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FINAL REMEDIAL INVESTIGATION/RISK ASSESSMENT REPORT FOR THE SITE 12 HARBOR DREDGE SPOIL AREA NSTC GREAT LAKES IL

6/1/2014

TETRA TECH

Final
Remedial Investigation/ Risk Assessment Report
for the
Site 12 – Harbor Dredge Spoil Area

Naval Station Great Lakes
Great Lakes, Illinois

Naval Facilities Engineering Command Midwest

Contract Number N62470-08-D-1001

Contract Task Order F27A

June 2014

FINAL
REMEDIAL INVESTIGATION/ RISK ASSESSMENT REPORT

FOR

SITE 12 – HARBOR DREDGE SPOIL AREA

NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
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ACRONYMS AND ABBREVIATIONS

ALM	Adult lead methodology
ASTM	American Society for Testing and Materials
ATSDR	Agency for Toxic Substances and Disease Registry
BAF	Bioaccumulation factor
BaP Eq	benzo(a)pyrene equivalents
BERA	Baseline ecological risk assessment
bgs	below ground surface
BTU	British thermal unit
Cal EPA	California Environmental Protection Agency
CDI	Chronic daily intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	cubic feet per second
cm/sec	centimeters per second
COC	Chemical of concern
COPC	Chemical of potential concern
C-Pah	carcinogenic polynuclear aromatic hydrocarbons
CSF	Cancer slope factor
CSM	Conceptual site model
CTE	Central tendency exposure
DAF	Dilution attenuation factor
DO	Dissolved oxygen
DPT	Direct push technology
EC	Exposure Concentration/Effective concentration
Eco SSL	Ecological soil screening level
EEQ	Ecological Effects Quotient
EFS	Environmental Field Services, Inc.
Empirical	Empirical Laboratories, LLC
EPA	Environmental Protection Agency
EPC	Exposure point concentration
ERA	Ecological Risk Assessment
ESL	Ecological screening level
EU	Exposure Unit
°F	Fahrenheit
FOL	Field Operations Leader
FSHA	Fort Sheridan Housing Annex

ft/day	feet per day
GHA	Glenview Housing Annex
GPS	Global positioning system
HEAST	Health Effects Assessment Summary Tables
HHRA	Human Health Risk Assessment
HI	Hazard index
HQ	Hazard quotient
IAS	Initial Assessment Study
IUR	Inhalation unit risk
ID	Inside diameter
IDW	Investigation-derived waste
IEUBK	Integrated Exposure Uptake Biokinetic
ILCR	Incremental lifetime cancer risk
IAC	Illinois Administrative Code
Illinois EPA	Illinois Environmental Protection Agency
INRMP	Integrated Natural Resource Management Plan
IRIS	Integrated Risk Information System
JULIE	Joint Utility Locating Information for Excavators
K	Hydraulic conductivity
K_{OC}	organic carbon partition coefficient
K_{OW}	octanol/water partition coefficient
LANL	Los Alamos National Laboratory
LOAEL	Lowest observed adverse effect level
MCL	Maximum contaminant level
mg/kg	milligrams per kilogram
µg/kg	micrograms per kilogram
MI	Mobility Index
MS	Matrix Spike
MSD	Matrix Spike Duplicate
msl	mean sea level
NAD 83	North American Datum 1983
NAVD 88	North American Vertical Datum 1988
NAVFAC MW	Naval Facilities Engineering Command Midwest
Navy	Department of the Navy
NCEA	National Center for Environmental Assessment
NFA	No Further Action
NSGL	Naval Station Great Lakes

NOAEL	No observed adverse effect level
NOAA	National Oceanic and Atmospheric Administration
NTU	Nephelometric turbidity unit
OPPTS	Office of Prevention, Pesticides, and Toxic Substances
ORNL	Oak Ridge National Laboratory
ORP	Oxidation reduction potential
OSWER	Office of Solid Waste and Emergency Response
PAH	Polynuclear aromatic hydrocarbon
PAL	Project Action Limit
PCB	Polychlorinated biphenyl
PEC	Probable effects concentration
PEF	Particulate emissions factor
PID	Photoionization detector
PPE	Personal protective equipment
ppm	Parts per million
PPRTV	Provisional Peer Reviewed Toxicity Value
QA	Quality Assurance
QC	Quality Control
RAGS	Risk Assessment Guidance for Superfund
RBA	Relative bioavailability
RfC	Reference concentration
RfD	Reference dose
RI	Remedial Investigation
RME	Reasonable maximum exposure
RSL	Regional screening level
SDWA	Safe Drinking Water Act
SLERA	Screening-level ecological risk assessment
SOP	Standard Operating Procedure
SPCS	State Plane Coordinate System
SPLP	Synthetic precipitation leaching procedure
SQG	Soil quality guideline
SQUIRT	Screening quick reference table
SRO	Soil Remediation Objective
SSL	Soil Screening Levels
SVOC	Semivolatile organic compound
TACO	Tiered Approach to Corrective Action Objectives
TAL	Target Analyte List

TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TEC	Threshold effect concentration
TEF	Toxic Equivalent Factor
Tetra Tech	Tetra Tech, Inc.
Trimatrix	Trimatrix Laboratories, Inc.
TRV	Toxicity reference value
UCL	Upper confidence limit
UFP SAP	Uniform Federal Policy Sampling Analysis Plan
USCS	Unified Soil Classification System
USGS	United States Geological Survey
USEPA	United States Environmental Protection Agency
WQC	Water quality criteria
WQS	Water quality standard
VOC	Volatile organic compound

EXECUTIVE SUMMARY

E.1 PURPOSE AND OBJECTIVE OF REPORT

The Remedial Investigation (RI) was conducted to determine the nature of fill material(s) that were placed in Harbor Dredge Spoil Area, and to identify potential risks associated with Site 12. The chemical data for Site 12 were used to delineate areas of impacted soil/fill, evaluate the potential for metals to migrate to groundwater, and conduct a Human Health Risk Assessment (HHRA) and an Ecological Risk Assessment (ERA) for the site.

The RI was completed in three phases. The RI fieldwork conducted in December 2010 and December 2012 consisted of the drilling of soil borings, and the collection and laboratory analysis of soil samples. The RI field work conducted in August 2013 consisted of installing monitoring wells and the collection and laboratory analysis of groundwater samples.

E.2 INVESTIGATION OBJECTIVES

Data collected during the RI were used to meet the following objectives:

- Determine the nature of fill material(s) that were placed in the Harbor Dredge Spoil Area, and identify human health and ecological risks that may be associated with this material.

- Determine if concentrations of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), metals, pesticides, and polychlorinated biphenyls (PCBs) are present in soil, and if they exceed screening levels.

- Determine the presence and nature of contamination within soil at the Harbor Dredge Spoil Area.

- Evaluate the potential for contaminants to migrate from soil to groundwater based on leachate data from subsurface soil samples and from groundwater to surface water based on groundwater samples from monitoring wells.

- Prepare a RI Report for submittal to the Navy and Illinois Environmental Protection Agency (Illinois EPA).

E.3 HISTORICAL INFORMATION

During harbor dredging activities in 1952 and the 1970s, dredge spoils from the boat slip (Boat Basin) area in the harbor were reportedly disposed in Site 12 (Rogers, Golden, and Halpern, 1986). The harbor area receives flow directly from Pettibone Creek, which drains storm water from the base and a number of off-base industries upstream of Naval Station Great Lakes (NSGL). The primary sources of the environmental contaminants in the harbor sediments are from upstream industrial sources (historical discharges and contamination) and storm water discharges within the Pettibone Creek Watershed. Overland runoff and storm water discharges from NSGL to Pettibone Creek may have contributed pollutants to the watershed. Recent sediment sampling performed in the creek suggests that there is no significant current point source(s) impacting the sediment quality of Pettibone Creek. However, chemicals in the runoff from past activities may have settled in the harbor sediments (Rogers, Golden, and Halpern, 1986).

An Initial Assessment Study (IAS) was performed at NSGL in 1986 (Dames & Moore, 1991). The IAS identified seven sites, including Site 12, as requiring further study within NSGL. After the report was issued, a storm water retention pond to the north of Site 12 was constructed and an additional portion of Site 12 along Lake Michigan was filled in (Figure 2-2). Past development activities at the Site are documented on historic maps and aerial photographs. These maps and photographs are presented in Appendix A of this document. The IAS also notes that in the late 1980s, there were piles of soil and plant debris on Site 12. The soil and debris presumably came from other locations at NSGL. The sediment reportedly dredged from the harbor and deposited on Site 12 could have high organic content, and may contain heavy metals, oils (i.e., SVOCs and PAHs), pesticides, and PCBs from industries upstream of the NSGL (Tetra Tech, 2011a).

E.4 SITE-SPECIFIC GEOLOGY

The shallow, subsurface lithology of the borings located directly on the shore of Lake Michigan (outer Harbor) was generally observed to be lake dredge soil. This material, observed from ground surface to termination of the borings at five feet bgs, is generally comprised of poorly sorted fine Sand (SP). The shallow, subsurface lithology of the major portion of Site 12 not located directly on the shore of Lake Michigan was generally observed to be a land-based fill material. This material, observed from ground surface to approximately 4.5 to 8 feet bgs, is generally comprised of sand and gravel, with some clay. A random distribution of asphalt-like material was distributed throughout this fill material in the borings from the center towards the west of the site.

The Unified Soil Classification System (USCS) description of the soil ranges from ML/SP/SC/SW/GW (silt, fine sand, clay and sand mix, well-graded sand, and gravel (with randomly distributed asphalt-like pieces)

land-based fill material near the surface, to a lake dredge soil SP (poorly sorted sand) in the subsurface soil. One boring, NTC12-SB28, had CH (fat clay) at 9 feet to termination of the boring at 10 feet bgs.

E.5 SITE-SPECIFIC HYDROGEOLOGY

Site 12 is located in a flat area on the lakeshore. Ground elevations at the site range from approximately 579 to 580 feet above mean sea level (msl) (a few feet above lake level). The surface consists of hard-packed gravel, sand, and silt covered with weeds and grasses, underlain by approximately 100 feet of glacial till over bedrock. Various mixtures of primarily sand and gravel, with construction debris and lesser amounts of silt and clay were encountered in the subsurface.

Shallow hydrogeology at NSGL is complex and includes several perched aquifers found mostly in discontinuous sand lenses within layers of clay and silty clay. The shallow aquifer located along the shoreline at the installation was encountered between 2 and 5 feet bgs due to the proximity of the lake. The total depth of the shallow aquifer was not investigated. The overall groundwater flow direction at Site 12 flows east towards Lake Michigan. The shallow aquifer system recharges from local rainfall infiltration, while the deep aquifer system receives sources from areas of central Wisconsin. Surface runoff drains directly into Lake Michigan (Tetra Tech, 2010).

E.6 RI RESULTS

The Site 12 RI required the collection of chemical data to be used to characterize the site and conduct a screening level HHRA and ERA. Both soil and groundwater sampling was conducted during the RI. Leachate from subsurface soil samples was evaluated to determine contaminants that could potentially migrate to groundwater. Groundwater was sampled to determine if contaminants in the soil had leached and impacted the groundwater and potentially migrated to surface water (Lake Michigan). Groundwater was generally not considered a medium of concern because NSGL and the communities surrounding the base use a public water supply that obtains water from Lake Michigan. NSGL also has an ordinance that does not allow the use of groundwater and a Memorandum of Agreement with Illinois EPA that restricts the use of groundwater. The shallow groundwater at Site 12 is less than ten feet bgs and generally flows eastward towards the lake. The shallow aquifer at Site 12 is not considered a potable aquifer because the site is located adjacent to Lake Michigan and it is possible that under long-term pumping conditions the lake versus the shallow aquifer would be the primary source of the water captured by the well. Surface water must be treated before it is used as a potable water source.

E.6.1 Soil Sampling Results

The soil project action limits (PALs) are set at the lowest matrix-specific, risk-based or human health screening criteria appropriate for the site. The PALs for this investigation are as follows:

- USEPA, 2013. Residential Regional Screening Levels (RSLs) for Chemical Contaminants in Soil at Superfund Sites, developed by Oak Ridge National Laboratory (ORNL). November. www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm

- Illinois EPA, 2013a. Tiered Approach to Corrective Action Objectives (TACO). Illinois Environmental Protection Agency, Bureau of Land, available online at http://www.epa.state.il.us/land/taco/ (Accessed September 2013). TACO and Non-TACO screening criteria. TACO criteria are from Illinois Pollution Control Board, 2013a. Title 35 of the Illinois Administrative Code (IAC) Section 742: TACO. www.ipcb.state.il.us/SLR/IPCBandIEPAEnvironmentalRegulations-Title35.aspx (Accessed September 2013).

Soil analytical results were compared to TACO, Non-TACO, and USEPA screening criteria. The summary of the exceedances compared to first the minimum screening criteria and then the TACO ingestion and inhalation Remediation Objectives (residential and industrial/commercial) is presented below. The minimum screening criteria were for protection of groundwater and were generally USEPA risk-based soil screening levels (SSLs) and Maximum Contaminant Level (MCL)-based SSLs (USEPA, 2013).

E.6.1.1 Comparison to Minimum Screening Criteria

Surface Soil

Metal Exceedances in Surface Soil

Parameter	Minimum Screening Criteria		
	Criteria (mg/kg)	Exceedances	Source
Antimony	0.27	3	MCL-based SSL
Arsenic	0.0013	10	Risk-based SSL
Barium	82	4	MCL-based SSL
Beryllium	3.2	1	MCL-based SSL
Cadmium	0.38	8	MCL-based SSL
Chromium	0.00059	10	Risk-based SSL
Cobalt	0.21	10	Risk-based SSL
Copper	22	7	Risk-based SSL
Iron	270	10	Risk-based SSL
Lead	14	10	MCL-based SSL

Parameter	Minimum Screening Criteria		
	Criteria (mg/kg)	Exceedances	Source
Manganese	21	10	Risk-based SSL
Mercury	0.033	9	Risk-based SSL
Nickel	20	5	Risk-based SSL
Selenium	0.26	7	MCL-based SSL
Silver	0.6	2	Risk-based SSL
Thallium	0.011	1	Risk-based SSL
Zinc	290	3	Risk-based SSL

mg/kg - milligram per kilogram

Pesticide Exceedances in Surface Soil

Parameter	Minimum Screening Criteria		
	Criteria (µg/kg)	Exceedances	Source
4,4'-DDD	6.4	6	Risk-based SSL
4,4'-DDE	46	5	Risk-based SSL
4,4'-DDT	67	4	Risk-based SSL
Aldrin	0.65	3	Risk-based SSL
Alpha-BHC	0.036	3	Risk-based SSL
Alpha-Chlordane	13	3	Risk-based SSL
Beta-BHC	0.13	2	Risk-based SSL
Delta-BHC[1]	0.036	9	Risk-based SSL
Dieldrin	0.061	8	Risk-based SSL
Gamma-BHC (Lindane)	0.21	3	Risk-based SSL
Gamma-Chlordane	13	3	Risk-based SSL
Heptachlor	0.14	4	Risk-based SSL
Heptachlor Epoxide	0.068	7	Risk-based SSL

1 Alpha-BHC was used as a surrogate
µg/kg - microgram per kilogram

PAH Exceedances in Surface Soil

Parameter	Minimum Screening Criteria		
	Criteria (µg/kg)	Exceedances	Source
Benzo(a)anthracene	10	10	Risk-based SSL
Benzo(a)pyrene	3.5	10	Risk-based SSL
Benzo(b)fluoranthene	35	9	Risk-based SSL
Benzo(k)fluoranthene	350	4	Risk-based SSL
Chrysene	1100	1	Risk-based SSL
Dibenzo(a,h)anthracene	11	9	Risk-based SSL

Parameter	Minimum Screening Criteria		
	Criteria (µg/kg)	Exceedances	Source
Indeno(1,2,3-cd)pyrene	150	5	Risk-based SSL
Naphthalene	0.47	10	Risk-based SSL

SVOC Exceedances in Surface Soil

Parameter	Minimum Screening Criteria		
	Criteria (µg/kg)	Exceedances	Source
Dibenzofuran	110	1	Risk-based SSL

Subsurface Soil

Metal Exceedances in Subsurface Soil

Parameter	Minimum Screening Criteria		
	Criteria (mg/kg)	Exceedances	Source
Antimony	0.27	6	MCL-based SSL
Arsenic	0.001	10	Risk-based SSL
Barium	82	6	MCL-based SSL
Cadmium	0.38	7	MCL-based SSL
Chromium	0.00059	10	Risk-based SSL
Cobalt	0.21	10	Risk-based SSL
Copper	22	8	Risk-based SSL
Iron	270	10	Risk-based SSL
Lead	14	10	MCL-based SSL
Manganese	21	10	Risk-based SSL
Mercury	0.033	9	Risk-based SSL
Nickel	20	7	Risk-based SSL
Selenium	0.26	8	MCL-based SSL
Silver	0.6	4	Risk-based SSL
Zinc	290	4	Risk-based SSL

Pesticide/PCB Exceedances in Subsurface Soil

Parameter	Minimum Screening Criteria		
	Criteria (µg/kg)	Exceedances	Source
PCBs			
Aroclor-1254	8.8	4	Risk-based SSL
Pesticides			
4,4'-DDD	6.4	6	Risk-based SSL

Parameter	Minimum Screening Criteria		
	Criteria (µg/kg)	Exceedances	Source
4,4'-DDE	46	4	Risk-based SSL
4,4'-DDT	67	2	Risk-based SSL
Aldrin	0.65	2	Risk-based SSL
Alpha-BHC	0.036	3	Risk-based SSL
Alpha-Chlordane	13	3	Risk-based SSL
Beta-BHC	0.13	3	Risk-based SSL
Delta-BHC[1]	0.036	8	Risk-based SSL
Dieldrin	0.061	7	Risk-based SSL
Gamma-BHC (Lindane)	0.21	3	Risk-based SSL
Gamma-Chlordane	13	3	Risk-based SSL
Heptachlor	0.14	4	Risk-based SSL
Heptachlor Epoxide	0.068	7	Risk-based SSL

1 Alpha-BHC was used as a surrogate

PAH Exceedances in Subsurface Soil

Parameter	Minimum Screening Criteria		
	Criteria (µg/kg)	Exceedances	Source
2-Methylnaphthalene	140	3	Risk-based SSL
Benzo(a)anthracene	10	10	Risk-based SSL
Benzo(a)pyrene	3.5	10	Risk-based SSL
Benzo(b)fluoranthene	35	10	Risk-based SSL
Benzo(k)fluoranthene	350	5	Risk-based SSL
Chrysene	1100	3	Risk-based SSL
Dibenzo(a,h)anthracene	11	7	Risk-based SSL
Indeno(1,2,3-cd)pyrene	150	5	Risk-based SSL
Naphthalene	0.47	10	Risk-based SSL
Phenanthrene[1]	9500	1	Risk-based SSL
Pyrene	9500	1	Risk-based SSL

1 Pyrene was used as a surrogate

SVOC Exceedances in Subsurface Soil

Parameter	Minimum Screening Criteria		
	Criteria (µg/kg)	Exceedances	Source
Carbazole	600	1	TACO soil to groundwater
Dibenzofuran	110	3	Risk-based SSL

Synthetic Precipitation Leaching Procedure (SPLP) Metal Exceedances from Subsurface Soil Samples

Parameter	Minimum Screening Criteria		
	Criteria (µg/L)	Exceedances	Source
Aluminum	3500	2	Non-TACO Class I
Antimony	6	5	TACO Class I
Iron	5000	3	TACO Class I
Lead	7.5	5	TACO Class I
Manganese	150	2	TACO Class I

µg/L - microgram per liter

E.6.1.2 Comparison to TACO Ingestion and Inhalation Remediation Objectives

Surface Soil

Four PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene), three pesticides (alpha-chlordane, gamma-chlordane, and heptachlor), and one metal (arsenic) were detected at concentrations above Illinois Environmental Protection Agency (EPA) Tiered Approach to Corrective Action Objectives (TACO) ingestion and/or inhalation Remediation Objectives (residential and/or industrial/commercial). In addition, mercury concentrations exceeded the construction worker TACO inhalation SSL. Eight of the ten surface soil sampling locations had these TACO exceedances.

- Benzo(a)pyrene exceeded the TACO residential ingestion Soil Remediation Objective value of 90 µg/kg at eight of 10 surface soil sampling locations. These exceedances were found in all the sample locations except the two shoreline sampling locations, NTC12SB24 and NTC12SB30. Benzo(a)pyrene also exceeded the TACO industrial/commercial ingestion Soil Remediation Objective value of 800 µg/kg at four of surface soil sampling locations.

- Benzo(b)fluoranthene exceeded the TACO residential ingestion Soil Remediation Objective value of 900 µg/kg at four of ten surface soil sampling locations.

- Benzo(a)anthracene exceeded the TACO residential ingestion Soil Remediation Objective value of 900 µg/kg at three of ten surface soil sampling locations.

- Dibenzo(a,h)anthracene exceeded the TACO residential ingestion Soil Remediation Objective value of 90 µg/kg at four of ten surface soil sampling locations.

- Alpha-Chlordane (3200 µg/kg) and gamma-chlordane (2600 µg/kg) exceeded the TACO residential ingestion Soil Remediation Objective value of 1800 µg/kg at one of 10 surface soil sampling locations, NTC12-SB25.

- Heptachlor (Pesticide) exceeded the TACO residential ingestion Soil Remediation Objective value of 100 µg/kg at one of ten surface soil sampling locations, NTC12SB25, at a value of 236 µg/kg.

- Arsenic exceeded the TACO residential and industrial/commercial ingestion Soil Remediation Objective value of 13 mg/kg, based on background concentrations, at two of 10 surface soil sampling locations.

- Mercury exceeded the TACO construction inhalation Soil Remediation Objective value of 0.1 mg/kg based on elemental mercury at six of 10 surface soil sampling locations.

No VOCs, SVOCs (excluding PAHs), or PCBs exceeded the TACO residential ingestion Soil Remediation Objective criteria.

Maximum surface soil metals and PAH concentrations were compared to levels in the background data set established for use by the Illinois EPA. Maximum concentrations of metals are greater than the background data set; therefore, no metals were excluded from the quantitative risk evaluation based on background conditions. The background PAH levels are higher than the maximum soil concentration for several PAHs, which indicates that the PAHs detected at Site 12 are background constituents. Given that not all PAHs were detected at concentrations lower than the Illinois background levels, PAHs were evaluated in the quantitative risk evaluation.

Subsurface Soil

Five PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene) and two metals (arsenic and lead) were detected at concentrations above Illinois EPA TACO ingestion and/or inhalation Remediation Objectives (residential and/or industrial/commercial). In addition, lead concentrations exceeded the construction worker TACO ingestion Soil Remediation Objective and mercury concentrations exceeded the construction worker TACO inhalation Soil Remediation Objective. SPLP metals leachate data for subsurface soil samples exceeded TACO soil to groundwater Class 1 criteria for antimony, iron, lead, and manganese.

- Benzo(a)anthracene exceeded the TACO residential and industrial/commercial ingestion Soil Remediation Objective values of 900 µg/kg and 8000 µg/kg at three of ten subsurface soil sampling locations and one of ten subsurface soil sampling locations, respectively.

- Benzo(a)pyrene exceeded the TACO residential and industrial/commercial ingestion Soil Remediation Objective values of 90 µg/kg and 800 µg/kg at six of ten subsurface soil sampling locations and three of ten subsurface soil sampling locations, respectively.

- Benzo(b)fluoranthene exceeded the TACO residential ingestion Soil Remediation Objective value of 900 µg/kg and 8000 µg/kg at three of ten subsurface soil sampling locations and one of ten subsurface soil sampling locations, respectively.

- Dibenzo(a,h)anthracene exceeded the TACO residential ingestion Soil Remediation Objective value of 90 µg/kg at five of ten subsurface soil sampling locations.

- Indeno(1,2,3-cd)Pyrene exceeded the TACO residential ingestion Soil Remediation Objective value of 900 µg/kg at one of ten subsurface soil sampling locations, NTC12SB28, at a value of 1330 µg/kg.

- Arsenic exceeded the TACO residential and industrial/commercial ingestion Soil Remediation Objective value of 13 mg/kg, which is based on background concentrations, at three of ten subsurface soil sampling locations.

- Lead exceeded the TACO residential ingestion Soil Remediation Objective value of 400 mg/kg, the TACO construction worker ingestion Soil Remediation Objective of 700 mg/kg, and the TACO industrial/commercial ingestion Soil Remediation Objective value of 800 mg/kg at one of ten subsurface soil sampling locations (i.e., NTC12SB29 at a concentration of 845 J mg/kg).

- Mercury exceeded the TACO construction inhalation Soil Remediation Objective value of 0.1 mg/kg, based on elemental mercury, at six of 10 subsurface soil sampling locations.

- Subsurface soil leachate samples exceeded TACO soil to groundwater Class 1 criteria for antimony (6 µg/L) in five samples, iron (5000 µg/L) in three samples, lead (7.5 µg/L) in five samples, and manganese (150 µg/L) in two samples. However, exposure to groundwater at Site 12 is not expected to occur under current and/or future land uses because the facility and the area surrounding the facility are supplied by public water, the facility has a groundwater use restriction in place, and there are no drinking water wells located immediately downgradient of the site.

No VOCs, SVOCs (excluding PAHs), or PCBs exceeded the TACO residential ingestion Soil Remediation Objective criteria.

Maximum subsurface soil metals and PAH concentrations were compared to levels in the background data set established for use by the Illinois EPA. Maximum concentrations of metals are greater than the background data set; therefore, no metals were excluded from the quantitative risk evaluation based on background conditions. Only the maximum subsurface soil sample concentration for one PAH is below the background level in the site subsurface soil. Recognizing that the Illinois EPA background data set for PAHs is for surface soil, this was done just for comparison purposes. No PAHs were excluded from the quantitative risk evaluation based on background conditions.

E.6.2 Groundwater Sampling Results

The groundwater PALs are set at the lowest risk-based or human health screening criteria appropriate for the site. The groundwater PALs for this investigation are as follows:

- USEPA, 2013. RSLs for Chemical Contaminants at Superfund Sites, November. Tapwater values.
- USEPA, 2012a. Maximum Contaminant Level (MCLs).
- Illinois EPA, 2013a. TACO and Non-TACO values. Class I and Class II criteria from TACO Section 742 Table E, Tier 1 Groundwater Remediation Objectives.
- 35 IAC, 2013. Groundwater Standards for Class I and Class II. Sections 620.410 and 620.420. Effective October 5, 2012 (Section 620.410), October 7, 2013 (Section 620.420). Accessed November 12, 2013.

Groundwater analytical results were compared to TACO, non-TACO, IAC, USEPA, and MCL screening criteria. The summary of the exceedances compared to first the minimum screening criteria and then the 35 IAC Groundwater Standards as presented below.

E.6.2.1 Comparison to Minimum Screening Criteria

Total Metal Exceedances in Groundwater

Parameter	Minimum Screening Criteria		
	Criteria (µg/L)	Exceedances	Source
Arsenic	0.045	3	USEPA RSL
Chromium	0.031	4	USEPA RSL
Cobalt	4.7	1	USEPA RSL
Iron	5000	2	IAC and TACO
Manganese	150	4	IAC and TACO

Dissolved Metal Exceedances in Groundwater

Parameter	Minimum Screening Criteria		
	Criteria (µg/L)	Exceedances	Source
Arsenic	0.045	3	USEPA RSL
Cobalt	4.7	1	USEPA RSL
Iron	5000	2	IAC and TACO
Manganese	150	4	IAC and TACO

E.6.2.2 Comparison to 35 IAC 620 Groundwater Standards (Class I and Class II)

Three total and dissolved metals (arsenic, iron, and manganese) were detected at concentrations above 35 IAC 620 Class I Groundwater Remediation Objectives, which are for potable groundwater resources. As previously discussed, groundwater is not used for drinking water. 35 IAC 620 Class II Groundwater Standards are appropriate for general groundwater resources. Only total and dissolved iron concentrations exceeded the 35 IAC 620 Class II Groundwater Standard.

- Arsenic was detected at concentrations that exceeded the 35 IAC 620 Class I Groundwater Standard of 10 µg/L in two of four groundwater samples analyzed for total metals and dissolved metals.

- Iron was detected as concentrations that exceeded the 35 IAC 620 Class I and Class II Groundwater Standards of 5000 µg/L in two of four groundwater samples analyzed for total and dissolved metals.

- Manganese was detected at concentrations that exceeded the 35 IAC 620 Class I Groundwater Standard of 150 µg/L in the four groundwater samples analyzed for total and dissolved metals.

Because of the geologic/hydrogeologic conditions at the site (low permeability and minimal groundwater flow in the clay with the sand stringers), groundwater was generally not considered a medium of concern. NSGL and the communities surrounding the base use a public water supply that obtains water from Lake Michigan. NSGL also has an ordinance that does not allow the use of groundwater and a Memorandum of Agreement with Illinois EPA that restricts the use of groundwater. The shallow groundwater at Site 12 is less than ten feet bgs and generally flows eastward towards the lake. The shallow aquifer at Site 12 is not considered a potable aquifer because the site is located adjacent to Lake Michigan and it is possible that under long-term pumping conditions the lake versus the shallow aquifer would be the primary source of the water captured by the well. Surface water must be treated before it is used as a potable water source.

E.6.3 Summary of RI Results

The initial comparison of the soil results to the minimum screening criteria identified a number of exceedances. The minimum screening criteria in many cases are the TACO or EPA soil to groundwater criteria. However, when the soil results are compared to the TACO residential and industrial/commercial ingestion and inhalation screening criteria, PAHs, three pesticides (alpha-chlordane, gamma-chlordane, and heptachlor), and two metals (arsenic and lead) remained above these criteria.

The soil analytical results indicate that contamination is distributed throughout Site 12, although the soil sample locations along the shoreline, NTC12-SB24 and NTC12-SB30, have lower concentrations of chemicals of potential concern (COPCs) than sample locations within the pre-1990 boundary. The contamination is most likely from the land-based fill material that was used to fill in Site 12. The concentrations of COPCs in the lake dredge soil along the shoreline are an order of magnitude lower than the land-based fill material found further inland at Site 12. COPCs are present directly above the shallow aquifer and SPLP leachate results indicate that several metals are potentially mobile.

However, a comparison of groundwater analytical results to the minimum screening criteria identified only a few metals in groundwater that may be impacted by the soil at Site 12. The initial comparison of the groundwater results to the minimum screening criteria identified five total metals and four dissolved metals as exceeding groundwater criteria. The minimum screening criteria in several cases are the USEPA RSLs. However, when the groundwater results are compared to 35 IAC Class I Groundwater Standards only three total and dissolved metals (arsenic, iron, and manganese) remained above these criteria. The 35 IAC Class I Groundwater Standards are for potable groundwater resources. Of the metals exceeding Class I standards, only total and dissolved iron exceeded the TACO Class II groundwater standard for general groundwater resources.

E.7 HUMAN HEALTH SCREENING CONCLUSIONS

Maximum surface PAH concentrations were compared to concentrations in the background data set established for use by the Illinois EPA. The background concentration in Metropolitan Statistical Area soil for benzo(a)pyrene (2.1 mg/kg), benzo(a)anthracene (1.8 mg/kg), dibenzo(a,h)anthracene (0.42 mg/kg) and indeno(1,2,3-cd)pyrene (1.6 mg/kg) is higher than or equal to the respective maximum soil sample results for these chemicals at Site 12. This indicates that it is probable that these PAHs at Site 12 are background constituents. Given that some of the carcinogenic PAHs (c-PAHs) were detected at concentrations greater than the Illinois background levels, benzo(a)pyrene equivalents (BaP Eq) is maintained as a COPC for the quantitative risk evaluation.

When the maximum concentrations of the metal compounds detected at Site 12 in surface soil were compared to background data established for use by the Illinois EPA, no metals were found to be below background, based on maximum concentrations. However, if the average positive results of detected metals were compared to the background data set, the metals except mercury were below the background concentrations. This indicates that it is possible that these metal compounds at Site 12 are likely background constituents.

If cumulative cancer risk was greater than $1x10^{-4}$ or the hazard index for a target organ was greater than 1, then chemicals were retained as COCs if their individual carcinogenic risk contribution was greater than $1x10^{-6}$ or their non-carcinogenic HQ was greater than 0.1. Based on the non-cancer and cancer evaluations, the following contaminants were identified as COCs: c-PAHs, arsenic, chromium, alpha-chlordane, gamma-chlordane, and heptachlor for residential exposure through ingestion and dermal contact to surface soil and c-PAHs, arsenic, Aroclor-1254, and chromium for residential exposure through ingestion and dermal contact to subsurface soil. Although no chemicals were removed based on comparison to background values, it is possible that the c-PAHs and some metals in soil are attributable to background at Site 12.

Although chromium, evaluated as hexavalent chromium, was identified as a COC in the HHRA, based on the historical information on the site, hexavalent chromium is not expected to be present. If chromium had been evaluated as trivalent chromium, then risks for chromium would be within acceptable levels. Therefore, chromium is not retained as a COC for Site 12.

Groundwater concentrations were screened against criteria for drinking water and some metals exceeded screening values. However, it is important to point out that direct exposure to groundwater at Site 12 is not expected to occur under current and/or future land uses because the facility and the area surrounding the facility are supplied by public water, the facility has a groundwater use restriction in place, and there are no drinking water wells located downgradient of the site.

E.8 ECOLOGICAL SCREENING CONCLUSIONS

The site consists of a grass-covered field with some wooded areas, a beach area along the lake, and a paved parking lot. Chemicals in the soil may migrate to the sediments via erosion of the bluff and surface runoff. Erosion is likely minimal because heavy vegetation is present over most areas at the site. Chemicals in soil may leach into the groundwater and ultimately discharge to surface water. Based on the habitat, potential ecological receptors at the site include plants, soil and sediment invertebrates, aquatic organisms, birds, and mammals. Terrestrial plants, soil invertebrates, birds, and mammals are exposed to chemicals in surface soil by direct contact (only pathway for plants) and ingestion of soil and food items that have accumulated chemicals from the soil. Based on the initial screening of the chemical

data for Site 12, several chemicals were initially selected as COPCs for ecological receptors in surface soil because they were detected at concentrations that exceeded conservative screening levels, they had ecological effects quotients (EEQs) greater than 1.0 in the conservative food chain model, or because they did not have screening levels. These chemicals were then further evaluated to refine the list of COPCs, and to better characterize risks to ecological receptors. No chemicals were retained as COPCs for terrestrial plants, soil invertebrates, mammals, or birds.

Potential impacts to sediment invertebrates from chemicals in surface soil, which may migrate to sediment via erosion and surface runoff, are not likely. Therefore, no chemicals were retained as COPCs for risks to sediment invertebrates.

Although based on the SPLP data, some metals in soil may present a risk to ecological receptors after leaching from the soil and discharging to the surface water, groundwater data indicates only iron concentrations exceed surface water criteria. Any potential impacts would be limited to the area immediately adjacent to the shoreline before the concentrations are diluted. In addition, once the groundwater exits to surface water, the dissolved iron may precipitate, therefore, iron concentrations are expected to be lower in surface water than they are in groundwater, before factoring in dilution. Therefore, this pathway is not considered to present a significant potential ecological risk and it is not retained for further consideration.

E.9 RECOMMENDATIONS

Based on the results of this RI, preparation of a feasibility study is recommended for the soil at Site 12. Even though risks are acceptable under the current land use scenario in which the receptors are limited to recreational users, a feasibility study is recommended for surface and subsurface soil associated with Site 12. The recommendation is made primarily because land use could change in the future that could result in unacceptable risks to potential residential receptors. Potential remedial alternatives to be evaluated in the feasibility study would include, but not be limited to No Action, Limited Action (Land Use Controls), and Removal (Excavation). After completion of the feasibility study, a Proposed Plan and Record of Decision should be prepared to propose and document the selection of the preferred remedial alternative from the feasibility study.

Because of the unproductive nature of the shallow aquifer and the existing facility restriction on the use of groundwater as a potable water source, there are no current risks to human health and the only potential receptors to groundwater would be ecological receptors after it discharges to Lake Michigan. The potential soil-to-groundwater-to-surface water contaminant migration issue was evaluated in the ecological risk assessment along with various other risk scenarios. Based on the conclusions of the ecological risk assessment, risks to ecological receptors do not require further evaluation. Therefore,

groundwater is not a major medium of concern requiring significant further evaluation in the feasibility study. However, land use controls should be evaluated in the feasibility study to formalize restriction on groundwater use.

1.0 INTRODUCTION AND PURPOSE

Tetra Tech, Inc. (Tetra Tech) was contracted by the Department of the Navy (Navy), Naval Facilities Engineering Command Midwest (NAVFAC MW) to perform a Remedial Investigation (RI) for Site 12, Harbor Dredge Spoil Area, located within Naval Station Great Lakes (NSGL) in Great Lakes, Illinois. This work was performed under Contract Task Order No. F27A under the Comprehensive Long-term Environmental Action Navy Contract No. N62470-08-D-1001 and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Guidance for Conducting Remedial Investigations and Feasibility Studies (USEPA, 1988). This RI Report summarizes the December 2010, December 2012, and August 2013 environmental investigations of Site 12, and the subsequent human health risk assessment (HHRA) and ecological risk assessment (ERA) for the site.

Figure 1-1 shows the general location of NSGL. Figure 1-2 shows the location of Site 12 - the Harbor Dredge Spoil Area along the shore of Lake Michigan, overlain onto a 2007 aerial photograph. Figure 1-3 shows the vicinity of the site and the location of the Harbor Dredge Spoil Area with current and pre-1990 boundaries. It can be seen from the figures that Site 12 is located along Lake Michigan below a steep hill and just south of the stormwater retention basin. The elevation of the site is not believed to have changed much since 1990.

1.1 PROJECT OVERVIEW

The RI was conducted to determine the nature of the fill material(s) placed at Site 12 Dredge Spoil Area, and to identify potential risks associated with Site 12. The chemical data for Site 12 soil and groundwater were used to conduct an HHRA (Section 6.0) and an ERA (Section 7.0).

Information gathered during two previous investigations, performed in December 1988 and August 1989 was used to guide development of the RI sampling efforts. The RI was completed in three phases. The RI fieldwork conducted in December 2010 and December 2012 consisted of drilling soil borings and the collection and laboratory analysis of soil samples. The RI field work conducted in August 2013 consisted of installing monitoring wells and the collection and laboratory analysis of groundwater samples. Data collected during the Phase 1 field investigation for the Site 12 RI were used to determine if chemical concentrations are present at greater than acceptable human health risk-based levels. Risks to ecological receptors exposed to surface soil and risks to macroinvertebrates from erosion of soil into the harbor were also evaluated. Data collected during the Phase 2 and Phase 3 field investigations were used to evaluate the potential for inorganic contaminants in soil to migrate to groundwater.

If chemical concentrations are found to be below human health or ecological risk levels, the outcome of the RI will be No Further Action (NFA). If chemical concentrations are above acceptable human health or ecological risk levels, a Feasibility Study (FS) will be developed to evaluate alternatives to address the site risks.

1.2 INVESTIGATION OBJECTIVES

Data collected during the RI were used to meet the following objectives:

- Determine the nature of fill material(s) historically placed at Site 12.
- Determine the geographical boundary of the fill areas by correlating the subsurface data from this investigation.
- Determine if concentrations of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), pesticides, polychlorinated biphenyls (PCBs), and metals are present in soil, and if they exceed screening levels.
- If soil contaminant concentrations exceed screening levels, conduct an HHRA and an ERA to determine site-specific risks.
- Evaluate the potential for inorganic contaminants to migrate to groundwater based on leachate data from subsurface soil samples and data from groundwater samples.
- Prepare a RI Report for submittal to the Navy and the Illinois Environmental Protection Agency (Illinois EPA).

1.3 REPORT ORGANIZATION

This report documents the results from the RI and contains the following sections:

1.0 Introduction and Purpose
2.0 Project Background and Physical Setting
3.0 Remedial Investigation Activities
4.0 Remedial Investigation Results
5.0 Chemical Fate and Transport Analysis
6.0 Human Health Risk Assessment
7.0 Ecological Risk Assessment
8.0 Conclusions and Recommendations

The report also includes appendices that contain historical drawings, sample log sheets, boring logs, monitoring well construction diagrams, investigation-derived waste (IDW) disposal manifest, validation reports, analytical laboratory results, and HHRA and ERA calculations.

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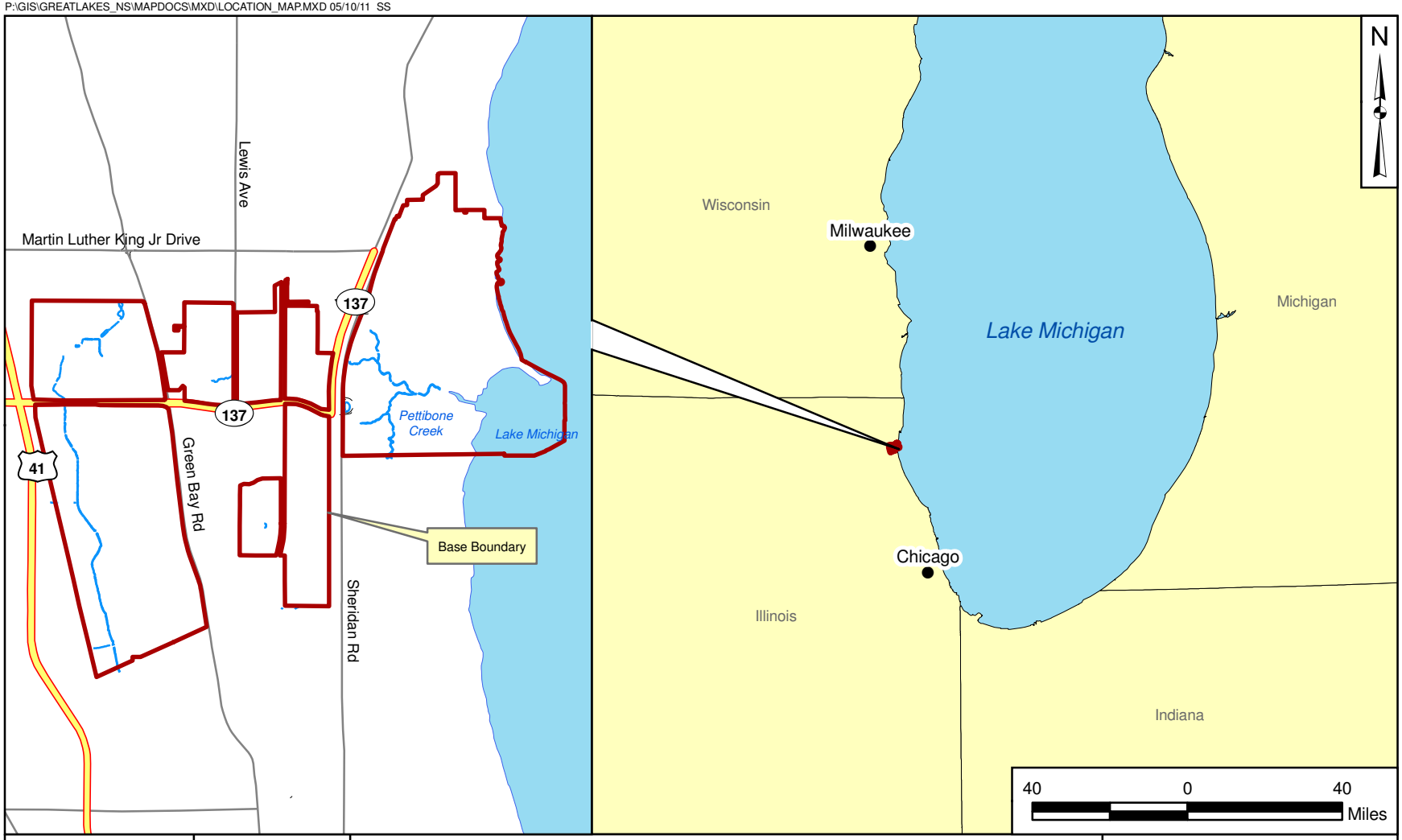

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M. MAGUIRE	06/10/10
CHECKED BY	DATE
E. BERKLITE	05/10/11
REVISED BY	DATE
S. STROZ	05/10/11
SCALE	
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NAVFAC

GENERAL LOCATION MAP
NS GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER	
F27A	
APPROVED BY	DATE
B. CUMMINGS	05/10/11
APPROVED BY	DATE
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FIGURE NO.	REV
FIGURE 1-1	0

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DRAWN BY T.WHEATON	DATE 10/22/09	LOCATION MAP SITE 12 - HARBOR DREDGE SPOIL AREA NS GREAT LAKES GREAT LAKES, ILLINOIS	CONTRACT NUMBER F27A
CHECKED BY E. BERKLITE	DATE 05/10/11		OWNER NUMBER —
REVISED BY S. STROZ	DATE 05/10/11		APPROVED BY B. CUMMINGS / DATE 05/10/11
SCALE AS NOTED			FIGURE NO. FIGURE 1-2 / REV 0

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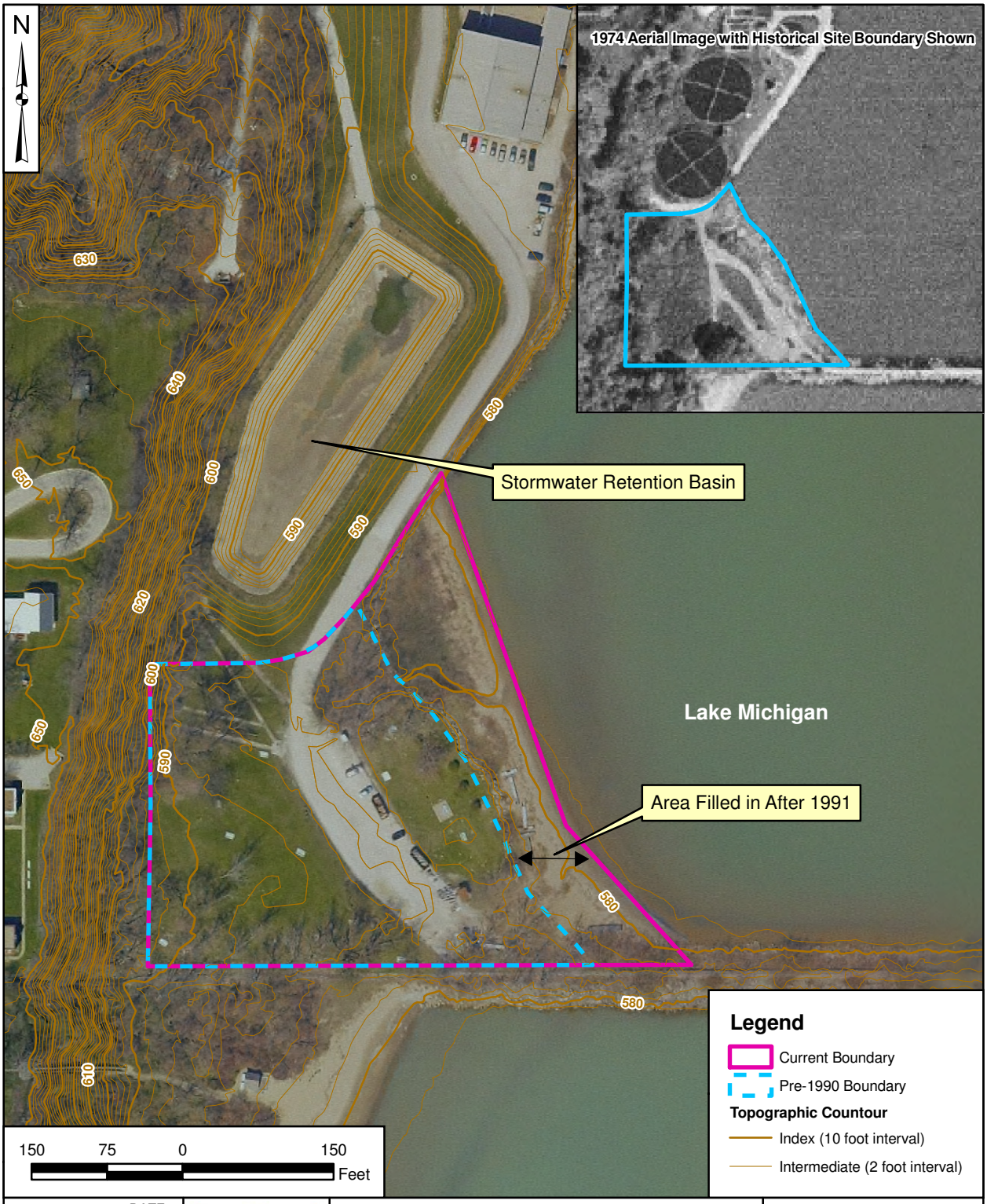

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REVISED BY S. STROZ	DATE 05/10/11		APPROVED BY B. CUMMINGS / DATE 05/10/11
SCALE AS NOTED			FIGURE NO. FIGURE 1-3 / REV 0

2.0 PROJECT BACKGROUND AND PHYSICAL SETTING

The following sections provide a brief description of the project background and physical setting, along with a summary of previous relevant investigations completed at Site 12. Figures 1-1, 1-2, and 1-3 show the general location of NSGL and the location of Site 12.

2.1 FACILITY LOCATION AND DESCRIPTION

NSGL is located in Lake County, Illinois, along the shore of Lake Michigan. It is bounded on the north by the city of North Chicago, on the south by the Veterans Administration Hospital and Shore Acres Golf Course and Country Club, on the east by Lake Michigan, and on the west by U.S. Route 41 (Skokie Highway).

Site 12 is located in a flat area on the shore of the NSGL Outer Harbor, south of a storm water retention basin, and is approximately 3.5 acres in size. Site 12 is a grass-covered field rising westward from the shore of Lake Michigan, and is bounded on the western edge by a wooded bluff that is 50- to 60-feet high. The site is currently used as a picnic and recreational area and the only structure on the site is a picnic pavilion overlooking the lake. An archery range is situated on the northern portion of the site, immediately south of the storm water retention basin. A gravel road transects the site from north to south and terminates in a gravel parking lot on the south, against a concrete pier. The only other notable feature is a drainage ditch, which emerges from the bluff and extends eastward across the site to Lake Michigan (Tetra Tech, 2011a)

2.2 FACILITY ENVIRONMENTAL SETTING

NSGL covers 1,202 acres of Lake County, Illinois (NSGL, 2010). The previous Integrated Natural Resources Management Plan (INRMP) (NSGL, 2001) addressed 1,939 acres and included the Main Station housing (e.g. Brick Row, Forrestal, Nimitz, and Halsey Villages) along with Fort Sheridan Housing Annex (FSHA) and Glenview Housing Annex (GHA). In January 2006, NSGL transferred the housing lands and structures to a private developer under the Military Housing Privatization Initiative. The 2001 INRMP identified these areas and the natural resource management issues associated with the housing areas. The 2010 INRMP excluded those areas. NSGL administers base operations and provides facilities and related support to training activities (including the Navy's only boot camp), and a variety of other military commands located on base.

Lake County is located in northeastern Illinois, north of the city of Chicago, and comprises 24 miles of Lake Michigan shoreline. Lake County extends from the Wisconsin border south to Cook County, and

from Lake Michigan west to McHenry County. Lake County is divided into 18 townships, 52 incorporated cities and villages, and 18 unincorporated cities and villages. There are numerous lakeside communities in Lake County. The United States Census Bureau data (2000) estimates the county's population at 617,975. During the 1950s and 1960s, population growth occurred primarily in the lakefront communities; however, by the 1980s and 1990s, population growth was greater in the north and west. Currently, most of Lake County's population lives in the 52 incorporated cities and villages.

Current land uses in Lake County include agricultural, industrial, and residential. Farmland and lake resorts characterize the western portions of the county; and industrial, urban, and suburban areas follow the 24 miles of Lake Michigan shoreline on the east. There are also three state parks in Lake County. Currently, there are a variety of land uses surrounding NSGL. The most highly urbanized and industrial areas are along the northern boundary of the base. Much of the land beyond the northwestern site boundary comprises unincorporated land of Lake County, and is vacant except for scattered retail and residential properties. Adjacent to the western boundary are primarily industrial properties, and along the southern boundary is a mixture of public open space and residential land.

2.2.1 Physiography and Topography

The gently rolling topography of Lake County, Illinois is the result of glaciation. The most prominent topographic features are glacial moraines and other unconsolidated glacial deposits that cover most of NSGL. The terrain of NSGL consists of relatively flat glacial drift deposits bordered by steep lake-facing bluffs cut with vertical sloping ravines. The unconsolidated glacial material that comprises the bluff faces and ravine walls is under continual erosion.

The topography of Lake County creates poorly defined drainage patterns consisting of swales that enter depressions and marshes. Most of NSGL is located on a plateau with elevations of 640 to 660 feet above mean sea level (msl). The eastern boundaries of the Station are beaches located on the western shore of Lake Michigan at an elevation of 580 feet above msl. The steep bluffs immediately behind the beaches reach elevations of approximately 650 feet above msl. Perpendicular to the bluff are ravines that discharge surface runoff to Lake Michigan. The topography of NSGL is similar to the surrounding area with buildings constructed along the bluff ravines and beachfront (see Figure 1-3) (NGSL, 2010).

Intensive development has replaced most of the oak, hickory, maple, and other hardwood forests that originally covered the area. Native woodlands occur primarily on the vertical sloped ravine of Pettibone Creek and on the bluffs facing Lake Michigan. The forested areas of NSGL contain white and red oak, maple, European larch, and white and Scotch pine trees; there are also shrubs, including raspberry and blackberry bushes. The principal mammals in the NSGL area include groundhogs, raccoons, squirrels, opossum, rabbits, chipmunks, and deer.

2.2.2 Climate

The climate of Lake County, Illinois, is considered continental. Changes in temperature, humidity, cloudiness, and wind direction occur frequently. The summer season is warm with few prolonged hot periods. Although major droughts are infrequent, there are commonly long periods of dry weather during the growing season. The area receives approximately 34 inches of rain per year, with 63 percent occurring between April and September. The average seasonal snowfall range is 37.2 to 41.1 inches. The average temperature is 58 degrees Fahrenheit (°F); the winter months normally have temperatures below freezing (Tetra Tech, 2011a).

2.2.3 Soil

The predominant soil type at NSGL is classified as Made Land. Made Land consists of areas of manmade cuts and fills, and areas covered almost entirely with roads and buildings. The cuts are made to a number of unspecified depths, and the fill consists of various materials, including materials that are not classified as "soil." Some of these areas have been filled with coal fines or cinders from the former on-site coal-fueled power plant (NSGL, 2010). The remaining soil series on the Station, east of Sheridan Road include Hennepin loam (30 to 60 percent slopes) in the ravines and the bluffs, Beecher silt loam (0.0 to 2.0 percent, and 2.0 to 4.0 percent slopes), and beach sand along Lake Michigan. Clayey subsoil limits water movement and maintains a seasonal high water table. This soil is best suited for farming when it occurs in agricultural areas.

Erosion is also occurring along the lakefront bluffs and beaches at the Station, threatening damage to the structures and infrastructure on the tops and slopes of the bluffs. These problems are a result of development in the area that has disturbed the natural vegetation cover, drainage, and littoral drift and beach formation process (NSGL, 2010).

Beach sediments along the Illinois coast consist of mixed sand, sandy gravel, and gravel. The primary source for the beach sediments was erosion of the coastal bluffs. The low gradient of the two major rivers along the Illinois coast (Chicago and Calumet Rivers) prevented them from providing any significant sediment supply to the coast. Some of the intermittent streams of the North Shore ravines have steeper gradients and may have contributed a negligible amount of sand. Because of the degree of coastal engineering and erosion mitigation, there has been considerable artificial input of beach sand from varied sources. Many of the beaches along the Chicago lakeshore are constructed beaches built in the early twentieth century with sand mined from the lake bottom off the western Indiana coast (Chrzastowski, 1991). Beach nourishment along erosion-prone beaches, such as at Illinois Beach State Park, has

resulted in the import of sand from inland sand pits in western Lake County (Chrzastowski and Frankie, 2000).

2.2.4 Regional Geology

The geologic units encountered at NSGL include aeolian and lacustrine deposits, and unconsolidated glacial till overlying bedrock. The aeolian material, the Richland Loess, covers the Wadsworth and Equality Formations and ranges from 16- to 20-inches in thickness. This aeolian material is much finer grained than the underlying formation. These wind-blown materials of the Richland Loess make up the current soil profile of NSGL.

Unconsolidated glacial tills blanket Lake County. Several glacial moraine systems are present within the county including the Valparaiso, Tinley, Zion City, and Lake Border systems. NSGL falls within the Lake Border moraine system. The glacial moraine system is composed of the Wadsworth Formation, which constitutes the largest volume of surficial deposits overlying the bedrock and forms the Highland Park Moraine that generally runs parallel to the Lake Michigan shoreline. The Wadsworth Formation ranges from approximately 170 to 210 feet in thickness overlying the Silurian bedrock. This formation is characterized as a till and is an unsorted mixture of sand, silt, and clay imbedded with pebbles, cobbles, and boulders. Interstices between the coarser-grained sediments are typically filled with fine, clay-sized particles resulting in low permeability. Generally, the Wadsworth till is clayey, with thin and irregular lenses of sand or silty sand occurring over limited areas. The till has been further subdivided into clayey and sandy phases, according to the size of the dominant particles. Because clay comprises up to 70 percent of the till at NSGL, the clayey phase dominates in the local area.

The Wadsworth Formation east of the Highland Park Moraine is generally covered by the Equality Formation, which includes deposits of silt, clay, and sand. Sediments of this formation were deposited in water trapped between the Highland Park Moraine and the former ice sheet (Illinois State Geological Survey, 2010).

Bedrock consists of Silurian Niagran and Alexandrian dolomite, the lowermost geologic unit reportedly encountered at NSGL. The bedding is nearly horizontal to gently eastward, dipping in the vicinity of NSGL. These Silurian units thicken from west to east in Lake County. The interface between the bedrock surface and overlying till consists of 1 to 15 feet of broken bedrock (dolomite), gravel, sand, and coarser material. This material appears to be bedrock debris ground from the advancing glaciers of the Wisconsin Stage of glaciation during the Late Pleistocene epoch.

The land bordering the Illinois coast has varied landscape characteristics that allow division into three geomorphic settings (Figure 2-1) (Chrzastowski, 2005; Chrzastowski, Thompson, and Trask, 1994).

These three settings also have different coastal management challenges and opportunities. The NSGL lies in the geomorphic setting known as the Bluff coast. NSGL is situated along the coast between North Chicago and Winnetka and the lakeshore intercepts the Zion City and Highland Park Moraines. These end moraines formed about 14,000 years ago just prior to glacial ice permanently receding into the Lake Michigan basin. These are thus the youngest end moraines in Illinois. Long-term wave erosion along this morainal upland has resulted in bluffs that form the highest and steepest landscape along the Illinois coast. Maximum bluff heights of about 90 feet occur along the southern Highland Park lakeshore. The bluff slopes range from near vertical to about 45 degrees. There is considerable local variability in slope, and many segments of the bluff slope have been graded or terraced for erosion control along private lakeshore property as well as public lakeshore. A discontinuous bluff face results from a series of steep-sided, V-shaped ravines that open to the lakeshore. These ravines are cut into the morainal upland and originate as much as one mile inland from the shore. The ravines typically have intermittent streams that discharge to the lake. The ravines of the North Shore are prominent landscape features and they have strongly influenced land use and development.

2.2.5 Coastal Geology

Site 12 is situated along the coast of Lake Michigan. The Coastal geology consists of Upland Sediments and Bedrock. The dominant material in the Illinois coastal zone is a compact, gray, silty and clayey till. The till may contain discontinuous layers of sand and gravelly sand. This till, which is ubiquitous across the coastal zone, was deposited by glacial ice during the most recent (Wisconsin) glacial episode. The till is exposed along the coastal bluffs, as well as the material first encountered beneath most of the soil in the area. It also occurs beneath the beach sand and on the near shore lake bottom, either beneath the near shore sand or exposed where sand cover is absent. The cohesion of the till has contributed to the near-vertical bluffs along parts of the bluff coast. The till has provided an exceptional foundation material for building in the coastal zone such as providing a foundation for breakwaters and other shore structures, and providing a material into which wood pilings and steel sheet pile can be driven. Analysis of the till exposed in the bluffs indicate that a typical sediment size distribution is 48 percent clay, 42 percent silt, and 10 percent sand (Lineback, 1974). When bluff erosion occurs, only the sand-size material ultimately remains along the beaches and near shore. The dominant clay and silt are transported offshore for eventual deposition in deep water (Colman and Foster, 1994). The grayish or milky coloration that is common along the Illinois coast following times of large waves, results from the suspension of the silt and clay from erosion along the bluffs or across the lake bottom.

2.2.6 Regional Hydrology

NSGL is located within both the North Branch Chicago River Drainage Basin and Lake Michigan North Drainage Basin. The divide between the basins is along Green Bay Road, which runs north to south

through the center of the base. Overland flow from precipitation that does not infiltrate into the ground flows into the Skokie River (located south of NSGL) or Pettibone Creek, approximately 650 feet north of Site 12. The areas east of Green Bay Road drain into Lake Michigan, with most of the area through Pettibone Creek and the east facing bluffs directly into Lake Michigan. Site 12 is located in the Lake Michigan watershed. Surface water in Pettibone Creek flows eastward into the NSGL harbor system, which discharges into Lake Michigan. The Illinois State Water Survey calculated the average flow of Pettibone Creek as less than 10 cubic feet per second (cfs) or 4,488 gallons per minute. This can greatly increase during periods of precipitation.

2.2.7 Regional Hydrogeology

Glacial deposits up to 300 feet thick underlie NSGL. This material is poorly sorted and is a possible source of area groundwater. Sand and gravel lenses located throughout the deposited glacial till may serve as localized aquifers, while fine-grained till deposits may serve as aquitards. Groundwater is the source of potable water for Illinois communities without access to Lake Michigan surface water. NSGL is located within the Great Lakes Basin aquifer system for groundwater storage. Regionally, there are five water-bearing hydrogeologic units located beneath the Station. These aquifers are, in order of increasing depth below surface, the Glacial Drift, the Silurian Dolomite, the Glenwood-St. Peter Sandstone, the Ironton-Galesville Sandstone, and the Mt. Simeon Sandstone. At NSGL, potable water is supplied from Lake Michigan (NSGL, 2010).

The water table is typically within 10 feet of the ground surface in most parts of the Station, and may intersect the surface in low-lying areas. The shallow water table intersects Pettibone Creek, and may intersect the Skokie River after periods of heavy rainfall. Groundwater movement is primarily horizontal through the till, and rates of movement are slow due to low hydraulic conductivities. With depth, pore spaces are filled with calcareous cement that isolates the overlying till from the deeper aquifers (NSGL, 2010).

The Glacial Drift and Silurian Dolomite are shallow aquifers reaching depths of 150 to 500 feet. The shallow aquifer located along the shoreline at the installation has a depth to groundwater between 2 and 10 feet below ground surface (bgs) due to the proximity of the lake. This water is not potable and is not utilized at NSGL or the surrounding area. The remaining aquifer system is known as the deep aquifer system, with depths ranging from 900 to 1,900 feet bgs. The shallow aquifer system recharges from local rainfall infiltration, while the deep aquifer system receives sources from areas of central Wisconsin.

2.3 SITE HISTORY

During harbor dredging activities in 1952 and the 1970s, dredge spoils from the boat slip (Boat Basin) area in the harbor were reportedly disposed in Site 12 (Rogers, Golden, and Halpern, 1986). The harbor area receives flow directly from Pettibone Creek, which drains storm water from the base and a number of off-base industries upstream of NSGL. The primary sources of the environmental contaminants in the harbor sediments are from upstream industrial sources (historical discharges and contamination) and storm water discharges within the Pettibone Creek Watershed. Overland runoff and storm water discharges from NSGL to Pettibone Creek may have contributed pollutants to the watershed. Recent sediment sampling performed in the creek suggests that there is no significant current point source(s) impacting the sediment quality of Pettibone Creek. However, chemicals in the runoff from past activities may have settled in the harbor sediments (Rogers, Golden, and Halpern, 1986).

An Initial Assessment Study (IAS) was performed at NSGL in 1986 (Rogers, Golden, and Halpern, 1986). The IAS identified seven sites, including Site 12, as requiring further study. The area of Site 12 that may have received fill between 1950 and 1990 is shown as the pre-1990 boundary on Figure 2-2. Dames & Moore (1991) reviewed aerial photographs taken between 1946 and 1985 that indicated evidence of some filling and other modifications to Site 12 over this period. However, these filling activities do not coincide with or closely follow the reported dates of harbor dredging; therefore, the filling activities may not be related to the disposition of dredge spoils, as originally reported by the IAS. Dames & Moore (1991) reported that discussions with personnel at the base regarding the 1970s dredging operations indicated that spoils from this period were placed in the lake approximately 5 miles from shore. Installation personnel were not able to provide personal knowledge of the 1952 dredging operations. After the Dames & Moore (1991) report was issued, the storm water retention pond was installed and an additional portion of Site 12 along Lake Michigan was filled in (Figure 2-2). Past development activities at the Site are documented on historic maps and aerial photographs. These maps and photographs are presented in Appendix A of this document. The Dames & Moore report (1991) also notes that in the late 1980s, there were piles of soil and plant debris on Site 12. The soil and debris presumably came from other locations at NSGL. The sediment reportedly dredged from the harbor and deposited on Site 12 could have high organic content, and may contain heavy metals, oils (i.e., SVOCs and PAHs), pesticides, and PCBs from industries upstream of the NSGL (Tetra Tech, 2011a).

Based on the recommendations of the IAS, Dames & Moore conducted the RI Verification Step on five of the seven sites identified in the IAS, including Site 12. Surface and subsurface soil samples were collected from various locations at Site 12 during two sampling events in December 1988 and in March 1989 and were analyzed for VOCs, metals, pesticides and PCBs. The samples from March 1989 exceeded laboratory holding times and were considered invalid. The site was resampled in August 1989 (see Figure 2-2). Thirty-three surface and subsurface soil samples were collected from 11 soil borings.

The pesticide and PCB data were validated and considered to be usable. The laboratory data for VOCs and metals could not be validated using United States Environmental Protection Agency (USEPA) Level III protocol for several technical and administrative reasons. Because the VOC and metals data were not validated, they were presented in the 1991 Dames & Moore Technical Memorandum but not used in that report's conclusions and recommendations.

The following summarizes the results of the previous investigation, as presented in the RI Verification Step:

- VOCs were analyzed in 14 surface and 28 subsurface soil samples collected in 1988 from 14 boring locations. Only four VOCs (acetone, 2-butanone, methylene chloride, and toluene) were detected. These compounds are common laboratory contaminants; therefore, they may be present in the laboratory results as a laboratory artifact.

- Heavy metals were analyzed in 14 surface and 28 subsurface soil samples collected in 1988 from 14 boring locations. Several metals were detected at the site in concentrations exceeding background soil concentrations provided in the Tiered Approach to Corrective Action Objectives (TACO). Metals were considered chemicals of potential concern (COPCs) at Site 12.

- Pesticides were analyzed in 11 surface and 22 subsurface soil samples collected in 1989 from 11 boring locations. Pesticides were considered COPCs at Site 12.

- PCBs were analyzed in 33 soil samples collected in 1989, but were not detected above the detection limits in any samples. However, PCBs were still considered COPCs at Site 12.

- SVOCs have not been analyzed in soil samples from Site 12. They were considered COPCs at Site 12.

- The areal extent of contaminants encompasses the entire site area identified in the IAS. The vertical extent of contamination was not determined; however, because metals were detected at the greatest depth sampled (i.e., 8 feet bgs), contamination probably extends below this depth.

Historical drawings, reports, and photographs (Appendix A) of NSGL and Site 12 were reviewed and the following information was noted.

Drawing/Photo Date	Description
1907 Topographic Map	• Harbor had not been constructed. • No above ground structure is identifiable in the area of Site 12.
1909 General Plan	• Inner Harbor had been constructed.
1923 Boundary Survey	• Harbor had been constructed. • No above ground structures are shown in the drawing.
1929 Drawing	• No above ground structures are shown in the area of Site 12.
1930 Drawing	• No above ground structures are shown in the area of Site 12.
1936 Sounding Contour Lines	• No significant changes are identifiable at Site 12.
1939 Aerial Photo	• The naval station was depicted in the aerial map.
1941 Drawing	• No significant change is identifiable at Site 12.
1943 Drawing	• Shoreline changed in the area of Site 12, with land surface extended eastward slightly into Lake Michigan. Backfilling and leveling of the site may have occurred. • Shows that several above ground treatment units were added to the sewage treatment plant to the north of Site 12. The shoreline in the southeast part of the sewage treatment plant also changed, and backfilling and leveling in this area may also have occurred.
1946 Drawing, 1949, 1950, and 1957 Plot Plans	• No significant change is identifiable at Site 12.
1958 and 1959 Base Map and 1961 Aerial Photo	• Shoreline slightly changed at Site 12.
1974 Aerial Photo	• Shows two gravel roads at Site 12.
1988 Aerial Photo	• The sewage treatment plant to the north of site 12 is still present.
2002 Aerial Photo	• The sewage treatment plant to the north of site 12 is no longer present. • Shoreline at Site 12 changed significantly and extended eastward into the lake. • Shows the above ground structure, gravel road, and parking lot.
2006 Harbor Bathymetry Map	• The bottom contour in the harbor changed significantly, compared to the 1936 sounding contour lines.

Based on the results of the Dames & Moore RI Verification report and the review of the drawings, the COPCs to be addressed are VOCs, SVOCs, metals, pesticides, and PCBs.

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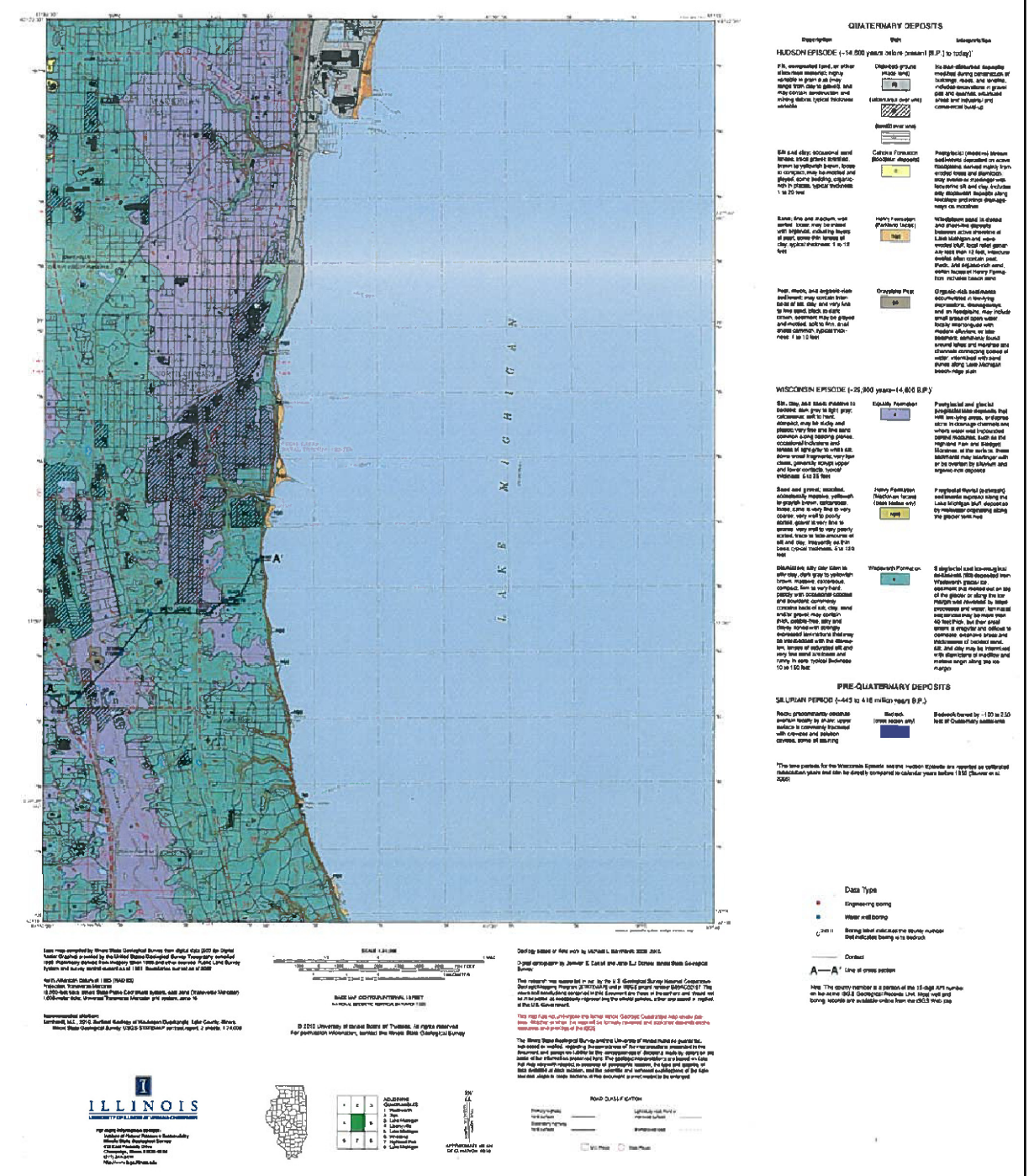
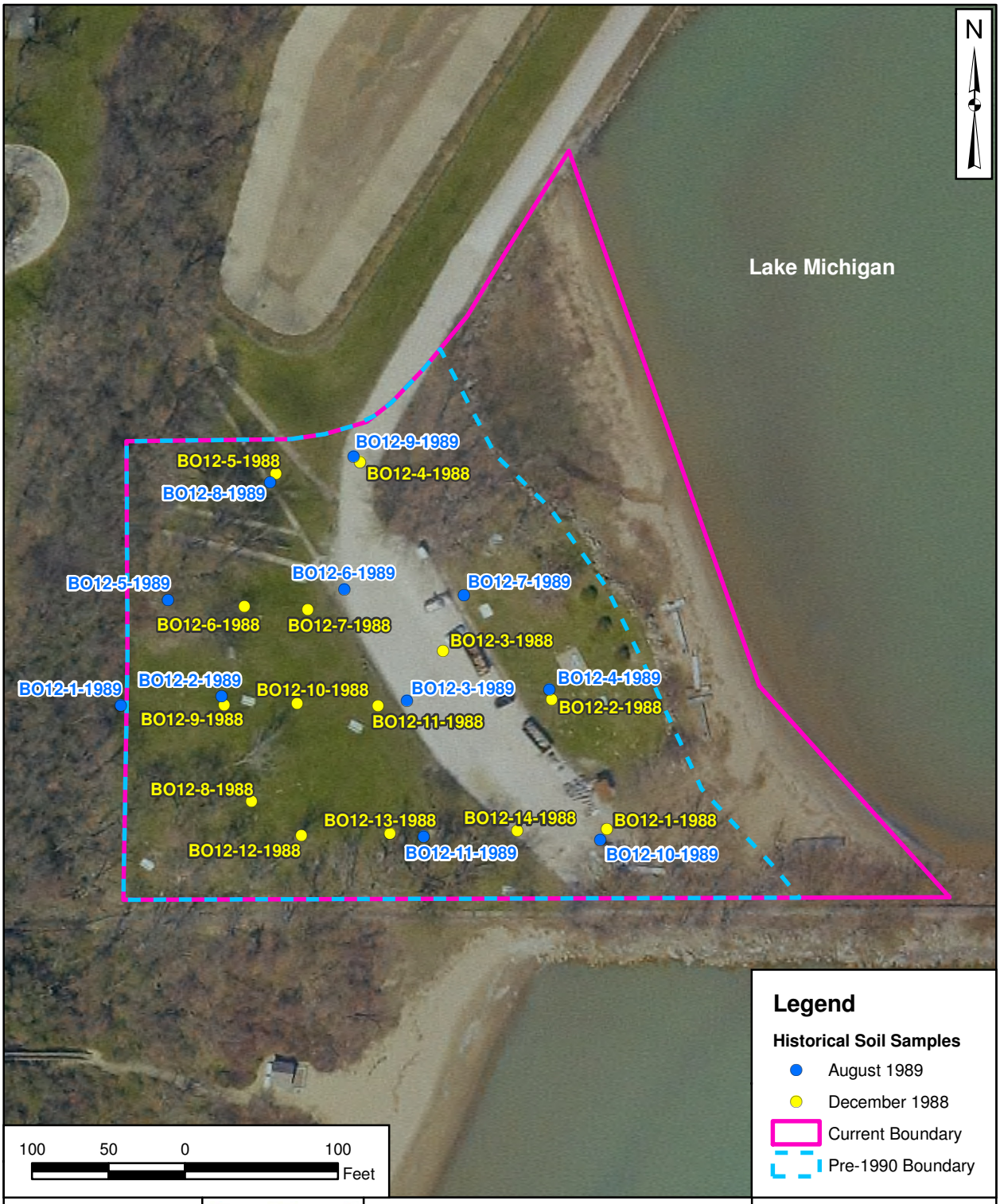


DRAWN BY T. WHEATON	DATE 02/25/11	SURFICIAL GEOLOGY NS GREAT LAKES GREAT LAKES, ILLINOIS	CONTRACT NUMBER F27A
CHECKED BY E. BERKLITE	DATE 05/10/11		OWNER NUMBER —
REVISED BY —	DATE —		APPROVED BY B. CUMMINGS DATE 05/10/11
SCALE AS NOTED			FIGURE NO. FIGURE 2-1 REV 0

P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE12_HISTORICAL_SAMPLING_AUG_1989.MXD 05/10/11 SS



DRAWN BY T. WHEATON	DATE 11/04/09	HISTORICAL SOIL SAMPLING LOCATIONS SITE 12 - HARBOR DREDGE SPOIL AREA NS GREAT LAKES GREAT LAKES, ILLINOIS	CONTRACT NUMBER F27A
CHECKED BY E. BERKLITE	DATE 05/10/11		OWNER NUMBER —
REVISED BY —	DATE —		APPROVED BY B. CUMMINGS / DATE 05/10/11
SCALE AS NOTED			FIGURE NO. FIGURE 2-2 / REV 0

3.0 REMEDIAL INVESTIGATION ACTIVITIES

Based on data collected during past investigations, it has been determined that Site 12 may be contaminated with VOCs, SVOCs, PAHs, PCBs, pesticides, and metals from the fill material (dredged sediments from the harbor or unknown fill sources). Human and ecological receptors (terrestrial receptors and macroinvertebrates) could be at risk if exposed to contaminated media. The nature and extent of contamination, if any, at Site 12, and the degree of risk to human and ecological receptors (terrestrial receptors and macroinvertebrates) are unknown and must be characterized so that appropriate actions can be taken to mitigate unacceptable risks. If risks are acceptable, then NFA will be recommended for the site.

The field activities associated with the three phases of investigation that were conducted at Site 12 to determine the nature and extent of contamination are discussed below. Figures 1-1, 1-2, and 1-3 show the general location of NSGL, and Figure 2-2 shows the layout of the previous sampling locations at Site 12.

3.1 PHASE 1 FIELD WORK

3.1.1 General Description and Information

The following physical and chemical data was collected at Site 12, as outlined in the Uniform Federal Policy Sampling and Analysis Plan (UFP SAP) (Tetra Tech, 2011a) during Phase 1 of the RI:

1) Surface soil and subsurface soil chemical data was collected to determine the nature and extent of Target Compound List (TCL) SVOCs, PAHs, PCBs, pesticides, and Target Analyte List (TAL) metals. The chosen analytical methods are presented in Appendix D of the UFP SAP. Analytical methods were selected to provide enough sensitivity to support attainment of project objectives.

   Laboratory VOC analysis (using encore sample kits) were proposed to be performed on up to four samples, depending on photo ionization detector (PID) readings collected at the 10 proposed soil sample locations, but only if warranted by high PID measurements. The PID readings were below 8.0 parts per million (ppm); which is generally accepted to be in the range of general background and not indicative of VOC contamination; therefore, no soil samples were collected for VOC analysis.

2) Visual screening of direct push technology (DPT) cores was also used to determine the presence of dredge spoils or other materials that may have contributed to contamination. Tetra Tech Standard

Operating Procedure (SOP) SA-1.3 (Appendix E of the UFP SAP) was used to conduct the screening.

3) To estimate the limit of dredge spoils, it was only necessary to use visual observations of samples collected from soil borings.

4) Illinois EPA background concentrations for PAHs and metals (35 Illinois Administrative Code (IAC) 742 Appendix A: Tables G and H, Concentrations of Inorganic Chemicals in Background Soils and Concentrations of Polynuclear Aromatic Hydrocarbon Chemicals in Background Soils) were used to compare the measured soil concentrations with background concentrations to make sure that soil was not inadvertently considered to be contaminated.

5) The locations of soil borings were marked off in the field and were based on locations proposed using the North American Datum 1983 (NAD 83) State Plane Coordinate System (SPCS) Illinois East (feet) coordinate system. The ground surface elevations were reported using the North American Vertical Datum 1988 (NAVD 88), provided by an NSGL topographic map.

6) Lithology data for borings. These data were collected during boring operations and sampling was done in accordance with Tetra Tech SOPs (SOP GH-1.5 in Appendix E of the UFP SAP) and Illinois state regulations.

7) Water level depths were observed in the test borings during boring installation to help with sample selection.

Phase 1 of the RI was performed to determine the nature of fill material(s) at Site 12. Data collected during Phase 1 of the RI were used to meet the following objectives:

- Determine the nature of fill material(s) placed at Site 12 and identify human health and ecological risks that may be associated with this material.

- Determine if concentrations of VOCs, SVOCs, PAHs, pesticides, PCBs, and metals are present, and if they exceed screening levels.

- Determine the lateral and vertical limits of the fill material by correlating the subsurface data from this investigation.

- Determine the presence and nature of contamination within soil at Harbor Dredge Spoil Area.

- Prepare an RI Report for submittal to the Navy and Illinois EPA.

The components of Phase 1 of the RI included the advancement of soil borings using DPT and collecting and analyzing surface and subsurface soil samples. The sampling objective was to determine if past dredge disposal activities have contributed to unacceptable contaminant concentrations in soil at the site. A judgmental sampling approach was used to evaluate contamination in the suspected source area, as discussed below. Figure 3-1 shows the locations of the soil boring samples. Field quality control (QC) samples, including field duplicates, and matrix spike (MS)/matrix spike duplicates (MSD) were collected, as outlined in the UFP SAP. Samples were analyzed for a select list of chemicals, as outlined in the UFP SAP.

Table 3-1 summarizes the Sampling Rationale. The soil sampling locations for Phase 1 of the RI were located in a grid pattern spaced 120 feet equidistantly apart (the location of NTC12-SB-26 was adjusted in the field due to auger refusal).

3.1.2 Deviations from the Work Plan

There were three deviations from the project UFP SAP (Tetra Tech, 2011a) during the Phase 1 field investigation at Site 12:

- The PID readings were below 8.0 ppm; which is generally accepted to be in the range of general background and not indicative of VOC contamination; therefore, no soil samples were collected for VOC analysis.

- The location of soil boring SB-26 was moved approximately 25 feet southwest of its original proposed location, due to DPT auger refusal in the gravel road.

- Soil was collected from two zones of fill material (land-based fill and lake-dredge fill), instead of lake dredge fill and native soil. Lake dredge fill encountered was in saturated conditions.

3.1.3 Soil Sampling

DPT soil borings were advanced at 10 locations on December 20, 2010 (Phase 1) as shown on Figure 3-1. Prior to Phase 1 drilling activities, Miller Drilling Company, a licensed driller subcontracted and overseen by Tetra Tech, obtained a Digging Permit from Joint Utility Locating Information for Excavators (JULIE) One-Call, after identifying the areas where the intrusive activities would occur.

DPT drilling was conducted during Phase 1 of the RI using a hydraulically-powered direct-push rig to characterize the lithology of the soil (including the thickness of the dredge spoils), collect subsurface soil samples, and determine the depth to the water table in and around Site 12. Soil samples were collected continuously during borehole advancement. Each boring was logged by an on-site geologist as the boring was being drilled. Soil boring logs are presented in Appendix B-1. For worker safety during Phase 1 of the RI, air quality was monitored in and near each borehole during drilling operations using a PID. The PID was also used to screen soil samples for Phase 1 of the RI.

Ten sampling locations were identified for Phase 1 of the RI based on the UFP SAP (Tetra Tech, 2011a). The selected soil data collection design was based on a judgmental approach, which utilized past sampling data and knowledge of the Site, including historical construction activities, to identify sampling locations. This approach was estimated to provide good spatial coverage, and was useful for estimating the extent of contamination in soil and evaluating risks. Ten samples are generally considered the minimum number required to support statistically based risk evaluations.

A DPT rig was used to obtain the surface and subsurface soil samples. Soil samples were collected in 5 foot long dedicated acetate sleeve sections. Each soil boring was extended until the boring encountered native soil, which was within 10 feet bgs. Borings were stopped once they encountered native soil. The characteristics of the soil in the borings were noted in the field logs, including the texture of the soil at each depth. The surface soil sample was collected in the top 6 inches of the soil boring. The subsurface soil sample collection ranged from the interval between 6 inches to the bottom depth of the boring. Therefore, a total of 20 soil samples, one surface and one subsurface sample per boring location, plus duplicates were collected for Phase 1 of the RI.

Subsurface soil samples were collected based on visual observations (staining, odor, etc.) by the Field Operations Leader (FOL) or based on PID readings. All but one of the subsurface soil samples were collected from the unsaturated zone, as determined by the FOL. Subsurface soil samples were collected from dredge spoils or in locations where staining or odors were observed. If dredge spoils were not evident, or no staining or odors were observed, the subsurface soil sample depth intervals were field selected by the FOL. The fill material from the surface to several feet beneath the subsurface, as evidenced by gravel and asphalt pieces, was a land based fill and the beach sand beneath was a dredge material from Lake Michigan, which would be native to the shoreline, but probably put at Site 12 by man and not by natural means. Saturated conditions (groundwater) were observed within two feet of encountering the lake dredge fill. The majority of the subsurface soil was proposed to be collected in unsaturated conditions.

The Phase 1 RI samples were collected from materials believed to be fill (not native soil). Ten surface soil and 10 subsurface soil samples were analyzed for SVOCs, PAHs, pesticides, and metals. Half (five) of the subsurface soil samples were analyzed for PCBs. Sample selection for PCB analysis was based on visual observations by the FOL. Soil samples were screened for VOCs in the field using a calibrated PID. Details of the PID screening and sampling methodology are discussed in Section 3.3.1. VOC samples were not collected due to the low PID measurements.

The methodology for sample collection is described in the UFP SAP SOP SA-2.5. The borings were logged in accordance with the UFP SAP SOP GH-1.5. The sample numbering scheme was in accordance with the UFP SAP SOP CT-04. Methods for recording data are included in the UFP SAP SOP SA-6.3 (SOPs are included in Appendix E of the UFP SAP).

Soil Sample Log Sheets are provided in Appendix B-1. The analytical results for the soil samples are presented in Section 4. Water level measurements were observed in the open borings and included on the boring logs and cross-sections discussed in Section 4.0 and included in Appendix B.

3.1.3.1 PID Screening

A PID was used to screen samples for the presence of VOCs during Phase 1 of the RI. Upon sample retrieval, each soil core was screened with a PID. Additionally, after the sample was collected, a headspace screening of the sample was collected by inserting the tip of the PID into a small opening at the top of the plastic Ziploc® bag (or equivalent) that contained the sample. The PID was calibrated daily to 100 ppm isobutylene. PID screening results are reported on the sample log sheets in Appendix B-1. Discrete subsurface soil samples were collected based on PID measurements or visual observations (staining, odor, etc.) by the FOL. VOC samples were originally proposed to be collected in up to four locations, but only if warranted by high PID measurements. The PID readings were below 8.0 ppm; which is generally accepted to be in the range of general background and not indicative of VOC contamination; therefore, no soil samples were collected for VOC analysis.

3.1.4 Field QA/QC Sample Description

Tetra Tech established a QC program to monitor and assess the quality of field work and laboratory work performed during the RI. This program included the collection of various types of QC samples as described below. The field QC samples consisted of temperature blanks, field duplicates, MS/MSD samples, equipment rinsate blanks, and source water blanks.

Temperature blanks were included in each cooler submitted to the laboratory to monitor sample storage conditions prior to arrival at the laboratory. One field duplicate sample was collected per 10 samples (one

surface and one subsurface). The purpose of the field duplicate sample was to examine the variability of the samples.

One equipment rinsate blank was collected for each type of non-dedicated soil sampling equipment used. An equipment rinsate blank was not collected to examine effectiveness of the decontamination procedures, as dedicated acetate liners were used for collection of each soil sample.

MS samples are investigative samples analyzed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The MS samples for organic analysis are performed in duplicate. MS and MSD samples were collected at a frequency of one per 20 samples.

Each type of field QC sample had the same preservation, analysis, and reporting procedure as the related environmental samples with the exception of temperature blanks. The log sheets for the quality assurance (QA)/QC samples are included in Appendix B-1.

Laboratory QC samples consisted of laboratory control samples, laboratory duplicates, internal standards, laboratory method blanks, MS, MSD, post digestion spikes, and surrogates. Empirical Laboratories, LLC (Empirical) conducted the laboratory analysis and QC in accordance with the UFP SAP (Tetra Tech, 2011a). Tetra Tech reviewed the laboratory QC during data validation, and noncompliances were noted in the data validation memoranda in Appendix D.

3.1.5 Field Measurements

The following subsections present discussions pertaining to field measurements performed in conjunction with the RI.

Field measurements collected during the course of Phase 1 of the RI were:

- VOC screening of workers' breathing space and recovered soil samples.

VOC screening was conducted using a MiniRae 2000 PID. The PID readings were recorded on the sample log sheets (Appendix B-1). The PID readings were low and indicative of background levels.

The PID was calibrated prior to its delivery to the field, daily, or as needed. The project calibration log sheet was used to document the calibration of field testing equipment and both are provided in Appendix B-1.

3.1.6 Decontamination Procedures

Decontamination liquids were placed in 55-gallon drums and stored in a secure designated area until final disposition. The containers were supplied by Miller Drilling and were clearly identified and labeled as IDW.

Prior to and after the completion of the sampling event, the procedure for decontaminating sampling equipment was to:

- Wash equipment in solution of tap water and Liquinox soap or equivalent.
- Rinse equipment with tap water.
- Double rinse with deionized or distilled water, or steam-clean equipment.
- Air dry equipment, if feasible.

Tap water for decontamination was obtained from a faucet connected to the NSGL public water supply.

3.1.7 Field Documentation

Field documentation and tracking of sample custody were integral portions of the overall QA/QC process for the RI. The field documentation system served as a record of activities conducted in the field during sample collection and data generation, and provided the means to identify, track, and monitor each sample from the time of collection through final reporting of data.

3.1.7.1 Sample Identification

The sample identification schemes presented in the UFP SAP (Tetra Tech, 2011a) were used to identify and label the field samples collected, and the field QC blanks created during the RI. The sample identification procedure was used for the sample labels and chain-of-custody documents in order to maintain consistency in the labeling process and to allow efficient handling of a large number of samples from different sources. Sample identification was identified and followed in accordance with the UFP SAP (Tetra Tech, 2011a). Chain-of-custody forms are provided in Appendix B-1.

3.1.7.2 Field Logbooks/Sample Log Sheets

The sampling coordinator maintained a field notebook and data sheets containing pertinent information regarding the samples. The field logs are intended to provide sufficient data and observations to enable the field team and other interested parties to reconstruct events that occurred during field activities.

Boring logs were prepared for the soil borings. The physical characteristics of these samples (e.g., color, lithology, general appearance, odor, etc.) were recorded on a log sheet.

3.1.8 Sample Management

The following chain-of-custody procedures were followed to document sample possession from the time of sample collection until ultimate disposal of the sample. For the purposes of these procedures, a sample was considered to be in custody if it was:

- In one's actual possession.
- In view after being in one's possession.
- Secured (i.e., locked up) so that no one could tamper with it.
- In a secured area, available to authorized personnel only.

Strict chain-of-custody procedures were maintained throughout the duration of the investigation. These procedures included the following:

- A Chain-of-Custody record was completed in the field. The original accompanied the samples, and copies were maintained at intermediate steps.

- At the point where the responsibility for custody of the samples changed, the new custodian signed the Chain-of-Custody record and noted the date and time.

RI samples were packed in an ice-filled cooler and sent by overnight carrier (Federal Express) to the analytical laboratory for chemical analysis. Soil samples were analyzed for SVOCs, PAHs, pesticides, PCBs, and metals by Empirical.

3.1.9 Investigation-Derived Waste Management

The types of wastes generated as a result of the RI activities were drill cuttings (soil), disposable sampling equipment, PPE, and decontamination liquids. The solid IDW was collected and placed into one 55-gallon drum supplied by Miller Drilling. The waste containers were clearly identified and labeled. The generated IDW was temporarily stored at a location designated by NSGL personnel. Under oversight by Tetra Tech, the drilling subcontractor was responsible for providing, filling, sealing, and moving the drums to a centralized area specified by the base point of contact during mobilization. The drum were moved to the centralized storage area and were labeled by Tetra Tech with an IDW label (see Attachment A of Tetra Tech SOP SA-7.1 in Appendix E of the UFP SAP) as soon as possible after they were filled.

One composite soil sample was collected from the drum containing solid IDW and submitted to the laboratory for chemical analysis. The solid IDW sample was analyzed for toxicity characteristic leaching procedure (TCLP) VOCs, TCLP SVOCs, TCLP pesticides, TCLP metals, and NSGL required analyses [British Thermal Unit (BTU); flash point; pH; reactive with acid, base, and water; reactive with cyanide and sulfide; PCBs; water content; and paint filter test]. Analytical results were provided to the NSGL personnel responsible for manifests, transportation, and disposal of the IDW. Manifests and Certificates of Disposal for IDW disposal will be maintained by NSGL and are included in the RI report in Appendix C.

Personal protective equipment (PPE), such as nitrile gloves, was disposed of as municipal waste and placed in a nearby dumpster.

3.2 PHASE 2 FIELD WORK

3.2.1 General Description and Information

The following physical and chemical data was collected at Site 12, as outlined in the UFP SAP Addendum (Tetra Tech, 2012) during Phase 2 of the RI:

1) Subsurface soil samples were collected and analyze to determine Synthetic Precipitation Leaching Procedure (SPLP) TAL metals concentrations. The chosen analytical methods were presented in the UFP SAP Addendum. Analytical methods were selected to provide enough sensitivity to support the attainment of project objectives.

2) The locations of soil borings were marked off in the field using a handheld global positioning system (GPS) using proposed coordinates based on the NAD 83 SPCS Illinois East (feet) coordinate system.

3) Lithology data for borings. These data were collected during boring operations and sampling was done in accordance with Tetra Tech SOPs (SOP GH-1.5 in Appendix C of the UFP SAP Addendum) and Illinois State regulations.

Phase 2 of the RI was performed to determine the potential for metals in subsurface soil at Site 12 to migrate to groundwater. Data collected during Phase 2 of the RI were used to meet the following objectives:

- Evaluate the potential for contaminants to migrate to groundwater based on leachate data from subsurface soil samples.
- Update the RI Report for submittal to the Navy and Illinois EPA.

The components of Phase 2 of the RI included the advancement of soil borings using DPT and collecting and analyzing subsurface soil samples. The sampling objective was to determine if past dredge disposal activities have contributed to unacceptable contaminant concentrations in soil at the site. A judgmental sampling approach was used to evaluate contamination in the suspected source area, as discussed below. Figure 3-1 shows the locations of the soil boring samples. Field quality control (QC) samples, including field duplicates, and matrix spike/matrix spike duplicates (MS/MSD) were collected, as outlined in the UFP SAP Addendum. Samples were analyzed for a select list of chemicals as outlined in the UFP SAP Addendum.

Table 3-1 summarizes the Sampling Rationale. The soil sampling locations for Phase 2 of the RI were located where the highest maximum concentrations of metals were detected in soil samples collected during Phase 1 of the RI.

