,1'-Biphenyl	5	25	NV	NV
2,2'-Oxybis(1-chloropropane)	NV	NV	NV	NV
2,3,4,6-Tetrachlorophenol	2.5	10	NV	NV
2,4,5-Trichlorophenol	10	30	NV	NV
2,4,6-Trichlorophenol	0.42	4.2	NV	NV
2,4-Dimethylphenol	5	25	NV	NV
1-Methylnaphthalene	65.6	356	2	20
2-Methylnaphthalene	65.6	356	2	20
2-Methylphenol	5	15	NV	NV
3-Nitroaniline	NV	NV	NV	NV
4-Chloroaniline	1.25	12.5	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
4-Chloro-3-methylphenol	NV	NV	NV	NV
4-Methylphenol	NV	NV	NV	NV
4-Nitroaniline	NV	NV	NV	NV
4-Nitrophenol	NV	NV	NV	NV
7,12-Dimethylbenz(a)anthracene	NV	NV	2	20
Acenaphthene	65.6	356	2	20
Acenaphthylene	65.6	356	2	20
Anthracene	65.6	356	2	20
Benzaldehyde	20	40	NV	NV
Benzo(a)anthracene	0.615	38.4	2	20
Benzo(a)pyrene	0.615	38.4	2	20

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Benzo(b)fluoranthene	0.615	38.4	2	20
Benzo(g,h,i)perylene	0.615	38.4	2	20
Benzo(k)fluoranthene	0.615	38.4	2	20
Bis(2-Ethylhexyl)phthalate	18.3	183	1.11	11.1
Butyl benzyl phthalate	15.9	47	NV	NV
Caprolactam	50	500	NV	NV
Carbazole	1	10	2	20
Chrysene	0.615	38.4	2	20
Dibenzo(a,h)anthracene	0.615	38.4	2	20
Dibenzofuran	NV	NV	2	20
1,4-Dichlorobenzene	30	300	NV	NV
Diethylphthalate	4583	45830	NV	NV
Di-n-butyl phthalate	550	1833	0.111	1.11
Di-n-octyl phthalate	NV	NV	NV	NV
Fluoranthene	65.6	356	2	20
Fluorene	65.6	356	2	20
Hexachloroethane	0.1	1.5	NV	NV
Indeno(1,2,3-cd)pyrene	0.615	38.4	2	20
Isophorone	15	179	NV	NV
Naphthalene	65.6	356	2	20
n-Nitrosodiphenylamine	NV	NV	NV	NV
Pentachlorophenol	8.42	22.65	6.73	52.01
Phenanthrene	65.6	356	2	20
Phenol	6	12	NV	NV
Pyrene	0.615	38.4	2	20
Perylene	0.615	38.4	2	20
HERBICIDES				
Dinoseb	0.1	1	NV	NV
2,4-D	1	5	NV	NV
2,4,5-T	3	10	NV	NV
PESTICIDES/PCBs				
2,4'-DDD	0.147	5.56	0.227	2.7
2,4'-DDE	0.147	5.56	0.227	2.7
2,4'-DDT	0.147	5.56	0.227	2.7
4,4'-DDD	0.147	5.56	0.227	2.7
4,4'-DDE	0.147	5.56	0.227	2.7
4,4'-DDT	0.147	5.56	0.227	2.7
Aldrin	0.2	1	NV	NV
Alpha-BHC	0.014	0.14	0.56	2.25
Alpha-Chlordane	4.58	9.16	2.14	10.7
Aroclor-1232	0.068	0.68	0.18	1.8
Aroclor-1242	0.069	0.69	0.41	4.1
Aroclor-1248	0.01	0.1	NV	NV
Aroclor-1254	0.068	0.68	0.18	1.8
Aroclor-1260	0.068	0.68	0.18	1.8
Aroclor-1268	0.068	0.68	0.18	1.8
PCB-28	0.068	0.68	0.18	1.8
PCB-44	0.068	0.68	0.18	1.8
PCB-52	0.068	0.68	0.18	1.8

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
PCB-66	0.068	0.68	0.18	1.8
PCB-101	0.068	0.68	0.18	1.8
PCB-105	0.068	0.68	0.18	1.8
PCB-118	0.068	0.68	0.18	1.8
PCB-128	0.068	0.68	0.18	1.8
PCB-138	0.068	0.68	0.18	1.8
PCB-153	0.068	0.68	0.18	1.8
PCB-170	0.068	0.68	0.18	1.8
PCB-180	0.068	0.68	0.18	1.8
PCB-187	0.068	0.68	0.18	1.8
PCB-195	0.068	0.68	0.18	1.8
PCB-206	0.068	0.68	0.18	1.8
PCB-209	0.068	0.68	0.18	1.8
beta-BHC	0.4	2	0.56	2.25
delta-BHC	0.014	0.14	0.56	2.25
Dieldrin	0.015	1.27	0.0709	0.8
Endosulfan I	0.15	1.5	10	100
Endosulfan II	0.15	1.5	10	100
Endosulfan Sulfate	0.15	1.5	10	100
Endrin	0.092	0.92	0.01035	0.1035
Endrin Aldehyde	0.092	0.92	0.01	0.1
Endrin Ketone	0.092	0.92	0.01	0.1
Gamma-BHC (Lindane)	8	80	2	20
Gamma-Chlordane	4.58	9.16	2.14	10.7
Heptachlor	0.1	1	NV	NV
Heptachlor Epoxide	0.1	1	NV	NV
Methoxychlor	4	8	NV	NV
Toxaphene	8	80	NV	NV
Total Aroclor	0.068	0.68	0.18	1.8
Total DDT	0.147	5.56	0.227	2.7
DIOXINS AND FURANS (mg/kg)				
1,2,3,4,6,7,8-HpCDD	0.0001	0.001	0.014	0.14
1,2,3,4,6,7,8-HpCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8,9-HPCDF	0.0001	0.001	0.0014	0.014
1,2,3,4,7,8-HXCDD	0.00001	0.0001	0.00028	0.0028
1,2,3,4,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,6,7,8-HxCDD	0.00001	0.0001	0.0014	0.014
1,2,3,6,7,8-HxCDF	0.00016	0.0016	0.00014	0.0014
1,2,3,7,8,9-HxCDD	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8,9-HxCDF	0.00001	0.0001	0.00014	0.0014
2,3,4,6,7,8-HxCDF	0.00001	0.0001	0.00014	0.0014
1,2,3,7,8-PECDD	0.000001	0.00001	0.000014	0.00014
1,2,3,7,8-PECDF	0.00016	0.0016	0.00014	0.0014
2,3,4,7,8-PECDF	0.000016	0.00016	0.000014	0.00014
2,3,7,8-TCDD	0.000001	0.00001	0.000014	0.00014
2,3,7,8-TCDF	0.00001	0.0001	0.000014	0.00014
OCDD	0.01	0.1	0.14	1.4
OCDF	0.01	0.1	0.14	1.4
TOTAL HpCDD	0.0001	0.001	0.014	0.14

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

	Mammal		Bird	
PARAMETER	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
TOTAL HxCDD	0.00001	0.0001	0.00014	0.0014
TOTAL PeCDD	0.000001	0.00001	0.000014	0.00014
Total HpCDF	0.0001	0.001	0.0014	0.014
Total HxCDF	0.00001	0.0001	0.00014	0.0014
Total PeCDF	0.000002	0.00002	0.000014	0.00014
Total TCDD	0.000001	0.00001	0.000014	0.00014
Total TCDF	0.00001	0.0001	0.000014	0.00014
EXPLOSIVES (mg/kg)				
1,3 Dinitrobenzene	0.4	1.07	NV	NV
1,3,5-Trinitrobenzene	2.68	13.31	NV	NV
2,4-Dinitrotoluene	0.67	1.4	0.1	0.5
2,6-Dinitrotoluene	0.7	7	NV	NV
2,4,6-Trinitrotoluene	1.6	16	0.7	17.8
2-Amino-4,6-dinitrotoluene	NV	NV	NV	NV
2-Nitrotoluene	20	200	NV	NV
3-Nitrotoluene	20	200	NV	NV
4-Amino-2,6-dinitrotoluene	NV	NV	NV	NV

TABLE X-X

WILDLIFE TOXICITY REFERENCE VALUES
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal NOAEL	Mammal LOAEL	Bird NOAEL	Bird LOAEL
4-Nitrotoluene	20	200	NV	NV
Ammonia	NV	NV	NV	NV
HMX	3	7.5	NV	NV
Nitrobenzene (exp)	NV	NV	NV	NV
Nitroglycerin	3	32	NV	NV
RDX	7	35	NV	NV
Tetryl	1.3	6.2	NV	NV
INORGANICS				
Aluminum	1.93	19.3	109.7	1097
Antimony	0.059	2.76	NV	NV
Arsenic	1.04	4.55	2.24	4.51
Barium	51.8	82.7	20.8	41.7
Beryllium	0.532	0.673	NV	NV
Cadmium	0.77	6.9	1.47	6.35
Chromium	2.40	58.17	2.66	15.63
Hexavalent Chromium	5.66	38.37	NV	NV
Cobalt	7.33	18.90	7.61	18.34
Copper	5.6	82.7	4.05	34.87
Cyanide	68.7	687	NV	NV
Iron	50	500	100	1000
Lead	4.7	186.4	1.63	44.63
Manganese	51.5	145.67	179	376.6
Mercury	0.032	0.16	0.0064	0.064
Nickel	1.70	14.77	6.71	18.57
Selenium	0.143	0.661	0.29	0.819

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
Volatile Organics				
1,1,1-Trichloroethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
2-Butanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Methyl-2-pentanone	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Acetone	5.20E+00	5.20E+00	1.00E+00	1.00E+00
Carbon Disulfide	2.00E+00	2.00E+00	1.00E+00	1.00E+00
Chlorobenzene	9.00E-01	9.00E-01	1.00E+00	1.00E+00
Ethylbenzene	6.10E-01	6.10E-01	1.00E+00	1.00E+00
Isopropylbenzene	1.00E+00	1.00E+00	1.00E+00	1.00E+00
M,p-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Methyl Acetate	2.99E+01	2.99E+01	1.00E+00	1.00E+00
Methylene Chloride	6.70E+00	6.70E+00	1.00E+00	1.00E+00
O-xylene	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Tetrachloroethene	1.20E+00	1.20E+00	1.00E+00	1.00E+00
Toluene	1.03E+00	1.03E+00	1.00E+00	1.00E+00
Total Xylenes	4.60E+00	4.60E+00	1.00E+00	1.00E+00
Trichloroethene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
Trichlorofluoromethane	1.35E+00	1.35E+00	1.00E+00	1.00E+00
Semivolatile Organics				
1,1'-Biphenyl	1.59E-01	1.59E-01	1.00E+00	1.00E+00
1,2-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
1,4-Dichlorobenzene	4.10E-01	4.10E-01	1.00E+00	1.00E+00
2,2'-Oxybis(1-Chloropropane)	???	???	1.00E+00	1.00E+00
2,3,4,6-Tetrachlorophenol	1.59E-01	1.59E-01	1.00E+00	1.00E+00
2,4-D	???	???		
2-Methylnaphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
2-Methylphenol	???	???	1.00E+00	1.00E+00
3-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Chloro-3-Methylphenol	???	???	1.00E+00	1.00E+00
4-Chloroaniline	9.03E-01	9.03E-01	1.00E+00	1.00E+00
4-Methylphenol	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitrophenol	3.00E+00	3.00E+00	1.00E+00	1.00E+00
2,4,5-Trichlorophenol	2.40E-01	2.40E-01	1.00E+00	1.00E+00
2,4,6-Trichlorophenol	2.70E-01	2.70E-01	1.00E+00	1.00E+00
2,4,5-T	???	???	???	???
Acenaphthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Acenaphthylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzaldehyde	1.76E+00	1.76E+00	1.00E+00	1.00E+00
Benzo(a)anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(a)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(b)fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(g,h,i)perylene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Benzo(k)Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Bis(2-ethylhexyl)phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Butyl benzyl Phthalate	5.50E-02	5.50E-02	1.00E+00	1.00E+00
Caprolactam	4.90E+01	4.90E+01	1.00E+00	1.00E+00
Carbazole	2.40E-01	2.40E-01	Eco-SSL	Eco-SSL
Chrysene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzo(a,h)Anthracene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Dibenzofuran	1.50E-01	1.50E-01	Eco-SSL	Eco-SSL
Diethylphthalate	1.30E+00	1.30E+00	1.00E+00	1.00E+00
Di-n-butyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Di-n-octyl Phthalate	5.50E-01	5.50E-01	1.00E+00	1.00E+00
Dinoseb	???	???	???	???
Fluoranthene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Fluorene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexachloroethane	2.10E-01	2.10E-01	1.00E+00	1.00E+00
Indeno(1,2,3-cd)pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Isophorone	3.92E+00	3.92E+00	1.00E+00	1.00E+00
N-Nitrosodiphenylamine	6.05E-01	6.05E-01	1.00E+00	1.00E+00
Naphthalene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pentachlorophenol	1.40E-02	1.40E-02	1.00E+00	1.00E+00
Phenanthrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Phenol	5.10E+00	5.10E+00	1.00E+00	1.00E+00
Pyrene	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Pesticides/ PCBs				
4,4'-DDD	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDE	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
4,4'-DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Aldrin	6.90E-01	6.90E-01	3.30E+00	3.30E+00
Alpha-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Aroclor-1232	5.30E-01	5.30E-01	1.59E+01	6.67E+00
Aroclor-1242	1.60E-01	1.60E-01	1.59E+01	6.67E+00
Aroclor-1248	1.60E-02	1.60E-02	1.59E+01	6.67E+00
Aroclor-1254	1.30E-02	1.30E-02	1.59E+01	6.67E+00
Aroclor-1260	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Aroclor-1268	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Dieldrin	8.20E-02	8.20E-02	6.64E+00	6.64E+00
Gamma-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00
Heptachlor	1.20E-01	1.20E-01	1.00E+01	1.00E+01
Endosulfan I	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan II	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endosulfan Sulfate	3.30E-01	3.30E-01	1.00E+00	1.00E+00
Endrin	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Aldehyde	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Endrin Ketone	8.20E-02	8.20E-02	3.60E+00	3.60E+00
Heptachlor Epoxide	2.80E-02	2.80E-02	3.00E+00	3.00E+00
Methoxychlor	1.10E-01	1.10E-01	1.00E+00	1.00E+00
alpha-BHC	2.10E-01	2.10E-01	5.00E+00	5.00E+00

TABLE X-X

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, AND FISH
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE,

	Plant BAFs[1,2,6]		Earthworm BAFs[3,6]	
Chemicals	**Conservative[5]**	**Average[5]**	**Conservative[5]**	**Average[5]**
beta-BHC	1.80E-01	1.80E-01	5.00E+00	5.00E+00
delta-BHC	9.00E-01	9.00E-01	5.00E+00	5.00E+00
gamma-BHC (Lindane)	2.70E-01	2.70E-01	5.00E+00	5.00E+00
Toxaphene	6.20E-02	6.20E-02	1.00E+00	1.00E+00
Total Aroclor	2.90E-03	2.90E-03	1.59E+01	6.67E+00
Total DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Explosives				
2,4,6-Trinitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
2-Nitrotoluene	1.80E+00	1.80E+00	1.00E+00	1.00E+00
1,3,5-Trinitrobenzene	7.70E+00	7.70E+00	1.00E+00	1.00E+00
4-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
RDX	4.60E-01	4.60E-01	1.00E+00	1.00E+00
4-Amino-2,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
HMX	1.70E+01	1.70E+01	1.00E+00	1.00E+00
Nitrobenzene (exp)	3.40E+00	3.40E+00	1.00E+00	1.00E+00
1,3 Dinitrobenzene	4.50E+00	4.50E+00	1.00E+00	1.00E+00
2-Amino-4,6-dinitrotoluene	???	???	1.00E+00	1.00E+00
Tetryl	???	???	1.00E+00	1.00E+00
3-Nitrotoluene	1.50E+00	1.50E+00	1.00E+00	1.00E+00
2,4-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
2,6-Dinitrotoluene	2.60E+00	2.60E+00	1.00E+00	1.00E+00
Dioxins				
1,2,3,4,6,7,8-HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,6,7,8-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8,9-HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,4,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8,9-HxCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
1,2,3,7,8-PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
1,2,3,7,8-Pecdf	4.40E-03	4.40E-03	2.22E+01	1.10E+01
2,3,4,6,7,8-HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
2,3,4,7,8-PECDF	3.70E-03	3.70E-03	2.22E+01	1.10E+01
2,3,7,8-TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ	4.30E-03	4.30E-03	2.22E+01	1.10E+01
TEQ HALFND	4.30E-03	4.30E-03	2.22E+01	1.10E+01
2,3,7,8-TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDD	???	???	2.22E+01	1.10E+01
1,2,3,4,6,7,8,9-OCDF	???	???	2.22E+01	1.10E+01
TOTAL HPCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL HXCDD	1.20E-03	1.20E-03	2.22E+01	1.10E+01
TOTAL PECDD	6.50E-03	6.50E-03	2.22E+01	1.10E+01
Total HPCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total HXCDF	1.20E-03	1.20E-03	2.22E+01	1.10E+01
Total PECDF	4.40E-03	4.40E-03	2.22E+01	1.10E+01
Total TCDD	4.30E-03	4.30E-03	2.22E+01	1.10E+01
Total TCDF	1.60E-02	1.60E-02	2.22E+01	1.10E+01
Inorganics				
Aluminum	5.00E-03	2.87E-03	1.18E-01	4.30E-02
Antimony	1.14E-02	1.02E-02	1.00E+00	1.00E+00
Arsenic	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Barium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Beryllium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cadmium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cobalt	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Copper	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Hexavalent Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Cyanide	1.80E+00	1.00E+00	1.00E+00	1.00E+00
Iron	1.00E-02	4.25E-03	7.80E-02	3.60E-02
Lead	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Manganese	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Mercury	5.00E+00	6.52E-01	ORNL Reg.	ORNL Reg.
Nickel	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Selenium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Silver	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Thallium	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Tin	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Vanadium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL
Zinc	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL

Notes:
BAF - Bioaccumulation Factor
BSAF - Biota Sediment Accumulation Factor
1 - ORNL (2001) for organics; only one value is available for conservative and average exposures
2 - Sample et al., (1997) for inorganics; conservative value is 90th percentile; average value is median v
3 - ORNL (September, 1998) for all chemicals; conservative value is 90th percentile; average value is m
4 - U.S. EPA, September 1997; only one value is available for conservative and average exposures. Va
5 - Conservative and average refers to the exposure scenarios for which the uptake factors are used
6 - Where "Eco-SSL" is given, values were calculated using equations from USEPA (2005), Attachment
Tables 4a (for inorganics) and 4b (for organics).

Default value of 1 is assigned to parameters without uptake factors

TABLE X-X

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL
SITE 2 - ANTENNAE FIELD LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

Species/Exposure Inputs	Conservative Inputs		Average Inputs	
	Values	Units	Values	Units
Bobwhite Quail				
Body Weight = BW	1.540E-01	kg	1.751E-01	kg
Food Ingestion Rate = If	2.442E-03	kg/day	2.042E-03	kg/day
Water Ingestion Rate = Iw	2.276E-02	L/day	1.926E-02	L/day
Soil Ingestion Rate = Is	3.395E-04	kg/day	1.246E-04	kg/day
Home Range = HR	Assume 100% on site		1.880E+01	acres
Meadow Vole				
Body Weight = BW	1.700E-02	kg	3.580E-02	kg
Food Ingestion Rate = If	1.878E-03	kg/day	1.744E-03	kg/day
Water Ingestion Rate = Iw	7.513E-03	L/day	6.261E-03	L/day
Soil Ingestion Rate = Is	6.010E-05	kg/day	2.093E-05	kg/day
Home Range = HR	Assume 100% on site		6.590E-02	acres
American Robin				
Body Weight = BW	7.73E-02	kg	8.04E-02	kg
Food Ingestion Rate = If	1.25E-02	kg/day	1.19E-02	kg/day
Water Ingestion Rate = Iw	1.21E-02	L/day	1.13E-02	L/day
Soil Ingestion Rate - Is	2.046E-03	kg/day	7.601E-04	kg/day
Home Range = HR	Assume 100% on site		6.095E-01	acres
Short-Tailed Shrew				
Body Weight = BW	1.500E-02	kg	1.610E-02	kg
Food Ingestion Rate = If	1.600E-03	kg/day	1.433E-03	kg/day
Water Ingestion Rate = Iw	4.280E-03	L/day	3.600E-03	L/day
Soil Ingestion Rate - Is	4.801E-05	kg/day	1.289E-05	kg/day
Home Range = HR	Assume 100% on site		9.699E-01	acres
Mink				
Body Weight = BW	5.500E-01	kg	1.103E+00	kg
Food Ingestion Rate = If	6.067E-02	kg/day	4.504E-02	kg/day
Water Ingestion Rate = Iw	1.213E-01	L/day	7.308E-02	L/day
Sediment Ingestion Rate = Is	5.703E-03	kg/day	4.234E-03	kg/day
Home Range = HR	Assume 100% on site		1.558E+03	acres
Green Heron				
Body Weight = BW	2.00E-01	kg	2.12E-01	kg
Food Ingestion Rate = If	3.10E-02	kg/day	3.00E-02	kg/day
Water Ingestion Rate = Iw	2.20E-02	L/day	2.10E-02	L/day
Sediment Ingestion Rate = Is	1.600E-03	kg/day	1.500E-03	kg/day
Home Range = HR	Assume 100% on site		1.000E+01	km-radius

Notes:
The exposure factors were derived as presented in Appendix I.

The soil/sediment ingestion rates were calculated by multiplying the food ingestion rates by the following incidental soil/sediment ingestion rates:

	Conservative	Average	Source
Bobwhite quail	13.90%	6.10%	1, 2
Meadow Vole	3.20%	1.20%	1
American Robin	16.40%	6.40%	1,4
Short-tailed Shrew	3%	0.90%	1
Mink	9.4%	9.4%	3, 5
Green Heron	5%	5%	6

1 - USEPA (U.S. Environmental Protection Agency), 2005. Ecological Soil Screening Level Guidance, Office of Emergency and Remedial Response. February.
2 - Based on the mourning dove.
3 - Beyer, N., E. Connor, and S. Gerould. 1994. Estimates of Soil Ingestion by Wildlife. Journal of Wildlife Management 58(2) pp. 375-382.
4 - Based on the American woodcock
5 - Based on the raccoon
6 - Based on piscivorous birds

APPENDIX F

MEADOW VOLE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.22E+01	0.00E+00	4.12E-01	4.31E-02	0.00E+00	4.55E-02	8.87E-02	5.90E-02	2.76E+00	1.50E+00	3.21E-02
ARSENIC	2.26E+01	0.00E+00	8.48E-01	7.99E-02	0.00E+00	9.37E-02	1.74E-01	1.04E+00	4.55E+00	1.67E-01	3.82E-02
COPPER	3.70E+02	0.00E+00	2.00E+01	1.31E+00	0.00E+00	2.21E+00	3.52E+00	5.60E+00	8.27E+01	6.29E-01	4.26E-02
LEAD	3.45E+03	0.00E+00	2.56E+01	1.22E+01	0.00E+00	2.83E+00	1.50E+01	4.70E+00	1.86E+02	3.20E+00	8.06E-02
ZINC	6.39E+01	0.00E+00	4.83E+01	2.26E-01	0.00E+00	5.34E+00	5.57E+00	7.54E+01	2.98E+02	7.38E-02	1.87E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.70E-02	kg
Food Ingestion Rate = (If)	1.88E-03	kg/day
Water Ingestion Rate = (Iw)	7.51E-03	L/day
Soil Ingestion Rate = (Is)	6.01E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

MEADOW VOLE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.28E+00	0.00E+00	4.96E-02	7.46E-04	0.00E+00	2.42E-03	3.16E-03	5.90E-02	2.76E+00	5.36E-02	1.15E-03
ARSENIC	4.42E+00	0.00E+00	1.66E-01	2.58E-03	0.00E+00	8.07E-03	1.07E-02	1.04E+00	4.55E+00	1.02E-02	2.34E-03
COPPER	4.11E+01	0.00E+00	8.43E+00	2.40E-02	0.00E+00	4.11E-01	4.35E-01	5.60E+00	8.27E+01	7.76E-02	5.26E-03
LEAD	3.49E+02	0.00E+00	7.08E+00	2.04E-01	0.00E+00	3.45E-01	5.49E-01	4.70E+00	1.86E+02	1.17E-01	2.94E-03
ZINC	3.39E+01	0.00E+00	3.40E+01	1.98E-02	0.00E+00	1.66E+00	1.68E+00	7.54E+01	2.98E+02	2.22E-02	5.63E-03

Body Weight = (BW)	3.58E-02	kg
Food Ingestion Rate = (If)	1.74E-03	kg/day
Water Ingestion Rate = (Iw)	6.26E-03	L/day
Soil Ingestion Rate = (Is)	2.09E-05	kg/day
Home Range = (HR)	6.59E-02	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.22E+01	0.00E+00	4.12E-01	2.69E-02	0.00E+00	6.53E-03	3.34E-02	NV	NV	#VALUE!	#VALUE!
ARSENIC	2.26E+01	0.00E+00	8.48E-01	4.98E-02	0.00E+00	1.34E-02	6.33E-02	2.24E+00	4.51E+00	2.8E-02	1.4E-02
COPPER	3.70E+02	0.00E+00	2.00E+01	8.16E-01	0.00E+00	3.18E-01	1.13E+00	4.05E+00	3.49E+01	2.8E-01	3.3E-02
LEAD	3.45E+03	0.00E+00	2.56E+01	7.61E+00	0.00E+00	4.06E-01	8.01E+00	1.63E+00	4.46E+01	4.9E+00	1.8E-01
ZINC	6.39E+01	0.00E+00	4.83E+01	1.41E-01	0.00E+00	7.67E-01	9.07E-01	6.61E+01	1.71E+02	1.4E-02	5.3E-03

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.54E-01	kg
Food Ingestion Rate = (If)	2.44E-03	kg/day
Water Ingestion Rate = (Iw)	2.28E-02	L/day
Soil Ingestion Rate = (Is)	3.40E-04	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

BOBWHITE QUAIL - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.28E+00	0.00E+00	4.96E-02	9.08E-04	0.00E+00	5.78E-04	1.49E-03	NV	NV	#VALUE!	#VALUE!
ARSENIC	4.42E+00	0.00E+00	1.66E-01	3.14E-03	0.00E+00	1.93E-03	5.07E-03	2.24E+00	4.51E+00	2.3E-03	1.1E-03
COPPER	4.11E+01	0.00E+00	8.43E+00	2.92E-02	0.00E+00	9.83E-02	1.28E-01	4.05E+00	3.49E+01	3.1E-02	3.7E-03
LEAD	3.49E+02	0.00E+00	7.08E+00	2.48E-01	0.00E+00	8.25E-02	3.31E-01	1.63E+00	4.46E+01	2.0E-01	7.4E-03
ZINC	3.39E+01	0.00E+00	3.40E+01	2.41E-02	0.00E+00	3.96E-01	4.21E-01	6.61E+01	1.71E+02	6.4E-03	2.5E-03

Body Weight = (BW)	1.75E-01	kg
Food Ingestion Rate = (If)	2.04E-03	kg/day
Water Ingestion Rate = (Iw)	1.93E-02	L/day
Soil Ingestion Rate = (Is)	1.25E-04	kg/day
Home Range = (HR)	1.88E+01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.22E+01	0.00E+00	1.22E+01	3.90E-02	0.00E+00	1.30E+00	1.34E+00	5.90E-02	2.76E+00	2.3E+01	4.9E-01
ARSENIC	2.26E+01	0.00E+00	2.18E+00	7.23E-02	0.00E+00	2.33E-01	3.05E-01	1.04E+00	4.55E+00	2.9E-01	6.7E-02
COPPER	3.70E+02	0.00E+00	1.91E+02	1.18E+00	0.00E+00	2.03E+01	2.15E+01	5.60E+00	8.27E+01	3.8E+00	2.6E-01
LEAD	3.45E+03	0.00E+00	5.76E+02	1.10E+01	0.00E+00	6.14E+01	7.25E+01	4.70E+00	1.86E+02	1.5E+01	3.9E-01
ZINC	6.39E+01	0.00E+00	3.34E+02	2.05E-01	0.00E+00	3.57E+01	3.59E+01	7.54E+01	2.98E+02	4.8E-01	1.2E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.50E-02	kg
Food Ingestion Rate = (If)	1.60E-03	kg/day
Water Ingestion Rate = (Iw)	4.28E-03	L/day
Soil Ingestion Rate = (Is)	4.80E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

SHORT-TAILED SHREW - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.28E+00	0.00E+00	1.28E+00	1.02E-03	0.00E+00	1.14E-01	1.15E-01	5.90E-02	2.76E+00	1.9E+00	4.2E-02
ARSENIC	4.42E+00	0.00E+00	6.89E-01	3.54E-03	0.00E+00	6.13E-02	6.48E-02	1.04E+00	4.55E+00	6.2E-02	1.4E-02
COPPER	4.11E+01	0.00E+00	2.12E+01	3.29E-02	0.00E+00	1.88E+00	1.92E+00	5.60E+00	8.27E+01	3.4E-01	2.3E-02
LEAD	3.49E+02	0.00E+00	9.07E+01	2.80E-01	0.00E+00	8.07E+00	8.35E+00	4.70E+00	1.86E+02	1.8E+00	4.5E-02
ZINC	3.39E+01	0.00E+00	2.72E+02	2.71E-02	0.00E+00	2.42E+01	2.42E+01	7.54E+01	2.98E+02	3.2E-01	8.1E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.61E-02	kg
Food Ingestion Rate = (If)	1.43E-03	kg/day
Water Ingestion Rate = (Iw)	3.60E-03	L/day
Soil Ingestion Rate = (Is)	1.29E-05	kg/day
Home Range = (HR)	9.70E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.22E+01	0.00E+00	1.22E+01	3.23E-01	0.00E+00	1.97E+00	2.29E+00	NV	NV	#VALUE!	#VALUE!
ARSENIC	2.26E+01	0.00E+00	2.18E+00	5.98E-01	0.00E+00	3.52E-01	9.50E-01	2.24E+00	4.51E+00	4.2E-01	2.1E-01
COPPER	3.70E+02	0.00E+00	1.91E+02	9.79E+00	0.00E+00	3.08E+01	4.05E+01	4.05E+00	3.49E+01	1.0E+01	1.2E+00
LEAD	3.45E+03	0.00E+00	5.76E+02	9.13E+01	0.00E+00	9.29E+01	1.84E+02	1.63E+00	4.46E+01	1.1E+02	4.1E+00
ZINC	6.39E+01	0.00E+00	3.34E+02	1.69E+00	0.00E+00	5.40E+01	5.57E+01	6.61E+01	1.71E+02	8.4E-01	3.2E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	7.73E-02	kg
Food Ingestion Rate = (If)	1.25E-02	kg/day
Water Ingestion Rate = (Iw)	1.21E-02	L/day
Soil Ingestion Rate = (Is)	2.05E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

APPENDIX F

AMERICAN ROBIN - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION - SURFACE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Chemical	Avg Soil Conc. (mg/kg)	Avg SW Conc. (mg/L)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Inorganics											
ANTIMONY	1.28E+00	0.00E+00	1.28E+00	1.21E-02	0.00E+00	1.89E-01	2.01E-01	NV	NV	#VALUE!	#VALUE!
ARSENIC	4.42E+00	0.00E+00	6.89E-01	4.17E-02	0.00E+00	1.02E-01	1.44E-01	2.24E+00	4.51E+00	6.4E-02	3.2E-02
COPPER	4.11E+01	0.00E+00	2.12E+01	3.89E-01	0.00E+00	3.13E+00	3.52E+00	4.05E+00	3.49E+01	8.7E-01	1.0E-01
LEAD	3.49E+02	0.00E+00	9.07E+01	3.30E+00	0.00E+00	1.34E+01	1.67E+01	1.63E+00	4.46E+01	1.0E+01	3.7E-01
ZINC	3.39E+01	0.00E+00	2.72E+02	3.20E-01	0.00E+00	4.01E+01	4.04E+01	6.61E+01	1.71E+02	6.1E-01	2.4E-01

Body Weight = (BW)	8.04E-02	kg
Food Ingestion Rate = (If)	1.19E-02	kg/day
Water Ingestion Rate = (Iw)	1.13E-02	L/day
Soil Ingestion Rate = (Is)	7.60E-04	kg/day
Home Range = (HR)	6.10E-01	acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Dose (water) = (Cw * Iw)(H)/BW
Ci = Contaminant concentration in invertebrate
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Total Dose = Dose (soil) + Dose (invertebrate) + Dose (water)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

TABLE 8-6.3.3

TERRESTRIAL FOOD CHAIN MODEL - CONSERVATIVE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - SURFACE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	1.5E+00	3.2E-02	#VALUE!	#VALUE!	2.3E+01	4.9E-01
ARSENIC	2.8E-02	1.4E-02	1.7E-01	3.8E-02	4.2E-01	2.1E-01	2.9E-01	6.7E-02
COPPER	2.8E-01	3.3E-02	6.3E-01	4.3E-02	1.0E+01	1.2E+00	3.8E+00	2.6E-01
LEAD	4.9E+00	1.8E-01	3.2E+00	8.1E-02	1.1E+02	4.1E+00	1.5E+01	3.9E-01
ZINC	1.4E-02	5.3E-03	7.4E-02	1.9E-02	8.4E-01	3.2E-01	4.8E-01	1.2E-01

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

TABLE 8-6.3.5

TERRESTRIAL FOOD CHAIN MODEL - AVERAGE SCENARIO
INSECTIVOROUS AND HERBIVOROUS RECEPTORS - SURFACE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics								
ANTIMONY	#VALUE!	#VALUE!	5.4E-02	1.1E-03	#VALUE!	#VALUE!	1.9E+00	4.2E-02
ARSENIC	2.3E-03	1.1E-03	1.0E-02	2.3E-03	6.4E-02	3.2E-02	6.2E-02	1.4E-02
COPPER	3.1E-02	3.7E-03	7.8E-02	5.3E-03	8.7E-01	1.0E-01	3.4E-01	2.3E-02
LEAD	2.0E-01	7.4E-03	1.2E-01	2.9E-03	1.0E+01	3.7E-01	1.8E+00	4.5E-02
ZINC	6.4E-03	2.5E-03	2.2E-02	5.6E-03	6.1E-01	2.4E-01	3.2E-01	8.1E-02

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
EEQ - Ecological Effects Quotient

TABLE 4-6.3.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN - COMPOSITE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Parameter	Frequency of Detection[1]	Minimum Concentration[2]	Maximum Concentration[2]	Location of Maximum Concentration	Minimum Nondetect	Maximum Nondetect	Average of Positive Results[3]	Overall Average[4]	Ecological Screening Level				COPC (yes/no)?	Rationale for COPC selection
									Invertebrates	Plants	Avian	Mammals		
Inorganics (mg/kg)														
ANTIMONY	2/2	0.46 L	0.68 L	X15SB077C	NA	NA	0.57	0.57	78	5	**NA**	**0.27**	YES	ASL/NSL
ARSENIC	2/2	2.6	2.7	X15SB078C	NA	NA	2.7	2.7	60	18	43	46	NO	BSL
COPPER	2/2	14.8	23.3	X15SB077C	NA	NA	19	19	80	70	28	49	NO	BSL
LEAD	2/2	66.7	77.2	X15SB078C	NA	NA	72	72	1700	120	**11**	**56**	YES	ASL
ZINC	2/2	52.5	54.4	X15SB078C	NA	NA	53	53	120	160	**46**	79	YES	ASL
XRF (mg/kg)														
LEAD	2/2	67.667	81.333	X15SB078C	NA	NA	75	75	1700	120	**11**	**56**	YES	ASL
Explosives (mg/kg)														
NITROGLYCERIN	2/2	0.49 J	3.7 J	X15SB077C	NA	NA	2.1	2.1	**NA**	**NA**	**NA**	**NA**	YES	NSL

Shaded cells indicate that the maximum concentration exceeds the screening level.

1 Sample and duplicate are considered as one sample when determining the frequency of detection.
2 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations detected.
3 Average of detected concentrations only.
4 Average of all analytical results.

COPC = Chemical of Potential Concern
NA = Not available or not applicable
J = Estimated concentration
L = Biased low concentration

Rationale Codes for COPC Selection:
ASL = Above COPC Screening Level
BSL = Below COPC Screening Level
NSL = No Screening Level Available

TABLE 4-6.3.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN - SEDIMENT
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Parameter	Frequency of Detection[1]	Minimum Concentration[2]	Maximum Concentration[2]	Location of Maximum Concentration	Minimum Nondetect	Maximum Nondetect	Average of Positive Results[3]	Overall Average[4]	Ecological Screening Level	COPC (yes/no)?	Rationale for COPC selection
Inorganics (mg/kg)											
ARSENIC	7/7	0.36	5.8	X15SD030	NA	NA	1.5	1.5	7.24	NO	BSL
COPPER	6/7	2.4	36.1	X15SD030	2.1	2.1	8.4	7.4	**18.7**	YES	ASL
LEAD	6/7	6.7	37	X15SD030	5	5	15.4	14	**30.2**	YES	ASL
TIN	1/7	3.4	3.4	X15SD030	0.64	1.9	3.4	0.93	**0.048**	YES	ASL
ZINC	7/7	8.1	164	X15SD030	NA	NA	33	33	**121**	YES	ASL
PAHs (ug/kg)											
BENZO(A)ANTHRACENE	1/3	2.9 J	2.9 J	X15SD023	24	25	2.9	9.1	74.8	NO	BSL
BENZO(A)PYRENE	1/3	4.6 J	4.6 J	X15SD023	24	25	4.6	9.7	88.8	NO	BSL
BENZO(B)FLUORANTHENE	1/3	3.4 J	3.4 J	X15SD023	24	25	3.4	9.3	130	NO	BSL
BENZO(G,H,I)PERYLENE	1/3	2.8 J	2.8 J	X15SD023	24	25	2.8	9.1	170	NO	BSL
CHRYSENE	1/3	5.4 J	5.4 J	X15SD023	3.5	25	5.4	6.6	108	NO	BSL
INDENO(1,2,3-CD)PYRENE	1/3	2.9 J	2.9 J	X15SD023	24	25	2.9	9.1	17	NO	BSL
XRF (mg/kg)											
LEAD	26/27	2.667	185	X15SD003	0	0	18	18	**30.2**	YES	ASL

Shaded cells indicate that the maximum concentration exceeds the screening level.

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2 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations detected.
3 Average of detected concentrations only.
4 Average of all analytical results.

COPC = Chemical of Potential Concern
NA = Not available or not applicable
J = Estimated concentration

Rationale Codes for COPC Selection:
ASL = Above COPC Screening Level
BSL = Below COPC Screening Level
NSL = No Screening Level Available

TABLE 4-6.3.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL
OLD SKEET AND TRAP RANGE (OSTR) - UXO 15
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Parameter	Frequency of Detection[1]	Minimum Concentration[2]	Maximum Concentration[2]	Location of Maximum Concentration	Minimum Nondetect	Maximum Nondetect	Average of Positive Results[3]	Overall Average[4]	Ecological Screening Level				COPC (yes/no)?	Rationale for COPC selection
									Invertebrates	Plants	Avian	Mammals		
Inorganics (mg/kg)														
ANTIMONY	14/14	0.16 J	4.8 J	X15SB064	NA	NA	0.88	0.88	78	5	**NA**	**0.27**	YES	ASL/NSL
ARSENIC	14/14	1.6	7.2	X15SB007	NA	NA	3.3	3.3	60	18	43	46	NO	BSL
COPPER	14/14	5.4	37.6 L	X15SB068	NA	NA	13	13	80	70	**28**	49	YES	ASL
LEAD	14/14	32	940	X15SB064	NA	NA	320	320	1700	**120**	**11**	**56**	YES	ASL
ZINC	14/14	25.1	53.3	X15SB068	NA	NA	35	35	120	160	**46**	79	YES	ASL
PAHs (ug/kg)														
1-METHYLNAPHTHALENE	7/18	5.4 J	230 J	X15SB052	23	10000	96	812	29000	**NA**	**NA**	10000	YES	NSL
2-METHYLNAPHTHALENE	10/18	9.2 J	230	X15SB015	24	10000	71	917	29000	**NA**	**NA**	100000	YES	NSL
ACENAPHTHENE	15/18	4.2 J	5000 J	X15SB038	24	26	1399	1168	29000	20000	**100**	100000	YES	ASL
ANTHRACENE	15/18	1.9 J	7200 J	X15SB038	25	27	1935	1615	29000	**100**	**100**	100000	YES	ASL
BENZO(A)ANTHRACENE	18/18	20 J	33000	X15SB053	NA	NA	8341	8341	**18000**	**100**	**100**	**1100**	YES	ASL
BENZO(A)PYRENE	18/18	18 J	42000	X15SB053	NA	NA	10721	10721	**18000**	**100**	**100**	**1100**	YES	ASL
BENZO(B)FLUORANTHENE	18/18	24 J	41000	X15SB053	NA	NA	10706	10706	**18000**	**100**	**100**	**1100**	YES	ASL
BENZO(G,H,I)PERYLENE	18/18	13 J	25000	X15SB053	NA	NA	6294	6294	**18000**	**100**	**100**	**1100**	YES	ASL
BENZO(K)FLUORANTHENE	18/18	11 J	18000	X15SB038	NA	NA	4501	4501	18000	**100**	**100**	**1100**	YES	ASL
CHRYSENE	18/18	13 J	43000	X15SB053	NA	NA	10718	10718	**18000**	**100**	**100**	**1100**	YES	ASL
DIBENZO(A,H)ANTHRACENE	18/18	7.8 J	7600 J	X15SB053	NA	NA	1955	1955	18000	**100**	**100**	**1100**	YES	ASL
FLUORANTHENE	18/18	13 J	38000	X15SB038	NA	NA	9723	9723	**29000**	**100**	**100**	100000	YES	ASL
FLUORENE	10/18	8.3 J	3100 J	X15SB038	24	10000	629	1077	29000	**100**	**100**	100000	YES	ASL
INDENO(1,2,3-CD)PYRENE	18/18	11 J	27000	X15SB038; X15SB053	NA	NA	6969	6969	**18000**	**100**	**100**	**1100**	YES	ASL
NAPHTHALENE	7/18	8.6 J	330	X15SB050	23	10000	118	1152	29000	**100**	**100**	100000	YES	ASL
PHENANTHRENE	18/18	5.4 J	30000	X15SB038	NA	NA	6820	6820	**29000**	**100**	**100**	100000	YES	ASL
PYRENE	18/18	11 J	45000	X15SB038	NA	NA	11362	11362	**18000**	**100**	**100**	**1100**	YES	ASL
XRF (mg/kg)														
LEAD	72/72	20.333	1260.33	X15SB074	NA	NA	188	188	1700	**120**	**11**	**56**	YES	ASL
LEAD-CALC	72/72	40.047	957.647	X15SB074	NA	NA	164	164	1700	**120**	**11**	**56**	YES	ASL

Shaded cells indicate that the maximum concentration exceeds the screening level.

1 Sample and duplicate are considered as one sample when determining the frequency of detection.
2 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations detected.
3 Average of detected concentrations only.
4 Average of all analytical results.

COPC = Chemical of Potential Concern
NA = Not available or not applicable
J = Estimated concentration
L = Biased low concentration

Rationale Codes for COPC Selection:
ASL = Above COPC Screening Level
BSL = Below COPC Screening Level
NSL = No Screening Level Available

TABLE 5-6.3.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN - COMPOSITE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Parameter	Frequency of Detection[1]	Minimum Concentration[2]	Maximum Concentration[2]	Location of Maximum Concentration	Minimum Nondetect	Maximum Nondetect	Average of Positive Results[3]	Overall Average[4]	Ecological Screening Level				COPC (yes/no)?	Rationale for COPC selection
									Invertebrates	Plants	Avian	Mammals		
Inorganics (mg/kg)														
ANTIMONY	9/9	0.13 J	1.4 J	X14SB004C	NA	NA	0.32	0.32	78	5	**NA**	**0.27**	YES	ASL/NSL
ARSENIC	9/9	1.6	3.3	X14SB004C	NA	NA	2.7	2.7	60	18	43	46	NO	BSL
COPPER	9/9	8 L	52.4 L	X14SB008C	NA	NA	17	17	80	70	**28**	**49**	YES	ASL
LEAD	9/9	12	52.5	X14SB004C	NA	NA	24	24	1700	120	**11**	56	YES	ASL
ZINC	9/9	25.1	66.5	X14SB004C	NA	NA	40	40	120	160	**46**	79	YES	ASL
XRF (mg/kg)														
LEAD	9/9	15.667	82.333	X14SB004C	NA	NA	27	27	1700	120	**11**	**56**	YES	ASL
Explosives (mg/kg)														
NITROGLYCERIN	1/9	0.8 J	0.8 J	X14SB009C	1.2	1.2	0.80	0.62	**NA**	**NA**	**NA**	**NA**	YES	NSL

Shaded cells indicate that the maximum concentration exceeds the screening level.

1 Sample and duplicate are considered as one sample when determining the frequency of detection.
2 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations detected.
3 Average of detected concentrations only.
4 Average of all analytical results.

COPC = Chemical of Potential Concern
NA = Not available or not applicable
J = Estimated concentration
L = Biased low concentration

Rationale Codes for COPC Selection:
ASL = Above COPC Screening Level
BSL = Below COPC Screening Level
NSL = No Screening Level Available

TABLE 5-6.3.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN - BERM 1 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Parameter	Frequency of Detection[1]	Minimum Concentration[2]	Maximum Concentration[2]	Location of Maximum Concentration	Minimum Nondetect	Maximum Nondetect	Average of Positive Results[3]	Overall Average[4]	Ecological Screening Level				COPC (yes/no)?	Rationale for COPC selection
									Invertebrates	Plants	Avian	Mammals		
Inorganics (mg/kg)														
ANTIMONY	5/5	0.1 L	0.16 L	X14SB039	NA	NA	0.13	0.13	78	5	**NA**	0.27	YES	NSL
ARSENIC	5/5	1.3	4.2	X14SB022	NA	NA	2.5	2.5	60	18	43	46	NO	BSL
COPPER	5/5	9.2	107	X14SB035	NA	NA	52	52	**80**	**70**	**28**	**49**	YES	ASL
LEAD	5/5	9.6	543	X14SB035	NA	NA	222	222	1700	**120**	**11**	**56**	YES	ASL
TIN	2/5	4.1	9.1	X14SB035	1.8	2.9	6.6	3.3	**NA**	50	**NA**	**7.62**	YES	ASL/NSL
ZINC	5/5	18.6	33.3	X14SB035	NA	NA	25	25	120	160	46	79	NO	BSL
XRF (mg/kg)														
LEAD	35/35	11.667	540.333	X14SB035	NA	NA	120	120	1700	**120**	**11**	**56**	YES	ASL
LEAD-CALC	35/35	29.383	468.177	X14SB035	NA	NA	120	120	1700	**120**	**11**	**56**	YES	ASL

Shaded cells indicate that the maximum concentration exceeds the screening level.