3.2.2 Deviations from the Work Plan

No deviations from the work plan described in the UFP SAP Addendum (Tetra Tech, 2012) occurred during the field investigation.

3.2.3 Soil Sampling

DPT soil borings were advanced at 4 locations on December 17, 2012 (Phase 2), as shown on Figure 3-1. Prior to Phase 2 drilling activities, Environmental Field Services, Inc. (EFS), a licensed driller subcontracted and overseen by Tetra Tech, obtained a Digging Permit from JULIE One-Call, after identifying the areas where the intrusive activities would occur.

DPT drilling was conducted using a hydraulically-powered direct-push rig to characterize the lithology of the soil, collect subsurface soil samples, and determine the depth to the water table in and around Site 12. Soil samples were collected continuously during borehole advancement. Each boring was logged by an on-site geologist as the boring was being drilled. Soil boring logs are presented in Appendix B-2. Based on the results of the Phase 1 air quality monitoring, no monitoring was deemed to be necessary during Phase 2.

Four sampling locations were identified for Phase 2 of the RI, based on the UFP SAP Addendum (Tetra Tech, 2012). The selected soil data collection design is based on a judgmental approach which utilized past sampling data and knowledge of the Site. This approach will provide good spatial coverage, and conservative information regarding the leachability of metals from Site 12 soil.

A DPT rig was used to obtain the subsurface soil samples for the SPLP analysis. Soil samples were collected in 5 foot long dedicated acetate sleeve sections. The characteristics of the soil in the borings were noted in the field logs, including the texture of the soil at each depth. The subsurface soil sample collection ranged from the interval between 6 inches to the bottom depth of the boring. Eight soil samples, two subsurface samples per boring location, were collected for Phase 2 of the RI.

For Phase 2 of the RI, subsurface soil samples were collected from locations where the highest maximum concentrations of metals were detected in soil samples previously collected during Phase 1 of the RI. Two subsurface soil samples were collected from four borings at predetermined depths. The samples were collected from the unsaturated zone. The soil consisted of fill materials of sand, silt, clay, and rock fragments. Dark gray stained clay was encountered in the soil boring from NTC12-SB34. Potential natural soil was encountered in soil borings from NTC12-SB32 and NTC12-SB33 at 7 feet and 6 feet bgs, respectively. The eight subsurface soil samples were sent to the project laboratory to be analyzed by SPLP for TAL metals. Following the completion of the DPT borings, the holes were backfilled with cuttings and bentonite pellets.

The methodology for sample collection is described in the UFP SAP SOP SA-2.5. The borings were logged in accordance with the UFP SAP SOP GH-1.5. The sample numbering scheme was in accordance with the UFP SAP SOP CT-04. Methods for recording data are included in the UFP SAP SOP SA-6.3 (SOPs are included in Appendix E of the UFP SAP).

Soil Sample Log Sheets are provided in Appendix B-2. The analytical results for the soil samples are presented in Section 4.

3.2.3.1 PID Screening

Based on the PID screening results from Phase 1, it was determined that no PID screening was required during Phase 2 sampling efforts.

3.2.4 Field QA/QC Sample Description

Tetra Tech established a QC program to monitor and assess the quality of field work and laboratory work performed during the RI. This program included the collection of various types of QC samples as described below. The field QC samples consisted of temperature blanks, field duplicates, MS/MSD samples, equipment rinsate blanks, and source water blanks.

Temperature blanks were included in each cooler submitted to the laboratory to monitor sample storage conditions prior to arrival at the laboratory. During Phase 2, no field duplicates were collected for the subsurface soil samples collected for SPLP metals analysis.

An equipment rinsate blank was not collected to examine effectiveness of the decontamination procedures, as dedicated acetate liners were used for collection of each soil sample. During Phase 2, no equipment rinsate blanks were collected for the soil sampling equipment.

MS samples are investigative samples analyzed to provide information about the effect of the sample matrix on the digestion and measurement methodology. MS and MSD samples were collected at a frequency of one per 20 samples during the Phase 2 investigation.

Each type of field QC sample had the same preservation, analysis, and reporting procedure as the related environmental samples with the exception of temperature blanks. The log sheets for the QA/QC samples are included in Appendix B-2.

Laboratory QC samples consisted of laboratory control samples, laboratory duplicates, internal standards, laboratory method blanks, MS, MSD, post digestion spikes, and surrogates. For Phase 2 of the RI, Trimatrix Laboratories, Inc. (Trimatrix) conducted the laboratory analysis and QC in accordance with the UFP SAP Addendum (Tetra Tech, 2012). Tetra Tech reviewed the laboratory QC during data validation, and noncompliances were noted in the data validation memoranda in Appendix D.

3.2.5 Field Measurements

No field measurements were collected during the Phase 2 investigation.

3.2.6 Decontamination Procedures

Decontamination liquids were placed in 55-gallon drums and stored in a secure designated area until final disposition. The containers were supplied by EFS and were clearly identified and labeled as IDW.

Prior to and after the completion of the sampling event, the procedure for decontaminating sampling equipment was to:

- Wash equipment in solution of tap water and Liquinox soap or equivalent.
- Rinse equipment with tap water.
- Double rinse with deionized or distilled water, or steam-clean equipment.
- Air dry equipment, if feasible.

Tap water for decontamination was obtained from a faucet connected to the NSGL public water supply.

3.2.7 Field Documentation

Field documentation and tracking of sample custody were integral portions of the overall QA/QC process for the RI. The field documentation system served as a record of activities conducted in the field during sample collection and data generation, and provided the means to identify, track, and monitor each sample from the time of collection through final reporting of data.

3.2.7.1 Sample Identification

The sample identification schemes presented in the UFP SAP Addendum (Tetra Tech, 2012,) were used to identify and label the field samples collected, and the field QC blanks created during the RI. The sample identification procedure was used for the sample labels and chain-of-custody documents in order to maintain consistency in the labeling process and to allow efficient handling of the samples. Sample identification was identified and followed in accordance with the UFP SAP Addendum (Tetra Tech, 2012). Chain-of-custody forms are provided in Appendix B-2.

3.2.7.2 Field Logbooks/Sample Log Sheets

The sampling coordinator maintained a field notebook and data sheets containing pertinent information regarding the samples. The field logs are intended to provide sufficient data and observations to enable the field team and other interested parties to reconstruct events that occurred during field activities.

Boring logs were prepared for the soil borings. The physical characteristics of these samples (e.g., color, lithology, general appearance, odor, etc.) were recorded on a log sheet.

3.2.8 Sample Management

The following chain-of-custody procedures were followed to document sample possession from the time of sample collection until ultimate disposal of the sample. The chain-of-custody procedures are discussed in Section 3.1.8.

RI samples were packed in an ice-filled cooler and sent by overnight carrier (Federal Express) to the analytical laboratory for chemical analysis. The Phase 2 soil samples were analyzed for SPLP metals by Trimatrix.

3.2.9 Investigation-Derived Waste Management

During Phase 2 of the investigation, IDW was managed with IDW generated from the investigation at Site 5. The solid and liquid IDW generated during Phase 2 was collected in temporary containers and transferred to the drums storing Site 5 IDW. Under oversight by Tetra Tech, the drilling subcontractor was responsible for providing, filling, sealing, and moving the drum to a centralized area specified by the base point of contact during mobilization. The drums were labeled by Tetra Tech with an IDW label (see Attachment A of Tetra Tech SOP SA-7.1 in Appendix C of the UFP SAP Addendum) as soon as possible after they were filled.

One composite sample was collected from the drum containing solid IDW and one composite liquid sample was collected from the drum containing liquid IDW and submitted to the laboratory for chemical analysis. The solid and liquid IDW samples were analyzed for toxicity characteristic leaching procedure (TCLP) VOCs, TCLP SVOCs, TCLP pesticides, TCLP metals, and NSGL required analyses (BTU; flash point; pH; reactive with acid, base, and water; reactive with cyanide and sulfide; PCBs; water content; and paint filter test). Analytical results were provided to the NSGL personnel responsible for manifests, transportation, and disposal of the IDW. Manifests and Certificates of Disposal for IDW disposal will be maintained by NSGL and are included in the RI report in Appendix C.

3.3 PHASE 3 FIELD WORK

3.3.1 General Description and Information

The following physical and chemical data was collected at Site 12, as outlined in the UFP SAP Addendum for Phase 3 (Tetra Tech, 2013) during Phase 3 of the RI:

1) Groundwater samples from four groundwater monitoring wells were collected and analyzed to determine total and dissolved TAL metals concentrations. The chosen analytical method was presented in the UFP SAP Addendum for Phase 3 (Tetra Tech, 2013). Analytical methods were selected to provide enough sensitivity to support the attainment of project objectives.

2) Water levels and aquifer hydraulic conductivities were measured in the four monitoring wells to provide information required to evaluate groundwater migration.

3) The proposed locations of the groundwater monitoring wells were marked off in the field using a handheld GPS using proposed coordinates based on the NAD 83 SPCS Illinois East (feet) coordinate system. The actual locations of the installed groundwater monitoring wells were surveyed by a

licensed Illinois surveyor. The horizontal location was surveyed using the NAD 83 SPCS Illinois East coordinate system and the elevations were reported in NAVD 1988.

4) Lithology data for borings. These data were collected during boring operations and sampling was done in accordance with Tetra Tech SOPs (SOP GH-1.5 in Appendix C of the UFP SAP Addendum) and Illinois State regulations.

Phase 3 of the RI was performed to determine if metals in subsurface soil at Site 12 have migrated and impacted the underlying groundwater. Data collected during the Phase 3 RI were used to meet the following objectives:

- Determine the concentrations of metals present in groundwater and evaluate the potential for metals to migrate to groundwater.

- To characterize/delineate groundwater contamination at the site and determine if there is an unacceptable risk to human receptors.

- Update the RI Report for submittal to the Navy and Illinois EPA.

Laboratory analyses of groundwater samples were obtained to confirm the presence or absence of contamination at Site 12.

The components of the Phase 3 RI included: the advancement of soil borings using DPT; installing groundwater monitoring wells; monitoring well development, collecting and analyzing groundwater samples, and aquifer testing. Table 3-1 describes the sampling rationale.

The sampling objective was to determine if past dredge disposal activities have contributed to unacceptable contaminant concentrations in groundwater at the site. A judgmental sampling approach was used to evaluate contamination in the suspected source area, as discussed below. Figure 3-1 shows the locations of the groundwater monitoring wells. Field QC samples, including field duplicates, and MS were collected, as outlined in the UFP SAP Addendum for Phase 3. Samples were analyzed for a select list of chemicals, as outlined in the UFP SAP Addendum Phase 3.

Table 3-1 summarizes the Sampling Rationale. The soil sampling locations for Phase 1 of the RI were located in a grid pattern spaced 120 feet equidistantly apart (the location of NTC12-SB-26 was adjusted in the field due to auger refusal). The soil sampling locations for Phase 2 of the RI were located where

the highest maximum concentrations of metals were detected in soil samples previously collected during Phase 1 of the RI.

3.3.2 Deviations from the Work Plan

There were minor deviations from the project UFP SAP Addendum for the Phase 3 RI for Site 12-Harbor Dredge Spoil Area (Tetra Tech, 2013). Monitoring wells NTC12-MW01 and NTC12-MW03 were moved due to encountering numerous pieces of concrete debris below the ground surface. NTC12-MW01 was moved to the northeast of the original location and NTC12-MW03 was moved east down over the toe of the slope. NTC12-MW02 was moved northwest to avoid a drainage ditch.

Falling head aquifer tests were not conducted because the equilibrium water level in the monitoring wells was below the top of the screen in three of the four wells; therefore, when the water level is increased with a slug and then quickly removed, the subsequent flow of water into the aquifer due to the falling water level not only takes place through the screen or perforations below the original water table, but also through the vadose zone above the original water table. This increases the rate of fall of the water level in the borehole beyond that caused by inflow into the aquifer and leads to an overestimation of hydraulic conductivity (K). In monitoring well NTC12-MW03, only a rising head test was conducted due to the high water level. Water overflowed the casing during the falling head test.

3.3.3 Soil Sampling

During the Phase 3 investigation, soil sampling was performed in conjunction with the soil DPT boring program using downhole sampling devices similar to the Phase 2 investigation completed by EFS, a driller subcontracted and overseen by Tetra Tech. The soil was screened with the PID, and the soil samples were used for lithologic description only. Boring Logs Sheets are provided in Appendix B-3.

3.3.3.1 PID Screening

A PID (MiniRae 2000) was used to screen samples for the potential presence of VOCs. Upon sample retrieval, each soil core was screened with a PID. The PID was calibrated daily to 100 ppm isobutylene. PID screening results are reported on the boring logs in Appendix B-3.

3.3.4 Monitoring Well Installation and Sampling

Permanent monitoring wells (NTC12-MW01 through NTC12-MW04) were installed in four locations throughout Site 12 to investigate the first water bearing (shallow groundwater) zone in August, 2013. Monitoring wells were installed to allow for the collection of groundwater samples for laboratory analysis to determine the presence of groundwater contamination, and to determine the depth to groundwater.

After monitoring wells were installed and sampled, rising head hydraulic conductivity tests were conducted to determine groundwater aquifer characteristics.

EFS installed the four monitoring wells at the site during the week of August 12, 2013. A Tetra Tech geologist supervised the drilling and well installation activities, prepared the drilling logs and well completion logs, and reviewed the field documentation. Boring logs and well construction diagrams are provided in Appendix B-3.

The following subsections discuss the permanent monitoring well drilling, installation, construction, sample collection, and hydraulic conductivity testing.

3.3.4.1 Monitoring Well Drilling, Installation, and Development

Four monitoring wells were installed at Site 12 during this Phase 3 RI at locations shown on Figure 3-1. Table 3-3 provides a summary of monitoring well construction information. Hollow stem auger drilling was used for monitoring well installation. The depths of the monitoring wells ranged from 13.5 to 14.5 feet bgs. Documentation of the soil lithology was based on information from DPT subsurface soil sampling activities described in Section 3.3.3.

The nominal diameter of the monitoring well borings was approximately 8-inches. Each monitoring well was constructed of 2-inch inside diameter (ID), Schedule 40 polyvinyl chloride (PVC) flush-joint riser pipe; 10-foot-long flush-joint, factory-slotted, PVC well screen; and an end cap. Each section of casing and screen was National Sanitation Foundation approved and met American Society for Testing and Materials Standard (ASTM) A312-86a. The well screens had a slot size of 0.01 inch (10 slot), and were supplied with a flush-joint bottom cap.

After the riser pipe and screen were in place, the annulus of the boring was backfilled with U.S. Standard Sieve Size No. 20-40 clean silica sand from the bottom of the boring to a minimum of 1 foot above the top of the well screen. Hollow stem augers with a 4.25-inch ID were used to hold the borehole open as the clean silica sand was placed around the well screen. As the sand pack was installed, the augers were slowly withdrawn to provide an adequate sand pack around the well. A bentonite seal consisting of bentonite chips (minimum 1-foot thickness) was then installed above the sand pack and allowed to hydrate in accordance with the manufacturer's recommendations.

The depth of construction materials were constantly monitored during the installation of the monitoring wells by using a weighted, stainless steel or plastic measuring tape to make sure that no bridging of the sand pack or bentonite seal occurred during the installation process. Additional bentonite was then

poured into the remaining borehole annulus to approximately 2 feet bgs, and hydrated in accordance with the manufacturer's recommendations.

After the bentonite was sufficiently hydrated, a flush-mounted protective steel casing equipped with a sealed, bolted down, and appropriately labeled cap was installed at the four permanent wells. Each flush-mount riser was secured with a locking J-plug. Flush-mounted covers were installed in accordance with the Illinois Department of Public Health Water Well Construction Code requirements. Each monitoring well was fitted with a 6-inch-diameter by 10-inch long steel protective casing. The annulus between the flush-mounted cover and the ground was filled with concrete. The 8-inch-diameter auger hole served as the outer form for the concrete. The soil cuttings from each monitoring well were collected in 55-gallon drums and labeled as IDW.

After the monitoring wells were installed, they were developed to remove fine materials (i.e., sands, silts, and clays) from the sand pack and the immediate area around the screened interval of the wells. The monitoring wells were developed no sooner than 24 hours after well completion to allow for settling/curing of the backfilling materials. Wells were developed by pumping using a whaler pump. During pumping, the well screens were periodically surged and the saturated screen interval was swept to remove the fine materials. The well development water was containerized in 55-gallon drums and labeled as IDW.

Well development continued until the wells were visually clear, a minimum of five well volumes were removed, or the well pumped dry. One well, NTC12-MW01 was pumped dry, hence the well was then allowed to recharge while the rate of recovery was monitored. After the well had substantial recovery, the well was again pumped until it ran dry. This process was repeated until the purge water became visually clear.

3.3.4.2 Water Level Measurements

During the investigation one round of synoptic water level measurements was collected from the monitoring wells at the site to determine static potentiometric groundwater surface elevations. The synoptic measurements were collected within a 2-hour period of consistent weather conditions to minimize atmospheric/precipitation effects on groundwater levels. Measurements were collected with an electrical water level indicator (M-scope) using the top of the well casing (i.e., riser pipe) as the reference point for determining the depth to water.

Water level measurements were collected from a notch or mark made at the top of each casing to make sure that subsequent rounds of synoptic measurements are collected from a consistent point. Water level measurements were recorded electronically to the nearest 0.01 foot. Table 3-3 provides a summary of the groundwater level measurements.

3.3.4.3 Hydraulic Conductivity Testing

Rising head K tests were completed in the four monitoring wells to further characterize the groundwater conditions. Each rising head test was performed by removing a quantity of water from each monitoring well and measuring the rate at which the water level in the well returned to the initial water level. A dedicated bailer was utilized to remove the groundwater at each well location. A Well Troll pressure transducer was utilized to measure the rate of recovery of the groundwater in the well versus time. Prior to initiating the rising head test, the pressure transducer was installed in the well. The static water levels were measured at the respective well locations. The pressure transducer was programmed to start data collection immediately following removal of the water from the well. The data collected from the pressure transducer are provided in Appendix B-3.

3.3.4.4 Groundwater Sampling

Groundwater sampling of wells occurred during the week of August 12th, 2013 to determine what chemical constituents may be present in the groundwater at the site. Table 3-2 provides a summary of the groundwater samples collected. The four groundwater samples from the monitoring wells were analyzed for TAL Metals (Total and Dissolved).

The monitoring wells were purged and sampled using low-flow purging techniques (low flow) in accordance with the SAP (Tetra Tech, 2013). Using a peristaltic pump and disposable polyethylene tubing, one to three screen casing volumes were purged from the well. Prior to purging, the intake of the sampling pump was placed at the approximate midpoint of the well screen or the midpoint of the water column present in the well, and at least 2 feet from the bottom of the well.

To start purging, the monitoring well pumping was conducted at a low flow rate to minimize drawdown. Water quality parameters [pH, temperature, specific conductance, turbidity, oxidation reduction potential (ORP), and dissolved oxygen (DO)] were measured and recorded at 5- to 10-minute intervals (Appendix B-3). Measurements were collected until the parameters stabilized for at least three consecutive readings, and the minimum purge volume (one screen volume) was removed. Stabilization of the above parameters was defined as follows:

- pH $\pm$ 0.2 standard unit
- Temperature $\pm$ 10%
- Turbidity less than 10 nephelometric turbidity units (NTUs)
- Specific conductance $\pm$ 10 %
- DO $\pm$ 10%
- ORP $\pm$ 10%

After the parameters stabilized and immediately prior to sampling, the temperature, pH, specific conductance, turbidity, ORP, and DO of the groundwater sample were measured and recorded on a Groundwater Sample Log Sheet. The sample containers were filled by allowing the pump discharge to flow with minimal turbulence down the inside of the container. For the collection of filtered samples, an in-line 0.45-micron, disposable particulate filter was used. The groundwater samples collected for chemical analysis were analyzed for TAL metals (Total and Dissolved).

Groundwater Sample Log Sheets are provided in Appendix B-3. The groundwater analytical results are discussed in Section 4.

3.3.5 Field QA/QC Sample Description

Tetra Tech established a QC program to monitor and assess the quality of field and laboratory work performed during Phase 3 of the RI. This program included the collection of various types of QC samples as described below. The field QC samples consisted of temperature blanks, field duplicates and MS samples.

Temperature blanks were included in each cooler submitted to the laboratory to monitor sample storage conditions prior to arrival at the laboratory. One field duplicate sample was collected. The purpose of the field duplicate sample was to examine the variability of the samples.

MS samples are investigative samples analyzed to provide information about the effect of the sample matrix on the digestion and measurement methodology. One MS was collected.

Each type of field QC sample had the same preservation, analysis, and reporting procedures as the related environmental samples with the exception of temperature blanks.

Laboratory QC samples consisted of laboratory control samples, laboratory duplicates, internal standards, laboratory method blanks, MS/MSD, post digestion spikes, and surrogates. Trimatrix conducted the laboratory analysis and QC in accordance with the SAP (Tetra Tech, 2013). Tetra Tech reviewed the laboratory QC during the data validation, and noncompliances were noted in the data validation memoranda in Appendix D.

3.3.6 Field Measurements

Field measurements collected during the course of the Phase 3 RI were:

- VOC screening of workers' breathing space and recovered soil samples.
- Water quality parameters (pH, temperature, specific conductance, turbidity, DO, ORP).

VOC screening was conducted using a MiniRae 2000 PID. The PID readings were recorded on the boring logs (Appendix B-3). There were no positive PID readings above background. Water quality parameters were measured using a Horiba U-52 water quality meter and a LaMotte turbidity meter. The water quality parameters are recorded on the Monitoring Well Development, Low Flow Groundwater Purge Data, and Groundwater Sample log sheets (Appendix B-3).

Each instrument was calibrated prior to its delivery to the field, daily, or as needed. The project calibration log sheet was used to document the calibration of field testing equipment and both are provided in Appendix B-3.

3.3.7 Decontamination Procedures

Proper decontamination of field equipment was an integral part of the overall QC process. Decontamination liquids were placed in 55-gallon drums with the development and purge water from the monitoring wells and stored in a secure designated area until final disposition. The containers were supplied by EFS, Inc., and were clearly identified and labeled as IDW.

Prior to and after the completion of the sampling events, the procedure for decontaminating sampling equipment was to:

- Wash equipment in solution of tap water and Liquinox soap or equivalent.
- Rinse equipment with tap water.
- Double rinse with deionized or distilled water, or steam-clean equipment.
- Air dry equipment, if feasible.

Field measurement equipment that directly contacted environmental media (i.e., M-scope, flow-through cells, etc.) was rinsed with distilled/deionized water after each usage.

3.3.8 Field Documentation

Field documentation and tracking of sample custody were integral portions of the overall QA/QC process for the RI. The field documentation system serves as a record of activities conducted in the field during sample collection and data generation, and provided the means to identify, track, and monitor each sample from the time of collection through final reporting of data.

3.3.8.1 Sample Identification

The sample identification scheme presented in the UFP SAP Addendum for Phase 3 (Tetra Tech, 2013) was used to identify and label the field samples collected, and the field QC blanks created during the Phase 3 RI. The sample identification procedure was used for the sample labels and chain-of-custody documents in order to maintain consistency in the labeling process and to allow efficient handling of a large number of samples from different sources. Sample identification was identified and followed in accordance with the UFP SAP Addendum for Phase 3 (Tetra Tech, 2013). Chain-of-custody forms are provided in Appendix B-3.

3.3.8.2 Field Logbooks/Sample Log Sheets

The sampling coordinator maintained data sheets containing pertinent information regarding the samples. The field logs are intended to provide sufficient data and observations to enable the field team and other interested parties to reconstruct events that occurred during field activities.

Boring logs and well construction diagrams were prepared for the soil borings and monitoring wells. The physical characteristics of these samples (e.g., color, lithology, general appearance, odor, etc.) were recorded on sample log sheets. Similarly, sample logs were prepared for the soil, groundwater, IDW, and QC samples. The log sheets are provided in Appendix B-3.

3.3.9 Sample Management

The following chain-of-custody procedures were followed to document sample possession from the time of sample collection until ultimate disposal of the sample. The chain-of-custody procedures are discussed in Section 3.1.8.

The Phase 3 RI samples were packed in an ice-filled cooler and sent by overnight carrier (Federal Express) to the analytical laboratory for chemical analysis.

3.3.10 Investigation-Derived Waste Management

The types of wastes generated during the Phase 3 RI activities were drill cuttings (soil), disposable sampling equipment, PPE, development and purge water, and decontamination liquids. The solid and liquid IDW was collected and placed into 55-gallon drums supplied by EFS. Under oversight by Tetra Tech, the drilling subcontractor was responsible for providing, filling, sealing, and moving the drums to a centralized area specified by the base point of contact during mobilization. The drums were labeled by Tetra Tech with an IDW label (see Attachment A of Tetra Tech SOP SA-7.1 in Appendix C of the UFP SAP Addendum) as soon as possible after they were filled.

One composite liquid sample was collected from the drums containing liquid IDW and submitted to the laboratory for chemical analysis. The liquid IDW samples were analyzed for TCLP VOCs, SVOCs, pesticides, herbicides, and metals, flash point, reactivity, BTU, Total PCBs and pH. Analytical results were provided to NSGL personnel who were responsible for manifesting, transporting, and disposing of the IDW. The results of the IDW analysis are provided in Appendix C with the waste manifest.

Tetra Tech and NSGL personnel determined that the soil cutting from the installation of the monitoring wells is considered the same IDW as the soil cutting from the Phase 1 investigation. The NSGL personnel were responsible for manifesting, transporting, and disposing of the IDW.

Manifests and Certificates of Disposal for IDW disposal (both solid and liquid) will be maintained by NSGL and are included in the RI report in Appendix C.

3.3.11 Land Surveying

Land surveying was conducted to determine the horizontal location and the vertical elevation of the ground surface and the top of casing of the monitoring wells. Land surveying was conducted by Graef-USA Inc., for the Phase 3 investigation. Locations were reported in Illinois SPCS NAD 83 and vertical elevations were reported in NAVD 88. Monitoring well locations are shown on Figure 3-1. The survey information is provided in Appendix B-3.

TABLE 3-1

SAMPLING RATIONALE
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Sample Location	Sampling Rationale
Phase 1 RI - Surface Soil	
NTC12-SB21-01 to NTC12-SB30-01	Ten surface soil samples plus one duplicate were collected at these locations for the analysis of SVOCs (including PAHs), pesticides, and metals based on subsurface soil samples collected previously identifying elevated pesticides, and metals.
Phase 1 RI - Subsurface Soil	
NTC12-SB21-02 to NTC12-SB30-02	Ten subsurface soil samples plus one duplicate were collected at these locations. The PID was utilized to determine high concentrations of VOCs. Samples were collected in two foot intervals above groundwater based on PID, and visual observations. Samples were analyzed for TCL VOCs (four plus one duplicate, if warranted by PID readings - **not collected**), SVOCs including PAHs (ten plus one duplicate), pesticides (ten plus one duplicate), and PCBs (five plus one duplicate), and TAL metals (ten plus one duplicate) .
Phase 2 RI - Subsurface Soil	
NTC12-SB31 to NTC12-SB34	Eight subsurface soil samples were collected at these locations (with two samples collected from each location). Leachate from the soil samples was analyzed for TAL metals.
Phase 3 RI - Groundwater	
NTC12-MW01 to NTC12-MW04	Groundwater samples were collected from four newly installed monitoring wells (one upgradient well and three downgradient wells). Groundwater samples were analyzed for total and dissolved TAL metals. Water quality parameters were measured during groundwater sample collection to provide an estimate of groundwater geochemistry at each of the wells.

PID = Photoionization detector.
VOC = Volatile organic compound.
TAL = Target Analyte List.
TCL = Target Compound List.
SVOC = Semivolatile organic compound.
PCB = Polychlorinated biphenyl.

TABLE 3-2

SAMPLING SUMMARY
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE NAME	DEPTH (feet bgs)	DEPTH OF BLACK ASPHALT PIECES (bgs)	SATURATED DEPTH (bgs)	UNSATURATED	UNSATURATED/ SATURATED INTERFACE	SATURATED	TCL SVOCs	TCL PAHs	TCL Pesticides	TCL PCBs	TAL METALs	DISSOLVED TAL METALs	TAL METALs by SPLP	*FIELD PARAMETERS	LAND-BASED FILL	LAKE DREDGE SOIL
PHASE 1 - SURFACE (NTC12-SB21-01 to NTC12-SB30-01)																
NTC12-SB21-0005	0 to 0.5	NA	NA	X	NA		X	X	X		X			PID	X	
NTC12-SB22-0005	0 to 0.5	NA	NA	X	NA		X	X	X		X			PID	X	
NTC12-SB23-0005	0 to 0.5	NA	NA	X	NA		X	X	X		X			PID	X	
NTC12-SB24-0005	0 to 0.5	NA	NA	X	NA		X	X	X		X			PID		X
NTC12-SB25-0005	0 to 0.5	NA	NA	X	NA		X	X	X		X			PID	X	
NTC12-SB26-0005	0 to 0.5	NA	NA	X	NA		X	X	X		X			PID	X	
NTC12-SB27-0005	0 to 0.5	NA	NA	X	NA		X	X	X		X			PID	X	
NTC12-SB28-0005	0 to 0.5	NA	NA	X	NA		X	X	X		X			PID	X	
NTC12-SB29-0005	0 to 0.5	NA	NA	X	NA		X	X	X		X			PID	X	
NTC12-SB30-0005	0 to 0.5	NA	NA	X	NA		X	X	X		X			PID		X
PHASE 1 - SUBSURFACE (NTC12-SB21-02 to NTC12-SB30-02)																
NTC12-SB21-0507	05-07	05-07	7.5		X		X	X	X	X	X			PID	X	
NTC12-SB22-00502	0.5-02	NA	7.5	X			X	X	X		X			PID	X	
NTC12-SB23-0810	08-10	NA	8.5			X	X	X	X		X			PID		X
NTC12-SB24-00502	0.5-02	NA	2.5		X		X	X	X		X			PID		X
NTC12-SB25-0204	02-04	02-04	9.5	X			X	X	X	X	X			PID	X	
NTC12-SB26-0406	04-06	04-06	6		X		X	X	X		X			PID	X	
NTC12-SB27-0204	02-04	NA	8.5	X			X	X	X	X	X			PID	X	
NTC12-SB28-0204	02-04	02-04	6	X			X	X	X	X	X			PID	X	
NTC12-SB29-0204	02-04	02-04	6	X			X	X	X	X	X			PID	X	
NTC12-SB30-00502	0.5-02	NA	2		X		X	X	X		X			PID		X
NTC12-DUP01: (NTC12-SB27-0204)	02-04			X			X	X	X	X	X			PID	X	
NTC12-DUP02: (NTC12-SB25-0204)	02-04			X			X	X	X	X	X			PID	X	
PHASE 2 - SUBSURFACE (NTC12-SB31 to NTC12-SB34)																
NTC12-SB31-0305	03-05	NA		X									X		X	
NTC12-SB31-0507	05-07	NA		X									X		X	
NTC12-SB32-0204	02-04	NA		X									X		X	
NTC12-SB32-0406	04-06	NA		X									X		X	
NTC12-SB33-0204	02-04	NA		X									X		X	
NTC12-SB33-0406	04-06	NA		X									X		X	
NTC12-SB34-0204	02-04	NA		X									X		X	
NTC12-SB34-0406	04-06	NA		X									X		X	
PHASE 3 - GROUNDWATER (NTC12-MW01 to NTC12-MW04)																
NTC12-MW01	NA	NA	NA	NA	NA	NA					X	X		PID/Water Quality	NA	NA
NTC12-MW02	NA	NA	NA	NA	NA	NA					X	X		PID/Water Quality	NA	NA
NTC12-MW03	NA	NA	NA	NA	NA	NA					X	X		PID/Water Quality	NA	NA
NTC12-MW04	NA	NA	NA	NA	NA	NA					X	X		PID/Water Quality	NA	NA

Notes:
bgs - Below ground surface
NA - Not applicable
PCB - Polychlorinated biphenyls
PID - Photoionization detector
SPLP - Synthetic Precipitation Leachate Procedure
SVOCs - Polynuclear aromatic hydrocarbons
TAL - Target Analyte List
TCL - Target Compound List
VOCs - Volatile organic compounds
*All PID readings were below 8.0 ppm.
Water Quality - dissolved oxygen, oxidation-reduction potential, specific conductivity, temperature, amd turbidity

TABLE 3-3

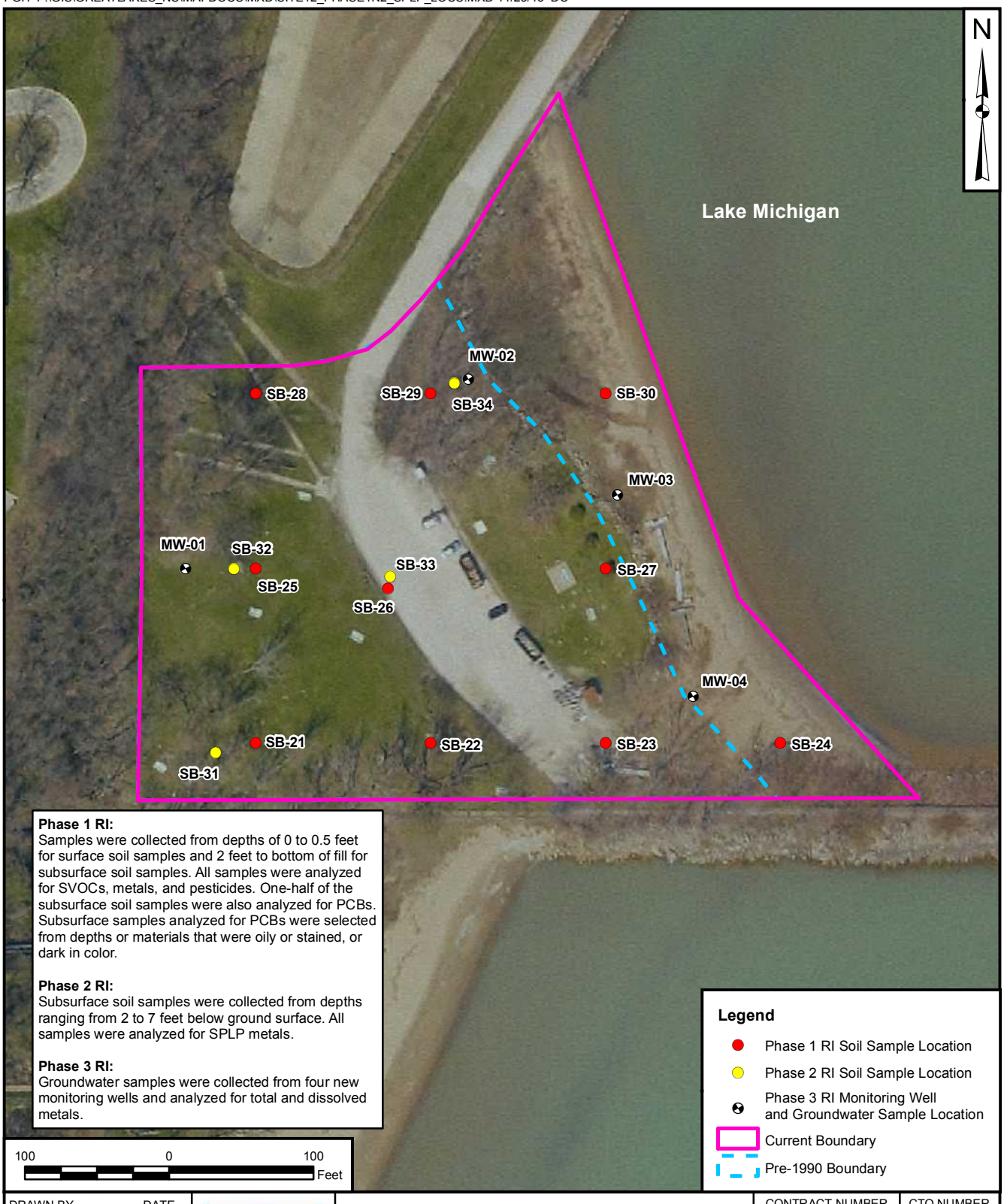
GROUNDWATER ELEVATION SURVEY
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Monitoring Well	Ground Surface Elevation (feet msl)	Top of Casing (feet msl)	Bottom of Well (feet bgs)	Screened Interval		8/17/2013	
				Top (feet bgs)	Bottom (feet bgs)	Depth to Water (feet bgs)	Water Level (feet msl)
NTC12-MW01	590.15	589.760	14.00	3.50	13.50	9.39	580.37
NTC12-MW02	585.19	584.860	14.50	4.00	14.00	5.93	578.93
NTC12-MW03	581.27	580.970	13.50	3.00	13.00	2.19	578.78
NTC12-MW04	582.58	582.250	13.50	3.00	13.00	3.55	578.70

Notes:
1. msl = mean sea level.
2. bgs = below ground surface.
3. Wells were surveyed according to North American Vertical Datum 88.

TOC. Top of PVC well casing.

PGH P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE12_PHASE1N2_SPLP_LOCS.MXD 11/25/13 DC



Phase 1 RI:
Samples were collected from depths of 0 to 0.5 feet for surface soil samples and 2 feet to bottom of fill for subsurface soil samples. All samples were analyzed for SVOCs, metals, and pesticides. One-half of the subsurface soil samples were also analyzed for PCBs. Subsurface samples analyzed for PCBs were selected from depths or materials that were oily or stained, or dark in color.

Phase 2 RI:
Subsurface soil samples were collected from depths ranging from 2 to 7 feet below ground surface. All samples were analyzed for SPLP metals.

Phase 3 RI:
Groundwater samples were collected from four new monitoring wells and analyzed for total and dissolved metals.

Legend

- Phase 1 RI Soil Sample Location
- Phase 2 RI Soil Sample Location
- Phase 3 RI Monitoring Well and Groundwater Sample Location
- Current Boundary
- Pre-1990 Boundary

DRAWN BY: D. COUCH	DATE: 02/08/13
CHECKED BY: L. GANSER	DATE: 11/25/13
REVISED BY: D. COUCH	DATE: 11/25/13
SCALE: AS NOTED	

NAVFAC

REMEDIAL INVESTIGATION SAMPLING LOCATIONS
PHASES 1 THROUGH 3
SITE 12 - HARBOR DREDGE SPOIL AREA
NS GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER: 2416	CTO NUMBER: F27A
APPROVED BY: C. RICH	DATE: 11/25/13
APPROVED BY: ___	DATE: ___
FIGURE NO.: FIGURE 3-1	REV: 0

4.0 REMEDIAL INVESTIGATION RESULTS

The following subsections provide a detailed discussion of field data and analytical results generated during the investigation of Site 12 at NSGL. Figure 1-3 shows the Site 12 location map, Figure 2-2 shows the layout of the previous sampling locations at Site 12, and Figure 3-1 shows the locations of samples collected during Phases 1, 2, and 3 of the RI.

The analytical data presented in this RI Report were subjected to a data validation process performed by Tetra Tech personnel for data integrity and defensibility. No data were rejected during the data validation process. Soil samples collected for chemical analysis during Phase 1 of the investigation were analyzed by Empirical for TCL SVOCs, PAHs, pesticides, and TAL metals and select samples were analyzed for PCBs. Soil samples collected for chemical analysis during Phase 2 of the investigation were analyzed by Trimatrix for TAL metals after the soil samples were prepared using the SPLP. Groundwater samples collected for chemical analysis during Phase 3 of the investigation were analyzed by Trimatrix for TAL metals (total and dissolved). Detected concentrations in analyzed soil and groundwater samples are discussed in this section.

4.1 SITE-SPECIFIC GEOLOGY

Geologic conditions at Site 12 were characterized as part of Phase 1 and Phase 3 of the RI. Surface and subsurface material at Site 12 were characterized based on data collected during the drilling of soil borings (see Appendix B for boring logs). The visual classifications utilizing the Unified Soil Classification System (USCS) were used to develop geologic cross-sections for the site. Figure 4-1 presents the locations of the geologic cross sections based on select borings. Figures 4-2, 4-3, 4-4, and 4-5 show cross-sectional transects A-A', B-B', and C-C', and D-D' respectively. Figure 4-4A is a fence-diagram of Figure 4-4.

The shallow, subsurface lithology of the borings located directly on the shore of Lake Michigan (outer Harbor), NTC12-SB24 and NTC12-SB30, observed from ground surface to termination of the borings at 5 feet bgs, generally comprises poorly sorted fine sand (SP). This beach sand most likely is a dredge material from Lake Michigan, which would be native to the shoreline, but probably put at Site 12 by man and not by natural means.

The shallow, subsurface lithology of the major portion of Site 12, not located directly on the shore of Lake Michigan, was generally observed to be land-based fill material. This material, observed from ground surface to approximately 4.5 to 8 feet bgs, generally comprises sand and gravel with some clay. A random distribution of asphalt-like material was encountered throughout this fill material in the borings

from the center toward the western portion of the site (NTC12-SB21, NTC12-SB25, NTC12-SB26, NTC12-SB28, and NTC12-SB29). Beneath the land-based soil is the lake-dredge soil that was encountered initially at the borings along the lakefront, NTC12-SB24 and NTC12-SB30. The depth advanced during this investigation for these borings was 10 feet bgs.

Figure 4-2 shows cross-sectional transect A-A', which includes the subsurface area between NTC12-SB24 and NTC12-SB30 along the shoreline. Figure 4-3 shows cross-sectional transect B-B', which includes the subsurface area between NTC12-SB23 and NTC12-SB27 and shows the sand and gravel and clay fill materials graded into the lake dredge soil at 7 to 8 feet bgs.

Figure 4-4 shows cross-sectional transect C-C', which includes NTC12-SB21, NTC12-SB22, NTC12-SB26, NTC12-SB28, and NTC12-SB29, and shows the sandy and clay fill materials, with asphalt-like material, graded into the lake dredge soil at 4.5 to 6 feet bgs. Figure 4-4A is a geologic fence diagram for cross section C-C'.

Figure 4-5 shows cross-sectional transect D-D', which includes NTC12-SB25, NTC12-SB26, NTC12-SB27, and shows the sandy and clay fill materials, with gravel material at NTC12-SB27, graded into the lake dredge soil at 6 to 7 feet bgs. Figure 4-5 also graphically depicts the topography of the steep bluff west of Site 12 and the shoreline of Lake Michigan east of Site 12.

The overall summary of geologic conditions across the site indicated an upper layer of coarser grained, land-based fill material underlain by fine grained dredge fill, with undisturbed sand/gravelly beach sand beneath the fill. The Phase 3 investigation revealed similar subsurface conditions. However, a significant amount of concrete debris was encountered at several boring locations which resulted in the need to make several attempts at alternate locations to complete the required hollow-stem auger drilling. The Phase 3 results also provided data that was used to refine the limit of the fill.

4.2 SITE-SPECIFIC HYDROGEOLOGY

The hydrogeologic conditions at Site 12 were interpreted from data collected during the subsurface investigation activities at the site, including drilling, observations of saturated conditions of soil samples collected, groundwater sampling, groundwater level measurements, and aquifer testing.

4.2.1 Hydrogeologic Framework

The shallow overburden aquifer was identified at Site 12 during Phases 1 and 3 of the investigation. The top of the shallow aquifer ranges from approximately 2 feet bgs (NTC12-SB30 and NTC12-MW03 along the shoreline) to approximately 9.5 feet bgs at the western upgradient edge of the site (NTC12-SB25 and

NTC12-MW-01). The aquifer is composed primarily of poorly sorted fine sand (see Figures 4-2, 4-3, 4-4, and 4-5), similar to native beach sand in the area.

Site 12 is located in a flat area on the lakeshore. Ground elevations at the site range from approximately 579 feet to 580 feet above msl (a few feet above lake level) as shown on Figure 4-6. Figure 4-5, depicts the topography of the steep bluff, which is at an elevation at approximately 600 feet just west of Site 12, and the shoreline of Lake Michigan just east of Site 12, which is at an elevation of approximately 576.5 feet.

The surface consists of hard-packed gravel, sand, and silt covered with weeds and grasses, underlain by approximately 100 feet of glacial till over bedrock. Various mixtures, primarily of sand and gravel with construction debris and lesser amounts of silt and clay were encountered when shallow borings were drilled by Dames & Moore in 1988. This is indicative of filling and active sorting by wave action of the lake, as would be expected of dredging. Dames & Moore reported that during soil boring activities, additional debris was being deposited at this site, and that during the last sampling event in August 1989 the site was being developed for recreational purposes.

Borings installed by Tetra Tech in December 2010 encountered silt, fine sand, clay and sand mix, well-graded sand, and gravel, with randomly distributed asphalt-like pieces, which are likely land-based fill material near the surface and a lake-dredge poorly sorted sand in the subsurface soil. Borings installed in August 2013 encountered similar material, but also numerous pieces of concrete debris at the surface to a depth of 3 to 5 feet bgs.

The shallow aquifer located along the shoreline at the installation has a depth to groundwater between 2 and 5 feet bgs, due to the proximity of the lake. The overall groundwater flow direction at Site 12 as determined using groundwater data collected during the Phase 3 Investigation is east to northeast towards Lake Michigan (see Figure 4-6). This water is not potable and not utilized at NSGL or the surrounding area. The remaining aquifer system is known as the deep aquifer system, with depths ranging from 900 to 1,900 feet bgs. The shallow aquifer system recharges from local rainfall infiltration, while the deep aquifer system receives sources from areas of central Wisconsin and Lake Michigan. Surface runoff drains directly into Lake Michigan. As discussed in Section 4.5, groundwater quality at Site 12 was evaluated during the Phase 3 investigation

The shallow aquifer at Site 12 is not considered a potable aquifer because the site is located adjacent to Lake Michigan and it is possible that under long-term pumping conditions the lake versus the shallow aquifer would be the primary source of the water captured by the well. Surface water must be treated before it is used as a potable water source.

There was a drop in the peak lake level from 582.3 feet in October 1986 to 576.5 feet in March 2003 (USGS, 2007), which is approximately the current lake level. This drop in lake level exposed the beachfront now present.

4.2.2 Groundwater Flow Direction

The topography of Site 12 consists of the western portion of the site that abuts the bluff ravines and the eastern portion of the site along the beachfront of Lake Michigan. Groundwater flows from the base of the bluff to the lake. During the Phase 3 investigation, groundwater elevations for the shallow water table aquifer were determined based on synoptic water level measurements collected on August 17, 2013 (see Table 4-1) from four monitoring wells. Water-level measurements were collected from the wells within a 2-hour time frame.

Static groundwater levels in unconsolidated materials at Site 12, as measured in monitoring wells NTC12-MW01 through NTC-MW04, occur in the subsurface deposits at depths ranging from 2.19 feet in monitoring well NTC12-MW03 to 9.39 feet in monitoring well NTC12-MW01. The groundwater elevations were used to generate the groundwater potentiometric surface for the shallow water table aquifer at the site (Figure 4-6). The predominant groundwater flow direction at the site is in a easterly to northeasterly direction toward Lake Michigan.

4.2.3 Hydraulic Conductivity

The shoreline at NSGL has eroded over the years; however, fill material has been placed periodically at Site 12 since the early 1940s to extend the shoreline. The lakefront area, composed of fill material, includes soil and other various materials, such as asphalt, serving as a foundation for the sandy beach, and adjacent structures on-site, including the gravel road bisecting the site. The predominate soil found in NSGL is located on top of morainic ridges. Silt deposits overlay a calcareous glacial till of a silty, sandy, clay soil, which has moderate to poor draining capacity. Lake dredge sandy beach soil is relatively uniform in grain size distribution, liquid limit, and plasticity. The glacial soil at Site 12 would be subdivided into glacial outwash, which is defined as medium to coarse, poor to well-graded sands and gravels to a glaciolacustrine soil, which is defined as fine, poorly graded silts and sands.

During the Phase 3 investigation, hydraulic conductivity testing (slug tests) was conducted on the four newly installed monitoring wells. The aquifer test data for the site were evaluated using the Hvorslev Method (1951) for unconfined aquifers. This method can be used to estimate the saturated hydraulic conductivity of aquifer materials around the screen, or otherwise open portion of a full penetrating or partially penetrating well. Rising-head slug tests were completed on the four newly installed Site 12 wells

(NTC12-MW01, NTC12-MW02, NTC12-MW03, and NTC12-MW04) on August 16th and 17th of 2013. The hydraulic conductivities estimated from the tests ranged from $1.64x10^{-3}$ centimeters per second (cm/sec) (4.64 feet/day) to $6.26x10^{-3}$ cm/sec (17.74 feet/day). The geometric mean of the four hydraulic conductivities is $3.00x10^{-3}$ cm/sec [8.50 feet per day (ft/day)]. Aquifer test results are provided in Appendix B and summarized in Table 4-1.

4.2.4 Groundwater Migration Velocities

The hydraulic gradient for the shallow groundwater at the site was calculated graphically from groundwater elevations presented on Figure 4-6. Using an average porosity of 0.40 for the fine sand (Freeze and Cherry, 1979 and Fetter, 1980), the site-wide geometric mean hydraulic conductivity of 8.50 feet per day, and a hydraulic gradient of 0.005, the groundwater velocity at the site was approximated at 0.106 feet per day (38.8 feet per year).

4.3 SOIL SAMPLING RESULTS

The Site 12 RI required the collection of chemical data to be used to characterize the site and conduct a screening level HHRA. The soil project action limits (PALs) are set at the lowest matrix-specific, risk-based or human health screening criteria appropriate for the site. The PALs for this investigation are as follows:

- USEPA, 2013. Residential Regional Screening Levels (RSLs) for Chemical Contaminants in Soil at Superfund Sites, developed by Oak Ridge National Laboratory (ORNL). November. www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm

- Illinois EPA, 2013a. Tiered Approach to Corrective Action Objectives (TACO). Illinois Environmental Protection Agency, Bureau of Land, available online at http://www.epa.state.il.us/land/taco/ (Accessed September 2013). TACO and Non-TACO screening criteria. TACO criteria are from Illinois Pollution Control Board, 2013a. Title 35 of the Illinois Administrative Code (IAC) Section 742: TACO. www.ipcb.state.il.us/SLR/IPCBandIEPAEnvironmentalRegulations-Title35.aspx (Accessed September 2013).

Soil analytical results were compared to TACO, Non-TACO, and USEPA screening criteria, as shown in Table 4-2 – Soil Screening Values. The comparison to these screening values provides an indication of the nature and extent of contamination. These screening values, as well as other criteria identified in Section 6, were used in the quantitative human health risk evaluation.

4.3.1 Surface Soil

The statistical summary of surface soil results from Site 12 is presented in Table 4-3. The number of soil samples that exceed the different screening criteria is identified for each chemical. The analytical results for soil samples collected and analyzed at Site 12 are summarized in Table 4-4 – Summary of Positive Detections in Surface Soil. Concentrations that exceed the minimum screening criteria are shaded. Soil sample locations are shown on Figure 3-1. Detailed soil analytical results are provided in Appendix E.

4.3.1.1 Metals

The table below presents a summary of metals contaminants detected at maximum concentrations exceeding the minimum screening criteria. The metals concentrations exceeding criteria at each boring location are shown on Figure 4-7.

Metal Exceedances in Surface Soil

Parameter	Frequency of Detection	Maximum Result (mg/kg)	Qualifier	Sample with Maximum Detection	Minimum Screening Criteria		
					Criteria (mg/kg)	Exceedances	Source
Antimony	3/10	1.12	J	NTC12-SB29	0.27	3	MCL-based SSL
Arsenic	10/10	16.9	J	NTC12-SB25	0.0013	10	Risk-based SSL
Barium	10/10	244	J	NTC12-SB21	82	4	MCL-based SSL
Beryllium	10/10	5.5		NTC12-SB27	3.2	1	MCL-based SSL
Cadmium	10/10	1.03	J	NTC12-SB29	0.38	8	MCL-based SSL
Chromium	10/10	23.8	J	NTC12-SB27	0.00059	10	Risk-based SSL
Cobalt	10/10	11.2		NTC12-SB27	0.21	10	Risk-based SSL
Copper	10/10	271		NTC12-SB27	22	7	Risk-based SSL
Iron	10/10	20300		NTC12-SB27	270	10	Risk-based SSL
Lead	10/10	263	J	NTC12-SB29	14	10	MCL-based SSL
Manganese	10/10	701		NTC12-SB29	21	10	Risk-based SSL
Mercury	10/10	0.598		NTC12-SB26	0.033	9	Risk-based SSL

Parameter	Frequency of Detection	Maximum Result (mg/kg)	Qualifier	Sample with Maximum Detection	Minimum Screening Criteria		
					Criteria (mg/kg)	Exceedances	Source
Nickel	10/10	34.7		NTC12-SB27	20	5	Risk-based SSL
Selenium	7/10	0.791		NTC12-SB29	0.26	7	MCL-based SSL
Silver	8/10	1.33		NTC12-SB29	0.6	2	Risk-based SSL
Thallium	1/10	0.167	J	NTC12-SB29	0.011	1	Risk-based SSL
Zinc	10/10	1530	J	NTC12-SB27	290	3	Risk-based SSL

mg/kg - milligram per kilogram

Exceedance of the minimum screening criteria for metals was widespread throughout the site. The majority of the maximum metals concentrations were at NTC12-SB27, which is located at the central-east portion of the site, at the edge of the pre-1990 site boundary. Sampling location NTC12-SB30, at the northeast corner of the site along the shoreline, had the overall lowest metals concentrations.

4.3.1.2 Pesticides

The table below presents a summary of pesticide contaminants detected at concentrations exceeding the minimum screening criteria. The pesticide concentrations exceeding criteria at each boring location are shown on Figure 4-8.

Pesticide Exceedances in Surface Soil

Parameter	Frequency of Detection	Maximum Result (µg/kg)	Qualifier	Sample with Maximum Detection	Minimum Screening Criteria		
					Criteria (µg/kg)	Exceedances	Source
4,4'-DDD	10/10	195		NTC12-SB25	6.4	6	Risk-based SSL
4,4'-DDE	10/10	197		NTC12-SB25	46	5	Risk-based SSL
4,4'-DDT	9/10	282		NTC12-SB25	67	4	Risk-based SSL
Aldrin	5/10	20.8		NTC12-SB25	0.65	3	Risk-based SSL
Alpha-BHC	3/10	1.1		NTC12-SB25	0.036	3	Risk-based SSL
Alpha-Chlordane	10/10	3220		NTC12-SB25	13	3	Risk-based SSL
Beta-BHC	2/10	6.55		NTC12-SB25	0.13	2	Risk-based SSL
Delta-BHC[1]	9/10	4.65		NTC12-SB25	0.036	9	Risk-based SSL
Dieldrin	8/10	16.6		NTC12-SB25	0.061	8	Risk-based SSL
Gamma-BHC (Lindane)	4/10	0.6	J	NTC12-SB29	0.21	3	Risk-based SSL

Parameter	Frequency of Detection	Maximum Result (µg/kg)	Qualifier	Sample with Maximum Detection	Minimum Screening Criteria		
					Criteria (µg/kg)	Exceedances	Source
Gamma-Chlordane	10/10	2600		NTC12-SB25	13	3	Risk-based SSL
Heptachlor	4/10	236		NTC12-SB25	0.14	4	Risk-based SSL
Heptachlor Epoxide	7/10	64		NTC12-SB25	0.068	7	Risk-based SSL

1 Alpha-BHC is used as a surrogate
µg/kg - microgram per kilogram

Exceedances of the minimum screening criteria for pesticides were widespread throughout the site. The majority of the maximum pesticides results were at NTC12-SB25, located near the central-west border of the site. Sampling location NTC12-SB23, at the southeast corner of the site near the pre-1990 boundary, had the majority of the minimum detected pesticide concentrations.

4.3.1.3 PAHs

The table below presents a summary of PAH contaminants detected at concentrations exceeding the minimum screening criteria. The PAH concentrations exceeding criteria at each boring location are shown on Figure 4-9. The PAH results are presented in Table 4-4, and the PAH summary tables are discussed in Sections 4.3.1.3 and 4.3.2.3.

PAH Exceedances in Surface Soil

Parameter	Frequency of Detection	Maximum Result (µg/kg)	Sample with Maximum Detection	Minimum Screening Criteria		
				Criteria (µg/kg)	Exceedances	Source
Benzo(a)anthracene	10/10	1830	NTC12-SB21	10	10	Risk-based SSL
Benzo(a)pyrene	10/10	1460	NTC12-SB27	3.5	10	Risk-based SSL
Benzo(b)fluoranthene	10/10	2260	NTC12-SB27	35	9	Risk-based SSL
Benzo(k)fluoranthene	10/10	2280	NTC12-SB21	350	4	Risk-based SSL
Chrysene	10/10	1530	NTC12-SB21	1100	1	Risk-based SSL
Dibenzo(a,h)anthracene	9/10	287	NTC12-SB21	11	9	Risk-based SSL
Indeno(1,2,3-cd)pyrene	10/10	674	NTC12-SB21	150	5	Risk-based SSL
Naphthalene	10/10	91.5	NTC12-SB27	0.47	10	Risk-based SSL

Exceedances of the minimum screening criteria for PAHs were widespread throughout the site. PAHs were detected at the 10 surface sampling locations, except dibenzo(a,h)anthracene, which was not detected at NTC12-SB30. The majority of the maximum PAHs results were at NTC12-SB21, which is located near the southwest corner of the site. Sampling location NTC12-SB30, at the northeast corner of the site along the shoreline, had the overall lowest PAH concentrations.

4.3.1.4 SVOCs (non-PAHs)

The table below presents a summary of SVOC (non-PAHs) contaminants detected at concentrations exceeding the minimum screening criteria. The location of NTC12-SB27 is shown on Figure 4-10 along with the dibenzofuran concentration that exceeded the criteria.

SVOC Exceedances in Surface Soil

Parameter	Frequency of Detection	Maximum Result (µg/kg)	Qualifier	Sample with Maximum Detection	Minimum Screening Criteria		
					Criteria (µg/kg)	Exceedances	Source
Dibenzofuran	1/10	144	J	NTC12-SB27	110	1	Risk-based SSL

An exceedance of the minimum screening criteria for SVOCs (non-PAHs) was found at one location: NTC12-SB27 (central-east). Dibenzofuran was detected at an estimated concentration of 144 µg/kg.

4.3.2 Subsurface Soil

The statistical summary of subsurface soil results from Site 12 is presented in Table 4-5 – Occurrence and Distribution of Organics and Inorganics (metals) in Subsurface Soil. The number of soil samples that exceed the different screening criteria is identified for each chemical. The analytical results for soil samples collected and analyzed at Site 12 are summarized in Table 4-6 – Summary of Positive Detections in Subsurface Soil. Concentrations that exceed the minimum screening criteria are shaded. Soil sample locations are shown on Figure 3-1. Detailed soil analytical results are provided in Appendix E.

4.3.2.1 Metals

The table below presents a summary of metals contaminants detected at maximum concentrations exceeding the minimum screening criteria. The metals concentrations exceeding criteria at each boring location are shown on Figure 4-11.

Metal Exceedances in Subsurface Soil

Parameter	Frequency of Detection	Maximum Result (mg/kg)	Qualifier	Sample with Maximum Detection	Minimum Screening Criteria		
					Criteria (mg/kg)	Exceedances	Source
Antimony	6/10	4.24	J	NTC12-SB26-0406	0.27	6	MCL-based SSL
Arsenic	10/10	25	J	NTC12-SB26-0406	0.001	10	Risk-based SSL
Barium	10/10	432	J	NTC12-SB21-0507	82	6	MCL-based SSL

Parameter	Frequency of Detection	Maximum Result (mg/kg)	Qualifier	Sample with Maximum Detection	Minimum Screening Criteria		
					Criteria (mg/kg)	Exceedances	Source
Cadmium	10/10	7.31	J	NTC12-SB26-0406	0.38	7	MCL-based SSL
Chromium	10/10	60.8	J	NTC12-SB26-0406	0.00059	10	Risk-based SSL
Cobalt	10/10	17		NTC12-SB26-0406	0.21	10	Risk-based SSL
Copper	10/10	362		NTC12-SB21-0507	22	8	Risk-based SSL
Iron	10/10	31400		NTC12-SB29-0204	270	10	Risk-based SSL
Lead	10/10	845	J	NTC12-SB29-0204	14	10	MCL-based SSL
Manganese	10/10	846		NTC12-SB26-0406	21	10	Risk-based SSL
Mercury	10/10	1.99		NTC12-SB26-0406	0.033	9	Risk-based SSL
Nickel	10/10	88.6		NTC12-SB26-0406	20	7	Risk-based SSL
Selenium	9/10	6.57		NTC12-SB26-0406	0.26	8	MCL-based SSL
Silver	7/10	22.3		NTC12-SB26-0406	0.6	4	Risk-based SSL
Zinc	10/10	912	J	NTC12-SB21-0507	290	4	Risk-based SSL

Exceedances of the minimum screening criteria for metals were widespread throughout the site. The majority of the maximum metals results were at NTC12-SB26 from 4 to 6 feet bgs, located at the center of the site. Sampling location NTC12-SB24 from 0.5 to 2 feet bgs, at the southeast corner of the site along the shoreline, had the overall lowest metals concentrations.

4.3.2.2 Pesticides/PCBs

The table below presents a summary of data for pesticides and PCB contaminants detected at concentrations exceeding the minimum screening criteria. The pesticide and PCB concentrations exceeding criteria at each boring location are shown on Figure 4-12. The data presented include: frequency of contaminant detection, maximum results, identity of the sample location having the maximum results, the screening value used, and the number of samples that exceeded the minimum screening criterion.

Pesticide/PCB Exceedances in Subsurface Soil

Parameter	Frequency of Detection	Maximum Result (µg/kg)	Qualifier	Sample with Maximum Detection	Minimum Screening Criteria		
					Criteria (µg/kg)	Exceedances	Source
PCBs							
Aroclor-1254	4/5	799		NTC12-SB21-0507	8.8	4	Risk-based SSL
PESTICIDES							
4,4'-DDD	10/10	1090		NTC12-SB26-0406	6.4	6	Risk-based SSL
4,4'-DDE	10/10	986	J	NTC12-SB25-0204	46	4	Risk-based SSL
4,4'-DDT	10/10	823		NTC12-SB21-0507	67	2	Risk-based SSL

Parameter	Frequency of Detection	Maximum Result (µg/kg)	Qualifier	Sample with Maximum Detection	Minimum Screening Criteria		
					Criteria (µg/kg)	Exceedances	Source
Aldrin	5/10	17		NTC12-SB21-0507	0.65	2	Risk-based SSL
Alpha-BHC	3/10	1.05		NTC12-SB26-0406	0.036	3	Risk-based SSL
Alpha-Chlordane	9/10	141		NTC12-SB21-0507	13	3	Risk-based SSL
Beta-BHC	3/10	1.12		NTC12-SB21-0507	0.13	3	Risk-based SSL
Delta-BHC[1]	8/10	6.05		NTC12-SB21-0507	0.036	8	Risk-based SSL
Dieldrin	7/10	13.4		NTC12-SB26-0406	0.061	7	Risk-based SSL
Gamma-BHC (Lindane)	3/10	3.61		NTC12-SB28-0204	0.21	3	Risk-based SSL
Gamma-Chlordane	9/10	129		NTC12-SB21-0507	13	3	Risk-based SSL
Heptachlor	4/10	1.83		NTC12-SB21-0507	0.14	4	Risk-based SSL
Heptachlor Epoxide	7/10	7		NTC12-SB22-00502	0.068	7	Risk-based SSL

1 Alpha-BHC is used as a surrogate

Exceedances of the minimum screening criteria for pesticides were widespread throughout the site. The majority of the maximum pesticides concentrations were detected at NTC12-SB21 in the sample from 5 to 7 feet bgs (southwest corner of site) and NTC12-SB26 in the sample from 4 to 6 feet bgs (center of site). Sampling location NTC12-SB24 from 0.5 to 2 feet bgs, at the southeast corner of the site, had the overall lowest pesticide concentrations.

Exceedances of the minimum screening criteria for PCBs occurred in approximately one-half of the subsurface soil samples collected from the site. The maximum PCB concentrations was also detected at NTC12-SB21 in the sample from 5 to 7 feet bgs. Sampling location NTC12-SB29 from 2 to 4 feet bgs, at the north-central portion of the site, had the lowest PCB concentration.

4.3.2.3 PAHs

The table below presents a summary of data for PAH contaminants detected at concentrations exceeding the minimum screening criteria. The PAH concentrations exceeding criteria at each boring location are shown on Figure 4-13.

PAH Exceedances in Subsurface Soil

Parameter	Frequency of Detection	Maximum Result (µg/kg)	Qualifier	Sample with Maximum Detection	Minimum Screening Criteria		
					Criteria (µg/kg)	Exceedances	Source
2-Methylnaphthalene	10/10	545		NTC12-SB26-0406	140	3	Risk-based SSL
Benzo(a)anthracene	10/10	9780		NTC12-SB28-0204	10	10	Risk-based SSL
Benzo(a)pyrene	10/10	7740		NTC12-SB28-0204	3.5	10	Risk-based SSL
Benzo(b)fluoranthene	10/10	10300		NTC12-SB28-0204	35	10	Risk-based SSL
Benzo(k)fluoranthene	10/10	2570		NTC12-SB26-0406	350	5	Risk-based SSL
Chrysene	10/10	7940		NTC12-SB28-0204	1100	3	Risk-based SSL
Dibenzo(a,h)anthracene	7/10	705		NTC12-SB28-0204	11	7	Risk-based SSL
Indeno(1,2,3-cd)pyrene	10/10	1330		NTC12-SB28-0204	150	5	Risk-based SSL
Naphthalene	10/10	439		NTC12-SB26-0406	0.47	10	Risk-based SSL
Phenanthrene[1]	10/10	20200		NTC12-SB28-0204	9500	1	Risk-based SSL
Pyrene	10/10	16800		NTC12-SB28-0204	9500	1	Risk-based SSL

1 Pyrene is used as a surrogate

Exceedances of the minimum screening criteria for PAHs were widespread throughout the site. Eleven PAHs were detected at the ten subsurface sampling locations. Dibenzo(a,h)anthracene was detected least frequently in subsurface soil samples, and was not detected at NTC12-SB24 from 0.5 to 2 feet bgs, NTC12-SB29 from 2 to 4 feet bgs, or NTC12-SB30 from 0.5 to 2 feet bgs. The majority of the maximum PAH concentrations were at NTC12-SB28 in the sample from 2 to 4 feet bgs, located near the northwest corner of the site. Sampling location NTC12-SB24 from 0.5 to 2 feet bgs, at the southeast corner of the site along the shoreline, had the overall lowest PAH concentrations.

4.3.2.4 SVOCs (non-PAHs)

The table below presents a summary of SVOC (non-PAHs) contaminants detected at concentrations exceeding the minimum screening criteria. The SVOC concentrations exceeding criteria at each boring location are shown on Figure 4-14.

SVOC Exceedances in Subsurface Soil

Parameter	Frequency of Detection	Maximum Result (µg/kg)	Qualifier	Sample with Maximum Detection	Minimum Screening Criteria		
					Criteria (µg/kg)	Exceedances	Source
Carbazole	2/10	1080	J	NTC12-SB28-0204	600	1	TACO soil to groundwater
Dibenzofuran	3/10	1140		NTC12-SB28-0204	110	3	Risk-based SSL

Exceedances of the minimum screening criteria for SVOCs (non-PAHs) were at three locations. The concentration of carbazole exceeded criteria in the sample from NTC12-SB28 (2 to 4 feet bgs, northwest). The concentrations of dibenzofuran exceeded criteria in three samples [NTC12 SB21 (5 to 7 feet bgs, southwest), NTC12-SB26 (4 to 6 feet bgs, central), and NTC12-SB28 (2 to 4 feet bgs, northwest)]. The concentrations detected in these samples are shown on Table 4-6.

4.3.2.5 SPLP Metals

The table below presents a summary of SPLP metals contaminants that were detected at concentrations exceeding Illinois EPA TACO and Non-TACO Soil to Groundwater Remediation Objectives (Illinois EPA, 2013a). The SPLP metals concentrations exceeding criteria at each boring location are shown on Figure 4-11.

SPLP Metal Exceedances in Subsurface Soil

Parameter	Frequency of Detection	Maximum Result (µg/L)	Qualifier	Sample with Maximum Detection	Minimum Screening Criteria		
					Criteria (µg/L)	Exceedances	Source
Aluminum	8/8	10000	J	NTC-SB33-0406	3500	2	Non-TACO Soil to GW Class I
Antimony	7/8	30	J	NTC-SB32-0406	10	3	TACO Soil to GW Class I
Iron	7/8	13000		NTC-SB33-0406	5000	3	TACO Soil to GW Class I
Lead	7/8	150	J	NTC-SB33-0406	7.5	5	TACO Soil to GW Class I
Manganese	8/8	360	J	NTC-SB33-0406	150	2	TACO Soil to GW Class I

µg/L - microgram per liter

Leachate samples exceeded groundwater screening criteria for several metals. Maximum concentrations of several metals in leachate samples were from NTC-SB33-0406, which was located adjacent to the location of the majority of the maximum metals results detected in subsurface soil samples (NTC12-SB26 from 4 to 6 feet bgs, located at the center of the site).

4.4 SOIL RESULTS COMPARISON TO TACO INGESTION AND INHALATION REMEDIATION OBJECTIVES

TACO guidance includes levels of metals and PAHs in background soil; however, these levels were not considered in the following discussion. The HHRA included an evaluation of background levels as discussed in Section 6.7.2.3.

4.4.1 Surface Soil Results Comparison

Four PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene), three pesticides (alpha-chlordane, gamma-chlordane, and heptachlor), and one metal (arsenic) were detected at concentrations above TACO ingestion and/or inhalation Remediation Objectives (residential and/or industrial/commercial). Concentrations of benzo(a)pyrene and arsenic exceeded TACO industrial/commercial values. No SVOCs (non-PAHs) were detected at concentrations above TACO criteria. In addition, mercury concentrations exceeded the construction worker TACO inhalation SSL. The chemical exceedances of TACO residential and industrial/commercial criteria in surface soil are shown on Figure 4-15. Eight of the ten surface soil sampling locations had TACO exceedances. Soil sampling locations NTC12-SB30 and NTC12-SB24, at the edge of the site along the shoreline, did not have any TACO ingestion and/or inhalation Remediation Objectives (residential and/or industrial/commercial) exceedances.

Benzo(a)anthracene

Benzo(a)anthracene was detected at concentrations that exceeded the TACO residential ingestion Soil Remediation Objective value of 900 µg/kg at 3 of 10 surface soil sampling locations.

Benzo(a)pyrene

Benzo(a)pyrene was detected at concentrations that exceeded the TACO residential ingestion Soil Remediation Objective value of 90 µg/kg at 8 of 10 surface soil sampling locations. The exceedances were at most of the sampling locations except the two shoreline sampling locations, NTC12-SB24 and NTC12-SB30. Benzo(a)pyrene was detected at concentrations that exceeded the TACO industrial/commercial ingestion Soil Remediation Objective value of 800 µg/kg at 4 of 10 surface soil sampling locations.

Benzo(b)flouranthene

Benzo(b)flouranthene was detected at concentrations that exceeded the TACO residential ingestion Soil Remediation Objective value of 900 µg/kg at 4 of 10 surface soil sampling locations.

Dibenzo(a,h)anthracene

Dibenzo(a,h)anthracene was detected at concentrations that exceeded the TACO residential ingestion Soil Remediation Objective value of 90 µg/kg at 4 of 10 surface soil sampling locations.

Alpha-Chlordane and Gamma-Chlordane (Pesticide)

Alpha-Chlordane (3200 µg/kg) and gamma-chlordane (2600 µg/kg) were detected at concentrations that exceeded the TACO residential ingestion Soil Remediation Objective value of 1800 µg/kg at 1 of 10 surface soil sampling locations, NTC12-SB25.

Heptachlor (Pesticide)

Heptachlor exceeded the TACO residential ingestion Soil Remediation Objective value of 100 µg/kg at 1 of 10 surface soil sampling locations, NTC12-SB25, at a value of 236 µg/kg.

Arsenic

Arsenic exceeded the TACO residential and industrial/commercial ingestion Soil Remediation Objective value of 13 mg/kg at 2 of 10 surface soil sampling locations. The Soil Remediation Objective for arsenic is based on background concentrations.

Mercury

Mercury exceeded the TACO construction inhalation Soil Remediation Objective value of 0.1 mg/kg at 6 of 10 surface soil sampling locations. However, the mercury Soil Remediation Objective for inhalation is based on elemental mercury. Inhalation Remediation Objective only applies at sites where elemental mercury is a contaminant of concern and elemental mercury is not expected to be present at the site.

4.4.2 Subsurface Soil Results Comparison

Five PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene) and two metals (arsenic and lead) were detected at concentrations above TACO ingestion and/or inhalation Remediation Objectives (residential and/or industrial/commercial). Detected concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, arsenic, and lead were greater than TACO industrial/commercial values. No pesticides, PCBs, or SVOCs (excluding PAHs) were detected at concentrations that exceeded TACO criteria. In addition, lead concentrations exceeded the construction worker TACO ingestion Soil Remediation Objective and mercury concentrations exceeded the construction worker TACO inhalation Soil Remediation Objective. The exceedances of TACO residential and industrial/commercial criteria in subsurface soil are shown on Figure 4-16.

Leachate data for subsurface soil samples exceeded TACO Class I Soil to Groundwater Remediation Objectives for potable groundwater resources for antimony, iron, lead, and manganese.

Benzo(a)anthracene

Benzo(a)anthracene was detected at concentrations that exceeded the TACO residential ingestion Soil Remediation Objective value of 900 µg/kg at 3 of 10 subsurface soil sampling locations and the TACO industrial/commercial ingestion Soil Remediation Objective value of 8000 µg/kg at one subsurface soil sampling location (NTC12-SB28).

Benzo(a)pyrene

Benzo(a)pyrene was detected at concentrations that exceeded the TACO residential ingestion Soil Remediation Objective value of 90 µg/kg at 6 of 10 subsurface soil sampling locations and the TACO industrial/commercial ingestion Soil Remediation Objective value of 800 µg/kg at three subsurface soil sampling locations.

Benzo(b)flouranthene

Benzo(b)fluoranthene was detected at concentrations that exceeded the TACO residential ingestion Soil Remediation Objective value of 900 µg/kg at 3 of 10 subsurface soil sampling locations and exceeded the TACO industrial/commercial ingestion Soil Remediation Objective value of 8000 µg/kg at one subsurface soil sampling location (NTC12-SB28).

Dibenzo(a,h)anthracene

Dibenzo(a,h)anthracene was detected at concentrations that exceeded the TACO residential ingestion Soil Remediation Objective value of 90 µg/kg at 5 of 10 subsurface soil sampling locations.

Indeno(1,2,3-cd)Pyrene

Indeno(1,2,3-cd)pyrene was detected at a concentration that exceeded the TACO residential ingestion Soil Remediation Objective value of 900 µg/kg at 1 of 10 subsurface soil sampling locations (NTC12-SB28, 1330 µg/kg).

Arsenic

Arsenic was detected at concentrations that exceeded the TACO residential and industrial/commercial ingestion Soil Remediation Objective value of 13 mg/kg at 3 of 10 subsurface soil sampling locations. The Soil Remediation Objective for arsenic is based on its background concentration.

Lead

Lead was detected at a concentration that exceeded the TACO residential ingestion Soil Remediation Objective value of 400 mg/kg, the TACO construction worker ingestion Soil Remediation Objective value of 700 mg/kg, and the TACO industrial/commercial ingestion Soil Remediation Objective value of 800 mg/kg at 1 of 10 subsurface soil sampling locations (i.e., NTC12SB29 at a concentration of 845 J mg/kg).

Mercury

Mercury exceeded the TACO construction inhalation Soil Remediation Objective value of 0.1 mg/kg at 6 of 10 subsurface soil sampling locations. However, the mercury Soil Remediation Objective for inhalation is based on elemental mercury. Inhalation Remediation Objective only applies at sites where elemental mercury is a contaminant of concern and elemental mercury is not expected to be present at the site.

SPLP metals

SPLP metals leachate concentrations exceeded TACO Class I Soil to Groundwater Remediation Objectives for antimony (6 µg/L) in 5 samples, iron (5000 µg/L) in 3 samples, lead (7.5 µg/L) in 5 samples, and manganese (150 µg/L) in 2 samples. However, exposure to groundwater at Site 12 is not expected to occur under current and/or future land uses because the facility and the area surrounding the facility are supplied by public water, the facility has a groundwater use restriction in place, and there are no drinking water wells located on the site or immediately downgradient of the site.

4.5 GROUNDWATER DATA

The Site 12 RI required the collection of groundwater for analysis of metals based on the potential for chemicals in the soil to migrate to the groundwater. However, as discussed above, exposure to groundwater at Site 12 is not expected to occur. Several field parameters were measured during groundwater sampling as presented in Table 4-7. The groundwater PALs are set at the lowest risk-based or human health screening criteria appropriate for the site. The groundwater PALs for this investigation are as follows:

- USEPA, 2013. RSLs for Chemical Contaminants at Superfund Sites, Tapwater values, November.
- USEPA, 2012a. Maximum Contaminant Level (MCLs).
- Illinois EPA, 2013a. TACO and Non-TACO values. Class I and Class II values from TACO Section 742 Table E, Tier 1 Groundwater Remediation Objectives.

- 35 IAC, 2013. Groundwater Standards for Class I and Class II. Sections 620.410 and 620.420. Effective October 5, 2012 (Section 620.410), October 7, 2013 (Section 620.420). Accessed November 12, 2013.

Groundwater analytical results were compared to TACO, IAC, USEPA, and MCL screening criteria, as shown in Table 4-8 – Groundwater Screening Values.

4.5.1 Groundwater Results

The statistical summary of groundwater results for Site 12 is presented in Table 4-9. The number of groundwater samples that exceed the different screening criteria is identified for each chemical. The analytical results for groundwater samples collected and analyzed at Site 12 are summarized in Table 4-10 – Summary of Positive Detections in Groundwater. Concentrations that exceed the minimum screening criteria are shaded. Groundwater sample locations are shown on Figure 3-1. Detailed groundwater analytical results are provided in Appendix E.

4.5.1.1 Field Parameters

The results for field parameters measured during groundwater samples are presented in Table 4-7. Dissolved oxygen was not present at a measurable level (0.00 mg/L) in the groundwater samples. The measured ORP was 6 mV a NTC12-MW01, -56 mV from NTC12-MW02, -134 mV from NTC12-MW03, and -145 mV from NTC12-MW04, indicating that reducing conditions are present in the area of the fill material compared to upgradient location (i.e., NTC12-MW01).

It is suspected that the cause for the reducing conditions is the expected high organic content of the dredge spoils deposited on site or plant debris in the soil/fill material. The high organic content and plant debris would be subject to biodegradation and after the dissolved oxygen is consumed anaerobic microorganisms would degrade the organic content and plant debris. This anaerobic biological activity would cause the reducing conditions.

4.5.1.2 Metals

The table below presents a summary of metals contaminants detected at maximum concentrations exceeding the minimum screening criteria. The metals concentrations exceeding criteria at each monitoring well are shown on Figure 4-17.

Total Metal Exceedances in Groundwater

Parameter	Frequency of Detection	Maximum Result (µg/L)	Qualifier	Location with Maximum Detection	Minimum Screening Criteria		
					Criteria (µg/L)	Exceedances	Source
Arsenic	3/4	78		NTC12MW04	0.045	3	USEPA RSL
Chromium	4/4	0.81	J	NTC12MW01	0.031	4	USEPA RSL
Cobalt	4/4	7		NTC12MW02	4.7	1	USEPA RSL
Iron	4/4	19000		NTC12MW04	5000	2	IAC and TACO
Manganese	4/4	740	J	NTC12MW04	150	4	IAC and TACO

Dissolved Metal Exceedances in Groundwater

Parameter	Frequency of Detection	Maximum Result (µg/L)	Qualifier	Location with Maximum Detection	Minimum Screening Criteria		
					Criteria (µg/L)	Exceedances	Source
Arsenic	3/4	71		NTC12MW04	0.045	3	USEPA RSL
Cobalt	4/4	9		NTC12MW02	4.7	1	USEPA RSL
Iron	4/4	18000		NTC12MW04	5000	2	IAC and TACO
Manganese	4/4	670	J	NTC12MW04	150	4	IAC and TACO

Only a few total and dissolved metals exceeded the minimum screening criteria. Except for chromium, which was not detected in filtered samples, the same total and dissolved metals had concentrations that exceeded the minimum screening criteria. Maximum concentrations for several metals were from monitoring well NTC12MW04, which is located to the southeast of the site.

Concentrations of some metals, particularly arsenic, iron, and manganese were detected in groundwater at elevated concentrations in samples from monitoring wells NTC12-MW02 to NTC12-MW04 compared to monitoring well NTC12-MW01, which was located upgradient of the site. The groundwater samples with elevated concentrations of these metals correspond to monitoring wells with low ORP results (Table 4-7). Therefore, it appears that groundwater at the site flows into a reductive zone, mobilizing some of the metals and resulting in elevated metals concentrations in groundwater.

Concentrations of some metals (arsenic and cobalt) which exceeded groundwater screening criteria were less than groundwater screening criteria in subsurface soil leachate samples. Concentrations of iron and manganese exceeded groundwater screening criteria in both groundwater and subsurface soil leachate samples.

4.5.2 Groundwater Results Comparison to 35 IAC 620 Groundwater Standards (Class I and Class II)

Three total and dissolved metals (arsenic, iron, and manganese) were detected at concentration above 35 IAC 620 Class I Groundwater Standards, which are for potable groundwater resources. The metal exceedances in groundwater are shown on Figure 4-17. As previously discussed, groundwater is not used for drinking water. 35 IAC 620 Class II Groundwater Standards are appropriate for general groundwater resources. Only total and dissolved iron concentrations exceeded the 35 IAC 620 Class II Groundwater Standard.

Arsenic was detected at concentrations that exceeded the 35 IAC 620 Class I Groundwater Standard of 10 µg/L in two of four groundwater samples analyzed for total metals and dissolved metals.

Iron was detected at concentrations that exceeded the 35 IAC 620 Class I and Class II Groundwater Standard of 5000 µg/L in two of four groundwater samples analyzed for total and dissolved metals.

Manganese was detected at concentrations that exceeded the 35 IAC 620 Class I Groundwater Standard of 150 µg/L in the four groundwater samples analyzed for total and dissolved metals.

4.6 HARBOR SEDIMENT DATA

This section compares site soil (surface and subsurface) concentrations and sediment concentrations in Lake Michigan near the site to evaluate whether the concentrations are similar. Chemical concentrations in subsurface soil, likely composed of lake dredge spoils based on available information were compared to concentrations in lake sediment. In addition, surface soil concentrations, likely composed of land-based fill, were compared to sediment concentrations to determine if the surface soil could impact the lake sediment if it eroded and was deposited into the lake. This evaluation was completed even though erosion is not expected to be a significant migration concern because there is substantial vegetation cover over the site soil. No sediment samples were collected at Site 12, but proximal sediment samples were presented in this evaluation.

Sediment samples were collected in the outer harbor by Weston Solutions in 2006 and 2007 as part of the NSGL's harbor dredging project. Sediment samples collected near Site 12 are representative of chemical concentrations present in Lake Michigan adjacent to the site. Samples collected from locations closest to Site 12 include samples 1, 2, and 11 collected in 2006 and sample 37 collected in 2007. Samples 1, 11, and 37 were comprised of sand and were collected from a depth of 3 to 5 feet. Sample 2 was comprised of muck and was collected from a depth of 2 to 7 feet. Appendix E presents the analytical results for the sediment samples along with a map showing the sample locations. Few organic chemicals

were detected in the sediment samples. Table 4-11 presents a comparison of metals concentrations in surface soil and subsurface soil from Site 12 and maximum sediment concentrations from the selected samples. Surface soil samples are likely composed of land-based fill material, while subsurface soil samples are likely composed of lake dredge spoils. Therefore, a comparison between subsurface soil and sediment concentrations is more applicable then a comparison between surface soil and sediment concentrations. However, both comparisons are discussed in this section. Most maximum surface soil and subsurface soil concentrations exceeded the maximum sediment concentrations. Maximum concentrations of sodium and vanadium in surface soil were less than sediment concentrations. Maximum concentrations of calcium, magnesium, selenium, and sodium in subsurface soil were less than sediment concentrations. Average surface soil concentrations of cadmium, calcium, iron, magnesium, manganese, potassium, sodium, and vanadium were less than maximum sediment concentrations. Average subsurface soil concentrations of calcium, magnesium, potassium, selenium, sodium, and vanadium were less than maximum sediment concentrations. Antimony, selenium, and thallium were not detected in sediment samples. These three metals were detected in surface soil samples and antimony and selenium were detected in subsurface soil samples. In summary, greater metals concentrations were generally found in soil samples compared to sediment samples.

4.7 SUMMARY

The soil along the shoreline consists of poorly sorted lake dredge beach sand. The sand was present beneath the fill at soil sampling locations at Site 12. The land-based fill material ranged from a depth of 2.5 feet bgs at NTC12-SB22 to a depth of 7.0 feet bgs at soil boring locations NTC12-SB21, NTC12-SB23, and NTC12-SB27. The lithology is shown in the boring logs in Appendix B-2 and illustrated on Figures 4-3 and 4-4. Five soil samples were collected and analyzed in the lake dredge soil (see Table 3-2).

Both soil and groundwater sampling was conducted during the RI. In addition, leachate from subsurface soil samples was evaluated to determine metal contaminants that could potentially migrate to groundwater. Groundwater was generally not considered a media of concern because NSGL and the communities surrounding the base use a public water supply that obtains water from Lake Michigan. NSGL also has an ordinance that does not allow the use of groundwater and a Memorandum of Agreement with Illinois EPA that restricts the use of groundwater. The shallow groundwater at Site 12 is less than 10 feet bgs and generally flows eastward towards the lake. Groundwater was sampled to determine if metal contaminants in the soil had leached and impacted the groundwater and potentially migrated to surface water (Lake Michigan).

The soil analytical results indicate that contamination is distributed throughout Site 12. The soil sample locations along the shoreline have lower concentrations of chemicals of potential concern (COPCs) than

sample locations within the pre-1990 boundary. The contamination is most likely from the land-based fill material used to fill in Site 12. The concentrations of COPCs in the lake dredge soil along the shoreline is an order of magnitude lower than the land-based fill material found further inland at Site 12. COPCs are present directly above the shallow aquifer and SPLP leachate results indicate that several metals are potentially mobile.

The initial screening of the surface and subsurface soil analytical results against the minimum screening criteria (PALs), as presented in Section 4.3, identified a number of contaminants in the soil that may be impacting Site 12. Metals, pesticides, PAHs, and non-PAH SVOCs were identified in the surface soil and metals, pesticides, PCBs, PAHs, and non-PAH SVOCs were identified in the subsurface soil. However, as presented in Section 4.4, when the soil results were screened against the TACO residential and industrial/commercial ingestion and inhalation screening criteria, only PAHs, pesticides (alpha-chlordane, gamma-chlordane, heptachlor), arsenic and lead were identified as potential issues in surface and subsurface soil. In addition, lead in subsurface soil and mercury in surface soil and subsurface soil were identified as potential issues when screened against TACO construction screening criteria. However, the inhalation screening criterion which mercury concentrations exceeded only applies at sites where elemental mercury is a concern and elemental mercury is not expected to be present. Antimony, iron, lead, and manganese were also identified as potential soil to groundwater mobility issues.

The initial screening of groundwater analytical results against the minimum screening criteria (PALs), as presented in Section 4.5, identified a few metals in the groundwater that may be impacting Site 12. Only three total and dissolved metals (arsenic, iron, and manganese) were identified as potential issues in groundwater based on comparison to 35 IAC Class I Groundwater Standards as presented in Section 4.5.2. The 35 IAC Class I Groundwater Standards are to protect potable groundwater resources. Of the metals exceeding Class I standards, only total and dissolved iron exceeded the 35 IAC Class II Groundwater Standard for general groundwater resources. It appears that groundwater at the site flows into a reductive zone, mobilizing some of the metals and resulting in elevated metals concentrations in groundwater based on ORP results.

TABLE 4-1

AQUIFER TEST RESULTS
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Monitoring Well	Northing	Easting	Elevation Top of PVC (feet above msl)	Existing Ground Elevation (feet above msl)	Total Depth	Screen Depth	Screen Elevation	Sandpack Depth	Sandpack Elevation	Hydraulic Conductivity (ft/day)	Hydraulic Conductivity (cm/sec)
NTC12-MW01	2054223.250	1119276.260	589.760	590.15	14.00	3.50 - 13.50	586.65 - 576.65	2.00 - 14.00	588.15 - 576.15	5.78	2.04E-03
NTC12-MW02	2054364.190	1119468.280	584.860	585.19	14.50	4.00 - 14.00	581.19 - 571.19	2.00 - 14.50	583.19 - 570.69	17.74	6.26E-03
NTC12-MW03	2054278.170	1119581.470	580.970	581.27	13.50	3.00 - 13.00	578.27 - 568.27	2.00 - 13.50	579.27 - 567.77	4.64	1.64E-03
NTC12-MW04	2054133.780	1119621.760	582.250	582.58	13.50	3.00 - 13.00	579.58 - 569.58	2.00 - 13.50	580.58 - 569.08	10.96	3.87E-03

Geometric Mean	8.50	3.00E-03
Arithmetic Mean	9.78	3.45E-03

Notes:
1. Rising head slug tests completed in selected wells were analyzed by Hvorslev, M.J. (1951).
2. Elevations were obtained by surveyor Graef.
3. Northing and Easting Coordinates according to North American Datum 83.
4. Vertical Elevations according to North American Vertical Datum 88.