1 Sample and duplicate are considered as one sample when determining the frequency of detection.
2 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations detected.
3 Average of detected concentrations only.
4 Average of all analytical results.

COPC = Chemical of Potential Concern
NA = Not available or not applicable
L = Biased low concentration

Rationale Codes for COPC Selection:
ASL = Above COPC Screening Level
BSL = Below COPC Screening Level
NSL = No Screening Level Available

TABLE 5-6.3.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN - BERM 2 SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Parameter	Frequency of Detection[1]	Minimum Concentration[2]	Maximum Concentration[2]	Location of Maximum Concentration	Minimum Nondetect	Maximum Nondetect	Average of Positive Results[3]	Overall Average[4]	Ecological Screening Level				COPC (yes/no)?	Rationale for COPC selection
									Invertebrates	Plants	Avian	Mammals		
Inorganics (mg/kg)														
ANTIMONY	4/5	0.13 L	0.17 L	X14SB062	0.11	0.11	0.15	0.13	78	5	**NA**	0.27	YES	NSL
ARSENIC	5/5	1.6	3.3	X14SB072	NA	NA	2.6	2.6	60	18	43	46	NO	BSL
COPPER	5/5	14.6	88.6	X14SB058	NA	NA	52	52	**80**	**70**	**28**	**49**	YES	ASL
LEAD	5/5	85.7	606	X14SB058	NA	NA	288	288	1700	**120**	**11**	**56**	YES	ASL
TIN	1/5	10.1	10.1	X14SB058	2	3	10	3.0	**NA**	50	**NA**	**7.62**	YES	ASL/NSL
ZINC	5/5	18.2	35.2	X14SB062	NA	NA	29	29	120	160	46	79	NO	BSL
XRF (mg/kg)														
LEAD	35/35	21.333	783.667	X14SB066	NA	NA	298	298	1700	**120**	**11**	**56**	YES	ASL
LEAD-CALC	35/35	37.407	670.143	X14SB066	NA	NA	267	267	1700	**120**	**11**	**56**	YES	ASL

Shaded cells indicate that the maximum concentration exceeds the screening level.

1 Sample and duplicate are considered as one sample when determining the frequency of detection.
2 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations detected.
3 Average of detected concentrations only.
4 Average of all analytical results.

COPC = Chemical of Potential Concern
NA = Not available or not applicable
L = Biased low concentration

Rationale Codes for COPC Selection:
ASL = Above COPC Screening Level
BSL = Below COPC Screening Level
NSL = No Screening Level Available

TABLE 5-6.3.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN - HILLSIDE SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Parameter	Frequency of Detection[1]	Minimum Concentration[2]	Maximum Concentration[2]	Location of Maximum Concentration	Minimum Nondetect	Maximum Nondetect	Average of Positive Results[3]	Overall Average[4]	Ecological Screening Level				COPC (yes/no)?
									Invertebrates	Plants	Avian	Mammals	
Inorganics (mg/kg)													
ANTIMONY	5/17	0.12 L	0.32 L	X14SB134	0.02	0.32	0.19	0.10	78	5	**NA**	**0.27**	YES
ARSENIC	16/17	1.1	7.3	X14SB134	1.6	1.6	3.3	3.1	60	18	43	46	NO
COPPER	17/17	8.6	276	X14SB120	NA	NA	59	59	**80**	**70**	**28**	**49**	YES
LEAD	16/17	17.9	904	X14SB134	11	11	316	298	1700	**120**	**11**	**56**	YES
TIN	11/17	1.6	81.8	X14SB140	0.49	1.7	16	10	**NA**	**50**	**NA**	**7.62**	YES
ZINC	17/17	7	60.3	X14SB132	NA	NA	28	28	120	160	**46**	79	YES
XRF (mg/kg)													
LEAD	64/64	19.333	19878	X14SB102	NA	NA	1978	1978	**1700**	**120**	**11**	**56**	YES
LEAD-CALC	44/44	35.747	2363.34	X14SB128	NA	NA	384	384	**1700**	**120**	**11**	**56**	YES

Shaded cells indicate that the maximum concentration exceeds the screening level.

1 Sample and duplicate are considered as one sample when determining the frequency of detection.
2 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations detected.
3 Average of detected concentrations only.
4 Average of all analytical results.

COPC = Chemical of Potential Concern
NA = Not available or not applicable
L = Biased low concentration

Rationale Codes for COPC Selection:
ASL = Above COPC Screening Level
BSL = Below COPC Screening Level
NSL = No Screening Level Available

TABLE 5-6.3.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN - HILLSIDE SURFACE SOIL
MARINE RIFLE RANGE (MRR) - UXO 14
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Rationale for COPC selection
ASL/NSL
BSL
ASL
ASL
ASL/NSL
ASL
ASL
ASL

TABLE 6-6.3.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN - COMPOSITE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Parameter	Frequency of Detection[1]	Minimum Concentration[2]	Maximum Concentration[2]	Location of Maximum Concentration	Minimum Nondetect	Maximum Nondetect	Average of Positive Results[3]	Overall Average[4]	Ecological Screening Level					COPC (yes/no)?	Rationale for COPC selection
									Invertebrates	Plants	Avian	Mammals	Lowest Value		
Inorganics (mg/kg)															
ANTIMONY	3/3	0.39 L	1.3 L	X17SB010C	NA	NA	0.71	0.71	78	5	**NA**	**0.27**	**0.27**	YES	ASL/NSL
ARSENIC	3/3	4.4	6.2	X17SB010C	NA	NA	5.2	5.2	60	18	43	46	18	NO	BSL
COPPER	3/3	11.2	24	X17SB010C	NA	NA	16	16	80	70	28	49	28	NO	BSL
LEAD	3/3	21	200	X17SB010C	NA	NA	87	87	1700	**120**	**11**	**56**	**11**	YES	ASL/NSL
ZINC	3/3	19	35.2	X17SB010C	NA	NA	26	26	120	160	46	79	46	NO	BSL
XRF (mg/kg)															
LEAD	3/3	73.333	156.333	X17SB010C	NA	NA	109	109	1700	**120**	**11**	**56**	**11**	YES	ASL
Explosives (mg/kg)															
NITROGLYCERIN	3/3	9.8	20.4	X17SB008C	NA	NA	14	14	**NA**	**NA**	**NA**	**NA**	**NA**	YES	NSL

Shaded cells indicate that the maximum concentration exceeds the screening level.

1 Sample and duplicate are considered as one sample when determining the frequency of detection.
2 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations detected.
3 Average of detected concentrations only.
4 Average of all analytical results.

COPC = Chemical of Potential Concern
NA = Not available or not applicable
L = Biased low concentration

Rationale Codes for COPC Selection:
ASL = Above COPC Screening Level
BSL = Below COPC Screening Level
NSL = No Screening Level Available

TABLE 6-6.3.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL
SMALL ARMS RANGE (SAR) - UXO 17
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Parameter	Frequency of Detection[1]	Minimum Concentration[2]	Maximum Concentration[2]	Location of Maximum Concentration	Minimum Nondetect	Maximum Nondetect	Average of Positive Results[3]	Overall Average[4]	Ecological Screening Level				COPC (yes/no)?	Rationale for COPC selection
									Invertebrates	Plants	Avian	Mammals		
Inorganics (mg/kg)														
ANTIMONY	8/12	0.15 L	6 L	X17SB014	0.13	3.3	1.6	1.2	78	**5**	**NA**	**0.27**	YES	ASL/NSL
ARSENIC	12/12	3.5	8.7	X17SB014	NA	NA	5.4	5.4	60	18	43	46	NO	BSL
COPPER	12/12	5.6 K	42 K	X17SB005	NA	NA	17	17	80	70	**28**	49	YES	ASL
LEAD	10/12	7.2	706	X17SB014	7	12.2	314	263	1700	**120**	**11**	**56**	YES	ASL
ZINC	12/12	10	33.2	X17SB004	NA	NA	19	19	120	160	46	79	NO	BSL
XRF (mg/kg)														
LEAD	25/26	3.667	3247	X17SB013	0	0	439	422	**1700**	**120**	**11**	**56**	YES	ASL

Shaded cells indicate that the maximum concentration exceeds the screening level.

1 Sample and duplicate are considered as one sample when determining the frequency of detection.
2 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations detected.
3 Average of detected concentrations only.
4 Average of all analytical results.

COPC = Chemical of Potential Concern
NA = Not available or not applicable
K = Biased high concentration
L = Biased low concentration

Rationale Codes for COPC Selection:
ASL = Above COPC Screening Level
BSL = Below COPC Screening Level
NSL = No Screening Level Available

TABLE 7-6.3.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN - COMPOSITE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Parameter	Frequency of Detection[1]	Minimum Concentration[2]	Maximum Concentration[2]	Location of Maximum Concentration	Minimum Nondetect	Maximum Nondetect	Average of Positive Results[3]	Overall Average[4]	Ecological Screening Level				COPC (yes/no)?	Rationale for COPC selection
									Invertebrates	Plants	Avian	Mammals		
Inorganics (mg/kg)														
ANTIMONY	2/2	0.14 L	0.42 L	X16SB081C	NA	NA	0.28	0.28	78	5	**NA**	**0.27**	YES	ASL/NSL
ARSENIC	2/2	3	4.2	X16SB081C	NA	NA	3.6	3.6	60	18	43	46	NO	BSL
COPPER	2/2	4.8	9.6	X16SB081C	NA	NA	7.2	7.2	80	70	28	49	NO	BSL
LEAD	2/2	9.1	48.7	X16SB081C	NA	NA	29	29	1700	120	**11**	56	YES	ASL
ZINC	2/2	18.7	29	X16SB081C	NA	NA	24	24	120	160	46	79	NO	BSL
PAHs (ug/kg)														
2-METHYLNAPHTHALENE	1/2	3.5 J	3.5 J	X16SB080C	23	23	3.5	7.5	29000	**NA**	**NA**	100000	YES	NSL
ANTHRACENE	2/2	4.1 J	5.6 J	X16SB081C	NA	NA	5	5	29000	100	100	100000	NO	BSL
BENZO(A)ANTHRACENE	2/2	78	94	X16SB081C	NA	NA	86	86	18000	100	100	1100	NO	BSL
BENZO(A)PYRENE	2/2	91	100	X16SB081C	NA	NA	96	96	18000	100	100	1100	NO	BSL
BENZO(B)FLUORANTHENE	2/2	33	38	X16SB081C	NA	NA	36	36	18000	100	100	1100	NO	BSL
BENZO(G,H,I)PERYLENE	2/2	41	50	X16SB081C	NA	NA	46	46	18000	100	100	1100	NO	BSL
BENZO(K)FLUORANTHENE	2/2	5.8 J	7.7 J	X16SB081C	NA	NA	6.8	6.8	18000	100	100	1100	NO	BSL
CHRYSENE	2/2	97	130	X16SB081C	NA	NA	114	114	18000	**100**	**100**	1100	YES	ASL
DIBENZO(A,H)ANTHRACENE	2/2	12 J	18 J	X16SB081C	NA	NA	15	15	18000	100	100	1100	NO	BSL
FLUORANTHENE	2/2	9.8 J	13 J	X16SB081C	NA	NA	11	11	29000	100	100	100000	NO	BSL
INDENO(1,2,3-CD)PYRENE	2/2	9.1 J	10 J	X16SB081C	NA	NA	9.6	9.6	18000	100	100	1100	NO	BSL
PHENANTHRENE	2/2	21 J	24	X16SB081C	NA	NA	23	23	29000	100	100	100000	NO	BSL
PYRENE	2/2	92	110	X16SB081C	NA	NA	101	101	18000	**100**	**100**	1100	YES	ASL
XRF (mg/kg)														
LEAD	2/2	21	73.333	X16SB081C	NA	NA	47	47	1700	120	**11**	**56**	YES	ASL

Shaded cells indicate that the maximum concentration exceeds the screening level.

1 Sample and duplicate are considered as one sample when determining the frequency of detection.
2 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations detected.
3 Average of detected concentrations only.
4 Average of all analytical results.

COPC = Chemical of Potential Concern
NA = Not available or not applicable
J = Estimated concentration
L = Biased low concentration

Rationale Codes for COPC Selection:
ASL = Above COPC Screening Level
BSL = Below COPC Screening Level
NSL = No Screening Level Available

TABLE 7-6.3.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL
RUM POINT SKEET RANGE (RPSR) - UXO 16
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Parameter	Frequency of Detection[1]	Minimum Concentration[2]	Maximum Concentration[2]	Location of Maximum Concentration	Minimum Nondetect	Maximum Nondetect	Average of Positive Results[3]	Overall Average[4]	Ecological Screening Level					COPC (yes/no)?	Rationale for COPC selection
									Invertebrates	Plants	Avian	Mammals	Lowest Value		
Inorganics (mg/kg)															
ANTIMONY	12/20	0.2 L	1.6 J	X16SB090	0.03	0.73	0.67	0.44	78	5	**NA**	**0.27**	**0.27**	YES	ASL/NSL
ARSENIC	18/20	1.1	6.5	X16SB061	0.16	1.9	3.3	3.0	60	18	43	46	18	NO	BSL
COPPER	20/20	2.4 K	11.4 K	X16SB013	NA	NA	6.3	6.3	80	70	28	49	28	NO	BSL
LEAD	20/20	6.7	616	X16SB008	NA	NA	91	91	1700	**120**	**11**	**56**	**11**	YES	ASL
ZINC	20/20	9.5	34.9	X16SB013	NA	NA	23	23	120	160	46	79	46	NO	BSL
PAHs (ug/kg)															
1-METHYLNAPHTHALENE	6/21	2.4 J	16 L	X16SB076	22	28	6.2	10	29000	**NA**	**NA**	100000	29000	YES	NSL
2-METHYLNAPHTHALENE	7/21	6.4 L	68 L	X16SB076	22	28	23	15	29000	**NA**	**NA**	100000	29000	YES	NSL
ACENAPHTHENE	4/21	2.4 J	7.7 L	X16SB076	22	28	4.5	10	29000	20000	100	100000	100	NO	BSL
ACENAPHTHYLENE	1/21	24 L	24 L	X16SB031	22	28	24	12	29000	100	100	100000	100	NO	BSL
ANTHRACENE	15/21	1.6 L	110 L	X16SB076	22	26	28	23	29000	**100**	**100**	100000	**100**	YES	ASL
BAP EQUIVALENT-HALFND	21/21	20.3838	4111	X16SB076	22	22	610	610					NA		
BENZO(A)ANTHRACENE	20/21	2.6 J	2400	X16SB076	22	23	426	406	18000	**100**	**100**	**1100**	**100**	YES	ASL
BENZO(A)PYRENE	18/21	5.8 J	3200	X16SB076	22	26	548	472	18000	**100**	**100**	**1100**	**100**	YES	ASL
BENZO(B)FLUORANTHENE	18/21	3 J	1000	X16SB076	22	26	185	161	18000	**100**	**100**	1100	**100**	YES	ASL
BENZO(G,H,I)PERYLENE	18/21	3.4 J	1500	X16SB076	22	26	239	206	18000	**100**	**100**	**1100**	**100**	YES	ASL
BENZO(K)FLUORANTHENE	14/21	4.3 J	200 L	X16SB076	22	26	42	32	18000	**100**	**100**	1100	**100**	YES	ASL
CHRYSENE	21/21	3.3 J	3000	X16SB076	22	22	510	510	18000	**100**	**100**	**1100**	**100**	YES	ASL
DIBENZO(A,H)ANTHRACENE	15/21	6.1 L	540	X16SB076	22	26	101	75	18000	**100**	**100**	1100	**100**	YES	ASL
FLUORANTHENE	19/21	2.5 L	210 L	X16SB076	22	26	52	48	29000	**100**	**100**	100000	**100**	YES	ASL
FLUORENE	5/21	4.2 L	21 J	X16SB076	22	28	10	12	29000	100	100	100000	100	NO	BSL
INDENO(1,2,3-CD)PYRENE	20/21	2.5 J	260 L	X16SB076	22	26	52	50	18000	**100**	**100**	1100	**100**	YES	ASL
NAPHTHALENE	2/21	3.1 J	7.2 L	X16SB076	22	28	5.2	11	29000	100	100	100000	100	NO	BSL
PHENANTHRENE	16/21	3.2 L	620	X16SB076	22	26	126	99	29000	**100**	**100**	100000	**100**	YES	ASL
PYRENE	20/21	3.1 J	2000	X16SB076	22	23	369	352	18000	**100**	**100**	**1100**	**100**	YES	ASL
XRF (mg/kg)															
LEAD	92/92	11.667	975.333	X16SB008	NA	NA	75	75	1700	**120**	**11**	**56**	**11**	YES	ASL

Shaded values indicate that the maximum concentration exceeds the screening level.

1 Sample and duplicate are considered as one sample when determining the frequency of detection.
2 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations detected.
3 Average of detected concentrations only.
4 Average of all analytical results.

COPC = Chemical of Potential Concern
NA = Not available or not applicable
J = Estimated concentration
K = Biased high concentration
L = Biased low concentration

Rationale Codes for COPC Selection:
ASL = Above COPC Screening Level
BSL = Below COPC Screening Level
NSL = No Screening Level Available

TABLE 8-6.3.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN - COMPOSITE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Parameter	Frequency of Detection[1]	Minimum Concentration[2]	Maximum Concentration[2]	Location of Maximum Concentration	Minimum Nondetect	Maximum Nondetect	Average of Positive Results[3]	Overall Average[4]	Ecological Screening Level				COPC (yes/no)?	Rationale for COPC selection
									Invertebrates	Plants	Avian	Mammals		
Inorganics (mg/kg)														
ANTIMONY	1/1	0.1 L	0.1 L	X25SB034C	NA	NA	0.1	0.1	78	5	**NA**	0.27	YES	NSL
ARSENIC	1/2	4.3	4.3	X25SB034C	NA	NA	4.3	4.3	60	18	43	46	NO	BSL
COPPER	1/3	8.5	8.5	X25SB034C	NA	NA	8.5	8.5	80	70	28	49	NO	BSL
LEAD	1/4	9.4	9.4	X25SB034C	NA	NA	9.4	9.4	1700	120	11	56	NO	BSL
TIN	1/5	1.6 B	1.6 B	X25SB034C	NA	NA	1.6	1.6	**NA**	50	**NA**	7.62	YES	NSL
ZINC	1/6	30.2	30.2	X25SB034C	NA	NA	30	30	120	160	46	79	NO	BSL

Shaded cells indicate that the maximum concentration exceeds the screening level.

1 Sample and duplicate are considered as one sample when determining the frequency of detection.
2 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations detected.
3 Average of detected concentrations only.
4 Average of all analytical results.

COPC = Chemical of Potential Concern
NA = Not available or not applicable
B = Result may be due to blank contamination
L = Biased low concentration

Rationale Codes for COPC Selection:
ASL = Above COPC Screening Level
BSL = Below COPC Screening Level
NSL = No Screening Level Available

TABLE 8-6.3.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL
ROACH ROAD RIFLE RANGE (RRRR) - UXO 25
SITE INVESTIGATION
NSF INDIAN HEAD - STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

Parameter	Frequency of Detection[1]	Minimum Concentration[2]	Maximum Concentration[2]	Location of Maximum Concentration	Minimum Nondetect	Maximum Nondetect	Average of Positive Results[3]	Overall Average[4]	Ecological Screening Level				COPC (yes/no)?	Rationale for COPC selection
									Invertebrates	Plants	Avian	Mammals		
Inorganics (mg/kg)														
ANTIMONY	16/20	0.19 L	12.2 L	X25SB020	0.02	0.16	1.6	1.3	78	**5**	**NA**	**0.27**	YES	ASL/NSL
ARSENIC	17/20	2.3 J	22.6	X25SB016	1.9	2.4	5.0	4.4	60	**18**	43	46	YES	ASL
COPPER	20/20	7.4	370	X25SB020	NA	NA	41	41	**80**	**70**	**28**	**49**	YES	ASL
LEAD	20/20	6.3	3450	X25SB020	NA	NA	349	349	**1700**	**120**	**11**	**56**	YES	ASL
ZINC	20/20	22	63.9	X25SB020	NA	NA	34	34	120	160	**46**	79	YES	ASL
XRF (mg/kg)														
LEAD	32/33	8.333	3877	X25SB020	0	0	359	348	**1700**	**120**	**11**	**56**	YES	ASL
LEAD-CALC	33/33	1.49	2754.83	X25SB020	NA	NA	227	227	**1700**	**120**	**11**	**56**	YES	ASL

Shaded cells indicate that the maximum concentration exceeds the screening level.

1 Sample and duplicate are considered as one sample when determining the frequency of detection.
2 Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations detected.
3 Average of detected concentrations only.
4 Average of all analytical results.