TABLE 4-2

SOIL SCREENING VALUES
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

PARAMETER	TACO RESIDENTIAL INHALATION		TACO RESIDENTIAL INGESTION		TACO INDUSTRIAL INHALATION		TACO INDUSTRIAL INGESTION		TACO CONSTRUCTION WORKER INHALATION SSLs		TACO CONSTRUCTION WORKER INGESTION SSLs		TACO CLASS 1 SOIL TO GROUNDWATER CRITERIA *		MIN TACO SOIL CRITERIA		NON-TACO RESIDENTIAL INHALATION		NON-TACO RESIDENTIAL INGESTION		NON-TACO INDUSTRIAL INHALATION		NON-TACO INDUSTRIAL INGESTION		NON-TACO CONSTRUCTION WORKER INHALATION SSLs		NON-TACO CONSTRUCTION WORKER INGESTION SSLs		NON-TACO CLASS 1 SOIL TO GROUNDWATER CRITERIA		MIN NON-TACO SOIL CRITERIA	
METALS (MG/KG)																																
ALUMINUM	NC		NC		NC		NC		NC		NC		NC		NC		1000000	N	78000	N	1000000	N	1000000	N	870000	N	200000	N	NC		78000	RES ING
ANTIMONY	NC		31	N	NC		820	N	NC		82	N	5	(11)	5	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
ARSENIC	750	C	13	(3)	1200	C	13	(3)	25000	C	61	N	30	(11, 12)	13	RES ING, IND ING	NC		NC		NC		NC		NC		NC		NC		NC	
BARIUM	690000	N	5500	N	910000	N	140000	N	870000	N	14000	N	1800	(11)	1800	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
BERYLLIUM	1300	C	160	N	2100	C	4100	N	44000	C	410	N	1000	(11)	160	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
CADMIUM	1800	C	78	N	2800	C	2000	N	59000	C	200	N	59	(11)	59	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
CALCIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
CHROMIUM	270	C	230	N	420	C	6100	N	690	N	4100	N	32	(11)	32	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
COBALT	NC		4700	N	NC		120000	N	NC		12000	N	NC		4700	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
COPPER	NC		2900	N	NC		82000	N	NC		8200	N	330000	(11)	2900	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
IRON	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
LEAD	NC		400		NC		800		NC		700		107	(11)	107	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
MAGNESIUM	NC		325000		NC		NC		NC		730000		NC		325000	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
MANGANESE	69000	N	1600	N	91000	N	41000	N	8700	N	4100	N	NC		1600	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
MERCURY	10	N	23	N	16	N	610	N	0.1	N	61	N	6.4	(11)	0.1	CW INH	NC		NC		NC		NC		NC		NC		NC		NC	
NICKEL	13000	C	1600	N	21000	C	41000	N	440000	C	4100	N	700	(11)	700	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
POTASSIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
SELENIUM	NC		390	N	NC		10000	N	NC		1000	N	3.3	(11)	3.3	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
SILVER	NC		390	N	NC		10000	N	NC		1000	N	39	(11)	39	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
SODIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
THALLIUM	NC		6.3	N	NC		160	N	NC		160	N	3.4	(11)	3.4	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
VANADIUM	NC		550	N	NC		14000	N	NC		1400	N	980	(11)	550	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
ZINC	NC		23000	N	NC		610000	N	NC		61000	N	16000	(11)	23000	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
PESTICIDES (UG/KG)																																
4,4'-DDD	NC		3000	C	NC		24000	C	NC		520000	C	16000		3000	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
4,4'-DDE	NC		2000	C	NC		17000	C	NC		370000	C	54000		2000	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
4,4'-DDT	NC		2000	C	1500000	C	17000	C	2100000	C	100000	N	32000		2000	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
ALDRIN	3000	C	40	C	6600	C	300	C	9300	C	6100	N	500		40	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
ALPHA-BHC	800	C	100	C	1500	C	900	C	2100	C	20000	C	0.5		0.5	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
ALPHA-CHLORDANE	72000	C	1800	C	140000	C	16000	C	22000	N	100000	N	10000		1800	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
BETA-BHC	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
DELTA-BHC[10]	800	C	100	C	1500	C	900	C	2100	C	20000	C	0.5		0.5	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
DIELDRIN	1000	C	40	C	2200	C	400	C	3100	C	7800	C	4		4	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
ENDOSULFAN I[4]	NC		470000	N	NC		12000000	N	NC		1200000	N	18000		18000	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
ENDOSULFAN II[4]	NC		470000	N	NC		12000000	N	NC		1200000	N	18000		18000	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
ENDOSULFAN SULFATE[4]	NC		470000	N	NC		12000000	N	NC		1200000	N	18000		18000	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
ENDRIN	NC		23000	N	NC		610000	N	NC		61000	N	1000		1000	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
ENDRIN ALDEHYDE[5]	NC		23000	N	NC		610000	N	NC		61000	N	1000		1000	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
ENDRIN KETONE[5]	NC		23000	N	NC		610000	N	NC		61000	N	1000		1000	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
GAMMA-BHC (LINDANE)	NC		500	C	NC		4000	C	NC		96000	C	9		9	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
GAMMA-CHLORDANE	72000	C	1800	C	140000	C	16000	C	22000	N	100000	N	10000		1800	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
HEPTACHLOR	100	C	100	C	11000	C	1000	C	16000	C	28000	C	23000		100	RES INH, RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
HEPTACHLOR EPOXIDE	5000	C	70	C	9200	C	600	C	13000	C	2700	N	700		70	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
METHOXYCHLOR	NC		390000	N	NC		10000000	N	NC		1000000	N	160000		160000	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
PCBS (UG/KG)																																
AROCLOR-1254	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
POLYNUCLEAR AROMATIC HYDROCARBONS (UG/KG)																																
2-METHYLNAPHTHALENE	NC		NC		NC		NC		NC		NC		NC		NC		NC		310000	N	NC		8200000	N	NC		820000	N	1900		NC	
ACENAPHTHENE	NC		4700000	N	NC		1.2E+08	N	NC		1.2E+08	N	570000		570000	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
ACENAPHTHYLENE	NC		NC		NC		NC		NC		NC		NC		NC		NC		2300000	N	NC		61000000	N	NC		61000000	N	85000	N	85000	SO TO GW
ANTHRACENE	NC		23000000	N	NC		6.1E+08	N	NC		6.1E+08	N	12000000		12000000	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
BENZO(A)ANTHRACENE	NC		900	C	NC		8000	C	NC		170000	C	2000		900	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
BENZO(A)PYRENE	NC		90	C	NC		800	C	NC		17000	C	8000		90	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
BENZO(B)FLUORANTHENE	NC		900	C	NC		8000	C	NC		170000	C	5000		900	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
BENZO(G,H,I)PERYLENE	NC		NC		NC		NC		NC		NC		NC		NC		NC		2300000	N	NC		61000000	N	NC		61000000	N	27000000	N	2300000	RES ING
BENZO(K)FLUORANTHENE	NC		9000	C	NC		78000	C	NC		1700000	C	49000		9000	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
CHRYSENE	NC		88000	C	NC		780000	C	NC		17000000	C	160000		88000	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
DIBENZO(A,H)ANTHRACENE	NC		90	C	NC		800	C	NC		17000	C	2000		90	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
FLUORANTHENE	NC		3100000	N	NC		82000000	N	NC		82000000	N	4300000		3100000	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
FLUORENE	NC		3100000	N	NC		82000000	N	NC		82000000	N	560000		560000	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
INDENO(1,2,3-CD)PYRENE	NC		900	C	NC		8000	C	NC		170000	C	14000		900	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
NAPHTHALENE	170000	N	1600000	N	270000	N	41000000	N	1800	N	4100000	N	12000		1800	CW INH	NC		NC		NC		NC		NC		NC		NC		NC	
PHENANTHRENE	NC		NC		NC		NC		NC		NC		NC		NC		NC		2300000	N	NC		61000000	N	NC		61000000	N	210000	N	200000	SO TO GW
PYRENE	NC		2300000	N	NC		61000000	N	NC		61000000	N	4200000		2300000	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	

TABLE 4-2

SOIL SCREENING VALUES
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

PARAMETER	TACO RESIDENTIAL INHALATION		TACO RESIDENTIAL INGESTION		TACO INDUSTRIAL INHALATION		TACO INDUSTRIAL INGESTION		TACO CONSTRUCTION WORKER INHALATION SSLs		TACO CONSTRUCTION WORKER INGESTION SSLs		TACO CLASS 1 SOIL TO GROUNDWATER CRITERIA *		MIN TACO SOIL CRITERIA		NON-TACO RESIDENTIAL INHALATION		NON-TACO RESIDENTIAL INGESTION		NON-TACO INDUSTRIAL INHALATION		NON-TACO INDUSTRIAL INGESTION		NON-TACO CONSTRUCTION WORKER INHALATION SSLs		NON-TACO CONSTRUCTION WORKER INGESTION SSLs		NON-TACO CLASS 1 SOIL TO GROUNDWATER CRITERIA		MIN NON-TACO SOIL CRITERIA	
SEMIVOLATILES (UG/KG)																																
4-METHYLPHENOL	NC		NC		NC		NC		NC		NC		NC		NC		1E+08	N	7800000	N	1.7E+08	N	2E+08	N	3300000	N	4100000	N	3900	N	3900	SO TO GW
BIS(2-ETHYLHEXYL)PHTHALATE	31000000	SAT	46000	C	31000000	SAT	410000	C	31000000	SAT	4100000	N	3600000		46000	RES ING	NC		NC		NC		NC		NC		NC		NC		NC	
CARBAZOLE	NC		32000	C	NC		290000	C	NC		6200000	C	600		600	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
DIBENZOFURAN	NC		NC		NC		NC		NC		NC		NC		NC		NC		78000	N	NC		2000000	N	NC		820000	N	3000	N	3000	SO TO GW
PHENOL	NC		23000000	N	NC		6.1E+08	N	NC		61000000	N	100000		100000	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
SPLP METALS (UG/L)																																
ALUMINUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		3500		3500	SO TO GW
ANTIMONY	NC		NC		NC		NC		NC		NC		6		6	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
ARSENIC	NC		NC		NC		NC		NC		NC		50	(13)	50	SO TO GW(13)	NC		NC		NC		NC		NC		NC		NC		NC	
BARIUM	NC		NC		NC		NC		NC		NC		2000		2000	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
BERYLLIUM	NC		NC		NC		NC		NC		NC		4		4	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
CADMIUM	NC		NC		NC		NC		NC		NC		5		5	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
CALCIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
CHROMIUM	NC		NC		NC		NC		NC		NC		100		100	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
COBALT	NC		NC		NC		NC		NC		NC		1000		1000	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
COPPER	NC		NC		NC		NC		NC		NC		650		650	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
IRON	NC		NC		NC		NC		NC		NC		5000		5000	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
LEAD	NC		NC		NC		NC		NC		NC		7.5		7.5	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
MAGNESIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
MANGANESE	NC		NC		NC		NC		NC		NC		150		150	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
MERCURY	NC		NC		NC		NC		NC		NC		2		2	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
NICKEL	NC		NC		NC		NC		NC		NC		100		100	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
POTASSIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
SELENIUM	NC		NC		NC		NC		NC		NC		50		50	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
SILVER	NC		NC		NC		NC		NC		NC		50		50	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
SODIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
THALLIUM	NC		NC		NC		NC		NC		NC		2		2	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
VANADIUM	NC		NC		NC		NC		NC		NC		49		49	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	
ZINC	NC		NC		NC		NC		NC		NC		5000		5000	SO TO GW	NC		NC		NC		NC		NC		NC		NC		NC	

TABLE 4-2

SOIL SCREENING VALUES
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

PARAMETER	USEPA RESIDENTIAL SOIL RSLs[1]		USEPA INDUSTRIAL SOIL RSLs		USEPA RISK BASED SSLs - MIGRATION TO GROUNDWATER		USEPA MCL BASED SSLs - MIGRATION TO GROUNDWATER		USEPA RESIDENTIAL INHALATION SSLs[2]		USEPA INDUSTRIAL INHALATION SSLs[2]		USEPA CONSTRUCTION WORKER INGESTION SSLs[2]		USEPA CONSTRUCTION WORKER INHALATION SSLs[2]		USEPA RISK BASED SSLs - USEPA MIGRATION TO GROUNDWATER DAF 15		USEPA MCL BASED SSLs - USEPA MIGRATION TO GROUNDWATER DAF 15		MINIMUM USEPA SOIL CRITERIA		OVERALL MINIMUM SOIL CRITERIA	
METALS (MG/KG)																								
ALUMINUM	77000	N	990000	N	23000		NC		7100000	N	33000000	N	310000	N	18000	N	345000		NC		18000	CW INH	18000	USEPA CW INH
ANTIMONY	31	N	410	N	0.27		0.27		NC		NC		120	N	NC		4.05		4.05		0.27	MCL BASED SSL	0.27	USEPA MCL BASED SSL
ARSENIC	0.61	C	2.4	C	0.0013		0.29		770	C	4300	C	13	C	53	C	0.0195		4.35		0.0013	RISK BASED SSL	0.0013	USEPA RISK BASED SSL
BARIUM	15000	N	190000	N	120		82		710000	N	3300000	N	62000	N	1800	N	1800		1230		82	MCL BASED SSL	82	USEPA MCL BASED SSL
BERYLLIUM	160	N	2000	N	13		3.2		1400	C	7700	C	620	N	71	N	195		48		3.2	MCL BASED SSL	3.2	USEPA MCL BASED SSL
CADMIUM	70	N	800	N	0.52		0.38		1800	C	10000	C	280	N	36	N	7.8		5.7		0.38	MCL BASED SSL	0.38	USEPA MCL BASED SSL
CALCIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
CHROMIUM	0.29	C[9]	5.6	C[9]	0.00059	[9]	180000		39	C[9]	220	C[9]	43	C[9]	3	C[9]	0.00885	[9]	2700000		0.00059	RISK BASED SSL	0.00059	USEPA RISK BASED SSL
COBALT	23	N	300	N	0.21		NC		370	C	2100	C	93	N	21	N	3.15		NC		0.21	RISK BASED SSL	0.21	USEPA RISK BASED SSL
COPPER	3100	N	41000	N	22		46		NC		NC		12000	N	NC		330		690		22	RISK BASED SSL	22	USEPA RISK BASED SSL
IRON	55000	N	720000	N	270		NC		NC		NC		220000	N	NC		4050		NC		270	RISK BASED SSL	270	USEPA RISK BASED SSL
LEAD	400	N	800	N	NC		14		NC		NC		NC		NC		NC		210		14	MCL BASED SSL	14	USEPA MCL BASED SSL
MAGNESIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		325000	TACO RES ING
MANGANESE	1800	N	23000	N	21		NC		71000	N	330000	N	74000	N	180	N	315		NC		21	RISK BASED SSL	21	USEPA RISK BASED SSL
MERCURY	23	N[6]	310	N[6]	0.033		0.1		4300000	N[6]	2000000	N[6]	93	N[6]	1100	N[6]	0.495		1.5		0.033	RISK BASED SSL	0.033	USEPA RISK BASED SSL
NICKEL	1500	N	20000	N	20		NC		13000	C	71000	C	6200	N	NC		300		NC		20	RISK BASED SSL	20	USEPA RISK BASED SSL
POTASSIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
SELENIUM	390	N	5100	N	0.4		0.26		28000000	N	130000000	N	1500	N	71000	N	6		3.9		0.26	MCL BASED SSL	0.26	USEPA MCL BASED SSL
SILVER	390	N	5100	N	0.6		NC		NC		NC		1500	N	NC		9		NC		0.6	RISK BASED SSL	0.6	USEPA RISK BASED SSL
SODIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
THALLIUM	0.78	N	10	N	0.011		0.14		NC		NC		3.1	N	NC		0.165		2.1		0.011	RISK BASED SSL	0.011	USEPA RISK BASED SSL
VANADIUM	390	N	5200	N	63		NC		140000	N	660000	N	1500	N	360	N	945		NC		63	RISK BASED SSL	63	USEPA RISK BASED SSL
ZINC	23000	N	310000	N	290		NC		NC		NC		93000	N	NC		4350		NC		290	RISK BASED SSL	290	USEPA RISK BASED SSL
PESTICIDES (UG/KG)																								
4,4'-DDD	2000	C	7200	C	6.4		NC		48000000	C	270000000	C	69000	C	3600000	C	96		NC		6.4	RISK BASED SSL	6.4	USEPA RISK BASED SSL
4,4'-DDE	1400	C	5100	C	46		NC		34000000	C	190000000	C	49000	C	2600000	C	690		NC		46	RISK BASED SSL	46	USEPA RISK BASED SSL
4,4'-DDT	1700	C	7000	C	67		NC		34000000	C	190000000	C	58000	C	2600000	C	1005		NC		67	RISK BASED SSL	67	USEPA RISK BASED SSL
ALDRIN	29	C	100	C	0.65		NC		680000	C	3800000	C	980	C	51000	C	9.75		NC		0.65	RISK BASED SSL	0.65	USEPA RISK BASED SSL
ALPHA-BHC	77	C	270	C	0.036		NC		1800000	C	10000000	C	2600	C	140000	C	0.54		NC		0.036	RISK BASED SSL	0.036	USEPA RISK BASED SSL
ALPHA-CHLORDANE	1600	C	6500	C	13		140		33000000	C	190000000	C	55000	C	2500000	N	195		2100		13	RISK BASED SSL	13	USEPA RISK BASED SSL
BETA-BHC	270	C	960	C	0.13		NC		6200000	C	35000000	C	9300	C	470000	C	1.95		NC		0.13	RISK BASED SSL	0.13	USEPA RISK BASED SSL
DELTA-BHC[10]	77	C	270	C	0.036		NC		1800000	C	10000000	C	2600	C	140000	C	0.54		NC		0.036	RISK BASED SSL	0.036	USEPA RISK BASED SSL
DIELDRIN	30	C	110	C	0.061		NC		720000	C	4000000	C	1000	C	54000	C	0.915		NC		0.061	RISK BASED SSL	0.061	USEPA RISK BASED SSL
ENDOSULFAN I[4]	370000	N	3700000	N	1100		NC		NC		NC		1400000	N	NC		16500		NC		1100	RISK BASED SSL	1100	USEPA RISK BASED SSL
ENDOSULFAN II[4]	370000	N	3700000	N	1100		NC		NC		NC		1400000	N	NC		16500		NC		1100	RISK BASED SSL	1100	USEPA RISK BASED SSL
ENDOSULFAN SULFATE[4]	370000	N	3700000	N	1100		NC		NC		NC		1400000	N	NC		16500		NC		1100	RISK BASED SSL	1100	USEPA RISK BASED SSL
ENDRIN	18000	N	180000	N	68		81		NC		NC		71000	N	NC		1020		1215		68	RISK BASED SSL	68	USEPA RISK BASED SSL
ENDRIN ALDEHYDE[5]	18000	N	180000	N	68		81		NC		NC		71000	N	NC		1020		1215		68	RISK BASED SSL	68	USEPA RISK BASED SSL
ENDRIN KETONE[5]	18000	N	180000	N	68		81		NC		NC		71000	N	NC		1020		1215		68	RISK BASED SSL	68	USEPA RISK BASED SSL
GAMMA-BHC (LINDANE)	520	C	2100	C	0.21		1.2		11000000	C	60000000	C	18000	C	800000	C	3.15		18		0.21	RISK BASED SSL	0.21	USEPA RISK BASED SSL
GAMMA-CHLORDANE	1600	C	6500	C	13		140		33000000	C	190000000	C	55000	C	2500000	N	195		2100		13	RISK BASED SSL	13	USEPA RISK BASED SSL
HEPTACHLOR	110	C	380	C	0.14		33		2500000	C	14000000	C	3700	C	190000	C	2.1		495		0.14	RISK BASED SSL	0.14	USEPA RISK BASED SSL
HEPTACHLOR EPOXIDE	53	C	190	C	0.068		4.1		1300000	C	7100000	C	1800	C	96000	C	1.02		61.5		0.068	RISK BASED SSL	0.068	USEPA RISK BASED SSL
METHOXYCHLOR	310000	N	3100000	N	1500		2200		NC		NC		1200000	N	NC		22500		33000		1500	MCL BASED SSL	1500	USEPA MCL BASED SSL
PCBS (UG/KG)																								
AROCLOR-1254	220	C	740	C	8.8		NC		5800000	C	33000000	C	4400	N	440000	N	132		NC		8.8	RISK BASED SSL	8.8	USEPA RISK BASED SSL
POLYNUCLEAR AROMATIC HYDROCARBONS (UG/KG)																								
2-METHYLNAPHTHALENE	230000	N	2200000	N	140		NC		NC		NC		890000	N	NC		2100		NC		140	RISK BASED SSL	140	USEPA RISK BASED SSL
ACENAPHTHENE	3400000	N	33000000	N	4100		NC		NC		NC		13000000	N	NC		61500		NC		4100	RISK BASED SSL	4100	USEPA RISK BASED SSL
ACENAPHTHYLENE	3400000	N[7]	33000000	N[7]	4100	[7]	NC		NC		NC		13000000	N[7]	NC		61500	[7]	NC		4100	RISK BASED SSL	4100	USEPA RISK BASED SSL
ANTHRACENE	17000000	N	1.7E+08	N	42000		NC		NC		NC		67000000	N	NC		630000		NC		4200	RISK BASED SSL	4200	USEPA RISK BASED SSL
BENZO(A)ANTHRACENE	150	C	2100	C	10		NC		30000000	C	170000000	C	21000	C	2300000	C	150		NC		10	RISK BASED SSL	10	USEPA RISK BASED SSL
BENZO(A)PYRENE	15	C	210	C	3.5		240		3000000	C	17000000	C	2100	C	230000	C	52.5		3600		3.5	RISK BASED SSL	3.5	USEPA RISK BASED SSL
BENZO(B)FLUORANTHENE	150	C	2100	C	35		NC		30000000	C	170000000	C	21000	C	2300000	C	525		NC		35	RISK BASED SSL	35	USEPA RISK BASED SSL
BENZO(G,H,I)PERYLENE	1700000	N[8]	17000000	N[8]	9500	[8]	NC		NC		NC		6700000	N[8]	NC		142500	[8]	NC		9500	RISK BASED SSL	9500	USEPA RISK BASED SSL
BENZO(K)FLUORANTHENE	1500	C	21000	C	350		NC		30000000	C	170000000	C	210000	C	2300000	C	5250		NC		350	RISK BASED SSL	350	USEPA RISK BASED SSL
CHRYSENE	15000	C	210000	C	1100		NC		3E+08	C	1700000000	C	2100000	C	23000000	C	16500		NC		1100	RISK BASED SSL	1100	USEPA RISK BASED SSL
DIBENZO(A,H)ANTHRACENE	15	C	210	C	11		NC		2800000	C	15000000	C	2100	C	210000	C	165		NC		11	RISK BASED SSL	11	USEPA RISK BASED SSL
FLUORANTHENE	2300000	N	22000000	N	70000		NC		NC		NC		8900000	N	NC		1050000		NC		70000	RISK BASED SSL	70000	USEPA RISK BASED SSL
FLUORENE	2300000	N	22000000	N	4000		NC		NC		NC		8900000	N	NC		60000		NC		4000	RISK BASED SSL	4000	USEPA RISK BASED SSL
INDENO(1,2,3-CD)PYRENE	150	C	2100	C	200		NC		30000000	C	170000000	C	21000	C	2300000	C	3000		NC		150	RISK BASED SSL	150	USEPA RISK BASED SSL
NAPHTHALENE	3600	C	18000	C	0.47		NC		3600	C	20000	C	4500000	N	31000	C	7.05		NC		0.47	RISK BASED SSL	0.47	USEPA RISK BASED SSL
PHENANTHRENE	1700000	N[8]	17000000	N[8]	9500	[8]	NC		NC		NC		6700000	N[8]	NC		142500	[8]	NC		9500	RISK BASED SSL	9500	USEPA RISK BASED SSL
PYRENE	1700000	N	17000000	N	9500		NC		NC		NC		6700000	N	NC		142500		NC		9500	RISK BASED SSL	9500	USEPA RISK BASED SSL

TABLE 4-2

SOIL SCREENING VALUES
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

PARAMETER	USEPA RESIDENTIAL SOIL RSLs[1]		USEPA INDUSTRIAL SOIL RSLs		USEPA RISK BASED SSLs - MIGRATION TO GROUNDWATER		USEPA MCL BASED SSLs - MIGRATION TO GROUNDWATER		USEPA RESIDENTIAL INHALATION SSLs[2]		USEPA INDUSTRIAL INHALATION SSLs[2]		USEPA CONSTRUCTION WORKER INGESTION SSLs[2]		USEPA CONSTRUCTION WORKER INHALATION SSLs[2]		USEPA RISK BASED SSLs - USEPA MIGRATION TO GROUNDWATER DAF 15		USEPA MCL BASED SSLs - USEPA MIGRATION TO GROUNDWATER DAF 15		MINIMUM USEPA SOIL CRITERIA		OVERALL MINIMUM SOIL CRITERIA	
SEMIVOLATILES (UG/KG)																								
4-METHYLPHENOL	6100000	N	62000000	N	1100		NC		8.5E+11	N	4E+12	N	24000000	N	2.1E+09	N	16500		NC		1100	RISK BASED SSL	1100	USEPA RISK BASED SSL
BIS(2-ETHYLHEXYL)PHTHALATE	35000	C	120000	C	1100		1400		1.4E+09	C	7700000000	C	1200000	C	1E+08	C	16500		21000		1100	RISK BASED SSL	1100	USEPA RISK BASED SSL
CARBAZOLE	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		600	TACO SO TO GW
DIBENZOFURAN	78000	N	1000000	N	110		NC		NC		NC		310000	N	NC		1650		NC		110	RISK BASED SSL	110	USEPA RISK BASED SSL
PHENOL	18000000	N	1.8E+08	N	2600		NC		2.8E+11	N	1.3E+12	N	71000000	N	7.1E+08	N	39000		NC		2600	RISK BASED SSL	2600	USEPA RISK BASED SSL
SPLP METALS (UG/L)																								
ALUMINUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		3500	NON-TACO SO TO GW
ANTIMONY	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		6	TACO SO TO GW
ARSENIC	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		50	TACO SO TO GW[13]
BARIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		2000	TACO SO TO GW
BERYLLIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		4	TACO SO TO GW
CADMIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		5	TACO SO TO GW
CALCIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
CHROMIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		100	TACO SO TO GW
COBALT	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		1000	TACO SO TO GW
COPPER	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		650	TACO SO TO GW
IRON	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		5000	TACO SO TO GW
LEAD	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		7.5	TACO SO TO GW
MAGNESIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
MANGANESE	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		150	TACO SO TO GW
MERCURY	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		2	TACO SO TO GW
NICKEL	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		100	TACO SO TO GW
POTASSIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
SELENIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		50	TACO SO TO GW
SILVER	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		50	TACO SO TO GW
SODIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
THALLIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		2	TACO SO TO GW
VANADIUM	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		49	TACO SO TO GW
ZINC	NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		5000	TACO SO TO GW

Footnotes:
1 - USEPA SSL ingestion values for the residential and industrial/commercial worker scenarios were considered but not presented as the USEPA residential RSLs cover the same pathway and are more restrictive.
2 - SSLs for the migration of chemicals from soil to air were calculated by Tetra Tech using the methodology and equations presented in the Supplemental Guidance For Developing Soil Screening Levels for Superfund Sites, OSWER 93355.4-24, December 2002 and online at http://rais.ornl.gov/epa/ssl1.shtml since these values are more
3 - Background value provided in TACO Appendix A, Table G (Illinois EPA, 2013a).
4 - Values for endosulfan.
5 - Values for endrin.
6 - Values for mercuric chloride (and other mercury salts).
7 - Values for acenaphthene.
8 - Values for pyrene.
9 - Values for hexavalent chromium.
10 - Values for alpha-BHC.
11 - Values are pH-specific (7.25-7.74) from TACO Appendix B, Table C (Illinois EPA, 2013a).
12 - Forthcoming criteria revisions (not yet available) will decrease this value.
13 - 35 IAC 620 Class I groundwater standard for arsenic is 10 µg/L.
* Illinois Tiered Approach to Corrective Action Objectives; Soil Component of Groundwater Ingestion Class 1 in mg/kg for soil pH of 7.58 and 7.6 obtained from IDW laboratory results as presented in Appendix C.

Sources:
USEPA, 2013. Residential Regional Screening Levels (RSLs) for Chemical Contaminants in Soil at Superfund Sites, developed by Oak Ridge National Laboratory (ORNL). November.
Illinois EPA, 2013a. Tiered Approach to Corrective Action Objectives. TACO and Non-TACO screening criteria. Accessed September 2013.

Abbreviations:
C = Carcinogen
CW = Construction worker
DAF 15 = Dilution Attenuation Factor of 15; selected based on information from USEPA soil screening guidance (USEPA, 1996a) and a source area of 1.75 acres.
IND = Industrial
ING = Ingestion
INH = Inhalation
MCL = Maximum Contaminant Level
mg/kg = Milligram per kilogram
N = Non-carcinogen
NC = No criteria
RES = Residential
SO TO GW = Soil to Groundwater
SSL = Soil Screening Level
TACO = Illinois Tiered Approach to Corrective Action Objectives
USEPA = United States Environmental Protection Agency
ug/kg = Microgram per kilogram
ug/L = Microgram per liter

TABLE 4-3

OCCURRENCE AND DISTRIBUTION OF ORGANICS AND METALS IN SURFACE SOIL
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS
PAGE 1 OF 2

PARAMETER	FREQUENCY OF DETECTION	MINIMUM RESULT	MAXIMUM RESULT	LOCATION OF MAXIMUM DETECT	MINIMUM NON-DETECT	MAXIMUM NON-DETECT	AVERAGE POSITIVE RESULT	OVERALL AVERAGE	STANDARD DEVIATION
METALS (MG/KG)									
ALUMINUM	10/10	1250	10000	NTC12SB27			5966	5966	3283
ANTIMONY	3/10	0.44 J	1.12 J	NTC12SB29	0.858	0.982	0.673	0.524	0.21
ARSENIC	10/10	4.28 J	16.9 J	NTC12SB25			9.07	9.07	4.04
BARIUM	10/10	8.12 J	244 J	NTC12SB21			72	72	70
BERYLLIUM	10/10	0.147 J	5.5	NTC12SB27			0.943	0.943	1.63
CADMIUM	10/10	0.119 J	1.03 J	NTC12SB29			0.554	0.554	0.284
CALCIUM	10/10	24400	142000	NTC12SB23			71190	71190	34982
CHROMIUM	10/10	4.07 J	23.8 J	NTC12SB27			12	12	6.18
COBALT	10/10	2.08	11.2	NTC12SB27			7.09	7.09	3.54
COPPER	10/10	6.55	271	NTC12SB27			68	68	77
IRON	10/10	4710	20300	NTC12SB27			13028	13028	5924
LEAD	10/10	17.9 J	263 J	NTC12SB29			86	86	73
MAGNESIUM	10/10	11100	84600	NTC12SB23			39770	39770	22168
MANGANESE	10/10	137	701	NTC12SB29			446	446	215
MERCURY	10/10	0.0235 J	0.598	NTC12SB26			0.177	0.177	0.173
NICKEL	10/10	4.49	34.7	NTC12SB27			19	19	11
POTASSIUM	10/10	230 J	1640	NTC12SB27			1034	1034	509
SELENIUM	7/10	0.288 J	0.791	NTC12SB29	0.536	0.614	0.525	0.453	0.19
SILVER	8/10	0.234 J	1.33	NTC12SB29	0.222	0.246	0.555	0.467	0.372
SODIUM	10/10	75.3 J	336 J	NTC12SB29			201	201	101
THALLIUM	1/10	0.167 J	0.167 J	NTC12SB29	0.446	0.644	0.167	0.241	0.042
VANADIUM	10/10	4.53	18.9	NTC12SB27			13	13	5.65
ZINC	10/10	44.7 J	1530 J	NTC12SB27			324	324	436
PESTICIDES (UG/KG)									
4,4'-DDD	10/10	2.92	195	NTC12SB25			39	39	58
4,4'-DDE	10/10	1.29	197	NTC12SB25			78	78	76
4,4'-DDT	9/10	1.28 J	282	NTC12SB25	0.782	0.782	89	80	92
ALDRIN	5/10	0.374 J	20.8	NTC12SB25	0.694	0.782	4.95	2.66	6.39
ALPHA-BHC	3/10	0.509 J	1.1	NTC12SB25	0.694	0.782	0.75	0.487	0.234
ALPHA-CHLORDANE	10/10	0.14 J	3220	NTC12SB25			353	353	1010
BETA-BHC	2/10	0.702 J	6.55	NTC12SB25	0.694	0.798	3.63	1.03	1.94
DELTA-BHC	9/10	0.151 J	4.65	NTC12SB25	0.756	0.756	1.7	1.57	1.48
DIELDRIN	8/10	0.246 J	16.6	NTC12SB25	0.756	0.782	3.1	2.55	4.98
ENDOSULFAN I	3/10	1.17	36.8	NTC12SB25	0.694	0.798	14	4.32	11
ENDOSULFAN II	7/10	0.24 J	53.5	NTC12SB25	0.728	0.756	8.29	5.92	17
ENDOSULFAN SULFATE	5/10	0.691 J	12.1	NTC12SB25	0.694	0.782	3.97	2.17	3.67
ENDRIN	7/10	0.74 J	22.6	NTC12SB27	0.728	0.782	8.37	5.97	7.68
ENDRIN ALDEHYDE	6/10	0.66 J	19.5	NTC12SB25	0.694	0.782	4.56	2.89	5.96
ENDRIN KETONE	1/10	1.14	1.14	NTC12SB25	0.694	0.798	1.14	0.453	0.242
GAMMA-BHC (LINDANE)	4/10	0.144 J	0.6 J	NTC12SB29	0.694	0.782	0.388	0.379	0.126
GAMMA-CHLORDANE	10/10	0.309 J	2600	NTC12SB25			281	281	816
HEPTACHLOR	4/10	0.18 J	236	NTC12SB25	0.694	0.798	61	24	74
HEPTACHLOR EPOXIDE	7/10	0.122 J	64	NTC12SB25	0.694	0.782	12	8.62	20
METHOXYCHLOR	3/10	0.383 J	3.04 J	NTC12SB26	0.694	0.798	1.34	0.664	0.838
POLYNUCLEAR AROMATIC HYDROCARBONS (UG/KG)									
2-METHYLNAPHTHALENE	10/10	4.77 J	87.9	NTC12SB29			34	34	28
ACENAPHTHENE	10/10	2.96 J	205	NTC12SB27			50	50	68
ACENAPHTHYLENE	8/10	4.21 J	98.1	NTC12SB21	7.22	7.92	52	42	37
ANTHRACENE	10/10	8.45	606	NTC12SB27			206	206	231
BENZO(A)ANTHRACENE	10/10	29.3	1830	NTC12SB21			573	573	603
BENZO(A)PYRENE	10/10	21.8	1460	NTC12SB27			618	618	564
BENZO(B)FLUORANTHENE	10/10	31.8	2260	NTC12SB27			748	748	707
BENZO(G,H,I)PERYLENE	10/10	13.5	711	NTC12SB21			290	290	257
BENZO(K)FLUORANTHENE	10/10	14.1 J	2280	NTC12SB21			543	543	712
CHRYSENE	10/10	38.5	1530	NTC12SB21			529	529	509
DIBENZO(A,H)ANTHRACENE	9/10	14	287	NTC12SB21	7.22	7.22	125	113	109
FLUORANTHENE	10/10	74.3	4290	NTC12SB21			1333	1333	1415
FLUORENE	9/10	5.63 J	254	NTC12SB27	7.22	7.22	69	63	85
INDENO(1,2,3-CD)PYRENE	10/10	12.8	674	NTC12SB21			276	276	246
NAPHTHALENE	10/10	4.25 J	91.5	NTC12SB27			30	30	25
PHENANTHRENE	10/10	56.4	2370	NTC12SB21			732	732	847
PYRENE	10/10	66	3190	NTC12SB21			1098	1098	1103
SEMIVOLATILES (UG/KG)									
BIS(2-ETHYLHEXYL)PHTHALATE	1/10	149 J	149 J	NTC12SB25	346	398	149	185	15
CARBAZOLE	2/10	167 J	254 J	NTC12SB21	346	398	211	192	24
DIBENZOFURAN	1/10	144 J	144 J	NTC12SB27	346	398	144	184	16

PARAMETER	TACO RESIDENTIAL INHALATION			TACO RESIDENTIAL INGESTION			TACO INDUSTRIAL INHALATION			TACO INDUSTRIAL INGESTION			TACO CONSTRUCTION WORKER INHALATION SSLs			TACO CONSTRUCTION WORKER INGESTION SSLs			TACO CLASS 1 SOIL TO GROUNDWATER CRITERIA[1]			MIN TACO CRITERIA		
METALS (MG/KG)																								
ALUMINUM	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
ANTIMONY	NC		0	31	N	0	NC		0	820	N	0	NC		0	82	N	0	5		0	5	SO TO GW	0
ARSENIC	750	C	0	13		1	1200	C	0	13		1	25000	C	0	61	N	0	30	(2)	0	13	RES ING, IND ING	1
BARIUM	690000	N	0	5500	N	0	910000	N	0	140000	N	0	870000	N	0	14000	N	0	1800		0	1800	SO TO GW	0
BERYLLIUM	1300	C	0	160	N	0	2100	C	0	4100	N	0	44000	C	0	410	N	0	1000		0	160	RES ING	0
CADMIUM	1800	C	0	78	N	0	2800	C	0	2000	N	0	59000	C	0	200	N	0	59		0	59	SO TO GW	0
CALCIUM	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
CHROMIUM	270	C	0	230	N	0	420	C	0	6100	N	0	690	N	0	4100	N	0	32		0	32	SO TO GW	0
COBALT	NC		0	4700	N	0	NC		0	120000	N	0	NC		0	12000	N	0	NC		0	4700	RES ING	0
COPPER	NC		0	2900	N	0	NC		0	82000	N	0	NC		0	8200	N	0	330000		0	2900	RES ING	0
IRON	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
LEAD	NC		0	400		0	NC		0	800		0	NC		0	700		0	107		2	107	SO TO GW	2
MAGNESIUM	NC		0	325000		0	NC		0	NC		0	NC		0	730000		0	NC		0	325000	RES ING	0
MANGANESE	69000	N	0	1600	N	0	91000	N	0	41000	N	0	8700	N	0	4100	N	0	NC		0	1600	RES ING	0
MERCURY	10	N	0	23	N	0	16	N	0	610	N	0	0.1	N	6	61	N	0	6.4		0	0.1	CW INH	6
NICKEL	13000	C	0	1600	N	0	21000	C	0	41000	N	0	440000	C	0	4100	N	0	700		0	700	SO TO GW	0
POTASSIUM	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
SELENIUM	NC		0	390	N	0	NC		0	10000	N	0	NC		0	1000	N	0	3.3		0	3.3	SO TO GW	0
SILVER	NC		0	390	N	0	NC		0	10000	N	0	NC		0	1000	N	0	39		0	39	SO TO GW	0
SODIUM	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
THALLIUM	NC		0	6.3	N	0	NC		0	160	N	0	NC		0	160	N	0	3.4		0	3.4	SO TO GW	0
VANADIUM	NC		0	550	N	0	NC		0	14000	N	0	NC		0	1400	N	0	980		0	550	RES ING	0
ZINC	NC		0	23000	N	0	NC		0	610000	N	0	NC		0	61000	N	0	16000		0	23000	RES ING	0
PESTICIDES (UG/KG)																								
4,4'-DDD	NC		0	3000	C	0	NC		0	24000	C	0	NC		0	520000	C	0	16000		0	3000	RES ING	0
4,4'-DDE	NC		0	2000	C	0	NC		0	17000	C	0	NC		0	370000	C	0	54000		0	2000	RES ING	0
4,4'-DDT	NC		0	2000	C	0	1500000	C	0	17000	C	0	2100000	C	0	100000	N	0	32000		0	2000	RES ING	0
ALDRIN	3000	C	0	40	C	0	6600	C	0	300	C	0	9300	C	0	6100	N	0	500		0	40	RES ING	0
ALPHA-BHC	800	C	0	100	C	0	1500	C	0	900	C	0	2100	C	0	20000	C	0	0.5		3	0.5	SO TO GW	3
ALPHA-CHLORDANE	72000	C	0	1800	C	1	140000	C	0	16000	C	0	22000	N	0	100000	N	0	10000		0	1800	RES ING	1
BETA-BHC	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
DELTA-BHC	800	C	0	100	C	0	1500	C	0	900	C	0	2100	C	0	20000	C	0	0.5		7	0.5	SO TO GW	7
DIELDRIN	1000	C	0	40	C	0	2200	C	0	400	C	0	3100	C	0	7800	C	0	4		1	4	SO TO GW	1
ENDOSULFAN I	NC		0	470000	N	0	NC		0	12000000	N	0	NC		0	1200000	N	0	18000		0	18000	SO TO GW	0
ENDOSULFAN II	NC		0	470000	N	0	NC		0	12000000	N	0	NC		0	1200000	N	0	18000		0	18000	SO TO GW	0
ENDOSULFAN SULFATE	NC		0	470000	N	0	NC		0	12000000	N	0	NC		0	1200000	N	0	18000		0	18000	SO TO GW	0
ENDRIN	NC		0	23000	N	0	NC		0	610000	N	0	NC		0	61000	N	0	1000		0	1000	SO TO GW	0
ENDRIN ALDEHYDE	NC		0	23000	N	0	NC		0	610000	N	0	NC		0	61000	N	0	1000		0	1000	SO TO GW	0
ENDRIN KETONE	NC		0	23000	N	0	NC		0	610000	N	0	NC		0	61000	N	0	1000		0	1000	SO TO GW	0
GAMMA-BHC (LINDANE)	NC		0	500	C	0	NC		0	4000	C	0	NC		0	96000	C	0	9		0	9	SO TO GW	0
GAMMA-CHLORDANE	72000	C	0	1800	C	1	140000	C	0	16000	C	0	22000	N	0	100000	N	0	10000		0	1800	RES ING	1
HEPTACHLOR	100	C	1	100	C	1	11000	C	0	1000	C	0	16000	C	0	28000	C	0	23000		0	100	RES INH, RES ING	1
HEPTACHLOR EPOXIDE	5000	C	0	70	C	0	9200	C	0	600	C	0	13000	C	0	2700	N	0	700		0	70	RES ING	0
METHOXYCHLOR	NC		0	390000	N	0	NC		0	10000000	N	0	NC		0	1000000	N	0	160000		0	160000	SO TO GW	0
POLYNUCLEAR AROMATIC HYDROCARBONS (UG/KG)																								
2-METHYLNAPHTHALENE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
ACENAPHTHENE	NC		0	4700000	N	0	NC		0	120000000	N	0	NC		0	120000000	N	0	570000		0	570000	SO TO GW	0
ACENAPHTHYLENE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
ANTHRACENE	NC		0	23000000	N	0	NC		0	610000000	N	0	NC		0	610000000	N	0	12000000		0	12000000	SO TO GW	0
BENZO(A)ANTHRACENE	NC		0	900	C	3	NC		0	8000	C	0	NC		0	170000	C	0	2000		0	900	RES ING	3
BENZO(A)PYRENE	NC		0	90	C	8	NC		0	800	C	4	NC		0	17000	C	0	8000		0	90	RES ING	8
BENZO(B)FLUORANTHENE	NC		0	900	C	4	NC		0	8000	C	0	NC		0	170000	C	0	5000		0	900	RES ING	4
BENZO(G,H,I)PERYLENE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
BENZO(K)FLUORANTHENE	NC		0	9000	C	0	NC		0	78000	C	0	NC		0	1700000	C	0	49000		0	9000	RES ING	0
CHRYSENE	NC		0	88000	C	0	NC		0	780000	C	0	NC		0	17000000	C	0	160000		0	88000	RES ING	0
DIBENZO(A,H)ANTHRACENE	NC		0	90	C	4	NC		0	800	C	0	NC		0	17000	C	0	2000		0	90	RES ING	4
FLUORANTHENE	NC		0	3100000	N	0	NC		0	82000000	N	0	NC		0	82000000	N	0	4300000		0	3100000	RES ING	0
FLUORENE	NC		0	3100000	N	0	NC		0	82000000	N	0	NC		0	82000000	N	0	560000		0	560000	SO TO GW	0
INDENO(1,2,3-CD)PYRENE	NC		0	900	C	0	NC		0	8000	C	0	NC		0	170000	C	0	14000		0	900	RES ING	0
NAPHTHALENE	170000	N	0	1600000	N	0	270000	N	0	41000000	N	0	1800	N	0	4100000	N	0	12000		0	1800	CW INH	0
PHENANTHRENE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
PYRENE	NC		0	2300000	N	0	NC		0	61000000	N	0	NC		0	61000000	N	0	4200000		0	2300000	RES ING	0
SEMIVOLATILES (UG/KG)																								
BIS(2-ETHYLHEXYL)PHTHALATE	31000000	SAT	0	46000	C	0	31000000	SAT	0	410000	C	0	31000000	SAT	0	4100000	N	0	3600000		0	46000	RES ING	0
CARBAZOLE	NC		0	32000	C	0	NC		0	290000	C	0	NC		0	6200000	C	0	600		0	600	SO TO GW	0
DIBENZOFURAN	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0

PARAMETER	NON-TACO RESIDENTIAL INHALATION			NON-TACO RESIDENTIAL INGESTION			NON-TACO INDUSTRIAL INHALATION			NON-TACO INDUSTRIAL INGESTION			NON-TACO CONSTRUCTION WORKER INHALATION SSLs			NON-TACO CONSTRUCTION WORKER INGESTION SSLs			NON-TACO CLASS 1 SOIL TO GROUNDWATER CRITERIA			MIN NON-TACO CRITERIA		
METALS (MG/KG)																								
ALUMINUM	1000000	N	0	78000	N	0	1000000	N	0	1000000	N	0	870000	N	0	200000	N	0	NC		0	78000	RES ING	0
ANTIMONY	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
ARSENIC	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
BARIUM	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
BERYLLIUM	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
CADMIUM	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
CALCIUM	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
CHROMIUM	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
COBALT	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
COPPER	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
IRON	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
LEAD	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
MAGNESIUM	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
MANGANESE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
MERCURY	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
NICKEL	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
POTASSIUM	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
SELENIUM	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
SILVER	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
SODIUM	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
THALLIUM	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
VANADIUM	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
ZINC	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
PESTICIDES (UG/KG)																								
4,4'-DDD	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
4,4'-DDE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
4,4'-DDT	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
ALDRIN	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
ALPHA-BHC	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
ALPHA-CHLORDANE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
BETA-BHC	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
DELTA-BHC	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
DIELDRIN	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
ENDOSULFAN I	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
ENDOSULFAN II	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
ENDOSULFAN SULFATE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
ENDRIN	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
ENDRIN ALDEHYDE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
ENDRIN KETONE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
GAMMA-BHC (LINDANE)	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
GAMMA-CHLORDANE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
HEPTACHLOR	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
HEPTACHLOR EPOXIDE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
METHOXYCHLOR	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
POLYNUCLEAR AROMATIC HYDROCARBONS (UG/KG)																								
2-METHYLNAPHTHALENE	NC		0	310000	N	0	NC		0	8200000	N	0	NC		0	820000	N	0	1900		0	NC	SO TO GW	0
ACENAPHTHENE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
ACENAPHTHYLENE	NC		0	2300000	N	0	NC		0	61000000	N	0	NC		0	61000000	N	0	85000	N	0	85000	SO TO GW	0
ANTHRACENE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
BENZO(A)ANTHRACENE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
BENZO(A)PYRENE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
BENZO(B)FLUORANTHENE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
BENZO(G,H,I)PERYLENE	NC		0	2300000	N	0	NC		0	61000000	N	0	NC		0	61000000	N	0	27000000	N	0	2300000	RES ING	0
BENZO(K)FLUORANTHENE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
CHRYSENE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
DIBENZO(A,H)ANTHRACENE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
FLUORANTHENE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
FLUORENE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
INDENO(1,2,3-CD)PYRENE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
NAPHTHALENE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
PHENANTHRENE	NC		0	2300000	N	0	NC		0	61000000	N	0	NC		0	61000000	N	0	210000	N	0	200000	SO TO GW	0
PYRENE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
SEMIVOLATILES (UG/KG)																								
BIS(2-ETHYLHEXYL)PHTHALATE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
CARBAZOLE	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0
DIBENZOFURAN	NC		0	78000	N	0	NC		0	2000000	N	0	NC		0	820000	N	0	3000	N	0	3000	SO TO GW	0

TABLE 4-3

OCCURRENCE AND DISTRIBUTION OF ORGANICS AND METALS IN SURFACE SOIL
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

PARAMETER	USEPA RESIDENTIAL SOIL RSLs			USEPA INDUSTRIAL SOIL RSLs			USEPA RISK BASED SSLs- MIGRATION TO GROUNDWATER			USEPA MCL BASED SSLs- MIGRATION TO GROUNDWATER			USEPA RESIDENTIAL INHALATION SSLs			USEPA INDUSTRIAL INHALATION SSLs			USEPA CONSTRUCTION WORKER INGESTION SSLs			USEPA CONSTRUCTION WORKER INHALATION SSLs			USEPA RISK BASED SSLs- MIGRATION TO GROUNDWATER DAF 15			USEPA MCL BASED SSLs- MIGRATION TO GROUNDWATER DAF 15			MINIMUM USEPA CRITERIA			OVERALL MINIMUM CRITERIA		
METALS (MG/KG)																																							
ALUMINUM	77000	N	0	990000	N	0	23000		0	NC		0	7100000	N	0	33000000	N	0	310000	N	0	18000	N	0	345000		0	NC		0	18000	CW INH	0	18000	USEPA CW INH	0
ANTIMONY	31	N	0	410	N	0	**0.27**	**3**	**0.27**	**3**	NC		0	NC		0	120	N	0	NC		0	4.05		0	4.05		0	**0.27**	**MCL BASED SSL**	**3**	**0.27**	**USEPA MCL BASED SSL**	**3**
ARSENIC	**0.61**	**C**	**10**	**2.4**	**C**	**10**	**0.0013**	**10**	**0.29**	**10**	770	C	0	4300	C	0	**13**	**C**	**1**	53	C	0	**0.0195**	**10**	**4.35**		**8**	**0.0013**	**RISK BASED SSL**	**10**	**0.0013**	**USEPA RISK BASED SSL**	**10**
BARIUM	15000	N	0	190000	N	0	**120**	**1**	**82**	**4**	710000	N	0	3300000	N	0	62000	N	0	1800	N	0	1800		0	1230		0	**82**	**MCL BASED SSL**	**4**	**82**	**USEPA MCL BASED SSL**	**4**
BERYLLIUM	160	N	0	2000	N	0	13		0	**3.2**	**1**	1400	C	0	7700	C	0	620	N	0	71	N	0	195		0	48		0	**3.2**	**MCL BASED SSL**	**1**	**3.2**	**USEPA MCL BASED SSL**	**1**
CADMIUM	70	N	0	800	N	0	**0.52**	**6**	**0.38**	**8**	1800	C	0	10000	C	0	280	N	0	36	N	0	7.8		0	5.7		0	**0.38**	**MCL BASED SSL**	**8**	**0.38**	**USEPA MCL BASED SSL**	**8**
CALCIUM	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC					0	NC		0
CHROMIUM	**0.29**	**C**	**10**	**5.6**	**C**	**7**	**0.00059**	**10**	180000	0	39	C	0	220	C	0	43	C	0	**3**	**C**	**10**	**0.00885**	**10**	2700000		0	**0.0006**	**RISK BASED SSL**	**10**	**0.0006**	**USEPA RISK BASED SSL**	**10**
COBALT	23	N	0	300	N	0	**0.21**	**10**	NC	0	370	C	0	2100	C	0	93	N	0	21	N	0	**3.15**	**7**	NC		0	**0.21**	**RISK BASED SSL**	**10**	**0.21**	**USEPA RISK BASED SSL**	**10**
COPPER	3100	N	0	41000	N	0	**22**	**7**	**46**	**6**	NC		0	NC		0	12000	N	0	NC		0	330		0	690		0	**22**	**RISK BASED SSL**	**7**	**22**	**USEPA RISK BASED SSL**	**7**
IRON	55000	N	0	720000	N	0	**270**	**10**	NC	0	NC		0	NC		0	220000	N	0	NC		0	**4050**	**10**	NC		0	**270**	**RISK BASED SSL**	**10**	**270**	**USEPA RISK BASED SSL**	**10**
LEAD	400	N	0	800	N	0	NC	0	**14**	**10**	NC		0	NC		0	NC		0	NC		0	NC		0	**210**	**1**	**14**	**MCL BASED SSL**	**10**	**14**	**USEPA MCL BASED SSL**	**10**
MAGNESIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	325000	TACO RES ING	0			
MANGANESE	1800	N	0	23000	N	0	**21**	**10**	NC	0	71000	N	0	330000	N	0	74000	N	0	**180**	**N**	**8**	**315**	**7**	NC		0	**21**	**RISK BASED SSL**	**10**	**21**	**USEPA RISK BASED SSL**	**10**
MERCURY	23	N	0	310	N	0	**0.033**	**9**	**0.1**	**6**	4300000	N	0	2000000	N	0	93	N	0	1100	N	0	**0.495**	**1**	1.5		0	**0.033**	**RISK BASED SSL**	**9**	**0.033**	**USEPA RISK BASED SSL**	**9**
NICKEL	1500	N	0	20000	N	0	**20**	**5**	NC	0	13000	C	0	71000	C	0	6200	N	0	NC		0	300		0	NC		0	**20**	**RISK BASED SSL**	**5**	**20**	**USEPA RISK BASED SSL**	**5**
POTASSIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC					0
SELENIUM	390	N	0	5100	N	0	**0.1**	**5**	**0.26**	**7**	28000000	N	0	130000000	N	0	1500	N	0	71000	N	0	6		0	3.9		0	**0.26**	**MCL BASED SSL**	**7**	**0.26**	**USEPA MCL BASED SSL**	**7**
SILVER	390	N	0	5100	N	0	**0.6**	**2**	NC	0	NC		0	NC		0	1500	N	0	NC		0	9		0	NC		0	**0.6**	**RISK BASED SSL**	**2**	**0.6**	**USEPA RISK BASED SSL**	**2**
SODIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC		0	NC					0
THALLIUM	0.78	N	0	10	N	0	**0.011**	**1**	**0.14**	**1**	NC		0	NC		0	3.1	N	0	NC		0	**0.165**	**1**	2.1		0	**0.011**	**RISK BASED SSL**	**1**	**0.011**	**USEPA RISK BASED SSL**	**1**
VANADIUM	390	N	0	5200	N	0	63	0	NC	0	140000	N	0	660000	N	0	1500	N	0	360	N	0	945	0	NC		0	63	RISK BASED SSL	0	63	USEPA RISK BASED SSL	0				
ZINC	23000	N	0	310000	N	0	**290**	**3**	NC	0	NC		0	NC		0	93000	N	0	NC		0	4350	0	NC		0	**290**	**RISK BASED SSL**	**3**	**290**	**USEPA RISK BASED SSL**	**3**
PESTICIDES (UG/KG)																																							
4,4'-DDD	2000	C	0	7200	C	0	**6.4**	**6**	NC	0	48000000	C	0	270000000	C	0	69000	C	0	3600000	C	0	**96**	**1**	NC		0	**6.4**	**RISK BASED SSL**	**6**	**6.4**	**USEPA RISK BASED SSL**	**6**
4,4'-DDE	1400	C	0	5100	C	0	**46**	**5**	NC	0	34000000	C	0	190000000	C	0	49000	C	0	2600000	C	0	690	0	NC		0	**46**	**RISK BASED SSL**	**5**	**46**	**USEPA RISK BASED SSL**	**5**
4,4'-DDT	1700	C	0	7000	C	0	**67**	**4**	NC	0	34000000	C	0	190000000	C	0	58000	C	0	2600000	C	0	1005	0	NC		0	**67**	**RISK BASED SSL**	**4**	**67**	**USEPA RISK BASED SSL**	**4**
ALDRIN	29	C	0	100	C	0	**0.65**	**3**	NC	0	680000	C	0	3800000	C	0	980	C	0	51000	C	0	**9.75**	**1**	NC		0	**0.65**	**RISK BASED SSL**	**3**	**0.65**	**USEPA RISK BASED SSL**	**3**
ALPHA-BHC	77	C	0	270	C	0	**0.036**	**3**	NC	0	1800000	C	0	10000000	C	0	2600	C	0	140000	C	0	**0.54**	**2**	NC		0	**0.036**	**RISK BASED SSL**	**3**	**0.036**	**USEPA RISK BASED SSL**	**3**
ALPHA-CHLORDANE	**1600**	**C**	**1**	6500	C	0	**13**	**3**	**140**	**2**	33000000	C	0	190000000	C	0	55000	C	0	2500000	N	0	**195**	**2**	**2100**		**1**	**13**	**RISK BASED SSL**	**3**	**13**	**USEPA RISK BASED SSL**	**3**
BETA-BHC	270	C	0	960	C	0	**0.13**	**2**	NC	0	6200000	C	0	35000000	C	0	9300	C	0	470000	C	0	**1.95**	**1**	NC		0	**0.13**	**RISK BASED SSL**	**2**	**0.13**	**USEPA RISK BASED SSL**	**2**
DELTA-BHC	77	C	0	270	C	0	**0.036**	**9**	NC	0	1800000	C	0	10000000	C	0	2600	C	0	140000	C	0	**0.54**	**7**	NC		0	**0.036**	**RISK BASED SSL**	**9**	**0.036**	**USEPA RISK BASED SSL**	**9**
DIELDRIN	30	C	0	110	C	0	**0.061**	**8**	NC	0	720000	C	0	4000000	C	0	1000	C	0	54000	C	0	**0.915**	**5**	NC		0	**0.061**	**RISK BASED SSL**	**8**	**0.061**	**USEPA RISK BASED SSL**	**8**
ENDOSULFAN I	370000	N	0	3700000	N	0	1100	0	NC	0	NC		0	NC		0	1400000	N	0	NC		0	16500	0	NC		0	1100	RISK BASED SSL	0	1100	USEPA RISK BASED SSL	0				
ENDOSULFAN II	370000	N	0	3700000	N	0	1100	0	NC	0	NC		0	NC		0	1400000	N	0	NC		0	16500	0	NC		0	1100	RISK BASED SSL	0	1100	USEPA RISK BASED SSL	0				
ENDOSULFAN SULFATE	370000	N	0	3700000	N	0	1100	0	NC	0	NC		0	NC		0	1400000	N	0	NC		0	16500	0	NC		0	1100	RISK BASED SSL	0	1100	USEPA RISK BASED SSL	0				
ENDRIN	18000	N	0	180000	N	0	68	0	81	0	NC		0	NC		0	71000	N	0	NC		0	1020	0	1215		0	68	RISK BASED SSL	0	68	USEPA RISK BASED SSL	0				
ENDRIN ALDEHYDE	18000	N	0	180000	N	0	68	0	81	0	NC		0	NC		0	71000	N	0	NC		0	1020	0	1215		0	68	RISK BASED SSL	0	68	USEPA RISK BASED SSL	0				
ENDRIN KETONE	18000	N	0	180000	N	0	68	0	81	0	NC		0	NC		0	71000	N	0	NC		0	1020	0	1215		0	68	RISK BASED SSL	0	68	USEPA RISK BASED SSL	0				
GAMMA-BHC (LINDANE)	520	C	0	2100	C	0	**0.21**	**3**	1.2	0	11000000	C	0	60000000	C	0	18000	C	0	800000	C	0	3.15	0	18		0	**0.21**	**RISK BASED SSL**	**3**	**0.21**	**USEPA RISK BASED SSL**	**3**
GAMMA-CHLORDANE	**1600**	**C**	**1**	6500	C	0	**13**	**3**	**140**	**2**	33000000	C	0	190000000	C	0	55000	C	0	2500000	N	0	**195**	**1**	**2100**		**1**	**13**	**RISK BASED SSL**	**3**	**13**	**USEPA RISK BASED SSL**	**3**
HEPTACHLOR	**110**	**C**	**1**	380	C	0	**0.14**	**4**	**33**	**1**	2500000	C	0	14000000	C	0	3700	C	0	190000	C	0	**2.1**	**2**	495		**0**	**0.14**	**RISK BASED SSL**	**4**	**0.14**	**USEPA RISK BASED SSL**	**4**
HEPTACHLOR EPOXIDE	**53**	**C**	**1**	190	C	0	**0.068**	**7**	**4.1**	**4**	1300000	C	0	7100000	C	0	1800	C	0	96000	C	0	**1.02**	**5**	**61.5**		**1**	**0.068**	**RISK BASED SSL**	**7**	**0.068**	**USEPA RISK BASED SSL**	**7**
METHOXYCHLOR	310000	N	0	3100000	N	0	1500	0	2200	0	NC		0	NC		0	1200000	N	0	NC		0	22500	0	33000		0	1500	MCL BASED SSL	0	1500	USEPA MCL BASED SSL	0				
POLYNUCLEAR AROMATIC HYDROCARBONS (UG/KG)																																							
2-METHYLNAPHTHALENE	230000	N	0	2200000	N	0	140	0	NC	0	NC		0	NC		0	890000	N	0	NC		0	2100	0	NC		0	140	RISK BASED SSL	0	140	USEPA RISK BASED SSL	0				
ACENAPHTHENE	3400000	N	0	33000000	N	0	4100	0	NC	0	NC		0	NC		0	13000000	N	0	NC		0	61500	0	NC		0	4100	RISK BASED SSL	0	4100	USEPA RISK BASED SSL	0				
ACENAPHTHYLENE	3400000	N	0	33000000	N	0	4100	0	NC	0	NC		0	NC		0	13000000	N	0	NC		0	61500	0	NC		0	4100	RISK BASED SSL	0	4100	USEPA RISK BASED SSL	0				
ANTHRACENE	17000000	N	0	170000000	N	0	42000	0	NC	0	NC		0	NC		0	67000000	N	0	NC		0	630000	0	NC		0	4200	RISK BASED SSL	0	4200	USEPA RISK BASED SSL	0				
BENZO(A)ANTHRACENE	**150**	**C**	**7**	2100	C	0	**10**	**10**	NC	0	30000000	C	0	170000000	C	0	21000	C	0	2300000	C	0	**150**	**7**	NC		0	**10**	**RISK BASED SSL**	**10**	**10**	**USEPA RISK BASED SSL**	**10**
BENZO(A)PYRENE	**15**	**C**	**10**	**210**	**C**	**7**	**3.5**	**10**	**240**	**6**	3000000	C	0	17000000	C	0	2100	C	0	230000	C	0	**52.5**	**9**	3600		0	**3.5**	**RISK BASED SSL**	**10**	**3.5**	**USEPA RISK BASED SSL**	**10**
BENZO(B)FLUORANTHENE	**150**	**C**	**7**	**2100**	**C**	**1**	**35**	**9**	NC	0	30000000	C	0	170000000	C	0	21000	C	0	2300000	C	0	**525**	**5**	NC		0	**35**	**RISK BASED SSL**	**9**	**35**	**USEPA RISK BASED SSL**	**9**
BENZO(G,H,I)PERYLENE	1700000	N	0	17000000	N	0	9500	0	NC	0	NC		0	NC		0	6700000	N	0	NC		0	142500	0	NC		0	9500	RISK BASED SSL	0	9500	USEPA RISK BASED SSL	0				
BENZO(K)FLUORANTHENE	**1500**	**C**	**1**	21000	C	0	**350**	**4**	NC	0	30000000	C	0	170000000	C	0	210000	C	0	2300000	C	0	5250	0	NC		0	**350**	**RISK BASED SSL**	**4**	**350**	**USEPA RISK BASED SSL**	**4**
CHRYSENE	15000	C	0	210000	C	0	**1100**	**1**	NC	0	300000000	C	0	1700000000	C	0	2100000	C	0	23000000	C	0	16500	0	NC		0	**1100**	**RISK BASED SSL**	**1**	**1100**	**USEPA RISK BASED SSL**	**1**
DIBENZO(A,H)ANTHRACENE	**15**	**C**	**8**	**210**	**C**	**2**	**11**	**9**	NC	0	2800000	C	0	15000000	C	0	2100	C	0	210000	C	0	**165**	**4**	NC		0	**11**	**RISK BASED SSL**	**9**	**11**	**USEPA RISK BASED SSL**	**9**
FLUORANTHENE	2300000	N	0	22000000	N	0	70000	0	NC	0	NC		0	NC		0	8900000	N	0	NC		0	1050000	0	NC		0	70000	RISK BASED SSL	0	70000	USEPA RISK BASED SSL	0				
FLUORENE	2300000	N	0	22000000	N	0	4000	0	NC	0	NC		0	NC		0	8900000	N	0	NC		0	60000	0	NC		0	4000	RISK BASED SSL	0	4000	USEPA RISK BASED SSL	0				
INDENO(1,2,3-CD)PYRENE	**150**	**C**	**5**	2100	C	0	**200**	**5**	NC	0	30000000	C	0	170000000	C	0	21000	C	0	2300000	C	0	3000	0	NC		0	**150**	**RISK BASED SSL**	**5**	**150**	**USEPA RISK BASED SSL**	**5**
NAPHTHALENE	3600	C	0	18000	C	0	**0.47**	**10**	NC	0	3600	C	0	20000	C	0	4500000	N	0	31000	C	0	**7.05**	**9**	NC		0	**0.47**	**RISK BASED SSL**	**10**	**0.47**	**USEPA RISK BASED SSL**	**10**
PHENANTHRENE	1700000	N	0	17000000	N	0	9500	0	NC	0	NC		0	NC		0	6700000	N	0	NC		0	142500	0	NC		0	9500	RISK BASED SSL	0	9500	USEPA RISK BASED SSL	0				
PYRENE	1700000	N	0	17000000	N	0	9500	0	NC	0	NC		0	NC		0	6700000	N	0	NC		0	142500	0	NC		0	9500	RISK BASED SSL	0	9500	USEPA RISK BASED SSL	0				
SEMIVOLATILES (UG/KG)																																							
BIS(2-ETHYLHEXYL)PHTHALATE	35000	C	0	120000	C	0	1100	0	1400	0	1400000000	C	0	7700000000	C	0	1200000	C	0	100000000	C	0	16500	0	21000		0	1100	RISK BASED SSL	0	1100	USEPA RISK BASED SSL	0				
CARBAZOLE	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC		0	NC					0	600	TACO SO TO GW	0
DIBENZOFURAN	78000	N	0	1000000	N	0	**110**	**1**	NC	0	NC		0	NC		0	310000	N	0	NC		0	1650	0	NC		0	**110**	**RISK BASED SSL**	**1**	**110**	**USEPA RISK BASED SSL**	**1**

Footnotes:
1 - Values which are pH-specific based on a pH of 7.25-7.74 from TACO Appendix B, Table C (Illinois EPA, 2013a).
Soil pH of 7.58 and 7.6 obtained from IDW laboratory results as presented in Appendix C.
2 - Forthcoming criteria revisions (not yet available) will decrease this value
Notes:
Sources of screening values are presented in Table 4-2.
Number of samples that exceed the screening criterion is presented beside the screening criterion.
Shaded cells indicate that the concentration is greater than the screening criterion.

mg/kg = Milligram per kilogram
ug/kg = Microgram per kilogram

Qualifiers:
J = Value is estimated

Abbreviations:
C = Carcinogen
CW = Construction worker
DAF 15 = Dilution Attenuation Factor of 15; selected based on information from USEPA soil screening guidance (USEPA, 1996a) and a source area of 1.75 acres.
IND = Industrial
ING = Ingestion
INH = Inhalation
MCL = Maximum Contaminant Level
N = Non-carcinogen
NC = No criteria
RES = Residential
SAT = Saturation Limit
SO TO GW = Soil to Groundwater
SSL = Soil Screening Level
TACO = Illinois Tiered Approach to Corrective Action Objectives
USEPA = United States Environmental Protection Agency

TABLE 4-4

SUMMARY OF POSITIVE DETECTIONS IN SURFACE SOIL
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

LOCATION TOP DEPTH BOTTOM DEPTH	OVERALL MINIMUM CRITERIA		NTC12SB21 0 0.5	NTC12SB22 0 0.5	NTC12SB23 0 0.5	NTC12SB24 0 0.5	NTC12SB25 0 0.5	NTC12SB26 0 0.5	NTC12SB27 0 0.5	NTC12SB28 0 0.5	NTC12SB29 0 0.5	NTC12SB30 0 0.5
METALS (MG/KG)												
ALUMINUM	18000	USEPA CW INH	8480	8140	1530	1410	6630	7050	10000	7850	7320	1250
ANTIMONY	0.27	USEPA MCL BASED SSL	0.468 UJ	0.471 UJ	0.429 UJ	0.491 UJ	0.459 UJ	**0.44 J**	**0.458 J**	0.456 UJ	**1.12 J**	0.446 UJ
ARSENIC	0.0013	USEPA RISK BASED SSL	**10.3 J**	**11.1 J**	**4.3 J**	**4.28 J**	**16.9 J**	**9.15 J**	**7.9 J**	**9.12 J**	**12.9 J**	**4.79 J**
BARIUM	82	USEPA MCL BASED SSL	**244 J**	72.2 J	10 J	8.91 J	48.9 J	**94.7 J**	**90.1 J**	53.6 J	**93.5 J**	8.12 J
BERYLLIUM	3.2	USEPA MCL BASED SSL	0.544	1.17	0.177 J	0.158 J	0.47	0.56	**5.5**	0.528	0.177 J	0.147 J
CADMIUM	0.38	USEPA MCL BASED SSL	**0.644 J**	**0.59 J**	**0.396 J**	0.141 J	**0.724 J**	**0.824 J**	**0.514 J**	**0.555 J**	**1.03 J**	0.119 J
CALCIUM	NC		45300	81300	142000	30200	92700	86300	49200	77200	83300	24400
CHROMIUM	0.00059	USEPA RISK BASED SSL	**13.7 J**	**13.7 J**	**4.97 J**	**5.19 J**	**13.4 J**	**12.7 J**	**23.8 J**	**15.3 J**	**17.3 J**	**4.07 J**
COBALT	0.21	USEPA RISK BASED SSL	**10.5**	**9.34**	**2.08**	**2.35**	**7.22**	**7.87**	**11.2**	**9.01**	**9.08**	**2.25**
COPPER	22	USEPA RISK BASED SSL	**32.5**	**66.4**	16.9	8.77	**57.1**	**100**	**271**	**60.4**	**64.2**	6.55
IRON	270	USEPA RISK BASED SSL	**19100 J**	**15700**	**5210**	**4710**	**14000**	**15900**	**20300**	**15900**	**14700**	**4760**
LEAD	14	USEPA MCL BASED SSL	**86 J**	**66.6 J**	**17.9 J**	**32.4 J**	**65.6 J**	**107 J**	**138 J**	**53.9 J**	**263 J**	**25.7 J**
MAGNESIUM	325000	TACO RES ING	23700	45900	84600	13900	54600	48700	23900	44000	47300	11100
MANGANESE	21	USEPA RISK BASED SSL	**678 J**	**513**	**222**	**151**	**409**	**670**	**538**	**442**	**701**	**137**
MERCURY	0.033	USEPA RISK BASED SSL	**0.0861**	**0.192**	**0.0414**	**0.0409 J**	**0.164**	**0.598**	**0.182**	**0.131**	**0.316**	0.0235 J
NICKEL	20	USEPA RISK BASED SSL	**21.3**	**22.2**	5.57	4.96	18.5	19.7	**34.7**	**23.2**	**30.6**	4.49
POTASSIUM	NC		1350	1430	645	232 J	1310	1080	1640	1460	963	230 J
SELENIUM	0.26	USEPA MCL BASED SSL	**0.527 J**	**0.694**	0.268 U	0.307 U	**0.322 J**	**0.472 J**	**0.584 J**	**0.288 J**	**0.791**	0.279 U
SILVER	0.6	USEPA RISK BASED SSL	0.27 J	0.553 J	0.234 J	0.123 U	0.304 J	**0.811**	0.408 J	0.527 J	**1.33**	0.111 U
SODIUM	NC		119 J	157 J	308 J	94.9 J	160 J	281 J	328 J	152 J	336 J	75.3 J
THALLIUM	0.011	USEPA RISK BASED SSL	0.234 U	0.294 U	0.322 U	0.245 U	0.23 U	0.225 U	0.24 U	0.228 U	**0.167 J**	0.223 U
VANADIUM	63	USEPA RISK BASED SSL	16.5	18.6	4.82	5.41	15.2	14.5	18.9	15.3	13.7	4.53
ZINC	290	USEPA RISK BASED SSL	241 J	**292 J**	81.9 J	47.3 J	190 J	215 J	**1530 J**	**328 J**	268 J	44.7 J
PESTICIDES (UG/KG)												
4,4'-DDD	6.4	USEPA RISK BASED SSL	**15.2 J**	**42.2**	5.82	3.01	**195**	**63.8**	**28.8**	2.92	**26**	5.19
4,4'-DDE	46	USEPA RISK BASED SSL	**119**	**168**	4.16	1.29	**197**	**95.4**	**143**	6.92	41.7	1.91
4,4'-DDT	67	USEPA RISK BASED SSL	**83.5**	**147**	8.12	0.391 U	**282**	66.7	**160**	5.44	47.4	1.28 J
ALDRIN	0.65	USEPA RISK BASED SSL	0.374 J	**1.87**	0.347 U	0.391 U	**20.8**	0.44 J	**1.29**	0.378 U	0.378 U	0.364 U
ALPHA-BHC	0.036	USEPA RISK BASED SSL	0.382 U	**0.641 J**	0.347 U	0.391 U	**1.1**	0.376 U	**0.509 J**	0.378 U	0.378 U	0.364 U
ALPHA-CHLORDANE	13	USEPA RISK BASED SSL	**54.8**	**243**	0.512 J	0.14 J	**3220**	1.88	4.74	0.203 J	1.74	0.628 J
BETA-BHC	0.13	USEPA RISK BASED SSL	0.382 U	**0.702 J**	0.347 U	0.391 U	**6.55**	0.376 U	0.399 U	0.378 U	0.378 U	0.364 U
DELTA-BHC	0.036	USEPA RISK BASED SSL	**1.62**	**2.09**	**0.151 J**	**0.722 J**	**4.65**	**0.325 J**	**3.55**	0.378 U	**1.06**	**1.16 J**
DIELDRIN	0.061	USEPA RISK BASED SSL	**1.77**	**1.63**	**0.271 J**	0.391 U	**16.6**	**1.54**	**1.81**	0.378 U	**0.893**	**0.246 J**
ENDOSULFAN I	1100	USEPA RISK BASED SSL	1.17	2.63	0.347 U	0.391 U	36.8	0.376 U	0.399 U	0.378 U	0.378 U	0.364 U
ENDOSULFAN II	1100	USEPA RISK BASED SSL	0.504 J	2.07	0.478 J	0.394 J	53.5	0.376 U	0.855	0.378 U	0.24 J	0.364 U
ENDOSULFAN SULFATE	1100	USEPA RISK BASED SSL	2.59	3.7	0.347 U	0.391 U	12.1	0.691 J	0.772 J	0.378 U	0.378 U	0.364 U
ENDRIN	68	USEPA RISK BASED SSL	0.74 J	2.52	1.18	0.391 U	12.2	13.7	22.6	0.378 U	5.65	0.364 U
ENDRIN ALDEHYDE	68	USEPA RISK BASED SSL	0.894	4.32	0.347 U	0.391 U	19.5	1.24	0.769 J	0.378 U	0.66 J	0.364 U
ENDRIN KETONE	68	USEPA RISK BASED SSL	0.382 U	0.378 U	0.347 U	0.391 U	1.14	0.376 U	0.399 U	0.378 U	0.378 U	0.364 U
GAMMA-BHC (LINDANE)	0.21	USEPA RISK BASED SSL	0.382 U	**0.268 J**	0.347 U	0.391 U	**0.538 J**	0.376 U	0.144 J	0.378 U	**0.6 J**	0.364 U
GAMMA-CHLORDANE	13	USEPA RISK BASED SSL	**30.6**	**171**	0.848	0.309 J	**2600**	4.35	4.31	0.326 J	2.2	0.512 J
HEPTACHLOR	0.14	USEPA RISK BASED SSL	**1.36**	**4.7**	0.347 U	0.391 U	**236**	0.376 UJ	0.399 U	0.378 U	**0.18 J**	0.364 UJ
HEPTACHLOR EPOXIDE	0.068	USEPA RISK BASED SSL	**5.22**	**10.1**	0.347 U	0.391 U	**64**	**0.122 J**	**4.18**	0.378 U	**0.288 J**	**1.13 J**
METHOXYCHLOR	1500	USEPA MCL BASED SSL	0.595 J	0.378 U	0.347 U	0.383 J	0.381 U	3.04 J	0.399 U	0.378 U	0.378 U	0.364 UJ
POLYNUCLEAR AROMATIC HYDROCARBONS (UG/KG)												
2-METHYLNAPHTHALENE	140	USEPA RISK BASED SSL	28.8	28.4	10.8	11.2	35.6	49.2	72.7	8.03	87.9	4.77 J
ACENAPHTHENE	4100	USEPA RISK BASED SSL	141	22.4	5.48 J	12.3	42.2	30.3	205	4.96 J	28.5	2.96 J
ACENAPHTHYLENE	4100	USEPA RISK BASED SSL	98.1	56.2	4.21 J	3.96 U	95.3	31	75.3	37.6	17.3	3.61 U
ANTHRACENE	4200	USEPA RISK BASED SSL	581	209	24.7	43.1	370	109	606	31.4	80.7	8.45
BENZO(A)ANTHRACENE	10	USEPA RISK BASED SSL	**1830**	**1080**	**90.3**	**86.5**	**832**	**252**	**1070**	**158**	**298**	**29.3**
BENZO(A)PYRENE	3.5	USEPA RISK BASED SSL	**1430**	**1040**	**111**	**76.8**	**988**	**546**	**1460**	**211**	**296**	**21.8**
BENZO(B)FLUORANTHENE	35	USEPA RISK BASED SSL	**919**	**1490**	**149**	**98.3**	**927**	**853**	**2260**	**273**	**475**	31.8
BENZO(G,H,I)PERYLENE	9500	USEPA RISK BASED SSL	711	531	61.2	44.4	437	247	594	101	158	13.5
BENZO(K)FLUORANTHENE	350	USEPA RISK BASED SSL	**2280**	**621**	67	42.6	**1080**	288	**800**	97.5	135	14.1 J
CHRYSENE	1100	USEPA RISK BASED SSL	**1530**	953	122	98.6	943	267	886	151	305	38.5
DIBENZO(A,H)ANTHRACENE	11	USEPA RISK BASED SSL	**287**	**183**	**17.8**	**14**	**258**	**87.4**	**204**	**29.1**	**44.5**	3.61 U
FLUORANTHENE	70000	USEPA RISK BASED SSL	4290	2250	204	213	2110	644	2630	318	597	74.3
FLUORENE	4000	USEPA RISK BASED SSL	179	24.7	5.63 J	22.1	63.1	34.5	254	6.02 J	36.4	3.61 U
INDENO(1,2,3-CD)PYRENE	150	USEPA RISK BASED SSL	**674**	**490**	58.2	40.1	**430**	**243**	**579**	91.2	139	12.8
NAPHTHALENE	0.47	USEPA RISK BASED SSL	**24.5**	**28.5**	**10.3**	**17.6**	**31.1**	**38.2**	**91.5**	**11.2**	**45**	**4.25 J**
PHENANTHRENE	9500	USEPA RISK BASED SSL	2370	529	108	214	970	428	2130	92.4	418	56.4
PYRENE	9500	USEPA RISK BASED SSL	3190	1880	180	170	1860	553	2260	323	495	66
SEMIVOLATILES (UG/KG)												
BIS(2-ETHYLHEXYL)PHTHALATE	1100	USEPA RISK BASED SSL	195 U	190 U	173 U	199 U	149 J	185 U	197 U	185 U	193 UJ	181 U
CARBAZOLE	600	TACO SO TO GW	254 J	190 UJ	173 UJ	199 UJ	191 UJ	185 UJ	167 J	185 UJ	193 U	181 UJ
DIBENZOFURAN	110	USEPA RISK BASED SSL	195 U	190 U	173 U	199 U	191 U	185 U	**144 J**	185 U	193 U	181 U

Notes:
Shaded cells indicate that the concentration is greater than the minimum screening criterion.
Sources of screening values are presented in Table 4-2.

mg/kg = Milligram per kilogram
ug/kg = Microgram per kilogram

Qualifiers:
J = Value is estimated
U = Analyte not detected at the reporting limit left of the letter.
UJ = Numerical detection limit for the undetected result is estimated.

Abbreviations:
CW = Construction worker
ING = Ingestion
INH = Inhalation
MCL = Maximum Contaminant Level
NC = No criteria
RES = Residential
SO TO GW = Soil to Groundwater
SSL = Soil Screening Level
TACO = Illinois Tiered Approach to Corrective Action Objectives
USEPA = United States Environmental Protection Agency

TABLE 4-5

OCCURRENCE AND DISTRIBUTION OF ORGANICS AND METALS IN SUBSURFACE SOIL
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

PARAMETER	FREQUENCY OF DETECTION	MINIMUM RESULT	MAXIMUM RESULT	LOCATION OF MAXIMUM DETECT	SAMPLE OF MAXIMUM DETECT	MINIMUM NON-DETECT	MAXIMUM NON-DETECT	AVERAGE POSITIVE RESULT	OVERALL AVERAGE	STANDARD DEVIATION	TACO RESIDENTIAL INHALATION	TACO RESIDENTIAL INGESTION	TACO INDUSTRIAL INHALATION	TACO INDUSTRIAL INGESTION	TACO CONSTRUCTION WORKER INHALATION SSLs	TACO CONSTRUCTION WORKER INGESTION SSLs	TACO CLASS 1 SOIL TO GROUNDWATER CRITERIA(1)	MIN TACO SOIL CRITERIA	NON-TACO RESIDENTIAL INHALATION	NON-TACO RESIDENTIAL INGESTION	NON-TACO INDUSTRIAL INHALATION	NON-TACO INDUSTRIAL INGESTION	NON-TACO CONSTRUCTION WORKER INHALATION	NON-TACO CONSTRUCTION WORKER INGESTION SSLs	NON-TACO CLASS 1 SOIL TO GROUNDWATER CRITERIA	MIN NON-TACO SOIL CRITERIA
METALS (MG/KG)																										
ALUMINUM	10/10	1380	11700	NTC12SB29	NTC12-SB29-0204			6717	6717	3807	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	1000000 N 0	78000 N 0	1000000 N 0	1000000 N 0	870000 N 0	200000 N 0	NC 0	78000 RES ING 0
ANTIMONY	6/10	0.297 J	4.24 J	NTC12SB26	NTC12-SB26-0406	0.902	0.954	1.42	1.04	1.29	NC 0	31 N 0	NC 0	820 N 0	NC 0	82 N 0	5 0	5 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
ARSENIC	10/10	4.26 J	25 J	NTC12SB26	NTC12-SB26-0406			12	12	6.46	750 C 0	13 3	1200 C 0	13 3	25000 C 0	61 N 0	30 (2) 0	13 RES ING, IND ING 3	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
BARIUM	10/10	6.73 J	432 J	NTC12SB21	NTC12-SB21-0507			120	120	125	690000 N 0	5500 N 0	910000 N 0	140000 N 0	870000 N 0	14000 N 0	1800 0	1800 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
BERYLLIUM	8/10	0.154 J	1.02	NTC12SB27	NTC12-SB27-0204	2.96	6.22	0.519	0.874	0.892	1300 C 0	160 N 0	2100 C 0	4100 N 0	44000 C 0	410 N 0	1000 0	160 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
CADMIUM	10/10	0.119 J	7.31 J	NTC12SB26	NTC12-SB26-0406			1.82	1.82	2.52	1800 C 0	78 N 0	2800 C 0	2000 N 0	59000 C 0	200 N 0	59 0	59 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
CALCIUM	10/10	26800	85700 J	NTC12SB25	NTC12-SB25-0204			49790	49790	17212	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
CHROMIUM	10/10	4.65 J	60.8 J	NTC12SB26	NTC12-SB26-0406			21	21	18	270 C 0	230 N 0	420 C 0	6100 N 0	690 N 0	4100 N 0	32 2	32 SO TO GW 2	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
COBALT	10/10	2.37	17	NTC12SB26	NTC12-SB26-0406			8.45	8.45	4.66	NC 0	4700 N 0	NC 0	120000 N 0	NC 0	12000 N 0	NC 0	4700 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
COPPER	10/10	6.56	362	NTC12SB21	NTC12-SB21-0507			105	105	118	NC 0	2900 N 0	NC 0	82000 N 0	NC 0	8200 N 0	330000 0	2900 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
IRON	10/10	4650	31400	NTC12SB29	NTC12-SB29-0204			15601	15601	8040	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
LEAD	10/10	26.6 J	845 J	NTC12SB29	NTC12-SB29-0204			200	200	252	NC 0	400 1	NC 0	800 1	NC 0	700 1	107 5	107 SO TO GW 5	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
MAGNESIUM	10/10	12000	42600 J	NTC12SB25	NTC12-SB25-0204			23400	23400	8806	NC 0	325000 0	NC 0	NC 0	NC 0	730000 0	NC 0	325000 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
MANGANESE	10/10	143	846	NTC12SB26	NTC12-SB26-0406			461	461	230	69000 N 0	1600 N 0	91000 N 0	41000 N 0	8700 N 0	4100 N 0	NC 0	1600 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
MERCURY	10/10	0.0327 J	1.99	NTC12SB26	NTC12-SB26-0406			0.451	0.451	0.647	10 N 0	23 N 0	16 N 0	610 N 0	0.1 N 6	61 N 0	6.4 0	0.1 CW INH 6	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
NICKEL	10/10	4.36	88.6	NTC12SB26	NTC12-SB26-0406			29	29	25	13000 C 0	1600 N 0	21000 C 0	41000 N 0	440000 C 0	4100 N 0	700 0	700 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
POTASSIUM	10/10	205 J	2110	NTC12SB26	NTC12-SB26-0406			1137	1137	650	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
SELENIUM	9/10	0.214 J	6.57	NTC12SB26	NTC12-SB26-0406	0.566	0.566	1.68	1.54	2.29	NC 0	390 N 0	NC 0	10000 N 0	NC 0	1000 N 0	3.3 2	3.3 SO TO GW 2	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
SILVER	7/10	0.0931 J	22.3	NTC12SB26	NTC12-SB26-0406	0.226	0.466	6.38	4.51	7.85	NC 0	390 N 0	NC 0	10000 N 0	NC 0	1000 N 0	39 0	39 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
SODIUM	10/10	84.7 J	270 J	NTC12SB26	NTC12-SB26-0406			160	160	63	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
VANADIUM	10/10	4.78	25.9	NTC12SB26	NTC12-SB26-0406			15	15	7.4	NC 0	550 N 0	NC 0	14000 N 0	NC 0	1400 N 0	980 0	550 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
ZINC	10/10	43.7 J	912 J	NTC12SB21	NTC12-SB21-0507			326	326	264	NC 0	23000 N 0	NC 0	610000 N 0	NC 0	61000 N 0	16000 0	23000 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
PESTICIDES (UG/KG)																										
4,4'-DDD	10/10	2.37	1090	NTC12SB26	NTC12-SB26-0406			244	244	392	NC 0	3000 C 0	NC 0	24000 C 0	NC 0	520000 C 0	16000 0	3000 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
4,4'-DDE	10/10	0.692 J	986 J	NTC12SB25	NTC12-SB25-0204			142	142	303	NC 0	2000 C 0	NC 0	17000 C 0	NC 0	370000 C 0	54000 0	2000 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
4,4'-DDT	10/10	0.362 J	823	NTC12SB21	NTC12-SB21-0507			105	105	254	NC 0	2000 C 0	1500000 C 0	17000 C 0	2100000 C 0	100000 N 0	32000 0	2000 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
ALDRIN	5/10	0.463 J	17	NTC12SB21	NTC12-SB21-0507	0.73	0.782	4.23	2.3	5.2	3000 C 0	40 C 0	6600 C 0	300 C 0	9300 C 0	6100 N 0	500 0	40 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
ALPHA-BHC	3/10	0.172 J	1.05	NTC12SB26	NTC12-SB26-0406	0.73	0.802	0.747	0.495	0.293	800 C 0	100 C 0	1500 C 0	900 C 0	2100 C 0	20000 C 0	0.5 2	0.5 SO TO GW 2	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
ALPHA-CHLORDANE	9/10	0.202 J	141	NTC12SB21	NTC12-SB21-0507	0.782	0.782	24	22	45	72000 C 0	1800 C 0	140000 C 0	16000 C 0	22000 N 0	100000 N 0	10000 0	1800 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
BETA-BHC	3/10	0.722 J	1.12	NTC12SB21	NTC12-SB21-0507	0.73	0.802	0.92	0.545	0.276	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
DELTA-BHC	8/10	0.164 J	6.05	NTC12SB21	NTC12-SB21-0507	0.77	0.802	1.42	1.22	1.85	800 C 0	100 C 0	1500 C 0	900 C 0	2100 C 0	20000 C 0	0.5 3	0.5 SO TO GW 3	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
DIELDRIN	7/10	0.321 J	13.4	NTC12SB26	NTC12-SB26-0406	0.766	0.782	4.32	3.14	4.15	1000 C 0	40 C 0	2200 C 0	400 C 0	3100 C 0	7800 C 0	4 4	4 SO TO GW 4	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
ENDOSULFAN I	5/10	0.194 J	4.51	NTC12SB26	NTC12-SB26-0406	0.73	0.788	2.25	1.32	1.69	NC 0	470000 N 0	NC 0	12000000 N 0	NC 0	1200000 N 0	18000 0	18000 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
ENDOSULFAN II	6/10	0.28 J	5.63	NTC12SB21	NTC12-SB21-0507	0.73	0.782	1.99	1.35	1.89	NC 0	470000 N 0	NC 0	12000000 N 0	NC 0	1200000 N 0	18000 0	18000 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
ENDOSULFAN SULFATE	4/10	0.204 J	3.95	NTC12SB28	NTC12-SB28-0204	0.73	0.788	2.24	1.13	1.31	NC 0	470000 N 0	NC 0	12000000 N 0	NC 0	1200000 N 0	18000 0	18000 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
ENDRIN	7/10	0.235 J	12.9	NTC12SB26	NTC12-SB26-0406	0.766	0.782	5.79	4.17	4.72	NC 0	23000 N 0	NC 0	610000 N 0	NC 0	61000 N 0	1000 0	1000 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
ENDRIN ALDEHYDE	5/10	0.953 J	10.9	NTC12SB26	NTC12-SB26-0406	0.73	0.788	4.02	2.2	3.45	NC 0	23000 N 0	NC 0	610000 N 0	NC 0	61000 N 0	1000 0	1000 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
ENDRIN KETONE	1/10	0.715 J	0.715 J	NTC12SB28	NTC12-SB28-0204	0.73	0.83	0.715	0.423	0.103	NC 0	23000 N 0	NC 0	610000 N 0	NC 0	61000 N 0	1000 0	1000 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
GAMMA-BHC (LINDANE)	3/10	0.346 J	3.61	NTC12SB28	NTC12-SB28-0204	0.73	0.802	1.51	0.725	1.02	NC 0	500 C 0	NC 0	4000 C 0	NC 0	96000 C 0	9 0	9 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
GAMMA-CHLORDANE	9/10	0.301 J	129	NTC12SB21	NTC12-SB21-0507	0.766	0.766	24	21	41	72000 C 0	1800 C 0	140000 C 0	16000 C 0	22000 N 0	100000 N 0	10000 0	1800 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
HEPTACHLOR	4/10	0.182 J	1.83	NTC12SB21	NTC12-SB21-0507	0.73	0.802	1.16	0.697	0.571	100 C 0	100 C 0	11000 C 0	1000 C 0	16000 C 0	28000 C 0	23000 0	100 RES INH, RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
HEPTACHLOR EPOXIDE	7/10	0.213 J	7	NTC12SB22	NTC12-SB22-00502	0.75	0.782	2.18	1.64	2.04	5000 C 0	70 C 0	9200 C 0	600 C 0	13000 C 0	2700 N 0	700 0	70 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
METHOXYCHLOR	3/10	0.528 J	1.33	NTC12SB28	NTC12-SB28-0204	0.766	0.83	0.937	0.556	0.324	NC 0	390000 N 0	NC 0	10000000 N 0	NC 0	1000000 N 0	160000 0	160000 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
PCBs (UG/KG)																										
AROCLOR-1254	4/5	29.8 J	799	NTC12SB21	NTC12-SB21-0507	18.86	18.86	245	198	338	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
POLYNUCLEAR AROMATIC HYDROCARBONS (UG/KG)																										
2-METHYLNAPHTHALENE	10/10	3.31 J	545	NTC12SB26	NTC12-SB26-0406			144	144	199	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	310000 N 0	NC 0	8200000 N 0	NC 0	820000 N 0	1900 0	NC 0
ACENAPHTHENE	10/10	5.87 J	1120	NTC12SB28	NTC12-SB28-0204			200	200	350	NC 0	4700000 N 0	NC 0	120000000 N 0	NC 0	120000000 N 0	570000 0	570000 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
ACENAPHTHYLENE	8/10	3.67 J	253	NTC12SB28	NTC12-SB28-0204	7.24	8.02	62	50	76	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	2300000 N 0	NC 0	61000000 N 0	NC 0	61000000 N 0	85000 N 0	85000 SO TO GW 0
ANTHRACENE	10/10	19	5280	NTC12SB28	NTC12-SB28-0204			726	726	1624	NC 0	23000000 N 0	NC 0	610000000 N 0	NC 0	610000000 N 0	12000000 0	12000000 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
BENZO(A)ANTHRACENE	10/10	41.3	9780	NTC12SB28	NTC12-SB28-0204			1506	1506	3015	NC 0	900 C 3	NC 0	8000 C 1	NC 0	170000 C 0	2000 2	900 RES ING 3	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
BENZO(A)PYRENE	10/10	40.1	7740	NTC12SB28	NTC12-SB28-0204			1274	1274	2355	NC 0	90 C 6	NC 0	800 C 3	NC 0	17000 C 0	8000 0	90 RES ING 6	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
BENZO(B)FLUORANTHENE	10/10	53.7	10300	NTC12SB28	NTC12-SB28-0204			1495	1495	3131	NC 0	900 C 3	NC 0	8000 C 1	NC 0	170000 C 0	5000 1	900 RES ING 3	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
BENZO(G,H,I)PERYLENE	10/10	26.9	1110	NTC12SB28	NTC12-SB28-0204			351	351	391	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	2300000 N 0	NC 0	61000000 N 0	NC 0	61000000 N 0	27000000 N 0	2300000 RES ING 0
BENZO(K)FLUORANTHENE	10/10	25.7	2570	NTC12SB26	NTC12-SB26-0406			676	676	876	NC 0	9000 C 0	NC 0	78000 C 0	NC 0	1700000 C 0	49000 0	9000 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
CHRYSENE	10/10	63	7940	NTC12SB28	NTC12-SB28-0204			1267	1267	2431	NC 0	88000 C 0	NC 0	780000 C 0	NC 0	17000000 C 0	160000 0	88000 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
DIBENZO(A,H)ANTHRACENE	7/10	12	705	NTC12SB28	NTC12-SB28-0204	7.24	8.02	224	158	227	NC 0	90 C 5	NC 0	800 C 0	NC 0	17000 C 0	2000 0	90 RES ING 5	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
FLUORANTHENE	10/10	118	21100	NTC12SB28	NTC12-SB28-0204			3420	3420	6516	NC 0	3100000 N 0	NC 0	82000000 N 0	NC 0	82000000 N 0	4300000 0	3100000 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
FLUORENE	9/10	10	2510	NTC12SB28	NTC12-SB28-0204	7.5	7.5	403	363	778	NC 0	3100000 N 0	NC 0	82000000 N 0	NC 0	82000000 N 0	560000 0	560000 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
INDENO(1,2,3-CD)PYRENE	10/10	19.9	1330	NTC12SB28	NTC12-SB28-0204			367	367	446	NC 0	900 C 1	NC 0	8000 C 0	NC 0	170000 C 0	14000 0	900 RES ING 1	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
NAPHTHALENE	10/10	4 J	439	NTC12SB26	NTC12-SB26-0406			128	128	156	170000 N 0	1600000 N 0	270000 N 0	41000000 N 0	1800 N 0	4100000 N 0	12000 0	1800 CW INH 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
PHENANTHRENE	10/10	75.4	20200	NTC12SB28	NTC12-SB28-0204			3034	3034	6259	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	2300000 N 0	NC 0	61000000 N 0	NC 0	61000000 N 0	210000 N 0	200000 SO TO GW 0
PYRENE	10/10	104	16800	NTC12SB28	NTC12-SB28-0204			2842	2842	5220	NC 0	2300000 N 0	NC 0	61000000 N 0	NC 0	61000000 N 0	4200000 0	2300000 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
SEMIVOLATILES (UG/KG)																										
4-METHYLPHENOL	3/10	167 J	375 J	NTC12SB25	NTC12-SB25-0204	364	402	270	215	62	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	1E+08 N 0	7800000 N 0	1.7E+08 N 0	2E+08 N 0	2E+08 N 0	4100000 N 0	3900 N 0	3900 SO TO GW 0
BIS(2-ETHYLHEXYL)PHTHALATE	1/10	201 J	201 J	NTC12SB26	NTC12-SB26-0406	364	402	201	193	6.31	31000000 SAT 0	46000 C 0	31000000 SAT 0	410000 C 0	31000000 SAT 0	4100000 N 0	3600000 0	46000 RES ING 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
CARBAZOLE	2/10	494 J	1080 J	NTC12SB28	NTC12-SB28-0204	364	402	787	311	286	NC 0	32000 C 0	NC 0	290000 C 0	NC 0	6200000 C 0	600 1	600 SO TO GW 1	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
DIBENZOFURAN	3/10	204 J	1140	NTC12SB28	NTC12-SB28-0204	364	402	570	306	298	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	78000 N 0	NC 0	2000000 N 0	NC 0	820000 N 0	3000 N 0	3000 SO TO GW 0
PHENOL	1/10	99.7 J	99.7 J	NTC12SB25	NTC12-SB25-0204	364	416	100	184	30	NC 0	23000000 N 0	NC 0	610000000 N 0	NC 0	61000000 N 0	100000 0	100000 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
SPLP METALS (UG/L)																										
ALUMINUM	8/8	41 J	10000 J	NTC12-SB33	NTC12-SB33-0406			2890	2890	3290	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	3500 2	3500 SO TO GW 2
ANTIMONY	7/8	3.6 J	30 J	NTC12-SB32	NTC12-SB32-0406	0.82	0.82	11.8	10.4	9.3	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	10 3	10 SO TO GW 3	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
ARSENIC	7/8	1.9	16	NTC12-SB34	NTC12-SB34-0406	0.5	0.5	7.5	6.6	5.8	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	50 (3) 0	50 SO TO GW(3) 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
BARIUM	8/8	3.8 J	130 J	NTC12-SB33	NTC12-SB33-0406			38.1	38.1	39.1	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	2000 0	2000 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
BERYLLIUM	3/8	0.23 J	0.71 J	NTC12-SB33	NTC12-SB33-0406	0.4	0.4	0.42	0.28	0.18	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	4 0	4 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
CADMIUM	7/8	0.042 J	4.8	NTC12-SB33	NTC12-SB33-0406	0.1	0.1	1	0.91	1.6	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	5 0	5 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
CALCIUM	8/8	13000	180000	NTC12-SB34	NTC12-SB34-0204			47900	47900	54300	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
CHROMIUM	8/8	0.77 J	46 J	NTC12-SB33	NTC12-SB33-0406			11.6	11.6	14.7	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	100 0	100 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
COBALT	8/8	0.13 J	13 J	NTC12-SB33	NTC12-SB33-0406			2.7	2.7	4.3	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	1000 0	1000 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
COPPER	8/8	4.2	92 J	NTC12-SB33	NTC12-SB33-0406			28.8	28.8	30.0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	650 0	650 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
IRON	7/8	120	13000	NTC12-SB33	NTC12-SB33-0406	10	10	4200	3680	4600	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	5000 3	5000 SO TO GW 3	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
LEAD	7/8	0.84 J	150 J	NTC12-SB33	NTC12-SB33-0406	0.5	0.5	45.2	39.6	54.7	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	7.5 5	7.5 SO TO GW 5	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
MAGNESIUM	7/8	400 J	8900	NTC12-SB33	NTC12-SB33-0406	500	500	3910	3460	2740	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
MANGANESE	8/8	0.24 J	360 J	NTC12-SB33	NTC12-SB33-0406			88.6	88.6	124	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	150 2	150 SO TO GW 2	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
MERCURY	4/8	0.067 J	1	NTC12-SB33	NTC12-SB33-0406	0.1	0.1	0.4	0.23	0.33	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	2 0	2 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
NICKEL	8/8	0.92 J	53 J	NTC12-SB33	NTC12-SB33-0406			12.6	12.6	17.8	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	100 0	100 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
POTASSIUM	8/8	1100	6000	NTC12-SB33	NTC12-SB33-0406			2700	2700	1780	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
SELENIUM	2/8	2.1	3.6	NTC12-SB31	NTC12-SB31-0507	1	1.6	2.9	1.1	1.1	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	50 0	50 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
SILVER	6/8	0.045 J	13	NTC12-SB33	NTC12-SB33-0406	0.1	0.1	3.5	2.7	4.3	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	50 0	50 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
SODIUM	8/8	8700 J	24000 J	NTC12-SB34	NTC12-SB34-0406			14600	14600	5440	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
THALLIUM	5/8	0.054 J	0.32 J	NTC12-SB33	NTC12-SB33-0406	0.1	0.1	0.15	0.11	0.1	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	2 0	2 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
VANADIUM	8/8	0.74 J	32	NTC12-SB32	NTC12-SB32-0204			10.6	10.6	10.5	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	49 0	49 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0
ZINC	5/8	31 J	350 J	NTC12-SB33	NTC12-SB33-0406	4	4.4	141	88.8	121	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	5000 0	5000 SO TO GW 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0	NC 0

TABLE 4-5

OCCURRENCE AND DISTRIBUTION OF ORGANICS AND METALS IN SUBSURFACE SOIL
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

PARAMETER	USEPA RESIDENTIAL SOIL RSLs			USEPA INDUSTRIAL SOIL RSLs			USEPA RISK BASED SSLs- MIGRATION TO GROUNDWATER		USEPA MCL BASED SSLs- MIGRATION TO GROUNDWATER		USEPA RESIDENTIAL INHALATION SSLs			USEPA INDUSTRIAL INHALATION SSLs			USEPA CONSTRUCTION WORKER INGESTION SSLs			USEPA CONSTRUCTION WORKER INHALATION			USEPA RISK BASED SSLs- MIGRATION TO GROUNDWATER DAF 15		USEPA MCL BASED SSLs- MIGRATION TO GROUNDWATER		MINIMUM USEPA SOIL CRITERIA			OVERALL MINIMUM SOIL CRITERIA		
METALS (MG/KG)																																
ALUMINUM	77000	N	0	990000	N	0	23000	0	NC	0	7100000	N	0	33000000	N	0	310000	N	0	18000	N	0	345000	0	NC	0	18000	CW INH	0	18000	USEPA CW INH	0
ANTIMONY	31	N	0	410	N	0	0.27	6	0.27	6	NC		0	NC		0	120	N	0	NC		0	4.05	1	4.05	1	0.27	MCL BASED SSL	6	0.27	USEPA MCL BASED SSL	6
ARSENIC	0.61	C	10	2.4	C	10	0.001	10	0.29	10	770	C	0	4300	C	0	13	C	3	53	C	0	0.0195	#	4.35	9	0.001	RISK BASED SSL	10	0.001	USEPA RISK BASED SSL	10
BARIUM	15000	N	0	190000	N	0	120	4	82	6	710000	N	0	3300000	N	0	62000	N	0	1800	N	0	1800	0	1230	0	82	MCL BASED SSL	6	82	USEPA MCL BASED SSL	6
BERYLLIUM	160	N	0	2000	N	0	13	0	3.2	0	1400	C	0	7700	C	0	620	N	0	71	N	0	195	0	48	0	3.2	MCL BASED SSL	0	3.2	USEPA MCL BASED SSL	0
CADMIUM	70	N	0	800	N	0	0.52	6	0.38	7	1800	C	0	10000	C	0	280	N	0	36	N	0	7.8	0	5.7	1	0.38	MCL BASED SSL	7	0.38	USEPA MCL BASED SSL	7
CALCIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0
CHROMIUM	0.29	C	10	5.6	C	8	6E-04	10	180000	0	39	C	1	220	C	0	43	C	1	3	C	10	0.00885	#	3E+06	0	6E-04	RISK BASED SSL	10	6E-04	USEPA RISK BASED SSL	10
COBALT	23	N	0	300	N	0	0.21	10	NC	0	370	C	0	2100	C	0	93	N	0	21	N	0	3.15	8	NC	0	0.21	RISK BASED SSL	10	0.21	USEPA RISK BASED SSL	10
COPPER	3100	N	0	41000	N	0	22	8	46	7	NC		0	NC		0	12000	N	0	NC		0	330	1	690	0	22	RISK BASED SSL	8	22	USEPA RISK BASED SSL	8
IRON	55000	N	0	720000	N	0	270	10	NC	0	NC		0	NC		0	220000	N	0	NC		0	4050	#	NC	0	270	RISK BASED SSL	10	270	USEPA RISK BASED SSL	10
LEAD	400	N	1	800	N	1	NC	0	14	10	NC		0	NC		0	NC		0	NC		0	NC	0	210	3	14	MCL BASED SSL	10	14	USEPA MCL BASED SSL	10
MAGNESIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	325000	TACO RES ING	0
MANGANESE	1800	N	0	23000	N	0	21	10	NC	0	71000	N	0	330000	N	0	74000	N	0	180	N	9	315	7	NC	0	21	RISK BASED SSL	10	21	USEPA RISK BASED SSL	10
MERCURY	23	N	0	310	N	0	0.033	9	0.1	6	4300000	N	0	2000000	N	0	93	N	0	1100	N	0	0.495	3	1.5	1	0.033	RISK BASED SSL	9	0.033	USEPA RISK BASED SSL	9
NICKEL	1500	N	0	20000	N	0	20	7	NC	0	13000	C	0	71000	C	0	6200	N	0	NC		0	300	0	NC	0	20	RISK BASED SSL	7	20	USEPA RISK BASED SSL	7
POTASSIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0
SELENIUM	390	N	0	5100	N	0	0.4	7	0.26	8	2.8E+07	N	0	1.3E+08	N	0	1500	N	0	71000	N	0	6	1	3.9	2	0.26	MCL BASED SSL	8	0.26	USEPA MCL BASED SSL	8
SILVER	390	N	0	5100	N	0	0.6	4	NC	0	NC		0	NC		0	1500	N	0	NC		0	9	2	NC	0	0.6	RISK BASED SSL	4	0.6	USEPA RISK BASED SSL	4
SODIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0
VANADIUM	390	N	0	5200	N	0	63	0	NC	0	140000	N	0	660000	N	0	1500	N	0	360	N	0	945	0	NC	0	63	RISK BASED SSL	0	63	USEPA RISK BASED SSL	0
ZINC	23000	N	0	310000	N	0	290	4	NC	0	NC		0	NC		0	93000	N	0	NC		0	4350	0	NC	0	290	RISK BASED SSL	4	290	USEPA RISK BASED SSL	4
PESTICIDES (UG/KG)																																
4,4'-DDD	2000	C	0	7200	C	0	6.4	6	NC	0	4.8E+07	C	0	2.7E+08	C	0	69000	C	0	3600000	C	0	96	3	NC	0	6.4	RISK BASED SSL	6	6.4	USEPA RISK BASED SSL	6
4,4'-DDE	1400	C	0	5100	C	0	46	4	NC	0	3.4E+07	C	0	1.9E+08	C	0	49000	C	0	2600000	C	0	690	1	NC	0	46	RISK BASED SSL	4	46	USEPA RISK BASED SSL	4
4,4'-DDT	1700	C	0	7000	C	0	67	2	NC	0	3.4E+07	C	0	1.9E+08	C	0	58000	C	0	2600000	C	0	1005	0	NC	0	67	RISK BASED SSL	2	67	USEPA RISK BASED SSL	2
ALDRIN	29	C	0	100	C	0	0.65	2	NC	0	680000	C	0	3800000	C	0	980	C	0	51000	C	0	9.75	1	NC	0	0.65	RISK BASED SSL	2	0.65	USEPA RISK BASED SSL	2
ALPHA-BHC	77	C	0	270	C	0	0.036	3	NC	0	1800000	C	0	10000000	C	0	2600	C	0	140000	C	0	0.54	2	NC	0	0.036	RISK BASED SSL	3	0.036	USEPA RISK BASED SSL	3
ALPHA-CHLORDANE	1600	C	0	6500	C	0	13	3	140	1	3.3E+07	C	0	1.9E+08	C	0	55000	C	0	2500000	N	0	195	0	2100	0	13	RISK BASED SSL	3	13	USEPA RISK BASED SSL	3
BETA-BHC	270	C	0	960	C	0	0.13	3	NC	0	6200000	C	0	35000000	C	0	9300	C	0	470000	C	0	1.95	0	NC	0	0.13	RISK BASED SSL	3	0.13	USEPA RISK BASED SSL	3
DELTA-BHC	77	C	0	270	C	0	0.036	8	NC	0	1800000	C	0	10000000	C	0	2600	C	0	140000	C	0	0.54	3	NC	0	0.036	RISK BASED SSL	8	0.036	USEPA RISK BASED SSL	8
DIELDRIN	30	C	0	110	C	0	0.061	7	NC	0	720000	C	0	4000000	C	0	1000	C	0	54000	C	0	0.915	6	NC	0	0.061	RISK BASED SSL	7	0.061	USEPA RISK BASED SSL	7
ENDOSULFAN I	370000	N	0	3700000	N	0	1100	0	NC	0	NC		0	NC		0	1400000	N	0	NC		0	16500	0	NC	0	1100	RISK BASED SSL	0	1100	USEPA RISK BASED SSL	0
ENDOSULFAN II	370000	N	0	3700000	N	0	1100	0	NC	0	NC		0	NC		0	1400000	N	0	NC		0	16500	0	NC	0	1100	RISK BASED SSL	0	1100	USEPA RISK BASED SSL	0
ENDOSULFAN SULFATE	370000	N	0	3700000	N	0	1100	0	NC	0	NC		0	NC		0	1400000	N	0	NC		0	16500	0	NC	0	1100	RISK BASED SSL	0	1100	USEPA RISK BASED SSL	0
ENDRIN	18000	N	0	180000	N	0	68	0	81	0	NC		0	NC		0	71000	N	0	NC		0	1020	0	1215	0	68	RISK BASED SSL	0	68	USEPA RISK BASED SSL	0
ENDRIN ALDEHYDE	18000	N	0	180000	N	0	68	0	81	0	NC		0	NC		0	71000	N	0	NC		0	1020	0	1215	0	68	RISK BASED SSL	0	68	USEPA RISK BASED SSL	0
ENDRIN KETONE	18000	N	0	180000	N	0	68	0	81	0	NC		0	NC		0	71000	N	0	NC		0	1020	0	1215	0	68	RISK BASED SSL	0	68	USEPA RISK BASED SSL	0
GAMMA-BHC (LINDANE)	520	C	0	2100	C	0	0.21	3	1.2	1	1.1E+07	C	0	60000000	C	0	18000	C	0	800000	C	0	3.15	1	18	0	0.21	RISK BASED SSL	3	0.21	USEPA RISK BASED SSL	3
GAMMA-CHLORDANE	1600	C	0	6500	C	0	13	3	140	0	3.3E+07	C	0	1.9E+08	C	0	55000	C	0	2500000	N	0	195	0	2100	0	13	RISK BASED SSL	3	13	USEPA RISK BASED SSL	3
HEPTACHLOR	110	C	0	380	C	0	0.14	4	33	0	2500000	C	0	14000000	C	0	3700	C	0	190000	C	0	2.1	0	495	0	0.14	RISK BASED SSL	4	0.14	USEPA RISK BASED SSL	4
HEPTACHLOR EPOXIDE	53	C	0	190	C	0	0.068	7	4.1	1	1300000	C	0	7100000	C	0	1800	C	0	96000	C	0	1.02	5	61.5	0	0.068	RISK BASED SSL	7	0.068	USEPA RISK BASED SSL	7
METHOXYCHLOR	310000	N	0	3100000	N	0	1500	0	2200	0	NC		0	NC		0	1200000	N	0	NC		0	22500	0	33000	0	1500	MCL BASED SSL	0	1500	USEPA MCL BASED SSL	0
PCBs (UG/KG)																																
AROCLOR-1254	220	C	1	740	C	1	8.8	4	NC	0	5800000	C	0	33000000	C	0	4400	N	0	440000	N	0	132	1	NC	0	8.8	RISK BASED SSL	4	8.8	USEPA RISK BASED SSL	4
POLYNUCLEAR AROMATIC HYDROCARBONS (UG/KG)																																
2-METHYLNAPHTHALENE	230000	N	0	2200000	N	0	140	3	NC	0	NC		0	NC		0	890000	N	0	NC		0	2100	0	NC	0	140	RISK BASED SSL	3	140	USEPA RISK BASED SSL	3
ACENAPHTHENE	3400000	N	0	33000000	N	0	4100	0	NC	0	NC		0	NC		0	13000000	N	0	NC		0	61500	0	NC	0	4100	RISK BASED SSL	0	4100	USEPA RISK BASED SSL	0
ACENAPHTHYLENE	3400000	N	0	33000000	N	0	4100	0	NC	0	NC		0	NC		0	13000000	N	0	NC		0	61500	0	NC	0	4100	RISK BASED SSL	0	4100	USEPA RISK BASED SSL	0
ANTHRACENE	17000000	N	0	170000000	N	0	42000	0	NC	0	NC		0	NC		0	67000000	N	0	NC		0	630000	0	NC	0	4200	RISK BASED SSL	1	4200	USEPA RISK BASED SSL	1
BENZO(A)ANTHRACENE	150	C	6	2100	C	2	10	10	NC	0	3E+07	C	0	1.7E+08	C	0	21000	C	0	2300000	C	0	150	6	NC	0	10	RISK BASED SSL	10	10	USEPA RISK BASED SSL	10
BENZO(A)PYRENE	15	C	10	210	C	5	3.5	10	240	5	3000000	C	0	17000000	C	0	2100	C	1	230000	C	0	52.5	9	3600	1	3.5	RISK BASED SSL	10	3.5	USEPA RISK BASED SSL	10
BENZO(B)FLUORANTHENE	150	C	6	2100	C	1	35	10	NC	0	3E+07	C	0	1.7E+08	C	0	21000	C	0	2300000	C	0	525	5	NC	0	35	RISK BASED SSL	10	35	USEPA RISK BASED SSL	10
BENZO(G,H,I)PERYLENE	1700000	N	0	17000000	N	0	9500	0	NC	0	NC		0	NC		0	6700000	N	0	NC		0	142500	0	NC	0	9500	RISK BASED SSL	0	9500	USEPA RISK BASED SSL	0
BENZO(K)FLUORANTHENE	1500	C	1	21000	C	0	350	5	NC	0	3E+07	C	0	1.7E+08	C	0	210000	C	0	2300000	C	0	5250	0	NC	0	350	RISK BASED SSL	5	350	USEPA RISK BASED SSL	5
CHRYSENE	15000	C	0	210000	C	0	1100	3	NC	0	3E+08	C	0	1.7E+09	C	0	2100000	C	0	2.3E+07	C	0	16500	0	NC	0	1100	RISK BASED SSL	3	1100	USEPA RISK BASED SSL	3
DIBENZO(A,H)ANTHRACENE	15	C	6	210	C	3	11	7	NC	0	2800000	C	0	15000000	C	0	2100	C	0	210000	C	0	165	3	NC	0	11	RISK BASED SSL	7	11	USEPA RISK BASED SSL	7
FLUORANTHENE	2300000	N	0	22000000	N	0	70000	0	NC	0	NC		0	NC		0	8900000	N	0	NC		0	1050000	0	NC	0	70000	RISK BASED SSL	0	70000	USEPA RISK BASED SSL	0
FLUORENE	2300000	N	0	22000000	N	0	4000	0	NC	0	NC		0	NC		0	8900000	N	0	NC		0	60000	0	NC	0	4000	RISK BASED SSL	0	4000	USEPA RISK BASED SSL	0
INDENO(1,2,3-CD)PYRENE	150	C	5	2100	C	0	200	5	NC	0	3E+07	C	0	1.7E+08	C	0	21000	C	0	2300000	C	0	3000	0	NC	0	150	RISK BASED SSL	5	150	USEPA RISK BASED SSL	5
NAPHTHALENE	3600	C	0	18000	C	0	0.47	10	NC	0	3600	C	0	20000	C	0	4500000	N	0	31000	C	0	7.05	9	NC	0	0.47	RISK BASED SSL	10	0.47	USEPA RISK BASED SSL	10
PHENANTHRENE	1700000	N	0	17000000	N	0	9500	1	NC	0	NC		0	NC		0	6700000	N	0	NC		0	142500	0	NC	0	9500	RISK BASED SSL	1	9500	USEPA RISK BASED SSL	1
PYRENE	1700000	N	0	17000000	N	0	9500	1	NC	0	NC		0	NC		0	6700000	N	0	NC		0	142500	0	NC	0	9500	RISK BASED SSL	1	9500	USEPA RISK BASED SSL	1
SEMIVOLATILES (UG/KG)																																
4-METHYLPHENOL	6100000	N	0	62000000	N	0	1100	0	NC	0	8.5E+11	N	0	4E+12	N	0	24000000	N	0	2.1E+09	N	0	16500	0	NC	0	1100	RISK BASED SSL	0	1100	USEPA RISK BASED SSL	0
BIS(2-ETHYLHEXYL)PHTHALATE	35000	C	0	120000	C	0	1100	0	1400	0	1.4E+09	C	0	7.7E+09	C	0	1200000	C	0	1E+08	C	0	16500	0	21000	0	1100	RISK BASED SSL	0	1100	USEPA RISK BASED SSL	0
CARBAZOLE	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	600	TACO SO TO GW	1
DIBENZOFURAN	78000	N	0	1000000	N	0	110	3	NC	0	NC		0	NC		0	310000	N	0	NC		0	1650	0	NC	0	110	RISK BASED SSL	3	110	USEPA RISK BASED SSL	3
PHENOL	18000000	N	0	180000000	N	0	2600	0	NC	0	2.8E+11	N	0	1.3E+12	N	0	71000000	N	0	7.1E+08	N	0	39000	0	NC	0	2600	RISK BASED SSL	0	2600	USEPA RISK BASED SSL	0
SPLP METALS (UG/L)																																
ALUMINUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	3500	NON-TACO SO TO GW	2
ANTIMONY	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	10	TACO SO TO GW	3
ARSENIC	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	50	TACO SO TO GW[3]	0
BARIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	2000	TACO SO TO GW	0
BERYLLIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	4	TACO SO TO GW	0
CADMIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	5	TACO SO TO GW	0
CALCIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0
CHROMIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	100	TACO SO TO GW	0
COBALT	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	1000	TACO SO TO GW	0
COPPER	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	650	TACO SO TO GW	0
IRON	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	5000	TACO SO TO GW	3
LEAD	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	7.5	TACO SO TO GW	5
MAGNESIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0
MANGANESE	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	150	TACO SO TO GW	2
MERCURY	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	2	TACO SO TO GW	0
NICKEL	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	100	TACO SO TO GW	0
POTASSIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0
SELENIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	50	TACO SO TO GW	0
SILVER	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	50	TACO SO TO GW	0
SODIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0
THALLIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	2	TACO SO TO GW	0
VANADIUM	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	49	TACO SO TO GW	0
ZINC	NC		0	NC		0	NC	0	NC	0	NC		0	NC		0	NC		0	NC		0	NC	0	NC	0	NC		0	5000	TACO SO TO GW	0

Footnotes:
1 - Values which are pH-specific based on a pH of 7.25-7.74 from TACO Appendix B, Table C (Illinois EPA, 2013a).
Soil pH of 7.58 and 7.6 obtained from IDW laboratory results as presented in Appendix C.
2 - Forthcoming criteria revisions (not yet available) will decrease this value.
3 - 35 IAC 620 Class I groundwater standard for arsenic is 10 µg/L.
Notes:
Sources of screening values are presented in Table 4-2.
Number of samples that exceed the screening criterion is presented beside the screening criterion.
Shaded cells indicate that the concentration is greater than the screening criterion.

mg/kg = Milligram per kilogram
ug/kg = Microgram per kilogram
ug/L = Microgram per liter

Qualifiers:
J = Value is estimated

Abbreviations:
C = Carcinogen
CW = Construction worker
DAF 15 = Dilution Attenuation Factor of 15; selected based on information from USEPA soil screening guidance (USEPA, 1996a) and a source area of 1.75 acres.
IND = Industrial
ING = Ingestion
INH = Inhalation
MCL = Maximum Contaminant Level
N = Non-carcinogen
NC = No criteria
RES = Residential
SAT = Saturation Limit
SO TO GW = Soil to Groundwater
SSL = Soil Screening Level
TACO = Illinois Tiered Approach to Corrective Action Objectives
USEPA = United States Environmental Protection Agency

TABLE 4-6

SUMMARY OF POSITIVE DETECTIONS IN SUBSURFACE SOIL
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

LOCATION	OVERALL MINIMUM CRITERIA		NTC12SB21	NTC12SB22	NTC12SB23	NTC12SB24	NTC12SB25	NTC12SB26	NTC12SB27	NTC12SB28	NTC12SB29	NTC12SB30	NTC12SB31		NTC12SB32		NTC12SB33		NTC12SB34	
TOP DEPTH			5	0.5	8	0.5	2	4	2	2	2	0.5	3	5	2	4	2	4	2	4
BOTTOM DEPTH			7	2	10	2	4	6	4	4	4	2	5	7	4	6	4	6	4	6
METALS (MG/KG)																				
ALUMINUM	18000	USEPA CW INH	6720	9490	2400	1400	7630	10300	9680	6470	11700	1380	--	--	--	--	--	--	--	--
ANTIMONY	0.27	USEPA MCL BASED SSL	**2.48 J**	0.471 UJ	0.477 UJ	0.451 UJ	**0.327 J**	**4.24 J**	**0.297 J**	0.461 UJ	**0.589 J**	**0.604 J**	--	--	--	--	--	--	--	--
ARSENIC	0.0013	USEPA RISK BASED SSL	**18.3 J**	**10.8 J**	**9.41 J**	**4.26 J**	**7.74 J**	**25 J**	**8.9 J**	**7 J**	**17.1 J**	**7.33 J**	--	--	--	--	--	--	--	--
BARIUM	82	USEPA MCL BASED SSL	**432 J**	**37.9 J**	19.1 J	6.73 J	**109 J**	**157 J**	64 J	**149 J**	**163 J**	11.4 J	--	--	--	--	--	--	--	--
BERYLLIUM	3.2	USEPA MCL BASED SSL	1.48 U	0.611	0.154 J	0.208 J	0.554	3.11 U	1.02	0.496	0.933	0.175 J	--	--	--	--	--	--	--	--
CADMIUM	0.38	USEPA MCL BASED SSL	**5.65 J**	**0.804 J**	**0.208 J**	0.119 J	**1.5 J**	**7.31 J**	0.287 J	**0.497 J**	**1.08 J**	0.212 J	--	--	--	--	--	--	--	--
CALCIUM	NC		44200	37800	61600	31000	85700 J	52200	49500	62600	46500	26800	--	--	--	--	--	--	--	--
CHROMIUM	0.00059	USEPA RISK BASED SSL	**38.9 J**	**15.7 J**	**7.07 J**	**4.65 J**	**25.1 J**	**60.8 J**	**16.6 J**	**10.6 J**	**21.5 J**	**5.27 J**	--	--	--	--	--	--	--	--
COBALT	0.21	USEPA RISK BASED SSL	**9.44**	**9.9**	**3.91**	**2.37**	**7.66**	**17**	**10.4**	**7.41**	**13.5**	**2.94**	--	--	--	--	--	--	--	--
COPPER	22	USEPA RISK BASED SSL	**362**	**54.6**	**23**	6.56	**88.4 J**	**274**	**58.8**	**104**	**70.8**	10.3	--	--	--	--	--	--	--	--
IRON	270	USEPA RISK BASED SSL	**18000**	**18600**	**7870**	**4650**	**15900 J**	**19900**	**19400 J**	**14900**	**31400**	**5390**	--	--	--	--	--	--	--	--
LEAD	14	USEPA MCL BASED SSL	**332 J**	**77.4 J**	**39.4 J**	**26.6 J**	**127 J**	**300 J**	**46.8 J**	**168 J**	**845 J**	**33.2 J**	--	--	--	--	--	--	--	--
MAGNESIUM	325000	TACO RES ING	20800	20400	24200	13200	42600 J	21200	26000	31500	22100	12000	--	--	--	--	--	--	--	--
MANGANESE	21	USEPA RISK BASED SSL	**566**	**674**	**220**	**143**	**503 J**	**846**	**493 J**	**359**	**614**	**188**	--	--	--	--	--	--	--	--
MERCURY	0.033	USEPA RISK BASED SSL	**0.96**	**0.159**	**0.113**	0.0327 J	**0.908 J**	**1.99**	**0.0631**	**0.208**	**0.0335 J**	**0.0418**	--	--	--	--	--	--	--	--
NICKEL	20	USEPA RISK BASED SSL	**50.1**	**24.9**	9.43	4.36	**22.5 J**	**88.6**	**26.8**	**21**	**34.3**	5.8	--	--	--	--	--	--	--	--
POTASSIUM	NC		1420	1480	358	239 J	1490	2110	1340	1130	1600	205 J	--	--	--	--	--	--	--	--
SELENIUM	0.26	USEPA MCL BASED SSL	**5.07**	**0.584 J**	**0.45 J**	**0.271 J**	**0.807**	**6.57**	0.283 U	**0.494 J**	**0.621 J**	0.214 J	--	--	--	--	--	--	--	--
SILVER	0.6	USEPA RISK BASED SSL	**15.2**	**1.35**	0.334 J	0.113 U	**5.28 J**	**22.3**	0.0931 J	0.125 J	0.233 U	0.114 U	--	--	--	--	--	--	--	--
SODIUM	NC		173 J	87.5 J	149 J	84.7 J	250 J	270 J	138 J	172 J	181 J	99.4 J	--	--	--	--	--	--	--	--
VANADIUM	63	USEPA RISK BASED SSL	18.6	19.1	6.85	4.93	15.6	25.9	19.8	15.2	22	4.78	--	--	--	--	--	--	--	--
ZINC	290	USEPA RISK BASED SSL	**912 J**	226 J	119 J	43.7 J	253 J	**568 J**	232 J	**438 J**	**387 J**	79.7 J	--	--	--	--	--	--	--	--
PESTICIDES (UG/KG)																				
4,4'-DDD	6.4	USEPA RISK BASED SSL	**696**	**15.8**	2.37	4.31	**545**	**1090**	5.41 J	**55.1**	**19.7**	2.96	--	--	--	--	--	--	--	--
4,4'-DDE	46	USEPA RISK BASED SSL	**107**	**70.3**	0.692 J	1.78	**986 J**	**196**	12.9	29.4	10.5	0.989	--	--	--	--	--	--	--	--
4,4'-DDT	67	USEPA RISK BASED SSL	**823**	64.4	0.9	0.362 J	**77.2 J**	55.8	9.1	16.7	4.07	0.872	--	--	--	--	--	--	--	--
ALDRIN	0.65	USEPA RISK BASED SSL	**17**	0.463 J	0.391 U	0.365 U	0.626 J	**2.48**	0.385 U	0.375 U	0.557 J	0.383 U	--	--	--	--	--	--	--	--
ALPHA-BHC	0.036	USEPA RISK BASED SSL	**1.02**	0.391 U	0.391 U	0.365 U	0.401 UJ	**1.05**	0.385 U	**0.172 J**	0.394 U	0.383 U	--	--	--	--	--	--	--	--
ALPHA-CHLORDANE	13	USEPA RISK BASED SSL	**141**	**51.3**	0.391 U	0.25 J	1.68 J	**19.3**	0.466 J	0.61 J	1.88	0.202 J	--	--	--	--	--	--	--	--
BETA-BHC	0.13	USEPA RISK BASED SSL	**1.12**	0.391 U	0.391 U	0.365 U	0.401 UJ	**0.919**	0.385 U	0.375 U	**0.722 J**	0.383 U	--	--	--	--	--	--	--	--
DELTA-BHC	0.036	USEPA RISK BASED SSL	**6.05**	**0.389 J**	**0.217 J**	**2.43 J**	0.401 UJ	**1.53 J**	0.385 U	**0.164 J**	**0.282 J**	**0.31 J**	--	--	--	--	--	--	--	--
DIELDRIN	0.061	USEPA RISK BASED SSL	**5.47**	**4.32**	0.391 U	**0.321 J**	**4.79 J**	**13.4**	0.385 U	**1.05**	**0.919**	0.383 U	--	--	--	--	--	--	--	--
ENDOSULFAN I	1100	USEPA RISK BASED SSL	4.35	0.506 J	0.391 U	0.365 U	0.194 J	4.51	0.385 U	1.68	0.394 U	0.383 U	--	--	--	--	--	--	--	--
ENDOSULFAN II	1100	USEPA RISK BASED SSL	5.63	0.322 J	0.391 U	0.365 U	0.28 J	4.04	0.385 U	1.13	0.54 J	0.383 U	--	--	--	--	--	--	--	--
ENDOSULFAN SULFATE	1100	USEPA RISK BASED SSL	2.62	0.391 U	0.391 U	0.365 U	0.204 J	2.17	0.385 U	3.95	0.394 U	0.383 U	--	--	--	--	--	--	--	--
ENDRIN	68	USEPA RISK BASED SSL	7.4	6.75	0.391 U	0.235 J	9.89 J	12.9	0.385 U	2.95	0.371 J	0.383 U	--	--	--	--	--	--	--	--
ENDRIN ALDEHYDE	68	USEPA RISK BASED SSL	5.64	1.5	0.391 U	0.365 U	0.953 J	10.9	0.385 U	1.13	0.394 U	0.383 U	--	--	--	--	--	--	--	--
ENDRIN KETONE	68	USEPA RISK BASED SSL	0.388 U	0.391 U	0.391 U	0.365 U	0.401 U	0.415 U	0.385 U	0.715 J	0.394 U	0.383 U	--	--	--	--	--	--	--	--
GAMMA-BHC (LINDANE)	0.21	USEPA RISK BASED SSL	**0.346 J**	0.391 U	0.391 U	0.365 U	0.401 UJ	**0.531 J**	0.385 U	**3.61**	0.394 U	0.383 U	--	--	--	--	--	--	--	--
GAMMA-CHLORDANE	13	USEPA RISK BASED SSL	**129**	**29.2**	0.308 J	0.578 J	1.16 J	**47.1**	0.301 J	3.57	2.36	0.383 U	--	--	--	--	--	--	--	--
HEPTACHLOR	0.14	USEPA RISK BASED SSL	**1.83**	**1.45**	0.391 U	0.365 UJ	0.401 U	**1.19**	0.385 U	**0.182 J**	0.394 U	0.383 UJ	--	--	--	--	--	--	--	--
HEPTACHLOR EPOXIDE	0.068	USEPA RISK BASED SSL	**2.36**	**7**	0.391 U	**1.61**	**1.77 J**	**1.9**	0.385 U	0.375 U	**0.213 J**	**0.435 J**	--	--	--	--	--	--	--	--
METHOXYCHLOR	1500	USEPA MCL BASED SSL	0.388 U	0.391 U	0.391 U	0.954	0.528 J	0.415 U	0.385 U	1.33	0.394 U	0.383 UJ	--	--	--	--	--	--	--	--
PCBS (UG/KG)																				
AROCLOR-1254	8.8	USEPA RISK BASED SSL	**799**	NA	NA	NA	**105**	NA	9.43 U	**48.1 J**	**29.8 J**	NA	--	--	--	--	--	--	--	--
POLYNUCLEAR AROMATIC HYDROCARBONS (UG/KG)																				
2-METHYLNAPHTHALENE	140	USEPA RISK BASED SSL	**431**	26.5	49.4	8.5	69.7 J	**545**	15 J	**266**	22.7	3.31 J	--	--	--	--	--	--	--	--
ACENAPHTHENE	4100	USEPA RISK BASED SSL	275	26.6	72.9	7.48	76.8 J	403	9.79	1120	6.64 J	5.87 J	--	--	--	--	--	--	--	--
ACENAPHTHYLENE	4100	USEPA RISK BASED SSL	75.3	39.7	25.8	3.62 U	20.8 J	73.1	3.7 J	253	4.01 U	3.67 J	--	--	--	--	--	--	--	--
ANTHRACENE	4200	USEPA RISK BASED SSL	481	115	199	19	216 J	887	22.3	**5280**	23.8	20.3	--	--	--	--	--	--	--	--
BENZO(A)ANTHRACENE	10	USEPA RISK BASED SSL	**1290**	**475**	**204**	**41.3**	**493 J**	**2580**	**75.6**	**9780**	**76.8**	**46.2**	--	--	--	--	--	--	--	--
BENZO(A)PYRENE	3.5	USEPA RISK BASED SSL	**1350**	**632**	**149**	**40.1**	**770 J**	**1840**	**87.8**	**7740**	**75.7**	**53.5**	--	--	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	35	USEPA RISK BASED SSL	**830**	**801**	**179**	**53.7**	**1080 J**	**1380**	**129**	**11300**	**123**	**69.9**	--	--	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	9500	USEPA RISK BASED SSL	620	417	52.4	26.9	314 J	841	43.2	1110	49.3	34.8	--	--	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	350	USEPA RISK BASED SSL	**1450**	**515**	87.7	27.6	**486 J**	**2570**	47.4 J	**1500**	47.6	25.7	--	--	--	--	--	--	--	--
CHRYSENE	1100	USEPA RISK BASED SSL	**1120**	518	223	63	478 J	**2090**	83.4	**7940**	86.6	65.7	--	--	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	11	USEPA RISK BASED SSL	**336**	**106**	**17.4**	3.62 U	**109 J**	**283**	**12**	**705**	4.01 U	3.75 U	--	--	--	--	--	--	--	--
FLUORANTHENE	70000	USEPA RISK BASED SSL	2790	1400	500	118	1360 J	6480	169	21100	158	123	--	--	--	--	--	--	--	--
FLUORENE	4000	USEPA RISK BASED SSL	282	41.7	73.7	10	77.4 J	608	10.3	2510	10.2	3.75 U	--	--	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	150	USEPA RISK BASED SSL	**639**	**366**	50.4	19.9	**309 J**	**848**	38	**1330**	36.3	29.8	--	--	--	--	--	--	--	--
NAPHTHALENE	0.47	USEPA RISK BASED SSL	**255**	**18.2**	**61.3**	**8.38**	**122 J**	**439**	**7.68 J**	**323**	**43.2**	**4 J**	--	--	--	--	--	--	--	--
PHENANTHRENE	9500	USEPA RISK BASED SSL	2140	775	415	92.6	881 J	5520	121 J	**20200**	120	75.4	--	--	--	--	--	--	--	--
PYRENE	9500	USEPA RISK BASED SSL	2500	1150	478	104	1120 J	5890	143	**16800**	129	105	--	--	--	--	--	--	--	--
SEMIVOLATILES (UG/KG)																				
4-METHYLPHENOL	1100	USEPA RISK BASED SSL	268 J	195 U	194 U	182 U	375 J	167 J	189 U	186 U	201 U	188 U	--	--	--	--	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	1100	USEPA RISK BASED SSL	193 U	195 U	194 U	182 U	197 U	201 J	189 U	186 U	201 UJ	188 U	--	--	--	--	--	--	--	--
CARBAZOLE	600	TACO SO TO GW	193 UJ	195 UJ	194 UJ	182 UJ	197 UJ	494 J	189 UJ	**1080 J**	201 U	188 UJ	--	--	--	--	--	--	--	--
DIBENZOFURAN	110	USEPA RISK BASED SSL	**204 J**	195 U	194 U	182 U	197 U	**366 J**	189 U	**1140**	201 U	188 U	--	--	--	--	--	--	--	--
PHENOL	2600	USEPA RISK BASED SSL	193 U	195 U	194 U	182 U	99.7 J	208 U	189 U	186 U	201 U	188 U	--	--	--	--	--	--	--	--
SPLP METALS (UG/L)																				
ALUMINUM	3500	NON-TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	**5300 J**	970 J	770 J	1900 J	41 J	**10000 J**	1400 J	2700 J
ANTIMONY	10	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	4.4 J	3.6 J	9.1 J	**30 J**	**12 J**	**16 J**	0.82 U	7.6 J
ARSENIC	50	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	5	1.9	5.3	3.8	5.5	15	0.5 U	16
BARIUM	2000	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	40 J	16 J	3.8 J	36 J	17 J	130 J	35 J	27 J
BERYLLIUM	4	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	0.32 J	0.4 U	0.4 U	0.4 U	0.4 U	0.71 J	0.4 U	0.23 J
CADMIUM	5	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	0.75	0.47	0.1 U	0.28	0.05 J	4.8	0.042 J	0.82
CALCIUM	NC	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	27000	22000	38000	26000	45000	32000	180000	13000
CHROMIUM	100	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	12	3.3	1.7	9	0.77 J	46 J	6	14
COBALT	1000	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	2.5	0.57 J	0.14 J	1.4	0.13 J	13 J	0.31 J	3.7
COPPER	650	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	36	13	12	13	4.2	92 J	9.5	51
IRON	5000	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	**5300**	1100	10 U	2500	120	**13000**	210	**7200**
LEAD	7.5	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	**42 J**	**13 J**	0.5 U	**15 J**	1.5 J	**150 J**	0.84 J	**94 J**
MAGNESIUM	NC	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	5000	2700	500 U	3900	3200	8900	400 J	3300
MANGANESE	150	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	**160 J**	30 J	0.24 J	39 J	2.9 J	**360 J**	6.7 J	110 J
MERCURY	2	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	0.3	0.067 J	0.1 U	0.1 U	0.1 U	1	0.1 U	0.24
NICKEL	100	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	19	3.7	1.1	6	0.92 J	53 J	1.2	16
POTASSIUM	NC	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	2400	1100	1600	2600	1900	6000	4800	1200
SELENIUM	50	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	2.1	3.6	1 U	1 U	1 U	1.6 U	1 U	1 U
SILVER	50	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	3.5	1.4	0.1 U	1.6	0.045 J	13	0.1 U	1.6
SODIUM	NC	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	12000 J	12000 J	8700 J	22000 J	13000 J	14000 J	11000 J	24000 J
THALLIUM	2	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	0.22 J	0.054 J	0.1 U	0.069 J	0.1 U	0.32 J	0.1 U	0.081 J
VANADIUM	49	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	9	1.7	32	5.3	8.7	20	0.74 J	7
ZINC	5000	TACO SO TO GW	--	--	--	--	--	--	--	--	--	--	100 J	31 J	4 U	53 J	4 U	350 J	4.4 U	170 J

Notes:
Shaded cells indicate that the concentration is greater than the minimum screening criterion.
Sources of screening values are presented in Table 4-2.

mg/kg = Milligram per kilogram
ug/kg = Microgram per kilogram
ug/L = Microgram per liter

Qualifiers:
J = Value is estimated
U = Analyte not detected at the reporting limit left of the letter.
UJ = Numerical detection limit for the undetected result is estimated.

Abbreviations:
CW = Construction worker
ING = Ingestion
INH = Inhalation
MCL = Maximum Contaminant Level
NC = No criteria
RES = Residential
SO TO GW = Soil to Groundwater
SSL = Soil Screening Level
TACO = Illinois Tiered Approach to Corrective Action Objectives
USEPA = United States Environmental Protection Agency

TABLE 4-7

FIELD PARAMETERS MEASURED IN GROUNDWATER SAMPLES
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Monitoring Well	pH (S.U.)	S.C. (mS/cm)	Temperature (°C)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)
NTC12-MW01	6.83	1.99	14.97	0.8	0.00	6
NTC12-MW02	6.89	1.72	21.25	0.8	0.00	-56
NTC12-MW03	7.1	1.15	20.01	4.6	0.00	-134
NTC12-MW04	7.05	1.66	19.94	9.8	0.00	-145

Abbreviations:
mg/L - milligram per liter
mS/cm - Microsiemen per centimeter
mV - Millivolt
NTU - Nephelometric Turbidity Unit
ORP - Oxidation-Reduction Potential
S.C. - Specific Conductivity
S.U. - Standard Units

TABLE 4-8

GROUNDWATER SCREENING VALUES
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

PARAMETER	TACO - CLASS I[1]	TACO - CLASS II[1]	IAC GWS - CLASS I[2]	IAC GWS - CLASS II[2]	USEPA RSL[3]		USEPA MCL[4]	OVERALL MINIMUM CRITERIA	
METALS (UG/L)									
ALUMINUM	3500[5]	5000[5]	NC	NC	16000	N	NC	3500	TACO I
ARSENIC	50	200	10	200	0.045	C	10	0.045	USEPA RSL
BARIUM	2000	2000	2000	2000	2900	N	2000	2000	USEPA MCL, TACO I, TACO 2, IAC GWS I, IAC GWS 2
CADMIUM	5	50	5	50	6.9	N	5	5	USEPA MCL, TACO I, IAC GWS I
CALCIUM	NC	NC	NC	NC	NC		NC	NC	
CHROMIUM	100	1000	100	1000	0.031	C	100	0.031	USEPA RSL
COBALT	1000	1000	1000	1000	4.7	N	NC	4.7	USEPA RSL
COPPER	650	650	650	650	620	N	1300	620	USEPA RSL
IRON	5000	5000	5000	5000	11000	N	NC	5000	TACO I, TACO 2, IAC GWS I, IAC GWS 2
LEAD	7.5	100	7.5	100	NC		15	7.5	TACO I, IAC GWS I
MAGNESIUM	NC	NC	NC	NC	NC		NC	NC	
MANGANESE	150	10,000	150	10,000	320	N	NC	150	TACO I, IAC GWS I
NICKEL	100	2000	100	2000	300	N	NC	100	TACO I, IAC GWS I
POTASSIUM	NC	NC	NC	NC	NC		NC	NC	
SELENIUM	50	50	50	50	78	N	50	50	USEPA MCL, TACO I, TACO 2, IAC GWS I, IAC GWS 2
SILVER	50	NC	50	NC	71	N	NC	50	TACO I, IAC GWS I
SODIUM	NC	NC	NC	NC	NC		NC	NC	
THALLIUM	2	20	2	20	0.16	N	2	0.16	USEPA RSL
VANADIUM	49	100	49	100	63	N	NC	49	TACO I, IAC GWS I
ZINC	5000	10,000	5,000	10,000	4700	N	NC	4700	USEPA RSL
DISSOLVED METALS (UG/L)									
ARSENIC	50	200	10	200	0.045	C	10	0.045	USEPA RSL
BARIUM	2000	2000	2000	2000	2900	N	2000	2000	USEPA MCL, TACO I, TACO 2, IAC GWS I, IAC GWS 2
CADMIUM	5	50	5	50	6.9	N	5	5	USEPA MCL, TACO I, IAC GWS I
CALCIUM	NC	NC	NC	NC	NC		NC	NC	
COBALT	1000	1000	1000	1000	4.7	N	NC	4.7	USEPA RSL
COPPER	650	650	650	650	620	N	1300	620	USEPA RSL
IRON	5000	5000	5000	5000	11000	N	NC	5000	TACO I, TACO 2, IAC GWS I, IAC GWS 2
LEAD	7.5	100	7.5	100	NC		15	7.5	TACO I, IAC GWS I
MAGNESIUM	NC	NC	NC	NC	NC		NC	NC	
MANGANESE	150	10,000	150	10,000	320	N	NC	150	TACO I, IAC GWS I
NICKEL	100	2000	100	2000	300	N	NC	100	TACO I, IAC GWS I
POTASSIUM	NC	NC	NC	NC	NC		NC	NC	
SILVER	50	NC	50	NC	71	N	NC	50	TACO I, IAC GWS I
SODIUM	NC	NC	NC	NC	NC		NC	NC	
THALLIUM	2	20	2	20	0.16	N	2	0.16	USEPA RSL
ZINC	5000	10,000	5,000	10,000	4700	N	NC	4700	USEPA RSL

TABLE 4-8

GROUNDWATER SCREENING VALUES
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Footnotes:
1 - Tiered Approach to Corrective Action Objectives (TACO), Section 742 Table E, Tier 1 Groundwater Remediation Objectives (Illinois EPA, 2013a).
2 - Illinois Adminstrative Code Groundwater Standards for Class I a& II. Title 35 Section 620.410 & 620.420. Effective October 5, 2012. Accessed November 12, 2013 (IAC,
3 - USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, November 2013 (USEPA, 2013). Tapwater values.
[Cancer benchmark value = 1E-06, hazard quotient (HQ) = 1].
4 - Maximum Contaminant Level. 2012 Edition of the Drinking Water Standards and Health Advisories (USEPA, 2012a).
5 - TACO value not available; non-TACO value presented.

Abbreviations:
TACO 1 - TACO, Class I Groundwater Remediation Objectives
TACO 2 - TACO, Class II Groundwater Remediation Objectives
IAC GWS 1- Illinois Adminstrative Code Groundwater Standards, Class I
IAC GWS 2- Illinois Adminstrative Code Groundwater Standards, Class II
USEPA RSL - USEPA Regional Screening Levels
USEPA MCL - USEPA Maximum Contaminant Levels
NC - No criteria
N - Noncarcinogen
C - Carcinogen

TABLE 4-9

OCCURRENCE AND DISTRIBUTION OF METALS IN GROUNDWATER
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

PARAMETER	FREQUENCY OF DETECTION	MINIMUM RESULT	MAXIMUM RESULT	LOCATION OF MAXIMUM DETECT	MINIMUM NON-DETECT	MAXIMUM NON-DETECT	AVERAGE POSITIVE RESULT	OVERALL AVERAGE	STANDARD DEVIATION	TACO - CLASS I		TACO - CLASS II		IAC GWS - CLASS I		IAC GWS - CLASS II		USEPA RSL			USEPA MCL	
METALS (UG/L)																						
ALUMINUM	1/4	57 J	57 J	NTC12MW04	50	50	57.0	33.0	16.0	3500	0	5000	0	NC	0	NC	0	16000	N	0	NC	0
ARSENIC	3/4	5.3	78	NTC12MW04	1	1	37.3	28.1	35.5	**50**	**1**	200	0	**10**	**2**	200	0	**0.045**	**C**	**3**	**10**	**2**
BARIUM	4/4	45 J	240 J	NTC12MW04			139	139	80.7	2000	0	2000	0	2000	0	2000	0	2900	N	0	2000	0
CADMIUM	3/4	0.054 J	0.39	NTC12MW01	0.1	0.1	0.18	0.15	0.162	5	0	50	0	5	0	50	0	6.9	N	0	5	0
CALCIUM	4/4	130000	240000	NTC12MW02			193000	193000	46458	NC	0	NC	0	NC	0	NC	0	NC		0	NC	0
CHROMIUM	4/4	0.24 J	0.81 J	NTC12MW01	1	1	0.51	0.51	0.234	100	0	1000	0	100	0	1000	0	**0.031**	**C**	**4**	100	0
COBALT	4/4	0.19 J	7	NTC12MW02			2.6	2.6	3.10	1000	0	1000	0	1000	0	1000	0	**4.7**	**N**	**1**	NC	0
COPPER	4/4	0.72 J	7 J	NTC12MW01			3.0	3.0	2.78	650	0	650	0	650	0	650	0	620	N	0	1300	0
IRON	4/4	66	19000	NTC12MW04			8000	8000	8246	**5000**	**2**	**5000**	**2**	**5000**	**2**	**5000**	**2**	**11000**	**N**	**1**	NC	0
LEAD	3/4	0.2 J	2.1	NTC12MW04	0.5	0.5	0.84	0.69	0.939	7.5	0	100	0	7.5	0	100	0	NC		0	15	0
MAGNESIUM	4/4	51000	160000	NTC12MW01			88500	88500	50256	NC	0	NC	0	NC	0	NC	0	NC		0	NC	0
MANGANESE	4/4	220 J	740 J	NTC12MW04			463	463	252	**150**	**4**	10000	0	**150**	**4**	10000	0	**320**	**N**	**2**	NC	0
NICKEL	4/4	0.91 J	40	NTC12MW02			12.4	12.4	18.6	100	0	2000	0	100	0	2000	0	300	N	0	NC	0
POTASSIUM	4/4	5300	7100	NTC12MW04			6130	6130	793	NC	0	NC	0	NC	0	NC	0	NC		0	NC	0
SELENIUM	1/4	4.2	4.2	NTC12MW02	1	1	4.2	1.4	1.85	50	0	50	0	50	0	50	0	78	N	0	50	0
SILVER	2/4	0.046 J	0.06 J	NTC12MW01	0.1	0.1	0.053	0.052	0.006	50	0	NC	0	50	0	NC	0	71	N	0	NC	0
SODIUM	4/4	65000	160000	NTC12MW02			107000	107000	40028	NC	0	NC	0	NC	0	NC	0	NC		0	NC	0
THALLIUM	2/4	0.035 J	0.056 J	NTC12MW01	0.1	0.1	0.046	0.048	0.009	2	0	20	0	2	0	20	0	0.16	N	0	2	0
VANADIUM	4/4	0.11 J	0.42 J	NTC12MW04	1	1	0.28	0.28	0.142	49	0	100	0	49	0	100	0	63	N	0	NC	0
ZINC	4/4	4.8 J	130	NTC12MW02			47.0	47.0	57.5	5000	0	10000	0	5000	0	10000	0	4700	N	0	NC	0
DISSOLVED METALS (UG/L)																						
ARSENIC	3/4	5.8	71	NTC12MW04	1.1	1.1	34.8	26.2	32.1	**50**	**1**	200	0	**10**	**2**	200	0	**0.045**	**C**	**3**	**10**	**2**
BARIUM	4/4	48	220	NTC12MW04			136	136	72.6	2000	0	2000	0	2000	0	2000	0	2900	N	0	2000	0
CADMIUM	2/4	0.12 J	0.45	NTC12MW01	0.1	0.1	0.29	0.17	0.191	5	0	50	0	5	0	50	0	6.9	N	0	5	0
CALCIUM	4/4	130000	240000	NTC12MW02			194000	194000	44230	NC	0	NC	0	NC	0	NC	0	NC		0	NC	0
COBALT	4/4	0.21 J	9	NTC12MW02			3.3	3.3	4.03	1000	0	1000	0	1000	0	1000	0	**4.7**	**N**	**1**	NC	0
COPPER	4/4	0.66 J	7.4 J	NTC12MW01			2.7	2.7	3.15	650	0	650	0	650	0	650	0	620	N	0	1300	0
IRON	4/4	55	18000	NTC12MW04			7800	7800	7798	**5000**	**2**	**5000**	**2**	**5000**	**2**	**5000**	**2**	**11000**	**N**	**1**	NC	0
LEAD	1/4	0.22 J	0.22 J	NTC12MW02	0.5	0.5	0.22	0.24	0.015	7.5	0	100	0	7.5	0	100	0	NC		0	15	0
MAGNESIUM	4/4	52000	150000	NTC12MW01			86500	86500	44606	NC	0	NC	0	NC	0	NC	0	NC		0	NC	0
MANGANESE	4/4	240 J	670 J	NTC12MW04			456	456	230	**150**	**4**	10000	0	**150**	**4**	10000	0	**320**	**N**	**2**	NC	0
NICKEL	4/4	0.59 J	48	NTC12MW02			14.9	14.9	22.4	100	0	2000	0	100	0	2000	0	300	N	0	NC	0
POTASSIUM	4/4	5500	6900	NTC12MW04			6180	6180	727	NC	0	NC	0	NC	0	NC	0	NC		0	NC	0
SILVER	2/4	0.056 J	0.077 J	NTC12MW01	0.1	0.1	0.067	0.058	0.013	50	0	NC	0	50	0	NC	0	71	N	0	NC	0
SODIUM	4/4	63000	160000	NTC12MW02			107000	107000	40264	NC	0	NC	0	NC	0	NC	0	NC		0	NC	0
THALLIUM	2/4	0.029 J	0.055 J	NTC12MW01	0.1	0.1	0.042	0.046	0.012	2	0	20	0	2	0	20	0	0.16	N	0	2	0
ZINC	4/4	3.7 J	130	NTC12MW02			46.2	46.2	58.8	5000	0	10000	0	5000	0	10000	0	4700	N	0	NC	0

Notes:
Sources of screening values are presented in Table 4-8.
Number of samples that exceed the screening criterion is presented beside the screening criterion.
Shaded cells indicate that the concentration is greater than the screening criterion.

Abbreviations:
C - Carcinogen
N - Noncarcinogen
NC - No criteria
J - Value is estimated

TABLE 4-10

SUMMARY OF POSITIVE DETECTIONS IN GROUNDWATER
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

LOCATION	OVERALL MINIMUM CRITERIA		NTC12MW01	NTC12MW02	NTC12MW03	NTC12MW04
METALS (UG/L)						
ALUMINUM	16000	USEPA RSL	50 U	50 U	50 U	57 J
ARSENIC	0.045	USEPA RSL	1 U	**5.3**	**28**	**78**
BARIUM	2000	USEPA MCL, TACO I, TACO 2, IAC GWS	45 J	150 J	120 J	240 J
CADMIUM	5	USEPA MCL, TACO I, IAC GWS	0.39	0.11 J	0.1 U	0.054 J
CALCIUM	NC		190000	240000	130000	210000
CHROMIUM	0.031	USEPA RSL	**0.81 J**	**0.48 J**	**0.24 J**	**0.5 J**
COBALT	4.7	USEPA RSL	2.6	**7**	0.19 J	0.68 J
COPPER	620	USEPA RSL	7 J	1.6 J	0.72 J	2.5 J
IRON	5000	TACO I, TACO 2, IAC GWS	66	3700	**9300**	**19000**
LEAD	7.5	TACO I, IAC GWS	0.5 U	0.21 J	0.2 J	2.1
MAGNESIUM	NC		160000	56000	51000	87000
MANGANESE	150	TACO I, IAC GWS	**220 J**	**610 J**	**280 J**	**740 J**
NICKEL	100	TACO I, IAC GWS	7.2	40	0.91 J	1.4
POTASSIUM	NC		5700	6400	5300	7100
SELENIUM	50	USEPA MCL, TACO I, TACO 2, IAC GWS	1 U	4.2	1 U	1 U
SILVER	50	TACO I, IAC GWS	0.06 J	0.1 U	0.1 U	0.1 U
SODIUM	NC		65000	160000	92000	110000
THALLIUM	0.16	USEPA RSL	0.056 J	0.035 J	0.1 U	0.1 U
VANADIUM	49	TACO I, IAC GWS	0.37 J	0.22 J	0.11 J	0.42 J
ZINC	4700	TACO I, IAC GWS	41	130	4.8 J	12
DISSOLVED METALS (UG/L)						
ARSENIC	0.045	USEPA RSL	1.1 U	**5.8**	**27**	**71**
BARIUM	2000	USEPA MCL, TACO I, TACO 2, IAC GWS	48	160	110	220
CADMIUM	5	USEPA MCL, TACO I, IAC GWS	0.45	0.12 J	0.1 U	0.1 U
CALCIUM	NC		190000	240000	130000	210000
COBALT	4.7	USEPA RSL	3.3	**9**	0.21 J	0.7 J
COPPER	620	USEPA RSL	7.4 J	1.8 J	0.66 J	0.98 J
IRON	5000	TACO I, TACO 2, IAC GWS	55	3800	**9100**	**18000**
LEAD	7.5	TACO I, IAC GWS	0.5 U	0.22 J	0.5 U	0.5 U
MAGNESIUM	NC		150000	58000	52000	85000
MANGANESE	150	TACO I, IAC GWS	**240 J**	**640 J**	**270 J**	**670 J**
NICKEL	100	TACO I, IAC GWS	9.3	48	0.59 J	1.4
POTASSIUM	NC		5500	6700	5500	6900
SILVER	50	USEPA MCL, TACO I, TACO 2, IAC GWS	0.077 J	0.1 U	0.1 U	0.1 U
SODIUM	NC		63000	160000	95000	110000
THALLIUM	0.16	USEPA RSL	0.055 J	0.029 J	0.1 U	0.1 U
ZINC	4700	USEPA RSL	44	130	4.1 J	6.9 J

Notes:
Sources of screening values are presented in Table 4-8.
Shaded cells indicate that the concentration is greater than the minimum screening criterion.

Abbreviations:
NC - No criteria
J - Value is estimated
U - Analyte not detected at the reporting limit left of the letter

TABLE 4-11

COMPARISON OF CHEMICAL CONCENTRATIONS IN SITE 12 SOIL AND OUTER HARBOR SEDIMENT
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

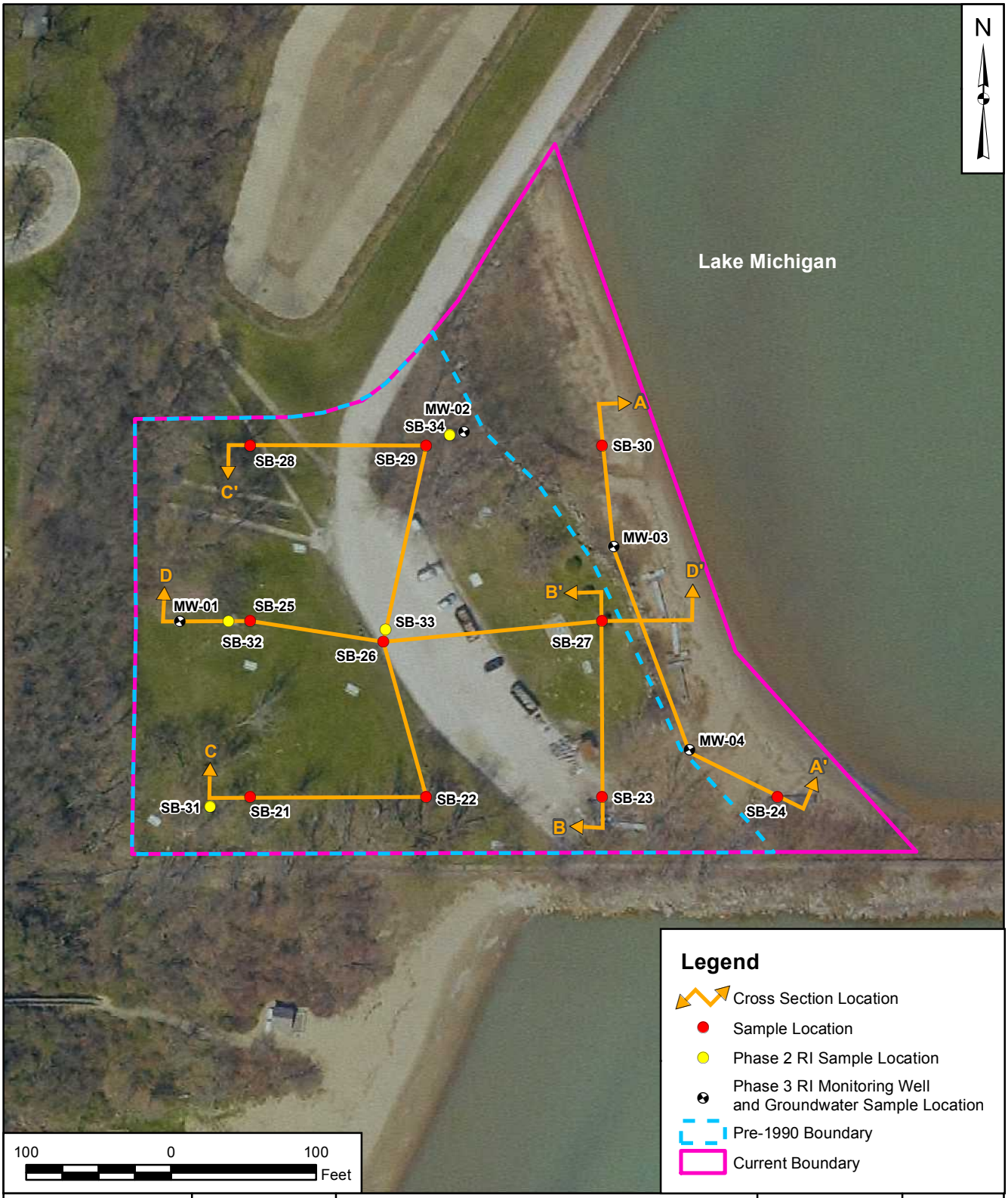
Chemical	Maximum Sediment Concentration[1]	Surface Soil						Subsurface Soil					
		Frequency of Detection	Minimum Concentration	Maximum Concentration	Location of Maximum Concentration	Average Positive Result[2]	Overall Average[3]	Frequency of Detection	Minimum Concentration	Maximum Concentration	Location of Maximum Concentration	Average Positive Result[2]	Overall Average[3]
METALS (MG/KG)													
ALUMINUM	3733	10/10	1250	**10000**	NTC12SB27	**5970**	**5970**	10/10	1380	**11700**	NTC12SB29	**6717**	**6717**
ANTIMONY	<1	3/10	0.44 J	**1.12** J	NTC12SB29	**0.67**	**0.52**	6/10	0.297 J	**4.24** J	NTC12SB26	**1.42**	**1.04**
ARSENIC	8.3	10/10	4.28 J	**16.9** J	NTC12SB25	**9.1**	**9.1**	10/10	4.26 J	**25** J	NTC12SB26	**12**	**12**
BARIUM	15.4	10/10	8.12 J	**244** J	NTC12SB21	**72.4**	**72.4**	10/10	6.73 J	**432** J	NTC12SB21	**120**	**120**
BERYLLIUM	0.3	10/10	0.147 J	**5.5**	NTC12SB27	**0.94**	**0.94**	8/10	0.154 J	**1.02**	NTC12SB27	**0.519**	**0.874**
CADMIUM	1	10/10	0.119 J	**1.03** J	NTC12SB29	0.55	0.55	10/10	0.119 J	**7.31** J	NTC12SB26	**1.82**	**1.82**
CALCIUM	94589	10/10	24400	**142000**	NTC12SB23	71200	71200	10/10	26800	85700 J	NTC12SB25	49790	49790
CHROMIUM	11.8	10/10	4.07 J	**23.8** J	NTC12SB27	**12.4**	**12.4**	10/10	4.65 J	**60.8** J	NTC12SB26	**21**	**21**
COBALT	4.29	10/10	2.08	**11.2**	NTC12SB27	**7.1**	**7.1**	10/10	2.37	**17**	NTC12SB26	**8.45**	**8.45**
COPPER	37.9	10/10	6.55	**271**	NTC12SB27	**68.4**	**68.4**	10/10	6.56	**362**	NTC12SB21	**105**	**105**
IRON	14200	10/10	4710	**20300**	NTC12SB27	13000	13000	10/10	4650	**31400**	NTC12SB29	**15601**	**15601**
LEAD	40.3	10/10	17.9 J	**263** J	NTC12SB29	**85.6**	**85.6**	10/10	26.6 J	**845** J	NTC12SB29	**200**	**200**
MAGNESIUM	49565	10/10	11100	**84600**	NTC12SB23	39800	39800	10/10	12000	42600 J	NTC12SB25	23400	23400
MANGANESE	455	10/10	137	**701**	NTC12SB29	446	446	10/10	143	**846**	NTC12SB26	**461**	**461**
MERCURY	0.15	10/10	0.0235 J	**0.598**	NTC12SB26	**0.18**	**0.18**	10/10	0.0327 J	**1.99**	NTC12SB26	**0.451**	**0.451**
NICKEL	9.5	10/10	4.49	**34.7**	NTC12SB27	**18.5**	**18.5**	10/10	4.36	**88.6**	NTC12SB26	**29**	**29**
POTASSIUM	1236	10/10	230 J	**1640**	NTC12SB27	1030	1030	10/10	205 J	**2110**	NTC12SB26	1137	1137
SELENIUM	<0.2	7/10	0.288 J	**0.791**	NTC12SB29	**0.53**	**0.45**	9/10	0.214 J	**6.57**	NTC12SB26	**1.68**	**1.54**
SILVER	0.3	8/10	0.234 J	**1.33**	NTC12SB29	**0.55**	**0.47**	7/10	0.0931 J	**22.3**	NTC12SB26	**6.38**	**4.51**
SODIUM	454	10/10	75.3 J	336 J	NTC12SB29	201	201	10/10	84.7 J	270 J	NTC12SB26	160	160
THALLIUM	<1	1/10	0.167 J	0.167 J	NTC12SB29	0.17	0.24	Not detected					
VANADIUM	25.2	10/10	4.53	18.9	NTC12SB27	12.7	12.7	10/10	4.78	**25.9**	NTC12SB26	15	15
ZINC	118	10/10	44.7 J	**1530** J	NTC12SB27	**324**	**324**	10/10	43.7 J	**912** J	NTC12SB21	**326**	**326**

Notes:
Shaded concentration indicates that the soil concentration exceeds the maximum sediment concentration.

Footnotes:
1 - Maximum concentration of sediment samples 1, 2, and 11 collected 6/15/2006, and 37 collected 6/14/2007. Samples 1, 11, and 37 were sand 3 to 5 feet deep. Sample 2 was muck from 2 to 7 feet deep on top of 1 to 5 feet of sand and sand/sit/clay mixture.
2 - Average of detected concentrations only.
3 - Average of all analytical results including one-half of the detection limit for non-detects.

Abbreviations:
J = Estimated value

PGH P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE12_X-SECTIONS.MXD 11/25/13 DC

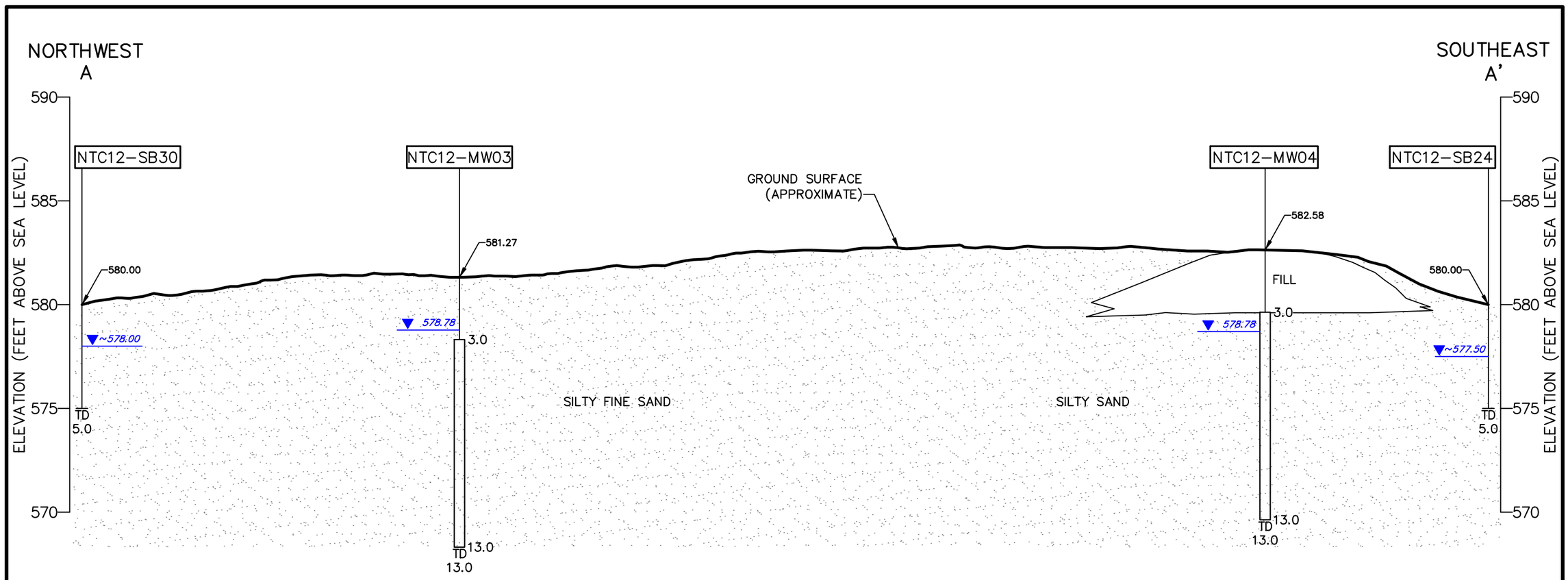


DRAWN BY: T. WHEATON	DATE: 02/25/11
CHECKED BY: E. BERKLITE	DATE: 11/25/13
REVISED BY: D. COUCH	DATE: 11/25/13
SCALE: AS NOTED	

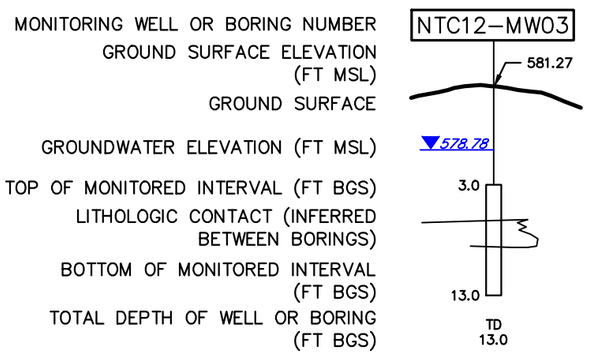
NAVFAC

CROSS SECTION LOCATIONS
SITE 12 - HARBOR DREDGE SPOIL AREA
NS GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER: 2416	CTO NUMBER: F27A
APPROVED BY: C. RICH	DATE: 11/25/13
APPROVED BY:	DATE:
FIGURE NO.: FIGURE 4-1	REV: 0



LEGEND:



POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES.

NOTE:

CROSS SECTION IS NOT TO BE USED FOR DESIGN PURPOSES, AND ALL LOCATIONS ARE APPROXIMATE.

0 20 40
HORIZONTAL SCALE: 1" = 20'

0 5 10
VERTICAL SCALE: 1" = 5'

DRAWN BY ND DATE 2/21/11	CROSS SECTION A–A' SITE 12 – HARBOR DREDGE SPOIL AREA NS GREAT LAKES GREAT LAKES, ILLINOIS	CONTRACT NO. F27A
CHECKED BY SJC DATE 11/20/13		OWNER NO.
REVISED BY CK DATE 11/20/13		APPROVED BY CR DATE 11/20/13
SCALE AS NOTED		DRAWING NO. FIGURE 4–2 REV. 0

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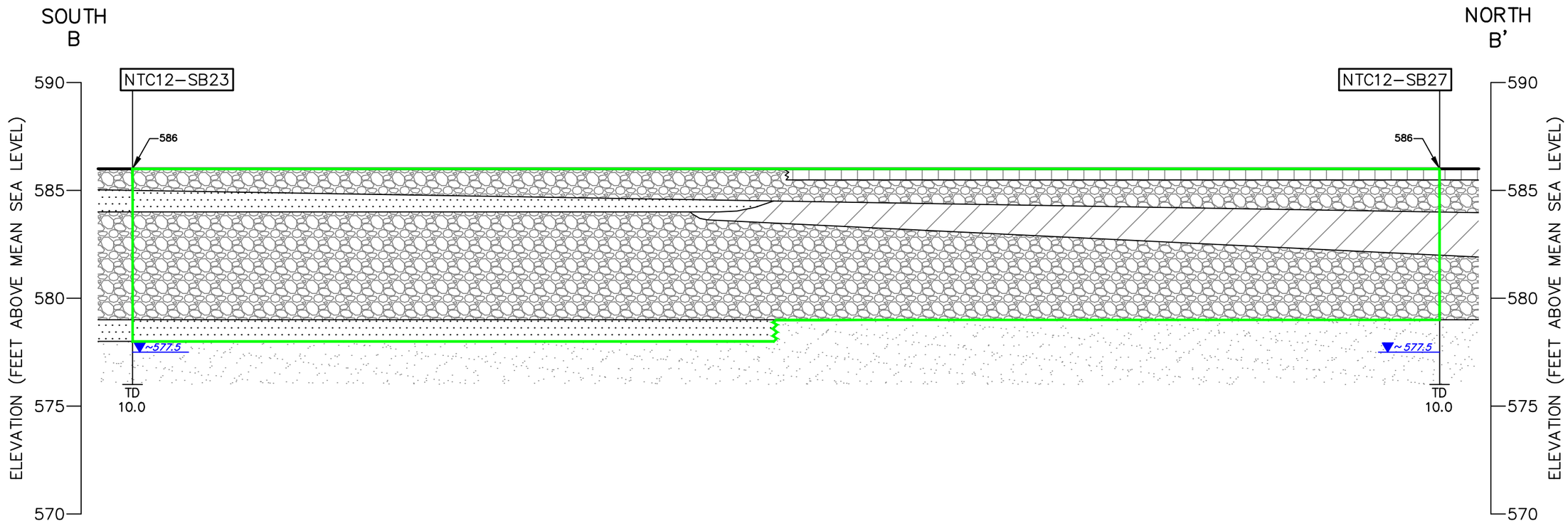


LEGEND:

MONITORING WELL OR BORING NUMBER

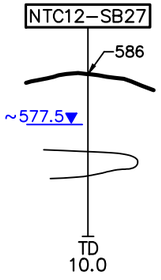
GROUND SURFACE ELEVATION

GROUND SURFACE

ESTIMATED GROUNDWATER ELEVATION (MSL)

LITHOLOGIC CONTACT (INFERRED BETWEEN BORINGS)

TOTAL DEPTH OF BORING (FT BGS)



WELL–GRADED GRAVELS, GRAVEL–SAND MIXTURES, LITTLE OR NO FINES

CLAYEY SANDS, SAND–CLAY MIXTURES

WELL–GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES

POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES.

INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY

FILL

NOTE:

CROSS SECTION IS NOT TO BE USED FOR DESIGN PURPOSES, AND ALL LOCATIONS ARE APPROXIMATE.

0 10 20

HORIZONTAL SCALE: 1" = 10'

0 5 10

VERTICAL SCALE: 1" = 5'

DRAWN BY ND	DATE 2/21/11
CHECKED BY SJC	DATE 11/20/13
REVISED BY CK	DATE 11/20/13
SCALE AS NOTED	

NAVFAC

CROSS SECTION B–B'
SITE 12 – HARBOR DREDGE SPOIL AREA
NS GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NO. F27A	
OWNER NO.	
APPROVED BY CR	DATE 11/20/13
DRAWING NO. FIGURE 4–3	REV. 0

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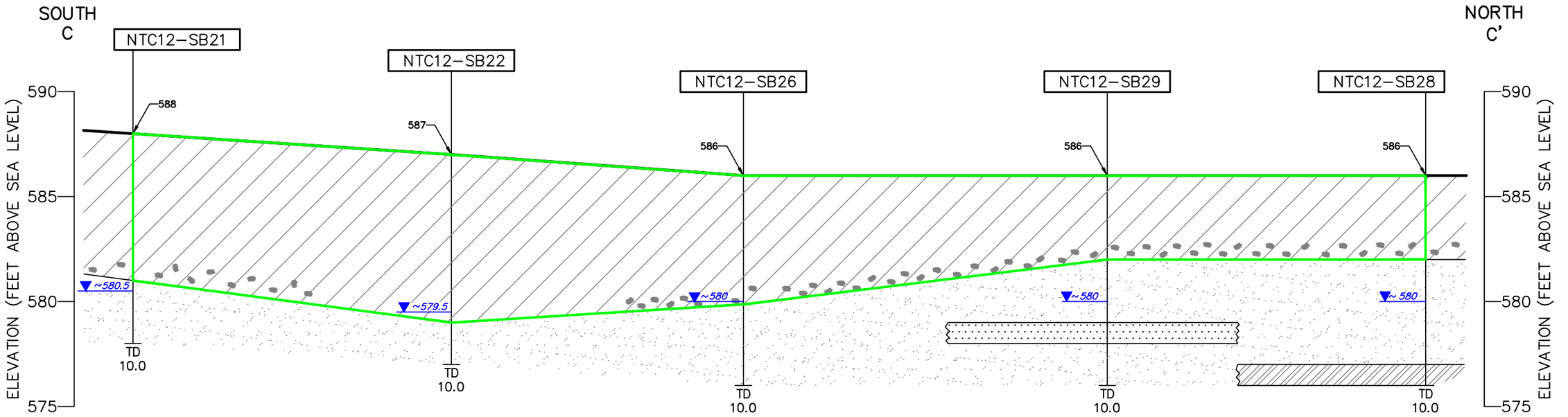


LEGEND:

MONITORING WELL OR BORING NUMBER — NTC12–SB28

GROUND SURFACE ELEVATION — 586

GROUND SURFACE

ESTIMATED GROUNDWATER ELEVATION (MSL) — ~578▼

LITHOLOGIC CONTACT (INFERRED BETWEEN BORINGS)

TOTAL DEPTH OF BORING (FT BGS) — TD 10.0

INORGANIC CLAYS OF HIGH PLASTICALLY, FAT CLAYS

CLAYEY SANDS, SAND–CLAY MIXTURES

WELL–GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES

POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES

FILL

ASPHALT PIECES

NOTE:

CROSS SECTION IS NOT TO BE USED FOR DESIGN PURPOSES, AND ALL LOCATIONS ARE APPROXIMATE.

0 40 80
HORIZONTAL SCALE: 1" = 40'

0 5 10
VERTICAL SCALE: 1" = 5'

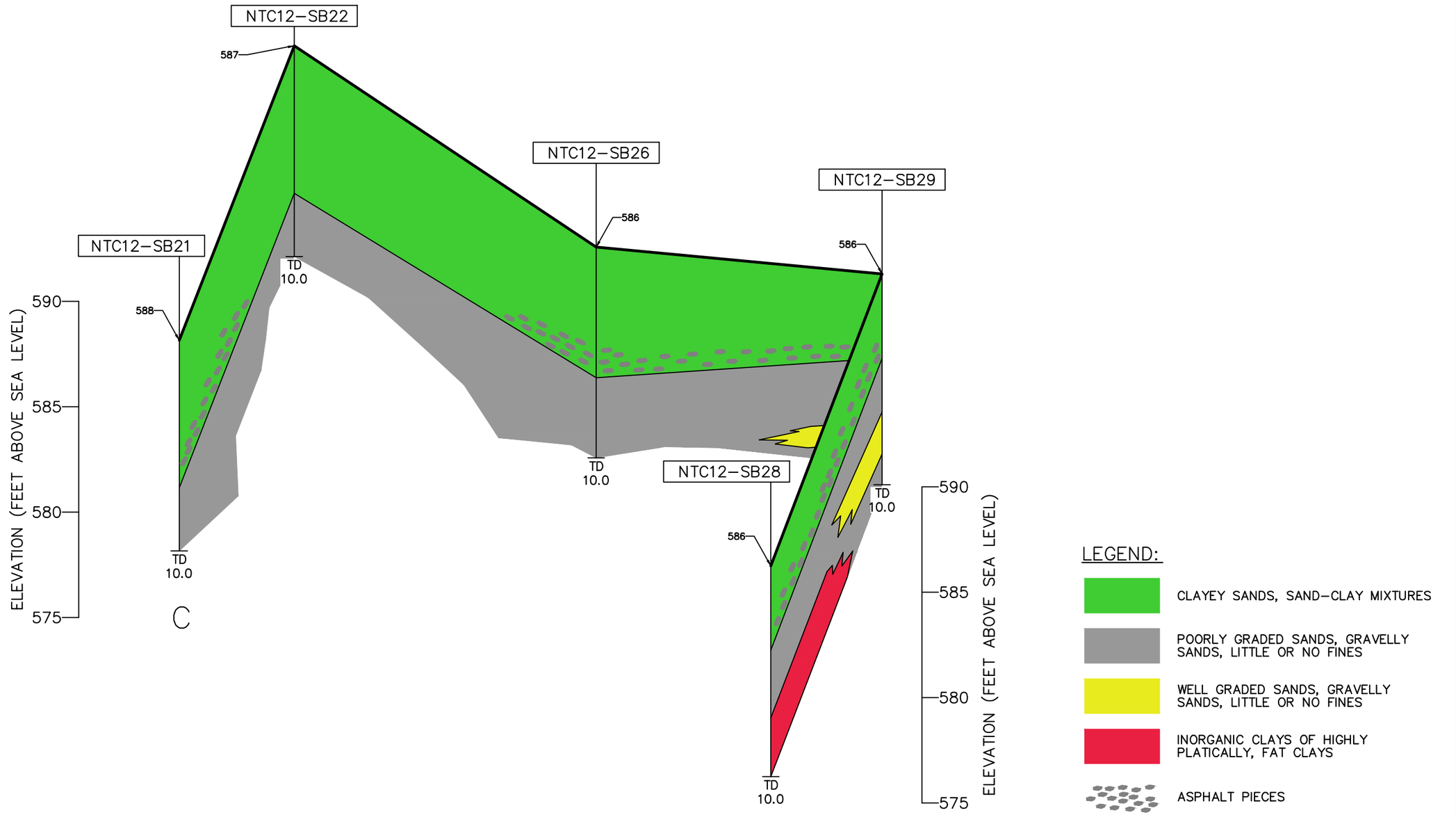
DRAWN BY ND	DATE 2/21/11
CHECKED BY SJC	DATE 11/20/13
REVISED BY CK	DATE 11/20/13
SCALE AS NOTED	

NAVFAC

CROSS SECTION C–C'
SITE 12 – HARBOR DREDGE SPOIL AREA
NS GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NO. F27A	
OWNER NO.	
APPROVED BY CR	DATE 11/20/13
DRAWING NO. FIGURE 4–4	REV. 0

R:\2416 – NS Great Lakes\Figures\2416FG004.dwg PIT CARLY.KRAMER 11/18/2013 10:39:26 AM



DRAWN BY MF	DATE 6/20/11	GEOLOGIC FENCE DIAGRAM C–C' SITE 12 – HARBOR DREDGE SPOIL AREA NS GREAT LAKES GREAT LAKES, ILLINOIS
CHECKED BY SJC	DATE 11/20/13	
REVISED BY CK	DATE 11/20/13	
SCALE NONE		

NAVFAC

CONTRACT NO.	
OWNER NO.	
APPROVED BY CR	DATE 11/20/13
DRAWING NO. FIGURE 4–4A	REV. 0

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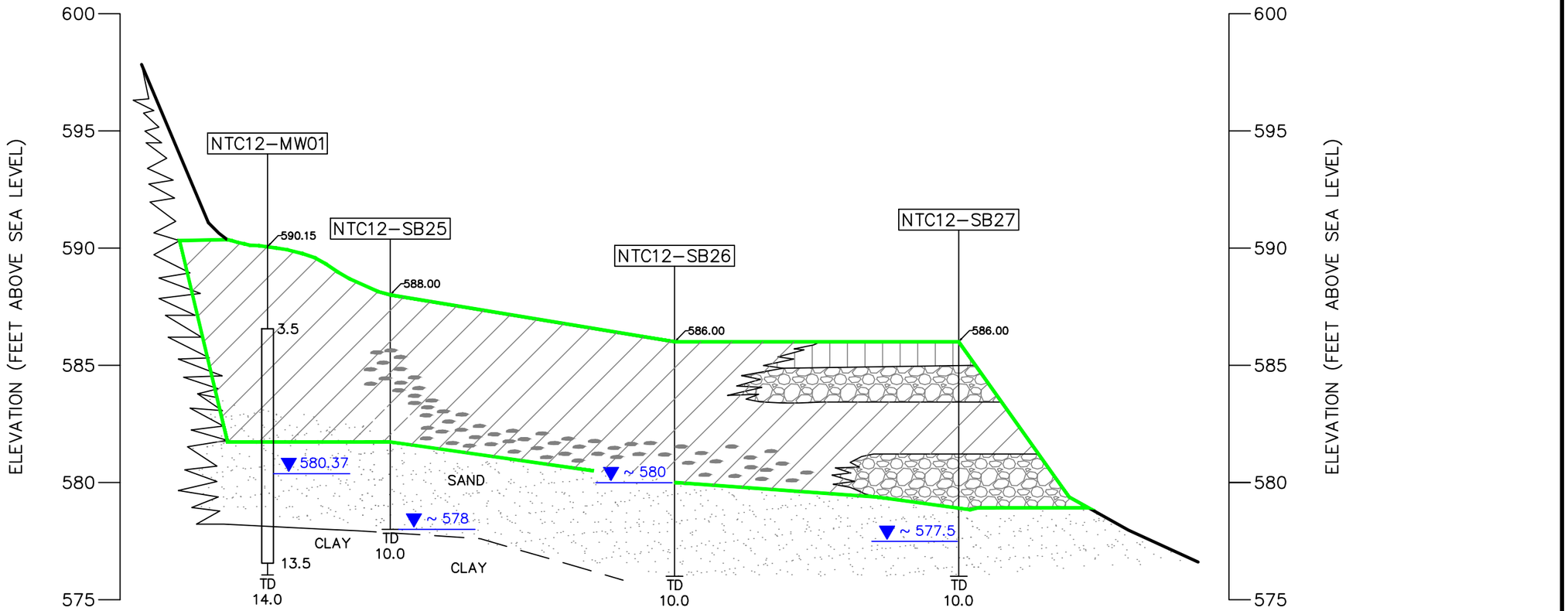
WEST
D

EAST
D'



LEGEND:

MONITORING WELL OR BORING NUMBER

GROUND SURFACE ELEVATION

GROUND SURFACE

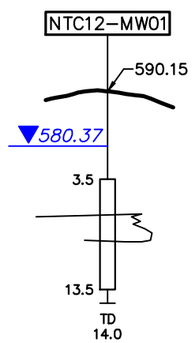
GROUNDWATER ELEVATION (MSL)

TOP OF MONITORED INTERVAL (FT BGS)

LITHOLOGIC CONTACT (INFERRED BETWEEN BORINGS)

BOTTOM OF MONITORED INTERVAL (FT BGS)

TOTAL DEPTH OF WELL OR BORING (FT BGS)



WELL–GRADED GRAVELS, GRAVEL–SAND MIXTURES, LITTLE OR NO FINES

CLAYEY SANDS, SAND–CLAY MIXTURES, ROCK FRAGMENTS

INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY

SILTY SANDS, GRAVELLY SANDS

FILL (APPROXIMATE)

ASPHALT/COAL PIECES

NOTE:

CROSS SECTION IS NOT TO BE USED FOR DESIGN PURPOSES, AND ALL LOCATIONS ARE APPROXIMATE.

0 50 100

HORIZONTAL SCALE: 1" = 50'

0 5 10

VERTICAL SCALE: 1" = 5'

DRAWN BY ND	DATE 5/17/11
CHECKED BY SJC	DATE 11/20/13
REVISED BY CK	DATE 11/20/13
SCALE AS NOTED	

NAVFAC

CROSS SECTION D–D'
SITE 12 – HARBOR DREDGE SPOIL AREA
NS GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NO. F27A	
OWNER NO.	
APPROVED BY CR	DATE 11/20/13
DRAWING NO. FIGURE 4–5	REV. 0

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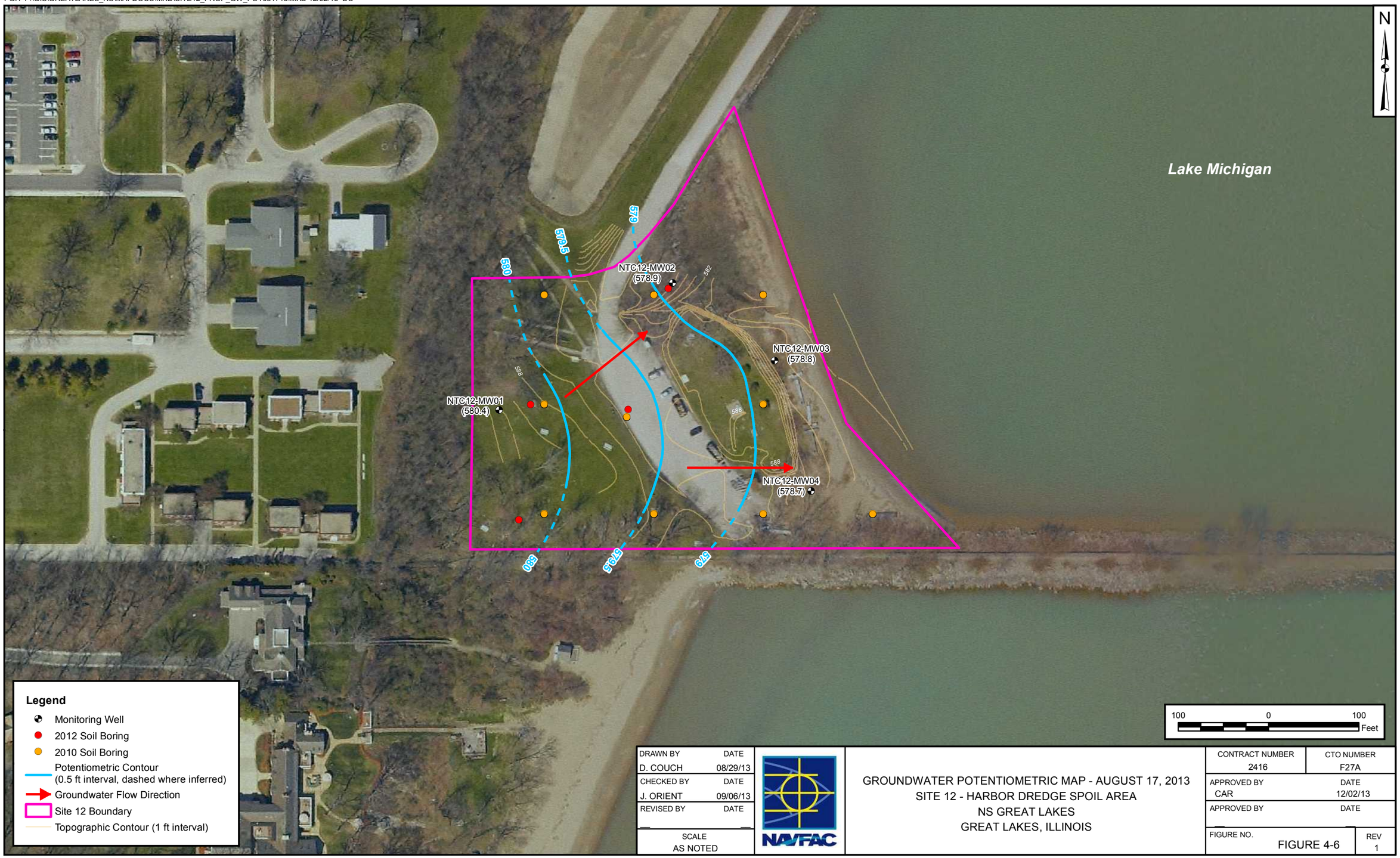


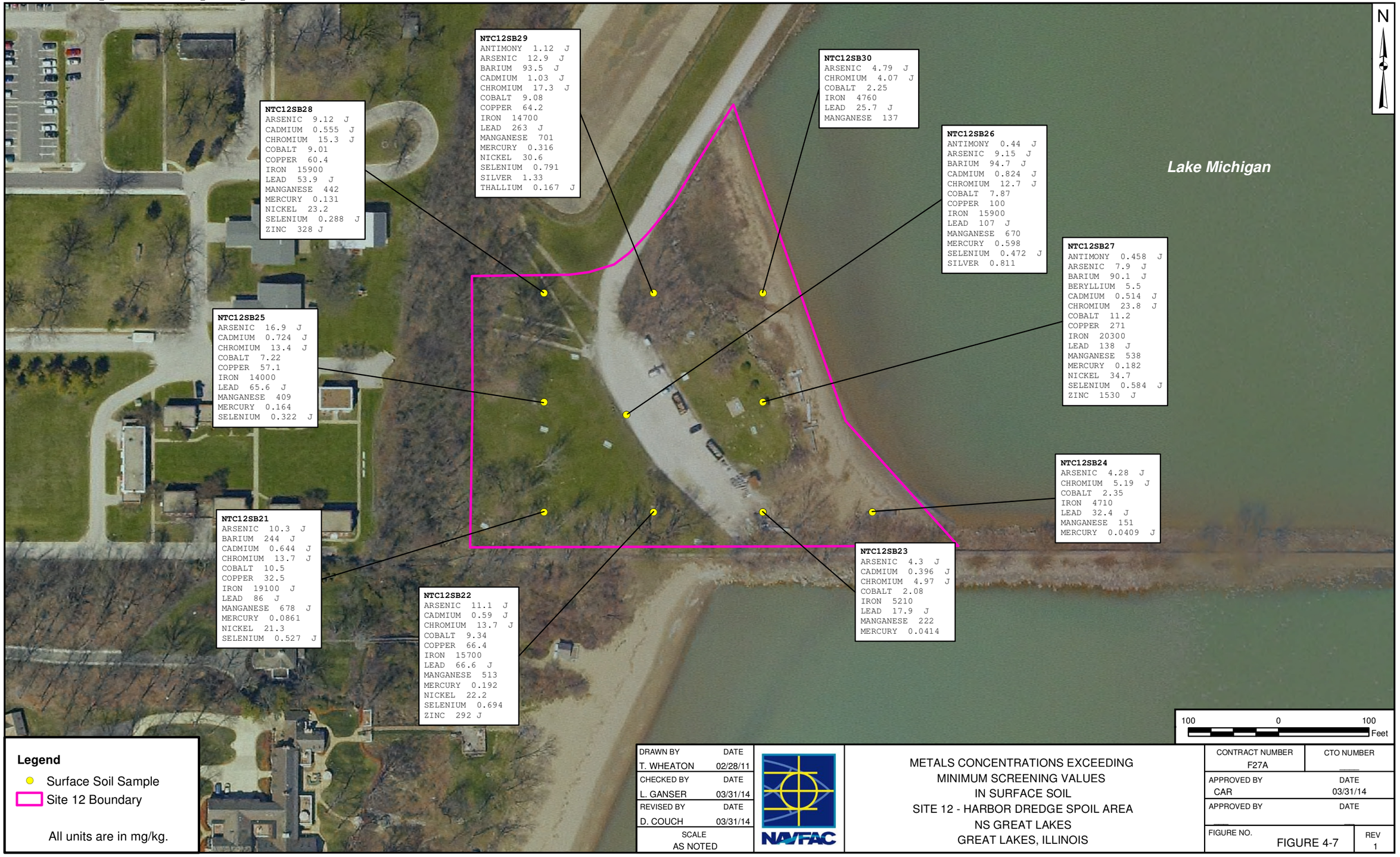
DRAWN BY / DATE	D. COUCH 08/29/13
CHECKED BY / DATE	J. ORIENT 09/06/13
REVISED BY / DATE	
SCALE	AS NOTED

NAVFAC

GROUNDWATER POTENTIOMETRIC MAP - AUGUST 17, 2013
SITE 12 - HARBOR DREDGE SPOIL AREA
NS GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER	2416
CTO NUMBER	F27A
APPROVED BY	CAR
DATE	12/02/13
APPROVED BY / DATE	
FIGURE NO.	FIGURE 4-6
REV	1

PGH P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE12_SURFACE_METALS.MXD 05/29/14 SP



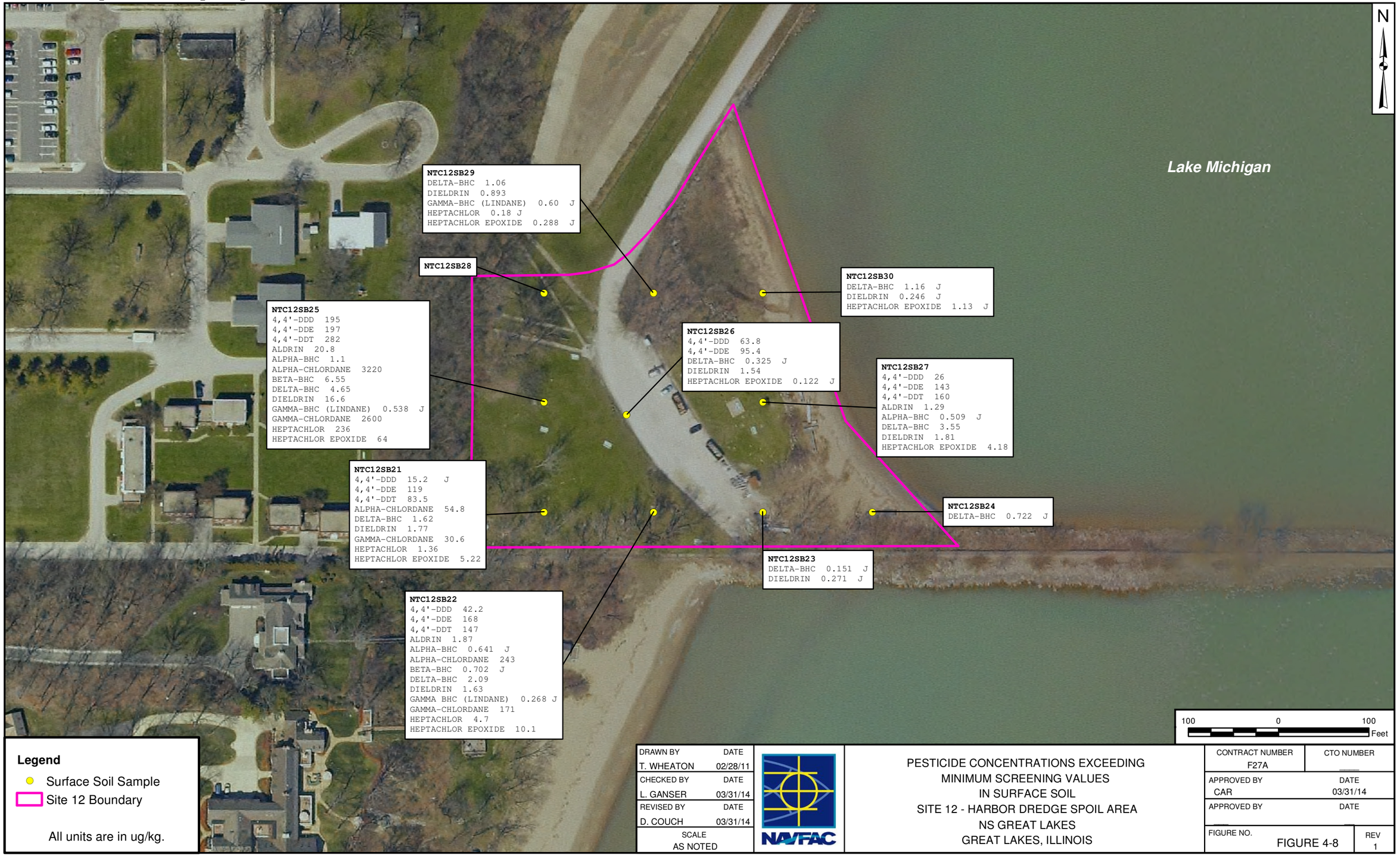
DRAWN BY	DATE
T. WHEATON	02/28/11
CHECKED BY	DATE
L. GANSER	03/31/14
REVISED BY	DATE
D. COUCH	03/31/14
SCALE	
AS NOTED	

NAVFAC

METALS CONCENTRATIONS EXCEEDING
MINIMUM SCREENING VALUES
IN SURFACE SOIL
SITE 12 - HARBOR DREDGE SPOIL AREA
NS GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER	CTO NUMBER
F27A	
APPROVED BY	DATE
CAR	03/31/14
APPROVED BY	DATE
FIGURE NO.	REV
FIGURE 4-7	1

PGH P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE12_SURFACE_PEST.MXD 05/29/14 SP



Legend

- Surface Soil Sample
- Site 12 Boundary

All units are in ug/kg.