COPC = Chemical of Potential Concern
NA = Not available or not applicable
J = Estimated concentration
L = Biased low concentration

Rationale Codes for COPC Selection:
ASL = Above COPC Screening Level
BSL = Below COPC Screening Level
NSL = No Screening Level Available

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APPENDIX G

STATISTICAL CALCULATIONS

TABLE G-1
OLD TRAP AND SKEET RANGE
DISCRETE SURFACE SOIL
BACKGROUND COMPARISON

Chemical	Site Maximum Detected Concentration	Background Maximum Detected Concentration	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion Site Above Background?	Site Distribution	Background Distribution	Test	Equal Variance?[1]	Test Statistic	P-Value	Quantile Test	Slippage Test	Site Above Background?
PAHS(ug/kg)																
ACENAPHTHENE	5000	140	15/18	1/23	16/41	61	YES[2]									YES[2]
ANTHRACENE	7200	260	15/18	1/23	16/41	61	YES[2]									YES[2]
BENZO(A)ANTHRACENE	33000	480	18/18	1/23	19/41	53.7	YES[2]									YES[2]
BENZO(A)PYRENE	42000	390	18/18	1/23	19/41	53.7	YES[2]									YES[2]
BENZO(B)FLUORANTHENE	41000	420	18/18	1/23	19/41	53.7	YES[2]									YES[2]
BENZO(G,H,I)PERYLENE	25000	130	18/18	1/23	19/41	53.7	YES[2]									YES[2]
BENZO(K)FLUORANTHENE	18000	360	18/18	1/23	19/41	53.7	YES[2]									YES[2]
CHRYSENE	43000	440	18/18	1/23	19/41	53.7	YES[2]									YES[2]
DIBENZO(A,H)ANTHRACENE	7600	ND	18/18	0/23	18/41	56.1	YES[3]									YES[3]
FLUORANTHENE	38000	1100	18/18	2/23	20/41	51.2	YES[2]									YES[2]
FLUORENE	3100	150	10/18	1/23	11/41	73.2	YES[2]									YES[2]
INDENO(1,2,3-CD)PYRENE	27000	100	18/18	1/23	19/41	53.7	YES[2]									YES[2]
NAPHTHALENE	330	110	7/18	1/23	8/41	80.5	YES[2]									YES[2]
PHENANTHRENE	30000	1100	18/18	1/23	19/41	53.7	YES[2]									YES[2]
PYRENE	45000	880	18/18	2/23	20/41	51.2	YES[2]									YES[2]
Inorganics(mg/kg)																
ANTIMONY	4.8	ND	14/14	0/33	14/47	70.2	YES[3]									YES[3]
ARSENIC	7.2	18.3	14/14	30/34	44/48	8.3	SIMILAR	NORMAL	LOGNORMAL	GEHAN		-2.134	0.0164	PASS	PASS	NO
COPPER	37.6	19.45	14/14	32/34	46/48	4.2	YES									YES
LEAD	940	149	14/14	32/34	46/48	4.2	YES									YES
ZINC	53.3	42.95	14/14	34/34	48/48	0	YES									YES

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE G-2
OLD TRAP AND SKEET RANGE
COMPOSITE SURFACE SOIL
BACKGROUND COMPARISON

Chemical	Site FOD	Background FOD	Site Maximum	Background Maximum	Background UPL		Site Exceed Background?
Inorganics(mg/kg)							
Antimony	2/2	0/33	0.68	ND	ND		YES
Arsenic	2/2	30/34	2.7	18.3	9.7	95%KM(t)UPL	NO
Lead	2/2	32/34	77.2	149	59.44	95%KM(t)UPL	YES
Zinc	2/2	34/34	54.4	42.95	33.9	95% UPL(t)	YES

ND = Non-detect

TABLE G-3
OLD TRAP AND SKEET RANGE
DISCRETE SUBSURFACE SOIL
BACKGROUND COMPARISON

Chemical	Site FOD	Background FOD	Site Maximum	Background Maximum	Background UPL		Site Exceed Background?
Inorganics(mg/kg)							
Arsenic	1/1	24/28	4.1	14.15	11.6	95% KM(t) UPL	NO
Lead	1/1	25/28	12.2	27.9	22	95% KM(t) UPL	NO

TABLE G-4
OLD TRAP AND SKEET RANGE
SEDIMENT
BACKGROUND COMPARISON

Chemical	Site Maximum Detected Concentration	Background Maximum Detected Concentration	Average Background Concentration	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion Site Above Background?[4]
Inorganics(mg/kg)								
ARSENIC	5.8	4.1	2.7	7/7	3/4	10/11	9	YES
COPPER	36.1	22.7	12.6	6/7	3/4	9/11	18	YES
LEAD	37	30.7	17.4	6/7	4/4	10/11	9	YES
ZINC	164	142	84.7	7/7	4/4	11/11	0	YES

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.
4 DUE TO THE LIMITED SIZE OF THE BACKGROUND DATASET CONCLUSIONS WERE BASED ON VISUAL COMPARISON

TABLE G-5
MARINE RIFLE RANGE
DISCRETE HILL SURFACE SOIL
BACKGROUND COMPARISON

Chemical	Site Maximum Detected Concentration	Background Maximum Detected Concentration	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion Site Above Background?	Site Distribution	Background Distribution	Test	Equal Variance?[1]	Test Statistic	P-Value	Quantile Test	Slippage Test	Site Above Background?
Inorganics(mg/kg)																
ANTIMONY	0.32	ND	5/17	0/33	5/50	90	NO[3]									NO
ARSENIC	7.3	18.3	16/17	30/34	46/51	10	SIMILAR	LOGNORMAL	LOGNORMAL	GEHAN		-2.146	0.0159	PASS	PASS	NO
COPPER	276	19.45	17/17	32/34	49/51	4	YES									YES
LEAD	904	149	16/17	32/34	48/51	6	YES									YES
TIN	81.8	ND	11/17	0/12	11/29	62	YES[3]									YES
ZINC	60.3	42.95	17/17	34/34	51/51	0	YES									YES

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE G-6
MARINE RIFLE RANGE
DISCRETE HILL SUBSURFACE SOIL
BACKGROUND COMPARISON

Chemical	Site FOD	Background FOD	Site Maximum	Background Maximum	Background UPL		Site Exceed Background?
Inorganics(mg/kg)							
ARSENIC	3/3	24/28	7.8	14.15	11.6	95% KM(t) UPL	NO
COPPER	3/3	26/28	849	25.9	20.3	95% KM(t) UPL	YES
LEAD	3/3	25/28	6620	27.9	22	95% KM(t) UPL	YES
TIN	3/3	0/14	139	ND	ND	ND	YES[1]
ZINC	3/3	28/28	53.9	70.4	44.5	95% WH APPROXIMATE GAMMA UPL	YES

1 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE G-7
MARINE RIFLE RANGE
DISCRETE BERM 1 SURFACE SOIL
BACKGROUND COMPARISON

Chemical	Site Maximum Detected Concentration	Background Maximum Detected Concentration	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion Site Above Background?	Site Distribution	Background Distribution	Test	Equal Variance?[1]	Test Statistic	P-Value	Quantile Test	Slippage Test	Site Above Background?
Inorganics(mg/kg)																
ARSENIC	4.2	18.3	5/5	30/34	35/39	10	NO									NO
COPPER	107	19.45	5/5	32/34	37/39	5	YES									YES
LEAD	543	149	5/5	32/34	37/39	5	YES									YES
TIN	9.1	ND	2/5	0/12	2/17	88	YES[3]									YES

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE G-8
MARINE RIFLE RANGE
DISCRETE BERM 2 SURFACE SOIL
BACKGROUND COMPARISON

Chemical	Site Maximum Detected Concentration	Background Maximum Detected Concentration	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion Site Above Background?	Site Distribution	Background Distribution	Test	Equal Variance?[1]	Test Statistic	P-Value	Quantile Test	Slippage Test	Site Above Background?
Inorganics(mg/kg)																
ARSENIC	3.3	18.3	5/5	30/34	35/39	10	NO									NO
COPPER	88.6	19.45	5/5	32/34	37/39	5	YES									YES
LEAD	606	149	5/5	32/34	37/39	5	YES									YES
TIN	10.1	ND	1/5	0/12	1/17	94	YES[3]									YES

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE G-9
MARINE RIFLE RANGE
COMPOSITE SURFACE SOIL
BACKGROUND COMPARISON

Chemical	Site FOD	Background FOD	Site Maximum	Background Maximum	Background UPL		Site Exceed Background?
Inorganics(mg/kg)							
Antimony	9/9	0/33	1.4	ND	ND		YES
Arsenic	9/9	30/34	3.3	18.3	9.7	95%KM(t)UPL	NO
Copper	9/9	32/34	52.4	19.45	13.83	95% KM(t)UPL	YES
Lead	9/9	32/34	52.5	149	59.44	95%KM(t)UPL	NO
Zinc	9/9	34/34	66.5	42.95	33.9	95% UPL(t)	YES

TABLE G-10
SMALL ARMS (PISTOL) RANGE
DISCRETE SURFACE SOIL
BACKGROUND COMPARISON

Chemical	Site Maximum Detected Concentration	Background Maximum Detected Concentration	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion Site Above Background?	Site Distribution	Background Distribution	Test	Equal Variance?[1]	Test Statistic	P-Value	Quantile Test	Slippage Test	Site Above Background?
Inorganics(mg/kg)																
ANTIMONY	6	ND	8/12	0/33	8/45	82	YES[3]									YES
ARSENIC	8.7	18.3	12/12	30/34	42/46	87	SIMILAR	NORMAL	LOGNORMAL	GEHAN		-1.619	0.0527			YES
COPPER	42	19.45	12/12	32/34	44/46	4	YES									YES
LEAD	706	149	10/12	32/34	42/46	87	YES									YES

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE G-11
SMALL ARMS PISTOL RANGE
COMPOSITE SURFACE SOIL
BACKGROUND COMPARISON

Chemical	Site FOD	Background FOD	Site Maximum	Background Maximum	Background UPL		Site Exceed Background?
Inorganics(mg/kg)							
Antimony	3/3	0/33	1.4	ND	ND	ND	NO
Arsenic	3/3	30/34	6.2	18.3	9.7	95%KM(t)UPL	NO
Lead	3/3	32/34	200	149	59.44	95%KM(t)UPL	YES

TABLE G-12
SMALL ARMS (PISTOL) RANGE
SUBSURFACE SOIL
BACKGROUND COMPARISON

Chemical	Site Maximum Detected	Background Maximum	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion	Site Distribution	Background Distribution	Test	Equal Variance?[1]	Test Statistic	P-Value	Quantile Test	Slippage Test	Site Above Background?
Inorganics(mg/kg)																
ANTIMONY	1	1.8	6/9	3/28	9/37	76	NO									NO
ARSENIC	7.8	14.15	7/9	24/28	31/37	16	NO									NO
LEAD	132	27.9	9/9	25/28	34/37	8	YES									YES

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE G-13
RUM POINT SKEET RANGE
DISCRETE SURFACE SOIL
BACKGROUND COMPARISON

Chemical	Site Maximum Detected Concentration	Background Maximum Detected Concentration	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion Site Above Background?	Site Distribution	Background Distribution	Test	Equal Variance?[1]	Test Statistic	P-Value	Quantile Test	Slippage Test	Site Above Background?
Inorganics(mg/kg)																
ANTIMONY	1.6	ND	12/20	0/33	12/53	90	NO									NO
ARSENIC	6.5	18.3	18/20	30/34	48/54	10	SIMILAR		LOGNORMAL	GEHAN		-2.282	0.0112	PASS	PASS	NO
LEAD	616	149	20/20	32/34	52/54	6	YES									YES
1-METHYLNAPHTHALENE	16	ND	6/21	0/23	6/44	86	NO[3]									NO
ANTHRACENE	110	260	15/21	1/23	16/44	64	NO[3]									NO
BENZO(A)ANTHRACENE	2400	480	20/21	1/23	21/44	52	YES[3]									YES
BENO(A)PYRENE	3200	390	18/21	1/23	19/44	57	YES[3]									YES
BENZO(B)FLUORANTHENE	1000	420	18/21	1/23	19/44	57	YES[3]									YES
BENZO(G,H,I)PERYLENE	1500	130	18/21	1/23	19/44	57	YES[3]									YES
BENZO(K)FLUORANTHENE	200	360	14/21	1/23	15/44	34	NO[3]									NO
CHRYSENE	3000	440	21/21	1/23	22/44	50	YES[3]									YES
DIBENZO(A,H)ANTHRACENE	540	ND	15/21	0/23	15/44	66	YES[3]									YES
FLUORANTHENE	210	1100	19/21	2/23	21/44	52	NO[3]									NO
INDENO(1,2,3-CD)PYRENE	260	100	20/21	1/23	21/44	52	NO[3]									NO
PHENANTHRENE	620	1100	16/21	1/23	17/44	61	NO[3]									NO
PYRENE	2000	880	20/21	2/23	22/44	5	YES[3]									YES

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE G-14
RUM POINT SKEET RANGE
COMPOSITE SURFACE SOIL
BACKGROUND COMPARISON

Chemical	Site FOD	Background FOD	Site Maximum	Background Maximum	Background UPL		Site Exceed Background?
Inorganics(mg/kg)							
Antimony	2/2	0/33	0.42	ND	ND		YES
Arsenic	2/2	30/34	4.2	18.3	9.7	95%KM(t)UPL	NO
Lead	2/2	32/34	48.7	149	59.44	95%KM(t)UPL	NO
Benzo(a)anthracene	2/2	1/23	94	480	NA[1]		NO
Benzo(a)pyrene	2/2	1/23	100	390	NA[1]		NO
Chrysene	2/2	1/23	130	440	NA[1]		NO
Dibenzo(a,h)anthracer	2/2	0/23	18	42.8	ND		NO
Pyrene	2/2	1/23	110	880	NA[1]		NO

ND = All background concentrations are non-detect. Conclusion based off comparison of maximum site to maximum background.
1 Only 1 detected background concentration. Conclusion based off comparison of maximum site to maximum background.

TABLE G-15
ROACH ROAD RIFLE RANGE
DISCRETE SURFACE SOIL
BACKGROUND COMPARISON

Chemical	Site Maximum Detected Concentration	Background Maximum Detected Concentration	Site FOD	Background FOD	Total FOD	Percent Nondetect	Visual Conclusion Site Above Background?	Site Distribution	Background Distribution	Test	Equal Variance?[1]	Test Statistic	P-Value	Quantile Test	Slippage Test
Inorganics(mg/kg)															
ANTIMONY	12.2	ND	16/20	0/33	16/53	70	YES[3]								
ARSENIC	22.6	18.3	17/20	30/34	47/54	13	SIMILAR	NONPARAMETRIC	LOGNORMAL	GEHAN		-2.233	0.0128	PASS	PASS
COPPER	370	19.45	20/20	32/34	52/54	4	YES								
LEAD	3450	149	20/20	32/34	52/54	4	YES								
ZINC	63.9	42.95	20/20	34/34	54/54	0	YES								
Napthalene															

1 EQUAL VARIANCE F TEST
2 LESS THAN THREE DETECTED BACKGROUND CONCENTRATION, COMPARISON BASED ON MAXIMUM DETECTED CONCENTRATIONS.
3 BACKGROUND ARE ALL NON-DETECT, COMPARISON MADE BASED ON MAXIMUM DETECTED SITE AND MAXIMUM NON-DETECT BACKGROUND.

TABLE G-15
ROACH ROAD RIFLE RANGE
DISCRETE SURFACE SOIL
BACKGROUND COMPARISON

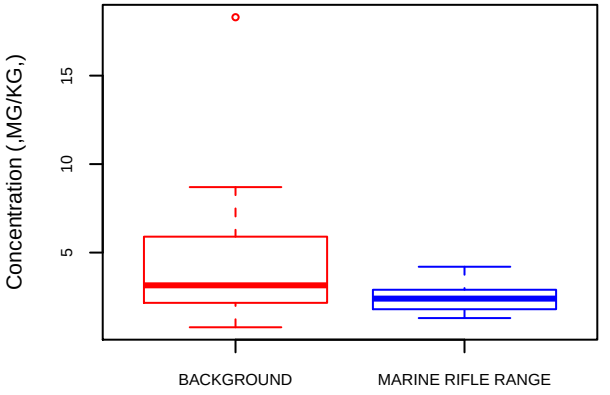
Site Above Background?
YES
NO
YES
YES
YES

TABLE G-16
ROACH ROAD RIFLE RANGE
COMPOSITE SURFACE SOIL
BACKGROUND COMPARISON

Chemical	Site FOD	Background FOD	Site Maximum	Background Maximum	Background UPL		Site Exceed Background?
Inorganics(mg/kg)							
Arsenic	1/1	30/34	4.3	18.3	9.7	95%KM(t)UPL	NO

UXO 14 MARINE RIFLE RANGE
BERM 1
ARSENIC
Surface Soil

Boxplot



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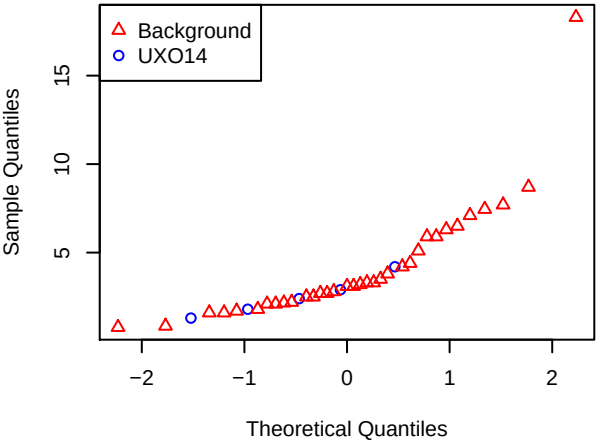

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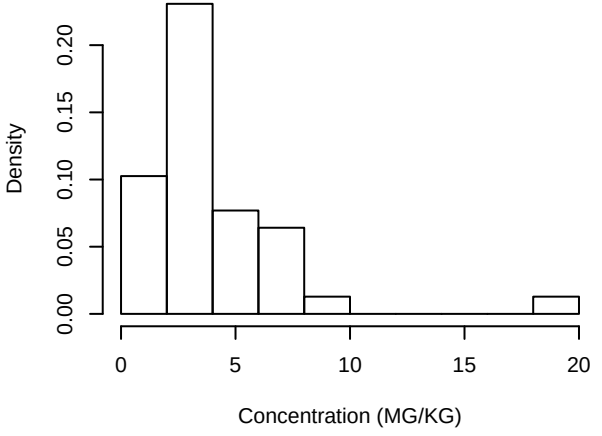
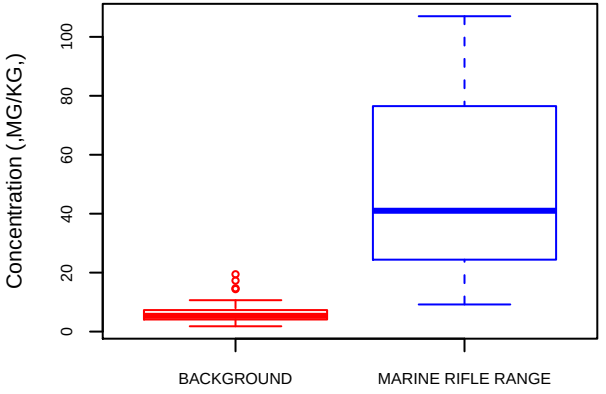


	UXO 14	Background
Minimum	1	1
25th Percentile	2	2
Median	2	3
Mean	3	4
75th Percentile	3	6
Maximum	4	18

UXO 14 MARINE RIFLE RANGE
BERM 1
COPPER
Surface Soil

Boxplot



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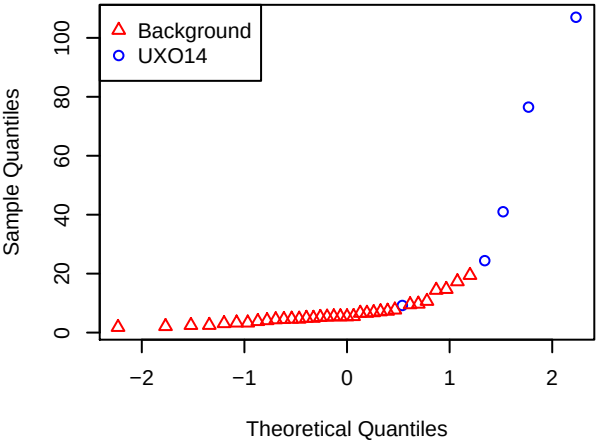

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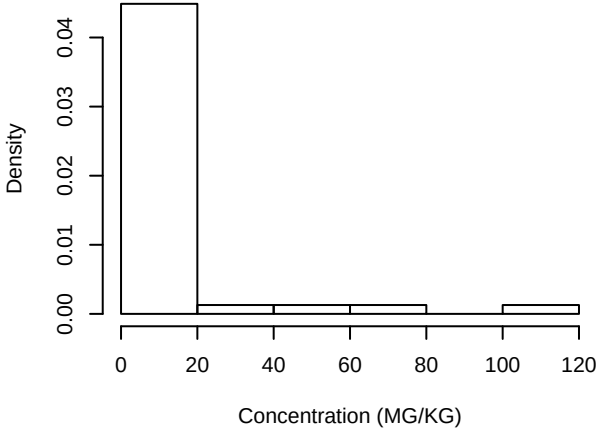
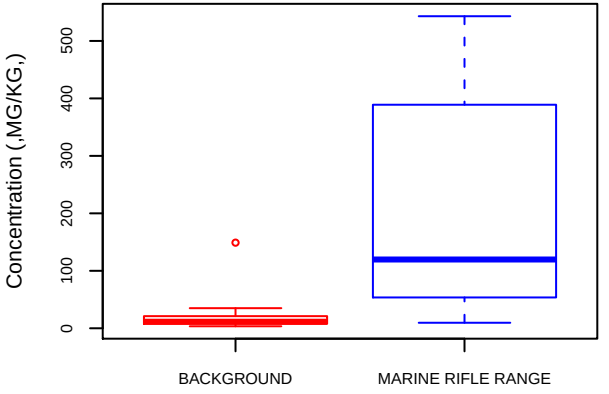


	UXO 14	Background
Minimum	9	2
25th Percentile	24	4
Median	41	5
Mean	52	7
75th Percentile	76	7
Maximum	107	19

UXO 14 MARINE RIFLE RANGE
BERM 1
LEAD
Surface Soil

Boxplot



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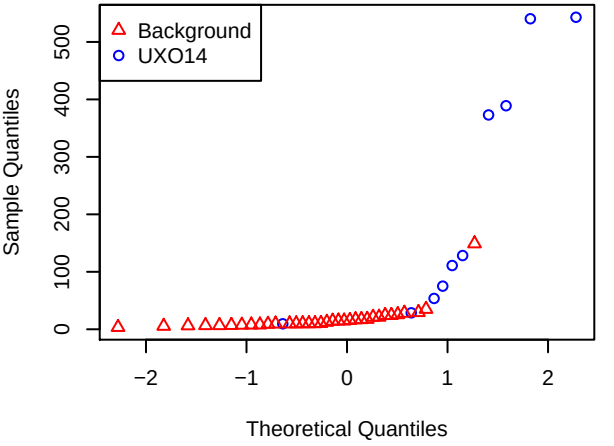

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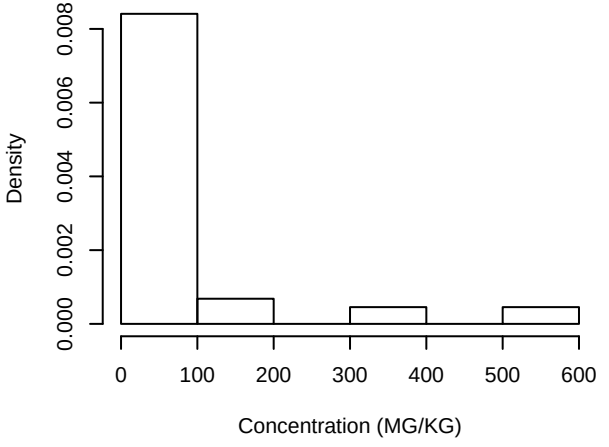
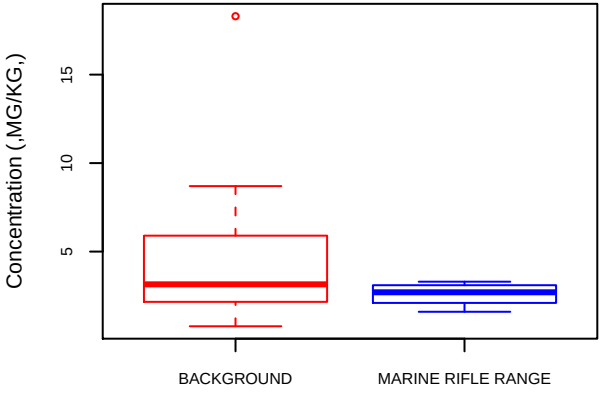


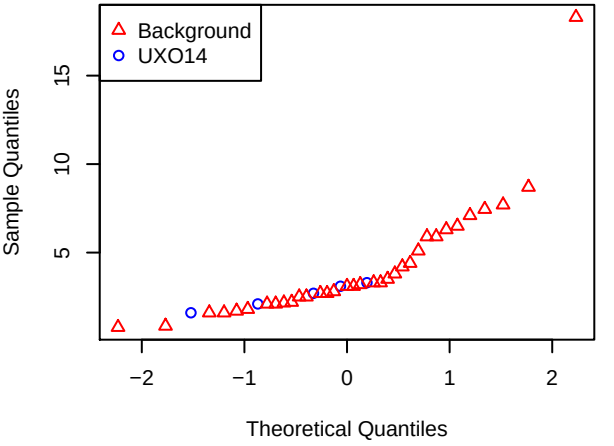
	UXO 14	Background
Minimum	10	4
25th Percentile	59	8
Median	120	11
Mean	225	18
75th Percentile	385	20
Maximum	543	149