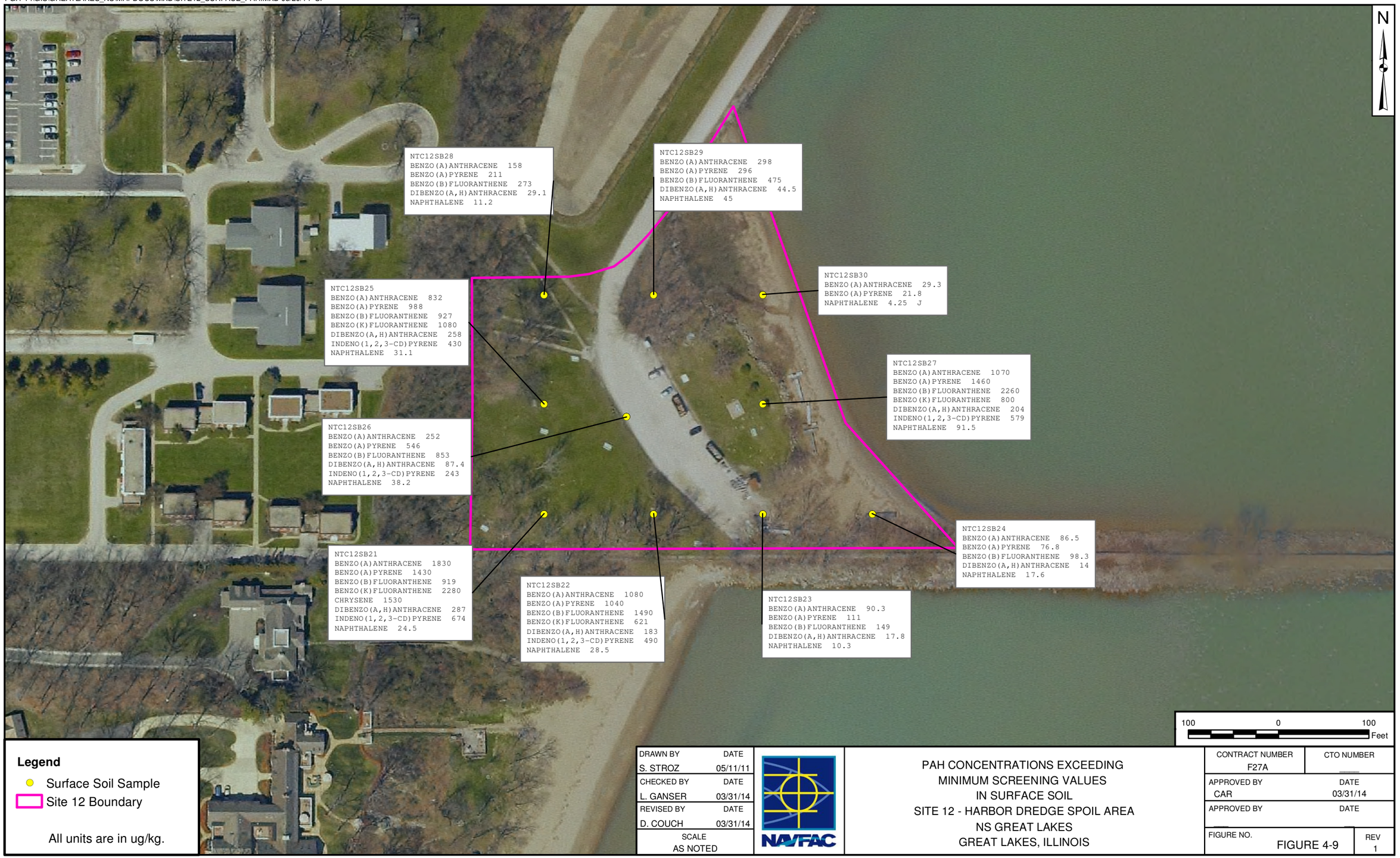
DRAWN BY	DATE
T. WHEATON	02/28/11
CHECKED BY	DATE
L. GANSER	03/31/14
REVISED BY	DATE
D. COUCH	03/31/14
SCALE	
AS NOTED	

NAVFAC

PESTICIDE CONCENTRATIONS EXCEEDING
MINIMUM SCREENING VALUES
IN SURFACE SOIL
SITE 12 - HARBOR DREDGE SPOIL AREA
NS GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER	CTO NUMBER
F27A	
APPROVED BY	DATE
CAR	03/31/14
APPROVED BY	DATE
FIGURE NO.	REV
FIGURE 4-8	1

PGH P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE12_SURFACE_PAH.MXD 05/29/14 SP



Legend

- Surface Soil Sample
- Site 12 Boundary

All units are in ug/kg.

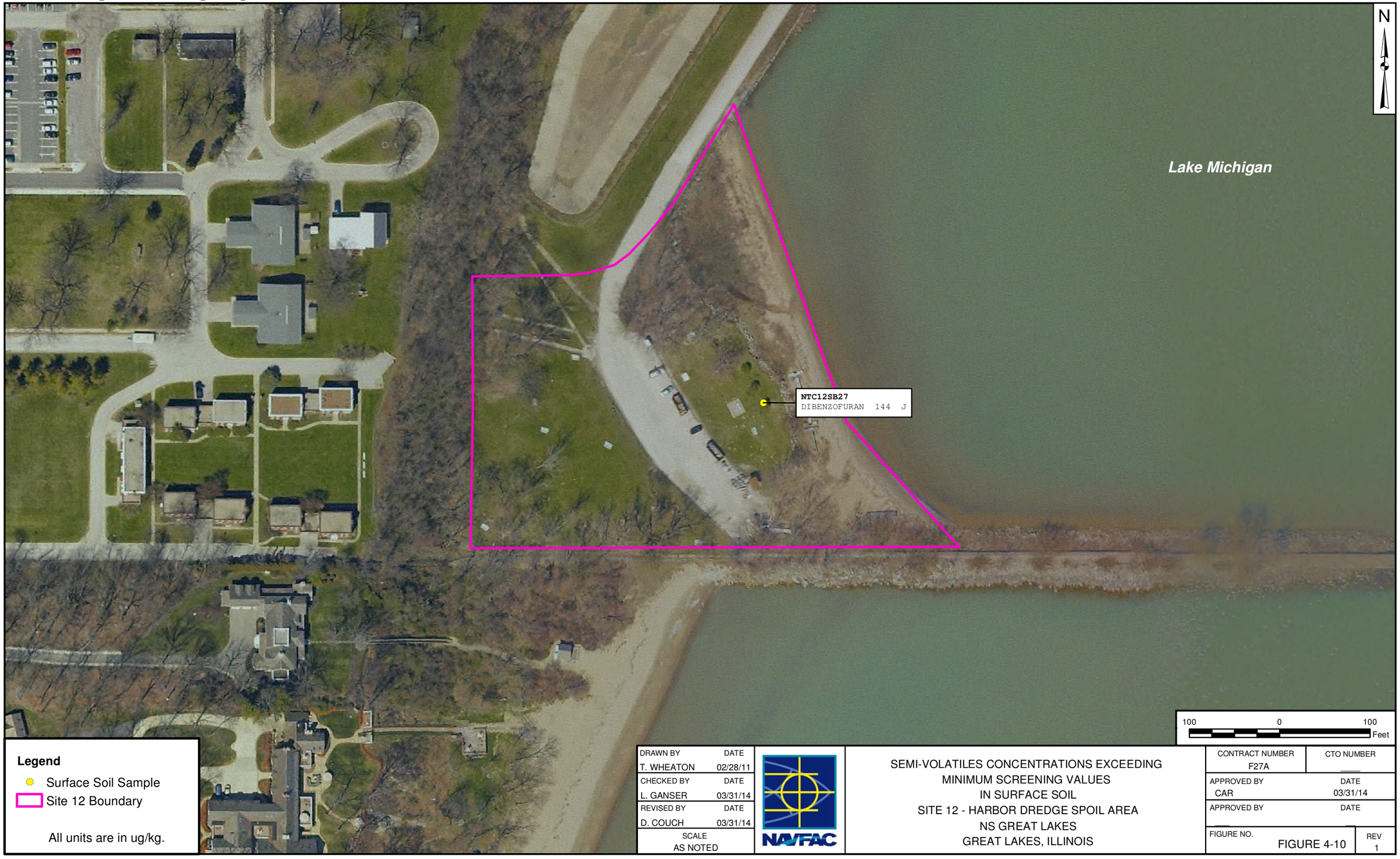
DRAWN BY / DATE	S. STROZ 05/11/11
CHECKED BY / DATE	L. GANSER 03/31/14
REVISED BY / DATE	D. COUCH 03/31/14
SCALE	AS NOTED

NAVFAC

PAH CONCENTRATIONS EXCEEDING
MINIMUM SCREENING VALUES
IN SURFACE SOIL
SITE 12 - HARBOR DREDGE SPOIL AREA
NS GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER	F27A
CTO NUMBER	
APPROVED BY / DATE	CAR 03/31/14
APPROVED BY / DATE	
FIGURE NO.	FIGURE 4-9
REV	1

PGH P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE12_SURFACE_ORGANICS.MXD 05/29/14 SP



Legend

- Surface Soil Sample
- Site 12 Boundary

All units are in ug/kg.

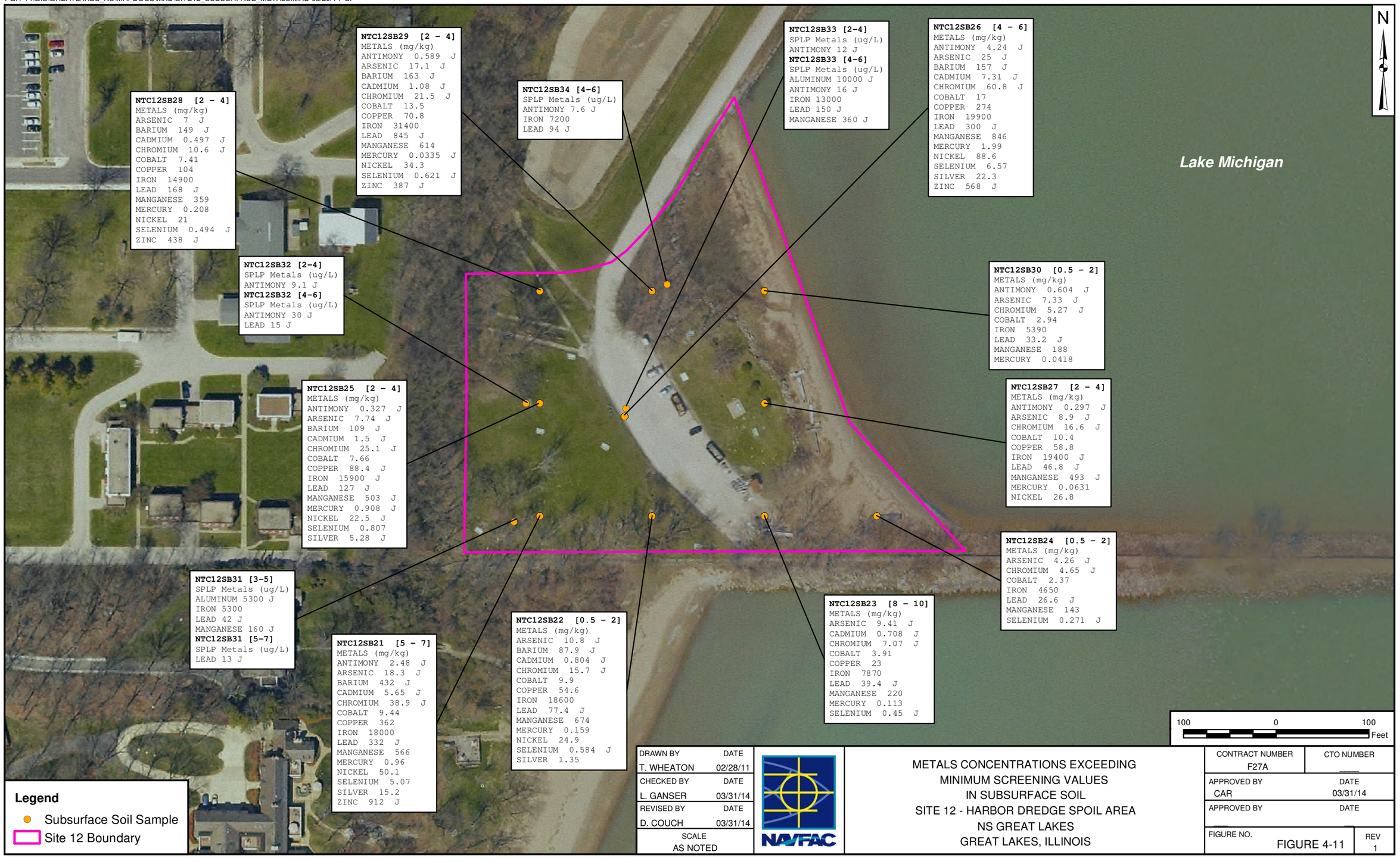
DRAWN BY	DATE
T. WHEATON	02/28/11
CHECKED BY	DATE
L. GANSER	03/31/14
REVISED BY	DATE
D. COUCH	03/31/14
SCALE	
AS NOTED	

NAVFAC

SEMI-VOLATILES CONCENTRATIONS EXCEEDING
MINIMUM SCREENING VALUES
IN SURFACE SOIL
SITE 12 - HARBOR DREDGE SPOIL AREA
NS GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER	CTO NUMBER
F27A	___
APPROVED BY	DATE
CAR	03/31/14
APPROVED BY	DATE
___	___
FIGURE NO.	REV
FIGURE 4-10	1

PGH P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE12_SUBSURFACE_METALS.MXD 05/29/14 SP



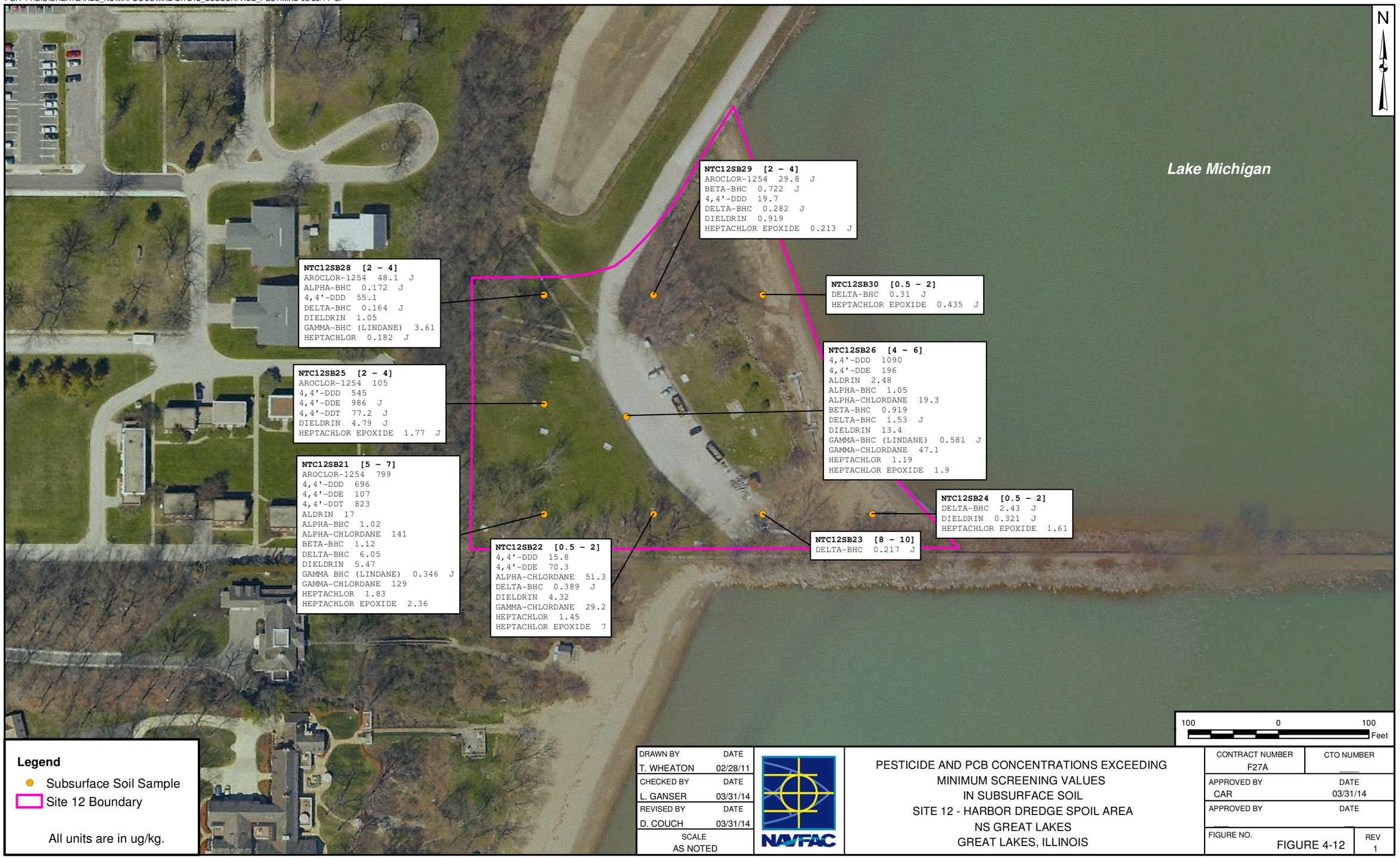
DRAWN BY	DATE
T. WHEATON	02/28/11
CHECKED BY	DATE
L. GANSER	03/31/14
REVISED BY	DATE
D. COUCH	03/31/14
SCALE	
AS NOTED	

NAVFAC

METALS CONCENTRATIONS EXCEEDING
MINIMUM SCREENING VALUES
IN SUBSURFACE SOIL
SITE 12 - HARBOR DREDGE SPOIL AREA
NS GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER	CTO NUMBER
F27A	
APPROVED BY	DATE
CAR	03/31/14
APPROVED BY	DATE
FIGURE NO.	REV
FIGURE 4-11	1

PGH P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE12_SUBSURFACE_PEST.MXD 05/29/14 SP



Legend

- Subsurface Soil Sample
- Site 12 Boundary

All units are in ug/kg.

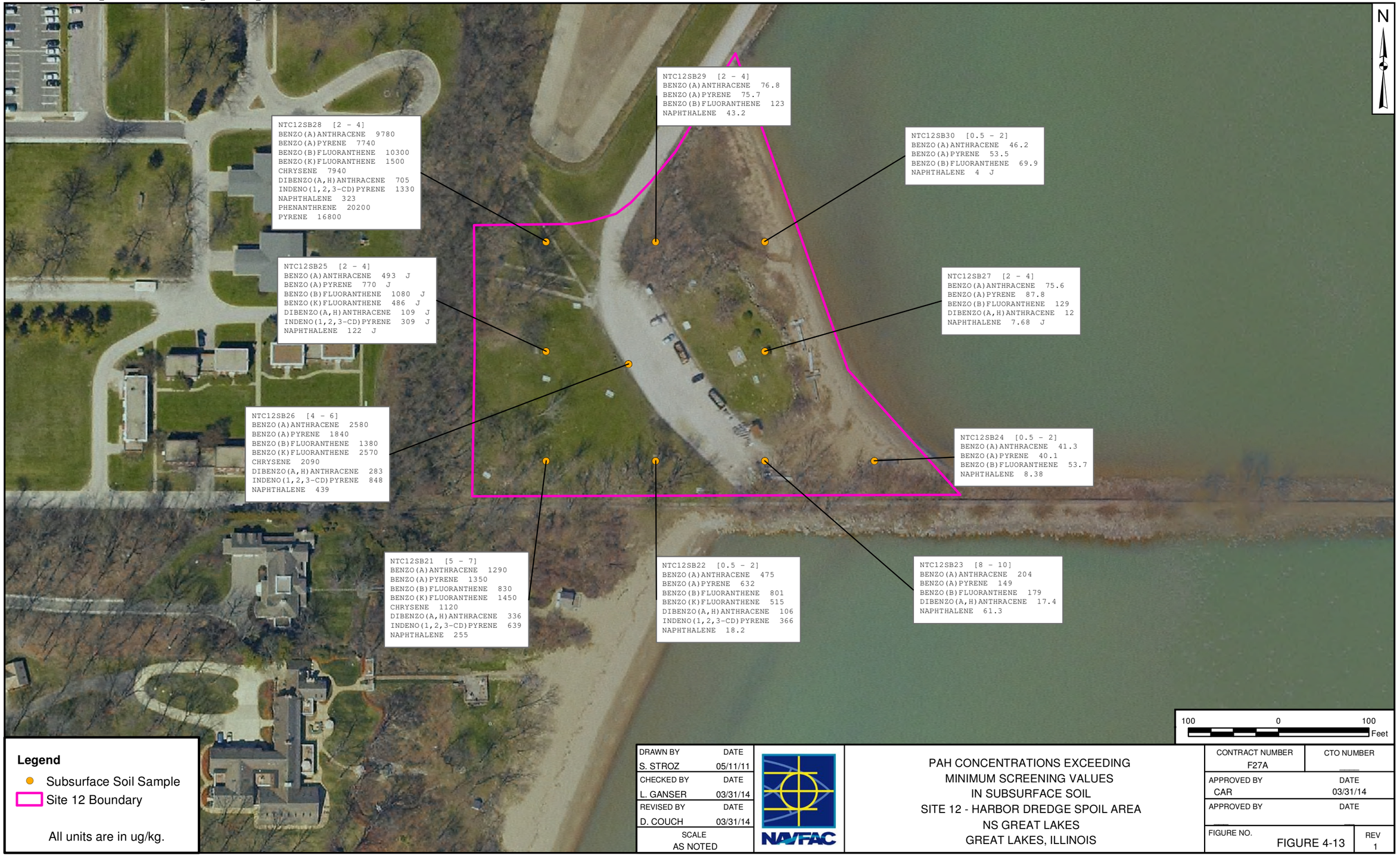
DRAWN BY	DATE
T. WHEATON	02/28/11
CHECKED BY	DATE
L. GANSER	03/31/14
REVISED BY	DATE
D. COUCH	03/31/14
SCALE	
AS NOTED	

NAVFAC

PESTICIDE AND PCB CONCENTRATIONS EXCEEDING
MINIMUM SCREENING VALUES
IN SUBSURFACE SOIL
SITE 12 - HARBOR DREDGE SPOIL AREA
NS GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER	CTO NUMBER
F27A	
APPROVED BY	DATE
CAR	03/31/14
APPROVED BY	DATE
FIGURE NO.	REV
FIGURE 4-12	1

PGH P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE12_SUBSURFACE_PAH.MXD 05/29/14 SP



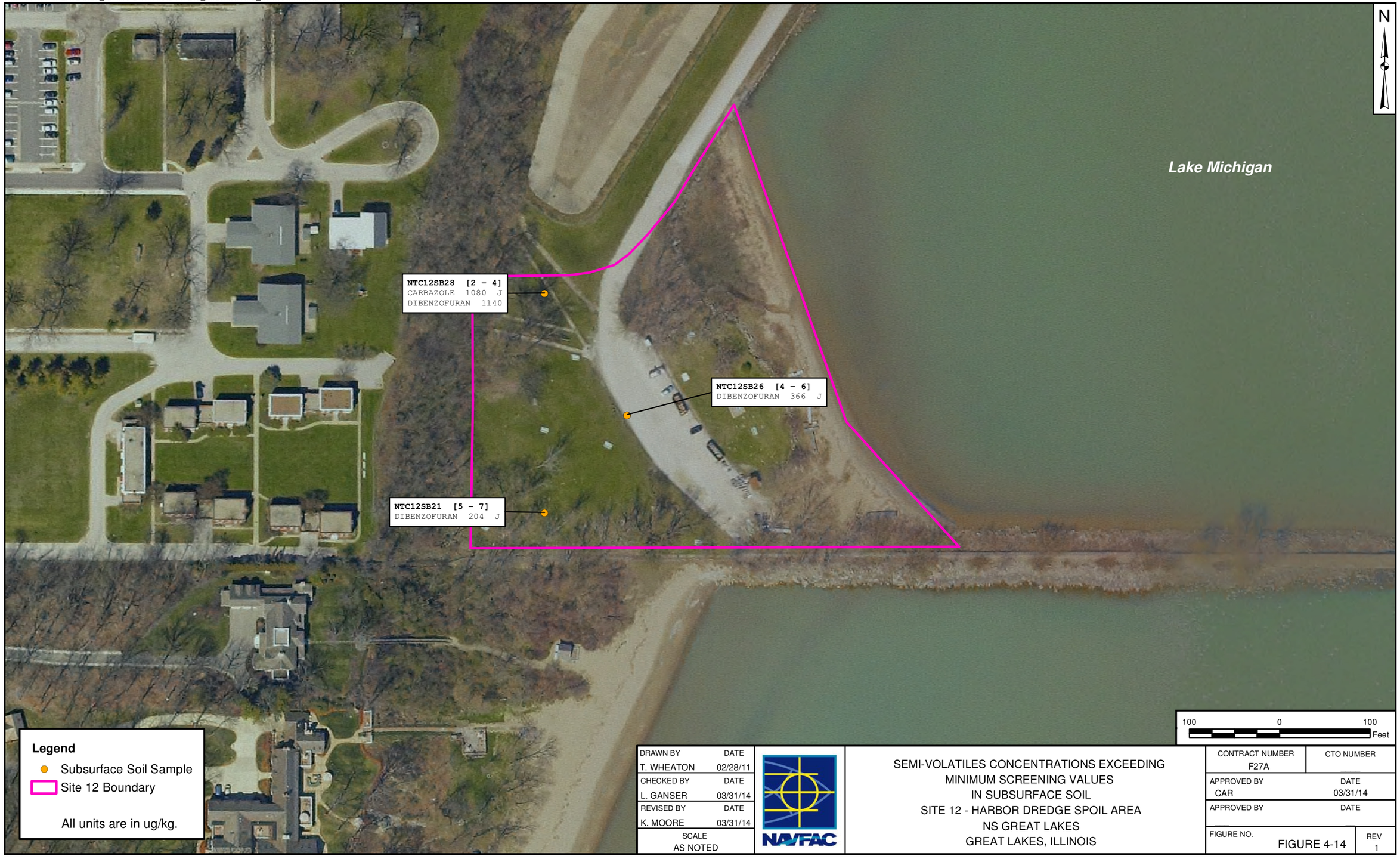
DRAWN BY / DATE	S. STROZ 05/11/11
CHECKED BY / DATE	L. GANSER 03/31/14
REVISED BY / DATE	D. COUCH 03/31/14
SCALE	AS NOTED

NAVFAC

PAH CONCENTRATIONS EXCEEDING
MINIMUM SCREENING VALUES
IN SUBSURFACE SOIL
SITE 12 - HARBOR DREDGE SPOIL AREA
NS GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER	F27A
CTO NUMBER	____
APPROVED BY / DATE	CAR 03/31/14
APPROVED BY / DATE	____ ____
FIGURE NO.	FIGURE 4-13
REV	1

PGH P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE12_SUBSURFACE_ORGANICS.MXD 05/29/14 SP



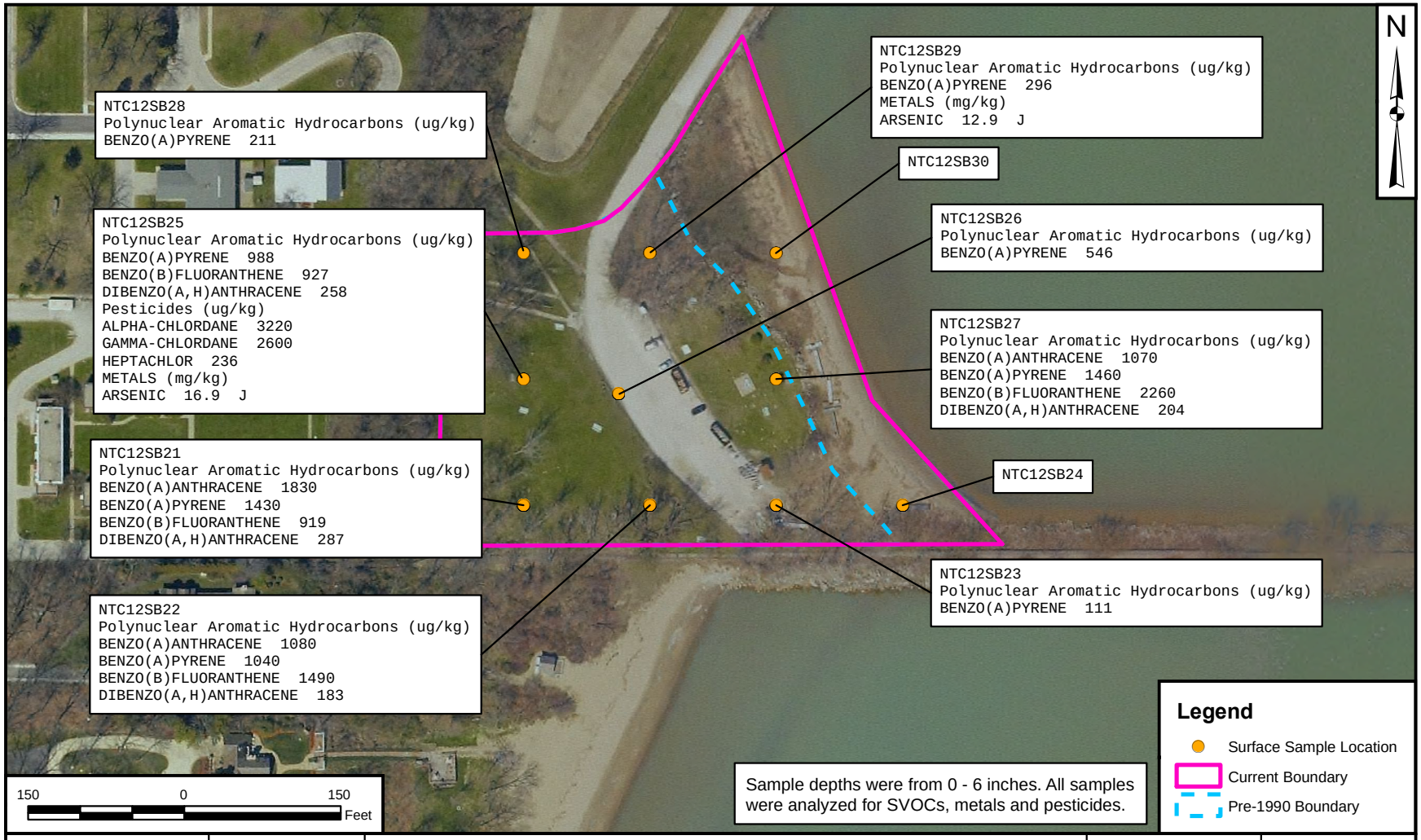
DRAWN BY	DATE
T. WHEATON	02/28/11
CHECKED BY	DATE
L. GANSER	03/31/14
REVISED BY	DATE
K. MOORE	03/31/14
SCALE	
AS NOTED	

NAVFAC

SEMI-VOLATILES CONCENTRATIONS EXCEEDING
MINIMUM SCREENING VALUES
IN SUBSURFACE SOIL
SITE 12 - HARBOR DREDGE SPOIL AREA
NS GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER	CTO NUMBER
F27A	___
APPROVED BY	DATE
CAR	03/31/14
APPROVED BY	DATE
___	___
FIGURE NO.	REV
FIGURE 4-14	1

PGH P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE12_SOIL_TAGS_SURFACE_R.MXD 02/08/13 DC



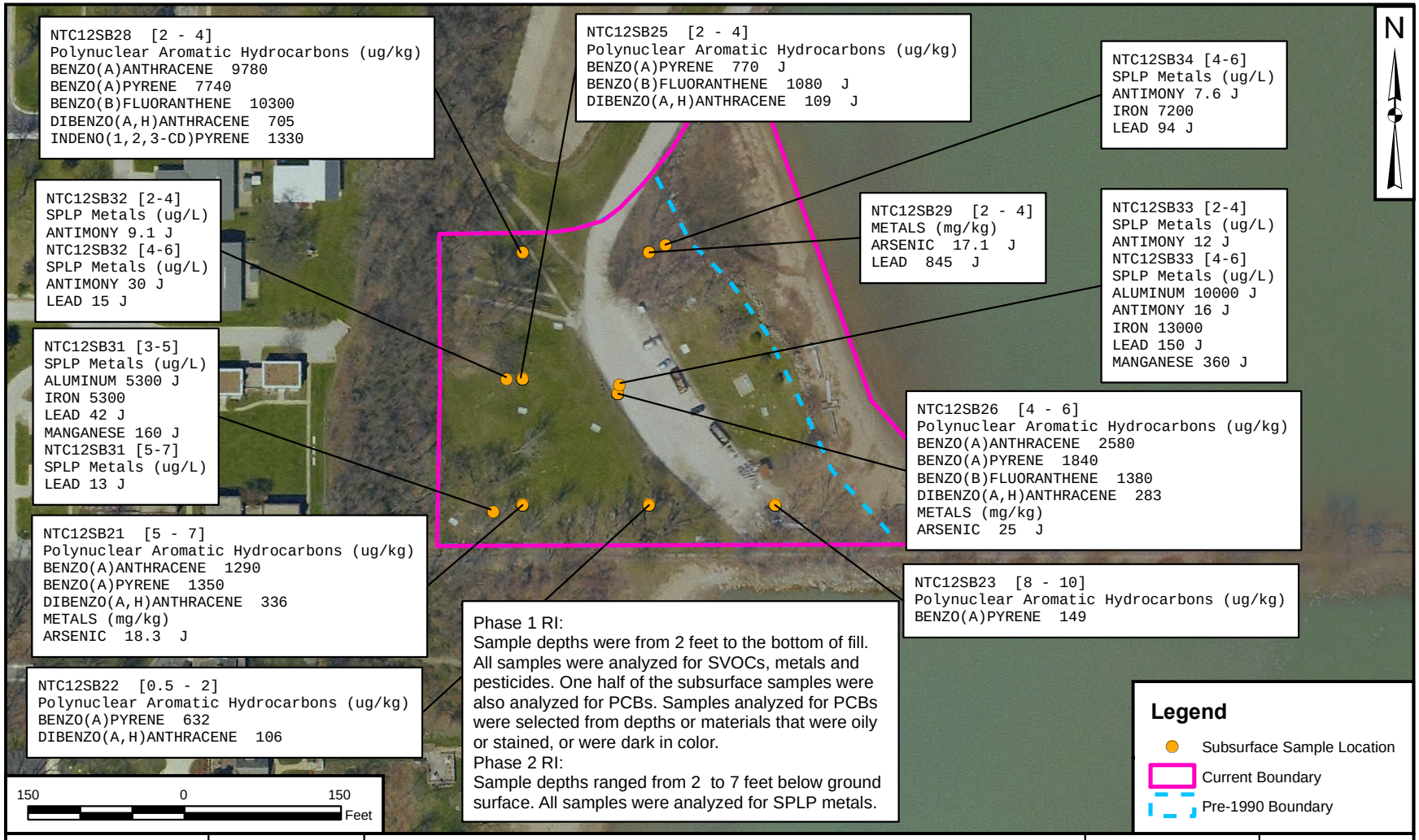
DRAWN BY	J. ENGLISH
DATE	03/25/11
CHECKED BY	L. GANSER
DATE	02/08/13
REVISED BY	D, COUCH
DATE	02/08/13
SCALE	AS NOTED

NAVFAC

CONTAMINANT CONCENTRATIONS EXCEEDING TACO INGESTION/INHALATION REMEDIATION OBJECTIVES (RESIDENTIAL AND/OR INDUSTRIAL) IN SURFACE SOIL
SITE 12
NS GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER	CTO NUMBER
___	F27A
APPROVED BY	DATE
__	__
APPROVED BY	DATE
__	__
FIGURE NO.	REV
FIGURE 4-15	1

PGH P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE12_SOIL_TAGS_SUBSURFACE.MXD 02/20/13 DC



DRAWN BY / DATE	J. ENGLISH / 03/25/11
CHECKED BY / DATE	L. GANSER / 02/08/13
REVISED BY / DATE	D. COUCH / 02/13/13
SCALE	AS NOTED

CONTAMINANT CONCENTRATIONS EXCEEDING TACO INGESTION/INHALATION REMEDIATION OBJECTIVES (RESIDENTIAL AND/OR INDUSTRIAL) IN SUBSURFACE SOIL
SITE 12
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER	CTO NUMBER F27A
APPROVED BY / DATE	— / —
APPROVED BY / DATE	— / —
FIGURE NO.	FIGURE 4-16
REV	1

PGH P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE12_GW_TAG_NOV2013.MXD 03/31/14 DC

Note:
[R] - Indicates exceedance of USEPA regional screening level
[M] - Indicates exceedance of maximum contaminant level
[T1] - Indicates exceedance of Illinois TACO Class I groundwater remediation objective
[T2] - Indicates exceedance of Illinois TACO Class II groundwater remediation objective
[I1] - Indicates exceedance of Illinois Administrative Code Class I groundwater quality standard
[I2] - Indicates exceedance of Illinois Administrative Code Class II groundwater quality standard

N

Lake Michigan

NTC12MW01		
Metals (µg/L)		
CHROMIUM	0.81 J	[R]
MANGANESE	220 J	[T1][I1]
Dissolved Metals (µg/L)		
MANGANESE	240 J	[T1][I1]

NTC12MW02		
Metals (µg/L)		
ARSENIC	5.3	[R]
CHROMIUM	0.48 J	[R]
COBALT	7	[R]
MANGANESE	610 J	[R][T1][I1]
Dissolved Metals (µg/L)		
ARSENIC	5.8	[R]
COBALT	9	[R]
MANGANESE	640 J	[R][T1][I1]

NTC12MW03		
Metals (µg/L)		
ARSENIC	28	[R][M][I1]
CHROMIUM	0.24 J	[R]
IRON	9300	[T1][T2][I1][I2]
MANGANESE	280 J	[T1][I1]
Dissolved Metals (µg/L)		
ARSENIC	27	[R][M][I1]
IRON	9100	[T1][T2][I1][I2]
MANGANESE	270 J	[T1][I1]
NTC12MW03-DUP		
Metals (µg/L)		
ARSENIC	29	[R][M][I1]
IRON	9200	[T1][T2][I1][I2]
MANGANESE	280 J	[T1][I1]
Dissolved Metals (µg/L)		
ARSENIC	28	[R][M][I1]
IRON	9600	[T1][T2][I1][I2]
MANGANESE	280 J	[T1][I1]

NTC12MW04		
Metals (µg/L)		
ARSENIC	78	[R][M][T1][I1]
CHROMIUM	0.5 J	[R]
IRON	19000	[R][T1][T2][I1][I2]
MANGANESE	740 J	[R][T1][I1]
Dissolved Metals (µg/L)		
ARSENIC	71	[R][M][T1][I1]
IRON	18000	[R][T1][T2][I1][I2]
MANGANESE	670 J	[R][T1][I1]

100 0 100 Feet

Legend
- Monitoring Well
- Site 12 Boundary

DRAWN BY	DATE
K. MOORE	11/12/13
CHECKED BY	DATE
L. GANSER	03/31/14
REVISED BY	DATE
D. COUCH	03/31/14
SCALE	
AS NOTED	

NAVFAC

METALS CONCENTRATIONS EXCEEDING SCREENING VALUES IN GROUNDWATER
SITE 12 - HARBOR DREDGE SPOIL AREA
NS GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER	CTO NUMBER
2416	F27A
APPROVED BY	DATE
CAR	03/31/14
APPROVED BY	DATE
__	__
FIGURE NO. FIGURE 4-17	REV 1

5.0 CHEMICAL FATE AND TRANSPORT ANALYSIS

The fate and transport of contaminants in environmental media are determined by a variety of factors. The physical and chemical properties of the contaminants and the environmental media (i.e., soil, groundwater, surface water, and sediment) into which the contaminants are released are factors that determine the eventual fate of the chemicals. The persistence of chemicals released to the environment is discussed in Section 5.1 and the issues affecting their fate and transport are discussed in Section 5.2. Chemical-specific fate and transport characteristics for the primary COPCs are provided in Tables 5-1 and 5-2.

5.1 CHEMICAL PERSISTENCE

The chemicals detected in Site 12 soil included SVOCs, pesticides/PCBs, and metals. Metals were also present in Site 12 groundwater. Several transformation mechanisms affect chemical persistence, such as hydrolysis, biodegradation, photolysis, and oxidation/reduction reactions. The persistence of each of these chemicals in the environment is discussed below.

5.1.1 Semi-Volatile Organic Compounds - PAHs

PAHs have very low solubilities, vapor pressures, and Henry's Law constants, and high soil organic carbon-water partition coefficients (K_{oc}s) and soil octanol-water partition coefficient (K_{ow}s). K_{oc}s are the ratio of the mass of a chemical that is adsorbed in the soil per unit mass of organic carbon in the soil per the equilibrium chemical concentration in solution. K_{ow}s are the ratio of the concentration of a chemical in octanol and in water at equilibrium and at a specified temperature. Octanol is an organic solvent that is used as a surrogate for natural organic matter. The low molecular weight PAHs (e.g., naphthalene) may volatilize from water, and the high molecular weight PAHs (e.g., benzo(a)pyrene, benzo(a)anthracene, etc.) are less likely to volatilize. PAHs in soil are much more likely to bind to the soil and be transported via mass transport mechanisms than go into solution or volatilize. PAHs are subject to degradation via aerobic bacteria, but may be relatively persistent in the absence of microbial populations or macronutrients such as phosphorus and nitrogen.

Bioconcentration of PAHs in aquatic organisms is greater for the higher molecular weight compounds than the lower molecular weight compounds. PAHs can bioaccumulate in receptors from ingesting water, sediments, or lower organisms in the food chain.

Landspreading applications, in which solid waste is placed in thin layers onto the surface of the land or incorporated into the surface layers of the soil, have indicated that PAHs are highly amenable to microbial

degradation in soil, with the rate of degradation influenced by temperature, pH, oxygen concentrations, initial chemical concentrations, and moisture. Photolysis, hydrolysis, and oxidation are not relevant fate processes for the degradation of PAHs in soil (ATSDR, 1995).

PAHs are degraded in water by photo-oxidation, chemical oxidation, and biodegradation. PAHs do not contain functional groups that are susceptible to hydrolytic action, and hydrolysis is considered to be an insignificant degradation mechanism. The rate of photodegradation is influenced by water depth, turbidity, and temperature. Benzo(a)pyrene is reported to be resistant to photodegradation. PAHs may also be oxidized by chlorination and ozonation and may be metabolized by microbes under oxygenated conditions (ATSDR, 1995). Although this RI investigated PAHs in the soil and not groundwater, the site is along the shore of Lake Michigan and groundwater is shallow, thus interaction between the soil and shallow groundwater and surface water is expected.

5.1.2 Pesticides/PCBs

Whether pesticides are sprayed, dusted, or applied directly, soil is the ultimate sink for these chemicals. Surface soil runoff may carry pesticides to adjacent surface water bodies. Bioconcentration of pesticides in the food chain is another important fate mechanism. In water, they would not be expected to biodegrade or hydrolyze to any significant extent and will likely bioconcentrate in aquatic organisms. Hydrolysis, oxidation, and photolysis are not generally important fate mechanisms for pesticides in soil or water. Concerning the shallow groundwater at the site, hydrolysis half-lives for several pesticides are reported in periods of months to years.

PCBs are considered to be very persistent organic chemicals. Biodegradation is the only process known to transform PCBs under environmental conditions, and only the lighter compounds are measurably biodegraded (USEPA, 1979). Although some microorganisms (e.g., *Phanaerochaete chrysosporium*) may biodegrade PCBs, such fungi may not exist in local soil. There is experimental evidence to suggest that heavier PCBs (five or more chlorines per molecule) can undergo photolytic degradation, but there are no data to suggest that this process operates under environmental conditions. Base-, acid-, and neutral-promoted hydrolysis are considered to be inconsequential degradation mechanisms for PCBs (USEPA, 1982).

5.1.3 Metals

Metals are highly persistent environmental contaminants; they do not biodegrade, photolyze, hydrolyze, etc. The major fate mechanisms for metals are adsorption to the soil matrix (as compared to being part of the soil structure) and bioaccumulation.

5.2 CONTAMINANT FATE AND TRANSPORT

This section focuses on the fate and transport issues associated with the major types of contaminants detected at Site 12. For organic compounds, the Mobility Index (MI) is an accepted indicator parameter that provides a quantitative assessment of contaminant mobility using water solubility, vapor pressure, and K_{oc} (Laskowski et al., 1983). The following scale was developed by Ford and Gurba (1994) to evaluate MI.

Relative MI	Mobility Description
> 5	Extremely mobile
0 to 5	Very mobile
-5 to 0	Slightly mobile
-10 to -5	Immobile
< -10	Very immobile

MIs for the organic chemicals detected in Site 12 soil are summarized in Table 5-1.

The mobility of metals is influenced primarily by their physical and chemical properties, in combination with the physical and chemical characteristics of the soil matrix. Factors that assist in predicting the mobility of inorganic species are soil/pore water pH, soil/pore water redox potential (Eh), and cation exchange capacity. The mobility of metals generally increases with decreasing soil pH and cation exchange capacity. Table 5-2 presents some physical and chemical properties of metals detected at the site in soil and groundwater.

PAHs, pesticides/PCBs, and metals were detected in soil at Site 12. PAHs, pesticides/PCBs, and metals generally adhere to soil particles and move by erosional processes. PAHs and pesticides/PCBs are not likely to leach and migrate vertically to groundwater as a result of infiltration and/or precipitation. The rate and extent of this leaching are influenced by the depth of the water table, amount of precipitation, rate of infiltration, physical and chemical properties of the soil, and physical and chemical properties of the contaminant. Metals may or may not leach and migrate vertically to groundwater and the rate and extent of this leaching is influenced by the odixation state and pH of the infiltration and/or precipitation.

The initial comparison of the soil results to the minimum risk-based screening criteria (in many cases this is the soil to groundwater criteria) from Illinois EPA or the USEPA identified many exceedances. Remediation objectives for the soil to groundwater pathway were only considered when contaminants were identified in the SPLP testing or in groundwater at concentrations in excess of the groundwater criteria

5.2.1 Semi-Volatile Organic Compounds - PAHs

PAHs are generally considered to be fairly immobile in the environment; they are large molecules with high K_{oc}s and low solubilities when compared to VOCs. These compounds generally do not migrate vertically through soil to a great extent. Instead, they are more likely to adhere to soil particles and be transported with the soil particles via surface runoff and erosional processes. Available mobility indices for PAHs range from -19.91 to -2.77. A chemical with a mobility index between -10 and 0 is considered to be immobile to slightly mobile and a chemical with a mobility index less than -10 is considered to be very immobile.

Available mobility indices for SVOCs other than PAHs range from -12.49 to 2.77. A chemical with a mobility index between -5 and 5 is considered to be slightly mobile to very mobile. A chemical with a mobility index less than -10 to -5 is considered to be very immobile to immobile.

5.2.2 Pesticides/PCBs

Like PAHs, pesticides as a class of compounds are not considered to be very mobile in the environment. These chemicals, upon application or disposal, tend to remain affixed to soil particles. Migration of pesticides occurs primarily by erosion via the action of wind or water. Erosion can account for their presence in surface water and sediment.

Available mobility indices for pesticides range from -14.28 to -6.41. A chemical with a mobility index between -10 and -5 is considered to be immobile and a chemical with a mobility index less than -10 is considered to be very immobile.

PCBs are considered to be very persistent organic chemicals. Biodegradation is the only process known to transform PCBs under environmental conditions, and only the lighter compounds are measurably biodegraded (USEPA, 1979). Base-, acid-, and neutral-promoted hydrolysis are considered to be inconsequential degradation mechanisms for PCBs (USEPA, 1982).

The mobility index for Aroclor-1254 is -11.7 and chemicals with a mobility index less than -10 are considered to be very immobile.

5.2.3 Metals

Because metals are naturally occurring, are frequently incorporated into the soil matrix, and remain bound to particulate matter, they migrate from source areas via erosion. The high soil-water partition coefficients on Table 5-2 indicate the tendency to adhere to particulate matter. However, there are some instances

where metals are found at such concentrations or in such forms (i.e., oxidation states) that they may migrate in solution. First, it is possible that uncontrolled industrial activities could saturate the available exchange sites in soil in the immediate vicinity of the activity and result in an inorganic being mobilized. Secondly, inorganic solutions may be used in some industrial applications. In these cases, it is possible for metals to migrate vertically through the soil column and reach groundwater.

The redox state of the subsurface environment affects the form and valence states of metals, such as arsenic, iron, and manganese and influences how much of each metal remains bound to soil and rock surfaces and how much remains in solution. In general, under oxidizing conditions, naturally occurring arsenic, iron, and manganese will remain bound in soil and rock or sorbed to suspended particles. Under reducing conditions, the concentrations of dissolved metals such as arsenic, iron, and manganese in groundwater will tend to increase as the metals at soil and rock surfaces are reduced to more soluble forms and remain in solution. The redox state is an important factor affecting metals concentrations in site groundwater because strongly reducing conditions exist in groundwater at the site. Dissolved oxygen was not present at a measurable level (0.00 mg/L) in the groundwater samples. The presence of oxygen would be an indication of oxidizing conditions. The measured ORP was 6 mV a NTC12-MW01, -56 mV from NTC12-MW02, -134 mV from NTC12-MW03, and -145 mV from NTC12-MW04, indicating that reducing conditions are present. The ORP was strongly reducing at NTC12-MW03 and NTC12-MW04, which generally also had the greatest concentrations of metals that have multiple oxidation states, such as arsenic, iron, and manganese.

Metals are naturally occurring substances; therefore, it is not unusual that they were detected in soil and groundwater at Site 12. Because metals tend to adhere to particulate matter (similar to PAHs), their release and migration patterns are similar to these chemicals. However, the reducing conditions at the site caused some metals, particularly arsenic, iron, and manganese to mobilize. Therefore, these metals were detected in groundwater at elevated concentrations in samples from monitoring wells NTC12-MW02 to NTC12-MW04 compared to monitoring well NTC12-MW01, which was located upgradient of the site.

TABLE 5-1

ENVIRONMENTAL FATE AND TRANSPORT PARAMETERS FOR ORGANIC CHEMICALS
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical	Density (g/cm^3)[1]	Vapor Pressure (mm Hg)[2]	Solubility (mg/L)[2]	Octanol/Water Partition Coefficient (K_{ow})[2]	Organic Carbon Partition Coefficient (K_{OC})[2]	Henry's Law Constant ($atm\text{-}m^3/mole$)[2]	Bioconcentration Factor (L/kg)[2]	Mobility Index[3] log((solubility*VP)/Koc)[4]
PCBS								
AROCLOR-1254	NA	6.53E-06	4.30E-02	6.79E+00	1.31E+05	2.83E-04	5.41E+04	-1.17E+01
PESTICIDES								
4,4'-DDD	NA	1.35E-06	9.00E-02	6.02E+00	1.18E+05	6.60E-06	4.36E+03	-1.20E+01
4,4'-DDE	NA	6.00E-06	4.00E-02	6.51E+00	1.18E+05	4.16E-05	1.20E+04	-1.17E+01
4,4'-DDT	NA	1.60E-07	5.50E-03	6.91E+00	1.69E+05	8.32E-06	1.96E+04	-1.43E+01
ALDRIN	NA	1.20E-04	1.70E-02	6.50E+00	8.20E+04	4.40E-05	5.50E+03	-1.06E+01
ALPHA-BHC	NA	3.52E-05	2.00E+00	3.80E+00	2.81E+03	5.14E-06	3.72E+02	-7.60E+00
ALPHA-CHLORDANE	NA	9.98E-06	5.60E-02	6.10E+00	6.75E+04	4.86E-04	2.68E+04	-1.11E+01
BETA-BHC	1.89E+00	3.52E-05	2.40E-01	3.78E+00	2.81E+03	5.14E-06	3.72E+02	-8.52E+00
DELTA-BHC	NA	3.52E-05	3.14E+01	4.14E+00	2.81E+03	5.14E-06	3.72E+02	-6.41E+00
DIELDRIN	1.75E+00	3.00E-06	1.95E-01	5.40E+00	2.01E+04	1.00E-05	7.48E+03	-1.05E+01
ENDOSULFAN I[2]	1.75E+00	6.00E-07	3.25E-01	3.83E+00	6.76E+03	6.50E-05	1.56E+02	-1.05E+01
ENDOSULFAN II[2]	1.75E+00	6.00E-07	3.25E-01	3.83E+00	6.76E+03	6.50E-05	1.56E+02	-1.05E+01
ENDOSULFAN SULFATE	NA	2.80E-07	4.80E-01	3.66E+00	9.85E+03	3.25E-07	1.21E+02	-1.09E+01
ENDRIN	NA	3.00E-06	2.50E-01	5.20E+00	2.01E+04	1.00E-04	7.48E+03	-1.04E+01
ENDRIN ALDEHYDE	NA	2.00E-07	2.40E-02	4.80E+00	3.27E+03	4.20E-06	6.87E+02	-1.18E+01
ENDRIN KETONE	NA	5.51E-06	7.55E-02	4.99E+00	9.72E+03	2.02E-08	9.06E+02	-1.04E+01
GAMMA-BHC (LINDANE)	NA	3.52E-05	7.30E+00	3.72E+00	2.81E+03	5.14E-06	3.72E+02	-7.04E+00
GAMMA-CHLORDANE	NA	9.98E-06	5.60E-02	6.22E+00	6.75E+04	4.86E-04	2.68E+04	-1.11E+01
HEPTACHLOR	1.57E+00	4.00E-04	1.80E-01	6.10E+00	4.13E+04	2.94E-04	8.77E+03	-8.76E+00
HEPTACHLOR EPOXIDE	NA	1.95E-05	2.00E-01	4.98E+00	1.01E+04	2.10E-05	8.97E+02	-9.41E+00
METHOXYCHLOR	1.41E+00	4.17E-05	1.00E-01	5.08E+00	2.69E+04	2.03E-07	3.15E+02	-9.81E+00
POLYNUCLEAR AROMATIC HYDROCARBONS								
2-METHYLNAPHTHALENE	1.01E+00	5.50E-02	2.46E+01	3.86E+00	2.48E+03	5.18E-04	7.47E+01	-3.26E+00
ACENAPHTHENE	1.22E+00	2.15E-03	3.90E+00	3.92E+00	5.03E+03	1.84E-04	7.55E+02	-5.78E+00
ACENAPHTHYLENE	8.99E-01	6.68E-03	1.61E+01	3.94E+00	5.03E+03	1.14E-04	2.71E+02	-4.67E+00
ANTHRACENE	1.28E+00	6.53E-06	4.34E-02	4.45E+00	1.64E+04	5.56E-05	1.80E+03	-1.08E+01
BENZO(A)ANTHRACENE	NA	2.10E-07	9.40E-03	5.76E+00	1.77E+05	1.20E-05	2.60E+02	-1.40E+01
BENZO(A)PYRENE	NA	5.49E-09	1.62E-03	6.13E+00	5.87E+05	4.57E-07	5.15E+03	-1.68E+01
BENZO(B)FLUORANTHENE	NA	5.00E-07	1.50E-03	5.78E+00	5.99E+05	6.57E-07	3.02E+03	-1.49E+01
BENZO(G,H,I)PERYLENE	NA	1.00E-10	2.60E-04	6.63E+00	1.95E+06	3.31E-07	1.10E+04	-1.99E+01
BENZO(K)FLUORANTHENE	NA	9.65E-10	8.00E-04	6.11E+00	5.87E+05	5.84E-07	4.99E+03	-1.79E+01
CHRYSENE	1.27E+00	6.23E-09	2.00E-03	5.81E+00	1.81E+05	5.23E-06	3.17E+03	-1.62E+01
DIBENZO(A,H)ANTHRACENE	NA	9.55E-10	2.49E-03	6.75E+00	1.91E+06	1.41E-07	9.60E+03	-1.79E+01
FLUORANTHENE	1.25E+00	9.22E-06	2.60E-01	5.16E+00	5.55E+04	8.86E-06	3.63E+03	-1.04E+01
FLUORENE	1.20E+00	6.00E-04	1.69E+00	4.18E+00	9.16E+03	9.62E-05	5.25E+02	-6.96E+00
INDENO(1,2,3-CD)PYRENE	NA	1.25E-10	1.90E-04	NA	1.95E+06	3.48E-07	1.22E+04	-1.99E+01
NAPHTHALENE	1.03E+00	8.50E-02	3.10E+01	3.30E+00	1.54E+03	4.40E-04	8.45E+01	-2.77E+00
PHENANTHRENE	9.80E-01	1.21E-04	1.15E+00	4.46E+00	1.67E+04	4.23E-05	2.51E+03	-8.08E+00
PYRENE	1.27E+00	4.50E-06	1.35E-01	4.99E+00	5.43E+04	1.19E-05	1.27E+00	-1.10E+01
SEMIVOLATILES								
4-METHYLPHENOL	1.02E+00	1.10E-01	2.15E+04	1.94E+00	3.00E+02	1.00E-06	8.85E+00	8.97E-01
BIS(2-ETHYLHEXYL)PHTHALATE	9.81E-01	1.42E-07	2.70E-01	7.60E+00	1.20E+05	2.70E-07	5.88E+02	-1.25E+01
CARBAZOLE	1.10E+00	7.50E-07	1.80E+00	3.72E+00	9.16E+03	1.16E-07	1.70E+02	-9.83E+00
DIBENZOFURAN	1.09E+00	2.48E-03	3.10E+00	4.12E+00	9.16E+03	2.13E-04	1.52E+03	-6.08E+00
PHENOL	1.05E+00	3.50E-01	8.28E+04	1.46E+00	1.87E+02	3.33E-07	1.74+1	2.19E+00

NA - Not available.

[1] Chemical Specific Parameters. Risk Assessment Information System Online Database.http://rais.ornl.gov.
[2] Values are referenced from Endosulfan
[3] Scale developed by Ford and Gurba (1994).
[4] Laskowski et al., 1983

TABLE 5-2

PHYSICAL AND CHEMICAL PROPERTIES OF METALS
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical	Molecular Weight (g/mol) [1]	Density (g/cm^3)[2]	Vapor Pressure (mm Hg) [1]	Solubility (mg/L) [1]	Henry's Law Constant ($atm\text{-}m^3/mol$) [1]	Bioconcentration Factor (L/kg) [3]	Soil-Water Partition Coefficient (Kd) (cm^3/g)[4]
ALUMINUM	30.01	2.7	NA	0	NA	36	1500
ANTIMONY	124.78	6.68	NA	0	NA	1	45
ARSENIC	77.95	5.75	NA	0	NA	4	29
BARIUM	137.33	3.62	NA	0	NA	NA	41
BERYLLIUM	9.01	1.85	NA	0	NA	19	790
CADMIUM	112.41	8.69	NA	0	NA	1000	75
CALCIUM	42.09	1.54	NA	NA	NA	NA	NA
CHROMIUM	52	7.15	NA	0	NA	120	1800000
COBALT	58.93	8.86	NA	0	NA	NA	45
COPPER	63.55	8.96	NA	0	NA	110	35
IRON	55.85	7.87	NA	0	NA	NA	25
LEAD	207.2	11.3	NA	0	NA	8.7	900
MAGNESIUM	26.32	1.74	NA	NA	NA	NA	4.5
MANGANESE	54.94	7.3	NA	0	NA	NA	65
MERCURY	200.59	13.5336	0.00196	0.06	0.0114	86000	52
NICKEL[5]	58.69	8.9	NA	0	NA	0.8	65
POTASSIUM	39.1	8.9	NA	NA	NA	NA	NA
SELENIUM	80.98	4.809	NA	0	NA	62	5
SILVER	107.87	10.5	NA	0	NA	28	8.3
SODIUM	22.99	0.97	NA	NA	NA	NA	100
THALLIUM[5]	204.38	11.8	NA	0	NA	130	71
VANADIUM	50.94	6	NA	0	NA	NA	1000
ZINC	67.41	7.134	NA	0	NA	2.8	62

NA Not available.

1 EPI (Estimation Programs Interface) Suite™ is a Windows-based suite of physical/chemical property and environmental fate estimation programs delveloped by the EPA's Office of Pollution Prevention Toxics and Syracuse Research Corporation (SRC).
2 The CRC Handbook of Chemistry and Physics, 89th or 91st Edition
3 Superfund Chemical Data Matrix, 2004, Food Chain Fresh BCF value, source: ECOTOX
4 Regional Screening Level Table - User's Guide (USEPA, 2013).
5 Value for soluble salts.

6.0 HUMAN HEALTH RISK ASSESSMENT

This baseline HHRA was performed to characterize and quantify potential health risks at Site 12. The objective of the HHRA was to determine whether detected concentrations of chemicals within the study area pose a significant threat to potential human receptors under current and/or future land use. The HHRA for Site 12 is based on chemical data for surface soil, subsurface soil, and groundwater. The potential risks to human receptors are estimated, based on the assumption that no actions will be taken to control contaminant releases.

Section 6.1 provides an overview of the HHRA process, and Sections 6.2 through 6.6 outline the methodology and results of the HHRA. An analysis of the uncertainties is presented in Section 6.7. Section 6.8 summarizes the HHRA for Site 12. Tables documenting the HHRA were prepared following the standard format in accordance with USEPA risk assessment guidance for Superfund (USEPA, 2001), and are presented in Appendix F.

The HHRA conducted for this RI follows guidance documents from USEPA (1989, 1991, 1993, 1996a, 1997a, 2001, 2002a, 2002b, 2004, and 2009), Navy (2001 and 2004) and State of Illinois (Illinois EPA, 2013a). The methodologies used complied with scientifically acceptable HHRA practices and USEPA guidance, including but not limited to the above referenced documents.

- USEPA, 1989. Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part A). EPA 540/1-89/002. Office of Emergency and Remedial Response, Washington, D.C.

- USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response (OSWER) Directive 9285.6-03. Washington, D.C.

- USEPA, 1993. Preliminary Review Draft: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure. OSWER, Washington, D.C.

- USEPA, 1996a. Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128. OSWER. Washington, D.C.

- USEPA, 1997a. Exposure Factors Handbook. EPA/600/P-95/002Fa. OSWER, Washington, D.C.

- USEPA, 2001. Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments).

- USEPA, December 2002a. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. Washington, D.C.

- USEPA, December 2002b. Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10. Washington, D.C.

- USEPA, 2004b. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final Guidance.

- USEPA, 2009. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), Final.

- Navy, 2001. Conducting Human Health Risk Assessments under the Environmental Restoration Program. Ser N453E/1U595168. Washington, D.C.

- Navy, 2004. Navy Final Policy on the Use of Background Chemical Levels.

- Illinois EPA, 2013a. 35 IAC 742 Tiered Approach to Corrective Action Objectives (TACO). Illinois Environmental Protection Agency, Bureau of Land, available online at http://www.epa.state.il.us/land/taco/ (Accessed 2013). TACO and Non-TACO screening criteria. TACO criteria are from Illinois Pollution Control Board, 2013a. Title 35 of the IAC Section 742: TACO. www.ipcb.state.il.us/SLR/IPCBandIEPAEnvironmentalRegulations-Title35.aspx (Accessed 2013).

The quantitative risk estimates are based on a number of assumptions about exposure and toxicity. Thus, the risk estimates may over- or under-estimate the level of potential human health risks associated with a site.

6.1 OVERVIEW OF RISK ASSESSMENT PROCESS

An HHRA provides the framework for developing information necessary to determine the need for remediating and developing potential remedial alternatives for a site. A baseline HHRA consists of five major components, as follows:

- Data evaluation and identification of COPCs
- Exposure assessment
- Toxicity assessment
- Risk characterization
- Characterization of uncertainty in the risk estimates

To assess potential public health risks, four major aspects of chemical contamination and exposure must be considered: contaminants with toxic characteristics must be found in environmental media; contaminants must be released by either natural processes or by human action; potential exposure points must exist either at the source or via migration pathways if exposure occurs at a remote location other than the source; and human receptors must be present at the point of exposure. Risk is a function of both toxicity and exposure. If any one of the requirements listed above is absent for a specific site, the exposure route is regarded as incomplete, and no potential risks are considered for human receptors.

The data evaluation component of the HHRA is primarily concerned with selecting COPCs and calculating exposure point concentrations (EPCs). Current study area data are considered in developing a list of COPCs. The chemical data are analyzed by medium and area in order to be representative of potential human health exposure, and COPCs are selected for each medium and exposure area. The EPCs provide the chemical input for each of the exposure pathways. A summary of the data evaluation process is contained in Section 6.2.

The selection of COPCs was based on chemical-specific concentrations, occurrence, distribution, and toxicity. COPCs were selected to represent site constituents present at concentrations that exceed risk-based screening levels. Identified COPCs are evaluated further in the quantitative HHRA. A discussion of COPC selection is included in Section 6.3.

The exposure assessment identifies potential human exposure pathways. Exposure routes are identified by medium (i.e., surface soil, subsurface soil, and groundwater) based on information on study area chemical concentrations, chemical release mechanisms, human activity patterns, and other pertinent information, to develop a conceptual site model (CSM). A discussion of the exposure assessment is contained in Section 6.4.

The toxicity assessment presents the available human health criteria (quantitative toxicity indices) for the selected COPCs. This assessment is contained in Section 6.5. A discussion of health effects and dose-response parameters such as Reference Doses (RfDs), Reference Concentrations (RfCs), Cancer Slope Factors (CSFs), and Inhalation Unit Risks (IURs), is presented.

The risk characterization section (Section 6.6) describes how the estimated intakes are combined with the toxicity information to estimate risks. Uncertainties associated with the HHRA process are discussed qualitatively in Section 6.7. Section 6.8 summarizes the HHRA for Site 12.

6.2 DATA EVALUATION

Information associated with data usability for Site 12 is provided in this section. The HHRA presented in this report is based on analytical data collected at Site 12 during the most recent field activities.

Data utilized in this HHRA include validated analytical results of known and sufficient quality for use in quantitative risk calculations. The data used have been validated in accordance with USEPA Tier II, or higher, validation levels and determined to be of adequate quality for use in the HHRA. Fixed-base laboratory analytical results for target analytes from the field investigation were used in the quantitative risk evaluation. The Work Plan indicated that field measurements and data regarded as unreliable (i.e., qualified as "R" during the data validation process), would not be used in the quantitative HHRA. No data were qualified as unreliable. Analytical data qualified as estimated (“J”, or “UJ”) were used, even though the reported concentrations or sample-specific quantitation limits may be somewhat imprecise. The use of estimated data adds to the uncertainty associated with the HHRA; however, the associated uncertainty is expected to be negligible compared to the other uncertainties inherent in the risk evaluation process (i.e., uncertainties associated with land uses, exposure scenarios, toxicological criteria, etc.). Compounds detected above the laboratory detection limit at least once were included in the summary tables for that medium. Duplicate analytical results were not used for the EPC calculations. The duplicate results were used for sampling and analytical QC purposes only. Data values less than sample-specific detection limits were reported as the detection limit, and the result designated as below detection limit by annotation.

Analytical results for samples used in this HHRA are presented in Appendix E. Section 3.0 of this RI Report discusses sample collection and fixed-based laboratory analysis by standard USEPA methods. Geologic soil boring and well construction logs from RI field activities are provided in Appendix B. Sample analytical results are presented in Section 4.0 of this report.

6.3 SELECTION OF CHEMICALS OF POTENTIAL CONCERN

The selection of COPCs is a qualitative screening process used to limit the number of chemicals and exposure routes quantitatively evaluated in the HHRA to those site-related constituents that dominate overall potential risks. Screening of site data against risk-based concentrations (RBCs) is used to focus the HHRA on meaningful chemicals and exposure routes.

In general, a chemical is selected as a COPC and retained for further quantitative risk evaluation in the HHRA if the maximum detection in a sampled medium exceeds a conservative screening value(s), as described below. Chemicals eliminated from further evaluation at this time are assumed to present minimal risks to potential human receptors.

6.3.1 Derivation of Screening Criteria

Several screening criteria were used to identify COPCs for Site 12. Screening concentrations based on risk-based cleanup objectives developed by Illinois EPA (2013a) and RSLs (USEPA, 2013) developed by ORNL for USEPA were used, as well as other USEPA criteria. The risk-based screening concentrations correspond to a systemic hazard quotient (HQ) of 0.1 for non-carcinogens, or an incremental lifetime cancer risk (ILCR) of $1x10^{-6}$ for carcinogens. Note that the Illinois EPA and USEPA RSLs for non-carcinogens are based on a HQ of 1.0, but screening concentrations for this HHRA were based on a HQ of 0.1 so that additive non-carcinogenic risks do not exceed 1.0. The screening levels used for each medium in the HHRA are briefly discussed below.

Screening Levels for Soil

The following criteria were used to select COPCs for surface and subsurface soil:

- Illinois EPA Tier 1 Soil Remediation Objectives (SRO) (Illinois EPA, 2013a). These include remediation objectives for the soil ingestion exposure route and the inhalation exposure route. The lowest Tier I objective of the receptors (i.e., residential, industrial/commercial, or construction worker) listed in the Tier 1 Tables was used for screening.

- SROs for Chemicals not listed in TACO (Illinois EPA, 2013a).

- USEPA RSLs online at http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm (USEPA, 2013). Residential soil values.

- USEPA Generic Residential and Industrial soil screening levels (SSLs) for Inhalation of Volatiles and Fugitive Dusts, online at http://www.epa.gov/superfund/health/conmedia/soil/pdfs/ssg_appa-c.pdf (USEPA, 2002a). USEPA SSL ingestion values for the residential and industrial/commercial worker scenarios were considered but not used in COPC selection as the ORNL residential RSLs cover the same pathway and are more restrictive.

- USEPA SSLs for the Construction Worker Scenario (USEPA, 2002a). SSLs were calculated according to the 2002 guidance document using the default construction worker exposure parameters

presented in Exhibit 5-1 of the Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER 93355.4-24, December 2002. Construction worker criteria were developed using subchronic RfDs/RfCs where available. The particulate emission factor for the calculation of inhalation of fugitive dusts for the construction worker was derived as presented in Equation 5-5 of the guidance using an assumption of 8 tons for mean vehicle weight (USEPA, 2002a).

If the maximum concentration of a constituent exceeded any of these criteria, the chemical was selected as a COPC.

The comparison of site soil data to USEPA inhalation SSLs for transfers from soil to air was used as a screening means to identify whether a quantitative analysis of this exposure pathway was warranted. If the maximum soil concentration of a chemical exceeded the inhalation SSL, a quantitative evaluation of potential risks from inhalation was performed. Otherwise, the risks associated with the inhalation pathway were considered insignificant, and the exposure pathway was eliminated from further evaluation.

To evaluate the potential for chemicals detected in soil to impact groundwater, maximum chemical concentrations were compared to SSLs for migration to groundwater. The comparisons are presented in separate tables (from the direct contact COPC tables) and were used to select COPCs for soil. Migration-to-Groundwater SSLs were not used to select COPCs for quantitative risk evaluation because quantitative HHRAs are typically based on direct contact with soil or inhalation of vapors for VOCs and particulates. There is no methodology available for quantitative risk evaluation of indirect exposure based on migration to groundwater; therefore, it is not appropriate to select COPCs for quantitative risk evaluation for direct exposure on the basis of the indirect soil-to-groundwater pathway. The soil-to-groundwater SSLs provide an indication of potential impacts of contamination in soil on groundwater quality, but are not indicators of quantitative risk.

The migration from soil-to-groundwater comparisons were made using the following criteria:

- Illinois EPA Tier 1 SROs for Residential Properties for the Soil Component of the Groundwater Ingestion Exposure Route for Class I Groundwater (Illinois EPA, 2013a).

- USEPA Generic SSLs for Migration from Soil to Groundwater calculated online at http://rais.ornl.gov/epa/ssl1.shtml (SSLs published online at http://rais.ornl.gov/epa/ssl1.shtml were used to screen for migration from soil to groundwater since these values are more recent than those published in the 1996 and 2002 SSL guidance documents. [USEPA, 1996a, 2002a]).

Results of the soil-to-groundwater comparisons are qualitatively discussed later in this HHRA in Sections 6.3.4 and 6.7, and are also presented in separate tables.

COPCs were identified for subsurface soil because of the different associated exposure scenarios for potential human receptors. Subsurface soil was defined as soil collected from depths greater than 1 foot bgs. Construction workers were assumed to be exposed to subsurface soil. Exposures to subsurface soil for future occupational workers and hypothetical future residents were evaluated to account for the possibility that subsurface soil may be brought to the surface in a future excavation project.

Screening Levels for Groundwater

The following criteria were used to select COPCs for groundwater:

- USEPA RSLs for tap water online at http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm (USEPA, 2013).
- Safe Drinking Water Act (SDWA) MCLs (USEPA, 2012a).
- Illinois EPA Tier 1 Groundwater Remediation Objectives – Class I (Illinois EPA, 2013a).

If the maximum concentration of a constituent exceeded these criteria, the chemical was selected as a COPC.

The RSLs for tap water, SDWA MCLs, and Illinois EPA Tier 1 Groundwater Remediation Objectives – Class I apply to domestic water supplies; therefore, it is conservative to use these drinking water criteria to evaluate groundwater at Site 12 because groundwater is not currently used as a drinking water source at the site. Because groundwater is likely confined to a shallow aquifer that is not productive and due to current basewide restrictions on groundwater use, potential exposure to groundwater is not likely. Therefore, the results of the groundwater comparisons to criteria are qualitatively discussed later in this HHRA in Sections 6.3.5 and 6.7.

Essential Nutrients, Metals, and Chemicals Without Toxicity Criteria

The essential nutrients calcium, magnesium, potassium, and sodium were not selected as human health COPCs for Site 12. These metals are naturally abundant in environmental matrices and are only toxic at high doses. In addition, because of the lack of toxicity criteria, risk-based COPC screening levels are not available for some chemicals (e.g., benzo(g,h,i)perylene, etc.). Appropriate surrogates were selected for some of these chemicals based on similar chemical structures and are noted when used.

In addition, some metals (other than essential nutrients) are also abundant in environmental matrices. The metals are compared to the Illinois Inorganic Background levels, as discussed later in this HHRA.

Determination of Site-Related Chemicals - Background Evaluation

The procedures for the elimination of chemicals as COPCs on the basis of background concentrations followed current U.S. Navy policy (Navy, 2004). At the present time, facility background concentrations for naturally occurring or anthropogenic chemicals have not been determined for NSGL. Therefore, maximum soil concentrations were compared to the concentrations of metals and PAHs provided by Illinois EPA in Appendix A, Table G and Table H of TACO, respectively (Illinois EPA, 2013a). No background are available for groundwater, consequently a background comparison for groundwater was not performed.

Navy policy as it applies to HHRAs states the following:

1. A clear and concise understanding of chemicals released from a site, thus making sure the Navy is focusing on remediating the release.

2. The use of background data in the screening-level HHRA.

    a. The comparison of site chemical levels to risk-based screening criteria.
    b. The comparison of site chemical levels to background concentrations.
    c. The identification of site-related COPCs based on screening criteria comparisons and background comparisons. Site-related COPCs are those chemicals with concentrations exceeding risk-based screening criteria and background concentrations. To the extent possible, site-related COPCs are further evaluated quantitatively in the HHRA.

3. The consideration of background in the HHRA.

    a. The calculation of risk estimates for site-related COPCs only.
    b. The further evaluation of non-site-related COPCs in the risk characterization section (e.g., the evaluation of chemicals detected at concentrations exceeding screening criteria but less than background concentrations). The Navy considers this comparison to be consistent with the USEPA's Role of Background in the CERCLA Cleanup Program (USEPA, 2002c).

4. The selection of site cleanup remedial goals at concentrations not less than background levels. Additionally, cleanup levels should not be developed for chemicals not identified as chemicals of

concern (COCs). As defined in the Navy guidance, COCs are site-related COPCs found to be the risk drivers in the HHRA.

To determine whether metals and anthropogenic organic chemicals are present at concentrations greater than background, maximum detected concentrations of metals and PAHs in soil were compared to background levels provided by Illinois EPA, and the results are discussed in the Uncertainty Section. No chemicals were excluded from the initial COPC selection process based on background.

Screening Concentrations for Lead

Limited criteria are available to evaluate the potential risks associated with lead. There are no risk-based concentrations for this compound because the USEPA has not derived toxicity values for lead. However, recommended screening levels available for lead in soil are used to indicate the need for response activities. Guidance from both the Office of Prevention, Pesticides, and Toxic Substances (OPPTS) and OSWER recommend 400 mg/kg as the lowest screening level for lead-contaminated soil in a residential setting where children are frequently present (USEPA, 1994). OPPTS identifies 2,000 to 5,000 mg/kg as an appropriate range for areas where contact with soil by children in a residential setting is less frequent.

The TACO objectives of 800 and 700 mg/kg for the industrial/commercial and construction worker receptors respectively, were also included for screening.

A discussion of the chemicals identified as COPCs and the rationale for their selection is provided in the following sections.

6.3.2 COPC Selection for Surface Soil

This section presents the results of the COPC selection process for surface soil. The COPC screening process for surface soil and the results of the screening are presented in Table 6-1 (the Risk Assessment Guidance for Superfund (RAGS) Part D tables, Table 2s). As previously discussed and noted in Table 6-1, screening values for risk-based non-carcinogenic compounds were reduced by a factor of 10 to correspond to a target hazard quotient of 0.1. The following chemicals were retained as COPCs for surface soil:

- SVOCs – carcinogenic PAHs (c-PAHs) evaluated as benzo(a)pyrene equivalents (BaP Eq), including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene. The BaP Eq concentration is the sum of the weighted potency factor of each compound in the mixture multiplied by the concentration of the compound in the mixture. The carcinogenic risks associated with exposure to BaP Eq, averaged over

a lifetime, are calculated and compared to screening levels. Total BaP Eq were calculated for comparative purposes. The concentration of each individual PAH was multiplied by its Toxic Equivalent Factor (TEF) to yield the concentration of benzo(a)pyrene toxic equivalents represented by each PAH. For nondetected results, the limit of detection was used in the calculation. This approach is used because an EPA derived CSF is available only for benzo(a)pyrene. Benzo(a)pyrene is one of the most potent of the PAHs and TEFs are quantitative indicators of the comparative potency of a PAH compound compared to the potency of benzo(a)pyrene (Kosteki and Calabrese, 1993).

- Pesticides – alpha-chlordane, gamma-chlordane, heptachlor, heptachlor epoxide.

- Metals – aluminum, arsenic, barium, chromium, cobalt, iron, manganese, mercury, and thallium.

These constituents were identified as COPCs in surface soil because maximum concentrations exceeded USEPA RSLs or Illinois TACO risk-based screening levels (primarily for residential soil).

The maximum concentrations were also compared to Illinois TACO inhalation screening levels and USEPA Generic SSLs for migration from soil to air (inhalation), when available. The maximum concentration of heptachlor and chromium exceeded the inhalation SSLs for the residential scenario; therefore, risks from inhalation of this chemical were quantitatively evaluated. The maximum concentrations of alpha-chlordane, gamma-chlordane, aluminum, arsenic, barium, chromium, cobalt, manganese, and mercury exceeded the inhalation SSLs for the construction worker scenario; therefore, risks from inhalation of these constituents as dusts/particulates were quantitatively evaluated conservatively.

Background Surface Soil Concentrations

Maximum surface soil metals and PAH concentrations were compared to concentrations in the background data set established for use by the Illinois EPA. The background level in metropolitan area soils for benzo(a)pyrene (2.1 mg/kg), benzo(a)anthracene (1.8 mg/kg), dibenzo(a,h)anthracene (0.42 mg/kg), and indeno(1,2,3-cd)pyrene (1.6 mg/kg) is higher than or equal to the respective maximum soil sample results for these chemicals at Site 12. In addition, the background level in metropolitan area soils is higher than the average positive results for all PAHs (see Table below). This indicates that it is probable that these PAHs at Site 12 are background constituents. Given that not all c-PAHs were detected at concentrations lower than the Illinois background levels, BaP Eq are maintained as COPCs for the quantitative risk evaluation.

When the maximum concentrations of metals detected at Site 12 in surface soil were compared to background data established for use by the Illinois EPA, no metals were found to be below background, based on maximum concentrations. However, if the average positive results of detected inorganics were compared to the background data set, all metals except mercury were below the background values. This indicates that it is possible that these metals at Site 12 could be background constituents.

COPCs	Surface Soil Maximum/Average Positive Result*	Illinois EPA Background Soil
Metals (mg/kg)		
Aluminum	10000/5966	9500
Arsenic	16.9/9.07	13
Barium	244/72.40	110
Chromium	23.8/12.71	16.2
Cobalt	11.2/7.09	8.9
Iron	20300/13028	15900
Manganese	701/446	636
Mercury	0.6/0.18	0.06
Vanadium	18.9/12.75	25.2
Polynuclear Aromatic Hydrocarbons (mg/kg)		
BaP Eq	2.08/0.90	2.1
Benzo(a)anthracene	1.8/0.57	1.8
Benzo(a)pyrene	1.5/0.62	2.1
Benzo(b)fluoranthene	2.3/0.75	2.0
Benzo(k)fluoranthene	2.3/0.54	1.7
Chrysene	1.5/0.53	2.7
Dibenzo(a,h)anthracene	0.29/0.12	0.42
Indeno(1,2,3-cd)pyrene	0.67/0.28	1.6

* Average is the average of the samples collected with positive results (not including non-detects).

No chemicals detected in surface soil were excluded as COPCs based on background conditions.

6.3.3 COPC Selection for Subsurface Soil

This section presents the results of the COPC selection process for subsurface soil. The COPC screening process for subsurface soil and the results of the screening are presented in Table 6-2 (RAGS Part D tables, Table 2s). As previously discussed and noted in Table 6-2, screening values for risk-based non-carcinogenic compounds were reduced by a factor of 10 to correspond to a target HQ of 0.1. The subsurface soil data set consists of samples collected from depths greater than 1 foot bgs. The following chemicals were retained as COPCs for subsurface soil:

- SVOCs – c-PAHs evaluated as BaP Eq including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene; naphthalene (inhalation construction worker scenario only)

- PCBs – Aroclor-1254

- Metals – aluminum, antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, and mercury

These constituents were identified as COPCs in subsurface soil because maximum concentrations exceeded USEPA RSLs or Illinois TACO risk-based screening levels (primarily for residential soil).

The maximum concentrations were also compared to Illinois TACO inhalation screening levels and USEPA Generic SSLs for migration from soil to air (inhalation), when available. The maximum concentration of chromium and mercury exceeded the inhalation SSLs for the residential scenario; therefore, risks from inhalation of this chemical were quantitatively evaluated. The maximum concentrations of naphthalene, aluminum, arsenic, barium, cadmium, chromium, cobalt, and manganese exceeded the inhalation SSLs for the construction worker scenario. Therefore, risks from inhalation of these constituents were quantitatively evaluated conservatively.

Background Subsurface Soil Concentrations

Maximum subsurface soil metals and PAH concentrations were also compared to concentrations in the background data set established for use by the Illinois EPA. Recognizing that the Illinois EPA dataset for PAHs is for surface soil, this was done just for comparison purposes. Only the maximum subsurface soil sample for indeno(1,2,3-cd)pyrene is below the background level in area soils. However, PAHs may have been associated with Site 12; therefore, it is reasonable to include them as COPCs in subsurface soil. Therefore, no chemicals detected in subsurface soil were excluded as COPCs based on background conditions.

When the maximum concentrations of the metals detected at Site 12 in subsurface soil were also compared to Illinois EPA background data, no metals were found to be below background based on maximum concentrations. However, if the positive average results of detected metals were compared to the background data set, the metals, except barium, cadmium, chromium, copper, lead, and mercury, were below the background values. This indicates that it is possible that these inorganic compounds at Site 12 could be background constituents.

COPCs	Subsurface Soil Maximum/Average Positive Result*	Illinois EPA Background Soil
Metals (mg/kg)		
Aluminum	11700/6717	9500
Antimony	4,24/1.42	4
Arsenic	25/11.58	13
Barium	432/119.91	110
Cadmium	7.31/1.82	0.6
Chromium	60.8/20.62	16.2
Cobalt	17/8.45	8.9
Copper	362/105.25	19.6
Iron	31400/15601	15900
Lead	845/200	36
Manganese	846/461	636
Mercury	1.99/0.45	0.06
Vanadium	25.90/15.28	25.2
Polynuclear Aromatic Hydrocarbons (mg/kg)		
BaP Eq	10.7/1.8	2.1
Benzo(a)anthracene	9.8/1.5	1.8
Benzo(a)pyrene	7.7/1.3	2.1
Benzo(b)fluoranthene	10.3/1.5	2.0
Benzo(k)fluoranthene	2.6/0.68	1.7
Chrysene	7.9/1.3	2.7
Dibenzo(a,h)anthracene	0.705/0.22	0.42
Indeno(1,2,3-cd)pyrene	1.3/0.37	1.6

No chemicals detected in subsurface soil were excluded as COPCs based on background conditions.

6.3.4 Migration of Chemicals from Soil to Groundwater

A quantitative evaluation of the migration of chemicals from soil to groundwater was not included in this HHRA. However, soil data were compared to Illinois EPA Tier 1 TACO and Non-TACO SROs for Residential Properties for the Soil Component of the Groundwater Ingestion Exposure Route for Class I Groundwater, and USEPA Generic SSLs for migration from soil to groundwater. Soil samples analyzed by SPLP were compared to Illinois EPA TACO and Non-TACO Groundwater Remediation Objectives (Illinois EPA, 2013a). The soil-to-groundwater SSLs were not used to select COPCs for quantitative risk evaluation, but to provide an evaluation of the potential impact of chemicals detected in soil. Exceedances of the soil-to-groundwater SSLs, exceedances of groundwater screening values, and a qualitative discussion of this pathway are included in the uncertainty section (Section 6.7 of this HHRA).

6.3.5 COPC Selection for Groundwater

As previously discussed a quantitative evaluation of direct contact with groundwater was not included in this HHRA. However, groundwater data were compared to USEPA RSLs for tapwater (USEPA, 2013), SDWA MCLs (USEPA, 2012a), and 35 IAC 620 Groundwater Standards – Class I and Class II (35 IAC 620, 2013). The groundwater screening levels were not used to select COPCs for quantitative risk evaluation, but to provide an evaluation of the potential impact of chemicals detected in groundwater. Exceedances of the groundwater screening levels and a qualitative discussion of this pathway are included in the uncertainty section (Section 6.7 of this HHRA).

6.3.6 Summary

Table 6-3 summarizes the chemicals retained as COPCs for surface soil and subsurface soil at Site 12.

6.4 EXPOSURE ASSESSMENT

The exposure assessment estimates the extent of human contact with COPCs by characterizing potentially exposed populations of individuals (i.e., receptors), identifying actual or potential pathways of exposure that are appropriate for each potential receptor, and estimating the extent of human exposure.

An exposure pathway identifies the exposure routes for potentially complete pathways at the site and describes the mechanism by which human receptors may come into contact with site-related COPCs. Exposure pathways are dependent on both current and future land use. An exposure pathway is defined by the following four elements (USEPA, 2005a):

- A source material and mechanism of constituent release to the environment.
- An environmental migration or transport medium (e.g., soil) for the COPCs.
- A point of potential human contact with the medium of interest (e.g., potential exposure to the contaminated soil).
- An exposure route (e.g., ingestion, dermal contact) at the point of contact.

An exposure pathway is considered "complete" if all elements are present. If complete and deemed a significant risk, these pathways are quantitatively evaluated in the HHRA.

The potential for exposure at Site 12 is based on several factors, including current and future land uses, human activity patterns, site access controls, chemical behavior in the environment, and the presence of human receptors. Based on these variables, exposure scenarios were developed that characterize the potential for human exposure under both current and future site conditions. The future scenario accounts

for potential or anticipated changes in land use and site characteristics that may alter exposure conditions at the site. The exposure assessment assumes that, in general, chemical compositions for environmental media are identical under current and future site conditions.

The exposure assessment presented in this section of the report describes the physical site setting and potential receptors of concern, identifies the potential contaminant migration and exposure pathways, defines the contaminant concentrations at the point of exposure, and presents the equations used to quantify exposure in terms of contaminant intake (dose). Appendix F presents summary calculations of the chemical-specific intakes for the receptors and exposure pathways, and also contains example calculations of the chemical intakes.

6.4.1 Site Background, Land Use, and Site Access

Site 12 is located in a flat area on the shore of the NSGL Outer Harbor, and is approximately 3.5 acres. Site 12 is currently a grass-covered field used as a picnic and recreational area. A gravel road transects the site from north to south and terminates in a gravel parking lot on the south against a concrete pier. The only structure on the site is a picnic pavilion overlooking the lake. The only other notable feature is a drainage ditch, which emerges from the bluff on the west and extends eastwards across the site to Lake Michigan. During harbor dredge activities in 1952 and in the early 1970s, dredge spoils were reportedly disposed of in this area. The sediment dredged from the harbor may have high organic content, and potentially contain heavy metals, oils, pesticides, and PCBs.

6.4.2 Conceptual Site Model

The development of a CSM is an essential component of the exposure assessment. The CSM integrates information regarding the physical characteristics of the site, exposed populations, sources of contamination, and contaminant mobility (fate and transport) to identify potential exposure routes and receptors to be evaluated in the HHRA. A well-developed CSM will allow a better understanding of the risks at a site and will aid risk managers in identifying the potential need for any additional environmental sampling and remediation. The site-specific CSM for Site 12 is presented in this section and illustrated on Figure 6-1. Table 6-4 presents a summary of the exposure pathways that were addressed quantitatively for each human receptor. The CSM depicts the relationships among the following elements:

- Site sources of contamination and potential COPCs
- Contaminant release mechanisms
- Transport pathways
- Exposure routes/pathways
- Potential receptors.

These elements of the CSM for Site 12 are discussed in the following sections.

6.4.2.1 Site Sources of Contamination

During harbor dredging activities in 1952 and the early 1970s, dredge spoils from the boat slip (Boat Basin) area in the harbor were reportedly disposed at Site 12. Aerial photographs taken between 1946 and 1985 indicated evidence of filling and other modifications of Site 12 over this period. However, these filling activities do not coincide with or closely follow the reported dates of harbor dredging; therefore, the filling activities may not be related to the disposition of dredge spoils, as originally reported. During site investigations in the late 1980s there were piles of soil and plant debris on Site 12. The soil and debris presumably came from other locations at NSGL. Therefore, it is likely that a variety of sources, including dredge spoils and fill material, contributed to contamination at Site 12.

The harbor area receives flow from Pettibone Creek, which drains stormwater from the base and a number of off-base industries upstream of NSGL. Chemicals in the runoff may have settled in the sediments. The sediment reportedly dredged from the harbor and deposited on Site 12 could have high organic content and may contain heavy metals, oils (i.e., VOCs and SVOCs), pesticides, and PCBs from industries upstream of the NSGL, according to initial reports.

The source of the fill material and the types of contaminants that may have been in them prior to being placed at Site 12 are unknown. However, it is possible that contaminants similar to those found in sediment could be in the fill material.

6.4.2.2 Contaminant Release Mechanisms and Migration Pathways

Chemicals could be released from the source area by a variety of mechanisms including:

- Transport of surface soil contaminants to the subsurface soil and groundwater via infiltration, percolation, and migration within the groundwater aquifer.

- Migration of fugitive dusts and VOCs from surface (subsurface soil if construction/excavation activities occur) to ambient air.

Receptors may be exposed either directly or indirectly to contaminants in environmental media. These exposure mechanisms generally act along one or more exposure routes such as ingestion, inhalation, or direct dermal contact.

Figure 6-1 shows the Site 12 CSM, which illustrates these potential contaminant migration pathways.

6.4.2.3 Exposure Mechanisms/Exposure Routes/Potential Receptors

The potential for exposure to contamination at Site 12 is based on several factors, including current and future land uses, human activity patterns, site access controls, and contaminant behavior in the environment. Based on these variables, different scenarios were developed to characterize the potential for human exposure under current and future site conditions. In addition to exposures that may result from current uses of the site, the future scenario also accounts for potential changes in land use and site characteristics that may alter the presence of COPCs and exposure to them in a given medium.

The exposure assessment is based on the assumption that, in general, chemical compositions for various environmental media are identical under current and future site conditions.

NSGL is an active facility and will remain so for the foreseeable future. Under current land use, access to and use of Site 12 for picnicking is primarily limited to military personnel and employees. However, to aid in risk management decisions, the risk assessment considered potential receptors, such as future residents and recreational receptors/trespassers, who might be exposed to contaminants persisting in site media or migrating from the site. The potential receptors have been identified by analyzing current land use practices, potential future land uses, and the identified areas of contamination, in order to focus the risk assessment on potential site-related exposures. The general receptor classes include:

- **Construction Workers** - Potential receptors under future land uses. Construction workers are assumed to be civilian personnel who may be involved in a short-term, one-time construction project. Excavation and ground-intrusive activities may occur on the site in the future. If these excavation projects were to occur, construction workers could potentially be exposed to surface soil and subsurface soil to an estimated depth of 10 feet bgs (conservative estimate based on available site information) by ingestion and dermal contact. In addition, construction workers could potentially be exposed to groundwater. However, exposures will be of short duration and protective clothing will limit dermal contact. Incidental ingestion of groundwater by construction workers is expected to be insignificant and direct contact with groundwater is qualitatively evaluated in Section 6.7.5. Construction workers may also be exposed by inhaling dusts from soil or vapors emitted from soil during excavation.

- **Maintenance/Occupational Workers** – Potential receptors under future and current land use. Maintenance/occupational workers include personnel to account for the possibility that NSGL might be developed for commercial/industrial uses at some future time. Maintenance/occupational workers

are assumed to be exposed to surface and subsurface soil by ingestion, dermal contact, and inhalation of fugitive dust and vapors.

- **Adult and Adolescent Recreational Receptors/Trespassers** - Potential receptors under current/future land use (e.g., picnickers). These receptors will be evaluated for exposure to surface soil at the site. Exposure to surface soil is evaluated for ingestion, dermal contact, and inhalation of fugitive dust and vapors.

- **Future Civilian Residents (Adults/Children)** – Potential receptor under future land use. Hypothetical future residents are not potential receptors under current land use but will be evaluated to aid in risk management decisions by providing an indication of potential risks if the facility were to close and be developed for residential use. Future onsite residents will be assumed to be exposed to surface and subsurface soil by ingestion, dermal contact, and the inhalation of fugitive dust and vapors.

- **Future Military Residents (Adults/Children**) – Potential receptor under future land use. Military residents are not potential receptors under current land use because they do not live on the site. They will be evaluated primarily for decision-making (risk management) purposes based on the assumption that the site could support military residential use in the future. Future military residents will be assumed to be exposed to surface and subsurface soil by ingestion, dermal contact, and the inhalation of fugitive dust and vapors. Risks to military residents will be evaluated by reference to future civilian residents because risks for these receptors are the same or slightly less than civilian residents.