UXO 14 MARINE RIFLE RANGE
BERM 2
ARSENIC
Surface Soil

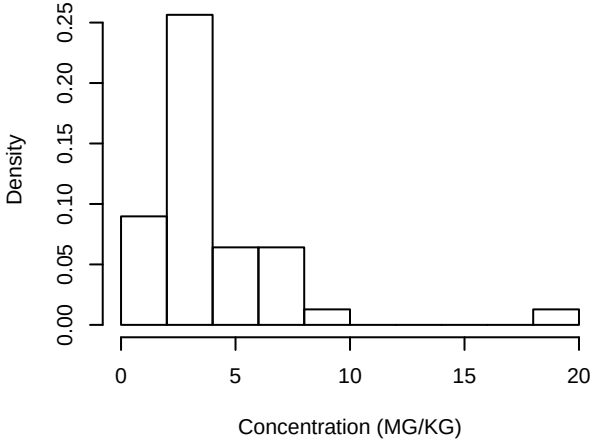
Boxplot



Normal Q−Q Plot



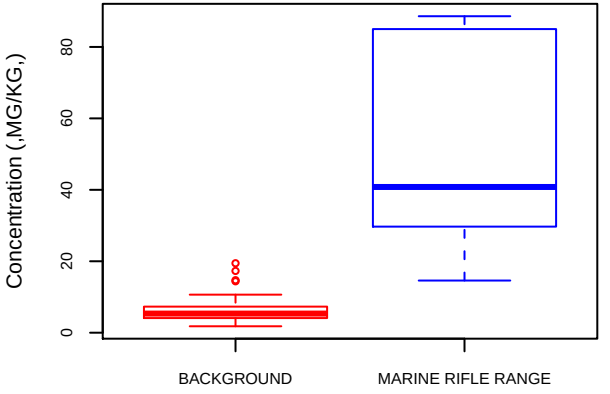
Histogram



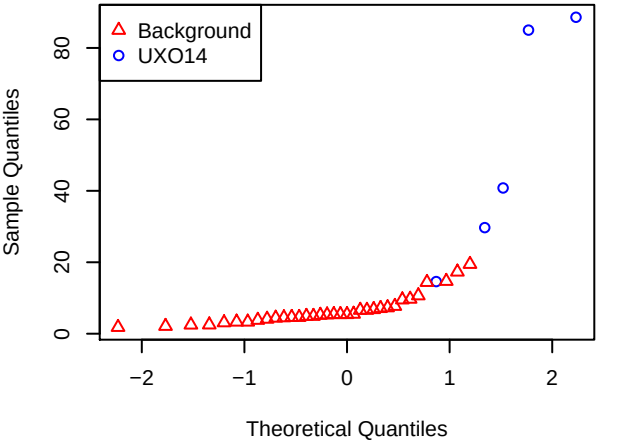
	UXO 14	Background
Minimum	2	1
25th Percentile	2	2
Median	3	3
Mean	3	4
75th Percentile	3	6
Maximum	3	18

UXO 14 MARINE RIFLE RANGE
BERM 2
COPPER
Surface Soil

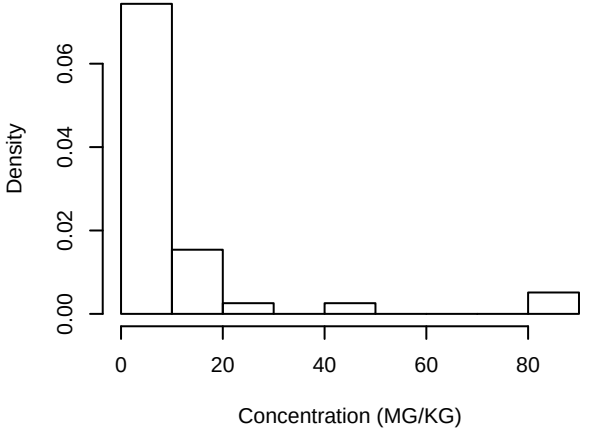
Boxplot



Normal Q−Q Plot



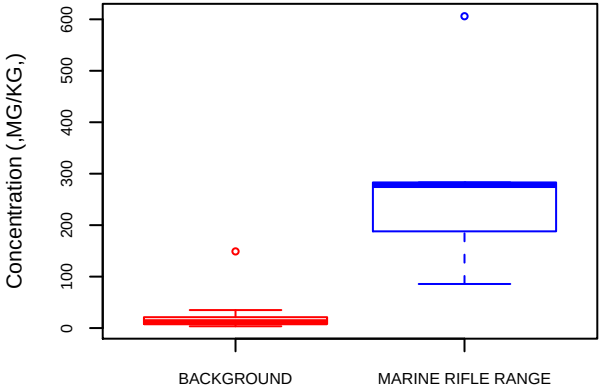
Histogram



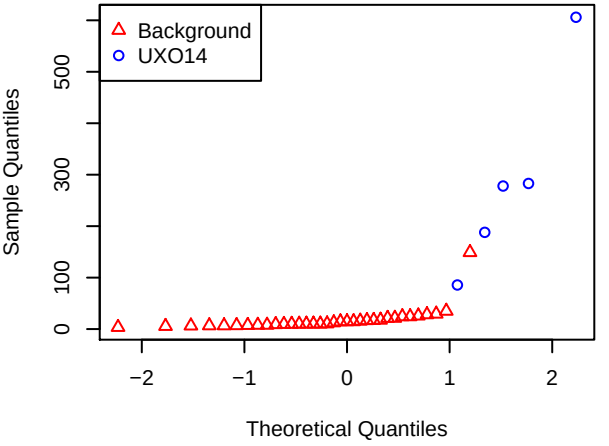
	UXO 14	Background
Minimum	15	2
25th Percentile	30	4
Median	41	5
Mean	52	7
75th Percentile	85	7
Maximum	89	19

UXO 14 MARINE RIFLE RANGE
BERM 2
LEAD
Surface Soil

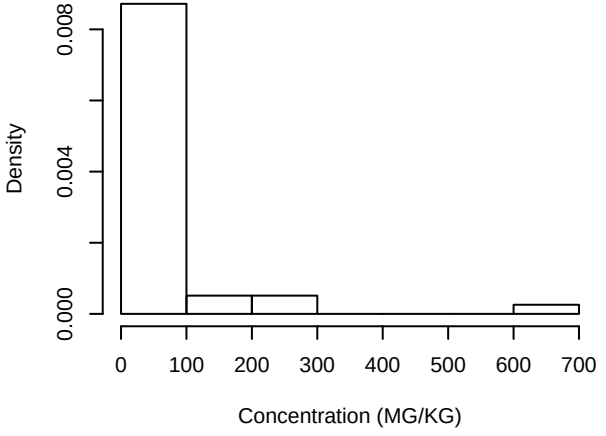
Boxplot



Normal Q−Q Plot



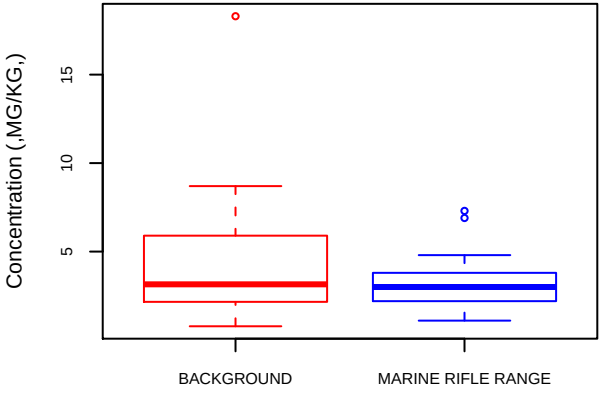
Histogram



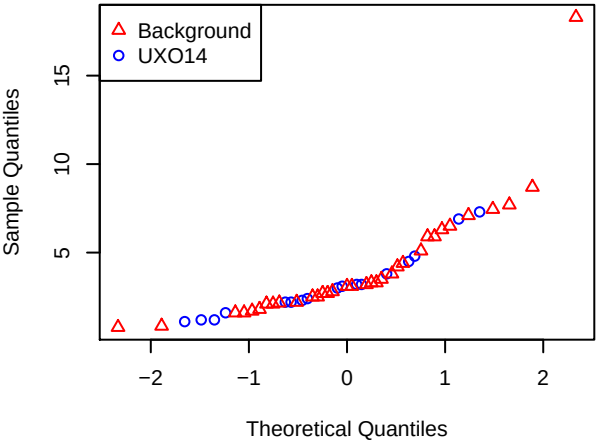
	UXO 14	Background
Minimum	86	4
25th Percentile	188	8
Median	278	11
Mean	288	18
75th Percentile	283	20
Maximum	606	149

UXO 14 MARINE RIFLE RANGE
HILLSIDE
ARSENIC
Surface Soil

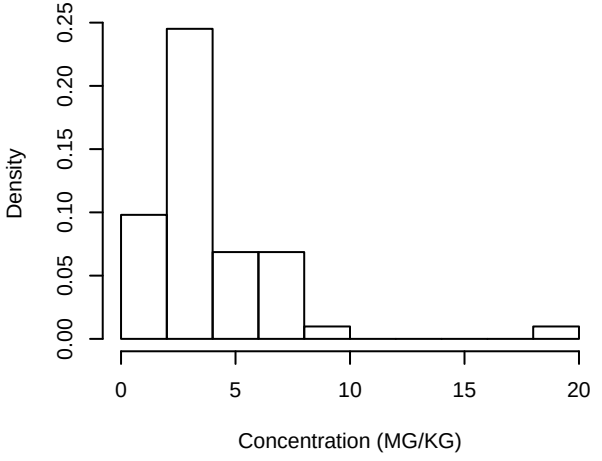
Boxplot



Normal Q−Q Plot



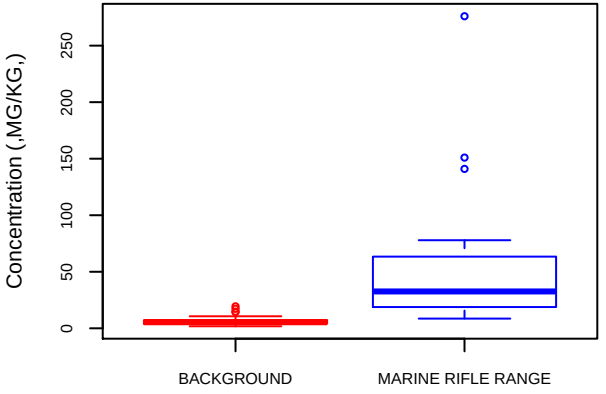
Histogram



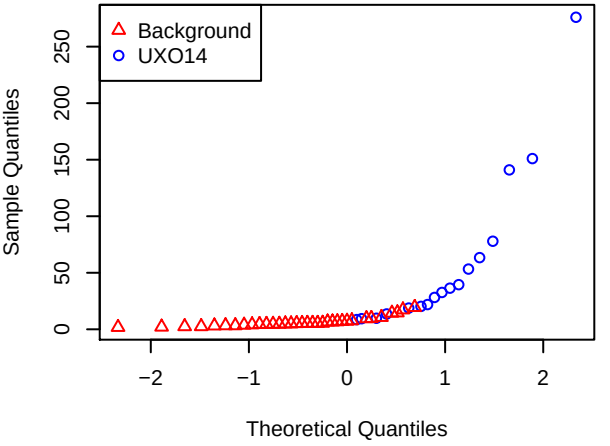
	UXO 14	Background
Minimum	1	1
25th Percentile	2	2
Median	3	3
Mean	3	4
75th Percentile	4	6
Maximum	7	18

UXO 14 MARINE RIFLE RANGE
HILLSIDE
COPPER
Surface Soil

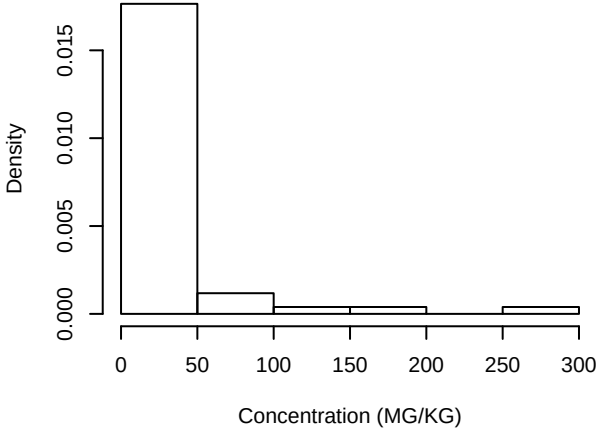
Boxplot



Normal Q−Q Plot



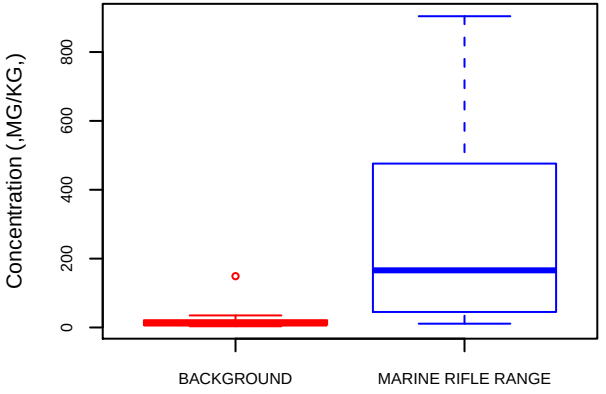
Histogram



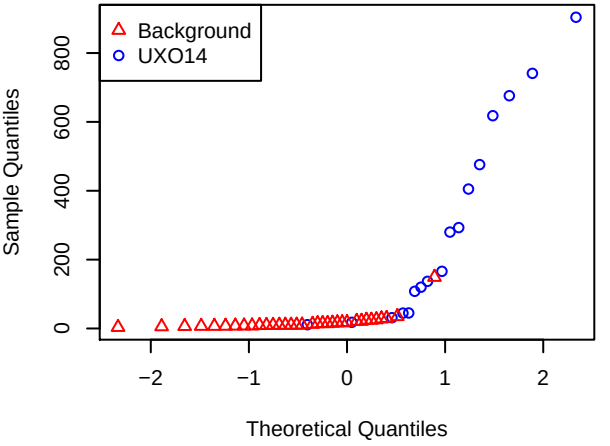
	UXO 14	Background
Minimum	9	2
25th Percentile	19	4
Median	33	5
Mean	59	7
75th Percentile	63	7
Maximum	276	19

UXO 14 MARINE RIFLE RANGE
HILLSIDE
LEAD
Surface Soil

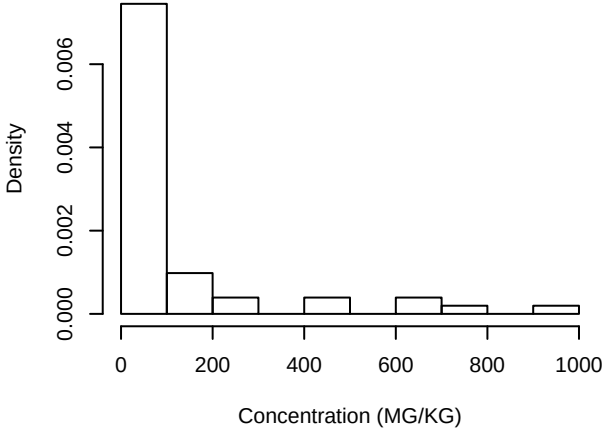
Boxplot



Normal Q−Q Plot



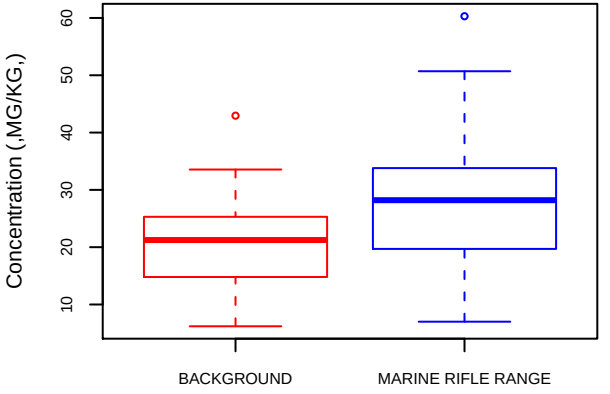
Histogram



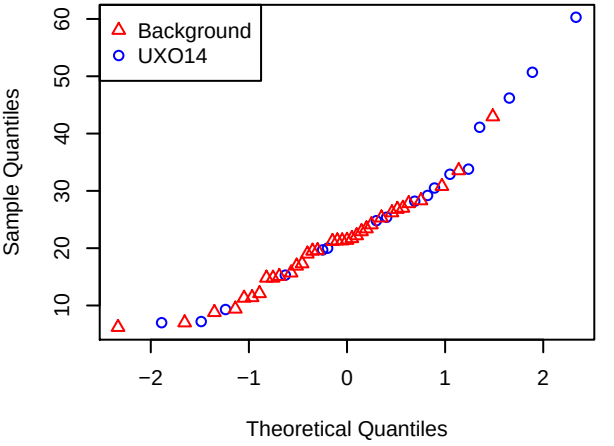
	UXO 14	Background
Minimum	11	4
25th Percentile	45	8
Median	166	11
Mean	298	18
75th Percentile	476	20
Maximum	904	149

UXO 14 MARINE RIFLE RANGE
HILLSIDE
ZINC
Surface Soil

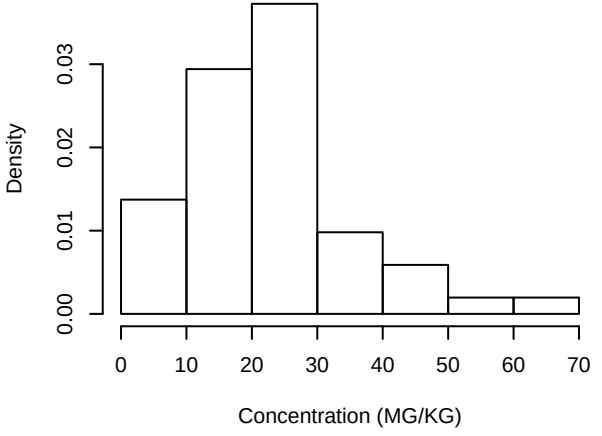
Boxplot



Normal Q−Q Plot



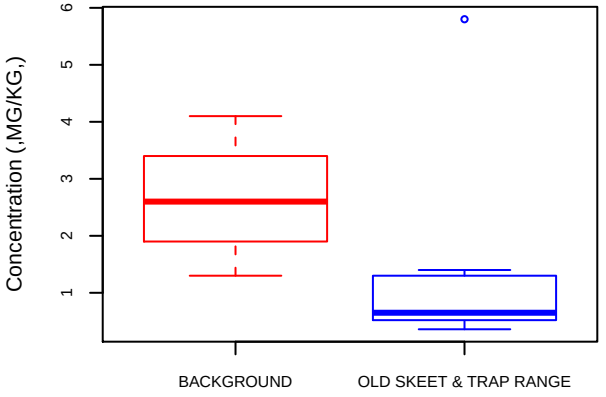
Histogram



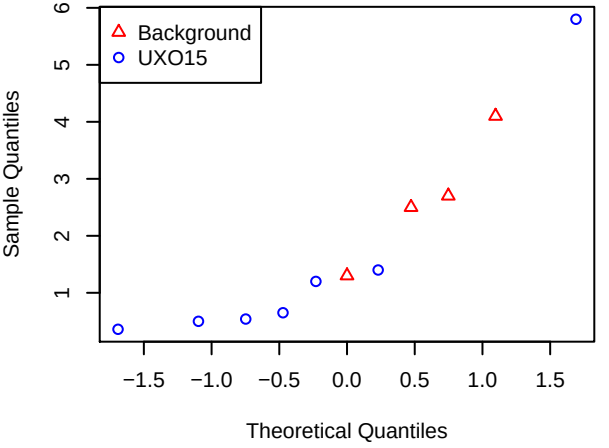
	UXO 14	Background
Minimum	7	6
25th Percentile	20	15
Median	28	21
Mean	28	20
75th Percentile	34	25
Maximum	60	43

UXO 15 OLD SKEET & TRAP RANGE
ARSENIC
SEDIMENT

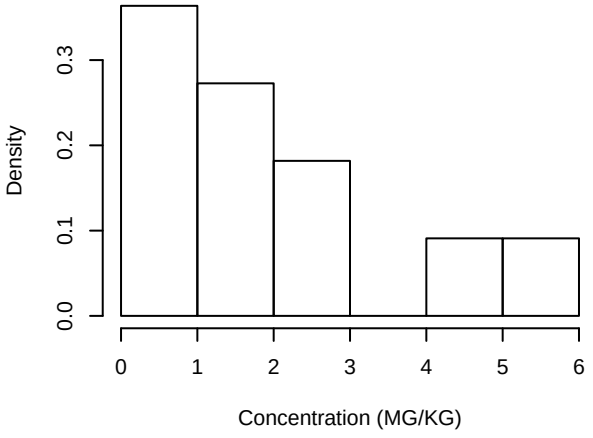
Boxplot



Normal Q−Q Plot



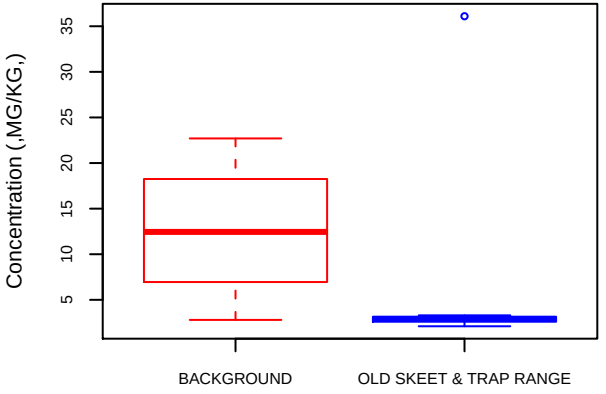
Histogram



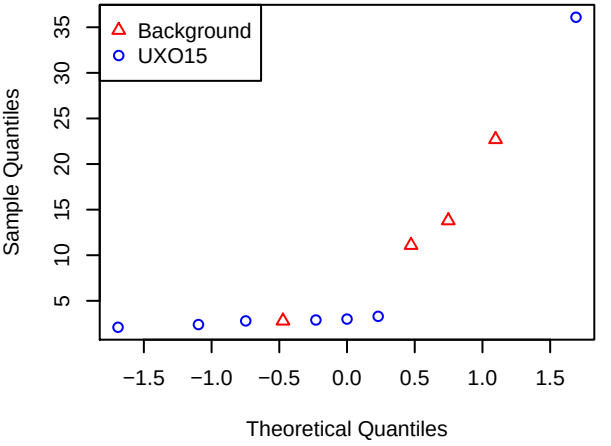
	UXO 15	Background
Minimum	0	1
25th Percentile	1	2
Median	1	3
Mean	1	3
75th Percentile	1	3
Maximum	6	4

UXO 15 OLD SKEET & TRAP RANGE
COPPER
SEDIMENT

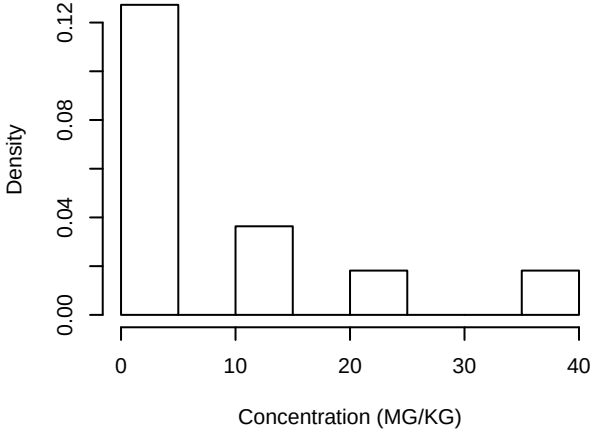
Boxplot



Normal Q−Q Plot



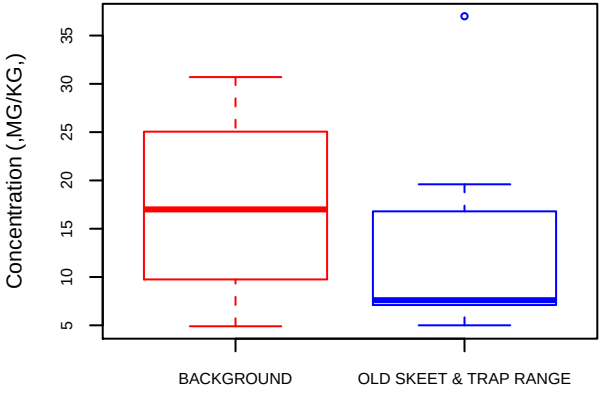
Histogram



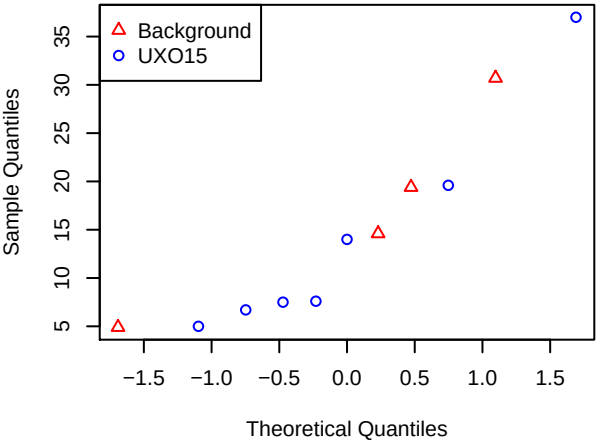
	UXO 15	Background
Minimum	2	3
25th Percentile	3	9
Median	3	12
Mean	8	13
75th Percentile	3	16
Maximum	36	23