- **Navy Recruits** - Navy recruits were also considered as potential receptors at Site 12. However, exposure for the recruits was assumed to be negligible because of the limited time recruits spend at NSGL (i.e., 12 weeks) and the lack of idle time allocated to recruits during training. Therefore, risks to Navy recruits are not evaluated in the risk assessment.

6.4.3 Central Tendency Exposure versus Reasonable Maximum Exposure

Traditionally, exposures evaluated in the HHRA were based on the concept of a Reasonable Maximum Exposure (RME) only, which is defined as "the maximum exposure that is reasonably expected to occur at a site" (USEPA, 1989). However, more recent HHRA guidance (USEPA, 1993a) indicates the value of addressing an average case or Central Tendency Exposure (CTE) as well as the RME.

To provide a full characterization of potential exposure, both RME and CTE were evaluated in the HHRA for Site 12. The available guidance (USEPA, 1993a) concerning the evaluation of CTE is limited;

therefore, professional judgment was used when defining CTE conditions for a particular receptor at the site. Exposure factors and assumptions for the CTE are presented and discussed in Section 6.4.5.

6.4.4 Exposure Point Concentrations

EPCs, which are calculated for COPCs only, are estimates of chemical concentrations within an exposure unit (EU) that are likely to be contacted over time by a receptor and are used to estimate exposure intakes.

The following guidelines were used to calculate the EPCs:

- If a soil data set for an EU contained fewer than 10 samples, the EPC for the RME and CTE cases were defined as the maximum detected concentration.

- If a soil data set for an EU contained 10 or more samples, the following receptor-specific EPCs were used:

    - Current and future maintenance occupational workers along with current Navy personnel and adolescent and adult recreational receptors/trespassers were assumed to be exposed to the upper confidence limit (UCL) on the arithmetic mean concentration of each COPC, which is based on the distribution of the data set, for the RME and CTE. The EPCs were calculated following USEPA's Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (USEPA, 2002b) using the USEPA's ProUCL Version 4.1.01 software and guidance (USEPA, 2010).

    - Construction workers and future residents were assumed to be exposed to the maximum detected concentrations of each COPC for the RME evaluations. The maximum detected concentration was used as the EPC for construction workers because of the possibility that construction workers might be exposed to a small highly concentrated area during the short exposure duration assumed for this receptor. The maximum concentration was used to estimate risks for future residents based on the conservative assumption that a dwelling would be built on the most highly contaminated section of the site in the future. The CTE evaluations for these receptors incorporate the mean concentrations of each COPC.

Duplicate analytical results were not used for the EPC calculations. The duplicate results were used for sampling and analytical quality control purposes only. Data values lower than sample-specific detection limits were reported as the detection limit and the result designated as below detection by annotation.

The EPCs for the chemicals identified as COPCs in surface soil and subsurface soil at Site 12 are presented in Tables 6-5 and 6-6, respectively (RAGS Part D tables, Table 3s).

6.4.5 Intake Estimation Methods and Exposure Parameters

To determine potential human health risks associated with Site 12, an estimate of chemical intake was made in accordance with current USEPA guidance. Exposure parameters and exposure concentrations were used to derive estimates of chemical intake for each exposure route, pathway, and receptor. The resulting chemical intakes were integrated with the toxicity factors discussed in Section 6.5 to develop quantitative risk estimates for potential receptors at the site. Intakes for the identified potential receptor groups were calculated using current USEPA HHRA guidance (USEPA, 1989, 2004 and 2009) and presented in the HHRA spreadsheets (Appendix F). In accordance with current USEPA guidance, chemical intakes (and risks) were estimated for both the CTE and RME conditions. Values of exposure parameters used to quantify exposure for each receptor are presented in Tables 6-7 and 6-8 for the RME and CTE, respectively.

The following sections present the equations used to estimate chemical intakes for the exposure routes identified for quantitative evaluation. Example calculations are contained in Appendix F.

6.4.5.1 Exposure to COPCs in Soil

The HHRA assumed that construction workers, maintenance/occupational workers, adult and adolescent recreational receptors/trespassers, and potential future residents (military and civilian; child and adult) may come into contact with chemicals detected in soil at the site. Soil exposure routes evaluated were incidental ingestion, dermal contact, and inhalation. A description of the methods and assumptions used to quantify soil exposure follows.

Dermal Contact with Soil

Doses for dermal contact with soil were estimated using the following equation (USEPA, 2004):

$$DEX = \frac{C \times SA \times AF \times ABS \times EF \times ED \times CF}{BW \times AT}$$

where:

DEX	=	dermal exposure dose (mg/kg-day)
C	=	chemical concentration in soil (mg/kg)
SA	=	skin surface area available for contact (cm^2/day)
AF	=	soil-to-skin adherence factor (mg/cm^2)

ABS	=	absorption factor (unitless)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
CF	=	conversion factor (1×10^{-6} kg/mg)
BW	=	body weight (kg)
AT	=	averaging time (days)
		for non-carcinogens: ED x 365 days/year
		for carcinogens: 70 years x 365 days/year

Exposed skin surface areas available for dermal contact were determined for each receptor based on assumed human activities and clothing worn during exposure events. USEPA guidance (USEPA, 1997a and 2004) was used to develop the default assumptions concerning the amount of skin surface area available for contact for a receptor. The skin surface areas used in HHRA calculations and the rationale for the selection of the surface areas are as follows:

- Maintenance/occupational workers, construction/excavation workers, and adult trespassers were assumed to be exposed on the head, hands, and forearms, assuming that they wear a short-sleeved shirt, long pants, and shoes. As recommended in RAGS Part E (USEPA, 2004), this skin surface area is assumed to be 3,300 cm^2 for the RME and CTE scenarios. This value represents the average of the 50th percentile areas of males and females more than 18 years old.

- For adolescent trespassers, 25 percent of the total body surface area of an adolescent (aged 7 to 16) is assumed to be available for contact with surface soil. The RME value (3,820 cm^2) is derived from the 95th percentile surface area data and the CTE value (3,100 cm^2) is derived from the 50th percentile data, as provided in Table 6-6 of the Exposure Factors Handbook (USEPA, 1997a).

- For future military and civilian adult residents the exposed surface areas available for contact were assumed to be the values for the adult skin surface area for exposure to soil recommended in RAGS Part E (USEPA, 2004). This is 5,700 cm^2 for both the RME and CTE. This skin surface area assumes that head, hands, forearms, and lower legs of the adult are available for contact. For child residents, the exposed surface area available for contact was the value for child skin surface area for exposure to soil recommended in RAGS Part E (USEPA, 2004), 2,800 cm^2 for both RME and CTE. This skin area assumes that head, hands, forearms, lower legs, and feet of the child are available for contact.

Values of soil adherence factors and chemical-specific dermal absorption factors provided in RAGS Part E (USEPA, 2004) were used to evaluate risks from exposure to soil. The following soil adherence factors were used for the RME and CTE exposure scenarios:

- Construction Workers – 0.3 mg/cm^2 for the RME and 0.1 mg/cm^2 for the CTE (Exhibit 3.3, USEPA, 2004).

- Maintenance/Occupational Workers – 0.2 mg/cm^2 for the RME and 0.02 mg/cm^2 for the CTE (Exhibit 3.5, USEPA, 2004).

- Adolescent Recreational Receptors/Trespassers – 0.2 mg/cm^2 for the RME and 0.04 mg/cm^2 for the CTE (Exhibit 3.5, USEPA, 2004).

- Future Adult Residents and Adult Recreational Receptors/Trespassers – 0.07 mg/cm^2 for the RME and 0.01 mg/cm^2 for the CTE (Exhibit 3.5, USEPA, 2004)

- Future Child Residents – 0.2 mg/cm^2 for the RME and 0.04 mg/cm^2 for the CTE (Exhibit 3.5, USEPA, 2004).

For constituents identified as COPCs in soil, the following absorption factors were used (USEPA, 2004):

- Arsenic – 0.03
- Cadmium – 0.001
- PAHs – 0.13
- Aroclor 1254 – 0.14
- Other semivolatiles – 0.1
- Other metals and volatile organics – not evaluated for dermal contact with soil

Exposure parameters for the dermal exposure route are summarized in Tables 6-7 and 6-8, for RME and CTE, respectively.

Incidental Ingestion of Soil

Intakes associated with soil ingestion were estimated using the following equation (USEPA, 1989):

$$\text{Intake} = \frac{C \times RBA \times IR \times FI \times EF \times ED \times CF}{BW \times AT}$$

where:

Intake	=	ingestion intake
C	=	chemical concentration in soil (mg/kg)
RBA	=	relative bioavailability (unitless)
IR	=	soil/sediment ingestion rate (mg/day)
FI	=	fraction ingested from contaminated source (unitless)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
CF	=	conversion factor (1×10^{-6} kg/mg)
BW	=	body weight (kg)
AT	=	averaging time (days) for non-carcinogens: 365 days/year x ED for carcinogens: 365 days/year x 70 years

Exposure parameters for the incidental ingestion of soil are summarized in Tables 6-7 and 6-8, for RME and CTE, respectively. A default value of 1.0 (USEPA, 1989) was used for the fraction ingested from the contaminated source for the RME and CTE scenarios. For the RME scenario, the ingestion rate was set at 330 mg/day for the construction worker (USEPA, 2002a), 200 mg/day for the future child resident, and 100 mg/day for the other potential receptors (the maintenance/occupational worker, adult and adolescent recreational receptors/trespassers, and future adult resident; USEPA, 1993). Ingestion rates for the CTE are assumed to be one-half of the RME values. A value of 0.6 was used for the relative bioavailability (RBA) for arsenic (USEPA, 2012b) and a value of 1 was used for all other chemicals.

Inhalation of Air Containing Fugitive Dust/Volatiles Emitted from Soil

The amount of chemical a receptor takes in as a result of respiration is determined using the concentration of the contaminant in air. Intakes of both particulates and vapors from soil were calculated using the following equation (USEPA, 2009):

$$EC = \frac{(C_{air})(ET)(EF)(ED)}{AT \times 24\ hrs/day}$$

where:

EC	=	exposure concentration (mg/m^3)
C_{air}	=	concentration of chemical in air (mg/m^3)
ET	=	exposure time
EF	=	exposure frequency
ED	=	exposure duration

AT = averaging time (days);
for non-carcinogens, AT = ED x 365 days/year
for carcinogens, AT = 70 years x 365 days/year

(Please note that "inhalation rate" is not a factor in the inhalation exposure calculation. The risk characterization compares site air concentrations of COPCs to the respective acceptable reference concentrations or inhalation unit risks, not calculated site inhalation exposure doses to RfDs and/or inhalation CSFs.)

The concentrations of chemicals in air resulting from emissions from soil were developed following procedures presented in USEPA Soil Screening Guidance (USEPA, 2002a). The chemical concentration in air was calculated as follows:

$$C_{air} = C_{soil} \times \left[\frac{1}{PEF} + \frac{1}{VF} \right]$$

where:
C_{air} = chemical concentration in air, mg/m^3
C_{soil} = chemical concentration in soil, mg/kg
PEF = particulate emission factor, m^3/kg
VF = volatilization factor, m^3/kg

The particulate emissions factor (PEF) relates the concentration of a chemical in soil with the concentration of dust particles in air. The PEF for construction workers (1.27 x 10^6 m^3/kg) was calculated using the equations presented in the supplemental SSL guidance document (USEPA, 2002a). The PEF for wind-generation of particulates from soil (1.3 x 10^9 m^3/kg) was applied to the industrial worker, trespasser, and residential receptors. The latter PEF was calculated according to USEPA guidance (USEPA, 1996a). A sample calculation of these PEFs is presented in Appendix F.

Ambient air concentrations resulting from the volatilization of COPCs from soil are chemical dependent and were calculated using the following equation from USEPA's Soil Screening Guidance:

$$VF = \frac{Q/C \times (3.14 \times D_a \times T)^{0.5} \times 10^{-4} \ (m^2 / cm^2)}{(2 \times \rho_b \times D_a)}$$

and

$$D_a = \frac{[(\theta_a^{10/3} \times D_i \times H' + \theta_w^{10/3} \times D_w)/n^2]}{\rho_b \times K_d + \theta_w + \theta_a \times H'}$$

where:

VF	=	volatilization factor (m^3-air/kg-soil)
Q/C	=	inverse of the mean concentration at the center of source (gm/m^2-sec per kg/m3)
D_a	=	apparent diffusivity, chemical specific, (cm^2/sec)
T	=	exposure interval, exposure specific, (sec)
ρ_b	=	dry bulk soil particle density (g/cm^3)
θ_a	=	air-filled soil porosity (L_{air}/L_{soil})
D_i	=	diffusivity in air, chemical specific, (cm^2/sec)
n	=	total soil porosity (L_{pore}/L_{soil})
θ_w	=	water-filled soil porosity (L_{air}/L_{soil})
D_w	=	diffusivity in water, chemical specific, (cm^2/sec)
K_d	=	soil-water partition coefficient, chemical specific
H'	=	dimensionless Henry's law constant, chemical specific

6.4.5.3 Exposure to Lead

The maximum concentration of lead in surface soil is well below the residential screening criteria for lead (400 mg/kg), and although the maximum concentration of lead in subsurface soil is above the residential screening value, there is only one sample result out of 10 in the subsurface soil dataset that is greater than the screening criterion. In addition, the subsurface soil mean (which is the EPC used in the Integrated Exposure Uptake Biokinetic [IEUBK]) is 200 mg/kg - considerably lower than the screening level of 400 mg/kg (USEPA, 1994). Given that both surface and subsurface soil means (which USEPA guidance utilizes for risk evaluations) are well below the screening levels, and that this would result in IEUBK Model for Lead in Children and Adult Lead Methodology (ALM) risk evaluations well below acceptable risk results, lead was not evaluated further at Site 12. Therefore, it was determined that a quantitative evaluation was not required because the potential risks associated with this COPC were regarded as minimal, and no further evaluation was performed.

6.5 TOXICITY ASSESSMENT

Oral and RfDs and CSFs and inhalation RfCs and IURs used in the HHRA for Site 12 were obtained from the following primary literature sources:

- Tier 1 - Integrated Risk Information System (IRIS) .

- Tier 2 - USEPA Provisional Peer Reviewed Toxicity Values (PPRTVs) – The Office of Research and Development/National Center for Environmental Assessment (NCEA) Superfund Health Risk

Technical Support Center develops PPRTVs on a chemical-specific basis when requested by USEPA's Superfund program.

- Tier 3 - Other Toxicity Values – These sources include but are not limited to California Environmental Protection Agency (Cal EPA) toxicity values, Agency for Toxic Substances and Disease Registry (ATSDR) values, and the Annual Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997b).

Although RfDs and CSFs can be found in several toxicological sources, USEPA's IRIS online database of peer-reviewed toxicity criteria is the preferred source for toxicity values. The Annual HEAST (USEPA, 1997b), as well as the PPRTVs, were used as sources of toxicity criteria, and subchronic RfDs were used when evaluating subchronic risks for the construction worker. Chronic toxicity values were used in the evaluation of risks to the construction worker when subchronic toxicity values were not available. Toxicity criteria for the constituents selected as COPCs for Site 12 are presented in Tables 6-9 through 6-12 (i.e., RAGS Part D tables; Table 5s and 6s).

6.5.1 Toxicity Criteria for Dermal Exposure

RfDs and CSFs found in literature are typically expressed as administered doses; therefore, these values are considered inappropriate for estimating the risks associated with dermal routes of exposure. Oral dose-response parameters based on administered doses should be adjusted to absorbed doses before the evaluation of estimated dermal exposure intakes is made.

The adjustment from administered to absorbed dose was made using chemical-specific absorption efficiencies published in available guidance [i.e., USEPA, 2004 (the primary reference), IRIS, ATSDR toxicological profiles, etc.] and the following equations:

$$RfD_{dermal} = (RfD_{oral})(ABS_{GI})$$
$$CSF_{dermal} = (CSF_{oral}) / (ABS_{GI})$$

where: ABS_{GI} = absorption efficiency in the gastrointestinal tract

Absorption efficiencies used in the Site 12 HHRA reflect USEPA's current dermal assessment guidance (USEPA, 2004).

6.5.2 Toxicity Criteria for Chromium

Toxicity criteria are available for two different forms of chromium, the trivalent state and the hexavalent state, of which the latter is considered to be more toxic. The screening of chromium was conducted assuming that 100 percent of the reported total chromium concentration is hexavalent. This is likely a conservative assumption, and the uncertainty associated with the assumption that all chromium is hexavalent chromium will be discussed in the uncertainty section of the HHRA.

6.5.3 Toxicity Criteria for Carcinogenic Effects of PAHs

Limited toxicity values are available to evaluate the carcinogenic effects from exposure to PAHs. The most extensively studied PAH is benzo(a)pyrene, which is classified by USEPA as a probable human carcinogen. Although CSFs are available for benzo(a)pyrene, insufficient data are available to calculate CSFs for other carcinogenic PAHs. Toxic effects for these chemicals were evaluated using the concept of estimated orders of potential potency, which relate the potency of the other potentially carcinogenic PAHs to the potency of benzo(a)pyrene, as presented in current USEPA guidance (USEPA, 1993a). These potencies were taken into account in the calculation of BaP Eq concentrations for each sample. Then the oral and inhalation CSFs were applied to the risk evaluation of the calculated BaP Eq.

USEPA currently incorporates the use of age-dependent adjustment factors for carcinogens that act via a mutagenic mode of action. BaP Eq also were evaluated following USEPA's Guidelines for Carcinogen Risk Assessment (USEPA, 2005a) and Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005b) in the RME risk evaluation of each receptor.

6.6 RISK CHARACTERIZATION

The baseline HHRA evaluated potential health risks associated with human exposure to chemicals present at Site 12. Receptors are unlikely to be exposed to subsurface soil and risks from exposure to subsurface soil are included to aid in future risk management decisions. Quantitative risk estimates are based on the conservative assumption that an individual is exposed to multiple COPCs by multiple exposure pathways. In accordance with USEPA guidance, chemical- and pathway-specific risks were summed to provide estimates of total risk for a given receptor. Risk estimates were developed by integrating chemical intake levels with chemical-specific toxicity factors. Risks were calculated for surface soil and subsurface soil separately. Risk example calculations are provided in Appendix F.

ILCR estimates were generated for each COPC using estimated exposure intakes and published CSFs, as follows:

ILCR = Estimated Exposure Intake x CSF

An ILCR of $1x10^{-6}$ indicates that the exposed receptor has a one-in-one-million chance of developing cancer from exposure to site COPCs under the defined exposure scenario. Alternatively, such a risk may be interpreted as representing one additional case of cancer in an exposed population of one million people.

Non-carcinogenic risks are assessed using the concept of HQs and hazard indices (HIs). The HQ for a COPC is the ratio of the estimated intake to the RfD, as follows:

HQ = (Estimated Exposure Intake)/(RfD)

An HI for a given exposure route is generated by summing the individual HQs for the COPCs. The HI is not a mathematical prediction of the severity of toxic effects and is not a true risk. It is simply a numerical indicator of the possibility of the occurrence of non-carcinogenic (threshold) effects.

6.6.1 Comparison of Quantitative Risk Estimates to Benchmarks

To interpret the quantitative risks and to aid risk managers in determining the need for remediation at a site, quantitative risk estimates were compared to typical benchmarks. USEPA has defined the range of $1x10^{-4}$to $1x10^{-6}$ as the ILCR target range for hazardous waste facilities addressed under CERCLA. The Illinois EPA goal for carcinogenic risks, as specified in TACO Tier 3 (i.e., site-specific risk assessment), is the range of $1x10^{-4}$ to $1x10^{-6}$.

An HI exceeding unity (1.0) indicates that there may be potential non-carcinogenic health risks associated with exposure. If an HI exceeds unity, target organ effects associated with exposure to COPCs are segregated (and the HI is calculated on a target organ/target effect basis). Only those chemicals that affect the same target organ(s) or exhibit similar critical effect(s) are regarded as truly additive. Consequently, it may be possible for a cumulative HI to exceed 1.0, but no adverse health effects are anticipated if the COPCs do not affect the same target organ or exhibit the same critical effect. Individual target organ HIs for the receptors are presented in Appendix F.

6.6.2 Risk Assessment Results

The baseline HHRA conducted for Site 12 evaluated the risks potentially incurred by site maintenance/occupational workers, adolescent and adult recreational receptors/trespassers, construction workers, and hypothetical future residents. Both RME and CTE scenarios were evaluated. Tables 6-13 and 6-14 contain a summary of the estimated risks for Site 12 for the RME and CTE, respectively (RAGS

Part D tables; Table 9s). Calculations of the detailed chemical-specific risks for Site 12 are included in Appendix F. The following sections discuss the results of the risk characterization.

6.6.2.1 Carcinogenic Risks - RME

Quantitative estimates of carcinogenic effects are presented in the form of ILCRs. The target risk range for carcinogenic effects, as defined by the USEPA and Illinois TACO Tier 3, is between $1x10^{-4}$ and $1x10^{-6}$.Estimated ILCRs for Site 12 are discussed in the following subsections. The carcinogenic risks calculated for the RME case are in Table 6-13 (RAGS Part D tables; Table 9s).

Carcinogenic Risks for Exposure to Surface Soil - RME

The ILCR for construction workers ($3x10^{-7}$) was less than the lower limit of the USEPA and Illinois EPA TACO target risk range for carcinogenic effects of $1x10^{-4}$ and $1x10^{-6}$ under the defined RME conditions.

The ILCR for maintenance/occupational workers ($2x10^{-5}$) was within the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects of $1x10^{-4}$ and $1x10^{-6}$. The elevated risk in the occupational/maintenance worker receptor is predominantly attributed to arsenic, chromium, and c-PAHs in surface soil.

The ILCR for adolescent recreational receptors/trespassers ($2x10^{-6}$) was within the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects of $1x10^{-4}$ and $1x10^{-6}$.

The ILCR for adult recreational receptors/trespassers ($3x10^{-6}$) was within the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects of $1x10^{-4}$ and $1x10^{-6}$.

The total ILCR for hypothetical future residents (adult + child) exposure to surface soil was $3x10^{-4}$, which is greater than the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects of $1x10^{-4}$ and $1x10^{-6}$. The residential risk is primarily attributed to exposure to c-PAHs, arsenic, chromium, and pesticides (alpha-chlordane, gamma-chlordane, and heptachlor) in surface soil. However, risks from c-PAHs are likely attributable to background conditions and risks from chromium are likely overestimated by assuming the chromium at the Site is present as hexavalent chromium, which is the more toxic form of chromium. If chromium had been evaluated as trivalent chromium, then risks for chromium would be within acceptable levels. These uncertainties are discussed in Section 6.7.2.3 for PAHs and Section 6.7.6.4 for chromium.

Carcinogenic Risks for Exposure to Subsurface Soil - RME

The ILCR for construction workers ($9x10^{-7}$) was below the lower limit of the USEPA and Illinois EPA TACO target risk range for carcinogenic effects of $1x10^{-4}$ and $1x10^{-6}$ under the defined RME conditions.

The ILCR for maintenance/occupational workers ($4x10^{-5}$) was within the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects of $1x10^{-4}$ and $1x10^{-6}$.

The total ILCR for hypothetical future residents (adult + child) exposure to subsurface soil was $1x10^{-3}$, which is greater than the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects of $1x10^{-4}$ and $1x10^{-6}$. The residential risk is primarily attributed to exposure to c-PAHs, arsenic, chromium, and PCBs in subsurface soil.

6.6.2.2 Non-Carcinogenic Effects - RME

Quantitative estimates of non-carcinogenic (toxic) effects are presented in the form of HQs and HIs. As discussed above, the risk benchmark for HQs and HIs (calculated on a target organ-specific basis) is 1 (USEPA, 1989). Estimated HQs and HIs for Site 12 are discussed below and summarized in Table 6-13.

Non-Carcinogenic Risks for Exposure to Surface Soil - RME

The cumulative HIs for construction workers (HI = 0.5), adolescent and adult recreational receptors/trespassers (HIs = 0.03 and 0.02, respectively), maintenance/occupational workers (HI = 0.2), and future adult residents (HI = 0.3) were less than unity (1.0). The cumulative HI for the future child resident (HI = 2) exceeded unity. However, no HI for any target organ was above the risk benchmark of 1.0. This indicates that adverse non-carcinogenic health effects are not anticipated for these receptors under the defined RME conditions.

Non-Carcinogenic Risks for Exposure to Subsurface Soil - RME

The cumulative HI for construction workers (HI = 0.8), maintenance/occupational workers (HI = 0.3), and future adult residents (HI =0.5) were less than unity (1.0). The cumulative HI for the future child resident (HI = 4) exceeded unity. However, no HI for any target organ was above the risk benchmark of 1.0. This indicates that adverse non-carcinogenic health effects are not anticipated for these receptors under the defined RME conditions.

6.6.2.3 Carcinogenic Risks - CTE

As discussed previously, an evaluation of the potential risks associated with the CTE scenario is included to provide a measure of the central, or average, case exposure. Estimated HQs and HIs for the CTE scenario for Site 12 are discussed below and summarized in Table 6-14.

Carcinogenic Risks for Exposure to Surface Soil - CTE

The ILCRs for construction workers ($7x10^{-8}$), adolescent and adult recreational receptors/trespassers ($5x10^{-7}$ and $2x10^{-7}$, respectively), and maintenance/occupational workers ($2x10^{-6}$) were less than or within the USEPA and Illinois EPA TACO target risk range for carcinogenic effects of $1x10^{-4}$ and $1x10^{-6}$.

The total ILCR for hypothetical future residents (adult + child) was $1x10^{-5}$ is within the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects.

Carcinogenic Risks for Exposure to Subsurface Soil - CTE

The ILCR for construction workers ($1x10^{-7}$) was less than the target risk range for carcinogenic effects.

The total ILCR for maintenance/occupational workers ($5x10^{-6}$) and hypothetical future residents (adult + child; $2x10^{-5}$) was within the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects.

6.6.2.4 Non-Carcinogenic Effects - CTE

Non-Carcinogenic Risks for Exposure to Surface Soil - CTE

The cumulative HIs for construction workers (HI = 0.1), maintenance/occupational workers (HI = 0.06), adolescent and adult recreational receptors/trespassers (HIs = 0.006 and 0.004, respectively), future child residents (HI = 0.4) and future adult residents (HI = 0.05) were less than unity (1.0), indicating that adverse non-carcinogenic health effects are not anticipated for any receptors under the defined CTE conditions.

Non-Carcinogenic Risks for Exposure to Subsurface Soil - CTE

The cumulative HIs for construction workers (HI = 0.2), maintenance/occupational workers (HI = 0.1), future child residents (HI = 0.6) and future adult residents (HI = 0.07) were less than unity (1.0). This indicates that adverse non-carcinogenic health effects are not anticipated for any receptors under the defined CTE conditions.

6.7 UNCERTAINTY ANALYSIS

The baseline HHRA for Site 12 was performed in accordance with current USEPA and Illinois EPA guidance. However, there are varying degrees of uncertainty associated with the baseline HHRA. This section presents a brief summary of uncertainties inherent in the HHRA and includes a discussion of how they may affect the quantitative risk estimates and conclusions of the risk analysis.

6.7.1 General Uncertainty in Risk Assessment

Uncertainty in the selection of COPCs is related to the current status of the predictive databases, grouping of samples, and procedures used to include or exclude constituents as COPCs. Uncertainty associated with the exposure assessment includes the values used as input variables for a given intake route or scenario, assumptions made to determine EPCs, and predictions regarding future land use and population characteristics. Uncertainty in the toxicity assessment includes the quality of the existing toxicity data needed to support dose-response relationships, and weight of evidence used to determine 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 HHRA process.

Whereas there are various sources of uncertainty, the direction of uncertainty can be influenced by the assumptions made throughout the HHRA, including selection of COPCs and selection of values for dose-response relationships. To account for uncertainties in the development of an HHRA, conservative estimates must be made to make sure that the particular assumptions made are protective of sensitive subpopulations and maximum exposed individuals. Therefore, throughout the entire HHRA, assumptions that consider safety factors are made so that the final calculated risks are overestimated, and consequentially, very conservative.

The major sources of uncertainty associated with this HHRA are discussed below.

6.7.2 Uncertainty in Selection of COPCs

A minor amount of uncertainty is associated with the selection of COPCs that may affect the numerical risk estimates presented in the HHRA. The most significant issues related to uncertainty in COPC selection are the existing database (i.e., the use of validated or unvalidated sample results), the biased selection of sampling locations, inclusion of chemicals potentially attributable to background, screening levels used, and absence of screening levels for a few chemicals detected in the site media. A brief discussion of each of these issues is provided in the remainder of this section.

6.7.2.1 Existing Databases

The data used in the HHRA were based on the most recent analytical data collected at Site 12 during RI field activities. No historical data were used for HHRA purposes. The analytical data were validated according to the methodologies specified in the Site 12 Work Plan (Tetra Tech, 2011a, 2012, 2013). Analytical data qualified as estimated were utilized, even though the reported concentrations or sample-specific quantitation limits may be somewhat imprecise. The use of estimated data adds to the uncertainty associated with the HHRA. However, the associated uncertainty is expected to be negligible compared to the other uncertainties inherent in the risk evaluation process (i.e., uncertainties with land uses, exposure scenarios, toxicological criteria, etc.). When determining exposure concentrations via statistical procedures, chemicals not detected were conservatively assumed to be present at concentrations equal to the sample-specific detection limits. Analytical results for chemicals qualified “R," rejected, were not used in the risk assessment.

6.7.2.2 Biased Selection of Sampling Locations

Soil boring and sample locations were selected to assist in detecting soil contamination throughout the intended study area and used to conduct this risk assessment. During the RI, sample locations were generally evenly spaced across the site, but sample locations were biased toward areas where the dredged spoils may have been placed in the past and depths most likely to detect contamination. The biased data collection strategy was designed to prevent overlooking a potential unacceptable human health risk. However, this most likely also overestimates the risks to potential receptors.

6.7.2.3 Chemicals Potentially Attributable to Background

No chemicals in soil were eliminated as COPCs on the basis of comparisons to background concentrations; however, the results were compared to the Illinois EPA background values. Comparison of the maximum soil concentrations to the Illinois EPA background values for PAHs indicated that a few PAHs exceeded the background values but the average concentrations of the PAHs at Site 12 were less than the background values and the PAHs should be considered background constituents. Comparison of the maximum soil concentrations to the Illinois EPA background values for metals indicated several that exceeded the background values but the average concentrations of most of the metals at Site 12 were less than the background values, and the metals should be considered background constituents. Several metals were exceptions; the average concentration of mercury was greater than the Illinois EPA background value in the surface and subsurface soil samples and the average concentration of barium, cadmium, chromium, copper, and lead were greater than the Illinois EPA background value in the subsurface soil samples.

6.7.2.4 COPC Screening Levels

The use of risk-based screening levels for soil and groundwater based on conservative residential land use scenarios corresponding to ILCRs of $1x10^{-6}$ and HIs of 0.1 should make certain that the significant contributors to risk from a site are evaluated. The elimination of chemicals present at concentrations that correspond to ILCRs less than $1x10^{-6}$ and HIs less than 0.1 should not affect the final conclusions of the HHRA, because these chemicals are not expected to cause a potential health concern at the concentrations detected.

6.7.2.5 Absence of COPC Screening Levels

Because of the lack of toxicity criteria, risk-based screening levels are currently not available for a few constituents detected at Site 12 (e.g., benzo(g,h,i)perylene, etc.). Therefore, screening levels available for surrogate chemicals were used as screening levels for these constituents. The use of these surrogates may increase the uncertainty in the HHRA. The direction of bias cannot be determined.

6.7.3 Uncertainty in the Exposure Assessment

Uncertainty in the exposure assessment can arise because of the methods used to calculate EPCs, determination of land use conditions, and selection of exposure parameters. Each of these is discussed below.

6.7.3.1 Exposure Point Concentrations

Uncertainty is associated with the use of the 95-percent UCL of the mean concentration as the EPC, as was done in the evaluation of the soil data for maintenance/occupational workers and trespassers. As a result of using the 95-percent UCL, the estimations of potential risk are most likely to be overestimated because this is a representation of the upper limit to which potential receptors would be exposed over the entire exposure period. The maximum concentration is used as the EPC when the UCL is greater than the maximum concentration and in the soil data evaluation for construction workers and residents for the RME scenario. The use of the maximum concentration as the EPC tends to overestimate potential risks because receptors are assumed to be exposed continuously to the maximum concentration for the entire exposure period, which is very unlikely. Therefore, theoretical excess lifetime cancer risks for construction workers and residents are likely overestimated given the application of the maximum detected soil concentration as the EPC. Inclusion of any high outlier maximum concentrations will also yield the calculation of relatively high mean and 95 percent UCL of the mean concentrations, potentially resulting in an overestimation of risks for scenarios that use statistical values as EPCs.

Uncertainty is also introduced when non-detected results are assigned a value of the quantitation limit when calculating the EPC. This most likely also overestimates the risks to potential receptors because most of these values would be lower than the detection limit.

6.7.3.2 Land Use

Uncertainty and conservatism may be introduced into the HHRA when estimated risks are not based on current land use patterns. The risks calculated in this HHRA are based on current and potential projected future land use at Site 12. However, future residential use is not a likely future use of Site 12.

6.7.3.3 Exposure Parameters

Each exposure factor selected for use in the HHRA contains some associated uncertainty. Generally, exposure factors are based on surveys of physiological and lifestyle profiles across the United States. The attributes and activities studied in these surveys generally have a broad distribution. To avoid underestimation of exposure, USEPA guidelines (e.g., USEPA, 1991) for the RME receptor were used, if applicable, which generally specify the use of the 95th percentile for most parameters. Therefore, the selected exposure factors for the RME receptor represent the upper bound of the observed or expected practices that are characteristic of the majority of the population. Because the USEPA does not provide values for exposure factors for some receptors/pathways, professional judgment was used to determine some values. When using professional judgment, an effort was made to be reasonably conservative. However, the use of professional judgment adds uncertainty to the HHRA.

Generally, uncertainty can be assessed for many assumptions made in determining factors for calculating exposures and intakes. Many of these parameters were determined from the statistical analyses of human population characteristics. Often, the database used to summarize a particular exposure parameter (i.e., body weight) is quite large. Consequently, the values chosen for such variables in the RME scenario have low uncertainty. For many parameters for which limited information exists (e.g., dermal absorption), greater uncertainty exists. For example, current USEPA guidance (USEPA, 2004) does not provide dermal absorption factors for exposure to most metals (except arsenic and cadmium) and VOCs in soil. Therefore, risks for dermal contact with soil were not evaluated for metals other than arsenic and cadmium, or for VOCs. Consequently, risks from exposure to soil may be underestimated by omitting metals and VOCs from the dermal HHRA.

6.7.4 Migration of Soil to Groundwater Pathway

Maximum surface and subsurface soil concentrations were compared to the USEPA Generic soil-to-groundwater SSLs and Illinois EPA TACO and Non-TACO Migration to Groundwater Class I screening

criteria. These results are summarized in Tables 6-15 and 6-16 for surface and subsurface soil, respectively.

The comparison shown in Table 6-15 indicates that dibenzofuran, PAHs (BaP Eq, benzo(a)anthracene benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and naphthalene), some pesticides (4,4-DDD, 4,4-DDE, 4,4-DDT, aldrin, alpha-BHC, alpha-chlordane, beta-BHC, delta-BHC, dieldrin, gamma-chlordane, lindane, heptachlor and heptachlor epoxide), and several metals (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, selenium, silver, thallium, and zinc) were detected in surface soil at concentrations that exceeded one or more of the screening criteria.

The comparison shown in Table 6-16 indicates that two SVOCs (carbazole, and dibenzofuran), some PAHs (2-methylnaphthalene, BAP Eq, benzo(a)anthracene benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene), several pesticides (4,4-DDD, 4,4-DDE, 4,4-DDT, aldrin, alpha-BHC, alpha-chlordane, beta-BHC, delta-BHC, dieldrin, gamma-chlordane, lindane, heptachlor, and heptachlor epoxide), one PCB (aroclor-1254), and metals (antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, silver, and zinc) were detected in subsurface soil at concentrations that exceeded one or more of the screening criteria.

This section presents a more refined evaluation of the potential for such migration based on the following considerations:

- Does the maximum detected soil concentration exceed the SSL at a dilution attenuation factor (DAF) of 15 (DAF15)?
- Are the chemical concentrations within the range of background levels?

A DAF of 1 (DAF_1) is conservative and used for the initial screening; however; a DAF_{15} is assumed to be more accurate for the site. The DAF_{15} was determined by extrapolating information from Table 7 of the USEPA Soil Screening Guidance Technical Background document (USEPA, 1996a). The data presented in Table 7 from the guidance was plotted and the equation for the best fit line was used to determine a DAF for a source area of 1.75 acres, which is the approximate area of soil impacted by fill material. Chemicals present at background concentrations in soil indicate the chemical is most likely naturally occurring and not site-related. Therefore, chemicals selected as migration-to-groundwater COPCs in the initial screening were not retained as COCs if maximum concentrations were less than protection of groundwater SSL based on a DAF_{15} or if the maximum concentration was less than the background concentration.

Surface Soil

In surface soil, benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(a,h)anthracene exceeded the risk-based SSLs with a DAF_{15} and Illinois background values. Benzo(a)anthracene and benzo(b)fluoranthene did not exceed MCL-based SSLs with a DAF_{15} and an MCL-based SSL was not available for dibenzo(a,h)anthracene. However, evaluation of the c-PAHs as BaP Eq compared to benzo(a)pyrene background concentrations indicates the maximum concentrations of c-PAHs as BaP Eq is less than background.

A few pesticides (4,4-DDD, aldrin, alpha-BHC, beta-BHC, delta-BHC, and dieldrin) exceeded the risk-based SSLs with a DAF_{15} and MCL-based SSLs were not available. Alpha-chlordane, gamma-chlordane, and heptachlor epoxide also exceeded risk-based SSLs with a DAF_{15} and MCL-based SSLs with a DAF_{15}. Heptachlor exceeded the risk-based SSLs with a DAF_{15} but was less than the MCL-based SSL. Only alpha-BHC, delta-BHC, and dieldrin exceeded available TACO migration to groundwater values and criteria were not available for beta-BHC. Based on the mobility indices included in Table 5-1, these pesticides are not expected to be mobile in the environment and should not present a soil to groundwater migration concern.

Arsenic exceeded the risk-based SSL with a DAF_{15} and MCL-based SSL with a DAF_{15}; however, arsenic concentrations did not exceed TACO migration to groundwater values. Chromium exceeded the risk-based SSL with a DAF_{15} for hexavalent chromium; however concentrations were less than the MCL-based SSL for total chromium and TACO migration to groundwater values for hexavalent chromium. Mercury and thallium exceeded the risk-based SSLs with a DAF_{15}; however concentrations were less than the MCL-based SSLs and TACO migration to groundwater values. Lead exceeded the TACO migration to groundwater value and the MCL-based SSL with a DAF_{15}. Cobalt, iron, and manganese exceeded the risk-based SSLs with a DAF_{15} and no other criteria were available. The maximum and average concentrations of cobalt, iron, and manganese are similar to the Illinois background criteria and are not expected to present a migration concern.

Subsurface Soil

Carbazole exceeded a TACO migration to groundwater value and no other criteria were available.

BaP Eq exceeded TACO migration to groundwater values and risk-based SSL with a DAF_{15}; however, concentrations were less than the MCL-based SSL with a DAF_{15}. Several PAHs (benzo(a)pyrene, dibenzo(a,h)anthracene, and naphthalene) exceeded risk-based SSLs with a DAF_{15}; however, concentrations were less than the TACO migration to groundwater values. Benzo(a)anthracene and

benzo(b)fluoranthene exceeded TACO migration to groundwater values and risk-based SSLs with a DAF_{15} and no other criteria were available.

Aroclor-1254 exceeded a risk-based SSL with a DAF_{15} and no other criteria were available. Several pesticides (4,4'-DDD, 4,4'-DDE, aldrin, gamma-BHC, and heptachlor epoxide) exceeded risk-based SSLs with a DAF_{15}; however, concentrations were less than the TACO migration to groundwater values. Alpha-BHC, delta-BHC, and dieldrin exceeded TACO migration to groundwater values and risk-based SSLs with a DAF_{15} and no other criteria were available.

These organic compounds (Aroclor-1254, carbazole, benzo(a)anthracene, benzo(b)fluoranthene, alpha-BHC, delta-BHC, and dieldrin) are not expected to be mobile in the environment based on the mobility indices included in Table 5-1 and therefore are not expected to present a soil to groundwater migration concern.

Antimony, arsenic, copper, mercury, and silver exceeded risk-based SSLs with a DAF_{15} and/or MCL-based SSLs with a DAF_{15}; however, concentrations were less than the TACO migration to groundwater values. Chromium exceeded the risk-based SSL with a DAF_{15} for hexavalent chromium and the TACO migration to groundwater values for hexavalent chromium; however concentrations were less than the MCL-based SSL for total chromium and chromium concentrations at the site are not expected to be present as only hexavalent chromium. Cobalt, iron, and manganese exceeded risk-based SSLs with a DAF_{15} and no other criteria were available. Cobalt and manganese concentrations are generally similar to Illinois background criteria. Lead exceeded TACO migration to groundwater values and MCL-based SSLs with a DAF_{15}. Selenium exceeded TACO migration to groundwater values, risk-based SSLs with a DAF_{15}, and MCL-based SSLs with a DAF_{15}.

Summary

Based on the above discussion and knowledge of site history, the potential exists for chemicals detected in soil to adversely impact environmental media downgradient of Site 12. To further evaluate this potential, subsurface soil samples were collected and analyzed for SPLP metals and the detected concentrations were compared to groundwater screening criteria (see Table 6-17). Maximum concentrations of aluminum, antimony, iron, lead, and manganese in SPLP samples exceeded TACO and Non-TACO soil to groundwater remediation objectives. In comparison, only iron, lead, and selenium in subsurface soil were retained as soil to groundwater migration COCs. Selenium concentrations in the SPLP samples did not exceed TACO soil to groundwater remediation objectives; therefore, it is eliminated as a soil to groundwater migration COC. Using the average concentrations of aluminum, iron, and manganese, it can be seen that these concentrations are less than the groundwater screening values. Based on this additional evaluation, aluminum, iron, and manganese, are eliminated as soil to

groundwater migration COCs. Migration of antimony and lead from soil to groundwater may impact downgradient groundwater concentrations. However, exposure to groundwater at Site 12 is not expected to occur under current and/or future land uses because the facility and the area surrounding the facility are supplied by public water, the facility has a groundwater use restriction in place, and there are no drinking water wells located immediately downgradient of the site. It should also be noted that any antimony or lead that leaches from the soil and migrates to the underlying groundwater will be significantly diluted after mixing with groundwater and downgradient surface water (Lake Michigan).

6.7.5 Direct Contact to Groundwater Pathway

Maximum groundwater concentrations were compared to the USEPA tapwater RSLs, SDWA MCLs, and 35 IAC 620 Groundwater Standards – Class I and Class II. These results are summarized in Table 6-18.

The comparison shown in Table 6-18 indicates that concentrations of total metals including arsenic, chromium, cobalt, iron, manganese, nickel, and thallium were detected in groundwater at concentrations that exceeded one or more of the screening criteria. Except for chromium, which was not detected in filtered samples, the same dissolved metals had concentrations that exceeded one or more of the screening criteria. Chromium only exceeds the screening criteria for hexavalent chromium. Concentrations of chromium are below the screening criteria for trivalent chromium.

As discussed for the soil to groundwater migration pathway, exposure to groundwater at Site 12 is not expected to occur under current and/or future land uses because the facility and the area surrounding the facility are supplied by public water, the facility has a groundwater use restriction in place, and there are no drinking water wells located immediately downgradient of the site. The local potable water supply is provided by water utilities in the area and the water utilities draw their water from Lake Michigan and treat it before being distributed to customers; the shallow water table is within ten feet of the ground surface, is not potable, and is not used by NSGL and the surrounding area; and could possibly be classified as a Class II groundwater according to 35 IAC 620 (similar to the classification at Ft. Sheridan, approximately 9 miles south of NSGL). The soil, clay with sand, has low permeability and minimal groundwater flow.

6.7.6 Uncertainty in the Toxicological Evaluation

Uncertainties associated with the toxicity assessment (determination of RfDs and CSFs and use of available criteria) are presented in this section.

6.7.6.1 Derivation of Toxicity Criteria

Uncertainty associated with the toxicity assessment is associated with hazard assessment and dose-response evaluations for the COPCs. The hazard assessment deals with characterizing the nature and strength of the evidence of causation or the likelihood that a chemical that induces adverse effects in animals will also induce adverse effects in humans. Hazard assessment of carcinogenicity is evaluated as a weight-of-evidence determination using USEPA methods. Positive animal cancer test data suggest that humans contain tissue(s) that may manifest a carcinogenic response; however, the animal data cannot necessarily be used to predict the target tissue in humans. However, in the hazard assessment of non-cancer effects, however, positive animal data often suggest the nature of the effects (i.e., the target tissues and type of effects) anticipated in humans.

Uncertainty in hazard assessment arises from the nature and quality of the animal and human data. Uncertainty is reduced when similar effects are observed across species, strain, sex, and exposure route; when the magnitude of the response is clearly dose related; when pharmacokinetic data indicate a similar fate in humans and animals; when postulated mechanisms of toxicity are similar for humans and animals; and when the COC is structurally similar to other chemicals for which the toxicity is more completely characterized.

Uncertainty in the dose-response evaluation includes determination of a CSF for the carcinogenic assessment and derivation of an RfD or RfC for the non-carcinogenic assessment. Uncertainty is introduced from interspecies (animal-to-human) extrapolation which, in the absence of quantitative pharmacokinetic or mechanistic data, is usually based on consideration of interspecies differences in basal metabolic rate. Uncertainty also results from intraspecies variation. Most toxicity experiments are performed with animals that are very similar in age and genotype, so intragroup biological variation is minimal, but the human population of concern may reflect a great deal of heterogeneity including unusual sensitivity or tolerance to the COPC. Even toxicity data from human occupational exposures reflect a bias because only those individuals sufficiently healthy to attend work regularly (the "healthy worker effect") and those not unusually sensitive to the chemical are likely to be occupationally exposed. Finally, uncertainty arises from the quality of the key study from which the quantitative estimate is derived and the database. For cancer effects, the uncertainty associated with dose-response factors is mitigated by assuming the 95-percent upper bound for the CSF. Another source of uncertainty in carcinogenic assessment is the method by which data from high doses in animal studies are extrapolated to the dose range expected for environmentally exposed humans. The linearized multistage model, which is used in nearly all quantitative estimations of human risk from animal data, is based on a non-threshold assumption of carcinogenesis. However, evidence suggests that epigenetic carcinogens, as well as many genotoxic carcinogens, have a threshold below which they are non-carcinogenic. Therefore, the

use of the linearized multistage model is conservative for chemicals that exhibit a threshold for carcinogenicity.

For non-cancer effects, additional uncertainty factors may be applied in the derivation of the RfD or RfC to mitigate poor quality of the key study or gaps in the database. Additional uncertainty for non-cancer effects arises from the use of an effect level in the estimation of an RfD or RfC because this estimation is predicated on the assumption of a threshold below which adverse effects are not expected. Therefore, an uncertainty factor is usually applied to estimate a no-effect level. Additional uncertainty arises in estimation of an RfD or RfC for chronic exposure from subchronic data. Unless empirical data indicate that effects do not worsen with increasing duration of exposure, an additional uncertainty factor is applied to the no-effect level in the subchronic study. Uncertainty in the derivation of RfDs is mitigated by the use of uncertainty and modifying factors that normally range between 3 and 10. The resulting combination of uncertainty and modifying factors may reach 1,000 or more.

The derivation of dermal RfDs and CSFs from oral values introduces uncertainty. This is particularly the case when chemical-specific gastrointestinal absorption rates are not available in the literature or when only qualitative statements regarding absorption are available.

6.7.6.2 Impact on Risk Characterization if Illinois EPA Additional Toxicity Criteria Were Applied

During its review of the draft of this HHRA, Illinois EPA proposed a number of alternative toxicity criteria, primarily subchronic RfD from Tier 3 toxicity resources. Many of Illinois EPA's chemical-specific toxicity criteria comments represent clarifications of the chemical-specific Tier 3 toxicity criteria sources (e.g., PPRTV and ATSDR) that Illinois EPA recommends. Summarized below is a comparison between the toxicity criteria that have been applied in the risk assessment and those additional toxicity values proposed by Illinois EPA. As indicated by this evaluation, there would not be substantive changes in the overall risk characterization nor risk decision-making if the alternative Illinois EPA values are used.

Appendix F Uncertainty Tables 1 and 2 present the chronic and subchronic toxicity values proposed by Illinois EPA compared with these values that were used in the Site 12 risk assessment. Most of Illinois EPA suggested toxicity values have been incorporated into the risk assessment. Some of the proposed Illinois EPA subchronic RfDs from a Tier 3 source were lower (that is more conservative) than the chronic RfD from Tier 1 source IRIS. These include heptachlor, heptachlor epoxide, cadmium, and copper RfDs. The proposed Illinois EPA subchronic RfCs for alpha-chlordane and gamma-chlordane were more conservative than the chronic RfC. Therefore, it is proposed that the chronic RfD and RfC from IRIS be retained as a surrogate for a subchronic RfD and RfC in these cases. The chronic RfD used for manganese (0.024) was close to the proposed Illinois EPA RfD (0.023). The subchronic RfD used for chromium (0.02) from HEAST as presented in the USEPA RSL calculator from June 2011 was less

conservative than the proposed Illinois EPA RfC of 0.005 from ATSDR. The chronic RfC used for chromium was more conservative than the proposed subchronic Illinois EPA RfC. As most of Illinois EPA's proposed values were incorporated into the risk assessment, any resulting changes to the HIs would yield the same remedial decision when the Illinois EPA toxicity values are applied compared to the summed HIs in the Site 12 HHRA. Therefore, changing these toxicity values would not result in substantive changes in the overall risk characterization nor risk decision-making, if the remaining alternative Illinois EPA values are used.

6.7.6.3 Uncertainty Associated with Evaluation of the Dermal Exposure Pathway

According to RAGS Part E (USEPA, 2004), risks from dermal absorption from soil are to be quantitatively evaluated for arsenic, cadmium, chlordane, 2,4-dichlorophenoxyacetic acid, DDT, TCDD (and other dioxins), PAHs, PCBs, pentachlorophenol, and SVOCs because of the limited guidance available to estimate dermal absorption factors for other constituents. Of these, arsenic, cadmium, PAHs, and PCBs are COPCs in soil. Therefore, the dermal route of exposure was evaluated quantitatively for these chemicals only. Risks for dermal exposure to metals (other than arsenic and cadmium) identified as COPCs for soil were not quantified in the HHRA; consequently, potential risks may be underestimated by excluding these constituents from the dermal HHRA calculations.

6.7.6.4 Uncertainty in the Toxicity Criteria for Chromium

Toxicity criteria are available for different forms of chromium, which is considered to be more toxic in the hexavalent state. Although there is no evidence to support the conclusion that hexavalent chromium is present at the Site, risks associated with this chemical were assessed by conservatively assuming that 100 percent of the reported chromium result is attributable to hexavalent chromium. If chromium had been evaluated as trivalent chromium then ILCRs and HIs for chromium would be within acceptable levels and chromium would not have been retained as a COC.

6.7.7 Uncertainty in the Risk Characterization

6.7.7.1 Uncertainty Associated with the Additivity of Effects

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 body, so additivity may not be an appropriate assumption. However, the assumption of additivity is made to provide a conservative estimate of risk, which may overestimate the risk.

6.7.7.2 Uncertainty Associated with the Risk Characterization of Surface and Subsurface Soil

Evaluating risks to surface soil and subsurface soil separately provides conservative risk estimates for exposure to each media. Exposure to surface soil and subsurface soil is assumed for each receptor 100 percent for each media; therefore, summing risks from surface soil and subsurface soil is not appropriate. Most receptors are not likely exposed to subsurface soil and providing separate risk calculations aids future risk management decisions.

6.7.7.3 Uncertainty Associated with Antagonistic or Synergistic Effects

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 uncertainty regarding antagonistic or synergistic effects is ambiguous because potential human health risks may either be underestimated or overestimated.

6.8 SUMMARY OF HUMAN HEALTH RISK ASSESSMENT

This section and Tables 6-13 and 6-14 present a summary of the HHRA findings for Site 12. Four potential receptor groups were evaluated: construction workers, occupational/maintenance workers, adult and adolescent recreational receptors/trespassers, and adult and child residents.

6.8.1 Carcinogenic Risks

RME and CTE cancer risk estimates for surface soil and subsurface soil for construction workers, maintenance/occupational workers, and adolescent and adult recreational receptors/trespassers for Site 12 are within the target USEPA and Illinois TACO Tier 3 cancer risk range (1×10^{-4} to 1×10^{-6}). RME cancer risk estimates for lifelong hypothetical future residents (child + adult) for surface soil (3×10^{-4}) and subsurface soil (1×10^{-3}) exceed the target USEPA and Illinois EPA TACO Tier 3 cancer risk range (1×10^{-4} to 1×10^{-6}). The major contributors to cancer risk at Site 12 under this scenario are primarily c-PAHs, arsenic, chromium (evaluated as hexavalent chromium), and some pesticides (surface soil only). CTE cancer risk estimates for lifelong hypothetical future residents (child + adult) for surface soil and subsurface soil are within the target USEPA and Illinois TACO Tier 3 cancer risk range.

6.8.2 Non-Carcinogenic Risks

RME and CTE HIs for surface soil and subsurface soil were less than or equal to 1.0 for adult residents, construction workers, occupational/maintenance workers, and adult and adolescent recreational

receptors/trespassers in the study area. For this reason, adverse non-carcinogenic health effects are not anticipated for these receptors at Site 12.

RME HIs for the hypothetical future child resident for surface soil (HI = 3) and subsurface soil (HI = 5) are greater than 1.0. However, HI for target organs were less than 1. The CTE HIs for the child resident for surface soil and subsurface soil were less than unity.

6.8.3 Human Health Risk Assessment Contaminants of Concern

If cumulative cancer risk was greater than $1x10^{-4}$ or the hazard index for a target organ was greater than 1, then chemicals were retained as COCs if their individual carcinogenic risk contribution was greater than $1x10^{-6}$ or their non-carcinogenic HQ was greater than 0.1. Based on the non-cancer and cancer evaluations, the following contaminants were identified as COCs: c-PAHs, arsenic, chromium, alpha-chlordane, gamma-chlordane, and heptachlor for residential exposure through ingestion and dermal contact to surface soil, c-PAHs, arsenic, Aroclor-1254, and chromium for residential exposure through ingestion and dermal contact to subsurface soil.

Although no chemicals were removed based on comparison to background values, as was discussed in Section 6.3.2, it is possible that the most of the c-PAHs and some metals in soil are attributable to background at Site 12. In addition, risks from chromium are likely overestimated by assuming the chromium at the Site is present as hexavalent chromium. If chromium had been evaluated as trivalent chromium, then risks for chromium would be within acceptable levels.

TABLE 6-1

HUMAN HEALTH SURFACE SOIL COPC SELECTION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS No.	Minimum Result	Maximum Result	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[1]	Concentration Used for Screening[2]	TACO - Residential Soil Inhalation[3]	TACO - Residential Soil Ingestion[3]	TACO - Industrial - Commercial Soil Inhalation[3]	TACO - Industrial - Commercial Soil Ingestion[3]	TACO - Construction Worker Soil Inhalation[3]	TACO - Construction Worker Soil Ingestion[3]
SEMIVOLATILES (ug/kg)													
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	149 J	149 J	NTC12-SB25-0005	1/10	346-398	149	31000000 SAT	46000 C	31000000 SAT	410000 C	31000000 SAT	410000 N
CARBAZOLE	86-74-8	167 J	254 J	NTC12-SB21-0005	2/10	346-398	254	NC	32000 C	NC	290000 C	NC	6200000 C
DIBENZOFURAN	132-64-9	144 J	144 J	NTC12-SB27-0005	1/10	346-398	144	NC	NC	NC	NC	NC	NC
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/kg)													
2-METHYLNAPHTHALENE	91-57-6	4.77 J	87.9	NTC12-SB29-0005	10/10	--	87.9	NC	NC	NC	NC	NC	NC
ACENAPHTHENE	83-32-9	2.96 J	205	NTC12-SB27-0005	10/10	--	205	NC	470000 N	NC	12000000 N	NC	12000000 N
ACENAPHTHYLENE	208-96-8	4.21 J	98.1	NTC12-SB21-0005	8/10	7.22-7.92	98.1	NC	NC	NC	NC	NC	NC
ANTHRACENE	120-12-7	8.45	606	NTC12-SB27-0005	10/10	--	606	NC	2300000 N	NC	61000000 N	NC	61000000 N
BAP EQUIVALENT - FULLND[9]	NA	33.0	2084	NTC12-SB21-0005	10/10	--	2084	NC	**90 C**	NC	**800 C**	NC	17000 C
BENZO(A)ANTHRACENE	56-55-3	29.3	1830	NTC12-SB21-0005	10/10	--	1830	NC	**900 C**	NC	8000 C	NC	170000 C
BENZO(A)PYRENE	50-32-8	21.8	1460	NTC12-SB27-0005	10/10	--	1460	NC	**90 C**	NC	**800 C**	NC	17000 C
BENZO(B)FLUORANTHENE	205-99-2	31.8	2260	NTC12-SB27-0005	10/10	--	2260	NC	**900 C**	NC	8000 C	NC	170000 C
BENZO(G,H,I)PERYLENE	191-24-2	13.5	711	NTC12-SB21-0005	10/10	--	711	NC	NC	NC	NC	NC	NC
BENZO(K)FLUORANTHENE	207-08-9	14.1 J	2280	NTC12-SB21-0005	10/10	--	2280	NC	9000 C	NC	78000 C	NC	1700000 C
CHRYSENE	218-01-9	38.5	1530	NTC12-SB21-0005	10/10	--	1530	NC	88000 C	NC	780000 C	NC	17000000 C
DIBENZO(A,H)ANTHRACENE	53-70-3	14	287	NTC12-SB21-0005	9/10	7.22	287	NC	**90 C**	NC	800 C	NC	17000 C
FLUORANTHENE	206-44-0	74.3	4290	NTC12-SB21-0005	10/10	--	4290	NC	310000 N	NC	8200000 N	NC	8200000 N
FLUORENE	86-73-7	5.63 J	254	NTC12-SB27-0005	9/10	7.22	254	NC	310000 N	NC	8200000 N	NC	8200000 N
INDENO(1,2,3-CD)PYRENE	193-39-5	12.8	674	NTC12-SB21-0005	10/10	--	674	NC	900 C	NC	8000 C	NC	170000 C
NAPHTHALENE	91-20-3	4.25 J	91.5	NTC12-SB27-0005	10/10	--	91.5	17000 N	160000 N	27000 N	4100000 N	180 N	410000 N
PHENANTHRENE	85-01-8	56.4	2370	NTC12-SB21-0005	10/10	--	2370	NC	NC	NC	NC	NC	NC
PYRENE	129-00-0	66	3190	NTC12-SB21-0005	10/10	--	3190	NC	230000 N	NC	6100000 N	NC	6100000 N
PESTICIDES (ug/kg)													
4,4'-DDD	72-54-8	2.92	195	NTC12-SB25-0005	10/10	--	195	NC	3000 C	NC	24000 C	NC	520000 C
4,4'-DDE	72-55-9	1.29	197	NTC12-SB25-0005	10/10	--	197	NC	2000 C	NC	17000 C	NC	370000 C
4,4'-DDT	50-29-3	1.28 J	282	NTC12-SB25-0005	9/10	0.782	282	NC	2000 C	1500000 C	17000 C	2100000 C	10000 N
ALDRIN	309-00-2	0.374 J	20.8	NTC12-SB25-0005	5/10	0.694-0.782	20.8	3000 C	40 C	6600 C	300 C	9300 C	610 N
ALPHA-BHC	319-84-6	0.509 J	1.1	NTC12-SB25-0005	3/10	0.694-0.782	1.1	800 C	100 C	1500 C	900 C	2100 C	20000 C
ALPHA-CHLORDANE	5103-71-9	0.14 J	3220	NTC12-SB25-0005	10/10	--	3220	72000 C	1800 C	140000 C	16000 C	**2200 N**	10000 N
BETA-BHC	319-85-7	0.702 J	6.55	NTC12-SB25-0005	2/10	0.694-0.798	6.55	NC	NC	NC	NC	NC	NC
DELTA-BHC	319-86-8	0.151 J	4.65	NTC12-SB25-0005	9/10	0.756	4.65	NC	NC	NC	NC	NC	NC
DIELDRIN	60-57-1	0.246 J	16.6	NTC12-SB25-0005	8/10	0.756-0.782	16.6	1000 C	40 C	2200 C	400 C	3100 C	7800 C
ENDOSULFAN I[10]	959-98-8	1.17	36.8	NTC12-SB25-0005	3/10	0.694-0.798	36.8	NC	47000 N	NC	1200000 N	NC	120000 N
ENDOSULFAN II[10]	33213-65-9	0.24 J	53.5	NTC12-SB25-0005	7/10	0.728-0.756	53.5	NC	47000 N	NC	1200000 N	NC	120000 N
ENDOSULFAN SULFATE[10]	1031-07-8	0.691 J	12.1	NTC12-SB25-0005	5/10	0.694-0.782	12.1	NC	47000 N	NC	1200000 N	NC	120000 N
ENDRIN	72-20-8	0.74 J	22.6	NTC12-SB27-0005	7/10	0.728-0.782	22.6	NC	2300 N	NC	61000 N	NC	6100 N
ENDRIN ALDEHYDE[11]	7421-93-4	0.66 J	19.5	NTC12-SB25-0005	6/10	0.694-0.782	19.5	NC	2300 N	NC	61000 N	NC	6100 N
ENDRIN KETONE[11]	53494-70-5	1.14	1.14	NTC12-SB25-0005	1/10	0.694-0.798	1.14	NC	2300 N	NC	61000 N	NC	6100 N
GAMMA-BHC (LINDANE)	58-89-9	0.144 J	0.6 J	NTC12-SB29-0005	4/10	0.694-0.782	0.6	NC	500 C	NC	4000 C	NC	96000 C
GAMMA-CHLORDANE	5103-74-2	0.309 J	2600	NTC12-SB25-0005	10/10	--	2600	72000 C	1800 C	140000 C	16000 C	**2200 N**	10000 N
HEPTACHLOR	76-44-8	0.18 J	236	NTC12-SB25-0005	4/10	0.694-0.798	236	**100 C**	**100 C**	11000 C	1000 C	16000 C	28000 C
HEPTACHLOR EPOXIDE	1024-57-3	0.122 J	64	NTC12-SB25-0005	7/10	0.694-0.782	64	5000 C	70 C	9200 C	600 C	13000 C	270 N
METHOXYCHLOR	72-43-5	0.383 J	3.04 J	NTC12-SB26-0005	3/10	0.694-0.798	3.04	NC	39000 N	NC	1000000 N	NC	100000 N
INORGANICS (mg/kg)													
ALUMINUM	7429-90-5	1250	10000	NTC12-SB27-0005	10/10	--	10000	NC	NC	NC	NC	NC	NC
ANTIMONY	7440-36-0	0.44 J	1.12 J	NTC12-SB29-0005	3/10	0.858-0.982	1.12	NC	3.1 N	NC	82 N	NC	8.2 N
ARSENIC	7440-38-2	4.28 J	16.9 J	NTC12-SB25-0005	10/10	--	16.9	750 C	**13** (16)	1200 C	**13** (16)	25000 C	61 N
BARIUM	7440-39-3	8.12 J	244 J	NTC12-SB21-0005	10/10	--	244	69000 N	550 N	91000 N	14000 N	87000 N	1400 N
BERYLLIUM	7440-41-7	0.147 J	5.5	NTC12-SB27-0005	10/10	--	5.5	1300 C	16 N	2100 C	410 N	44000 C	41 N
CADMIUM	7440-43-9	0.119 J	1.03 J	NTC12-SB29-0005	10/10	--	1.03	1800 C	7.8 N	2800 C	200 N	59000 C	20 N
CALCIUM	7440-70-2	24400	142000	NTC12-SB23-0005	10/10	--	142000	NC	NC	NC	NC	NC	NC
CHROMIUM[12]	7440-47-3	4.07 J	23.8 J	NTC12-SB27-0005	10/10	--	23.8	270 C	**23 N**	420 C	610 N	69 N	410 N
COBALT	7440-48-4	2.08	11.2	NTC12-SB27-0005	10/10	--	11.2	NC	470 N	NC	12000 N	NC	1200 N
COPPER	7440-50-8	6.55	271	NTC12-SB27-0005	10/10	--	271	NC	290 N	NC	8200 N	NC	820 N
IRON	7439-89-6	4710	20300	NTC12-SB27-0005	10/10	--	20300	NC	NC	NC	NC	NC	NC
LEAD	7439-92-1	17.9 J	263 J	NTC12-SB29-0005	10/10	--	263	NC	400	NC	800	NC	700
MAGNESIUM	7439-95-4	11100	84600	NTC12-SB23-0005	10/10	--	84600	NC	325000	NC	NC	NC	730000
MANGANESE	7439-96-5	137	701	NTC12-SB29-0005	10/10	--	701	6900 N	**160 N**	9100 N	4100 N	870 N	**410 N**
MERCURY	7439-97-6	0.0235 J	0.598	NTC12-SB26-0005	10/10	--	0.598	1 N	2.3 N	1.6 N	61 N	**0.01 N**	6.1 N
NICKEL	7440-02-0	4.49	34.7	NTC12-SB27-0005	10/10	--	34.7	13000 C	160 N	21000 C	4100 N	440000 C	410 N
POTASSIUM	7440-09-7	230 J	1640	NTC12-SB27-0005	10/10	--	1640	NC	NC	NC	NC	NC	NC
SELENIUM	7782-49-2	0.288 J	0.791	NTC12-SB29-0005	7/10	0.536-0.614	0.791	NC	39 N	NC	1000 N	NC	100 N
SILVER	7440-22-4	0.234 J	1.33	NTC12-SB29-0005	8/10	0.222-0.246	1.33	NC	39 N	NC	1000 N	NC	100 N
SODIUM	7440-23-5	75.3 J	336 J	NTC12-SB29-0005	10/10	--	336	NC	NC	NC	NC	NC	NC
THALLIUM	7440-28-0	0.167 J	0.167 J	NTC12-SB29-0005	1/10	0.446-0.644	0.167	NC	0.63 N	NC	16 N	NC	16 N
VANADIUM	7440-62-2	4.53	18.9	NTC12-SB27-0005	10/10	--	18.9	NC	55 N	NC	1400 N	NC	140 N
ZINC	7440-66-6	44.7 J	1530 J	NTC12-SB27-0005	10/10	--	1530	NC	2300 N	NC	61000 N	NC	6100 N

Parameter	Non-TACO - Residential Soil Inhalation[4]	Non-TACO - Residential Soil Ingestion[4]	Non-TACO - Industrial/ Commercial/Soil Inhalation[4]	Non-TACO - Industrial Commercial Soil Ingestion[4]	Non-TACO - Construction Worker Soil Inhalation[4]	Non-TACO - Construction Worker Soil Ingestion[4]	USEPA Residential Soil Criteria[5]	USEPA Industrial Soil Criteria[5]	USEPA Residential Inhalation SSLs[6]	USEPA Industrial Inhalation SSLs[6]	USEPA Construction Worker Direct Contact SSLs[7]	USEPA Construction Worker Inhalation SSLs[7]	COPC Flag[8]	Rationale for Contaminant Deletion or Selection
SEMIVOLATILES (ug/kg)														
BIS(2-ETHYLHEXYL)PHTHALATE	NC	NC	NC	NC	NC	NC	35000 C	120000 C	1.4E+09 C	7700000000 C	1200000 C	1E+08 C	NO	BSL
CARBAZOLE	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
DIBENZOFURAN	NC	7800 N	NC	200000 N	NC	82000 N	7800 N	100000 N	NC	NC	31000 N	NC	NO	BSL
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/kg)														
2-METHYLNAPHTHALENE	NC	31000 N	NC	820000 N	NC	82000 N	23000 N	220000 N	NC	NC	89000 N	NC	NO	BSL
ACENAPHTHENE	NC	NC	NC	NC	NC	NC	340000 N	3300000 N	NC	NC	1300000 N	NC	NO	BSL
ACENAPHTHYLENE	NC	230000 N	NC	6100000 N	NC	6100000 N	340000 N(13)	3300000 N(13)	NC	NC	1300000 N(13)	NC	NO	BSL
ANTHRACENE	NC	NC	NC	NC	NC	NC	1700000 N	17000000 N	NC	NC	6700000 N	NC	NO	BSL
BAP EQUIVALENT - FULLND[9]	NC	NC	NC	NC	NC	NC	**15 C**	**210 C**	3000000 C	17000000 C	2100 C	230000 C	YES	ASL
BENZO(A)ANTHRACENE	NC	NC	NC	NC	NC	NC	**150 C**	2100 C	30000000 C	170000000 C	21000 C	2300000 C	YES	ASL
BENZO(A)PYRENE	NC	NC	NC	NC	NC	NC	**15 C**	**210 C**	3000000 C	17000000 C	2100 C	230000 C	YES	ASL
BENZO(B)FLUORANTHENE	NC	NC	NC	NC	NC	NC	**150 C**	**2100 C**	30000000 C	170000000 C	21000 C	2300000 C	YES	ASL
BENZO(G,H,I)PERYLENE	NC	230000 N	NC	6100000 N	NC	6100000 N	170000 N(14)	1700000 N(14)	NC	NC	670000 N(14)	NC	NO	BSL
BENZO(K)FLUORANTHENE	NC	NC	NC	NC	NC	NC	**1500 C**	21000 C	30000000 C	170000000 C	210000 C	2300000 C	YES	ASL
CHRYSENE	NC	NC	NC	NC	NC	NC	15000 C	210000 C	300000000 C	1700000000 C	2100000 C	23000000 C	NO	BSL
DIBENZO(A,H)ANTHRACENE	NC	NC	NC	NC	NC	NC	**15 C**	**210 C**	2800000 C	15000000 C	2100 C	210000 C	YES	ASL
FLUORANTHENE	NC	NC	NC	NC	NC	NC	230000 N	2200000 N	NC	NC	890000 N	NC	NO	BSL
FLUORENE	NC	NC	NC	NC	NC	NC	230000 N	2200000 N	NC	NC	890000 N	NC	NO	BSL
INDENO(1,2,3-CD)PYRENE	NC	NC	NC	NC	NC	NC	**150 C**	2100 C	30000000 C	170000000 C	21000 C	2300000 C	YES	ASL
NAPHTHALENE	NC	NC	NC	NC	NC	NC	3600 C	18000 C	3600 C	20000 C	450000 N	31000 C	NO	BSL
PHENANTHRENE	NC	230000 N	NC	6100000 N	NC	6100000 N	170000 N(14)	1700000 N(14)	NC	NC	670000 N(14)	NC	NO	BSL
PYRENE	NC	NC	NC	NC	NC	NC	170000 N	1700000 N	NC	NC	670000 N	NC	NO	BSL
PESTICIDES (ug/kg)														
4,4'-DDD	NC	NC	NC	NC	NC	NC	2000 C	7200 C	48000000 C	270000000 C	69000 C	3600000 C	NO	BSL
4,4'-DDE	NC	NC	NC	NC	NC	NC	1400 C	5100 C	34000000 C	190000000 C	49000 C	2600000 C	NO	BSL
4,4'-DDT	NC	NC	NC	NC	NC	NC	1700 C	7000 C	34000000 C	190000000 C	58000 C	2600000 C	NO	BSL
ALDRIN	NC	NC	NC	NC	NC	NC	29 C	100 C	680000 C	3800000 C	980 C	51000 C	NO	BSL
ALPHA-BHC	NC	NC	NC	NC	NC	NC	77 C	270 C	1800000 C	10000000 C	2600 C	140000 C	NO	BSL
ALPHA-CHLORDANE	NC	NC	NC	NC	NC	NC	**1600 C**	6500 C	33000000 C	190000000 C	55000 C	250000 N	YES	ASL
BETA-BHC	NC	NC	NC	NC	NC	NC	270 C	960 C	6200000 C	35000000 C	9300 C	470000 C	NO	BSL
DELTA-BHC	NC	NC	NC	NC	NC	NC	77 C(15)	270 C(15)	1800000 C(15)	10000000 C(15)	2600 C(15)	140000 C(15)	NO	BSL
DIELDRIN	NC	NC	NC	NC	NC	NC	30 C	110 C	720000 C	4000000 C	1000 C	54000 C	NO	BSL
ENDOSULFAN I[10]	NC	NC	NC	NC	NC	NC	37000 N	370000 N	NC	NC	140000 N	NC	NO	BSL
ENDOSULFAN II[10]	NC	NC	NC	NC	NC	NC	37000 N	370000 N	NC	NC	140000 N	NC	NO	BSL
ENDOSULFAN SULFATE[10]	NC	NC	NC	NC	NC	NC	37000 N	370000 N	NC	NC	140000 N	NC	NO	BSL
ENDRIN	NC	NC	NC	NC	NC	NC	1800 N	18000 N	NC	NC	7100 N	NC	NO	BSL
ENDRIN ALDEHYDE[11]	NC	NC	NC	NC	NC	NC	1800 N	18000 N	NC	NC	7100 N	NC	NO	BSL
ENDRIN KETONE[11]	NC	NC	NC	NC	NC	NC	1800 N	18000 N	NC	NC	7100 N	NC	NO	BSL
GAMMA-BHC (LINDANE)	NC	NC	NC	NC	NC	NC	520 C	2100 C	11000000 C	60000000 C	18000 C	800000 C	NO	BSL
GAMMA-CHLORDANE	NC	NC	NC	NC	NC	NC	**1600 C**	6500 C	33000000 C	190000000 C	55000 C	250000 N	YES	ASL
HEPTACHLOR	NC	NC	NC	NC	NC	NC	**110 C**	380 C	2500000 C	4000000 C	3700 C	190000 C	YES	ASL
HEPTACHLOR EPOXIDE	NC	NC	NC	NC	NC	NC	**53 C**	190 C	1300000 C	7100000 C	1800 C	96000 C	YES	ASL
METHOXYCHLOR	NC	NC	NC	NC	NC	NC	31000 N	310000 N	NC	NC	120000 N	NC	NO	BSL
INORGANICS (mg/kg)														
ALUMINUM	100000 N	**7800 N**	100000 N	100000 N	87000 N	20000 N	**7700 N**	99000 N	710000 N	3300000 N	31000 N	**1800 N**	YES	ASL
ANTIMONY	NC	NC	NC	NC	NC	NC	3.1 N	41 N	NC	NC	12 N	NC N	NO	BSL
ARSENIC	NC	NC	NC	NC	NC	NC	**0.61 C**	**2.4 C**	770 C	4300 C	**13 C**	**5.3 N**	YES	ASL
BARIUM	NC	NC	NC	NC	NC	NC	1500 N	19000 N	71000 N	330000 N	6200 N	**180 N**	YES	ASL
BERYLLIUM	NC	NC	NC	NC	NC	NC	16 N	200 N	1400 C	7700 C	62 N	7.1 N	NO	BSL
CADMIUM	NC	NC	NC	NC	NC	NC	7 N	80 N	1800 C	10000 C	28 N	3.6 N	NO	BSL
CALCIUM	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
CHROMIUM[12]	NC	NC	NC	NC	NC	NC	**0.29 C**	**5.6 C**	**39 C**	220 C	43 C	**3 C**	YES	ASL
COBALT	NC	NC	NC	NC	NC	NC	**2.3 N**	30 N	370 C	2100 C	**9.3 N**	**2.1 N**	YES	ASL
COPPER	NC	NC	NC	NC	NC	NC	310 N	4100 N	NC	NC	1200 N	NC	NO	BSL
IRON	NC	NC	NC	NC	NC	NC	**5500 N**	72000 N	NC	NC	22000 N	NC	YES	ASL
LEAD	NC	NC	NC	NC	NC	NC	400 N	800 N	NC	NC	NC	NC	NO	BSL
MAGNESIUM	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
MANGANESE	NC	NC	NC	NC	NC	NC	**180 N**	2300 N	7100 N	33000 N	7400 N	**18 N**	YES	ASL
MERCURY	NC	NC	NC	NC	NC	NC	2.3 N(17)	31 N(17)	43000 N(17)	200000 N(17)	9.3 N(17)	110 N(17)	YES	ASL
NICKEL	NC	NC	NC	NC	NC	NC	150 N	2000 N	13000 C	71000 C	620 N	NC N	NO	BSL
POTASSIUM	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
SELENIUM	NC	NC	NC	NC	NC	NC	39 N	510 N	2800000 N	13000000 N	150 N	7100 N	NO	BSL
SILVER	NC	NC	NC	NC	NC	NC	39 N	510 N	NC	NC	150 N	NC	NO	BSL
SODIUM	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
THALLIUM	NC	NC	NC	NC	NC	NC	**0.078 N**	1 N	NC	NC	0.31 N	NC	YES	ASL
VANADIUM	NC	NC	NC	NC	NC	NC	39 N	520 N	14000 N	66000 N	150 N	36 N	NO	BSL
ZINC	NC	NC	NC	NC	NC	NC	2300 N	31000 N	NC	NC	9300 N	NC	NO	BSL

Notes:

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Screening values for risk-based non-carcinogenic values (denoted with a "N" flag) were reduced by a factor of 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values (denoted with a "C" flag) represent an incremental cancer risk of 1.0E-06.

Footnotes:

1 - Values presented are sample-specific quantitation limits.
2 - The maximum detected concentration is used for screening purposes
3 - Section 742 Table A and Table B, Tier 1, Soil Remediation Objectives - Residential/Industrial/Commercial (Ingestion or Inhalation)(Illinois EPA, 2013a)
4 - Soil Remediation Objectives for Residential/Industrial/Commercial properties, Non-TACO Chemicals. (Illinois EPA, 2013a)
5 - USEPA RSL Screening Level (USEPA, 2013).
6 - SSLs for the migration of chemicals from soil to air were calculated by Tetra Tech using the methodology and equations presented in the Supplemental Guidance For Developing Soil Screening Levels for Superfund Sites, OSWER 93355.4-24, December 2002 and online at http://rais.ornl.gov/epa/ssl1.shtml since these values are more recent than those published in the 1996 and 2002 SSL guidance documents.
7 - Soil Screening Levels for Migration from Soil to Air for Construction Worker Scenario were calculated by Tetra Tech using methodology and equations presented in the Supplemental Guidance For Developing Soil Screening Levels for Superfund Sites, OSWER 93355.4-24, December 2002.
8 - The chemical is selected as a COPC if the maximum detected concentration exceeds a screening level.
9 - A toxicity equivalence factor (TEF) approach was used based on the relative potency of each carcinogenic PAH compound relative to that of benzo(a)pyrene. The limit of detection was used to represent non-detected concentrations in the calculation.
10 - Endosulfan is used as a surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
11 - Endrin is used as a surrogate for endrin aldehyde and endrin ketone.
12 - Hexavalent chromium is used as a surrogate for chromium.
13 - Acenaphthene is used as a surrogate for acenaphthylene
14- Pyrene is used as a surrogate for benzo(ghi)perylene and phenanthrene
15 - Alpha-BHC used as a surrogate for delta-BHC.
16 - Background value provided in TACO Appendix A, Table G used as screening value (Illinois EPA, 2013a).
17 - Value for mercuric chloride (and other mercury salts).

Definitions:

C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Non-carcinogen
NC = No criteria
NA = Not applicable/not available
SAT = Saturation

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC screening level
For Elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient

TABLE 6-2

HUMAN HEALTH SUBSURFACE SOIL COPC SELECTION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS No.	Minimum Result	Maximum Result	Samples of Maximum Concentration	Frequency of Detection	Range of Nondetects[1]	Concentration Used for Screening[2]	TACO - Residential Soil Inhalation[3]	TACO - Residential Soil Ingestion[3]	TACO - Industrial - Commercial Soil Inhalation[3]	TACO - Industrial - Commercial Soil Ingestion[3]	TACO - Construction Worker Soil Inhalation[3]	TACO - Construction Worker Soil Ingestion[3]	Non-TACO - Residential Soil Inhalation[4]	Non-TACO - Residential Soil Ingestion[4]	Non-TACO - Industrial-Commercial Soil Inhalation[4]	Non-TACO - Industrial-Commercial Soil Ingestion[4]	Non-TACO - Construction Worker Soil Inhalation[4]	Non-TACO - Construction Worker Soil Ingestion[4]	USEPA Residential Soil Criteria[5]	USEPA Industrial Soil Criteria[5]	USEPA Residential Inhalation SSLs[6]	USEPA Industrial Inhalation SSLs[6]	USEPA Construction Worker Direct Contact SSLs[7]	USEPA Construction Worker Inhalation SSLs[7]	COPC Flag[8]	Rationale for Contaminant Deletion or Selection
SEMIVOLATILES																											
4-METHYLPHENOL	106-44-5	167 J	375 J	NTC12-SB25-0204	3/10	364-402	375	NC	NC	NC	NC	NC	NC	10000000 N	780000 N	17000000 N	20000000 N	330000 N	410000 N	610000 N	6200000 N	85000000000 N	4E+11 N	2400000 N	210000000 N	NO	BSL
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	201 J	201 J	NTC12-SB26-0406	1/10	364-402	201	31000000 SAT	46000 C	31000000 SAT	410000 C	31000000 SAT	410000 N	NC	NC	NC	NC	NC	NC	35000 C	120000 C	1400000000 C	7700000000 C	1200000 C	100000000 C	NO	BSL
CARBAZOLE	86-74-8	494 J	1080 J	NTC12-SB28-0204	2/10	364-402	1080	NC	32000 C	NC	290000 C	NC	6200000 C	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
DIBENZOFURAN	132-64-9	204 J	1140	NTC12-SB28-0204	3/10	364-402	1140	NC	NC	NC	NC	NC	NC	NC	7800 N	NC	200000 N	NC	82000 N	7800 N	100000 N	NC	NC	31000 N	NC	NO	BSL
PHENOL	108-95-2	99.7 J	99.7 J	NTC12-SB25-0204	1/10	364-416	99.7	NC	2300000 N	NC	61000000 N	NC	6100000 N	NC	NC	NC	NC	NC	NC	1800000 N	18000000 N	28000000000 N	1.3E+11 N	7100000 N	71000000 N	NO	BSL
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/kg)																											
2-METHYLNAPHTHALENE	91-57-6	3.31 J	545	NTC12-SB26-0406	10/10	--	545	NC	NC	NC	NC	NC	NC	NC	31000 N	NC	820000 N	NC	82000 N	23000 N	220000 N	NC	NC	89000 N	NC	NO	BSL
ACENAPHTHENE	83-32-9	5.87 J	1120	NTC12-SB28-0204	10/10	--	1120	NC	470000 N	NC	12000000 N	NC	12000000 N	NC	NC	NC	NC	NC	NC	340000 N	3300000 N	NC	NC	1300000 N	NC	NO	BSL
ACENAPHTHYLENE	208-96-8	3.67 J	253	NTC12-SB28-0204	8/10	7.24-8.02	253	NC	NC	NC	NC	NC	NC	NC	230000 N	NC	6100000 N	NC	6100000 N	340000 N[13]	3300000 N[13]	NC	NC	1300000 N[13]	NC	NO	BSL
ANTHRACENE	120-12-7	19	5280	NTC12-SB28-0204	10/10	--	5280	NC	2300000 N	NC	61000000 N	NC	61000000 N	NC	NC	NC	NC	NC	NC	1700000 N	17000000 N	NC	NC	6700000 N	NC	NO	BSL
BAP EQUIVALENT-FULLND[9]	NA	55.5	10609	NTC12-SB28-0204	10/10	--	10609	NC	**90 C**	NC	**800 C**	NC	17000 C	NC	NC	NC	NC	NC	NC	**15 C**	**210 C**	1200000 C	15000000 C	**2100 C**	230000 C	YES	ASL
BENZO(A)ANTHRACENE	56-55-3	41.3	9780	NTC12-SB28-0204	10/10	--	9780	NC	**900 C**	NC	**8000 C**	NC	170000 C	NC	NC	NC	NC	NC	NC	**150 C**	**2100 C**	12000000 C	150000000 C	21000 C	2300000 C	YES	ASL
BENZO(A)PYRENE	50-32-8	40.1	7740	NTC12-SB28-0204	10/10	--	7740	NC	**90 C**	NC	**800 C**	NC	17000 C	NC	NC	NC	NC	NC	NC	**15 C**	**210 C**	1200000 C	15000000 C	**2100 C**	230000 C	YES	ASL
BENZO(B)FLUORANTHENE	205-99-2	53.7	10300	NTC12-SB28-0204	10/10	--	10300	NC	**900 C**	NC	**8000 C**	NC	170000 C	NC	NC	NC	NC	NC	NC	**150 C**	**2100 C**	12000000 C	150000000 C	21000 C	2300000 C	YES	ASL
BENZO(G,H,I)PERYLENE	191-24-2	26.9	1110	NTC12-SB28-0204	10/10	--	1110	NC	NC	NC	NC	NC	NC	NC	230000 N	NC	6100000 N	NC	6100000 N	170000 N[14]	1700000 N[14]	NC	NC	670000 N[14]	NC	NO	BSL
BENZO(K)FLUORANTHENE	207-08-9	25.7	2570	NTC12-SB26-0406	10/10	--	2570	NC	9000 C	NC	78000 C	NC	1700000 C	NC	NC	NC	NC	NC	NC	**1500 C**	21000 C	12000000 C	150000000 C	210000 C	2300000 C	YES	ASL
CHRYSENE	218-01-9	63	7940	NTC12-SB28-0204	10/10	--	7940	NC	88000 C	NC	780000 C	NC	17000000 C	NC	NC	NC	NC	NC	NC	15000 C	210000 C	120000000 C	1500000000 C	2100000 C	23000000 C	NO	BSL
DIBENZO(A,H)ANTHRACENE	53-70-3	12	705	NTC12-SB28-0204	7/10	7.24-8.02	705	NC	**90 C**	NC	800 C	NC	17000 C	NC	NC	NC	NC	NC	NC	**15 C**	**210 C**	1100000 C	14000000 C	2100 C	210000 C	YES	ASL
FLUORANTHENE	206-44-0	118	21100	NTC12-SB28-0204	10/10	--	21100	NC	310000 N	NC	8200000 N	NC	8200000 N	NC	NC	NC	NC	NC	NC	230000 N	2200000 N	NC	NC	890000 N	NC	NO	BSL
FLUORENE	86-73-7	10	2510	NTC12-SB28-0204	9/10	7.5	2510	NC	310000 N	NC	8200000 N	NC	8200000 N	NC	NC	NC	NC	NC	NC	230000 N	2200000 N	NC	NC	890000 N	NC	NO	BSL
INDENO(1,2,3-CD)PYRENE	193-39-5	19.9	1330	NTC12-SB28-0204	10/10	--	1330	NC	**900 C**	NC	8000 C	NC	170000 C	NC	NC	NC	NC	NC	NC	**150 C**	2100 C	12000000 C	150000000 C	21000 C	2300000 C	YES	ASL
NAPHTHALENE	91-20-3	4 J	439	NTC12-SB26-0406	10/10	--	439	17000 N	160000 N	27000 N	4100000 N	**180 N**	410000 N	NC	NC	NC	NC	NC	NC	3600 C	18000 C	3600 C	18000 C	450000 N	31000 N	YES	ASL
PHENANTHRENE	85-01-8	75.4	20200	NTC12-SB28-0204	10/10	--	20200	NC	NC	NC	NC	NC	NC	NC	230000 N	NC	6100000 N	NC	6100000 N	170000 N[14]	1700000 N[14]	NC	NC	670000 N[14]	NC	NO	BSL
PYRENE	129-00-0	104	16800	NTC12-SB28-0204	10/10	--	16800	NC	230000 N	NC	6100000 N	NC	6100000 N	NC	NC	NC	NC	NC	NC	170000 N	1700000 N	NC	NC	670000 N	NC	NO	BSL
PCBs (ug/kg)																											
AROCLOR-1254	11097-69-1	29.8 J	799	NTC12-SB21-0507	4/5	18.86	799	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	**220 N[16]**	**740 C**	5800000 C	33000000 C	**440 N**	44000 N	YES	ASL
PESTICIDES																											
4,4'-DDD	72-54-8	2.37	1090	NTC12-SB26-0406	10/10	--	1090	NC	3000 C	NC	24000 C	NC	520000 C	NC	NC	NC	NC	NC	NC	2000 C	7200 C	48000000 C	270000000 C	69000 C	3600000 C	NO	BSL
4,4'-DDE	72-55-9	0.692 J	986 J	NTC12-SB25-0204	10/10	--	986	NC	2000 C	NC	17000 C	NC	370000 C	NC	NC	NC	NC	NC	NC	1400 C	5100 C	34000000 C	190000000 C	49000 C	2600000 C	NO	BSL
4,4'-DDT	50-29-3	0.362 J	823	NTC12-SB21-0507	10/10	--	823	NC	2000 C	1500000 C	17000 C	2100000 C	10000 N	NC	NC	NC	NC	NC	NC	1700 C	7000 C	34000000 C	190000000 C	58000 C	2600000 C	NO	BSL
ALDRIN	309-00-2	0.463 J	17	NTC12-SB21-0507	5/10	0.73-0.782	17	3000 C	40 C	6600 C	300 C	9300 C	610 N	NC	NC	NC	NC	NC	NC	29 C	100 C	680000 C	3800000 C	980 C	51000 C	NO	BSL
ALPHA-BHC	319-84-6	0.172 J	1.05	NTC12-SB26-0406	3/10	0.73-0.802	1.05	800 C	100 C	1500 C	900 C	2100 C	20000 C	NC	NC	NC	NC	NC	NC	77 C	270 C	1800000 C	10000000 C	2600 C	140000 C	NO	BSL
ALPHA-CHLORDANE	5103-71-9	0.202 J	141	NTC12-SB21-0507	9/10	0.782	141	72000 C	1800 C	140000 C	16000 C	2200 N	10000 N	NC	NC	NC	NC	NC	NC	1600 C	6500 C	33000000 C	190000000 C	55000 C	250000 N	NO	BSL
BETA-BHC	319-85-7	0.722 J	1.12	NTC12-SB21-0507	3/10	0.73-0.802	1.12	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	270 C	960 C	6200000 C	35000000 C	9300 C	470000 C	NO	BSL
DELTA-BHC	319-86-8	0.164 J	6.05	NTC12-SB21-0507	8/10	0.77-0.802	6.05	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	77 C[15]	270 C[15]	1800000 C[15]	10000000 C[15]	2600 C[15]	140000 C[15]	NO	BSL
DIELDRIN	60-57-1	0.321 J	13.4	NTC12-SB26-0406	7/10	0.766-0.782	13.4	1000 C	40 C	2200 C	400 C	3100 C	7800 C	NC	NC	NC	NC	NC	NC	30 C	110 C	720000 C	4000000 C	1000 C	54000 C	NO	BSL
ENDOSULFAN I[10]	959-98-8	0.194 J	4.51	NTC12-SB26-0406	5/10	0.73-0.788	4.51	NC	47000 N	NC	1200000 N	NC	120000 N	NC	NC	NC	NC	NC	NC	37000 N	370000 N	NC	NC	140000 N	NC	NO	BSL
ENDOSULFAN II[10]	33213-65-9	0.28 J	5.63	NTC12-SB21-0507	6/10	0.73-0.782	5.63	NC	47000 N	NC	1200000 N	NC	120000 N	NC	NC	NC	NC	NC	NC	37000 N	370000 N	NC	NC	140000 N	NC	NO	BSL
ENDOSULFAN SULFATE[10]	1031-07-8	0.204 J	3.95	NTC12-SB28-0204	4/10	0.73-0.788	3.95	NC	47000 N	NC	1200000 N	NC	120000 N	NC	NC	NC	NC	NC	NC	37000 N	370000 N	NC	NC	140000 N	NC	NO	BSL
ENDRIN	72-20-8	0.235 J	12.9	NTC12-SB26-0406	7/10	0.766-0.782	12.9	NC	2300 N	NC	61000 N	NC	6100 N	NC	NC	NC	NC	NC	NC	1800 N	18000 N	NC	NC	7100 N	NC	NO	BSL
ENDRIN ALDEHYDE[11]	7421-93-4	0.953 J	10.9	NTC12-SB26-0406	5/10	0.73-0.788	10.9	NC	2300 N	NC	61000 N	NC	6100 N	NC	NC	NC	NC	NC	NC	1800 N	18000 N	NC	NC	7100 N	NC	NO	BSL
ENDRIN KETONE[11]	53494-70-5	0.715 J	0.715 J	NTC12-SB28-0204	1/10	0.73-0.83	0.715	NC	2300 N	NC	61000 N	NC	6100 N	NC	NC	NC	NC	NC	NC	1800 N	18000 N	NC	NC	7100 N	NC	NO	BSL
GAMMA-BHC (LINDANE)	58-89-9	0.346 J	3.61	NTC12-SB28-0204	3/10	0.73-0.802	3.61	NC	500 C	NC	4000 C	NC	96000 C	NC	NC	NC	NC	NC	NC	520 C	2100 C	11000000 C	60000000 C	18000 C	800000 C	NO	BSL
GAMMA-CHLORDANE	5103-74-2	0.301 J	129	NTC12-SB21-0507	9/10	0.766	129	7200 C	1800 C	140000 C	16000 C	2200 N	10000 N	NC	NC	NC	NC	NC	NC	1600 C	6500 C	33000000 C	190000000 C	55000 C	250000 N	NO	BSL
HEPTACHLOR	76-44-8	0.182 J	1.83	NTC12-SB21-0507	4/10	0.73-0.802	1.83	100 C	100 C	11000 C	1000 C	16000 C	28000 C	NC	NC	NC	NC	NC	NC	110 C	380 C	2500000 C	14000000 C	3700 C	190000 C	NO	BSL
HEPTACHLOR EPOXIDE	1024-57-3	0.213 J	7	NTC12-SB22-0502	7/10	0.75-0.782	7	5000 C	70 C	9200 C	600 C	13000 C	270 N	NC	NC	NC	NC	NC	NC	53 C	190 C	1300000 C	7100000 C	1800 C	96000 C	NO	BSL
METHOXYCHLOR	72-43-5	0.528 J	1.33	NTC12-SB28-0204	3/10	0.766-0.83	1.33	NC	39000 N	NC	1000000 N	NC	100000 N	NC	NC	NC	NC	NC	NC	31000 N	310000 N	NC	NC	120000 N	NC	NO	BSL
INORGANICS (mg/kg)																											
ALUMINUM	7429-90-5	1380	11700	NTC12-SB29-0204	10/10	--	11700	NC	NC	NC	NC	NC	NC	100000 N	**7800 N**	100000 N	100000 N	87000 N	20000 N	**7700 N**	99000 N	710000 N	3300000 N	31000 N	**1800 N**	YES	ASL
ANTIMONY	7440-36-0	0.297 J	4.24 J	NTC12-SB26-0406	6/10	0.902-0.954	4.24	NC	**3.1 N[16]**	NC	82 N	NC	8.2 N	NC	NC	NC	NC	NC	NC	**3.1 N**	41 N	NC	NC	12 N	NC	YES	ASL
ARSENIC	7440-38-2	4.26 J	25 J	NTC12-SB26-0406	10/10	--	25	750 C	**13 [16]**	1200 C	**13 [16]**	25000 C	61 N	NC	NC	NC	NC	NC	NC	**0.61 C**	**2.4 C**	770 C	4300 C	**13 C**	**5.3 N**	YES	ASL
BARIUM	7440-39-3	6.73 J	432 J	NTC12-SB21-0507	10/10	--	432	69000 N	550 N	91000 N	14000 N	87000 N	1400 N	NC	NC	NC	NC	NC	NC	1500 N	19000 N	71000 N	330000 N	6200 N	**180 N**	YES	ASL
BERYLLIUM	7440-41-7	0.154 J	1.02	NTC12-SB27-0204	8/10	2.96-6.22	1.02	1300 C	16 N	2100 C	410 N	44000 C	41 N	NC	NC	NC	NC	NC	NC	16 N	200 N	1400 C	7700 C	62 N	7.1 N	NO	BSL
CADMIUM	7440-43-9	0.119 J	7.31 J	NTC12-SB26-0406	10/10	--	7.31	1800 C	7.8 N	2800 C	200 N	59000 C	20 N	NC	NC	NC	NC	NC	NC	**7 N**	80 N	1800 C	10000 C	28 N	**3.6 N**	YES	ASL
CALCIUM	7440-70-2	26800	85700 J	NTC12-SB25-0204	10/10	--	85700	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
CHROMIUM[12]	7440-47-3	4.65 J	60.8 J	NTC12-SB26-0406	10/10	--	60.8	270 C	**23 N**	420 C	610 N	69 N	410 N	NC	NC	NC	NC	NC	NC	**0.29 C**	**5.6 C**	**16 C**	220 C	**43 C**	**3 C**	YES	ASL
COBALT	7440-48-4	2.37	17	NTC12-SB26-0406	10/10	--	17	NC	470 N	NC	12000 N	NC	1200 N	NC	NC	NC	NC	NC	NC	**2.3 N**	30 N	370 C	2100 C	**9.3 N**	**2.1 N**	YES	ASL
COPPER	7440-50-8	6.56	362	NTC12-SB21-0507	10/10	--	362	NC	**290 N**	NC	8200 N	NC	820 N	NC	NC	NC	NC	NC	NC	**310 N**	4100 N	NC	NC	1200 N	NC	YES	ASL
IRON	7439-89-6	4650	31400	NTC12-SB29-0204	10/10	--	31400	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	**5500 N**	72000 N	NC	NC	**22000 N**	NC	YES	ASL
LEAD	7439-92-1	26.6 J	845 J	NTC12-SB29-0204	10/10	--	845	NC	**400**	NC	**800**	NC	**700**	NC	NC	NC	NC	NC	NC	**400 N**	**800 N**	NC	NC	NC	NC	YES	ASL
MAGNESIUM	7439-95-4	12000	42600 J	NTC12-SB25-0204	10/10	--	42600	NC	325000	NC	NC	NC	730000	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
MANGANESE	7439-96-5	143	846	NTC12-SB26-0406	10/10	--	846	6900 N	**160 N**	9100 N	4100 N	870 N	**410 N**	NC	NC	NC	NC	NC	NC	**180 N**	2300 N	7100 N	33000 N	7400 N	**18 N**	YES	ASL
MERCURY	7439-97-6	0.0327 J	1.99	NTC12-SB26-0406	10/10	--	1.99	**1 N**	2.3 N	**1.6 N**	61 N	**0.01 N**	6.1 N	NC	NC	NC	NC	NC	NC	**2.3 N[17]**	31 N[17]	43000 N[17]	200000 N[17]	9.3 N[17]	110 N[17]	YES	ASL
NICKEL	7440-02-0	4.36	88.6	NTC12-SB26-0406	10/10	--	88.6	13000 C	160 N	21000 C	4100 N	440000 C	410 N	NC	NC	NC	NC	NC	NC	150 N	2000 N	13000 C	71000 C	620 N	NC	NO	BSL
POTASSIUM	7440-09-7	205 J	2110	NTC12-SB26-0406	10/10	--	2110	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
SELENIUM	7782-49-2	0.214 J	6.57	NTC12-SB26-0406	9/10	0.566	6.57	NC	39 N	NC	1000 N	NC	100 N	NC	NC	NC	NC	NC	NC	39 N	510 N	2800000 N	13000000 N	150 N	7100 N	NO	BSL
SILVER	7440-22-4	0.0931 J	22.3	NTC12-SB26-0406	7/10	0.226-0.466	22.3	NC	39 N	NC	1000 N	NC	100 N	NC	NC	NC	NC	NC	NC	39 N	510 N	NC	NC	150 N	NC	NO	BSL
SODIUM	7440-23-5	84.7 J	270 J	NTC12-SB26-0406	10/10	--	270	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
VANADIUM	7440-62-2	4.78	25.9	NTC12-SB26-0406	10/10	--	25.9	NC	55 N	NC	1400 N	NC	140 N	NC	NC	NC	NC	NC	NC	39 N	520 N	14000 N	66000 N	150 N	36 N	NO	BSL
ZINC	7440-66-6	43.7 J	912 J	NTC12-SB21-0507	10/10	--	912	NC	2300 N	NC	61000 N	NC	6100 N	NC	NC	NC	NC	NC	NC	2300 N	31000 N	NC	NC	9300 N	NC	NO	BSL

TABLE 6-2

HUMAN HEALTH SUBSURFACE SOIL COPC SELECTION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Notes:

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Screening values for risk-based non-carcinogenic values (denoted with a "N" flag) were reduced by a factor of 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values (denoted with a "C" flag) represent an incremental cancer risk of 1.0E-06.