UXO 15 OLD SKEET & TRAP RANGE
LEAD
SEDIMENT

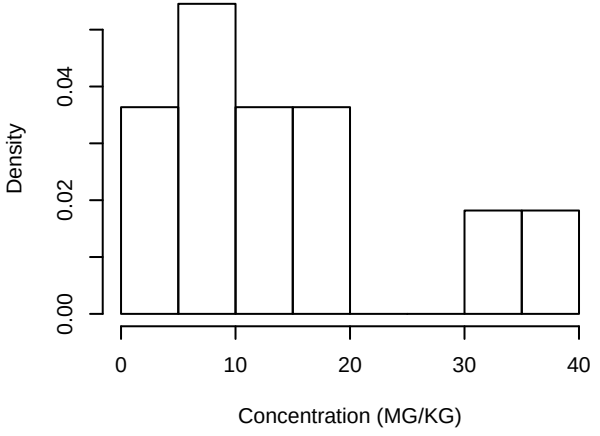
Boxplot



Normal Q−Q Plot



Histogram

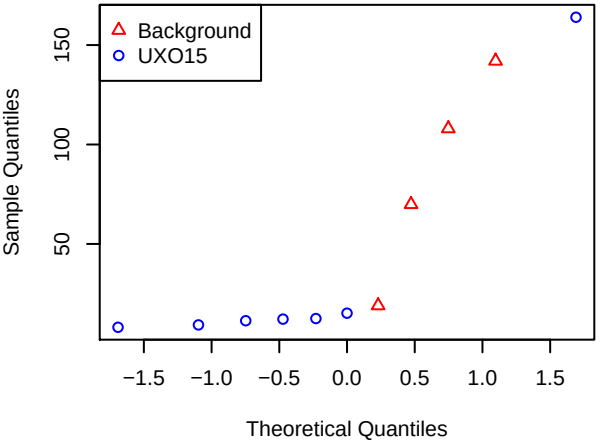


	UXO 15	Background
Minimum	5	5
25th Percentile	7	12
Median	8	17
Mean	14	17
75th Percentile	17	22
Maximum	37	31

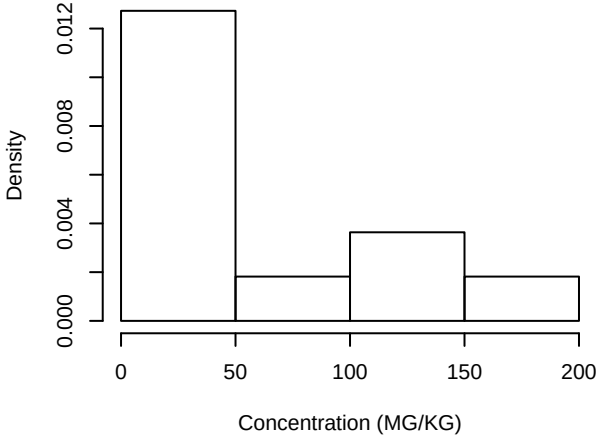
UXO 15 OLD SKEET & TRAP RANGE
ZINC
SEDIMENT

Boxplot

Normal Q−Q Plot



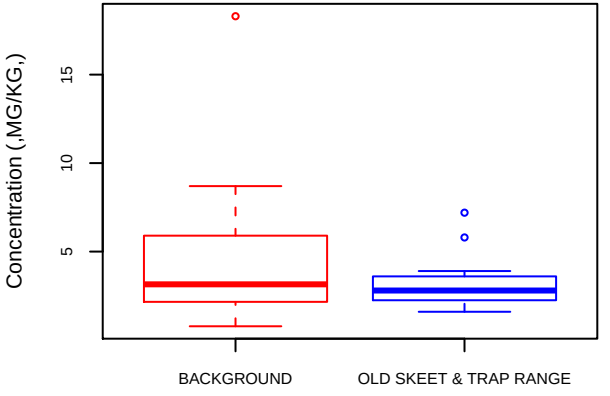
Histogram



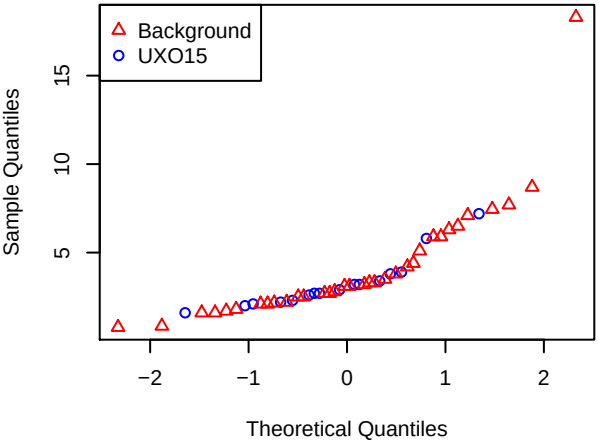
	UXO 15	Background
Minimum	8	19
25th Percentile	10	57
Median	12	89
Mean	33	85
75th Percentile	14	116
Maximum	164	142

UXO 15 OLD SKEET & TRAP RANGE
ARSENIC
Surface Soil

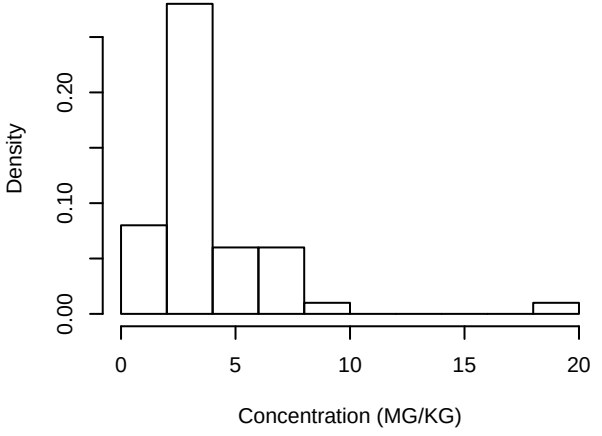
Boxplot



Normal Q−Q Plot



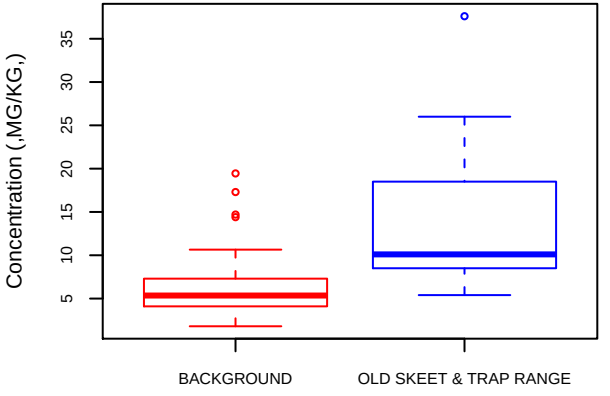
Histogram



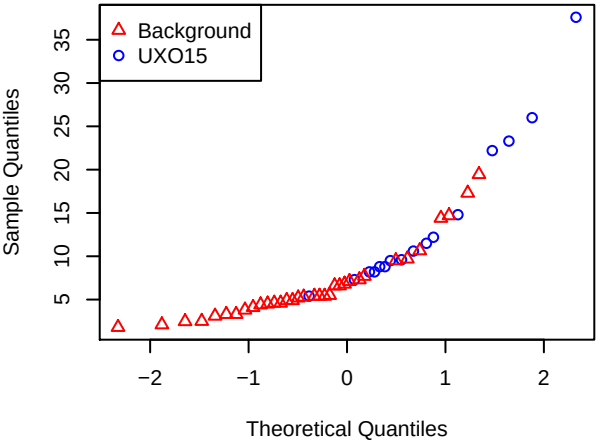
	UXO 15	Background
Minimum	2	1
25th Percentile	2	2
Median	3	3
Mean	3	4
75th Percentile	4	6
Maximum	7	18

UXO 15 OLD SKEET & TRAP RANGE
COPPER
Surface Soil

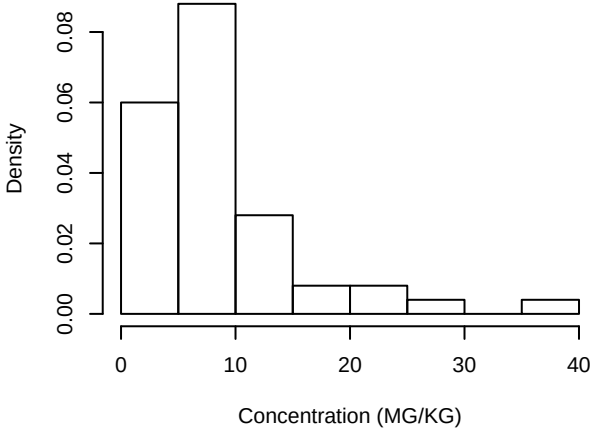
Boxplot



Normal Q−Q Plot



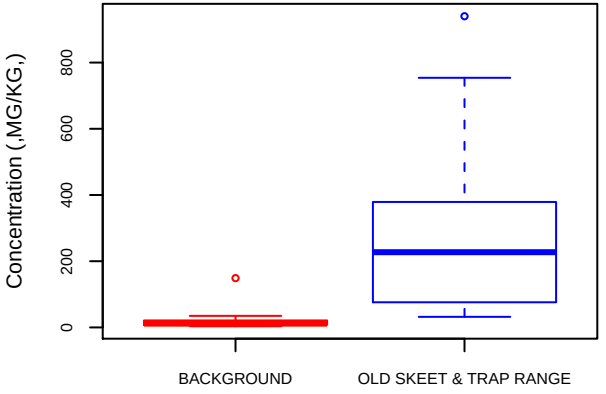
Histogram



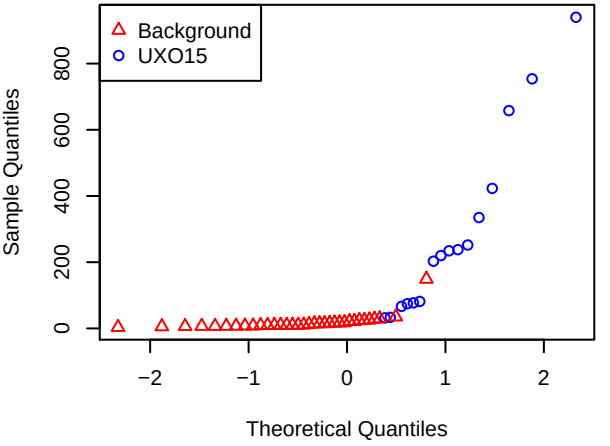
	UXO 15	Background
Minimum	5	2
25th Percentile	9	4
Median	10	5
Mean	14	7
75th Percentile	17	7
Maximum	38	19

UXO 15 OLD SKEET & TRAP RANGE
LEAD
Surface Soil

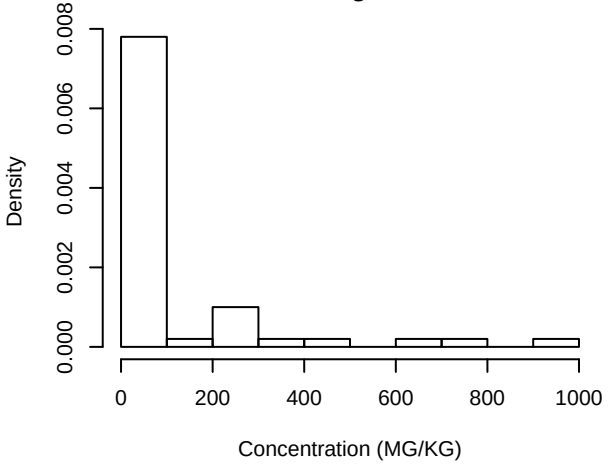
Boxplot



Normal Q−Q Plot



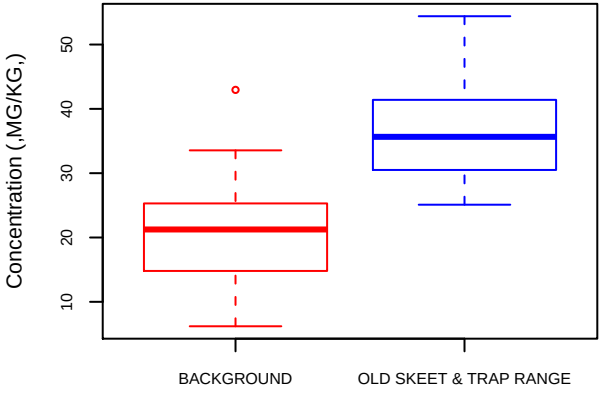
Histogram



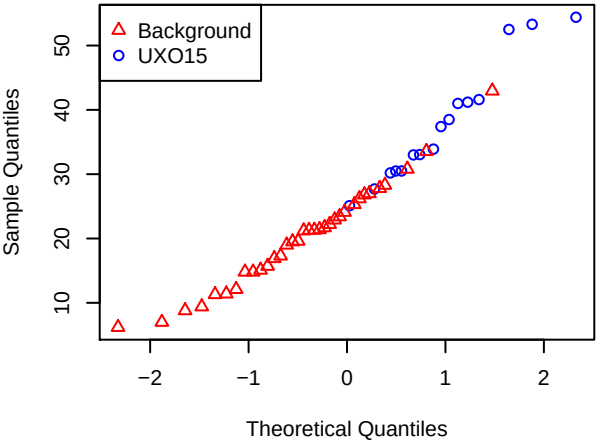
	UXO 15	Background
Minimum	32	4
25th Percentile	77	8
Median	227	11
Mean	289	18
75th Percentile	357	20
Maximum	940	149

UXO 15 OLD SKEET & TRAP RANGE
ZINC
Surface Soil

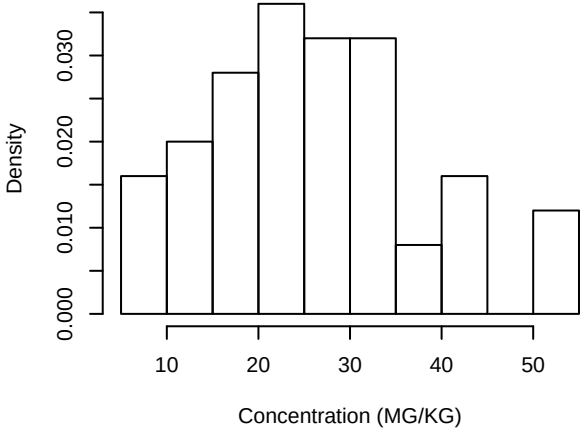
Boxplot



Normal Q−Q Plot



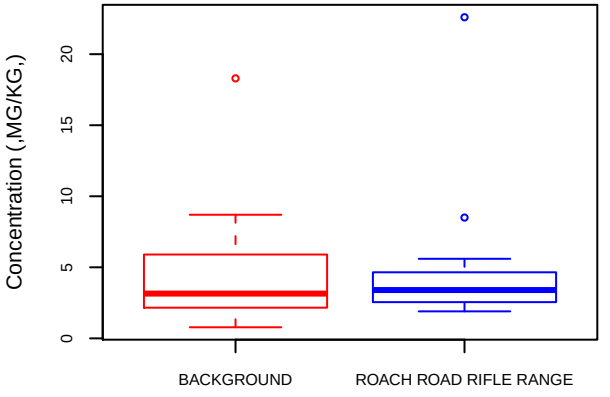
Histogram



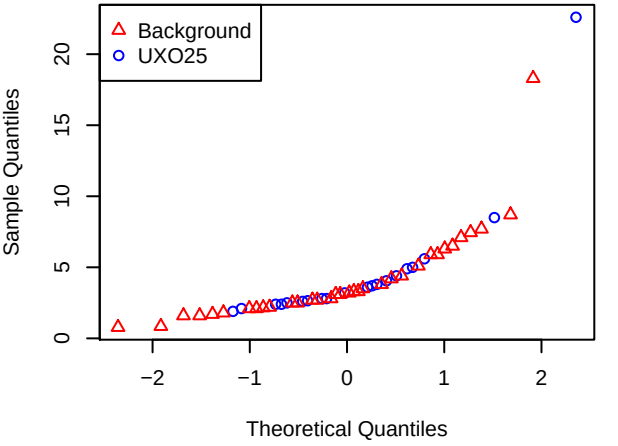
	UXO 15	Background
Minimum	25	6
25th Percentile	30	15
Median	36	21
Mean	38	20
75th Percentile	41	25
Maximum	54	43

UXO 25 ROACH ROAD RIFLE RANGE
ARSENIC
Surface Soil

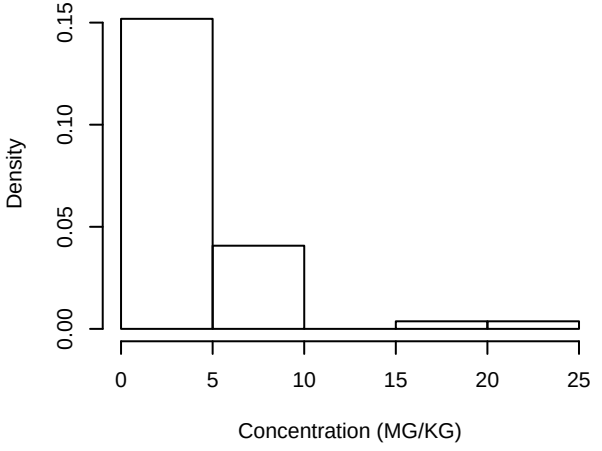
Boxplot



Normal Q−Q Plot



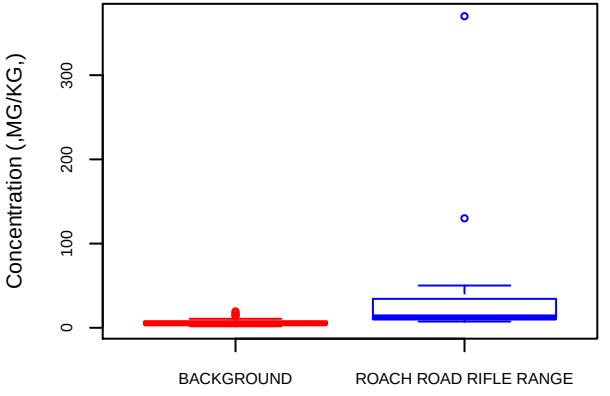
Histogram



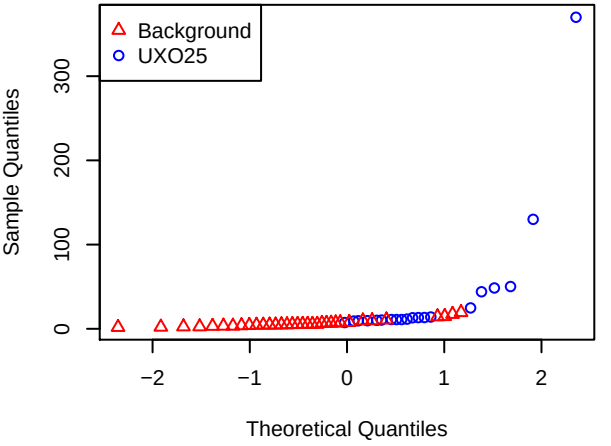
	UXO 25	Background
Minimum	2	1
25th Percentile	3	2
Median	3	3
Mean	5	4
75th Percentile	5	6
Maximum	23	18

UXO 25 ROACH ROAD RIFLE RANGE
COPPER
Surface Soil

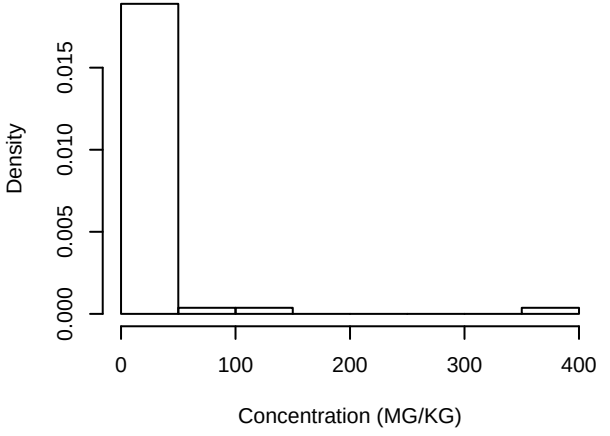
Boxplot



Normal Q−Q Plot



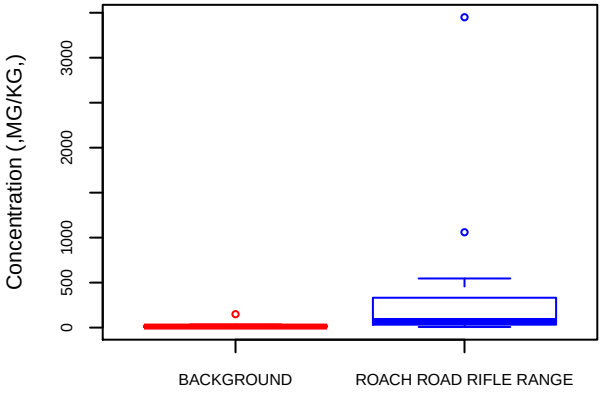
Histogram



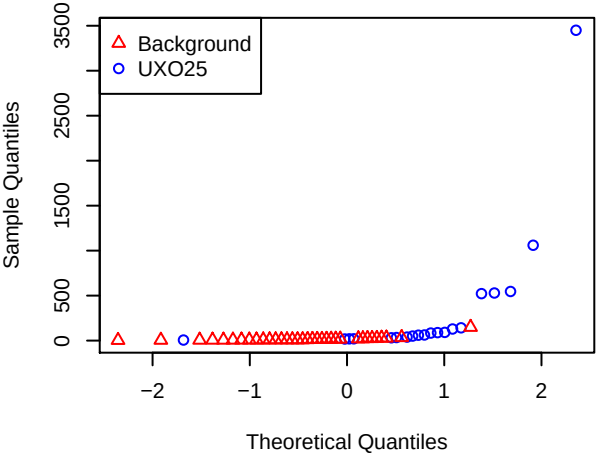
	UXO 25	Background
Minimum	7	2
25th Percentile	10	4
Median	12	5
Mean	41	7
75th Percentile	30	7
Maximum	370	19

UXO 25 ROACH ROAD RIFLE RANGE
LEAD
Surface Soil

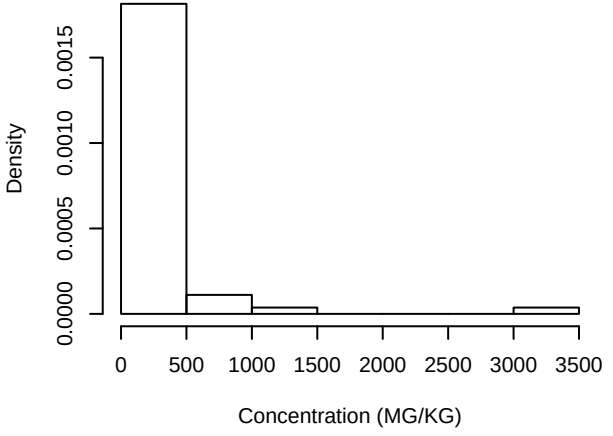
Boxplot



Normal Q−Q Plot



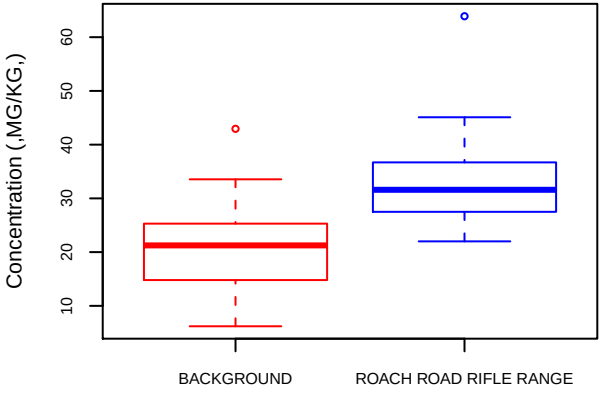
Histogram



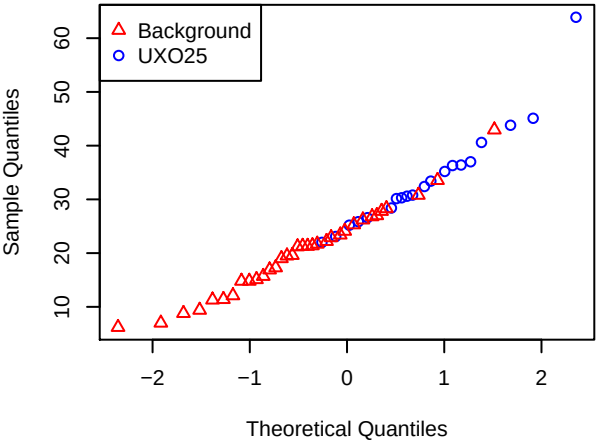
	UXO 25	Background
Minimum	6	4
25th Percentile	33	8
Median	73	11
Mean	349	18
75th Percentile	237	20
Maximum	3450	149

UXO 25 ROACH ROAD RIFLE RANGE
ZINC
Surface Soil

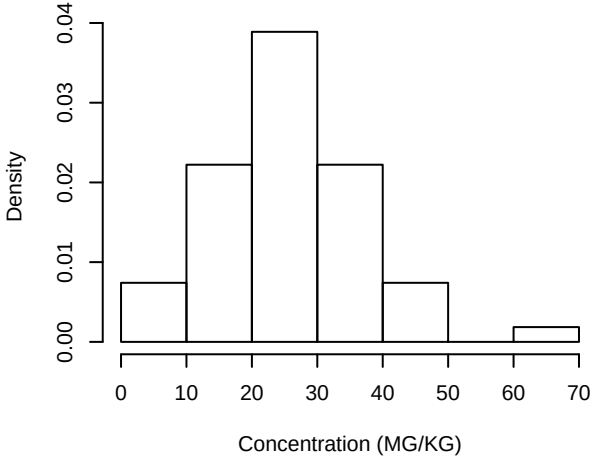
Boxplot



Normal Q−Q Plot



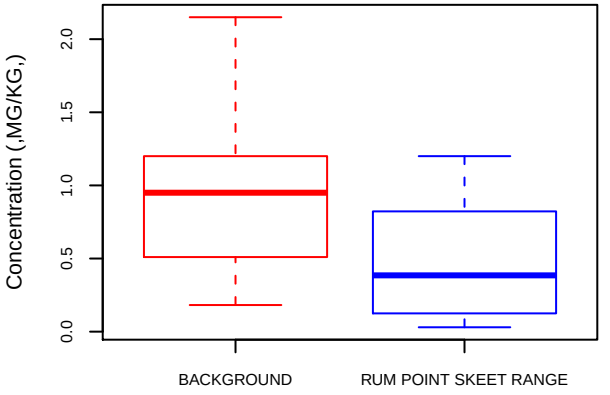
Histogram



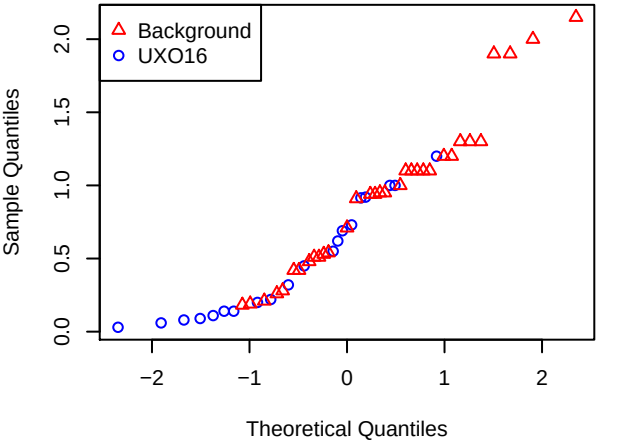
	UXO 25	Background
Minimum	22	6
25th Percentile	28	15
Median	32	21
Mean	34	20
75th Percentile	37	25
Maximum	64	43

UXO 16 RUM POINT SKEET RANGE
ANTIMONY
Surface Soil

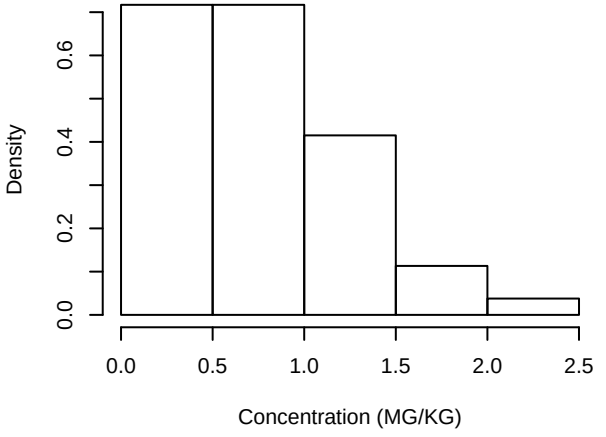
Boxplot



Normal Q−Q Plot



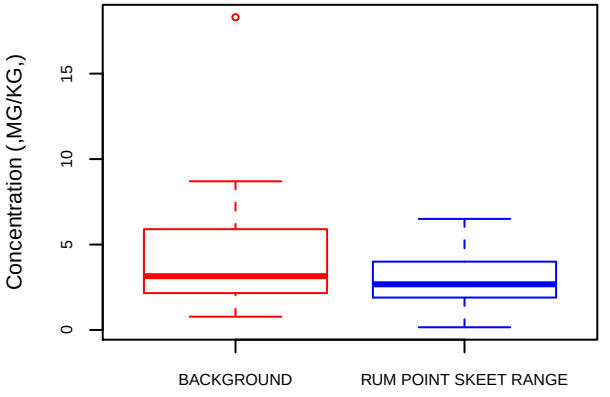
Histogram



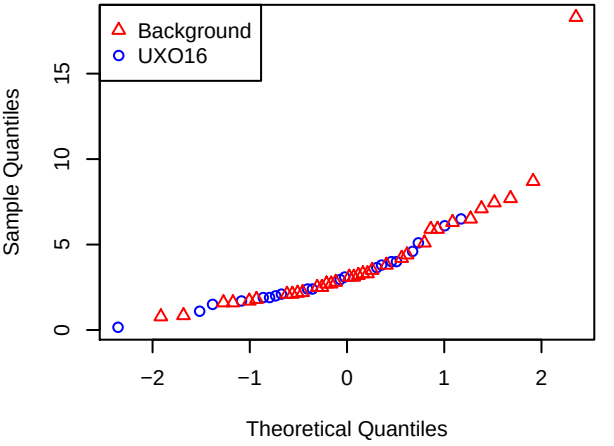
	UXO 14	Background
Minimum	0	0
25th Percentile	0	1
Median	0	1
Mean	0	1
75th Percentile	1	1
Maximum	1	2

UXO 16 RUM POINT SKEET RANGE
ARSENIC
Surface Soil

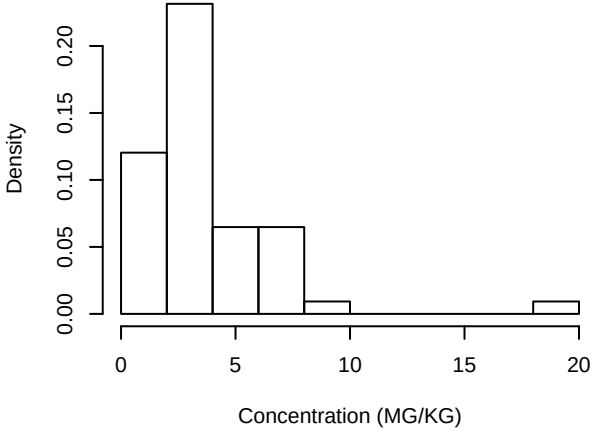
Boxplot



Normal Q−Q Plot



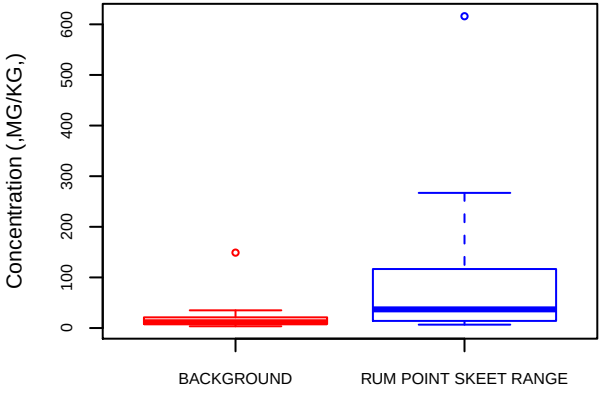
Histogram



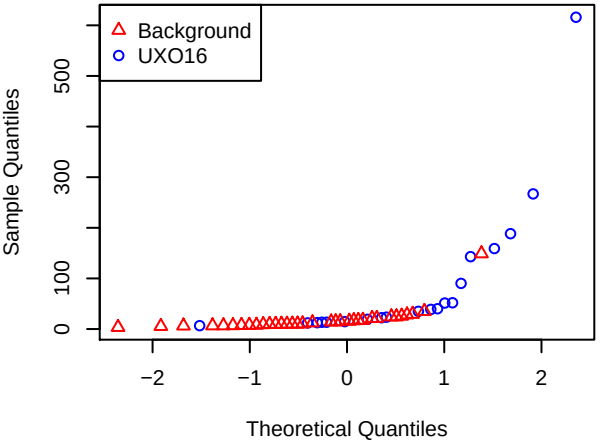
	UXO 14	Background
Minimum	0	1
25th Percentile	2	2
Median	3	3
Mean	3	4
75th Percentile	4	6
Maximum	6	18

UXO 16 RUM POINT SKEET RANGE
LEAD
Surface Soil

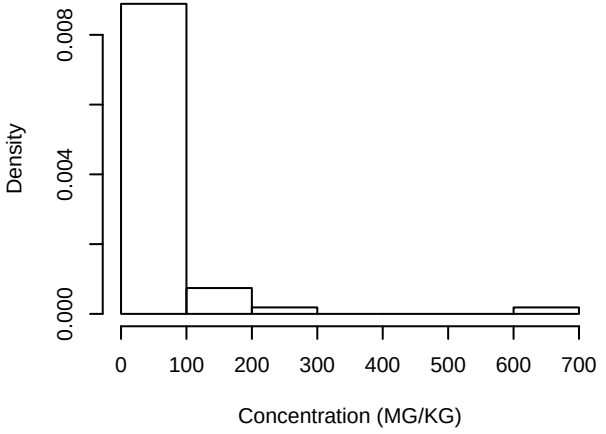
Boxplot



Normal Q−Q Plot



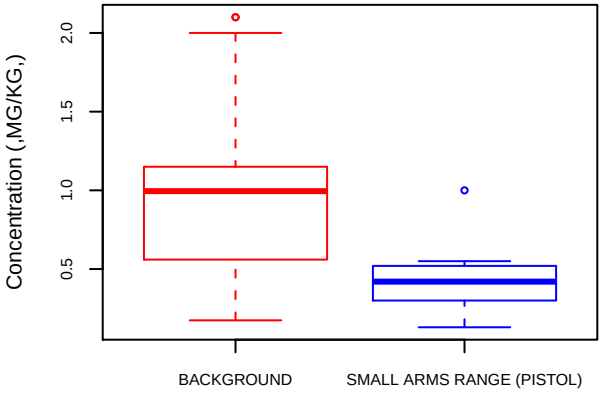
Histogram



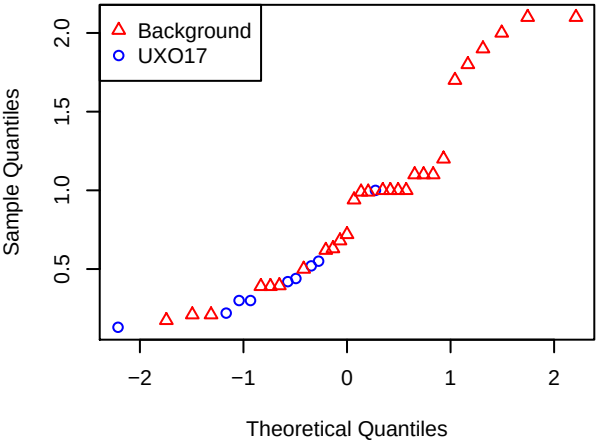
	UXO 14	Background
Minimum	7	4
25th Percentile	14	8
Median	37	11
Mean	91	18
75th Percentile	103	20
Maximum	616	149

UXO 17 SMALL ARMS (PISTOL) RANGE
ANTIMONY
Subsurface Soil

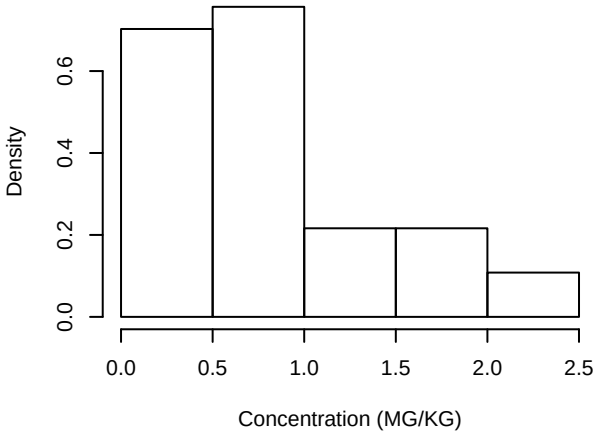
Boxplot



Normal Q−Q Plot



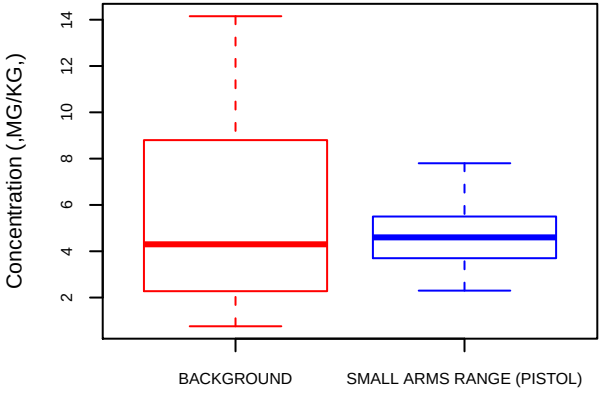
Histogram



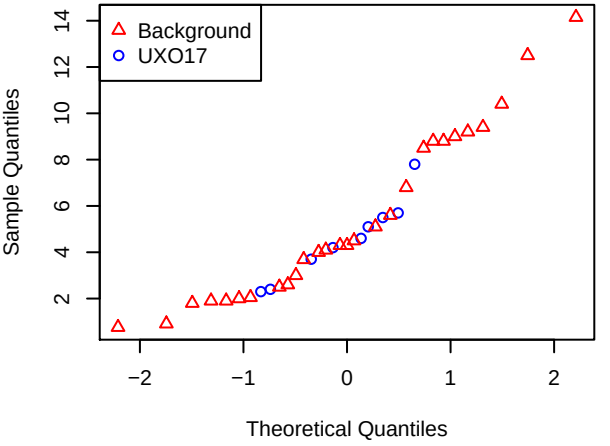
	UXO 14	Background
Minimum	0	0
25th Percentile	0	1
Median	0	1
Mean	0	1
75th Percentile	1	1
Maximum	1	2

UXO 17 SMALL ARMS (PISTOL) RANGE
ARSENIC
Subsurface Soil

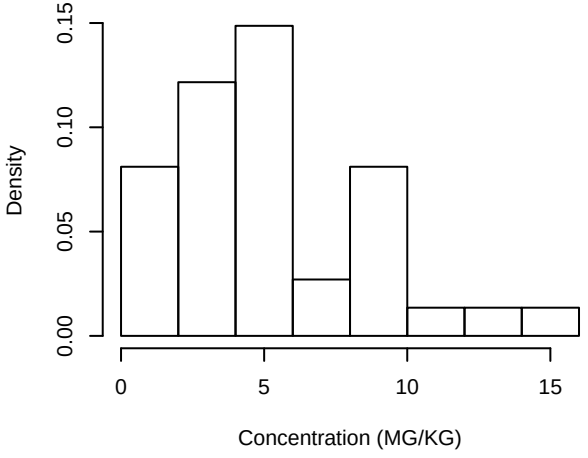
Boxplot



Normal Q−Q Plot



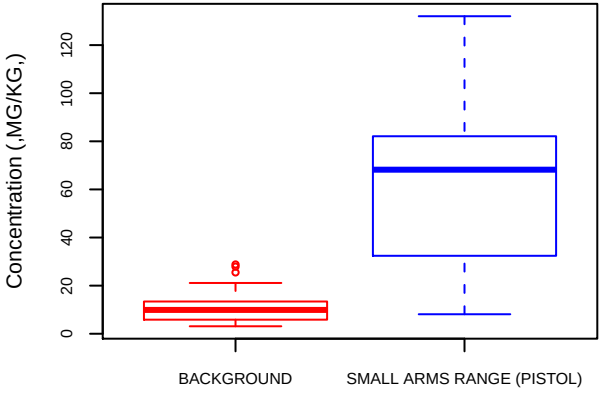
Histogram



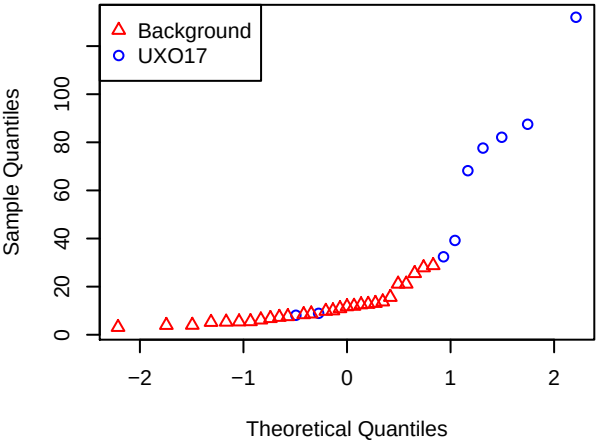
	UXO 14	Background
Minimum	2	1
25th Percentile	4	2
Median	5	4
Mean	5	5
75th Percentile	6	9
Maximum	8	14

UXO 17 SMALL ARMS (PISTOL) RANGE
LEAD
Subsurface Soil

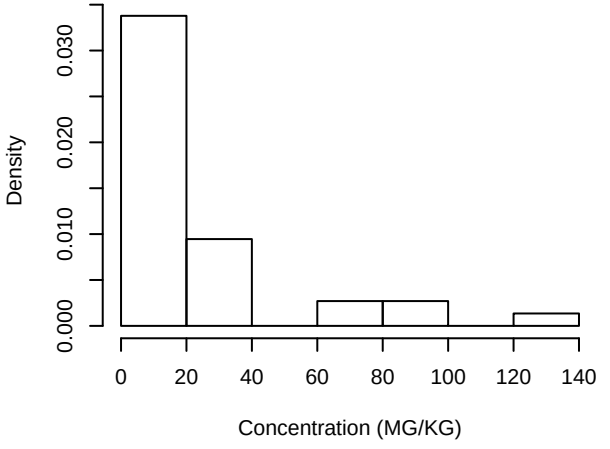
Boxplot



Normal Q−Q Plot



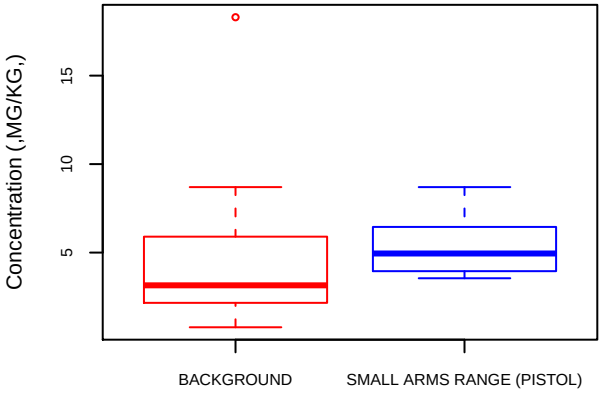
Histogram



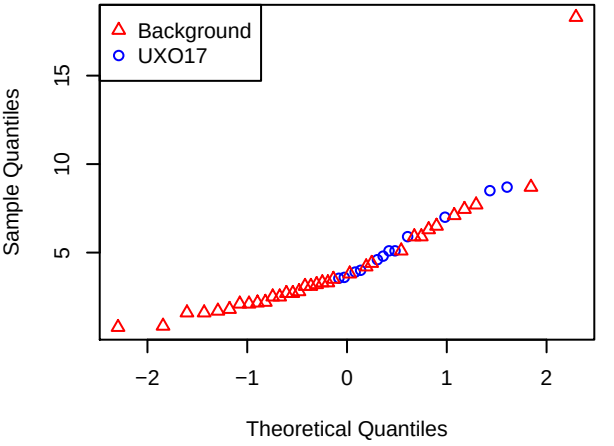
	UXO 14	Background
Minimum	8	3
25th Percentile	32	6
Median	68	10
Mean	60	12
75th Percentile	82	13
Maximum	132	29