Footnotes:

1 - Values presented are sample-specific quantitation limits.

2 - The maximum detected concentration is used for screening purposes

3 - Section 742 Table A and Table B, Tier 1, Soil Remediation Objectives - Residential/Industrial/Commercial (Ingestion or Inhalation)(Illinois EPA, 2013a)

4 - Soil Remediation Objectives for Residential/Industrial/Commercial properties, Non-TACO Chemicals. (Illinois EPA, 2013a)

5 - USEPA RSL Screening Level (USEPA, 2013).

6 - SSLs for the migration of chemicals from soil to air were calculated by Tetra Tech using the methodology and equations presented in the Supplemental Guidance For Developing Soil Screening Levels for Superfund Sites, OSWER 93355.4-24, December 2002 and online at http://rais.ornl.gov/epa/ssl1.shtml since these values are more recent than those published in the 1996 and 2002 SSL guidance documents.

7 - Soil Screening Levels for Migration from Soil to Air for Construction Worker Scenario were calculated by Tetra Tech using methodology and equations presented in the Supplemental Guidance For Developing Soil Screening Levels for Superfund Sites, OSWER 93355.4-24, December 2002.

8 - The chemical is selected as a COPC if the maximum detected concentration exceeds a screening level.

9 - A toxicity equivalence factor (TEF) approach was used based on the relative potency of each carcinogenic PAH compound relative to that of benzo(a)pyrene. The limit of detection was used to represent non-detected concentrations in the calculation.

10 - Endosulfan is used as a surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.

11 - Endrin is used as a surrogate for endrin aldehyde and endrin ketone.

12 - Hexavalent chromium is used as a surrogate for chromium.

13 - Acenaphthene is used as a surrogate for acenaphthylene

14- Pyrene is used as a surrogate for benzo(ghi)perylene and phenanthrene

15 - Alpha-BHC used as a surrogate for delta-BHC.

16 - Background value provided in TACO Appendix A, Table G used as screening value (Illinois EPA, 2013a).

17 - Value for mercuric chloride (and other mercury salts).

18 - One-tenth of the noncarcinogenic value is less than the carcinogenic value. Therefore, the noncarcinogenic value is presented.

Definitions:

C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Non-carcinogen
NC = No criteria
NA = Not applicable/not available
SAT = Saturation

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC screening level
For Elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient

TABLE 6-3

CHEMICALS RETAINED AS COPCs
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical	Surface Soil		Subsurface Soil	
	Direct Contact	Soil to Air/Inhalation	Direct Contact	Soil to Air/Inhalation
PAHs				
BAP EQUIVALENT-FULLND	X		X	
BENZO(A)ANTHRACENE	X		X	
BENZO(A)PYRENE	X		X	
BENZO(B)FLUORANTHENE	X		X	
BENZO(K)FLUORANTHENE	X		X	
DIBENZO(A,H)ANTHRACENE	X		X	
INDENO(1,2,3-CD)PYRENE	X		X	
NAPTHALENE				X
Pesticides/PAHs				
AROCLOR-1254			X	
ALPHA-CHLORDANE	X	X		
GAMMA-CHLORDANE	X	X		
HEPTACHLOR	X	X		
HEPTACHLOR EPOXIDE	X			
Inorganics				
ALUMINUM	X	X	X	X
ANTIMONY			X	
ARSENIC	X	X	X	X
BARIUM		X		X
CADMIUM			X	X
CHROMIUM	X	X	X	X
COBALT	X	X	X	X
COPPER			X	
IRON	X		X	
LEAD			X	
MANGANESE	X	X	X	X
MERCURY		X	X	X

Notes:
X - Indicates chemical was retained as a COPC

TABLE 6-4

HUMAN HEALTH RISK ASSESSMENT
EXPOSURE ROUTES FOR POSSIBLE QUANTITATIVE EVALUATION
SITE 12 – HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Receptors	Exposure Routes
Construction Workers (future land use)	• Surface and Subsurface Soil - Dermal Contact • Surface and Subsurface Soil - Incidental Ingestion • Surface and Subsurface Soil - Inhalation of Vapor and Dust
Maintenance/Occupational Workers (future land use)	• Surface and Subsurface Soil - Dermal Contact • Surface and Subsurface Soil - Incidental Ingestion • Surface and Subsurface Soil – Inhalation of Vapor and Dust
Trespassers (Adult/Adolescent)	• Surface Soil - Dermal Contact • Surface Soil - Incidental Ingestion • Surface Soil – Inhalation of Vapor and Dust
Future Residents (Adult/Children)	• Surface and Subsurface Soil - Dermal Contact • Surface and Subsurface Soil - Incidental Ingestion • Surface and Subsurface Soil – Inhalation of Vapor and Dust

TABLE 6-5

EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

Chemical of Potential Concern	Units	# Detects/ # Samples	Arithmetic Mean [1]	Maximum Detection [2]	EPC Units	Dataset Distribution	95% UCL of the Mean Statistic	95% UCL [3]
PAHs/Semivolatile Organic Compounds								
BAP EQUIVALENT	mg/kg	10/10	0.897	2.084	mg/kg	Normal	95% Student's-t UCL	1.37
Pesticides								
ALPHA-CHLORDANE	mg/kg	10/10	0.353	3.22	mg/kg	Lognormal	95% Hall's Bootstrap UCL	3.22 [4]
GAMMA-CHLORDANE	mg/kg	10/10	0.281	2.60	mg/kg	Lognormal	99% Chebyshev UCL	2.60 [4]
HEPTACHLOR	mg/kg	4/10	0.024	0.236	mg/kg	Gamma	95% KM (t) UCL	0.072
HEPTACHLOR EPOXIDE	mg/kg	7/10	0.0086	0.064	mg/kg	Gamma	95% KM (BCA) UCL	0.020
Inorganics								
ALUMINUM	mg/kg	10/10	5,966	10,000	mg/kg	Nonparametric	95% Chebyshev UCL	10,000 [4]
ARSENIC	mg/kg	10/10	9.07	16.9	mg/kg	Normal	95% Student's-t UCL	11.4
BARIUM	mg/kg	10/10	72.4	244	mg/kg	Gamma	95% Approximate Gamma UCL	141
CHROMIUM	mg/kg	10/10	12.40	23.8	mg/kg	Normal	95% Student's-t UCL	15.99
COBALT	mg/kg	10/10	7.09	11.2	mg/kg	Nonparametric	95% Chebyshev UCL	11.2 [4]
IRON	mg/kg	10/10	13,028	20,300	mg/kg	Nonparametric	95% Chebyshev UCL	20,300 [4]
MANGANESE	mg/kg	10/10	446	701	mg/kg	Normal	95% Student's-t UCL	571
MERCURY	mg/kg	10/10	0.177	0.598	mg/kg	Gamma	95% Approximate Gamma UCL	0.326

Footnotes:

1. EPC for construction workers and residents under CTE scenario.
2. EPC for construction workers and residents under RME scenario.
3. EPC for all receptors except for construction workers and residents under RME and CTE scenarios.
4. 95% UCL exceeds the maximum detection. Therefore, EPC is the maximum detection.

TABLE 6-6

EXPOSURE POINT CONCENTRATION SUMMARY - SUBSURFACE SOIL
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site

Chemical of Potential Concern	Units	# Detects/ # Samples	Arithmetic Mean [1]	Maximum Detection [2]	EPC Units	Dataset Distribution	95% UCL of the Mean Statistic	95% UCL [3]
PAHs/Semivolatile Organic Compounds								
BAP EQUIVALENT	mg/kg	10/10	1.777	10.609	mg/kg	Gamma	95% Adjusted Gamma	6.302
NAPHTHALENE	mg/kg	10/10	0.128	0.439	mg/kg	Gamma	95% Approximate Gamma	0.326
PCBs								
AROCLOR-1254	mg/kg	4/5	0.197	0.799	mg/kg	Gamma	95% KM (Chebyshev)	0.877
Inorganics								
ALUMINUM	mg/kg	10/10	6717	11700	mg/kg	Normal	95% Student's t	8924
ANTIMONY	mg/kg	6/10	0.95	4.24	mg/kg	Gamma	95% KM (BCA)	1.8
ARSENIC	mg/kg	10/10	11.6	25	mg/kg	Normal	95% Student's t	15.3
BARIUM	mg/kg	10/10	120	432	mg/kg	Gamma	95% Approximate Gamma	249
CADMIUM	mg/kg	10/10	1.82	7.31	mg/kg	Gamma	95% Approximate Gamma	4.2
CHROMIUM	mg/kg	10/10	20.6	60.8	mg/kg	Normal	95% Student's t	30.8
COBALT	mg/kg	10/10	8.45	17	mg/kg	Normal	95% Student's t	11.2
COPPER	mg/kg	10/10	105	362	mg/kg	Gamma	95% Approximate Gamma	222
IRON	mg/kg	10/10	15600	31400	mg/kg	Normal	95% Student's t	20260
MANGANESE	mg/kg	10/10	461	846	mg/kg	Normal	95% Student's t	594
MERCURY	mg/kg	10/10	0.45	1.99	mg/kg	Gamma	95% Approximate Gamma	1.14

Footnotes:

1. EPC for construction workers and residents under CTE scenario.
2. EPC for construction workers and residents under RME scenario.
3. EPC for all receptors except for construction workers and residents under RME and CTE scenarios.

TABLE 6-7

SUMMARY OF EXPOSURE
INPUT PARAMETERS, REASONABLE MAXIMUM EXPOSURES
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Exposure Parameter	Construction Worker	Maintenance/Occupational Worker	Adolescent Trespasser	Adult Trespasser	On-Site Child Resident	On-Site Adult Resident
All Exposures						
C_{soil}/C_{sed} (mg/kg)	Maximum [1]	Maximum or 95% UCL [1]	Maximum or 95% UCL [1]	Maximum or 95% UCL [1]	Maximum [1]	Maximum [1]
ED (years)	1[2]	25[3]	10[4]	24[5]	6[5]	24[5]
BW (kg)	70[5]	70[5]	42[6]	70[5]	15[5]	70[5]
AT_n (days)	42[7]	9,125[8]	3,650[8]	8,760[8]	2,190[8]	8,760[8]
AT_c (days)	25,550[8]	25,550[8]	25,550[8]	25,550[8]	25,550[8]	25,550[8]
Incidental Ingestion/Dermal Contact with Soil						
IR (mg/day)	330[9]	100[5]	100[5]	100[5]	200[5]	100[5]
EF-Soil (days/year)	30[7]	250[5]	26[10]	26[10]	350[5]	350[5]
FI (unitless)	1[5]	1[5]	1[5]	1[5]	1[5]	1[5]
SA (cm^2/day)	3,300[11]	3,300[11]	3,280[6]	3,300[11]	2,800[11]	5,700[11]
AF (mg/cm^2)	0.3[11]	0.2[11]	0.2[11]	0.2[11]	0.2[11]	0.07[11]
ABS (unitless)	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]
CF (kg/mg)	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06
Inhalation Fugitive Dust/Volatile Emissions from Soil						
C_{air} (mg/m^3)	calculated[9]	calculated[9]	calculated[11]	calculated[9]	calculated[9]	calculated[9]
ET (hours/day)	8[12]	8[7]	2[2]	2[2]	24[6]	24[9]
EF-Soil (days/year)	30[7]	250[5]	26[10]	26[10]	350[5]	350[5]
PEF (m^3/kg)	1.24E+8[7]	1.24E+9[7]	1.32E+9[7]	1.32E+9[7]	1.32E+9[7]	1.32E+9[7]

Notes:

A	Skin surface area available for contact	EF	Exposure frequency
ABS	Absorption factor	ET	Exposure time
AF	Soil-to-skin adherence factor	EV	Event frequency
AT_c	Averaging time for carcinogenic effects	FI	Fraction ingested from contaminated source
AT_n	Averaging time for non-carcinogenic effects	InhR	Inhalation rate
B	Bunge Model partitioning coefficient	IR	Ingestion rate (soil or groundwater)
BW	Body weight	K_p	Permeability coefficient from water through skin
CF	Conversion factor	SA	Skin surface area available for contact

TABLE 6-7

SUMMARY OF EXPOSURE
INPUT PARAMETERS, REASONABLE MAXIMUM EXPOSURES
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

IR	Ingestion rate	PEF	Particulate emission factor
$C_{soil/sed}$	Exposure concentration for soil/sediment	τ	Lag time
C_{air}	Exposure concentration for air	t^*	Time it takes to reach steady-state conditions
ED	Exposure duration	t_{event}	Duration of event

1 - U.S. EPA, 2002b. Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.
2 - Professional judgment.
3 - U.S. EPA, 1991: Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. OSWER Directive 9285.6-03.
4 - Adolescents ages 7 to 16 years old.
5 - U.S. EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.
6 - U.S. EPA, 1997a: Exposure Factors Handbook. EPA/600/8-95/002FA.
7 - Illinois EPA, February 2013. 35 IAC 742 Tiered Approach to Corrective Action Objectives (TACO). Appendix C, Table B SSL Parameters
8 - U.S. EPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.
9 - U.S. EPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9365.4-24.
10 - One day a week in warm weather months.
11 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. PA/540/R/99/005.
12 - Assume an 8-hour work shift.

TABLE 6-8

SUMMARY OF EXPOSURE
INPUT PARAMETERS, CENTRAL TENDENCY EXPOSURES
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Exposure Parameter	Construction Worker	Maintenance/Occupational Worker	Adolescent Trespasser	Adult Trespasser	On-Site Child Resident	On-Site Adult Resident
All Exposures						
C_{soil}/C_{sed} (mg/kg)	Average	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Average	Average
ED (years)	1[2]	9[3]	10[4]	7[3]	2[3]	7[3]
BW (kg)	70[3]	70[3]	42[5]	70[3]	15[3]	70[3]
AT_n (days)	42[6]	3,285[7]	3,650[7]	2,555[7]	730[7]	2,555[7]
AT_c (days)	25,550[7]	25,550[7]	25,550[7]	25,550[7]	25,550[7]	25,550[7]
Incidental Ingestion/Dermal Contact with Soil						
IR (mg/day)	165[8]	50[6]	50[6]	50[6]	100[8]	50[8]
EF-Soil (days/year)	30[6]	219[3]	13[8]	13[8]	234[3]	234[3]
FI (unitless)	1[3]	1[3]	1[3]	1[3]	1[3]	1[3]
SA (cm^2/day)	3,300[9]	3,300[9]	3,100[5]	3,300[9]	2,800[9]	5,700[9]
AF (mg/cm^2)	0.1[9]	0.02[9]	0.04[9]	0.02[9]	0.04[9]	0.01[9]
ABS (unitless)	chemical-specific[9]	chemical-specific[9]	chemical-specific[9]	chemical-specific[9]	chemical-specific[9]	chemical-specific[9]
CF (kg/mg)	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06
Inhalation Fugitive Dust/Volatile Emissions from Soil						
C_{air} (mg/m^3)	calculated[10]	calculated[10]	calculated[10]	calculated[10]	calculated[10]	calculated[10]
ET (hours/day)	4[8]	4[6]	1[6]	1[6]	24[5]	24[10]
EF-Soil (days/year)	30[6]	219[3]	13[8]	13[8]	234[3]	234[3]
PEF (m^3/kg)	1.24E+8[6]	1.24E+9[6]	1.32E+9[6]	1.32E+9[6]	1.32E+9[6]	1.32E+9[6]

Notes:

A	Skin surface area available for contact	EF	Exposure frequency
ABS	Absorption factor	ET	Exposure time
AF	Soil-to-skin adherence factor	EV	Event frequency
AT_c	Averaging time for carcinogenic effects	FI	Fraction ingested from contaminated source
AT_n	Averaging time for non-carcinogenic effects	InhR	Inhalation rate
B	Bunge Model partitioning coefficient	IR	Ingestion rate (soil or groundwater)
BW	Body weight	K_p	Permeability coefficient from water through skin
CF	Conversion factor	SA	Skin surface area available for contact

TABLE 6-8

SUMMARY OF EXPOSURE
INPUT PARAMETERS, CENTRAL TENDENCY EXPOSURES
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

IR	Ingestion rate	PEF	Particulate emission factor
$C_{soil/sed}$	Exposure concentration for soil/sediment	τ	Lag time
C_{air}	Exposure concentration for air	t*	Time it takes to reach steady-state conditions
ED	Exposure duration	t_{event}	Duration of event

1 - U.S. EPA, 2002b. Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.
2 - Professional judgment.
3 - U.S. EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.
4 - Adolescents ages 7 to 16 years old.
5 - U.S. EPA, 1997a: Exposure Factors Handbook. EPA/600/8-95/002FA.
6 - Illinois EPA, February 2013. 35 IAC 742 Tiered Approach to Corrective Action Objectives (TACO). Appendix C, Table B SSL Parameters
7 - U.S. EPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.
8 - Central tendency exposure is assumed to be one-half the reasonable maximum exposure value.
9 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. PA/540/R/99/005.
10 - U.S. EPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9365.4-24.

TABLE 6-9

NON-CANCER TOXICITY DATA - ORAL/DERMAL
SITE 12 - HARBOR DREDGE SPOILS AREA
NAVAL STATION GREAT LAKES, ILLINOIS

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source	Date
Semivolatile Organic Compounds										
BENZO(A)PYRENE EQUIVALENTS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NAPHTHALENE	Subchronic	6.0E-01	mg/kg/day	1	6.0E-01	mg/kg/day	Body Weight	90/1	ATSDR	9/2005
	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Body Weight	3000/1	IRIS	1/28/2013
Pesticides/PCBs										
AROCLOR 1254	Subchronic	3.0E-05	mg/kg/day	1	3.0E-05	mg/kg/day	Central Nervous System	300/1	ATSDR	11/2000
	Chronic	2.0E-05	mg/kg/day	1	2.0E-05	mg/kg/day	Immune System	300/1	IRIS	1/28/2013
ALPHA-CHLORDANE	Subchronic	6.00E-04	mg/kg/day	1	6.00E-04	mg/kg/day	Liver	NA	ATSDR	5/1994
	Chronic	5.00E-04	mg/kg/day	1	5.00E-04	mg/kg/day	Liver	300/1	IRIS	1/28/2013
GAMMA-CHLORDANE	Subchronic	6.00E-04	mg/kg/day	1	6.00E-04	mg/kg/day	Liver	NA	ATSDR	5/1994
	Chronic	5.00E-04	mg/kg/day	1	5.00E-04	mg/kg/day	Liver	300/1	IRIS	1/28/2013
HEPTACHLOR	Chronic	5.00E-04	mg/kg/day	1	5.00E-04	mg/kg/day	Liver	300/1	IRIS	1/28/2013
HEPTACHLOR EPOXIDE	Chronic	1.30E-05	mg/kg/day	1	1.30E-05	mg/kg/day	Liver	1000/1	IRIS	1/28/2013
Inorganics										
ALUMINUM	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	CNS	100	PPRTV	10/23/2006
ANTIMONY	Chronic	4.0E-04	mg/kg/day	0.15	6.0E-05	mg/kg/day	Blood	1000/1	IRIS	1/28/2013
ARSENIC	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, CVS	3/1	IRIS	1/28/2013
BARIUM	Chronic	2.0E-01	mg/kg/day	0.07	1.4E-02	mg/kg/day	Kidney	300	IRIS	1/28/2013
CADMIUM	Chronic	1.0E-03	mg/kg/day	0.025	2.5E-05	mg/kg/day	Kidney	10/1	IRIS	1/28/2013
CHROMIUM VI	Subchronic	2.0E-02	mg/kg/day	0.025	5.0E-04	mg/kg/day	None Reported	100/3	HEAST	9/1997
	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	None Reported	300/3	IRIS	1/28/2013
COBALT	Subchronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Thyroid	300/1	PPRTV	8/25/2008
	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Thyroid	3000/1	PPRTV	8/25/2008
COPPER	Chronic	4.0E-02	mg/kg/day	1	4.0E-02	mg/kg/day	GS	NA	HEAST	7/1997
IRON	Chronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	GS	1.5	PPRTV	8/25/2008
MANGANESE	Chronic	2.4E-02	mg/kg/day	0.04	9.6E-04	mg/kg/day	CNS	1/3	IRIS	1/28/2013
MERCURY[3]	Subchronic	2.0E-03	mg/kg/day	0.07	1.4E-04	mg/kg/day	CNS	100	ATSDR	3/1999
	Chronic	3.0E-04	mg/kg/day	0.07	2.1E-05	mg/kg/day	CNS	1000/1	IRIS	1/28/2013

Notes:

1 - USEPA, July 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.

3 - Values are for mercuric chloride.

Definitions:

ATSDR = Agency for Toxic Substances and Disease Registry

CNS = Central nervous system

CVS = Cardiovascular system

GS = Gastrointestinal System

HEAST= Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System

PPRTV = Provisional Peer Reviewed Toxicity Value

NA = Not applicable

TABLE 6-10

NON-CANCER TOXICITY DATA - INHALATION
SITE 12 - HARBOR DREDGE SPOILS AREA
NAVAL STATION GREAT LAKES, ILLINOIS

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units			Source(s)	Date(s)
Semivolatile Organic Compounds							
BENZO(A)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA
CHRYSENE	NA	NA	NA	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	NA	NA	NA
NAPHTHALENE	Chronic	3.0E-03	mg/m^3	Respiratory	3000/1	IRIS	1/28/2013
Pesticides/PCBs							
AROCLOR 1254	NA	NA	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	Chronic	7.00E-04	mg/m^3	Liver	1000/1	IRIS	1/28/2013
GAMMA-CHLORDANE	Chronic	7.00E-04	mg/m^3	Liver	1000/1	IRIS	1/28/2013
HEPTACHLOR	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	NA	NA
Inorganics							
ALUMINUM	Chronic	5.0E-03	mg/m^3	CNS	300	NCEA	10/23/2006
ANTIMONY	NA	NA	NA	NA	NA	NA	NA
ARSENIC	Chronic	1.50E-05	mg/m^3	NA	NA	Cal EPA(1)	9/2009
BARIUM	Subchronic	5.0E-03	mg/m^3	Fetus	100	HEAST	7/1997
	Chronic	5.0E-04	mg/m^3	CVS	1000/1	HEAST	7/1997
CADMIUM	Chronic	2.0E-05	mg/m3	Kidney, Respiratory	NA	Cal EPA(1)	9/2009
CHROMIUM VI	Chronic	1.0E-04	mg/m^3	Respiratory	300/1	IRIS	1/28/2013
COBALT	Subchronic	2.0E-05	mg/m^3	Respiratory	100/1	PPRTV	8/25/2008
	Chronic	6.0E-06	mg/m^3	Respiratory	300/1	PPRTV	8/25/2008
COPPER	NA	NA	NA	NA	NA	NA	NA
IRON	NA	NA	NA	NA	NA	NA	NA
MANGANESE	Chronic	5.0E-05	mg/m^3	CNS	1000/1	IRIS	4/2009
MERCURY	Chronic	3.0E-04	mg/m^3	CNS	not available	Cal EPA(1)	9/2009

Notes:

Cal EPA(1) = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.

Definitions:

ATSDR = Agency for Toxic Substances and Disease Registry
CNS = Central Nervous System
CVS = Cardiovascular system
HEAST= Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
NA = Not Applicable
PPRTV = Provisional Peer Reviewed Toxicity Value

TABLE 6-11

CANCER TOXICITY DATA - ORAL/DERMAL
SITE 12 - HARBOR DREDGE SPOILS AREA
NAVAL STATION GREAT LAKES, ILLINOIS

Chemical of Potential Concern	Oral Cancer Slope Factor Value	Oral Cancer Slope Factor Units	Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2] Value	Absorbed Cancer Slope Factor for Dermal[2] Units	Weight of Evidence/ Cancer Guideline Description	Oral CSF Source	Oral CSF Date
Semivolatile Organic Compounds								
BENZO(A)PYRENE EQUIVALENTS[3]	7.3E+00	$(mg/kg/day)^{-1}$	1	7.3E+00	$(mg/kg/day)^{-1}$	B2	IRIS	1/28/2013
NAPHTHALENE	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides/PCBs								
AROCLOR 1254	2.0E+00	$(mg/kg/day)^{-1}$	1	2.0E+00	$(mg/kg/day)^{-1}$	B2	USEPA(2)	9/1996
ALPHA-CHLORDANE	3.5E-01	(mg/kg/day)-1	1	3.5E-01	(mg/kg/day)-1	B2	IRIS	1/28/2013
GAMMA-CHLORDANE	3.5E-01	(mg/kg/day)-1	1	3.5E-01	(mg/kg/day)-1	B2	IRIS	1/28/2013
HEPTACHLOR	4.5E+00	(mg/kg/day)-1	1	4.5E+00	(mg/kg/day)-1	B2	IRIS	1/28/2013
HEPTACHLOR EPOXIDE	9.1E+00	(mg/kg/day)-1	1	9.1E+00	(mg/kg/day)-1	B2	IRIS	1/28/2013
Inorganics								
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A	IRIS	1/28/2013
BARIUM	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	NA	NA	NA	NA	NA	NA	NA	NA
CHROMIUM[3]	5.0E-01	$(mg/kg/day)^{-1}$	0.025	2.0E+01	$(mg/kg/day)^{-1}$	D	NJDEP	4/8/2009
COBALT	NA	NA	NA	NA	NA	NA	NA	NA
COPPER	NA	NA	NA	NA	NA	NA	NA	NA
IRON	NA	NA	NA	NA	NA	NA	NA	NA
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA
MERCURY	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

1 - USEPA, 2004

2 - Adjusted dermal cancer slope factor = oral cancer slope factor/oral absorption efficiency for dermal

3 - Carcinogenic PAHs and hexavalent chromium are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

EPA Group:

A - Human carcinogen.

B1 - Probable human carcinogen - indicates that limited human data are available.

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans.

C - Possible human carcinogen.

D - Not classifiable as a human carcinogen.

E - Evidence of non-carcinogenicity.

Definitions:

IRIS = Integrated Risk Information System.

NA = Not available.

NJDEP = New Jersey Department of Environmental Protection.

USEPA(2) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

TABLE 6-12

CANCER TOXICITY DATA - INHALATION
SITE 12 - HARBOR DREDGE SPOILS AREA
NAVAL STATION GREAT LAKES, ILLINOIS

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[(1)]		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source	Date
Semivolatile Organic Compounds							
BENZO(A)PYRENE EQUIVALENTS	1.1E-03	$(ug/m^3)^{-1}$	3.9E+00	$(mg/kg/day)^{-1}$	B2	Cal EPA(1)	9/2009
NAPHTHALENE	3.4E-05	$(ug/m^3)^{-1}$	1.2E-01	$(mg/kg/day)^{-1}$	Carcinogenic potential cannot be determined	Cal EPA(2)	8/2004
Pesticides/PCBs							
AROCLOR 1254	5.7E-04	(ug/m^3)-1	2.0E+00	$(mg/kg/day)^{-1}$	B2	USEPA(2)	9/1996
ALPHA-CHLORDANE	1.0E-04	(ug/m^3)-1	3.5E-01	$(mg/kg/day)^{-1}$	B2	IRIS	1/28/2013
GAMMA-CHLORDANE	1.0E-04	(ug/m^3)-1	3.5E-01	$(mg/kg/day)^{-1}$	B2	IRIS	1/28/2013
HEPTACHLOR	1.3E-03	(ug/m^3)-1	4.6E+00	$(mg/kg/day)^{-1}$	B2	IRIS	1/28/2013
HEPTACHLOR EPOXIDE	2.6E-03	(ug/m^3)-1	9.1E+00	$(mg/kg/day)^{-1}$	B2	IRIS	1/28/2013
Inorganics							
ALUMINUM	NA	NA	NA	NA	NA	NA	NA
ARSENIC	4.3E-03	(ug/m^3)-1	1.5E+01	$(mg/kg/day)^{-1}$	A	IRIS	1/28/2013
BARIUM	NA	NA	NA	NA	NA	NA	NA
CADMIUM	1.8E-03	$(ug/m^3)^{-1}$	6.3E+00	$(mg/kg/day)^{-1}$	B1	IRIS	1/28/2013
CHROMIUM	8.4E-02	$(ug/m^3)^{-1}$	2.9E+02	$(mg/kg/day)^{-1}$	A/Known human carcinogen	IRIS	1/28/2013
COBALT	9.0E-03	$(ug/m^3)^{-1}$	3.2E+01	$(mg/kg/day)^{-1}$	NA	PPRTV	8/25/2008
COPPER	NA	NA	NA	NA	NA	NA	NA
IRON	NA	NA	NA	NA	NA	NA	NA
MANGANESE	NA	NA	NA	NA	NA	NA	NA
MERCURY	NA	NA	NA	NA	NA	NA	NA

1 - Inhalation CSF = Unit Risk * 70 kg / $20m^3$/day.

Definitions:

IRIS = Integrated Risk Information System.

PPRTV = Provisional Peer Reviewed Toxicity Value

Cal EPA(1) = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.

Cal EPA(2) = Air Toxic Hot Spots: Adoption of a Unit Risk Value for Naphthalene, August 2004.

USEPA(2) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

A - Human carcinogen.

B1 - Probable human carcinogen - indicates that limited human data are available.

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .

C - Possible human carcinogen.

D - Not classifiable as a human carcinogen.

E - Evidence of non-carcinogenicity.

TABLE 6-13

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATON GREAT LAKES
GREAT LAKES, ILLINOIS

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10^{-4}	Chemicals with Cancer Risks > 10^{-5} and ≤ 10^{-4}	Chemicals with Cancer Risks > 10^{-6} and ≤ 10^{-5}	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Construction Worker	Surface Soil	Incidental Ingestion	3E-07	--	--	--	0.4	--
		Dermal Contact	5E-08	--	--	--	0.03	--
		Inhalation	7E-09	--	--	--	0.03	--
		Total	3E-07	--	--	--	0.5	--
	Subsurface Soil	Incidental Ingestion	7E-07	--	--	--	0.7	--
		Dermal Contact	2E-07	--	--	--	0.07	--
		Inhalation	2E-08	--	--	--	0.04	--
		Total	9E-07	--	--	--	0.8	--
Occupational/Maintenance Worker	Surface Soil	Incidental Ingestion	1E-05	--	--	BENZO(A)PYRENE EQUIVALENTS, ARSENIC, CHROMIUM VI	0.1	--
		Dermal Contact	5E-06	--	--	BENZO(A)PYRENE EQUIVALENTS	0.02	--
		Inhalation	1E-07	--	--	--	0.003	--
		Total	2E-05	--	--	BENZO(A)PYRENE EQUIVALENTS, ARSENIC, CHROMIUM VI	0.2	--
	Subsurface Soil	Incidental Ingestion	3E-05	--	BENZO(A)PYRENE EQUIVALENTS	ARSENIC, CHROMIUM VI	0.2	--
		Dermal Contact	2E-05	--	--	BENZO(A)PYRENE EQUIVALENTS, ARSENIC	0.05	--
		Inhalation	2E-07	--	--	--	0.004	--
		Total	4E-05	--	BENZO(A)PYRENE EQUIVALENTS	ARSENIC, CHROMIUM VI	0.3	--
Adolescent Trespasser	Surface Soil	Incidental Ingestion	2E-06	--	--	--	0.02	--
		Dermal Contact	7E-07	--	--	--	0.003	--
		Inhalation	3E-09	--	--	--	0.00007	--
		Total	2E-06	--	--	--	0.03	--

TABLE 6-13

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATON GREAT LAKES
GREAT LAKES, ILLINOIS

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10^{-4}	Chemicals with Cancer Risks > 10^{-5} and ≤ 10^{-4}	Chemicals with Cancer Risks > 10^{-6} and ≤ 10^{-5}	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Adult Trespasser	Surface Soil	Incidental Ingestion	2E-06	--	--	--	0.01	--
		Dermal Contact	1E-06	--	--	--	0.002	--
		Inhalation	6E-09	--	--	--	0.00007	--
		Total	3E-06	--	--	BENZO(A)PYRENE EQUIVALENTS	0.02	--
Child Residents	Surface Soil	Incidental Ingestion	2E-04	--	BENZO(A)PYRENE EQUIVALENTS, ARSENIC, CHROMIUM VI	--	2	Target Organs HI < 1
		Dermal Contact	4E-05	--	BENZO(A)PYRENE EQUIVALENTS	ARSENIC	0.1	--
		Inhalation	7E-07	--	--	--	0.01	--
		Total	2E-04	--	BENZO(A)PYRENE EQUIVALENTS, ARSENIC, CHROMIUM VI	ALPHA-CHLORDANE	2	Target Organs HI < 1
	Subsurface Soil	Incidental Ingestion	7E-04	BENZO(A)PYRENE EQUIVALENTS, CHROMIUM VI	ARSENIC	AROCLOR-1254	4	Target Organs HI < 1
		Dermal Contact	2E-04	BENZO(A)PYRENE EQUIVALENTS	--	ARSENIC	0.3	--
		Inhalation	2E-06	--	--	CHROMIUM VI	0.02	--
		Total	8E-04	BENZO(A)PYRENE EQUIVALENTS, CHROMIUM VI	ARSENIC	AROCLOR-1254	4	Target Organs HI < 1

TABLE 6-13

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATON GREAT LAKES
GREAT LAKES, ILLINOIS

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10^{-4}	Chemicals with Cancer Risks > 10^{-5} and ≤ 10^{-4}	Chemicals with Cancer Risks > 10^{-6} and ≤ 10^{-5}	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Adult Residents	Surface Soil	Incidental Ingestion	3E-05	--	--	BENZO(A)PYRENE EQUIVALENTS, ARSENIC, CHROMIUM VI	0.2	--
		Dermal Contact	9E-06	--	--	BENZO(A)PYRENE EQUIVALENTS	0.02	--
		Inhalation	1E-06	--	--	--	0.01	--
		Total	4E-05	--	BENZO(A)PYRENE EQUIVALENTS	ARSENIC, CHROMIUM VI	0.3	--
	Subsurface Soil	Incidental Ingestion	1E-04	--	BENZO(A)PYRENE EQUIVALENTS, CHROMIUM VI	ARSENIC	0.4	--
		Dermal Contact	4E-05	--	BENZO(A)PYRENE EQUIVALENTS	ARSENIC	0.05	--
		Inhalation	2E-06	--	--	CHROMIUM VI	0.02	--
		Total	1E-04	--	BENZO(A)PYRENE EQUIVALENTS, CHROMIUM VI	ARSENIC	0.5	--

TABLE 6-13

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATON GREAT LAKES
GREAT LAKES, ILLINOIS

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10^{-4}	Chemicals with Cancer Risks > 10^{-5} and ≤ 10^{-4}	Chemicals with Cancer Risks > 10^{-6} and ≤ 10^{-5}	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Lifelong (Child and Adult)	Surface Soil	Incidental Ingestion	2E-04	--	BENZO(A)PYRENE EQUIVALENTS, ARSENIC, CHROMIUM VI	ALPHA-CHLORDANE, HEPTACHLOR	NA	--
		Dermal Contact	4E-05	--	BENZO(A)PYRENE EQUIVALENTS	ARSENIC	NA	--
		Inhalation	2E-06	--	--	CHROMIUM VI	NA	--
		Total	3E-04	--	BENZO(A)PYRENE EQUIVALENTS, ARSENIC, CHROMIUM VI	ALPHA-CHLORDANE, GAMMA-CHLORDANE, HEPTACHLOR	NA	--
	Subsurface Soil	Incidental Ingestion	8E-04	BENZO(A)PYRENE EQUIVALENTS, CHROMIUM VI	ARSENIC	ARCLOR-1254	NA	--
		Dermal Contact	2E-04	BENZO(A)PYRENE EQUIVALENTS	--	ARSENIC	NA	--
		Inhalation	4E-06	--	--	CHROMIUM VI	NA	--
		Total	1E-03	BENZO(A)PYRENE EQUIVALENTS, CHROMIUM VI	ARSENIC	ARCLOR-1254	NA	--

NA = Not applicable

TABLE 6-14

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATON GREAT LAKES
GREAT LAKES, ILLINOIS

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10^{-4}	Chemicals with Cancer Risks > 10^{-5} and ≤ 10^{-4}	Chemicals with Cancer Risks > 10^{-6} and ≤ 10^{-5}	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Construction Worker	Surface Soil	Incidental Ingestion	6E-08	--	--	--	0.1	--
		Dermal Contact	7E-09	--	--	--	0.004	--
		Inhalation	2E-07	--	--	--	0.01	--
		Total	7E-08	--	--	--	0.1	--
	Subsurface Soil	Incidental Ingestion	9E-08	--	--	--	0.2	--
		Dermal Contact	1E-08	--	--	--	0.007	--
		Inhalation	3E-09	--	--	--	0.01	--
		Total	1E-07	--	--	--	0.2	--
Occupational/Maintenance Worker	Surface Soil	Incidental Ingestion	2E-06	--	--	--	0.06	--
		Dermal Contact	2E-07	--	--	--	0.001	--
		Inhalation	2E-08	--	--	--	0.001	--
		Total	2E-06	--	--	--	0.06	--
	Subsurface Soil	Incidental Ingestion	4E-06	--	--	BENZO(A)PYRENE EQUIVALENTS	0.09	--
		Dermal Contact	5E-07	--	--	--	0.004	--
		Inhalation	3E-08	--	--	--	0.002	--
		Total	5E-06	--	--	BENZO(A)PYRENE EQUIVALENTS	0.1	--
Adolescent Trespasser	Surface Soil	Incidental Ingestion	4E-07	--	--	--	0.006	--
		Dermal Contact	7E-08	--	--	--	0.0003	--
		Inhalation	7E-10	--	--	--	0.00002	--
		Total	5E-07	--	--	--	0.006	--
Adult Trespasser	Surface Soil	Incidental Ingestion	2E-07	--	--	--	0.004	--
		Dermal Contact	2E-08	--	--	--	0.00008	--
		Inhalation	5E-10	--	--	--	0.00002	--
		Total	2E-07	--	--	--	0.004	--

TABLE 6-14

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATON GREAT LAKES
GREAT LAKES, ILLINOIS

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks $> 10^{-4}$	Chemicals with Cancer Risks $> 10^{-5}$ and $\leq 10^{-4}$	Chemicals with Cancer Risks $> 10^{-6}$ and $\leq 10^{-5}$	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Child Residents	Surface Soil	Incidental Ingestion	1E-05	--	--	BENZO(A)PYRENE EQUIVALENTS, ARSENIC, CHROMIUM VI	0.4	--
		Dermal Contact	8E-07	--	--	--	0.005	--
		Inhalation	1E-07	--	--	--	0.006	--
		Total	1E-05	--	--	BENZO(A)PYRENE EQUIVALENTS, ARSENIC, CHROMIUM VI	0.4	--
	Subsurface Soil	Incidental Ingestion	2E-05	--	--	BENZO(A)PYRENE EQUIVALENTS, ARSENIC, CHROMIUM VI	0.5	--
		Dermal Contact	2E-06	--	--	--	0.01	--
		Inhalation	2E-07	--	--	--	0.007	--
		Total	2E-05	--	--	BENZO(A)PYRENE EQUIVALENTS, ARSENIC, CHROMIUM VI	0.6	--
Adult Residents	Surface Soil	Incidental Ingestion	1E-06	--	--	--	0.04	--
		Dermal Contact	9E-08	--	--	--	0.0006	--
		Inhalation	8E-08	--	--	--	0.006	--
		Total	1E-06	--	--	--	0.05	--
	Subsurface Soil	Incidental Ingestion	2E-06	--	--	--	0.06	--
		Dermal Contact	2E-07	--	--	--	0.001	--
		Inhalation	1E-07	--	--	--	0.007	--
		Total	2E-06	--	--	--	0.07	--

TABLE 6-14

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATON GREAT LAKES
GREAT LAKES, ILLINOIS

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks $> 10^{-4}$	Chemicals with Cancer Risks $> 10^{-5}$ and $\leq 10^{-4}$	Chemicals with Cancer Risks $> 10^{-6}$ and $\leq 10^{-5}$	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Lifelong (Child and Adult)	Surface Soil	Incidental Ingestion	1E-05	--	--	BENZO(A)PYRENE EQUIVALENTS, ARSENIC, CHROMIUM VI	NA	--
		Dermal Contact	9E-07	--	--	--	NA	--
		Inhalation	2E-07	--	--	--	NA	--
		Total	1E-05	--	--	BENZO(A)PYRENE EQUIVALENTS, ARSENIC, CHROMIUM VI	NA	--
	Subsurface Soil	Incidental Ingestion	2E-05	--	--	BENZO(A)PYRENE EQUIVALENTS, ARSENIC, CHROMIUM VI	NA	--
		Dermal Contact	2E-06	--	--	BENZO(A)PYRENE EQUIVALENTS	NA	--
		Inhalation	3E-07	--	--	--	NA	--
		Total	2E-05	--	--	BENZO(A)PYRENE EQUIVALENTS, ARSENIC, CHROMIUM VI	NA	--

NA = Not applicable

TABLE 6-15

HUMAN HEALTH SURFACE SOIL MIGRATION TO GROUNDWATER SCREENING ASSESSMENT
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS #	Minimum Result	Maximum Result[1]	Average Positive Result	Overall Average	Illinois Background Levels[2]	TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[3,4]	NON-TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[5]	USEPA Risk Based SSLs - Migration from Soil to Groundwater[6]	USEPA Risk Based SSLs - Migration from Soil to Groundwater with a DAF of 15[6]	USEPA MCL Based SSLs - Migration from Soil to Groundwater[6]	USEPA MCL Based SSLs - Migration from Soil to Groundwater with a DAF of 15[6]
SEMIVOLATILES (ug/kg)												
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	149 J	149 J	149	185	NC	3600000	NC	1100	16500	1400	21000
CARBAZOLE	86-74-8	167 J	254 J	211	192	NC	600	NC	NC	NC	NC	NC
DIBENZOFURAN	132-64-9	144 J	144 J	144	184	NC	NC	3000	**110**	1650	NC	NC
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/kg)												
2-METHYLNAPHTHALENE	91-57-6	4.77 J	87.9	33.7	33.7	140	NC	1900	140	2100	NC	NC
ACENAPHTHENE	83-32-9	2.96 J	205	49.5	49.5	**130**	570000	NC	4100	61500	NC	NC
ACENAPHTHYLENE	208-96-8	4.21 J	98.1	51.9	42.3	**70**	NC	85000	4100[7]	61500	NC	NC
ANTHRACENE	120-12-7	8.45	606	206	206	**400**	12000000	NC	42000	630000	NC	NC
BAP EQUIVALENT	NA	33.0	2084	896	896	2100	8000	NC	**3.5**	**52.5**	**240**	4800
BENZO(A)ANTHRACENE	56-55-3	29.3	1830	573	573	**1800**	2000	NC	**10**	**150**	NC	NC
BENZO(A)PYRENE	50-32-8	21.8	1460	618	618	2100	8000	NC	**3.5**	**52.5**	**240**	3600
BENZO(B)FLUORANTHENE	205-99-2	31.8	2260	748	748	**2100**	5000	NC	**35**	**525**	NC	NC
BENZO(G,H,I)PERYLENE	191-24-2	13.5	711	290	290	1700	NC	27000000	9500[8]	142500	NC	NC
BENZO(K)FLUORANTHENE	207-08-9	14.1 J	2280	543	543	**1700**	49000	NC	**350**	5250	NC	NC
CHRYSENE	218-01-9	38.5	1530	529	529	2700	160000	NC	**1100**	16500	NC	NC
DIBENZO(A,H)ANTHRACENE	53-70-3	14	287	125	113	420	2000	NC	**11**	**165**	NC	NC
FLUORANTHENE	206-44-0	74.3	4290	1330	1330	**4100**	4300000	NC	70000	1050000	NC	NC
FLUORENE	86-73-7	5.63 J	254	69.5	62.9	**180**	560000	NC	4000	60000	NC	NC
INDENO(1,2,3-CD)PYRENE	193-39-5	12.8	674	276	276	1600	14000	NC	**200**	3000	NC	NC
NAPHTHALENE	91-20-3	4.25 J	91.5	30.2	30.2	200	12000	NC	**0.47**	**7.05**	NC	NC
PHENANTHRENE	85-01-8	56.4	2370	732	732	2500	NC	210000	9500[8]	142500	NC	NC
PYRENE	129-00-0	66	3190	1100	1100	**3000**	4200000	NC	9500	142500	NC	NC
PESTICIDES (ug/kg)												
4,4'-DDD	72-54-8	2.92	195	38.8	38.8	NC	16000	NC	**6.4**	**96**	NC	NC
4,4'-DDE	72-55-9	1.29	197	77.8	77.8	NC	54000	NC	**46**	690	NC	NC
4,4'-DDT	50-29-3	1.28 J	282	89.0	80.2	NC	32000	NC	**67**	1005	NC	NC
ALDRIN	309-00-2	0.374 J	20.8	5.0	2.7	NC	500	NC	**0.65**	**9.75**	NC	NC
ALPHA-BHC	319-84-6	0.509 J	1.1	0.75	0.49	NC	**0.5**	NC	**0.036**	**0.54**	NC	NC
ALPHA-CHLORDANE	5103-71-9	0.14 J	3220	353	353	NC	10000	NC	**13**	**195**	**140**	**2100**
BETA-BHC	319-85-7	0.702 J	6.55	3.6	1.0	NC	NC	NC	**0.13**	**1.95**	NC	NC
DELTA-BHC[9]	319-86-8	0.151 J	4.65	1.7	1.6	NC	**0.5**	NC	**0.036**	**0.54**	NC	NC
DIELDRIN	60-57-1	0.246 J	16.6	3.1	2.6	NC	**4**	NC	**0.061**	**0.915**	NC	NC
ENDOSULFAN I[10]	959-98-8	1.17	36.8	13.5	4.3	NC	18000	NC	1100	16500	NC	NC
ENDOSULFAN II[10]	33213-65-9	0.24 J	53.5	8.3	5.9	NC	18000	NC	1100	16500	NC	NC
ENDOSULFAN SULFATE[10]	1031-07-8	0.691 J	12.1	4.0	2.2	NC	18000	NC	1100	16500	NC	NC
ENDRIN	72-20-8	0.74 J	22.6	8.4	6.0	NC	1000	NC	68	1020	81	1215
ENDRIN ALDEHYDE[11]	7421-93-4	0.66 J	19.5	4.6	2.9	NC	1000	NC	68	1020	81	1215
ENDRIN KETONE[11]	53494-70-5	1.14	1.14	1.1	0.45	NC	1000	NC	68	1020	81	1215
GAMMA-BHC (LINDANE)	58-89-9	0.144 J	0.6 J	0.39	0.38	NC	9	NC	**0.21**	3.15	1.2	18
GAMMA-CHLORDANE	5103-74-2	0.309 J	2600	281	281	NC	10000	NC	**13**	**195**	**140**	**2100**
HEPTACHLOR	76-44-8	0.18 J	236	60.6	24.4	NC	23000	NC	**0.14**	**2.1**	**33**	495
HEPTACHLOR EPOXIDE	1024-57-3	0.122 J	64	12.1	8.6	NC	700	NC	**0.068**	**1.02**	**4.1**	**61.5**
METHOXYCHLOR	72-43-5	0.383 J	3.04 J	1.3	0.66	NC	160000	NC	1500	22500	2200	33000

TABLE 6-15

HUMAN HEALTH SURFACE SOIL MIGRATION TO GROUNDWATER SCREENING ASSESSMENT
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS #	Minimum Result	Maximum Result[1]	Average Positive Result	Overall Average	Illinois Background Levels[2]	TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[3,4]	NON-TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[5]	USEPA Risk Based SSLs - Migration from Soil to Groundwater[6]	USEPA Risk Based SSLs - Migration from Soil to Groundwater with a DAF of 15[6]	USEPA MCL Based SSLs - Migration from Soil to Groundwater[6]	USEPA MCL Based SSLs - Migration from Soil to Groundwater with a DAF of 15[6]
INORGANICS (mg/kg)												
ALUMINUM	7429-90-5	1250	10000	5970	5970	**9500**	NC	NC	23000	345000	NC	NC
ANTIMONY	7440-36-0	0.44 J	1.12 J	0.67	0.52	4	5 *	NC	**0.27**	4.05	**0.27**	4.05
ARSENIC	7440-38-2	4.28 J	16.9 J	9.1	9.1	**13**	30 *[14]	NC	**0.0013**	**0.0195**	**0.29**	**4.35**
BARIUM	7440-39-3	8.12 J	244 J	72.4	72.4	**110**	1800 *	NC	120	1800	**82**	1230
BERYLLIUM	7440-41-7	0.147 J	5.5	0.94	0.94	**0.59**	1000 *	NC	13	195	**3.2**	48
CADMIUM	7440-43-9	0.119 J	1.03 J	0.55	0.55	**0.6**	59 *	NC	**0.52**	7.8	**0.38**	5.7
CALCIUM	7440-70-2	24400	142000	71200	71200	**9300**	NC	NC	NC	NC	NC	NC
CHROMIUM[12]	7440-47-3	4.07 J	23.8 J	12.4	12.4	**16.2**	32 *	NC	**0.00059**	**0.00885**	180000[13]	2700000
COBALT	7440-48-4	2.08	11.2	7.1	7.1	**8.9**	NC	NC	**0.21**	**3.15**	NC	NC
COPPER	7440-50-8	6.55	271	68.4	68.4	**19.6**	330000 *	NC	**22**	330	**46**	690
IRON	7439-89-6	4710	20300	13000	13000	**15900**	NC	NC	**270**	**4050**	NC	NC
LEAD	7439-92-1	17.9 J	263 J	85.6	85.6	**36**	**107 ***	NC	NC	NC	**14**	**210**
MAGNESIUM	7439-95-4	11100	84600	39800	39800	**4820**	NC	NC	NC	NC	NC	NC
MANGANESE	7439-96-5	137	701	446	446	**636**	NC	NC	**21**	**315**	NC	NC
MERCURY	7439-97-6	0.0235 J	0.598	0.18	0.18	**0.06**	6.4 *	NC	**0.033**	**0.495**	**0.1**	1.5
NICKEL	7440-02-0	4.49	34.7	18.5	18.5	**18**	700 *	NC	20	300	NC	NC
POTASSIUM	7440-09-7	230 J	1640	1030	1030	**1268**	NC	NC	NC	NC	NC	NC
SELENIUM	7782-49-2	0.288 J	0.791	0.53	0.45	**0.48**	3.3 *	NC	**0.4**	6	**0.26**	3.9
SILVER	7440-22-4	0.234 J	1.33	0.55	0.47	**0.55**	39 *	NC	**0.6**	9	NC	NC
SODIUM	7440-23-5	75.3 J	336 J	201	201	**130**	NC	NC	NC	NC	NC	NC
THALLIUM	7440-28-0	0.167 J	0.167 J	0.17	0.24	0.32	3.4 *	NC	**0.011**	**0.165**	**0.14**	2.1
VANADIUM	7440-62-2	4.53	18.9	12.7	12.7	25.2	980 *	NC	63	945	NC	NC
ZINC	7440-66-6	44.7 J	1530 J	324	324	**95**	16000 *	NC	**290**	4350	NC	NC

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria or Illinois background values.
Shaded chemical name indicates that the maximum detected concentration exceeds one or more screening criteria and Illinois background values..
Bold, italicized chemical name indicates that maximum detection, although exceeding groundwater protection criterion, is lower than Illinois background.

Footnotes:

1 - The maximum detected concentration is used for screening purposes
2 - Illinois background values: Section 742 Appendix A, Tables G & H (Illinois EPA, 2013a).
3 - TACO values: Section 742 Appendix B, Table A, Tier 1 Soil Remediation Objectives for Residential Properties (Illinois EPA, 2013a). Unless otherwise noted.
4 - * values are pH dependent criteria (site-specific pH result of 7.58), Section 742 Appendix B, Table C (Illinois EPA, 2013a).
5 - Soil Remediation Objectives for Residential Properties, Non-TACO Chemicals (Illinois EPA, 2013a).
6 - USEPA RSL Soil Screening Level for the Protection of Groundwater (USEPA, 2013). Dilution Attenuation Factor (DAF) of 15; selected based on information from USEPA soil screening guidance (USEPA, 1996a) and a source area of 1.75 acres.
7 - Acenaphthene is used as a surrogate for acenaphthylene
8 - Pyrene is used as a surrogate for benzo(ghi)perylene and phenanthrene
9 - Alpha-BHC used as a surrogate for delta-BHC.
10 - Endosulfan is used as a surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
11 - Endrin is used as a surrogate for endrin aldehyde and endrin ketone.
12 - Hexavalent chromium is used as a surrogate for chromium.
13 - Value for total chromium.
14 - Forthcoming criteria revisions (not yet available) will decrease this value.

Definitions:

J = Estimated value
NC = No criteria
NA = not available/not applicable

TABLE 6-16

HUMAN HEALTH SUBSURFACE SOIL MIGRATION TO GROUNDWATER SCREENING ASSESSMENT
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS #	Minimum Result	Maximum Result[1]	Average Positive Result	Overall Average	Illinois Background Levels[2]	TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[3,4]	NON-TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[5]	USEPA Risk Based SSLs - Migration from Soil to Groundwater[6]	USEPA Risk Based SSLs - Migration from Soil to Groundwater with a DAF of 15[6]	USEPA MCL Based SSLs - Migration from Soil to Groundwater[6]	USEPA MCL Based SSLs - Migration from Soil to Groundwater with a DAF of 15[6]
SEMIVOLATILES (ug/kg)												
4-METHYLPHENOL	106-44-5	167 J	375 J	270	215	NC	NC	3900	1100	16500	NC	NC
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	201 J	201 J	201	193	NC	3600000	NC	1100	16500	1400	21000
CARBAZOLE	86-74-8	494 J	1080 J	787	311	NC	**600**	NC	NC	NC	NC	NC
DIBENZOFURAN	132-64-9	204 J	1140	570	306	NC	NC	3000	**110**	1650	NC	NC
PHENOL	108-95-2	99.7 J	99.7 J	99.7	184	NC	100000	NC	2600	39000	NC	NC
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/kg)												
2-METHYLNAPHTHALENE	91-57-6	3.31 J	545	144	144	**140**	NC	1900	**140**	2100	NC	NC
ACENAPHTHENE	83-32-9	5.87 J	1120	200	200	**130**	570000	NC	4100	61500	NC	NC
ACENAPHTHYLENE	208-96-8	3.67 J	253	61.9	50.3	**70**	NC	85000	4100[7]	61500	NC	NC
ANTHRACENE	120-12-7	19	5280	726	726	**400**	12000000	NC	42000	630000	NC	NC
BAP EQUIVALENT	NA	55.5	10609	1780	1780	**2100**	**8000**	NC	**3.5**	**52.5**	**240**	4800
BENZO(A)ANTHRACENE	56-55-3	41.3	9780	1510	1510	**1800**	**2000**	NC	**10**	**150**	NC	NC
BENZO(A)PYRENE	50-32-8	40.1	7740	1270	1270	**2100**	8000	NC	**3.5**	**52.5**	**240**	3600
BENZO(B)FLUORANTHENE	205-99-2	53.7	10300	1490	1490	**2100**	**5000**	NC	**35**	**525**	NC	NC
BENZO(G,H,I)PERYLENE	191-24-2	26.9	1110	351	351	1700	NC	27000000	9500[8]	142500	NC	NC
BENZO(K)FLUORANTHENE	207-08-9	25.7	2570	676	676	**1700**	49000	NC	**350**	5250	NC	NC
CHRYSENE	218-01-9	63	7940	1270	1270	**2700**	160000	NC	**1100**	16500	NC	NC
DIBENZO(A,H)ANTHRACENE	53-70-3	12	705	224	158	**420**	2000	NC	**11**	**165**	NC	NC
FLUORANTHENE	206-44-0	118	21100	3420	3420	**4100**	4300000	NC	70000	1050000	NC	NC
FLUORENE	86-73-7	10	2510	403	363	**180**	560000	NC	4000	60000	NC	NC
INDENO(1,2,3-CD)PYRENE	193-39-5	19.9	1330	367	367	1600	14000	NC	**200**	3000	NC	NC
NAPHTHALENE	91-20-3	4 J	439	128	128	**200**	12000	NC	**0.47**	**7.05**	NC	NC
PHENANTHRENE	85-01-8	75.4	20200	3030	3030	**2500**	NC	210000	**9500**[8]	142500	NC	NC
PYRENE	129-00-0	104	16800	2840	2840	**3000**	4200000	NC	**9500**	142500	NC	NC
PCBs (ug/kg)												
AROCLOR-1254	11097-69-1	29.8 J	799	245	198	NC	NC	NC	**8.8**	**132**	NC	NC
PESTICIDES (ug/kg)												
4,4'-DDD	72-54-8	2.37	1090	244	244	NC	16000	NC	**6.4**	**96**	NC	NC
4,4'-DDE	72-55-9	0.692 J	986 J	142	142	NC	54000	NC	**46**	**690**	NC	NC
4,4'-DDT	50-29-3	0.362 J	823	105	105	NC	32000	NC	**67**	1005	NC	NC
ALDRIN	309-00-2	0.463 J	17	4.2	2.3	NC	500	NC	**0.65**	**9.75**	NC	NC
ALPHA-BHC	319-84-6	0.172 J	1.05	0.75	0.5	NC	**0.5**	NC	**0.036**	**0.54**	NC	NC
ALPHA-CHLORDANE	5103-71-9	0.202 J	141	24.1	21.7	NC	10000	NC	**13**	195	**140**	2100
BETA-BHC	319-85-7	0.722 J	1.12	0.92	0.55	NC	NC	NC	**0.13**	1.95	NC	NC
DELTA-BHC[9]	319-86-8	0.164 J	6.05	1.4	1.2	NC	**0.5**	NC	**0.036**	**0.54**	NC	NC
DIELDRIN	60-57-1	0.321 J	13.4	4.3	3.1	NC	**4**	NC	**0.061**	**0.915**	NC	NC
ENDOSULFAN I[10]	959-98-8	0.194 J	4.51	2.2	1.3	NC	18000	NC	1100	16500	NC	NC
ENDOSULFAN II[10]	33213-65-9	0.28 J	5.63	2.0	1.3	NC	18000	NC	1100	16500	NC	NC

TABLE 6-16

HUMAN HEALTH SUBSURFACE SOIL MIGRATION TO GROUNDWATER SCREENING ASSESSMENT
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS #	Minimum Result	Maximum Result[1]	Average Positive Result	Overall Average	Illinois Background Levels[2]	TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[3,4]	NON-TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[5]	USEPA Risk Based SSLs - Migration from Soil to Groundwater[6]	USEPA Risk Based SSLs - Migration from Soil to Groundwater with a DAF of 15[6]	USEPA MCL Based SSLs - Migration from Soil to Groundwater[6]	USEPA MCL Based SSLs - Migration from Soil to Groundwater with a DAF of 15[6]
ENDOSULFAN SULFATE[10]	1031-07-8	0.204 J	3.95	2.2	1.1	NC	18000	NC	1100	16500	NC	NC
ENDRIN	72-20-8	0.235 J	12.9	5.8	4.2	NC	1000	NC	68	1020	81	1215
ENDRIN ALDEHYDE[11]	7421-93-4	0.953 J	10.9	4.0	2.2	NC	1000	NC	68	1020	81	1215
ENDRIN KETONE[11]	53494-70-5	0.715 J	0.715 J	0.72	0.42	NC	1000	NC	68	1020	81	1215
GAMMA-BHC (LINDANE)	58-89-9	0.346 J	3.61	1.5	0.72	NC	9	NC	**0.21**	**3.15**	**1.2**	18
GAMMA-CHLORDANE	5103-74-2	0.301 J	129	23.7	21.4	NC	10000	NC	**13**	195	140	2100
HEPTACHLOR	76-44-8	0.182 J	1.83	1.2	0.7	NC	23000	NC	**0.14**	2.1	33	495
HEPTACHLOR EPOXIDE	1024-57-3	0.213 J	7	2.2	1.6	NC	700	NC	**0.068**	**1.02**	**4.1**	61.5
METHOXYCHLOR	72-43-5	0.528 J	1.33	0.94	0.56	NC	160000	NC	1500	22500	2200	33000
INORGANICS (mg/kg)												
ALUMINUM	7429-90-5	1380	11700	6720	6720	**9500**	NC	NC	23000	345000	NC	NC
ANTIMONY	7440-36-0	0.297 J	4.24 J	1.4	1.0	**4**	5 *	NC	**0.27**	**4.05**	**0.27**	4.05
ARSENIC	7440-38-2	4.26 J	25 J	11.6	11.6	**13**	30 *[14]	NC	**0.0013**	**0.0195**	**0.29**	**4.35**
BARIUM	7440-39-3	6.73 J	432 J	120	120	**110**	1800 *	NC	**120**	1800	**82**	1230
BERYLLIUM	7440-41-7	0.154 J	1.02	0.52	0.87	**0.59**	1000 *	NC	13	195	3.2	48
CADMIUM	7440-43-9	0.119 J	7.31 J	1.8	1.8	**0.6**	59 *	NC	**0.52**	7.8	**0.38**	5.7
CALCIUM	7440-70-2	26800	85700 J	49800	49800	**9300**	NC	NC	NC	NC	NC	NC
CHROMIUM[12]	7440-47-3	4.65 J	60.8 J	20.6	20.6	**16.2**	**32***	NC	**0.00059**	**0.00885**	180000[13]	2700000
COBALT	7440-48-4	2.37	17	8.5	8.5	**8.9**	NC	NC	**0.21**	**3.15**	NC	NC
COPPER	7440-50-8	6.56	362	105	105	**19.6**	330000 *	NC	**22**	**330**	**46**	690
IRON	7439-89-6	4650	31400	15600	15600	**15900**	NC	NC	**270**	**4050**	NC	NC
LEAD	7439-92-1	26.6 J	845 J	200	200	**36**	**107 ***	NC	NC	NC	**14**	**210**
MAGNESIUM	7439-95-4	12000	42600 J	23400	23400	**4820**	NC	NC	NC	NC	NC	NC
MANGANESE	7439-96-5	143	846	461	461	**636**	NC	NC	**21**	**315**	NC	NC
MERCURY	7439-97-6	0.0327 J	1.99	0.45	0.45	**0.06**	6.4 *	NC	**0.033**	**0.495**	**0.1**	1.5
NICKEL	7440-02-0	4.36	88.6	28.8	28.8	**18**	700 *	NC	**20**	300	NC	NC
POTASSIUM	7440-09-7	205 J	2110	1140	1140	**1268**	NC	NC	NC	NC	NC	NC
SELENIUM	7782-49-2	0.214 J	6.57	1.7	1.5	**0.48**	**3.3 ***	NC	**0.4**	**6**	**0.26**	**3.9**
SILVER	7440-22-4	0.0931 J	22.3	6.4	4.5	**0.55**	39 *	NC	**0.6**	**9**	NC	NC
SODIUM	7440-23-5	84.7 J	270 J	160	160	**130**	NC	NC	NC	NC	NC	NC
VANADIUM	7440-62-2	4.78	25.9	15.3	15.3	**25.2**	980 *	NC	68	945	NC	NC
ZINC	7440-66-6	43.7 J	912 J	326	326	**95**	16000 *	NC	**290**	4350	NC	NC

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria or Illinois background values.
Shaded chemical name indicates that the maximum detected concentration exceeds one or more screening criteria and Illinois background values..
Bold, italicized chemical name indicates that maximum detection, although exceeding groundwater protection criterion, is lower than Illinois background.

Footnotes:

1 - The maximum detected concentration is used for screening purposes
2 - Illinois background values: Section 742 Appendix A, Tables G & H (Illinois EPA, 2013a).
3 - TACO values: Section 742 Appendix B, Table A, Tier 1 Soil Remediation Objectives for Residential Properties (Illinois EPA, 2013a). Unless otherwise noted.
4 - * values are pH dependent criteria (site-specific pH result of 7.58), Section 742 Appendix B, Table C (Illinois EPA, 2013a).
5 - Soil Remediation Objectives for Residential Properties, Non-TACO Chemicals (Illinois EPA, 2013a)
6 - USEPA RSL Soil Screening Level for the Protection of Groundwater (USEPA, 2013). Dilution Attenuation Factor (DAF) of 15; selected based on information from USEPA soil screening guidance (USEPA, 1996a) and a source area of 1.75 acres.
7 - Acenaphthene is used as a surrogate for acenaphthylene
8 - Pyrene is used as a surrogate for benzo(ghi)perylene and phenanthrene
9 - Alpha-BHC used as a surrogate for delta-BHC.
10 - Endosulfan is used as a surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
11 - Endrin is used as a surrogate for endrin aldehyde and endrin ketone.
12 - Hexavalent chromium is used as a surrogate for chromium.
13 - Value for total chromium.
14 - Forthcoming criteria revisions (not yet available) will decrease this value.

Definitions:

J = Estimated value
NC = No criteria
NA = not available/not applicable

TABLE 6-17

COMPARISON OF SUBSURFACE SOIL SAMPLES ANALYZED BY SPLP TO GROUNDWATER SCREENING VALUES
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	Frequency of Detection	Minimum Non Detected	Maximum Non Detected	Mininum Detected	Maximum Detected	Sample of Maximum Detected	Mean of All Samples	Mean of Positive Detects	Illinois EPA TACO values[1]
SPLP METALS (µg/L)									
ALUMINUM	8/8	-	-	41 J	10000 J	NTC12-SB33-0406	2890	2890	**3500[2]**
ANTIMONY	7/8	0.82	0.82	3.6 J	30 J	NTC12-SB32-0406	10.4	11.8	**6**
ARSENIC	7/8	0.5	0.5	1.9	16	NTC12-SB34-0406	6.6	7.5	**10[3]**
BARIUM	8/8	-	-	3.8 J	130 J	NTC12-SB33-0406	38.1	38.1	2000
BERYLLIUM	3/8	0.4	0.4	0.23 J	0.71 J	NTC12-SB33-0406	0.28	0.42	4
CADMIUM	7/8	0.1	0.1	0.042 J	4.8	NTC12-SB33-0406	0.91	1.0	5
CALCIUM	8/8	-	-	13000	180000	NTC12-SB34-0204	47900	47900	NC
CHROMIUM	8/8	-	-	0.77 J	46 J	NTC12-SB33-0406	11.6	11.6	100
COBALT	8/8	-	-	0.13 J	13 J	NTC12-SB33-0406	2.7	2.7	1000
COPPER	8/8	-	-	4.2	92 J	NTC12-SB33-0406	28.8	28.8	650
IRON	7/8	10	10	120	13000	NTC12-SB33-0406	3680	4200	**5000**
LEAD	7/8	0.5	0.5	0.84 J	150 J	NTC12-SB33-0406	39.6	45.2	**7.5**
MAGNESIUM	7/8	500	500	400 J	8900	NTC12-SB33-0406	3460	3910	NC
MANGANESE	8/8	-	-	0.24 J	360 J	NTC12-SB33-0406	88.6	88.6	**150**
MERCURY	4/8	0.1	0.1	0.067 J	1	NTC12-SB33-0406	0.23	0.4	2
NICKEL	8/8	-	-	0.92 J	53 J	NTC12-SB33-0406	12.6	12.6	100
POTASSIUM	8/8	-	-	1100	6000	NTC12-SB33-0406	2700	2700	NC
SELENIUM	2/8	1	1.6	2.1	3.6	NTC12-SB31-0507	1.1	2.9	50
SILVER	6/8	0.1	0.1	0.045 J	13	NTC12-SB33-0406	2.7	3.5	50
SODIUM	8/8	-	-	8700 J	24000 J	NTC12-SB34-0406	14600	14600	NC
THALLIUM	5/8	0.1	0.1	0.054 J	0.32 J	NTC12-SB33-0406	0.11	0.15	2
VANADIUM	8/8	-	-	0.74 J	32	NTC12-SB32-0204	10.6	10.6	49
ZINC	5/8	4	4.4	31 J	350 J	NTC12-SB33-0406	88.8	141	5000

Shaded chemical name and shaded criterion indicates that the maximum detected concentration exceeds screening criterion.
NC - No criteria available

1 - Illinois EPA TACO Soil to Groundwater Remediation Objectives (Illinois EPA, 2013a)
2 - TACO value not available; non-TACO value presented.
3 - 10 µg/L is the 35 IAC 620 Class I Groundwater Standard. Illinois EPA TACO is 50 µg/L.

TABLE 6-18

HUMAN HEALTH GROUNDWATER COPC SELECTION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	Minimum Concentration[1]	Maximum Concentration[1]	Sample of Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Adjusted USEPA Regional Screening Level - Tap Water[4]	USEPA MCL[5]	IAC - Class I[6]	IAC - Class II[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
DISSOLVED METALS (µg/L)												
ARSENIC	5.8	71	NTC12GW-04	3/4	1.1	71	**0.045 C**	**10**	**10**	200	**YES**	ASL
BARIUM	48	220	NTC12GW-04	4/4	--	220	290 N	2000	2000	2000	NO	BSL
CADMIUM	0.12 J	0.45	NTC12GW-01	2/4	0.1	0.45	0.69 N	5	5	50	NO	BSL
CALCIUM	130000	240000	NTC12GW-02	4/4	--	240000	NA	NA	NA	NA	NO	NUT
COBALT	0.21 J	9	NTC12GW-02	4/4	--	9	**0.47 N**	NA	1000	1000	**YES**	ASL
COPPER	0.66 J	7.4 J	NTC12GW-01	4/4	--	7.4	62 N	1300	650	650	NO	BSL
IRON	55	18000	NTC12GW-04	4/4	--	18000	**1100 N**	NA	**5000**	**5000**	**YES**	ASL
LEAD	0.22 J	0.22 J	NTC12GW-02	1/4	0.5	0.22	NA	15	7.5	100	NO	BSL
MAGNESIUM	52000	150000	NTC12GW-01	4/4	--	150000	NA	NA	NA	NA	NO	NUT
MANGANESE	240 J	670 J	NTC12GW-04	4/4	--	670	**32 N**	NA	**150**	10000	**YES**	ASL
NICKEL	0.59 J	48	NTC12GW-02	4/4	--	48	**30 N**	NA	100	2000	**YES**	ASL
POTASSIUM	5500	6900	NTC12GW-04	4/4	--	6900	NA	NA	NA	NA	NO	NUT
SILVER	0.056 J	0.077 J	NTC12GW-01	2/4	0.1	0.077	7.1 N	NA	50	NA	NO	BSL
SODIUM	63000	160000	NTC12GW-02	4/4	--	160000	NA	NA	NA	NA	NO	NUT
THALLIUM	0.029 J	0.055 J	NTC12GW-01	2/4	0.1	0.055	**0.016 N**	2	2	20	**YES**	ASL
ZINC	3.7 J	130	NTC12GW-02	4/4	--	130	470 N	NA	5000	10000	NO	BSL
METALS (µg/L)												
ALUMINUM	57 J	57 J	NTC12GW-04	1/4	50	57	1600 N	NA	NA	NA	NO	BSL
ARSENIC	5.3	78	NTC12GW-04	3/4	1	78	**0.045 C**	**10**	**10**	200	**YES**	ASL
BARIUM	45 J	240 J	NTC12GW-04	4/4	--	240	290 N	2000	2000	2000	NO	BSL
CADMIUM	0.054 J	0.39	NTC12GW-01	3/4	0.1	0.39	0.69 N	5	5	50	NO	BSL
CALCIUM	130000	240000	NTC12GW-02	4/4	--	240000	NA	NA	NA	NA	NO	NUT
CHROMIUM	0.24 J	0.81 J	NTC12GW-01	4/4	1	0.81	**0.031 C[8]**	100	100	1000	**YES**	ASL
COBALT	0.19 J	7	NTC12GW-02	4/4	--	7	**0.47 N**	NA	1000	1000	**YES**	ASL
COPPER	0.72 J	7 J	NTC12GW-01	4/4	--	7	62 N	1300	650	650	NO	BSL
IRON	66	19000	NTC12GW-04	4/4	--	19000	**1100 N**	NA	**5000**	**500**	**YES**	ASL
LEAD	0.2 J	2.1	NTC12GW-04	3/4	0.5	2.1	NA	15	7.5	100	NO	BSL
MAGNESIUM	51000	160000	NTC12GW-01	4/4	--	160000	NA	NA	NA	NA	NO	NUT
MANGANESE	220 J	740 J	NTC12GW-04	4/4	--	740	**32 N**	NA	**150**	10000	**YES**	ASL
NICKEL	0.91 J	40	NTC12GW-02	4/4	--	40	**30 N**	NA	100	2000	**YES**	ASL
POTASSIUM	5300	7100	NTC12GW-04	4/4	--	7100	NA	NA	NA	NA	NO	NUT
SELENIUM	4.2	4.2	NTC12GW-02	1/4	1	4.2	7.8 N	50	50	50	NO	BSL
SILVER	0.046 J	0.06 J	NTC12GW-01	2/4	0.1	0.06	7.1 N	NA	50	NA	NO	BSL
SODIUM	65000	160000	NTC12GW-02	4/4	--	160000	NA	NA	NA	NA	NO	NUT
THALLIUM	0.035 J	0.056 J	NTC12GW-01	2/4	0.1	0.056	**0.016 N**	2	2	20	**YES**	ASL
VANADIUM	0.11 J	0.42 J	NTC12GW-04	4/4	1	0.42	6.3 N	NA	49	100	NO	BSL
ZINC	4.8 J	130	NTC12GW-02	4/4	--	130	470 N	NA	5000	10000	NO	BSL

TABLE 6-18

HUMAN HEALTH GROUNDWATER COPC SELECTION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Adjusted USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, 2013.
[Cancer benchmark value = 1E-06, hazard quotient (HQ) = 0.1].
5 - 2012 Edition of the Drinking Water Standards and Health Advisories (USEPA, 2012a).
6 - Illinois Adminstrative Code Groundwater Standards for Class I and II. Title 35 Sections 620.410 and 620.420. (IAC, 2013).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
8 - The value is for hexavalent chromium.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

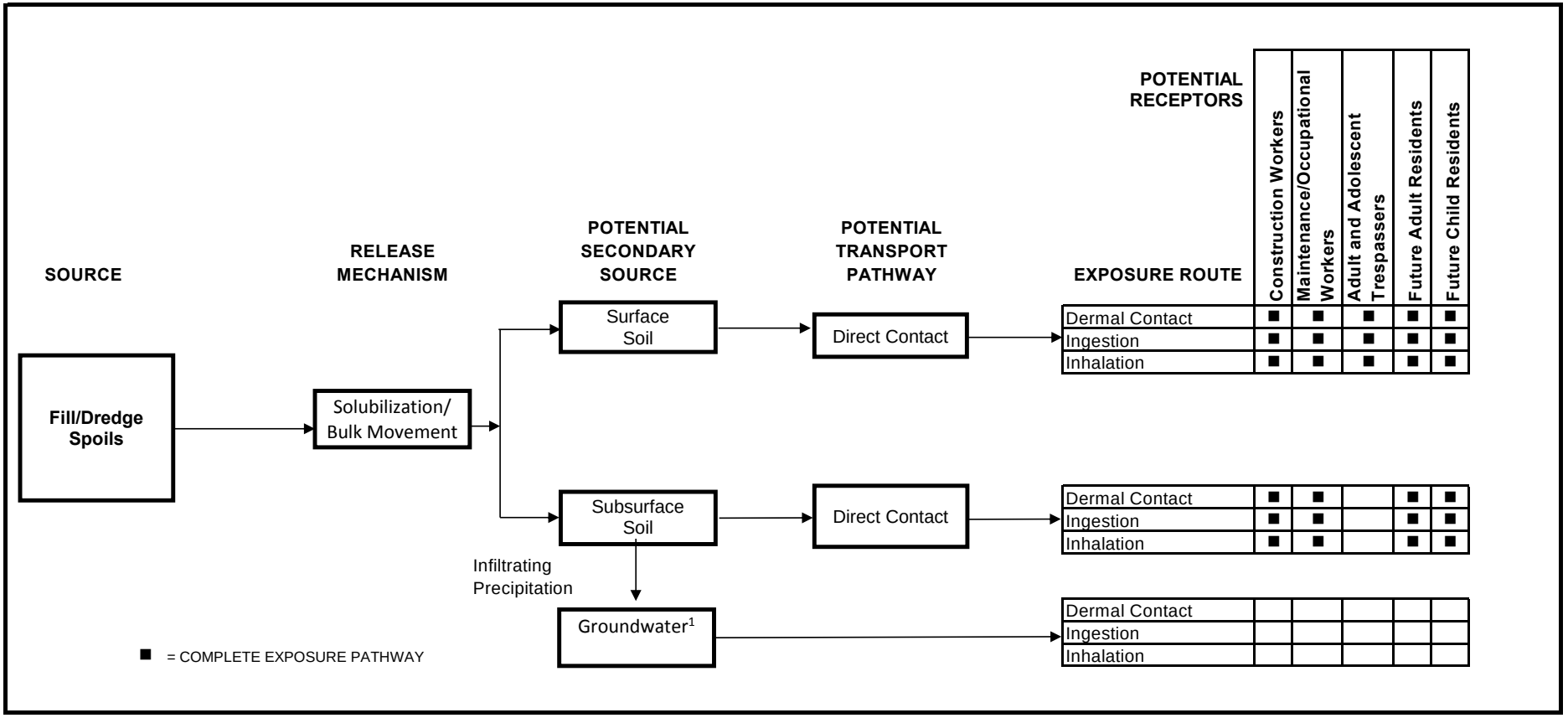
Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level
For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient

Definitions:

C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

FIGURE 6-1

HUMAN HEALTH CONCEPTUAL SITE MODEL
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES, ILLINOIS



Blank space indicates incomplete exposure pathway or relatively insignificant or not applicable potential exposure.

A complete exposure pathway requires a source, a route of contaminant transport, and an exposure or contact point for a human receptor. If one of these is lacking, the exposure pathway is considered incomplete and is not quantitatively in the risk assessment under current land use. However, the situation at the site might change in the future (e.g., residential dwellings could be built), and the exposure pathway for future residents would be complete and would then be evaluated in the risk assessment under future land use.

[1] Only a qualitative evaluation of groundwater was conducted because Site's proximity to Lake Michigan results in predominant surface water influence on groundwater, not groundwater impact on surface water.

7.0 ECOLOGICAL RISK ASSESSMENT

This ERA was conducted to determine whether adverse ecological impacts are potentially occurring from exposure to chemicals released to the environment through historical activities at the Harbor Dredge Spoil Area, Site 12, located within NSGL in Great Lakes, Illinois. This goal was accomplished by identifying COPCs (i.e., chemicals detected at concentrations that exceed screening levels), identifying the locations of these exceedances, and concluding whether or not further investigation and/or remedial action at Site 12 is warranted from an ecological perspective.

7.1 INTRODUCTION

The ERA was conducted in accordance with the following guidance documents:

- Department of Navy (Navy) Environmental Policy Memorandum 97-04: Use of Ecological Risk Assessments dated May 16, 1997.
- Navy Policy for Conducting Ecological Risk Assessments (Navy, 1999).
- Final Guidelines for Ecological Risk Assessment (USEPA, 1998).
- Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (USEPA, 1997c).

The ERA consists of Steps 1, 2, and 3a of the eight step ERA process presented in USEPA guidance (USEPA, 1997c and 1998) and the Navy Policy for Conducting ERAs (Navy, 1999). The first two screening steps comprise the screening-level ecological risk assessment (SLERA), and correspond with Tier 1 of the Navy Policy (Navy, 1999), 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. Step 3a corresponds with the first part of Tier 2 of the Navy Policy (Navy, 1999). Steps 3b through 7 are conducted if additional evaluations or investigations are necessary. Aspects of Step 8, risk management, are addressed throughout the ERA process, in cooperation with the regulators.

A schematic diagram of the general risk assessment process is provided on Figure 7-1.

7.2 TIER 1, STEP 1: SCREENING-LEVEL PROBLEM FORMULATION

The screening-level problem formulation is the first step of an ERA and includes identification of potential receptor groups, COPCs, and the mechanisms for contaminant fate, transport, and toxicity. The complete exposure pathways that exist at a site are determined at this point to facilitate receptor selection. The problem formulation process enables the risk assessor to identify: the ecological resources to be protected (known as assessment endpoints); the measurements used to evaluate risks to those resources (known as measurement endpoints); and the chemicals, geographic areas, and environmental media relevant to the risk assessment.

As part of receptor identification, site habitats and potential ecological receptors, as they apply to ecological risk, are described in the following subsections.

7.2.1 Environmental Setting

Site 12 is located in a flat area along Lake Michigan below a steep hill and is south of a stormwater retention basin. The site is approximately 3.5 acres in size. It is a grass-covered field rising westward from the shore of Lake Michigan, and is bounded on the western edge by a wooded bluff that is 50 to 60-feet high. The unconsolidated glacial material that comprises the bluff faces is under continual erosion. Approximately 15 percent of the site is covered by a gravel road and parking lot and approximately 15 percent of the site is a sandy beach. The beach area includes approximately one-tenth of a mile of shoreline. Beach sediments along the Illinois coast consist of mixed sand, sandy gravel, and gravel. The primary source for the beach sediments was erosion of the coastal bluffs. The remainder of the site is mostly maintained turf grasses with a few deciduous trees.

No Federal-listed threatened or endangered species are known to inhabit NSGL; however, the Federally Endangered Piping plover (*Charadrius melodus*) has been documented as using NSGL habitat during migratory stopover (NSGL, 2010). Several State-listed species of animals and plants have been documented as occurring on NSGL. The maintained turf grasses and deciduous trees at Site 12 may provide habitat for some common species found at NSGL, including groundhogs, raccoons, squirrels, chipmunks, opossum, rabbits, skunks, transient white-tailed deer, and various songbirds. The beach area at Site 12 may provide habitat for the Federally Endangered Piping plover and other shorebirds. However, Piping plover prefer to nest on undisturbed sandy beaches and the beaches at NSGL are easily accessible to foot traffic creating relatively low but a constant level of disturbance. Based on the low quality habitat at the site (e.g., site mainly consists of mowed grass), it is not likely that there are any threatened or endangered species or any sensitive habitat present at the site. In addition, no federal or State protected fauna or flora have been identified as inhabiting Site 12 according to Bob Vanbendegom,

Biologist and National Environmental Policy Act Program Manager at NSGL, based on a records review and a May 8, 2014 site evaluation.

7.2.2 Potential Sources of Contamination

During harbor dredging activities in 1952 and the 1970s, dredge spoils from the boat slip area (Boat Basin)in the harbor were reportedly disposed in Site 12 (Rogers, Golden & Halpern, 1986). Overland runoff and storm water discharges from NSGL to Pettibone Creek may have contributed pollutants to the watershed. Dredge spoils could have high organic content, and may contain heavy metals, oils (i.e., SVOCs and PAHs), pesticides, and PCBs from industries upstream of the NSGL (Tetra Tech, 2011a). However, a review of aerial photographs by Dames & Moore (1991) indicated evidence of some filling and other modifications to Site 12 between 1946 and 1985. These filling activities do not coincide with or closely follow the reported dates of harbor dredging; therefore, the filling activities may not be related to the disposition of dredge spoils, as originally reported by the IAS (Dames & Moore, 1991). The Dames and Moore report (1991) also notes that in the late 1980s, there were piles of soil and plant debris on Site 12. The soil and debris presumably came from other locations at NSGL. For these reasons, it is likely that most of the surficial soil is comprised top-soil or fill material.

7.2.3 Potential Exposure Pathways

The site consists of a grass-covered field with some wooded areas, a beach area along the lake, and a paved parking lot (see Figure 3-1). Chemicals in the soil may migrate to the sediment in Lake Michigan via erosion of the bluff and surface runoff. Erosion is likely minimal because heavy vegetation is present over most areas at the site. Chemicals in soil may leach into the groundwater and ultimately discharge to surface water. Based on the habitat, potential ecological receptors at the site include plants, soil and sediment invertebrates, aquatic organisms, birds, and mammals. Terrestrial plants, soil invertebrates, birds, and mammals are exposed to chemicals in surface soil by direct contact (only pathway for plants) and ingestion of soil and food items that have accumulated chemicals from the soil. Sediment invertebrates are exposed to chemicals in surface soil by direct contact and ingestion of sediment which may be from runoff and overland transport of surface soil. Aquatic organisms are exposed to chemicals in surface water which may be from the discharge of groundwater. The following sections describe the potential exposure pathways in more detail.

7.2.3.1 Surface Soil

Several groups of terrestrial ecological receptors can be exposed to contaminants in surface soil. For this project, the surface soil depth interval was 0 to 6 inches bgs. Invertebrates such as earthworms are exposed to contaminants as they move through the soil and ingest soil particles while searching for food.

Plants are exposed to contaminants via direct contact as contaminants are absorbed through the roots, and contaminants are then translocated to different parts of the plants (e.g., leaves, seeds). These pathways are evaluated in the ERA.

Small mammals may be exposed to contaminants in 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 contaminants 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 contaminants across dermal tissue. Therefore, the dermal pathway was not evaluated in the ERA. Small mammals also may be exposed to contaminants in soil via incidental ingestion of soil and ingestion of plants and/or invertebrates that have accumulated contaminants from the soil. These pathways are evaluated in the ERA.

Larger predatory species such as the red fox and red-tailed hawk can be indirectly exposed to soil contaminants by ingesting small mammals that have accumulated contaminants from soil.

Terrestrial receptors, such as plants and small mammals are not substantially exposed to subsurface soil, so that pathway was not evaluated in the ERA. Exposure of terrestrial receptors to subsurface soil from 6 inches to 2 feet is discussed in the uncertainty section (Section 7.5).

7.2.3.2 Sediment

Contaminants in soil may enter the harbor via runoff and overland transport of surface soil. This pathway is expected to be minimal because the majority of the site is covered with vegetation. Sediment invertebrates can be exposed to chemicals in the soil, after the soil migrates to the sediment. Because only soil samples were collected, the potential exposure of sediment invertebrates to surface soil after the soil migrates to the water is a very conservative approach and potentially overestimates exposure of sediment invertebrates to the chemicals. This evaluation was conducted based on a request from Illinois EPA.

Although sediment invertebrates, which can accumulate chemicals, can be consumed by higher trophic level receptors, this pathway is not evaluated in the ERA because this pathway is not expected to be significant. The reason is that the overall area that could be potentially impacted is small relative to the home range for piscivorous birds and mammals.

7.2.3.3 Groundwater

Site 12 is located along Lake Michigan. Chemicals in soil may migrate to groundwater which flows eastward and discharges into Lake Michigan. Aquatic organisms can then be exposed to the chemicals in the groundwater after it discharges. Therefore, exposure to groundwater discharging directly to Lake Michigan represents a complete exposure pathway and is evaluated as part of the surface water pathway.

7.2.3.4 Surface water

As mentioned above, contaminated groundwater may discharge directly to Lake Michigan. Aquatic organisms such as fish and invertebrates within the lake can be exposed to chemicals in groundwater after discharging as pore water in the sediment or mixing with surface water. However, the actual exposure of contaminants in the groundwater will be very low after discharging as pore water (which is a mixture of groundwater and surface water) or mixing with the surface water. For the same reason as discussed above for sediment invertebrates, although aquatic organisms can accumulate chemicals and be consumed by higher trophic level receptors, this pathway is not evaluated in the ERA because this pathway is not expected to be significant.

7.2.3.5 Air

Inhalation of particulates by mammals and birds is not considered a complete pathway at Site 12 because there are no activities causing air contamination. Also, inhalation pathways are not typically evaluated in ERAs because of the uncertainty inherent in estimating exposure levels and toxicological effects. Therefore, the air inhalation pathway is not evaluated in the ERA.

7.2.4 Assessment Endpoints and Measurement Endpoints

Assessment endpoints are explicit expressions of the environmental value that is to be protected (US EPA, 1997c). 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. Measurement endpoints are estimates of biological impacts (e.g., mortality, growth, reproduction) that are used to evaluate the assessment endpoints. The assessment endpoints and measurement endpoints for Site12 are presented in Table 7-1.

7.2.4.1 Assessment Endpoints

Based on the habitat at Site 12, which consists of mostly grass, the potential for surface soil to enter the harbor, and the chemicals present at the site, the assessment endpoints include protection of the following groups of receptors from adverse effects of contaminants on their growth, survival, and reproduction:

- Terrestrial vegetation
- Soil invertebrates
- Sediment invertebrates
- Aquatic organisms
- Herbivorous birds and mammals
- Invertivorous birds and mammals

The following paragraphs discuss details regarding the assessment endpoints.

Terrestrial Vegetation: Terrestrial vegetation at Site 12 consists of grasses, shrubs, and trees. They serve as a food source, provide shade and cover for many organisms, and they help to prevent soil erosion, among other important functions. They also can accumulate some contaminants that can then be transferred to the higher trophic-level organisms that consume plants.

Soil Invertebrates: Soil invertebrates are present in soil at Site 12. They aid in the formation of soil and the redistribution and decomposition of organic matter in the soil, and they serve as a food source for higher trophic-level organisms. They also can accumulate bioaccumulative contaminants that can then be transferred to the higher trophic-level organisms that consume soil invertebrates.

Sediment Invertebrates: Sediment invertebrates are present in the harbor sediment abutting Site 12. Sediment 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.

Aquatic Organisms: Aquatic organisms such as amphibians, insects and other invertebrates serve as a food source for higher trophic-level organisms (i.e., birds, mammals). These organisms are present in Lake Michigan. They can also accumulate contaminants, which can be transferred to higher trophic-level organisms that consume them.

Herbivorous Birds and Mammals: Herbivorous birds and mammals (i.e., animals that consume only plant tissue) forage at Site 12. 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 present in the plants they consume.

Invertivorous Birds and Mammals: Invertivorous birds and mammals are present throughout the base in different terrestrial habitats (e.g., forested, open field) and are present at Site 12. These are considered first-level carnivores, and they serve as a food source for higher trophic-level carnivores. They may be exposed to and accumulate contaminants present in the food items they consume.

Not all of the potential assessment endpoints were evaluated in this ERA. As indicated in USEPA guidance (USEPA, 1997c), "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, the ERA will focus on the endpoints that will tend to yield the highest risks, which should then account for endpoints that will have lower risks.

Large carnivorous birds and mammals were not selected as assessment endpoints because their home range (hundreds of acres) is much larger than Site 12 (approximately 3.5 acres), so they would only consume a small portion of food from the site. Therefore, risks would be greater to small mammals and birds that may obtain all of their food from the site. Although amphibians and reptiles may be present at or near the site, they were not selected as assessment endpoints because of the general lack of toxicity information and the lack of methods to evaluate their exposure to chemicals.

7.2.4.2 Measurement Endpoints

The following measurement endpoints were used to evaluate the assessment endpoints in the SERA:

- Soil screening values - Mortality, growth, and reproduction of plants and soil invertebrates were evaluated by comparing the measured concentrations of chemicals in surface soil to screening values designed to be protective of ecological receptors.

- Sediment screening values - Mortality, growth, and reproduction of sediment invertebrates were evaluated by comparing the measured concentrations of chemicals in surface soil to screening values designed to be protective of ecological receptors.

- Surface water screening values - Mortality, growth, and reproduction of aquatic organisms were evaluated by comparing the measured concentrations of chemicals in groundwater to screening values designed to be protective of ecological receptors.

- Wildlife toxicity reference values (TRVs) - Mortality, reproductive, and/or developmental effects of birds and mammals were evaluated by comparing the estimated dose incurred (based on conservative and average assumptions) from ingestion of contaminants in surface soil, plants, and invertebrates to wildlife TRVs.