UXO 17 SMALL ARMS (PISTOL) RANGE
ARSENIC
Surface Soil

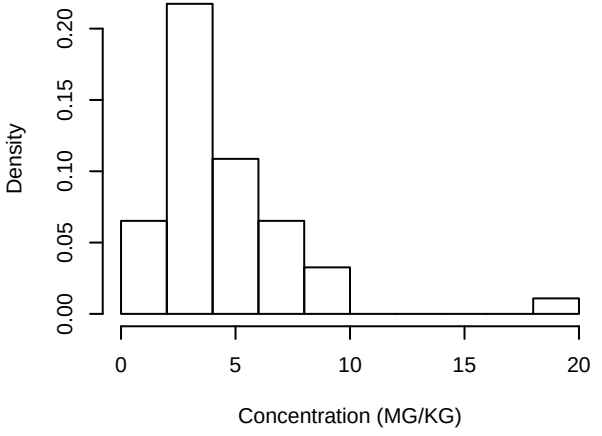
Boxplot



Normal Q−Q Plot



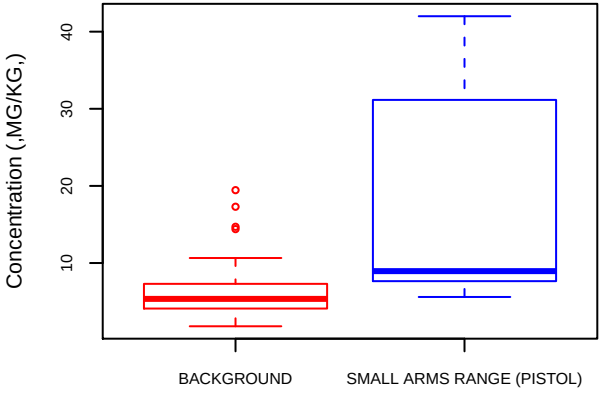
Histogram



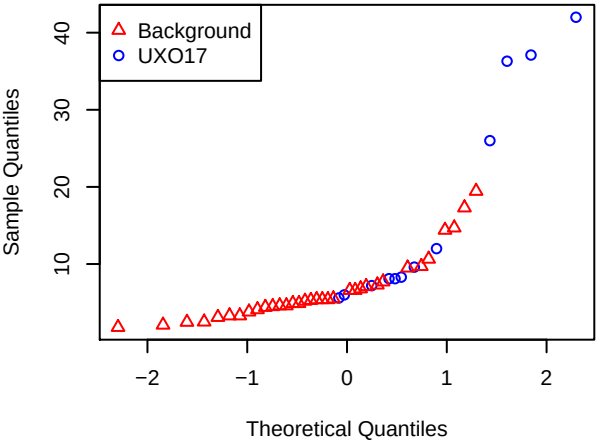
	UXO 14	Background
Minimum	4	1
25th Percentile	4	2
Median	5	3
Mean	5	4
75th Percentile	6	6
Maximum	9	18

UXO 17 SMALL ARMS (PISTOL) RANGE
COPPER
Surface Soil

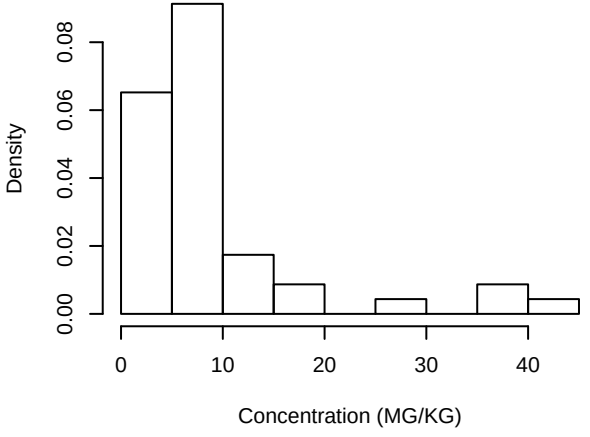
Boxplot



Normal Q−Q Plot



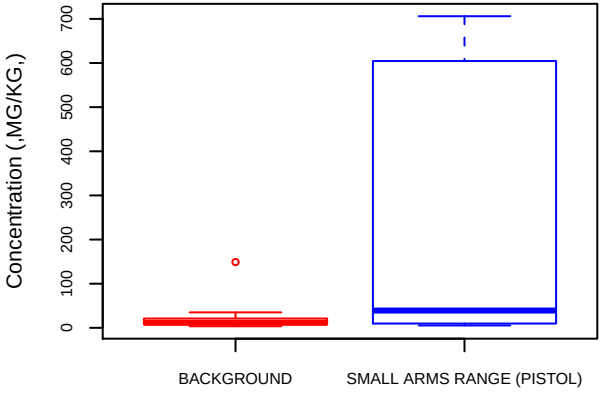
Histogram



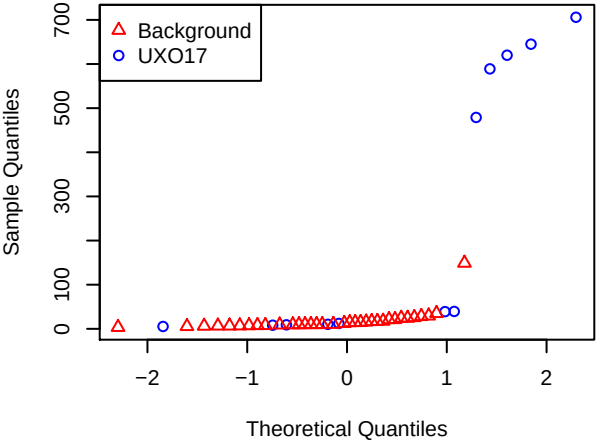
	UXO 14	Background
Minimum	6	2
25th Percentile	8	4
Median	9	5
Mean	17	7
75th Percentile	29	7
Maximum	42	19

UXO 17 SMALL ARMS (PISTOL) RANGE
LEAD
Surface Soil

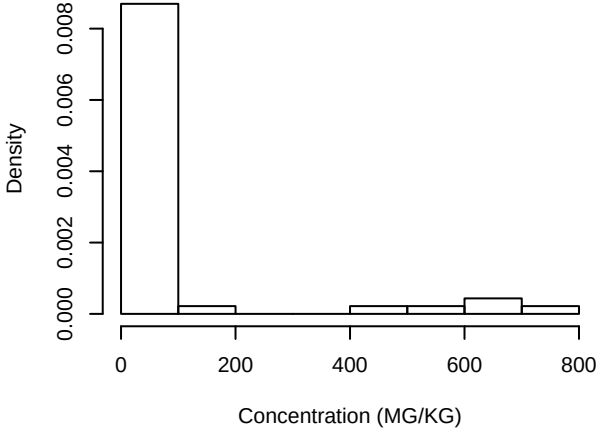
Boxplot



Normal Q−Q Plot



Histogram



	UXO 14	Background
Minimum	5	4
25th Percentile	10	8
Median	39	11
Mean	264	18
75th Percentile	597	20
Maximum	706	149

Statistical Methodology

This section describes the statistical methodologies used to compare site data with background data. Statistical analyses were used to compare site soil concentrations to Facility Background soil concentrations to determine if the analytical results obtained from the samples represent site conditions or background/ anthropogenic conditions. The results of the graphical and statistical tests performed and final recommendations for each constituent tested are presented in Tables G-1 through G-X.

The comparison of the site data with the background data was performed using summary statistics, probability plots, box plots, and several statistical tests described below. If the combined data sets are greater than 90 percent non-detect then the maximum concentrations were compared. If the site data appear to be obviously below or above background from visual inspection no formal statistical test was performed.

Probability Plots

Probability plots are a useful first step for visually comparing two data sets in a single graph. If the site and background distributions were exactly identical, the plotted values would lie on a straight line through the origin. Deviations from this line show the differences between the two distributions. If the site and background distributions are similar the scattering of the two data sets will be mixed. If there is grouping of the two data sets then data sets are most likely different.

Box Plots

As an additional aid for the population analysis, box plots were generated for the site data and background data.

Box plots show the central tendency, degree of symmetry, range of variation, and potential outliers of a data set. The data set is shown as a rectangular box that represents the middle 50 percent of the data. The upper value of the box represents the 75th percentile and the lower value of the box represents the 25th percentile. The median is represented by the middle line in the box.

Box plots for the same analyte in the two data sets were plotted on the same graph. The plots were visually inspected to see which data sets look similar and which ones differed. Particular attention was paid to see if the median from one data set fell within the 75th and 25th percentile range of the other data sets.

Statistical Tests

As stated above, the data were analyzed to determine whether they are similar. A number of statistical tests can be used to determine if the data sets are similar. If the combined percentage of non-detected concentrations was between 0 and 50 percent then the Two sample T-test, Wilcoxon Rank Sum test, or Gehan test was computed to test if the site data set is greater than the background data set plus one background standard deviation as outlined in Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites (2002).

USEPA's ProUCl 4.00.04 software was used to determine the data distribution of the site and background concentrations and compute the Two sample T-test, Wilcoxon Rank Sum Test, or Gehan Test. If the data were log normally distributed then the statistical tests were performed on the log-transformed concentrations. If there are more than two detection limits for data that are non-detect then the Gehan test was computed.

Two Sample T-Test

Test for a difference between two populations means when it can be assumed that the data are approximately normally distributed or sample sizes are large enough (m and n at least 30). If the variances of the two data sets are not equal than the Two sample T Test with unequal variance was computed. The Two Sample T Test was computed using USEPA's Pro UCL 4.00.04. The null and alternative hypothesis are:

H_o: The site distribution exceeds the background distribution by more than one background standard deviation.

H_A: The site distribution does not exceed the background distribution by more than one background standard deviation.

Wilcoxon Rank Sum Test

The Wilcoxon Rank-Sum (WRS) nonparametric test is used to test for a shift in location between two independent populations. The WRS test has two main advantages over the independent sample t test: the two data sets need not be drawn from the normal distribution and the WRS test can handle a moderate number of nondetected values by treating them as ties. The Wilcoxon Rank Sum test was computed using USEPA's PRO UCL 4.00.04 software.

H_o: The site distribution exceeds the background distribution by more than one background standard deviation.

H_A: The site distribution does not exceed the background distribution by more than one background standard deviation.

Gehan Test

The Gehan nonparametric test is used to test for a shift in location between two independent populations. The Gehan test can be used when the background or site datasets contain multiple nondetects with different reporting limits. The Gehan test was computed using USEPA's PRO UCL 4.00.04 software.

H_o: The site distribution exceeds the background distribution by more than one background standard deviation.

H_A: The site distribution does not exceed the background distribution by more than one background standard deviation.

Quantile Test

The Quantile test is used to identify the differences in the right tails of the site and background distributions. This may be regarded as detecting if the values in the right-tail of the site population are greater than the right-tail of the background distribution. If the results of the Two Sample T-Test, WRS Test, or Gehan Test found the distributions to not be different then the quantile test was computed. If the quantile test found the right tail of the site data to be larger than the right tail of the background data it was concluded that the site concentrations are greater than background. The test is valid regardless of the underlying distribution of the site and background data sets.

Slippage Test

The Slippage test is used to test for a shift to the right in the extreme right-tail of the site versus the background concentrations. This is equivalent to asking if a set of the largest values of the site distribution are larger than the maximum value of the background distribution. If the results of the Quantile Test were that the right tails of the site and background distributions were not different than the slippage test was computed. If the slippage test found the extreme right tail of

the site data to be larger than the background data it was concluded that the site concentrations are greater than background. This test can be used regardless of the underlying distribution of the site and background data sets.

Statistical Summary

Old Skeet and Trap Range
Surface Soil

Arsenic

The box plots show that the background and UXO 14 have similar median and 25th percentile concentrations. There is one suspected background outlier that is greater than the site maximum concentration. The normal plot shows there is a mixing of the two datasets. The histogram shows that the combined data are right skewed with one concentration elevated above the rest of the data. Therefore from visual inspection of the data it can be concluded that the site concentrations are similar to the background concentrations.

Copper

The box plots show that the background concentrations are shifted below the site concentrations. This can be seen by the upper whisker of the background dataset being roughly equal to the site median concentration. The normal quantile plot shows that the four largest concentrations are form the site dataset. The histogram shows that the combined data are right skewed with one data point separated from the rest of the data set. Therefore from visual inspection of the data it can be concluded that the site concentrations are greater than the background concentrations.

Lead

The box plots show that the background concentrations are shifted below the site concentrations. This can be seen by the maximum background concentration being roughly equal to the site median concentration. The normal quantile plot shows that the site concentrations only occur in the upper tail of the combined data distribution. The histogram shows that the combined data are right skewed with three data points separated from the rest of the data set. Therefore from visual inspection of the data it can be concluded that the site concentrations are greater than the background concentrations.

Zinc

The box plots show that the background concentrations are shifted below the site concentrations. This can be seen by the upper whisker of the background dataset being roughly equal to the site median concentration. The normal quantile plot shows that the site concentrations only occur in the upper tail of the combined data distribution and the three largest concentrations are from the site data set. The histogram shows that the combined data are right skewed with three data points separated from the rest of the data set. Therefore from visual inspection of the data it can be concluded that the site concentrations are greater than the background concentrations.

Sediment

Arsenic

The box plots show that the background concentrations are shifted above the site concentrations. This shift can be seen by the upper whisker of the site concentrations being less than the background 25th percentile. However there is one site concentration that is elevated above the background data set. The normal plot shows a separation of data sets with the lower half of the dataset containing only site concentrations. However the maximum concentration is from the site data set and it is elevated above the rest of the concentrations. The histogram of the combined data set is right skewed with two concentrations separated from the rest of the data. Based on

the small sample size and the one elevated site concentration it can be concluded that the site concentrations are greater than background.

Copper

The box plots show that the background concentrations are shifted above the site concentrations. This shift can be seen by the upper whisker of the site concentrations being less than the background 25th percentile. However there is one site concentration that is elevated above the background data set. The normal plot shows a separation of data sets with the lower half of the dataset containing only site concentrations. However the maximum concentration is from the site data set and it is elevated above the rest of the concentrations. The histogram of the combined data set is right skewed with two concentrations separated from the rest of the data. Based on the small sample size and the one elevated site concentration it can be concluded that the site concentrations are greater than background.

Lead

The box plots show that the background concentrations are shifted above the site concentrations. This shift can be seen by the upper whisker of the site concentrations being less than the background 75th percentile. However there is one site concentration that is elevated above the background data set. The normal plot shows a mixing of data sets. However the maximum concentration is from the site data set and it is elevated above the rest of the concentrations. The histogram of the combined data set is right skewed with two concentrations separated from the rest of the data. Based on the small sample size and the one elevated site concentration it can be concluded that the site concentrations are greater than background.

Zinc

The box plots show that the background concentrations are shifted above the site concentrations. This shift can be seen by the upper whisker of the site concentrations being less than the background 25th percentile. However there is one site concentration that is elevated above the background data set. The normal plot shows a separation of data sets with the lower half of the dataset containing only site concentrations. However the maximum concentration is from the site data set and it is elevated above the rest of the concentrations. The histogram of the combined data set is right skewed. Based on the small sample size and the one elevated site concentration it can be concluded that the site concentrations are greater than background.

Marine Rifle Range

Hillside Surface Soil

Arsenic

The box plots show that the background concentrations and Hillside concentrations have similar medians and 25th percentiles. There is one suspected background outlier that is greater than the site maximum concentration. The normal plot shows that the upper tail of the data distribution contains both background and hillside concentrations. The histogram shows that the combined data are right skewed with one concentration elevated above the rest of the data. Therefore from visual inspection of the data it can be concluded that the site concentrations are similar to the background concentrations.

Copper

The box plots show that the background concentrations are shifted below the Hillside concentrations. This can be seen by the maximum background concentration being roughly equal to the Hillside 25th percentile. The normal quantile plot shows that the Hillside

concentrations only occur in the upper tail of the combined data distribution. The histogram shows that the combined data are right skewed with one data point separated from the rest of the data set. Therefore from visual inspection of the data it can be concluded that the site concentrations are greater than the background concentrations.

Lead

The box plots show that the background concentrations are shifted below the Hillside concentrations. This can be seen by the maximum background concentration being roughly equal to the Hillside median concentration. The normal quantile plot shows that the Hillside concentrations only occur in the upper tail of the combined data distribution. The histogram shows that the combined data are right skewed with six data points separated from the rest of the data set. Therefore from visual inspection of the data it can be concluded that the site concentrations are greater than the background concentrations.

Zinc

The box plots show that the background concentrations are shifted below the Hillside concentrations. This can be seen by the background upper whisker being roughly equal to the Hillside 75th percentile. The normal quantile plot shows that three of the four largest concentrations are from the Hillside data set. The histogram shows that the combined data are right skewed. Therefore from visual inspection of the data it can be concluded that the site concentrations are greater than the background concentrations.

Berm 1

Arsenic

The box plots show that the background concentrations are shifted above the Berm 1 concentrations. This can be seen by the upper whisker of the Marine Rifle Range concentrations being less than the background 75th percentile. There is one suspected background outlier that is greater than the site maximum concentration. The normal plot shows that the upper tail of the data distribution contains only background concentrations. The histogram shows that the combined data are right skewed with one concentration elevated above the rest of the data. Therefore from visual inspection of the data it can be concluded that the site concentrations are less than the background concentrations.

Copper

The box plots show that the background concentrations are shifted below the Berm 1 concentrations. This can be seen by the maximum background concentration being less than the Berm 1 25th percentile. The normal quantile plot shows that the Berm 1 concentrations only occur in the upper tail of the combined data distribution and the four largest concentrations are from the Berm 1 dataset. The histogram shows that the combined data are right skewed with one data point separated from the rest of the data set. Therefore from visual inspection of the data it can be concluded that the site concentrations are greater than the background concentrations.

Lead

The box plots show that the background concentrations are shifted below the Berm 1 concentrations. This can be seen by the maximum background concentration being slightly greater than the Berm 1 median concentration. The normal quantile plot shows that the Berm 1 concentrations only occur in the upper tail of the combined data distribution and the four largest concentrations are from the Berm 1 dataset. The histogram shows that the combined data are right skewed with two data points separated from the rest of the data set. Therefore from visual

inspection of the data it can be concluded that the site concentrations are greater than the background concentrations.

Berm2

Arsenic

The box plots show that the background concentrations are shifted above the Berm 2 concentrations. This can be seen by the upper whisker of the Berm 2 concentrations being roughly equal to the background median concentration. There is one suspected background outlier that is greater than the site maximum concentration. The normal plot shows that the upper tail of the data distribution contains only background concentrations. The histogram shows that the combined data are right skewed with one concentration elevated above the rest of the data. Therefore from visual inspection of the data it can be concluded that the site concentrations are less than the background concentrations.

Copper

The box plots show that the background concentrations are shifted below the Berm 2 concentrations. This can be seen by the maximum background concentration being less than the Berm 2 25th percentile. The normal quantile plot shows that the Berm 2 concentrations only occur in the upper tail of the combined data distribution and the four largest concentrations are from the Berm 2 dataset. The histogram shows that the combined data are right skewed with two data points separated from the rest of the data set. Therefore from visual inspection of the data it can be concluded that the site concentrations are greater than the background concentrations.

Lead

The box plots show that the background concentrations are shifted below the Berm 2 concentrations. This can be seen by the maximum background concentration being roughly equal to the Berm 2 25th percentile. The normal quantile plot shows that the Berm 2 concentrations only occur in the upper tail of the combined data distribution and the four largest concentrations are from the Berm 2 dataset. The histogram shows that the combined data are right skewed with two data points separated from the rest of the data set. Therefore from visual inspection of the data it can be concluded that the site concentrations are greater than the background concentrations.

Small Arms (Pistol) Range

Surface Soil

Arsenic

The box plots show that the site median and 75th percentile are slightly greater than the background median and 75th percentile; however the upper background data set is greater than the upper whisker of the site data set and the background maximum concentration is two times the site maximum concentration. The normal plot shows a mixing of the two datasets with the largest concentration coming from the background data set. The histogram shows that the combined data are right skewed with one concentration elevated above the rest of the data. Therefore from visual inspection of the data it can be concluded that the site concentrations are similar to background concentrations.

Copper

The box plots show that the background concentrations are shifted below the site concentrations. This can be seen by the upper whisker of the background concentration being roughly equal to the site median concentration. The normal quantile plot shows that the four largest

concentrations are from the site data set. The histogram shows that the combined data are right skewed with four data points separated from the rest of the data set. Therefore from visual inspection of the data it can be concluded that the site concentrations are greater than the background concentrations.

Lead

The box plots show that the background concentrations are shifted below the site concentrations. This can be seen by the upper whisker of the background concentration being roughly equal to the site median concentration. The normal quantile plot shows that the four largest concentrations are from the site data set. The histogram shows that the combined data are right skewed with four data points separated from the rest of the data set. Therefore from visual inspection of the data it can be concluded that the site concentrations are greater than the background concentrations.

Subsurface Soil

Antimony

The box plots show that the background concentrations are shifted above the site concentrations. This can be seen by the site upper whisker being roughly equal to the background 25th percentile. The normal plot shows a that the site concentrations only occur in the lower tail and that the upper tail of the combined data set it all background concentrations. The histogram shows that the combined data are right. Therefore from visual inspection of the data it can be concluded that the site concentrations are similar to background concentrations.

Arsenic

The box plots show that the site and background median concentrations are similar. The normal plot shows a mixing of the two datasets with the nine largest concentration coming from the background data set. The histogram shows that the combined data are right skewed. Therefore from visual inspection of the data it can be concluded that the site concentrations are similar to background concentrations.

Lead

The box plots show that the background concentrations are shifted below the site concentrations. This can be seen by the suspected background outliers being roughly equal to the site 25th percentile. The normal quantile plot shows that the seven largest concentrations are from the site data set. The histogram shows that the combined data are right skewed with three data points separated from the rest of the data set. Therefore from visual inspection of the data it can be concluded that the site concentrations are greater than the background concentrations.

Rum Point Skeet Range

Antimony

The box plots show that the background concentrations are shifted above the site concentrations. This can be seen by the upper whisker of the site concentrations being roughly equal to the background 75th percentile. The normal plot shows that the upper half of the upper tail of the data distribution contains only background concentrations(ten largest concentrations). The histogram shows that the combined data are right skewed. Therefore from visual inspection of the data it can be concluded that the site concentrations are less than the background concentrations.

Arsenic

The box plots show that the median and 25th percentiles of the background and site data sets are roughly equal. The maximum background concentration is more than two times the site maximum. The normal plot shows that the six largest concentrations are from the background data but otherwise there is a mixing of data sets. The histogram shows that the combined data are right skewed with one concentration elevated above the rest of the data. Therefore from visual inspection of the data it can be concluded that the site concentrations are similar to background concentrations.

Lead

The box plots show that the background concentrations are shifted below the site concentrations. This can be seen by the upper whisker of the background concentration being roughly equal to the site median concentration. The normal quantile plot shows that the four largest concentrations are from the site data set. The histogram shows that the combined data are right skewed with two data points separated from the rest of the data set. Therefore from visual inspection of the data it can be concluded that the site concentrations are greater than the background concentrations.

Roach Road Rifle Range
Surface Soil

Arsenic

The box plots show that the background and UXO 25 have similar median and 25th percentile concentrations. There is one suspected background outlier that is less than the suspected site outlier. The normal plot shows there is a mixing of the two datasets. The histogram shows that the combined data are right skewed with two concentrations elevated above the rest of the data. Therefore from visual inspection of the data it can be concluded that the site concentrations are similar to the background concentrations.

Copper

The box plots show that the background concentrations are shifted below the site concentrations. This can be suspected background outliers being roughly equal to the site median concentration. The normal quantile plot shows that the six largest concentrations are form the site dataset. The histogram shows that the combined data are right skewed with one data point separated from the rest of the data set. Therefore from visual inspection of the data it can be concluded that the site concentrations are greater than the background concentrations.

Lead

The box plots show that the background concentrations are shifted below the site concentrations. This can be seen by the maximum background concentration being roughly equal to the site median concentration. The normal quantile plot shows that the five largest concentrations are site concentrations. The histogram shows that the combined data are right skewed with one data point separated from the rest of the data set. Therefore from visual inspection of the data it can be concluded that the site concentrations are greater than the background concentrations.

Zinc

The box plots show that the background concentrations are shifted below the site concentrations. This can be seen by the upper whisker of the background dataset being roughly equal to the site median concentration. The normal quantile plot shows that the site concentrations only occur in the upper tail of the combined data distribution and the three largest concentrations are from the site data set. The histogram shows that the combined data are bell shaped with one data point

separated from the rest of the data set. Therefore from visual inspection of the data it can be concluded that the site concentrations are greater than the background concentrations.