7.2.4.3 Selection of Receptor Species

Many receptors in the terrestrial environment at Site12 are typically grouped into general categories such as invertebrates and vegetation. This is a reflection of the nature of the threshold values, effects values, or criteria typically used to characterize risk for such organisms. However, for vertebrate receptors, selection of a representative species is required so that risks to these upper-level species incurred by intake through eating and drinking can be estimated.

Ingestion is the primary route of exposure for most mammals and birds. The selection of species used to represent the receptor groups identified in Section 7.2.4.1 was based on considerations of their preferred habitat, body size, sensitivity to contaminants, home range, abundance, commercial or sport utilization, legal status, and functional role (e.g., predators). The availability of exposure parameters such as body mass, feeding rate, and drinking rate was also a factor in selecting surrogate species. The following surrogate species were used in the food chain modeling conducted as part of this ERA:

- Herbivorous mammal - Meadow vole
- Herbivorous bird - Bobwhite quail
- Invertivorous mammal - Short-tailed shrew
- Invertivorous bird - American woodcock

Receptor profiles for each of the species above are presented in Appendix G.

7.2.4.4 Conceptual Site Model

A conceptual model in problem formulation is a written description and visual representation of predicted relationships between ecological entities and the stressors to which they may be exposed. The conceptual model consists of two primary components: predicted relationships among stressor, exposure, and assessment endpoint response and a diagram that illustrates the relationships (USEPA, 1998).

The primary sources of known or potential contamination at Site 12 were identified based on past operational practices and the physical characteristics of the site. The primary sources of contamination are disposal of soil and plant debris and reported disposal of dredge spoils from the harbor potentially containing metals, oils, and PCBs. However, it appears that the surficial material consists mainly of top

soil or fill material that was placed on top of the dredge spoils. Also, there is evidence that the surficial soil at the site was reworked several times, and this may have been related to the construction of the recreational area. The primary stressors to ecological receptors are contaminants in surface soil. The primary receptors for contaminants in surface soil are plants and soil invertebrates, and secondary receptors are birds and mammals. In addition, contamination may have migrated from soil to groundwater by leaching and to sediment by overland runoff. The primary receptors for contaminants in the groundwater are sediment invertebrates and aquatic organisms in Lake Michigan after the groundwater discharges as pore water and mixes with the surface water. Sediment invertebrates are also exposed to contaminants in surface soil that were transported to sediment via overland runoff. Figure 7-2 represents the ecological CSM for Site 12.

7.3 TIER 1, STEP 2: SCREENING-LEVEL EXPOSURE ESTIMATE AND RISK QUOTIENTS

7.3.1 Ecological Effects Evaluation

The preliminary ecological effects evaluation is an investigation of the relationship between the magnitude of exposure to a chemical and the nature and magnitude of adverse effects resulting from exposure. In addition to being a toxicological evaluation, it may also include descriptions of apparent effects seen during the site visit (e.g., stressed vegetation). Toxicity thresholds are usually expressed in units of concentration when the medium of concern is in intimate contact with the receptor, such as soil for soil invertebrates. For vertebrates such as mammals and birds, toxicity data are typically available as doses, with units equal to mass of contaminant per unit of body mass per unit of time (usually mg/kg-day).

As the first step in the ecological effects evaluation, COPCs were selected by comparing contaminant concentrations in surface soil to ecological screening levels. For surface soil, chemical concentrations were compared to USEPA Ecological Soil Screening Levels (Eco SSLs) (USEPA, 2007a and supporting documents) because they are the most current screening levels. If USEPA Eco SSLs were not available, Region 5 soil ecological screening levels (ESLs) (USEPA, 2003a) were used next in order of preference, followed by the values from Canadian Soil Quality Guidelines (SQG) (CCME, 1999a-e, 2001, 2010) and the ORNL Toxicological Benchmarks for plants (Efroymson et al., 1997a) and invertebrates (Efroymson et al., 1997b), and Los Alamos National Laboratory (LANL) ECORISK database (version 3.1; LANL, 2012). Note that because most of the Region 5 ESLs are based on risks to mammals, screening levels specific to plants or invertebrates from other sources were used preferentially for those endpoints, when available. Table 7-2 presents the soil screening levels for plants, invertebrates, mammals, and birds for each chemical and the sources of each value.

The potential risks to sediment invertebrates resulting from direct exposure to chemicals were evaluated by comparing chemical concentrations in the surface soil to sediment screening levels. The threshold

effect concentrations (TECs) from MacDonald, et al (2000),followed by Region 5 sediment ESLs (USEPA, 2003a)and freshwater sediment screening levels from the National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQUIRT) (Buchman, 2008) were used in COPC selection for evaluation of risk to sediment invertebrates.

The potential risks to aquatic organisms resulting from exposure to chemicals in groundwater were evaluated by comparing chemical concentrations in the groundwater to surface water screening levels. Groundwater concentrations were compared to freshwater chronic values for protection of aquatic organisms from Illinois Water Quality Standards (WQS) (Illinois Pollution Control Board, 2013b), followed by Illinois Derived Water Quality Criteria (WQC) pursuant to 35 Ill. Adm. Code 302, Subpart F (Illinois EPA, 2013b), National Recommended WQC (USEPA, 2012b), and secondary chronic values (Suter and Tsao, 1996). Values specific for Lake Michigan were used when available. Several of the Illinois WQS are based on hardness dependent equations. Hardness in groundwater at the site ranged from 535 to 1130 mg/L based on calcium and magnesium concentrations. A hardness value of 400 mg/L was used in the equations because above 400 mg/L there is uncertainty in the relationship between hardness and toxicity. Therefore USEPA recommends criteria should be calculated with a hardness value of 400 mg/L when water hardness is over 400 mg/L (USEPA, 2002d).

7.3.2 Exposure Characterization

To determine whether a chemical has the potential to impact an ecological receptor, a chemical concentration or dose must first be determined. That concentration/dose is then compared to the ecological effects data presented above. The following paragraphs describe the concentrations/doses used for each set of ecological receptors.

Soil invertebrates and plants are exposed to chemicals in the surface soil, and sediment invertebrates and aquatic organisms are exposed to chemicals in sediment and groundwater that discharges to surface water, through direct contact and/or ingestion. Because the screening values developed for these receptors are in units of chemical concentration in each medium, maximum chemical concentrations were used in the screening step to select COPCs.

However, for terrestrial wildlife (mammals and birds), doses in mg/kg-day were estimated for using exposure dose equations. The food chain models were conducted on a dry-weight basis to be consistent with the soil concentrations which are reported on a dry-weight basis. Therefore, the concentrations in the food items were estimated on a dry-weight basis. The following generic equation was used to calculate the EPCs for terrestrial wildlife from exposure to chemicals in soil and associated food items such as plants and soil invertebrates:

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

where:

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

The exposure factors used for the food chain model, their derivation, and the receptor profiles for the surrogate species are presented in Appendix G. The exposure assumptions (i.e., ingestion rate, body weight) were obtained primarily from the Wildlife Exposure Factors Handbook (USEPA, 1993b) and USEPA Eco SSL Guidance Attachment 4-1 (2007a) with other sources used as necessary.

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 Attachment 4-1 (2007a) or BAFs from published sources. The following equation was used to calculate chemical concentrations in plants or invertebrates when BAFs were 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)

A default value of 1.0 was used for the BAF when chemical-specific data was not available. Sources of BAFs are documented in Appendix G.

The food chain model scenarios were calculated using various exposure assumptions to present a range of potential risks. For selecting chemicals as COPCs, the following Tier 1 exposure assumptions were used:

- Maximum soil concentrations
- 90th percentile BAFs (or maximum value if a 90th percentile value is not available) or regression equations
- Conservative receptor body weight and ingestion rates
- Receptors spend 100% of their time at the Site

7.3.3 Risk Characterization

An ecological effects quotient (EEQ) approach was used to characterize the risk to ecological receptors. This approach characterizes potential effects by comparing exposure concentrations with effects data. The EEQs for plants and soil invertebrates were calculated as follows:

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

where: EEQ = Ecological Effects Quotient (unitless)
C_{ss} = Contaminant concentration in surface soil (µg/kg or mg/kg)
SSSL = Surface soil screening level (µg/kg or mg/kg)

The EEQs for sediment invertebrates were calculated as follows:

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

where: EEQ = Ecological Effects Quotient (unitless)
Cs = Contaminant concentration in surface soil (µg/kg or mg/kg)
SdSL = Sediment screening level (µg/kg or mg/kg)

The EEQs for aquatic organisms were calculated as follows:

$$EEQ = \frac{Cgw}{SwSL}$$

where: EEQ = Ecological effects quotient (unitless)
Cgw = Chemical concentration in groundwater (µg/L)
SwSL = Surface water screening level (µg/L)

The EEQs for terrestrial 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 [no observed adverse effect level (NOAEL) or lowest observed adverse effect level (LOAEL)] (mg/kg-day)

An EEQ of greater than 1.0 was considered to indicate potential risk. Such values do not necessarily indicate that an effect will occur but only that a low (i.e., conservative) threshold has been exceeded.

7.3.4 Tier 1, Step 2: Selection of Contaminants of Potential Concern

This section presents the results of the COPC selection, which was conducted using the following rules:

- A contaminant was retained as a COPC for risks to terrestrial plants, soil invertebrates, sediment invertebrates, or aquatic organisms if the maximum detected concentration in surface soil or groundwater exceeded the associated screening level or a screening level was not available.

- If a contaminant had a maximum detected concentration that exceeded associated soil screening level for birds or mammals or a screening level was not available for a bioaccumulative chemical, then the chemical was retained for food chain modeling for wildlife. If the EEQ was greater than 1.0 based on the conservative food chain model, the chemical was selected as a COPC.

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

Contaminants retained as COPCs were further evaluated as part of Step 3a of the eight-step ERA process.

7.3.4.1 Terrestrial Plants

Table 7-3 presents the COPC selection for terrestrial plants in Site 12 surface soil. Two metals, two SVOCs, nine PAHs, and nine pesticides were selected as COPCs because screening levels were not

available. Five metals and five pesticides were selected as COPCs because they were detected at a maximum concentration that resulted in an EEQ greater than 1.0.

7.3.4.2 Soil Invertebrates

Table 7-3 presents the COPC selection for soil invertebrates in Site 12 surface soil. One metal, three SVOCs, and seventeen pesticides were selected as COPCs because screening levels were not available. Six metals were selected as COPCs because they were detected at a maximum concentration that resulted in an EEQ greater than 1.0.

7.3.4.3 Sediment Invertebrates

Table 7-4 presents the COPC selection for sediment invertebrates exposed to Site 12 surface soil. Five metals and one SVOC were selected as COPCs because screening levels were not available. Ten metals, 15 PAHs, and 13 pesticides were selected as COPCs because they were detected at a maximum concentration that resulted in an EEQ greater than 1.0.

7.3.4.4 Aquatic Organisms

Several subsurface soil samples were collected and analyzed for SPLP metals to determine whether chemicals detected in soil could leach into the groundwater and ultimately impact aquatic organisms after the groundwater discharged to surface water. Detected concentrations of SPLP metals were compared to the surface water criteria listed in Section 7.3.1. Table 7-5 presents the COPC selection for aquatic organisms based on this comparison. Seven metals had maximum detected concentrations that exceeded the Illinois WQS or WQC. Illinois values were not available for aluminum, beryllium, cobalt, or vanadium or the four common essential nutrients (calcium, magnesium, potassium, or sodium). The maximum detected aluminum concentration exceeded the USEPA WQC.

Groundwater samples were collected from 4 monitoring wells and analyzed for total and dissolved metals. Table 7-6 presents the COPC selection for aquatic organisms based on this comparison. Total and dissolved concentrations of iron were selected as COPCs because they were detected at a maximum concentration that resulted in an EEQ greater than 1.0.

7.3.4.5 Wildlife

Table 7-7 summarizes the results of the Tier 1 inputs food chain modeling for terrestrial soil receptors. Appendix G presents the calculation worksheets. The following lists the chemicals selected as COPCs for birds and mammals because EEQs were greater than 1.0 using maximum chemical concentrations and Tier 1 input parameters in the food chain model:

- Herbivorous mammal: Mercury was selected as a COPC.
- Herbivorous bird: Three metals were selected as COPCs.
- Invertivorous mammal: Seven metals and four pesticides were selected as COPCs.
- Invertivorous bird: Six metals, one PAH, and six pesticides were selected as COPCs.
- Avian TRVs were not available for antimony, thallium, aldrin, heptachlor, and heptachlor epoxide.

7.4 TIER 2, STEP 3A: COPC REFINEMENT

Step 3a consists of refining the conservative exposure assumptions/concentrations used to evaluate potential risks to ecological receptors and re-evaluating the analytical data using benchmarks that are more appropriate for the assessment endpoints. The objective of the Step 3a refinement was to better determine which chemicals contribute to potentially unacceptable levels of ecological risk, and to identify and eliminate from further consideration those chemicals that were initially selected as COPCs because of the use of very conservative exposure scenarios but are not likely causing a significant risk. The Step 3a evaluation can also be used to eliminate chemicals from further evaluation for certain groups of receptors that are not at significant risk. For example, a chemical might not be retained as a COPC in soil for plants based on low risks to plants but the same chemical might be retained as a COPC based on risks to invertebrates or wildlife. This is important because if the site proceeds further to a baseline ERA, the studies in the baseline ERA should only focus on the receptors that are at potential risk.

For chemicals evaluated further in Step 3a, the following factors were evaluated, as appropriate, to determine if the risks are great enough to warrant additional evaluations (i.e., proceed to a baseline ERA, develop cleanup levels). All of these factors may not be discussed for each chemical and/or receptor group.

- Magnitude of criterion exceedance: Although the magnitude of 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 metals) are present in the environment in forms that are typically not bioavailable, and limited bioavailability was considered when evaluating exposures of receptors to site contaminants. Contaminants with generally less bioavailability are considered to be less toxic than more bioavailable contaminants, all other factors being equal.

- Habitat: Although exceedances of criteria may occur, potential risks to ecological receptors may be minimal if there is little habitat for those receptors. Therefore, the extent of habitat was used qualitatively when considering additional evaluation. Areas with little habitat were less of a concern than areas with suitable habitat to support the receptors of interest.

- Alternate benchmarks: These benchmarks are used to further evaluate risks to specific groups of ecological receptors (e.g., plants, invertebrates). Several of the sediment risk screening levels (e.g., TECs) that are 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 risk screening is to determine if the chemicals at the site are causing a risk to ecological receptors, higher effect benchmarks [e.g., probable effects concentrations (PECs)] are used to further evaluate risks to sediment invertebrates from chemicals that exceeded conservative screening levels. PECs are the concentration above which adverse effects are expected to frequently occur.

- Food Chain Modeling: Exposure via the food chain is a major pathway of concern for chemicals known to significantly bioaccumulate and/or biomagnify. Thus, potential risk to upper level receptors was evaluated using food chain models. The Tier 1 exposure doses calculated for terrestrial wildlife were re-calculated using the following Tier 2, Step 3a exposure assumptions and chemical concentrations:

    - Average soil concentrations
    - Median or mean BAFs (if available)
    - Average receptor body weights and ingestion rates

- Background: Concentrations of chemicals in surface soil were compared to background concentration data. Site-specific background data are not available; therefore, maximum site surface soil concentrations were compared to Illinois EPA TACO background values for the Metropolitan Statistical Area (Table 7-3). Concentrations of three metals (antimony, thallium, and vanadium) and eight PAHs [2-methylnapthalene, benzo(a)pyrene, benzo(g,h,i)perylene, chrysene,

dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, and phenanthrene] were less than background values. Chemical concentrations less than background are not considered site related.

The Step 3a evaluation is discussed in the following sections.

7.4.1 Tier 2, Step 3a: Plants

Two SVOCs (bis(2-ethylhexyl)phthalate and carbazole) were selected as COPCs for plants because a screening level was not available. The SVOCs were detected infrequently in 1 to 2 of 10 samples. The maximum concentration of bis(2-ethylhexyl)phthalate (149 µg/kg) was well below the plant screening levels for other phthalates, such as diethylphthalate (100,000µg/kg) (Efroymson et al., 1997a). The maximum concentration of carbazole (254µg/kg) was well below the screening level for the PAH, benzo(a)pyrene (20,000 µg/kg).Therefore, it is not likely that plants are being significantly impacted by bis(2-ethylhexyl)phthalate and carbazole and they are eliminated as COPCs for plants.

Several PAHs were selected as COPCs because screening levels were not available. An Eco SSL is not available for plants for PAHs; 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 effective concentration 50 (EC_{50}) of 30,000µg/kg from Mitchell et al. (1988). The concentrations of PAHs are less than this value. Also, the concentrations were much lower than the Canadian SQG screening values (CCME, 2010) for anthracene (2,500 µg/kg) and benzo(a)pyrene (20,000 µg/kg), which can be used as surrogates for PAHs without screening values. Therefore, PAHs are not expected to impact plants at the site and are eliminated as COPCs.

Several pesticides were selected as COPCs because screening levels were not available. Using the screening value for gamma-BHC (5 µg/kg) as a surrogate, concentrations of alpha-BHC and delta-BHC are less than the screening value. Using the screening value for endrin (3.4µg/kg) as a surrogate, concentrations of endrin ketone are less than the screening value and concentrations of endrin aldehyde exceed the screening value in two samples. Using the screening value for heptachlor (400 µg/kg) as a surrogate, concentrations of heptachlor epoxide are less than the screening value. The maximum concentration of methoxychlor (3.04 µg/kg) is less than screening values for other pesticides. Concentrations of endosulfan I, endosulfan II, and endosulfan sulfate are generally less than screening values for other pesticides except at one location (NTC12SB25).

The pesticides selected as COPCs because the maximum concentration exceeded their respective screening levels generally exceeded at one location (NTC12SB25). The concentration of alpha-chlordane slightly exceeded its screening value at a second location (NTC12SB22). Endrin exceeded its screening level at three locations.

Generally, the pesticides were detected at relatively low concentrations, with a few exceptions. Many of the detected concentrations were less than 10 µg/kg and only a few detections were greater than 100 µg/kg. Also, the portion of the site with the maximum concentrations of several pesticides is vegetated; therefore, it does not appear that plants are being significantly impacted. The location (NTC12SB25) of maximum concentrations for several pesticides is bounded to the west by topography, to the east by a parking lot, and to the north and south by samples with lower pesticide concentrations. For these reasons, even though some isolated potential risks to plants cannot be ruled out, risks are not great enough to warrant carrying any of the pesticides further in the ERA process.

Aluminum is only selected as a COPC when soil pH is less than 5.5 (USEPA, 2003b). Because soil pH data were not available for the soil samples, aluminum was initially selected as a COPC for terrestrial plants. The soil pH was measured as 7.58 for IDW characterization; therefore, aluminum in soil from the site is not highly bioavailable. While total aluminum concentrations were measured, only soluble aluminum may result in the toxicity to plants and invertebrates (USEPA, 2003b). This is the form of aluminum that is typically used in toxicity tests, which is not the same form typically found in the environment. Usually a large fraction of the soluble aluminum is found in the form of organic and fluoride complexes and these complexed forms of aluminum are much less toxic to plants than soluble Al^{3+} or Al-hydroxy cations (USEPA, 2003b). Also, only one sample had a concentration slightly greater than the Illinois EPA TACO background value. For these reasons, aluminum is eliminated as a COPC.

Iron was initially selected as a COPC for plants because a pH value for the soil samples, which the screening level is based on, was not available. The soil pH was measured as 7.58 for IDW characterization; therefore, iron in soil from the site is not expected to be toxic to plants, since the soil pH is between 5 and 8. Also, because this portion of the site with the maximum iron concentration is vegetated, it does not appear that plants are being significantly impacted. In addition, only two samples had concentrations greater than the Illinois EPA TACO background value. For these reasons, iron is eliminated as a COPC.

Several metals (copper, lead, manganese, selenium, and zinc) were selected as COPCs for plants because the maximum chemical concentration exceeded its screening level.

For copper, samples from two locations (NTC12SB26 and NTC12SB27) had concentrations exceeding the screening level (70 mg/kg). For lead, samples from two locations (NTC12SB27 and NTC12SB29) had concentrations exceeding the screening level (120 mg/kg). Copper and lead concentrations in adjacent samples within approximately 100 feet are less than screening values.

Manganese concentrations at eight of ten locations exceeded the screening level (220 mg/kg). Zinc concentrations at seven locations exceeded the screening level (160 mg/kg). Most zinc concentrations (44.7 to 328 mg/kg) were only slightly greater than the screening level; however, one sample had a zinc concentration (1,530 mg/kg) well above the other concentrations detected at the site.

Selenium concentrations at four locations exceeded the screening level (0.52 mg/kg). However, most concentrations only slightly exceeded the screening level.

In summary, concentrations of a few metals exceeded their respective plant benchmarks in some of the surface soil samples. The soil sampling locations along the shoreline, which were mainly comprised of sand, have lower metals concentrations than sampling locations that most likely received land-based fill material. Because the portion of the site with the maximum metals concentrations is vegetated, it does not appear that plants are being significantly impacted. For these reasons, even though some isolated potential risks to plants cannot be ruled out, risks are not great enough to warrant carrying the metals further in the ERA process. Therefore, no metals are retained as COPCs for risks to plants.

7.4.2 Tier 2, Step 3a: Soil Invertebrates

Three SVOCs (bis[2-ethylhexyl]phthalate, carbazole, and dibenzofuran)were selected as COPCs for soil invertebrates because a screening level was not available. The maximum concentration of bis(2-ethylhexyl)phthalate (149 µg/kg) was less than screening levels for another phthalate, dimethyl phthalate (200,000 µg/kg) (Efroymson et al., 1997b). Maximum concentrations of carbazole and dibenzofuran were less than the screening levels for the PAHs. Therefore, it is not likely that invertebrates are being significantly impacted by bis(2-ethylhexyl)phthalate, carbazole, and dibenzofuran and they are eliminated as COPCs for invertebrates.

Several pesticides were selected as COPCs for soil invertebrates because a screening level was not available. Except for maximum concentrations of the pesticides, which were generally at only one location (NTC12SB25), concentrations were relatively low, which are indicative of typical spraying activities. NTC12SB25 is bounded by topography and sampling locations with low pesticide concentrations within 100 feet. Even though some isolated potential risks to soil invertebrates cannot be ruled out, risks are not great enough to warrant carrying any of the pesticides further in the ERA process. Therefore, no pesticides are retained as COPCs for risks to soil invertebrates.

Aluminum was eliminated as a COPC for soil invertebrates for reasons similar to those presented above.

Several metals (chromium, copper, iron, manganese, mercury, and zinc) were selected as COPCs for soil invertebrates because the maximum chemical concentration exceeded its screening level.

Chromium exceeded its screening value of 0.4 mg/kg in the samples. The screening value for chromium is the Region 5 ESL (0.4 mg/kg), which is a screening benchmark for hexavalent chromium. This value is overly conservative, as it is well below background levels (16.2 mg/kg) and is based on a chromium salt in solution being added to the soil. This makes the chromium much more bioavailable then it would be in the environment. A more appropriate benchmark is the Canadian SQG for plants/invertebrates of 78 mg/kg because it is based on a more robust data set (CCME, 1999a). No chromium concentrations exceeded the alternate benchmark (78 mg/kg).

For copper, samples from two locations (NTC12SB26 and NTC12SB27) had concentrations exceeding the screening level (80 mg/kg). Copper concentrations in adjacent samples within approximately 100 feet are less than screening value.

Iron was selected as a COPC because it exceeded its screening value (200 mg/kg) in the samples. The iron screening value is based reduced nitrogen mineralization by native soil microflora by iron(III) (Efroymson, et al., 1997b). Although the form of the iron at the site is not known, iron is typically not considered a very bioavailable metal in the environment. Also, only two samples had concentrations greater than the Illinois EPA TACO background value. Therefore, impacts to soil invertebrate from iron are expected to be minimal, and iron is eliminated as a COPC for soil invertebrates.

Manganese exceeded its screening value in five samples and only slightly exceeded background in three samples.

Mercury exceeded its screening value in six samples. The Region 5 soil ESL for mercury (0.1 mg/kg) is based on the ORNL benchmark for invertebrates (Efroymson et al., 1997b). That documents states that there is a lot of uncertainty in the value because of the limited data set. However, a Canadian SQG of 12 mg/kg for the protection of plants and invertebrates was developed for mercury using a much more robust data set (CCME, 1999c). The mercury concentrations were less than the Canadian SQG so risks to soil invertebrates are expected to be minimal.

Zinc concentrations at seven locations exceeded the screening level (160 mg/kg).One location (NTC12SB27) had a zinc concentration (1530 mg/kg) elevated above the other zinc concentrations (44.7 to 328 mg/kg).

In summary, concentrations of a few metals exceeded their respective soil invertebrate benchmarks in some of the surface soil samples. The soil sample locations along the shoreline, which were mainly comprised of sand, have lower metals concentrations than sample locations that most likely received

land-based fill material. Generally metals concentrations exceeding screening values and background values occur infrequently and are bounded within approximately 100 feet by topography and samples with lower metals concentrations. For these reasons, even though some isolated potential risks to soil invertebrates cannot be ruled out, risks are not great enough to warrant carrying the metals further in the ERA process. Therefore, no metals are retained as COPCs for risks to soil invertebrates.

7.4.3 Tier 2, Step 3a: Sediment Invertebrates

Several of the sediment risk screening levels used to select COPCs, are conservative because chemicals detected at concentrations less than 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 sediment receptors, alternate benchmarks were used to further evaluate the risk associated with chemicals that exceeded the conservative screening levels. Table 7-7 presents the higher effects levels that are discussed below for the chemicals that were selected as COPCs.

Several chemicals including metals, PAHs, and pesticides were detected in surface soil at concentrations exceeding available higher effect levels (i.e., PECs). Average concentrations for a few pesticides exceed the available PECs (Table 7-8). Adverse effects would probably occur to sediment invertebrates exposed to concentrations greater than the PEC. However, as sediment invertebrates would only be exposed to chemicals present in surface soil through runoff, comparisons to maximum and average surface soil concentrations likely overestimate risk as only a small portion of surface soil would likely enter the harbor through runoff.

Several SVOCs including 15 PAHs and carbazole were selected as COPCs. Total PAHs were evaluated instead of the individually detected PAHs in the surface soil as part of the Step 3a refinement. This was done because the toxicity of PAHs has been reported to be additive and several studies have reported toxicity data for total PAHs (Di Toro, et al., 2000). The maximum detected total PAH concentration of 22,647 µg/kg was at NTC12SB21, which is located approximately 200 feet from the shore (see Figure 3-1). This concentration is greater than the screening level (1,610 µg/kg), but is lower that the PEC of 22,800 µg/kg from MacDonald et al. (2000). Samples from NTC12SB23, NTC12SB24, and NTC12SB30 which are located closest to the shoreline had total PAH concentrations less than the screening level. Some slight impacts to sediment invertebrates could occur from PAHs; however, because the soil samples with total PAH concentrations exceeding the screening level are not located close to the shoreline, the soil is less likely to be transported by surface runoff into the harbor. No additional toxicity data were available to further evaluate risks to sediment invertebrates from carbazole. However, because of carbazole was infrequently detected in 2 of 10 samples, potential risks are not expected to be significant.

Several pesticides were selected as COPCs in the surface soil samples because they were detected at concentrations that exceeded their respective screening levels. The maximum detected concentrations of several pesticides were less than their PECs (62 µg/kg for dieldrin, 207 µg/kg for endrin, and 5 µg/kg for gamma-BHC). Higher effect concentrations were not available for aldrin, beta-BHC, endosulfan I, and endosulfan II. However, concentrations of these pesticides only exceeded screening levels in one sample from NTC12SB25, located approximately 270 feet from the shore. The maximum detected concentrations of several pesticides including 4,4'-DDD (195 µg/kg), 4,4'-DDE (197 µg/kg), 4,4'-DDT (282 µg/kg), alpha-chlordane (3220 µg/kg), gamma-chlordane (2600 µg/kg), heptachlor (236 µg/kg), and heptachlor epoxide (64 µg/kg) were greater than their respective PECs (28 µg/kg for 4,4'-DDD, 31 µg/kg for 4,4'-DDE, 63 µg/kg for 4,4'-DDT, and 18 µg/kg for alpha-chlordane and gamma-chlordane, 16 µg/kg for heptachlor and heptachlor epoxide). Although maximum and average concentrations for some pesticides in surface soil exceed PECs, chemical concentrations from surface soil are expected to only be a small portion of the sediment to which sediment invertebrates are exposed. While isolated potential risks to sediment invertebrates cannot be ruled out, risks are not great enough to warrant carrying any of the pesticides further in the ERA process.

Concentrations of arsenic, cadmium, copper, iron, lead, mercury, nickel, silver, and zinc exceeded screening values. However, the maximum detected concentrations of several metals were less than their PECs (33 mg/kg for arsenic, 5 mg/kg for cadmium, 1 mg/kg for mercury and 49 mg/kg for nickel). The maximum detected concentration of iron slightly exceeded the lowest effects level (LEL) of 20,000 mg/kg and was less than the severe effects level (SEL) of 40,000 mg/kg (Buchman, 2008). The maximum detected concentrations of copper, lead, and zinc exceeded their respective PECs. The average concentrations of copper, lead, and zinc are less than their respective PECs. Concentrations of copper and zinc exceeded their respective PECs in only one sample from NTC12SB27. Concentrations of iron exceeded its PEC in two samples from NTC12SB27 and NTC12SB29. Potential impacts to sediment invertebrates from these metals are not likely as concentrations exceed PECs in only two soil samples located approximately 80 feet (NTC12SB27) and 150 feet (NTC12SB29) from the shoreline. The criterion for silver in sediment (0.5 mg/kg) is based on open water disposal guidelines (OMOE, 1993). Alternate benchmarks for silver in sediment include effects range-low (1 mg/kg) and effects range-medium (2.2 mg/kg) concentrations (Long and Morgan, 1991). The maximum concentration of silver in sediment (1.33 mg/kg) is less than the effects range-medium concentration (2.2 mg/kg). Also, concentrations of silver were greater in several sediment samples collected in 2006 and 2007 located close to Site 12 (4.6 – 25.3 mg/kg). Potential impacts from silver are not expected and silver is not considered site-related.

Screening criteria was not available for barium, beryllium, manganese, selenium, and thallium. Thallium was detected in only 1 of 10 samples. No additional toxicity data were available to further evaluate risks to sediment invertebrates from these metals.

7.4.4 Tier 2, Step 3a: Aquatic Organisms

Eight metals had maximum detected SPLP concentrations that exceeded the Illinois WQS/WQC or the USEPA WQC. Because groundwater would discharge to surface water over an area, not just from a single location, the average SPLP concentrations were also compared to the WQS/WQC in Table 7-5. In addition, because the groundwater would be rapidly diluted with surface water after discharging to Lake Michigan, the average SPLP concentrations were also divided by several dilution factors (10x, 25x, and 50x) on Table 7-5. Average concentrations of several metals (aluminum, copper, iron, and lead) exceed the screening level with no dilution factor applied. Only the average concentration of aluminum exceeded the USEPA WQC with a dilutor factor of 10 applied. The average concentration of aluminum with a dilution factor of 50 is less than the USEPA WQC. Therefore, based on the SPLP data, some metals in soil may present a risk to ecological receptors after leaching from the soil and discharging to the surface water. However, potential impacts would be limited to the area immediately adjacent to the shoreline before the concentrations are diluted. Note that there is considerable uncertainty in this evaluation, which is discussed further in Section 7.5.2.

SPLP concentrations are only an estimate of potential concentrations in groundwater samples; therefore, groundwater samples were collected to determine the actual chemical concentrations in groundwater. Groundwater samples from three of the four monitoring wells had total and dissolved iron concentrations exceeding Illinois WQS. The other metals concentrations were below Illinois WQS or other screening values. Although dissolved metals more closely approximate the bioavailable fraction of metals in the water column than total recoverable metals, the concentrations of dissolved iron in the groundwater samples was generally close to the concentrations of total iron. As discussed earlier, groundwater would be rapidly diluted with surface water after discharging to Lake Michigan. Dilution would also occur in the porewater, because overlying surface water would mix with the groundwater in the top several inches of sediment, which is considered the biologically active zone. Assuming a 20x dilution, dissolved iron concentrations are less than the Illinois WQS. In addition, since groundwater would discharge to surface water over an area, not just from a single location, the average groundwater concentrations were also compared to the WQS and assuming a 10x dilution, the average groundwater concentration for dissolved iron is less than the WQS. Also, once the groundwater exits to surface water, the dissolved iron may precipitate making it less soluble than it was in the groundwater. The extent to which iron dissolves in groundwater depends on the amount of oxygen in the water and, to a lesser extent, its pH. At lower dissolved oxygen levels, the iron occurs as Fe^{2+}, which is very soluble. Iron dissolved in groundwater at the site is expected to be in the reduced form (Fe^{2+}) because dissolved oxygen was not present at a

measurable level (0.00 mg/L) in the groundwater samples. When the groundwater reaches surface water, the dissolved iron reacts with oxygen, changes to Fe^{3}+. Although Fe2+ is very soluble, Fe3+ will not dissolve appreciably. Therefore, the actual concentration of iron in surface water is expected to be less than the dissolved iron concentration measured in groundwater. For these reasons, impacts to aquatic organisms from iron in groundwater are not expected.

7.4.5 Tier 2, Step 3a: Terrestrial Wildlife

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 7.3.4.4). Therefore, as part of the Step 3a refinement, risks for this pathway were recalculated using average chemical concentrations in surface soil and less conservative exposure assumptions (i.e., average ingestion rates, average body weights, see Appendix G).

Table 7-9 summarizes the results of the less conservative inputs food chain modeling for the birds and mammals. Appendix G presents the calculation worksheets. A discussion of the risks to mammals and birds is presented below.

- Herbivorous receptors: No EEQs were greater than 1.0 for the vole; therefore, impacts to herbivorous mammals are not expected from chemicals detected in surface soil. The EEQ for mercury (1.5) for the quail was slightly greater than 1.0 using the NOAEL as the TRV, but was less than 1.0 using the LOAEL as the TRV. For this reason, impacts to herbivorous birds are expected to be minimal; therefore, mercury is eliminated as a COPC.

- Invertivorous receptors: The EEQs for mercury (1.7) and thallium (2.0) for the shrew were greater than 1.0 using the NOAEL as the TRV. The EEQs for copper (1.2), lead (2.6), mercury (12), and zinc (1.1) for the woodcock were greater than 1.0 using the NOAEL as the TRV. The NOAEL EEQs for mercury and thallium for the shrew and copper, lead, and zinc for the woodcock were only slightly greater than 1.0 and the LOAEL EEQs were less than 1.0. The EEQ for mercury (1.2) for the woodcock was greater than 1.0 using the LOAEL as the TRV. The food chain model assumes that receptors obtain their entire diet from the site. However, receptors are unlikely to obtain their entire diet from this 3.5 acre site, especially because a significant portion of the site is paved or consists of a sandy beach. For these reasons, impacts to invertivorous receptors are expected to be minimal and these metals are eliminated as COPCs.

7.5 UNCERTAINTY ANALYSIS

This section presents general uncertainties associated with the ERA.

7.5.1 Uncertainty in Assessment Endpoints and Measurement Endpoints

Measurement endpoints were used to evaluate the assessment endpoints selected for the ERA. For the ERA, the measurement endpoints were not the same as the assessment endpoints. Measurement endpoints were used to predict effects to the assessment endpoints by selecting surrogate species to be evaluated. For example, a decrease in reproduction of a shrew was used to assess a decrease in reproduction of the small mammal population. However, predicting a decrease in reproduction of a shrew may either underprotect or overprotect the small mammal population based on differences in ingestion rates, toxicity, food preferences, home ranges, etc. between different species.

Several endpoints were not quantitatively evaluated in the ERA. For example, risks to reptiles were not quantitatively evaluated because exposure factors have not been established for most species, and toxicity data are very limited.

7.5.2 Uncertainty in Exposure Characterization

The contaminant dose to terrestrial wildlife was calculated using an equation that incorporates ingestion rates, body weights, BAFs, and other exposure factors. These exposure factors were obtained from literature studies or predicted using various equations. Ingestion rates and body weights vary among species, especially among species inhabiting different habitats.

Bioaccumulation of contaminants into various biological media (e.g., plants, invertebrates, small mammals) depends on characteristics of the media such as pH, organic carbon, etc. Therefore, actual BAFs at the sites may be different than those used in the ERA and obtained from the literature. Also, the bioavailability of contaminants reported in toxicity studies is typically greater than the contaminants in environmental media. Typically, highly bioavailable forms of the chemicals are used when conducting toxicity tests and/or conducting dosing studies for wildlife.

As discussed earlier in this document, potential risks to aquatic organisms were evaluated by comparing SPLP results and groundwater results to WQS/WQC. Evaluating potential risks to aquatic organisms based on SPLP results is very conservative for several reasons. The amount of leachate generated in the laboratory does not account for dilution that may occur with existing groundwater coming from upgradient locations. Also, once the groundwater exits to surface water, the dissolved metals may precipitate making them less soluble than they would be in the groundwater. Finally, because of the large size of Lake Michigan, there is likely to be some amount of dilution at the surface water/sediment interface making the dilution factors of 10x and 20x conservative.

7.5.3 Uncertainty in Ecological Effects Data

Uncertainty exists in the ecological effects data, including the screening levels and wildlife TRVs. Several of the screening levels are very conservative, and typically are based on studies where the bioavailability of the chemical is much greater than it is in the environment. Also, toxicity data was not available or was limited for some chemicals.

The NOAELs/LOAELs used for the wildlife endpoints species are based on species other than the endpoint species (e.g., rats, mice). Uncertainty exists in the application of toxicity data across species because the contaminant may be more or less toxic to the endpoint species than it was to the test study species.

TRVs were not available for birds and/or mammals for antimony, thallium, aldrin, heptachlor, and heptachlor epoxide. Therefore, food chain model risks to these receptors could not be evaluated. Additionally, PAH TRVs for birds were based on 7,12-dimethylbenz(a)anthracene. There is uncertainty with using this TRV for the PAH calculations for birds.

7.5.4 Uncertainty in Risk Characterization

Risks are possible if an EEQ is greater than or equal to 1.0 regardless of the magnitude of the EEQ. However, the magnitude of effects to ecological receptors cannot be inferred based on the magnitude of the EEQ. Rather, an EEQ greater than 1.0 simply indicates that the dose used to derive the toxicity reference value was exceeded. Finally, there is uncertainty in how the predicted risks to a species at a site translate into risk to the population in the area as a whole.

Because subsurface soil samples were not evaluated in the ERA, there is uncertainty in the predicted risks if ecological receptors are exposed to subsurface soil. Some terrestrial receptors, such as burrowing mammals or deep-rooted trees, could be exposed to shallow layers of contaminated subsurface soils. Three samples from NTC12SS22, NTC12SB24, and NTC12SB30 were collected in shallow subsurface soil from a depth of 6 inches to 2 feet. Chemical concentrations in these subsurface samples were lower than the surface soil samples. Therefore, not evaluating these samples does not impact the conclusions of the ERA.

7.4 SUMMARY AND CONCLUSIONS

This ERA evaluated surface soil data collected at Site 12. Based on the initial screening of the chemical data, several chemicals were initially selected as COPCs in surface soil because they were detected at concentrations that exceeded conservative screening levels, they had EEQs greater than 1.0 in the

conservative food chain model, or because they did not have screening levels. These chemicals were further evaluated to refine the list of COPCs, and to better characterize risks to ecological receptors. No chemicals were retained as COPCs for terrestrial plants, soil invertebrates, mammals, or birds.

Potential impacts to sediment invertebrates from chemicals in surface soil, which may migrate to sediment via erosion and surface runoff, are not likely. Therefore, no chemicals were retained as COPCs for risks to sediment invertebrates. Although based on the SPLP data, some metals in soil may present a risk to aquatic organisms after leaching from the soil and discharging to the surface water, groundwater data indicates only iron concentrations exceed surface water criteria. Potential impacts would be limited to the area immediately adjacent to the shoreline before the concentrations are diluted. In addition, once the groundwater exits to surface water, the dissolved iron may precipitate, therefore, iron concentrations are expected to be lower in surface water than they are in groundwater, before factoring in dilution. Therefore, this pathway is not considered to present a significant potential ecological risk and it is not retained for further consideration.

TABLE 7-1

ASSESSMENT ENDPOINTS AND MEASUREMENT ENDPOINTS
SITE 12 – HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Assessment Endpoint	Measurement Endpoint
Adverse effects on the survival, reproduction, and/or growth of terrestrial plants	• Survival, growth, and/or reproduction of terrestrial plants were evaluated by comparing the measured concentrations of chemicals in the surface soil to plant soil screening levels.
Adverse effects on the survival, reproduction, and/or growth of soil invertebrates	• Survival, growth, and/or reproduction of soil invertebrates were evaluated by comparing the measured concentrations of chemicals in the surface soil to invertebrate soil screening levels.
Adverse effects on the survival, reproduction, and/or growth of sediment invertebrates	• Survival, growth, and/or reproduction of sediment invertebrates were evaluated by comparing the measured concentrations of chemicals in the surface soil to sediment screening levels.
Adverse effects on the survival, reproduction, and/or increase in development effects of invertivorous birds and mammals	• Survival, reproduction, and/or increase in development effects of birds and mammals were evaluated by comparing the estimated ingested dose of contaminants in the surface soil and earthworms to No Observed Adverse Effects Levels (NOAELs) and Lowest Observed Adverse Effects Levels (LOAELs) for surrogate wildlife species.
Adverse effects on the survival, reproduction, and/or increase in development effects of herbivorous birds and mammals	• Survival, reproduction, and/or increase in development effects of birds and mammals were evaluated by comparing the estimated ingested dose of contaminants in the surface soil and plants to NOAELs and LOAELs for surrogate wildlife species.

TABLE 7-2

ECOLOGICAL SURFACE SOIL SCREENING VALUES
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical	Plants		Invertebrates		Avian		Mammals	
	Value	Source	Value	Source	Value	Source	Value	Source
METALS (MG/KG)								
ALUMINUM	NA[1]	NA	NA[1]	NA	NA	NA	NA	NA
ANTIMONY	5	ORNL	78	EcoSSL	NA	NA	0.27	EcoSSL
ARSENIC	18	EcoSSL	17	CCME	43	EcoSSL	46	EcoSSL
BARIUM	500	ORNL	330	EcoSSL	820	LANL	2000	EcoSSL
BERYLLIUM	10	ORNL	40	EcoSSL	NA	NA	21	EcoSSL
CADMIUM	32	EcoSSL	140	EcoSSL	0.77	EcoSSL	0.36	EcoSSL
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA
CHROMIUM	78	CCME	0.4	Region 5	26	EcoSSL	34	EcoSSL
COBALT	13	EcoSSL	1000	ORNL[2]	120	EcoSSL	230	EcoSSL
COPPER	70	EcoSSL	80	EcoSSL	28	EcoSSL	49	EcoSSL
IRON	NA[3]	NA	200	ORNL[2]	NA	NA	NA	NA
LEAD	120	EcoSSL	1700	EcoSSL	11	EcoSSL	56	EcoSSL
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA
MANGANESE	220	EcoSSL	450	EcoSSL	4300	EcoSSL	4000	EcoSSL
MERCURY	12	CCME	0.1	Region 5	0.013	LANL[4]	1.7	LANL[4]
NICKEL	38	EcoSSL	280	EcoSSL	210	EcoSSL	130	EcoSSL
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA
SELENIUM	0.52	EcoSSL	4.1	EcoSSL	1.2	EcoSSL	0.63	EcoSSL
SILVER	560	EcoSSL	50	ORNL[2]	4.2	EcoSSL	14	EcoSSL
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA
THALLIUM	1.4	CCME	1.4	CCME	0.9	LANL	0.0569	Region 5
VANADIUM	130	CCME	130	CCME	7.8	EcoSSL	280	EcoSSL
ZINC	160	EcoSSL	120	EcoSSL	46	EcoSSL	79	EcoSSL
SEMIVOLATILES (UG/KG)								
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	NA	NA	20	LANL	925	Region 5
CARBAZOLE	NA	NA	NA	NA	NA	NA	80000	LANL
DIBENZOFURAN	6100	LANL	NA	NA	NA	NA	NA	NA
POLYNUCLEAR AROMATIC HYDROCARBONS (UG/KG)								
2-METHYLNAPHTHALENE	NA	NA	29000	EcoSSL	NA	NA	100000	EcoSSL
ACENAPHTHENE	20000	ORNL	29000	EcoSSL	NA	NA[5]	100000	EcoSSL
ACENAPHTHYLENE	20000	ORNL[6]	29000	EcoSSL	NA	NA	100000	EcoSSL
ANTHRACENE	2500	CCME	29000	EcoSSL	NA	NA[5]	100000	EcoSSL
BENZO(A)ANTHRACENE	18000	LANL	18000	EcoSSL	NA	NA[5]	1100	EcoSSL
BENZO(A)PYRENE	20000	CCME	18000	EcoSSL	NA	NA[5]	1100	EcoSSL
BENZO(B)FLUORANTHENE	18000	LANL	18000	EcoSSL	NA	NA[5]	1100	EcoSSL
BENZO(G,H,I)PERYLENE	NA	NA	18000	EcoSSL	NA	NA	1100	EcoSSL
BENZO(K)FLUORANTHENE	NA	NA	18000	EcoSSL	NA	NA[5]	1100	EcoSSL
CHRYSENE	NA	NA	18000	EcoSSL	NA	NA[5]	1100	EcoSSL
DIBENZO(A,H)ANTHRACENE	NA	NA	18000	EcoSSL	NA	NA	1100	EcoSSL
FLUORANTHENE	50000	CCME	29000	EcoSSL	NA	NA[5]	100000	EcoSSL
FLUORENE	NA	NA	29000	EcoSSL	NA	NA[5]	100000	EcoSSL
INDENO(1,2,3-CD)PYRENE	NA	NA	18000	EcoSSL	NA	NA	1100	EcoSSL
NAPHTHALENE	1000	LANL	29000	EcoSSL	NA	NA[5]	100000	EcoSSL
PHENANTHRENE	NA	NA	29000	EcoSSL	NA	NA[5]	100000	EcoSSL
PYRENE	NA	NA	18000	EcoSSL	NA	NA[5]	1100	EcoSSL
PESTICIDES (UG/KG)								
4,4'-DDD	12000	CCME	12000	CCME	93	EcoSSL	21	EcoSSL
4,4'-DDE	12000	CCME	12000	CCME	93	EcoSSL	21	EcoSSL
4,4'-DDT	12000	CCME	12000	CCME	93	EcoSSL	21	EcoSSL
ALDRIN	3.32	Region 5	NA	NA	NA	NA	37	LANL
ALPHA-BHC	NA	NA	NA	NA	NA	NA	99.4	Region 5
ALPHA-CHLORDANE	224	Region 5	NA	NA	280	LANL	270	LANL
BETA-BHC	3.98	Region 5	NA	NA	14000	LANL	270	LANL
DELTA-BHC	NA	NA	NA	NA	NA	NA	9940	Region 5
DIELDRIN	10000	LANL	NA	NA	22	EcoSSL	4.9	EcoSSL
ENDOSULFAN I	NA	NA	NA	NA	15000	LANL	119	Region 5
ENDOSULFAN II	NA	NA	NA	NA	NA	NA	119	Region 5
ENDOSULFAN SULFATE	NA	NA	NA	NA	NA	NA	35.8	Region 5
ENDRIN	3.4	LANL	NA	NA	1.4	LANL	10.1	Region 5
ENDRIN ALDEHYDE	NA	NA	NA	NA	NA	NA	10.5	Region 5
ENDRIN KETONE	NA	NA	NA	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	5	Region 5	NA	NA	210	LANL	9.4	LANL
GAMMA-CHLORDANE	224	Region 5	NA	NA	2300	LANL	2200	LANL
HEPTACHLOR	400	LANL	NA	NA	300	LANL	5.98	Region 5
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	NA	152	Region 5
METHOXYCHLOR	NA	NA	NA	NA	18000	LANL	19.9	Region 5

Screening Level Sources in the Order of Preference:
EcoSSL - EPA Ecological Soil Screening Levels (USEPA, 2005c-j, 2006, 2007b-f, 2008)
Region 5 - USEPA Region 5 Ecological Screening Levels (USEPA, 2003a).
CCME - Canadian Soil Quality Guidelines (CCME, 1999a-e, 2001, 2010).
ORNL - Oak Ridge National Laboratory Toxicological Benchmarks for plants and invertebrates (Efroymson et al., 1997a, 1997b).
LANL (3.1 database; LANL, 2012)

Footnotes:
1 - Only considered a COPC when the soil pH is less than 5.5.
2 - Value for soil microorganisms
3 - Not expected to be toxic to plants with a soil pH between 5 and 8.
4 - Available Canadian SQG was not selected because it was based on organic mercury toxicity to a pig.
5 - Canadian SQG was not selected because it was calculated using a lowest observed adverse effects level (LOAEL) for mammals.
6 - Value for acenaphthene.

NA - Not available

TABLE 7-3

SURFACE SOIL ECOLOGICAL COPC SELECTION FOR TERRESTRIAL RECEPTORS
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical	Frequency of Detection	Minimum Concentration	Maximum Concentration	Location of Maximum Concentration	Average Positive Result[1]	Overall Average[2]	Maximum Background Concentration[3]	Screening Levels[4]				EEQs[5]				Deletion or Selection of COPCs for Invertebrates/Plants		Further Evaluated in Terrestrial Food Chain Modeling[6]	
								Plants	Invertebrates	Birds	Mammals	Plants	Invertebrates	Birds	Mammals	COPC (yes/no)?	Rationale	Evaluated (yes/no)?	Rationale
METALS (MG/KG)																			
ALUMINUM	10/10	1250	10000	NTC12SB27	5966	5966	**9500**	NA	NA	NA	NA	NA	NA	NA	NA	**YES**	NSL	NO	NONBIO
ANTIMONY	3/10	0.44 J	1.12 J	NTC12SB29	0.673	0.524	4	5	78	NA	0.27	0.22	0.014	NA	**4.15**	NO	BSL	**YES**	ASL
ARSENIC	10/10	4.28 J	16.9 J	NTC12SB25	9.07	9.07	**13**	18	17	43	46	0.94	0.99	0.39	0.37	NO	BSL	NO	BSL
BARIUM	10/10	8.12 J	244 J	NTC12SB21	72.4	72.4	**110**	500	330	820	2000	0.49	0.74	0.30	0.12	NO	BSL	NO	BSL
BERYLLIUM	10/10	0.147 J	5.5	NTC12SB27	0.943	0.943	**0.59**	10	40	NA	21	0.55	0.14	NA	0.26	NO	BSL	NO	NONBIO
CADMIUM	10/10	0.119 J	1.03 J	NTC12SB29	0.554	0.554	**0.6**	32	140	0.77	0.36	0.032	0.0074	**1.3**	**2.9**	NO	BSL	**YES**	ASL
CALCIUM	10/10	24400	142000	NTC12SB23	71190	71190	**9300**	NA	NA	NA	NA	NA	NA	NA	NA	NO	NUT	NO	NUT
CHROMIUM	10/10	4.07 J	23.8 J	NTC12SB27	12.4	12.4	**16.2**	78	0.4	26	34	0.31	**60**	0.92	0.70	**YES**	ASL	NO	BSL
COBALT	10/10	2.08	11.2	NTC12SB27	7.09	7.09	**8.9**	13	1000	120	230	0.86	0.011	0.093	0.049	NO	BSL	NO	BSL
COPPER	10/10	6.55	271	NTC12SB27	68.4	68.4	**19.6**	70	80	28	49	**3.9**	**3.4**	**9.7**	**5.5**	**YES**	ASL	**YES**	ASL
IRON	10/10	4710	20300	NTC12SB27	13028	13028	**15900**	NA	200	NA	NA	NA	**102**	NA	NA	**YES**	NSL, ASL	NO	NONBIO
LEAD	10/10	17.9 J	263 J	NTC12SB29	85.6	85.6	**36**	120	1700	11	56	**2.2**	0.15	**24**	**4.7**	**YES**	ASL	**YES**	ASL
MAGNESIUM	10/10	11100	84600	NTC12SB23	39770	39770	**4820**	NA	NA	NA	NA	NA	NA	NA	NA	NO	NUT	NO	NUT
MANGANESE	10/10	137	701	NTC12SB29	446	446	**636**	220	450	4300	4000	**3.2**	**1.6**	0.16	0.18	**YES**	ASL	NO	BSL
MERCURY	10/10	0.0235 J	0.598	NTC12SB26	0.177	0.177	**0.06**	12	0.1	0.013	1.7	0.050	**6.0**	**46**	0.35	**YES**	ASL	**YES**	ASL
NICKEL	10/10	4.49	34.7	NTC12SB27	18.5	18.5	**18**	38	280	210	130	0.91	0.12	0.17	0.27	NO	BSL	NO	BSL
POTASSIUM	10/10	230 J	1640	NTC12SB27	1034	1034	**1268**	NA	NA	NA	NA	NA	NA	NA	NA	NO	NUT	NO	NUT
SELENIUM	7/10	0.288 J	0.791	NTC12SB29	0.525	0.453	**0.48**	0.52	4.1	1.2	0.63	**1.5**	0.19	0.66	**1.3**	**YES**	ASL	**YES**	ASL
SILVER	8/10	0.234 J	1.33	NTC12SB29	0.555	0.467	**0.55**	560	50	4.2	14	0.0024	0.027	0.32	0.10	NO	BSL	NO	BSL
SODIUM	10/10	75.3 J	336 J	NTC12SB29	201	201	**130**	NA	NA	NA	NA	NA	NA	NA	NA	NO	NUT	NO	NUT
THALLIUM	1/10	0.167 J	0.167 J	NTC12SB29	0.167	0.241	0.32	1.4	1.4	0.9	0.0569	0.12	0.12	0.19	**2.9**	NO	BSL	**YES**	ASL
VANADIUM	10/10	4.53	18.9	NTC12SB27	12.7	12.7	25.2	130	130	7.8	280	0.15	0.15	**2.4**	0.068	NO	BSL	**YES**	ASL
ZINC	10/10	44.7 J	1530 J	NTC12SB27	324	324	**95**	160	120	46	79	**9.6**	**13**	**33**	**19**	**YES**	ASL	**YES**	ASL
SEMIVOLATILES (UG/KG)																			
BIS(2-ETHYLHEXYL)PHTHALATE	1/10	149 J	149 J	NTC12SB25	149	185	--	NA	NA	20	925	NA	NA	**7.5**	0.16	**YES**	NSL	**YES**	ASL
CARBAZOLE	2/10	167 J	254 J	NTC12SB21	211	192	--	NA	NA	NA	80000	NA	NA	NA	0.0032	**YES**	NSL	NO	NONBIO
DIBENZOFURAN	1/10	144 J	144 J	NTC12SB27	144	184	--	6100	NA	NA	NA	0.024	NA	NA	NA	**YES**	NSL	NO	NONBIO
POLYNUCLEAR AROMATIC HYDROCARBONS (UG/KG)																			
2-METHYLNAPHTHALENE	10/10	4.77 J	87.9	NTC12SB29	33.7	33.7	140	NA	29000	NA	100000	NA	0.0030	NA	0.00088	**YES**	NSL	NO	NONBIO
ACENAPHTHENE	10/10	2.96 J	205	NTC12SB27	49.5	49.5	**130**	20000	29000	NA	100000	0.010	0.0071	NA	0.0021	NO	BSL	**YES**	NSL, BIO
ACENAPHTHYLENE	8/10	4.21 J	98.1	NTC12SB21	51.9	42.3	**70**	20000	29000	NA	100000	0.0049	0.0034	NA	0.00098	NO	BSL	**YES**	NSL, BIO
ANTHRACENE	10/10	8.45	606	NTC12SB27	206	206	**400**	2500	29000	NA	100000	0.24	0.021	NA	0.0061	NO	BSL	**YES**	NSL, BIO
BENZO(A)ANTHRACENE	10/10	29.3	1830	NTC12SB21	573	573	**1800**	18000	18000	NA	1100	0.10	0.10	NA	**1.7**	NO	BSL	**YES**	ASL
BENZO(A)PYRENE	10/10	21.8	1460	NTC12SB27	618	618	2100	20000	18000	NA	1100	0.073	0.081	NA	**1.3**	NO	BSL	**YES**	ASL
BENZO(B)FLUORANTHENE	10/10	31.8	2260	NTC12SB27	748	748	**2100**	18000	18000	NA	1100	0.13	0.13	NA	**2.1**	NO	BSL	**YES**	ASL
BENZO(G,H,I)PERYLENE	10/10	13.5	711	NTC12SB21	290	290	1700	NA	18000	NA	1100	NA	0.040	NA	0.65	**YES**	NSL	**YES**	NSL, BIO
BENZO(K)FLUORANTHENE	10/10	14.1 J	2280	NTC12SB21	543	543	**1700**	NA	18000	NA	1100	NA	0.13	NA	**2.1**	**YES**	NSL	**YES**	ASL
CHRYSENE	10/10	38.5	1530	NTC12SB21	529	529	2700	NA	18000	NA	1100	NA	0.085	NA	**1.4**	**YES**	NSL	**YES**	ASL
DIBENZO(A,H)ANTHRACENE	9/10	14	287	NTC12SB21	125	113	420	NA	18000	NA	1100	NA	0.016	NA	0.26	**YES**	NSL	**YES**	NSL, BIO
FLUORANTHENE	10/10	74.3	4290	NTC12SB21	1333	1333	**4100**	50000	29000	NA	100000	0.086	0.15	NA	0.043	NO	BSL	**YES**	NSL, BIO
FLUORENE	9/10	5.63 J	254	NTC12SB27	69.5	62.9	**180**	NA	29000	NA	100000	NA	0.0088	NA	0.0025	**YES**	NSL	**YES**	NSL, BIO
INDENO(1,2,3-CD)PYRENE	10/10	12.8	674	NTC12SB21	276	276	1600	NA	18000	NA	1100	NA	0.037	NA	0.61	**YES**	NSL	**YES**	NSL, BIO
NAPHTHALENE	10/10	4.25 J	91.5	NTC12SB27	30.2	30.2	200	1000	29000	NA	100000	0.092	0.0032	NA	0.00092	NO	BSL	NO	NONBIO
PHENANTHRENE	10/10	56.4	2370	NTC12SB21	732	732	2500	NA	29000	NA	100000	NA	0.082	NA	0.024	**YES**	NSL	**YES**	NSL, BIO
PYRENE	10/10	66	3190	NTC12SB21	1098	1098	**3000**	NA	18000	NA	1100	NA	0.18	NA	**2.9**	**YES**	NSL	**YES**	ASL
PESTICIDES (UG/KG)																			
4,4'-DDD	10/10	2.92	195	NTC12SB25	38.8	38.8	--	12000	12000	93	21	0.016	0.016	**2.1**	**9.3**	NO	BSL	**YES**	ASL
4,4'-DDE	10/10	1.29	197	NTC12SB25	77.8	77.8	--	12000	12000	93	21	0.016	0.016	**2.1**	**9.4**	NO	BSL	**YES**	ASL
4,4'-DDT	9/10	1.28 J	282	NTC12SB25	89.0	80.2	--	12000	12000	93	21	0.024	0.024	**3.0**	**13**	NO	BSL	**YES**	ASL
ALDRIN	5/10	0.374 J	20.8	NTC12SB25	4.95	2.66	--	3.32	NA	NA	37	**6.3**	NA	NA	0.56	**YES**	NSL, ASL	**YES**	NSL, BIO
ALPHA-BHC	3/10	0.509 J	1.1	NTC12SB25	0.75	0.487	--	NA	NA	NA	99.4	NA	NA	NA	0.011	**YES**	NSL	**YES**	NSL, BIO
ALPHA-CHLORDANE	10/10	0.14 J	3220	NTC12SB25	353	353	--	224	NA	280	270	**14**	NA	**12**	**12**	**YES**	NSL, ASL	**YES**	ASL
BETA-BHC	2/10	0.702 J	6.55	NTC12SB25	3.63	1.03	--	3.98	NA	14000	270	**1.6**	NA	0.00047	0.024	**YES**	NSL, ASL	NO	BSL
DELTA-BHC	9/10	0.151 J	4.65	NTC12SB25	1.70	1.57	--	NA	NA	NA	9940	NA	NA	NA	0.00047	**YES**	NSL	**YES**	NSL, BIO
DIELDRIN	8/10	0.246 J	16.6	NTC12SB25	3.10	2.55	--	10000	NA	22	4.9	0.0017	NA	0.75	**3.4**	**YES**	NSL	**YES**	ASL
ENDOSULFAN I	3/10	1.17	36.8	NTC12SB25	13.5	4.32	--	NA	NA	15000	119	NA	NA	0.0025	0.31	**YES**	NSL	NO	BSL
ENDOSULFAN II	7/10	0.24 J	53.5	NTC12SB25	8.29	5.92	--	NA	NA	NA	119	NA	NA	NA	0.45	**YES**	NSL	**YES**	NSL, BIO
ENDOSULFAN SULFATE	5/10	0.691 J	12.1	NTC12SB25	3.97	2.17	--	NA	NA	NA	35.8	NA	NA	NA	0.34	**YES**	NSL	**YES**	NSL, BIO

TABLE 7-3

SURFACE SOIL ECOLOGICAL COPC SELECTION FOR TERRESTRIAL RECEPTORS
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical	Frequency of Detection	Minimum Concentration	Maximum Concentration	Location of Maximum Concentration	Average Positive Result[1]	Overall Average[2]	Maximum Background Concentration[3]	Screening Levels[4]				EEQs[5]				Deletion or Selection of COPCs for Invertebrates/Plants		Further Evaluated in Terrestrial Food Chain Modeling[6]	
								Plants	Invertebrates	Birds	Mammals	Plants	Invertebrates	Birds	Mammals	COPC (yes/no)?	Rationale	Evaluated (yes/no)?	Rationale
ENDRIN	7/10	0.74 J	22.6	NTC12SB27	8.37	5.97	--	3.4	NA	1.4	10.1	**6.6**	NA	**16**	**2.2**	**YES**	NSL, ASL	**YES**	ASL
ENDRIN ALDEHYDE	6/10	0.66 J	19.5	NTC12SB25	4.56	2.89	--	NA	NA	NA	10.5	NA	NA	NA	**1.9**	**YES**	NSL	**YES**	ASL
ENDRIN KETONE	1/10	1.14	1.14	NTC12SB25	1.14	0.453	--	NA	NA	NA	NA	NA	NA	NA	NA	**YES**	NSL	**YES**	NSL, BIO
GAMMA-BHC (LINDANE)	4/10	0.144 J	0.6 J	NTC12SB29	0.388	0.379	--	5	NA	210	9.4	0.12	NA	0.0029	0.064	**YES**	NSL	NO	BSL
GAMMA-CHLORDANE	10/10	0.309 J	2600	NTC12SB25	281	281	--	224	NA	2300	2200	**12**	NA	**1.1**	**1.2**	**YES**	NSL, ASL	**YES**	ASL
HEPTACHLOR	4/10	0.18 J	236	NTC12SB25	60.6	24.4	--	400	NA	300	5.98	0.59	NA	0.79	**39**	**YES**	NSL	**YES**	ASL
HEPTACHLOR EPOXIDE	7/10	0.122 J	64	NTC12SB25	12.1	8.62	--	NA	NA	NA	152	NA	NA	NA	0.42	**YES**	NSL	**YES**	NSL, BIO
METHOXYCHLOR	3/10	0.383 J	3.04 J	NTC12SB26	1.34	0.664	--	NA	NA	18000	19.9	NA	NA	0.00017	0.15	**YES**	NSL	NO	BSL

Notes:
Shaded chemical name indicates that the chemical was selected as a COPC or retained for food chain modeling. Shaded cells indicate that the EEQ exceeds 1.

Footnotes:
1 - Average of detected concentrations only.
2 - Average of all analytical results including one-half of the detection limit for non-detects.
3 - Illinois EPA TACO background for Metropolitan Statistical Area. Value is shaded if maximum detection exceeds background.
4 - The sources of the screening levels are presented in Table 7-2.
5 - EEQ is calculated by dividing the chemical concentration by its screening level. Value is unitless.
6 - Chemicals with EEQs for birds or mammals greater than 1.0 or bioaccumulative chemicals without bird or mammal screening values are retained for food chain modeling.

Rationale Codes for COPC Selection:
ASL = Above Screening Level
BSL = Below Screening Level
NONBIO = Non-bioaccumulative chemical
NSL = No Screening Level
NUT = Essential Nutrient

Abbreviations:
COPC - Chemical of Potential Concern
EEQ - Ecological Effects Quotient
EPA - Environmental Protection Agency
J - Estimated concentration
NA - Not available or Not applicable
TACO - Tiered Approach to Corrective Action Objectives

TABLE 7-4

SURFACE SOIL ECOLOGICAL COPC SELECTION FOR SEDIMENT INVERTEBRATES
SITE 12 - HARBOR DREDGE SPOIL AREA
GREAT LAKES NAVAL STATION
GREAT LAKES, ILLINOIS

Chemical	Frequency of Detection	Minimum Concentration	Maximum Concentration	Location of Maximum Concentration	Average Positive Result[1]	Overall Average[2]	Ecological Screening Level[3]		COPC (yes/no)?	Rationale for COPC Selection
							Value	Source		
METALS (MG/KG)										
ALUMINUM	10/10	1250	10000	NTC12SB27	5966	5966	25500	NOAA	NO	BSL
ANTIMONY	3/10	0.44 J	1.12 J	NTC12SB29	0.673	0.524	3	NOAA	NO	BSL
ARSENIC	10/10	4.28 J	16.9 J	NTC12SB25	9.07	9.07	**9.79**	TEC	YES	ASL
BARIUM	10/10	8.12 J	244 J	NTC12SB21	72.4	72.4	NA	NA	YES	NSL
BERYLLIUM	10/10	0.147 J	5.5	NTC12SB27	0.943	0.943	NA	NA	YES	NSL
CADMIUM	10/10	0.119 J	1.03 J	NTC12SB29	0.554	0.554	**0.99**	TEC	YES	ASL
CALCIUM	10/10	24400	142000	NTC12SB23	71190	71190	NA	NA	NO	NUT
CHROMIUM	10/10	4.07 J	23.8 J	NTC12SB27	12.4	12.4	43.4	TEC	NO	BSL
COBALT	10/10	2.08	11.2	NTC12SB27	7.09	7.09	50	Region 5	NO	BSL
COPPER	10/10	6.55	271	NTC12SB27	68.4	68.4	**31.6**	TEC	YES	ASL
IRON	10/10	4710	20300	NTC12SB27	13028	13028	**20000**	NOAA	YES	ASL
LEAD	10/10	17.9 J	263 J	NTC12SB29	85.6	85.6	**35.8**	TEC	YES	ASL
MAGNESIUM	10/10	11100	84600	NTC12SB23	39770	39770	NA	NA	NO	NUT
MANGANESE	10/10	137	701	NTC12SB29	446	446	**460**	NOAA	YES	ASL
MERCURY	10/10	0.0235 J	0.598	NTC12SB26	0.177	0.177	**0.18**	TEC	YES	ASL
NICKEL	10/10	4.49	34.7	NTC12SB27	18.5	18.5	**22.7**	TEC	YES	ASL
POTASSIUM	10/10	230 J	1640	NTC12SB27	1034	1034	NA	NA	NO	NUT
SELENIUM	7/10	0.288 J	0.791	NTC12SB29	0.525	0.453	NA	NA	YES	NSL
SILVER	8/10	0.234 J	1.33	NTC12SB29	0.555	0.467	**0.5**	Region 5	YES	ASL
SODIUM	10/10	75.3 J	336 J	NTC12SB29	201	201	NA	NA	NO	NUT
THALLIUM	1/10	0.167 J	0.167 J	NTC12SB29	0.167	0.241	NA	NA	YES	NSL
VANADIUM	10/10	4.53	18.9	NTC12SB27	12.7	12.7	NA	NA	YES	NSL
ZINC	10/10	44.7 J	1530 J	NTC12SB27	324	324	**121**	TEC	YES	ASL
SEMIVOLATILES (UG/KG)										
BIS(2-ETHYLHEXYL)PHTHALATE	1/10	149 J	149 J	NTC12SB25	149	185	182	Region 5	NO	BSL
CARBAZOLE	2/10	167 J	254 J	NTC12SB21	211	192	NA	NA	YES	NSL
DIBENZOFURAN	1/10	144 J	144 J	NTC12SB27	144	184	449	Region 5	NO	BSL
POLYNUCLEAR AROMATIC HYDROCARBONS (UG/KG)										
2-METHYLNAPHTHALENE	10/10	4.77 J	87.9	NTC12SB29	33.7	33.7	**20.2**	Region 5	YES	ASL
ACENAPHTHENE	10/10	2.96 J	205	NTC12SB27	49.5	49.5	**6.71**	Region 5	YES	ASL
ACENAPHTHYLENE	8/10	4.21 J	98.1	NTC12SB21	51.9	42.3	**5.87**	Region 5	YES	ASL
ANTHRACENE	10/10	8.45	606	NTC12SB27	206	206	**57.2**	TEC	YES	ASL
BENZO(A)ANTHRACENE	10/10	29.3	1830	NTC12SB21	573	573	**108**	TEC	YES	ASL
BENZO(A)PYRENE	10/10	21.8	1460	NTC12SB27	618	618	**150**	TEC	YES	ASL
BENZO(B)FLUORANTHENE	10/10	31.8	2260	NTC12SB27	748	748	10400	Region 5	NO	BSL
BENZO(G,H,I)PERYLENE	10/10	13.5	711	NTC12SB21	290	290	**170**	Region 5	YES	ASL
BENZO(K)FLUORANTHENE	10/10	14.1 J	2280	NTC12SB21	543	543	**240**	Region 5	YES	ASL
CHRYSENE	10/10	38.5	1530	NTC12SB21	529	529	**166**	TEC	YES	ASL
DIBENZO(A,H)ANTHRACENE	9/10	14	287	NTC12SB21	125	113	**33**	TEC	YES	ASL
FLUORANTHENE	10/10	74.3	4290	NTC12SB21	1333	1333	**423**	TEC	YES	ASL
FLUORENE	9/10	5.63 J	254	NTC12SB27	69.5	62.9	**77.4**	TEC	YES	ASL
INDENO(1,2,3-CD)PYRENE	10/10	12.8	674	NTC12SB21	276	276	**200**	Region 5	YES	ASL

TABLE 7-4

SURFACE SOIL ECOLOGICAL COPC SELECTION FOR SEDIMENT INVERTEBRATES
SITE 12 - HARBOR DREDGE SPOIL AREA
GREAT LAKES NAVAL STATION
GREAT LAKES, ILLINOIS

Chemical	Frequency of Detection	Minimum Concentration	Maximum Concentration	Location of Maximum Concentration	Average Positive Result[1]	Overall Average[2]	Ecological Screening Level[3]		COPC (yes/no)?	Rationale for COPC Selection
							Value	Source		
NAPHTHALENE	10/10	4.25 J	91.5	NTC12SB27	30.2	30.2	176	TEC	NO	BSL
PHENANTHRENE	10/10	56.4	2370	NTC12SB21	732	732	**204**	TEC	YES	ASL
PYRENE	10/10	66	3190	NTC12SB21	1098	1098	**195**	TEC	YES	ASL
PESTICIDES (UG/KG)										
4,4'-DDD	10/10	2.92	195	NTC12SB25	38.8	38.8	**4.88**	TEC	YES	ASL
4,4'-DDE	10/10	1.29	197	NTC12SB25	77.8	77.8	**3.16**	TEC	YES	ASL
4,4'-DDT	9/10	1.28 J	282	NTC12SB25	89.0	80.2	**4.16**	TEC	YES	ASL
ALDRIN	5/10	0.374 J	20.8	NTC12SB25	4.95	2.66	**2**	Region 5	YES	ASL
ALPHA-BHC	3/10	0.509 J	1.1	NTC12SB25	0.75	0.487	6	Region 5	NO	BSL
ALPHA-CHLORDANE	10/10	0.14 J	3220	NTC12SB25	353	353	**3.24**	TEC	YES	ASL
BETA-BHC	2/10	0.702 J	6.55	NTC12SB25	3.63	1.03	**5**	Region 5	YES	ASL
DELTA-BHC	9/10	0.151 J	4.65	NTC12SB25	1.70	1.57	71500	Region 5	NO	BSL
DIELDRIN	8/10	0.246 J	16.6	NTC12SB25	3.10	2.55	**1.9**	TEC	YES	ASL
ENDOSULFAN I	3/10	1.17	36.8	NTC12SB25	13.5	4.32	**3.26**	Region 5	YES	ASL
ENDOSULFAN II	7/10	0.24 J	53.5	NTC12SB25	8.29	5.92	**1.94**	Region 5	YES	ASL
ENDOSULFAN SULFATE	5/10	0.691 J	12.1	NTC12SB25	3.97	2.17	34.6	Region 5	NO	BSL
ENDRIN	7/10	0.74 J	22.6	NTC12SB27	8.37	5.97	**2.22**	TEC	YES	ASL
ENDRIN ALDEHYDE	6/10	0.66 J	19.5	NTC12SB25	4.56	2.89	480	Region 5	NO	BSL
ENDRIN KETONE	1/10	1.14	1.14	NTC12SB25	1.14	0.453	2.22	TEC[4]	NO	BSL
GAMMA-BHC (LINDANE)	4/10	0.144 J	0.6 J	NTC12SB29	0.388	0.379	2.37	TEC	NO	BSL
GAMMA-CHLORDANE	10/10	0.309 J	2600	NTC12SB25	281	281	**3.24**	TEC	YES	ASL
HEPTACHLOR	4/10	0.18 J	236	NTC12SB25	60.6	24.4	**2.47**	TEC[5]	YES	ASL
HEPTACHLOR EPOXIDE	7/10	0.122 J	64	NTC12SB25	12.1	8.62	**2.47**	TEC	YES	ASL
METHOXYCHLOR	3/10	0.383 J	3.04 J	NTC12SB26	1.34	0.664	13.6	Region 5	NO	BSL

Notes:
Shaded criterion indicates that the maximum detected concentration exceed screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Footnotes:
1 - Average of detected concentrations only.
2 - Average of all analytical results including one-half of the detection limit for non-detects.
3 - Screening Level Sources used in the following order of preference:
TEC- Threshold Effect Concentration (MacDonald et al, 2000)
Region 5 - USEPA Region 5 Ecological Screening Levels, Sediment (USEPA, 2003)
NOAA - National Oceanic and Atmospheric Adminstration Quick Reference Tables, Sediment (Buchman, 2008)
4 - Value for endrin.
5 - Value for heptachlor epoxide.

Abbreviations:
COPC = Chemical of Potential Concern
NA = Not available or not applicable
J = Estimated value

Rationale Codes for COPC Selection:
ASL = Above COPC Screening Level
BSL = Below COPC Screening Level
NUT = Essential Nutrient
NSL = No Screening Level Available

TABLE 7-5

COMPARISON OF SUBSURFACE SOIL SAMPLES ANALYZED BY SPLP TO ECOLOGICAL SURFACE WATER SCREENING VALUES
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	Illinois EPA Water Quality Standards[1]	Frequency of Detection	Minimum Non Detected	Maximum Non Detected	Mininum Detected	Maximum Detected	Sample of Maximum Detected	Mean of All Samples	Mean of All Samples (DAF of 10)	Mean of All Samples (DAF of 25)	Mean of All Samples (DAF of 50)
SPLP METALS (µg/L)											
ALUMINUM	87 [2]	8/8	-	-	41 J	**10000** J	NTC12-SB33-0406	**2890**	**289**	**115.6**	57.8
ANTIMONY	320 [3]	7/8	0.82	0.82	3.6 J	30 J	NTC12-SB32-0406	10.4	1.04	0.416	0.208
ARSENIC	148	7/8	0.5	0.5	1.9	16	NTC12-SB34-0406	6.6	0.66	0.264	0.132
BARIUM	5000	8/8	-	-	3.8 J	130 J	NTC12-SB33-0406	38.1	3.81	1.524	0.762
BERYLLIUM	NA	3/8	0.4	0.4	0.23 J	0.71 J	NTC12-SB33-0406	0.28	0.028	0.0112	0.0056
CADMIUM	2.78 [4]	7/8	0.1	0.1	0.042 J	**4.8**	NTC12-SB33-0406	0.91	0.091	0.0364	0.0182
CALCIUM	NA	8/8	-	-	13000	180000	NTC12-SB34-0204	47900	4790	1916	958
CHROMIUM	94.2 [4, 5]	8/8	-	-	0.77 J	46 J	NTC12-SB33-0406	11.6	1.16	0.464	0.232
COBALT	NA	8/8	-	-	0.13 J	13 J	NTC12-SB33-0406	2.7	0.27	0.108	0.054
COPPER	11.5 [4]	8/8	-	-	4.2	**92** J	NTC12-SB33-0406	**28.8**	2.88	1.152	0.576
IRON	1000	7/8	10	10	120	**13000**	NTC12-SB33-0406	**3680**	368	147.2	73.6
LEAD	6.97 [4]	7/8	0.5	0.5	0.84 J	**150** J	NTC12-SB33-0406	**39.6**	3.96	1.584	0.792
MAGNESIUM	NA	7/8	500	500	400 J	8900	NTC12-SB33-0406	3460	346	138.4	69.2
MANGANESE	2210 [4]	8/8	-	-	0.24 J	360 J	NTC12-SB33-0406	88.6	8.86	3.544	1.772
MERCURY	0.91	4/8	0.1	0.1	0.067 J	**1**	NTC12-SB33-0406	0.23	0.023	0.0092	0.0046
NICKEL	66.6 [4]	8/8	-	-	0.92 J	53 J	NTC12-SB33-0406	12.6	1.26	0.504	0.252
POTASSIUM	NA	8/8	-	-	1100	6000	NTC12-SB33-0406	2700	270	108	54
SELENIUM	5	2/8	1	1.6	2.1	3.6	NTC12-SB31-0507	1.1	0.11	0.044	0.022
SILVER	5	6/8	0.1	0.1	0.045 J	**13**	NTC12-SB33-0406	2.7	0.27	0.108	0.054
SODIUM	NA	8/8	-	-	8700 J	24000 J	NTC12-SB34-0406	14600	1460	584	292
THALLIUM	15 [3]	5/8	0.1	0.1	0.054 J	0.32 J	NTC12-SB33-0406	0.11	0.011	0.0044	0.0022
VANADIUM	NA	8/8	-	-	0.74 J	32	NTC12-SB32-0204	10.6	1.06	0.424	0.212
ZINC	151 [4]	5/8	4	4.4	31 J	**350** J	NTC12-SB33-0406	88.8	8.88	3.552	1.776

Shaded value indicates that the concentration exceeds the screening criterion.
Ilinois criteria used unless no criteria was available.

1 - Unless otherwise noted, values are from Illinois Pollution Control Board, 2013b. Water Quality Standards for the Protection of Aquatic Organisms, chronic values. Title 35: Environmental Protection Subtitle C: Water Pollution Chapter I: Pollution Control Board Part 302 Water Quality Standards. Effective May 16, 2013. Accessed September 25, 2013. Lake Michigan values used when available.
2 - National Recommended Water Quality Criteria (UPEPA, 2012b). Chronic freshwater value used.
3 - Illinois EPA, 2013b. Derived Water Quality Criteria pursuant to 35 Ill. Adm. Code 302, Subpart F. http://www.epa.state.il.us/water/water-quality-standards/water-quality-criteria.html. Revised April 4, 2013. Lake Michigan values used when available.
4 - Hardness dependent equation. Calculated hardness value of 134 mg/L using calcium concentration of 47.9 mg/L and mangnesium concentration of 3.46 mg/L.
5 - Value for trivalent chromium.

NA - No criteria available
DAF - Dilution Attenuation Factor

TABLE 7-6

ECOLOGICAL GROUNDWATER COPC SELECTION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	Minimum Concentration[1]	Maximum Concentration[1]	Sample of Maximum Concentration	Frequency of Detection	Average of Positive Concentrations[2]	Average of All Results[3]	Illinois EPA Water Quality Standards[4]	COPC (yes/no)?	Rationale for COPC Selection
DISSOLVED METALS (µg/L)									
ARSENIC	5.8	71	NTC12GW-04	3/4	34.8	26.2	148	NO	BSL
BARIUM	48	220	NTC12GW-04	4/4	135.8	135.8	5000 [5]	NO	BSL
CADMIUM	0.12 J	0.45	NTC12GW-01	2/4	0.29	0.17	6.22 [6]	NO	BSL
CALCIUM	130000	240000	NTC12GW-02	4/4	193750	193750	NA	NO	NUT
COBALT	0.21 J	9	NTC12GW-02	4/4	3.3	3.3	23 [7]	NO	BSL
COPPER	0.66 J	7.4 J	NTC12GW-01	4/4	2.7	2.7	29.3 [6]	NO	BSL
IRON	55	18000	NTC12GW-04	4/4	7801	7801	**1000**	**YES**	ASL
LEAD	0.22 J	0.22 J	NTC12GW-02	1/4	0.22	0.24	22.1 [6]	NO	BSL
MAGNESIUM	52000	150000	NTC12GW-01	4/4	86500	86500	NA	NO	NUT
MANGANESE	240 J	670 J	NTC12GW-04	4/4	456	456	5010 [6]	NO	BSL
NICKEL	0.59 J	48	NTC12GW-02	4/4	14.9	14.9	168 [6]	NO	BSL
POTASSIUM	5500	6900	NTC12GW-04	4/4	6175	6175	NA	NO	NUT
SILVER	0.056 J	0.077 J	NTC12GW-01	2/4	0.067	0.058	5 [5]	NO	BSL
SODIUM	63000	160000	NTC12GW-02	4/4	107375	107375	NA	NO	NUT
THALLIUM	0.029 J	0.055 J	NTC12GW-01	2/4	0.042	0.046	15 [8]	NO	BSL
ZINC	3.7 J	130	NTC12GW-02	4/4	46.2	46.2	382 [6]	NO	BSL
METALS (µg/L)									
ALUMINUM	57 J	57 J	NTC12GW-04	1/4	57.0	33.0	87 [9]	NO	BSL
ARSENIC	5.3	78	NTC12GW-04	3/4	37.3	28.1	148 [10]	NO	BSL
BARIUM	45 J	240 J	NTC12GW-04	4/4	139	139	5000	NO	BSL
CADMIUM	0.054 J	0.39	NTC12GW-01	3/4	0.18	0.15	7.31 [6]	NO	BSL
CALCIUM	130000	240000	NTC12GW-02	4/4	192500	192500	NA	NO	NUT
CHROMIUM	0.24 J	0.81 J	NTC12GW-01	4/4	0.51	0.51	268 [6, 11]	NO	BSL
COBALT	0.19 J	7	NTC12GW-02	4/4	2.6	2.6	23 [7]	NO	BSL
COPPER	0.72 J	7 J	NTC12GW-01	4/4	3.0	3.0	30.5 [6]	NO	BSL
IRON	66	19000	NTC12GW-04	4/4	8004	8004	**1000 [10]**	**YES**	ASL
LEAD	0.2 J	2.1	NTC12GW-04	3/4	0.84	0.69	37.5 [6]	NO	BSL
MAGNESIUM	51000	160000	NTC12GW-01	4/4	88500	88500	NA	NO	NUT
MANGANESE	220 J	740 J	NTC12GW-04	4/4	463	463	5100 [6]	NO	BSL
NICKEL	0.91 J	40	NTC12GW-02	4/4	12.4	12.4	169 [6]	NO	BSL
POTASSIUM	5300	7100	NTC12GW-04	4/4	6125	6125	NA	NO	NUT
SELENIUM	4.2	4.2	NTC12GW-02	1/4	4.2	1.4	5 [10]	NO	BSL
SILVER	0.046 J	0.06 J	NTC12GW-01	2/4	0.053	0.052	5	NO	BSL
SODIUM	65000	160000	NTC12GW-02	4/4	106750	106750	NA	NO	NUT
THALLIUM	0.035 J	0.056 J	NTC12GW-01	2/4	0.046	0.048	15 [8]	NO	BSL
VANADIUM	0.11 J	0.42 J	NTC12GW-04	4/4	0.28	0.28	20 [7]	NO	BSL
ZINC	4.8 J	130	NTC12GW-02	4/4	47.0	47.0	388 [5]	NO	BSL

TABLE 7-6

ECOLOGICAL GROUNDWATER COPC SELECTION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Average of detected concentrations only.
3 - Average of all analytical results including one-half of the detection limit for non-detects.
4 - Unless otherwise noted, values are from Illinois Pollution Control Board, 2013b. Water Quality Standards for the Protection of Aquatic Organisms, chronic values. Title 35: Environmental Protection Subtitle C: Water Pollution Chapter I: Pollution Control Board Part 302 Water Quality Standards. Effective May 16, 2013. Accessed September 25, 2013. Lake Michigan values used when available.
5 - Total value presented because dissolved value was not available.
6 - Hardness dependent equation. Used hardness value of 400 mg/L. Hardness in groundwater at the site ranged from 535 to 1130 mg/L based on calcium and magnesium concentrations.
7 - Toxicological Benchmarks for Aquatic Biota, secondary chronic values (Suter and Tsao, 1996).
8 - Illinois EPA, 2013b. Derived Water Quality Criteria pursuant to 35 Ill. Adm. Code 302, Subpart F. http://www.epa.state.il.us/water/water-quality-standards/water-quality-criteria.html. Revised April 4, 2013. Lake Michigan values used when available.
9 - National Recommended Water Quality Criteria (UPEPA, 2012b). Chronic freshwater value used.
10 - Dissolved value presented because total value was not available.
11 - Value for trivalent chromium.

Notes:
Shaded criterion indicates that the maximum detected concentration exceeds the screening criterion. Shaded chemical name indicates that the chemical was retained as a COPC.

Abbreviations:
COPC = Chemical of Potential Concern
NA = Not available or not applicable
J = Estimated value

Rationale Codes for COPC Selection:
ASL = Above COPC Screening Level
BSL = Below COPC Screening Level
NUT = Essential Nutrient
NSL = No Screening Level Available

TABLE 7-7

TERRESTRIAL FOOD CHAIN MODEL - TIER 1 SCENARIO
INVERTIVOROUS AND HERBIVOROUS RECEPTORS
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

	Herbivorous Receptors EEQs				Invertivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		American Woodcock		Short-Tailed Shrew	
Chemical	NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based
METALS								
ANTIMONY	NV	NV	1.5E-01	3.2E-03	NV	NV	2.1E+00	4.5E-02
CADMIUM	5.6E-02	1.3E-02	9.5E-02	1.1E-02	1.2E+00	2.7E-01	1.2E+00	1.3E-01
COPPER	1.4E+00	1.7E-01	5.2E-01	3.5E-02	9.1E+00	1.1E+00	2.8E+00	1.9E-01
LEAD	2.8E+00	1.0E-01	3.4E-01	8.6E-03	1.4E+01	5.2E-01	1.8E+00	4.6E-02
MERCURY	5.1E+01	5.1E+00	1.0E+01	2.1E+00	3.2E+01	3.2E+00	3.1E+00	6.2E-01
SELENIUM	1.8E-01	6.5E-02	3.2E-01	7.0E-02	6.3E-01	2.2E-01	6.0E-01	1.3E-01
THALLIUM	NV	NV	9.0E-02	9.0E-03	NV	NV	2.5E+00	2.5E-01
VANADIUM	8.4E-01	1.7E-01	1.8E-02	8.2E-03	2.3E+00	4.6E-01	3.5E-02	1.5E-02
ZINC	7.9E-01	3.0E-01	4.8E-01	1.2E-01	3.6E+00	1.4E+00	1.4E+00	3.6E-01
SEMIVOLATILES								
BIS(2-ETHYLHEXYL)PHTHALATE	2.0E-03	2.0E-04	3.0E-05	3.0E-06	3.1E-02	3.1E-03	8.9E-04	8.9E-05
POLYNUCLEAR AROMATIC HYDROCARBONS								
ACENAPHTHENE	2.3E-03	2.3E-04	3.6E-05	6.7E-06	3.4E-02	3.4E-03	5.0E-04	9.2E-05
ACENAPHTHYLENE	3.4E-03	3.4E-04	9.1E-05	1.7E-05	2.3E-01	2.3E-02	3.7E-03	6.7E-04
ANTHRACENE	1.8E-02	1.8E-03	4.6E-04	8.4E-05	1.6E-01	1.6E-02	2.4E-03	4.4E-04
BENZO(A)ANTHRACENE	1.8E-02	1.8E-03	2.8E-02	4.4E-04	3.2E-01	3.2E-02	5.1E-01	8.2E-03
BENZO(A)PYRENE	2.0E-02	2.0E-03	4.1E-02	6.6E-04	2.2E-01	2.2E-02	3.4E-01	5.5E-03
BENZO(B)FLUORANTHENE	5.4E-02	5.4E-03	1.4E-01	2.2E-03	6.3E-01	6.3E-02	1.0E+00	1.7E-02
BENZO(G,H,I)PERYLENE	1.9E-02	1.9E-03	5.1E-02	8.2E-04	2.2E-01	2.2E-02	3.7E-01	5.9E-03
BENZO(K)FLUORANTHENE	2.9E-02	2.9E-03	5.5E-02	8.9E-04	6.3E-01	6.3E-02	1.0E+00	1.7E-02
CHRYSENE	1.6E-02	1.6E-03	2.4E-02	3.9E-04	3.8E-01	3.8E-02	6.2E-01	9.9E-03
DIBENZO(A,H)ANTHRACENE	4.1E-03	4.1E-04	8.4E-03	1.3E-04	7.1E-02	7.1E-03	1.2E-01	1.9E-03
FLUORANTHENE	1.4E-01	1.4E-02	3.8E-03	7.1E-04	1.4E+00	1.4E-01	2.1E-02	3.9E-03
FLUORENE	2.5E-03	2.5E-04	3.5E-05	6.4E-06	2.5E-01	2.5E-02	4.0E-03	7.3E-04
INDENO(1,2,3-CD)PYRENE	8.9E-03	8.9E-04	1.7E-02	2.8E-04	2.0E-01	2.0E-02	3.4E-01	5.4E-03
PHENANTHRENE	9.4E-02	9.4E-03	2.6E-03	4.7E-04	4.5E-01	4.5E-02	6.7E-03	1.2E-03
PYRENE	1.4E-01	1.4E-02	4.3E-01	6.9E-03	6.1E-01	6.1E-02	9.9E-01	1.6E-02
PESTICIDES								
4,4'-DDD	2.4E-02	2.0E-03	2.3E-02	6.0E-04	9.3E-01	7.8E-02	7.5E-01	2.0E-02
4,4'-DDE	2.4E-02	2.0E-03	2.3E-02	6.0E-04	2.5E+00	2.1E-01	2.1E+00	5.5E-02
4,4'-DDT	3.3E-02	2.8E-03	3.0E-02	8.0E-04	2.5E+00	2.1E-01	2.0E+00	5.4E-02
ALDRIN	NV	NV	4.4E-04	8.9E-05	NV	NV	3.7E-02	7.4E-03
ALPHA-BHC	7.9E-05	2.0E-05	2.4E-03	2.4E-04	4.6E-04	1.1E-04	8.6E-03	8.6E-04
ALPHA-CHLORDANE	2.4E-02	4.7E-03	3.2E-03	1.6E-03	1.6E+00	3.1E-01	3.8E-01	1.9E-01
DELTA-BHC	2.6E-04	6.4E-05	6.8E-03	6.8E-04	1.9E-03	4.8E-04	3.6E-02	3.6E-03
DIELDRIN	1.4E-02	1.2E-03	5.4E-02	6.4E-04	7.0E-01	6.2E-02	1.7E+00	2.1E-02
ENDOSULFAN II	2.1E-04	2.1E-05	1.0E-02	1.0E-03	1.2E-03	1.2E-04	3.9E-02	3.9E-03
ENDOSULFAN SULFATE	5.5E-05	5.5E-06	2.9E-03	2.9E-04	2.8E-04	2.8E-05	8.9E-03	8.9E-04
ENDRIN	4.1E-02	4.1E-03	1.9E-03	1.9E-04	1.6E+00	1.6E-01	9.5E-02	9.5E-03
ENDRIN ALDEHYDE	3.6E-02	3.6E-03	1.6E-03	1.6E-04	1.5E+00	1.5E-01	8.2E-02	8.2E-03
ENDRIN KETONE	2.1E-03	2.1E-04	9.5E-05	9.5E-06	8.6E-02	8.6E-03	4.8E-03	4.8E-04
GAMMA-CHLORDANE	1.9E-02	3.8E-03	2.6E-03	1.3E-03	1.3E+00	2.5E-01	3.0E-01	1.5E-01
HEPTACHLOR	NV	NV	1.1E-02	1.1E-03	NV	NV	2.5E+00	2.5E-01
HEPTACHLOR EPOXIDE	NV	NV	5.8E-03	5.8E-04	NV	NV	2.1E-01	2.1E-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
NV - No value determined

TABLE 7-8

SURFACE SOIL CONCENTRATIONS COMPARED TO HIGHER EFFECT LEVEL SCREENING CRITERIA FOR SEDIMENT
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical	Higher Effects Level		Concentration			Number of Samples exceeding Higher Effects Level
	Value	Source	Maximum	Average Positive Result	Overall Average	
METALS (MG/KG)						
ARSENIC	33	PEC	16.9	9.07	9.07	0
CADMIUM	4.98	PEC	1.03	0.554	0.554	0
CHROMIUM	111	PEC	23.8	12.4	12.4	0
COPPER	149	PEC	**271**	68.4	68.4	1
IRON	40000	NOAA	20300	13028	13028	0
LEAD	128	PEC	**263**	85.6	85.6	2
MERCURY	1.06	PEC	0.598	0.177	0.177	0
NICKEL	48.6	PEC	34.7	18.5	18.5	0
ZINC	459	PEC	**1530**	324	324	1
POLYNUCLEAR AROMATIC HYDROCARBONS (UG/KG)						
ANTHRACENE	845	PEC	606	206	206	0
BENZO(A)ANTHRACENE	1050	PEC	**1830**	573	573	3
BENZO(A)PYRENE	1450	PEC	**1460**	618	618	1
CHRYSENE	1290	PEC	**1530**	529	529	1
FLUORANTHENE	2230	PEC	**4290**	1333	1333	3
FLUORENE	536	PEC	254	69.5	62.9	0
NAPHTHALENE	561	PEC	91.5	30.2	30.2	0
PHENANTHRENE	1170	PEC	**2370**	732	732	2
PYRENE	1520	PEC	**3190**	1098	1098	4
TOTAL PAHS	22800	PEC	NA	NA	NA	NA
PESTICIDES (UG/KG)						
4,4'-DDD	28	PEC	**195**	**38.8**	**38.8**	4
4,4'-DDE	31.3	PEC	**197**	**77.8**	**77.8**	6
4,4'-DDT	62.9	PEC	**282**	**89.0**	**80.2**	5
ALPHA-CHLORDANE	17.6	PEC	**3220**	**353**	**353**	3
DIELDRIN	61.8	PEC	16.6	3.10	2.55	0
ENDRIN	207	PEC	22.6	8.37	5.97	0
GAMMA-BHC (LINDANE)	4.99	PEC	0.60	0.388	0.379	0
GAMMA-CHLORDANE	17.6	PEC	**2600**	**281**	**281**	3
HEPTACHLOR	17.6	PEC[(1)]	**236**	**60.6**	**24.4**	1
HEPTACHLOR EPOXIDE	16	PEC	**64.0**	12.1	8.62	1

Shaded cells indicate concentration exceeds higher effects level.
PEC- Probable Effect Concentration (MacDonald et al, 2000)
NOAA - National Oceanic and Atmospheric Adminstration
Quick Reference Tables, Sediment (Buchman, 2008)
1 - Value for heptachlor epoxide.
NA - Not available

TABLE 7-9

TERRESTRIAL FOOD CHAIN MODEL - TIER 2, STEP 3A SCENARIO
INVERTIVOROUS AND HERBIVOROUS RECEPTORS
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

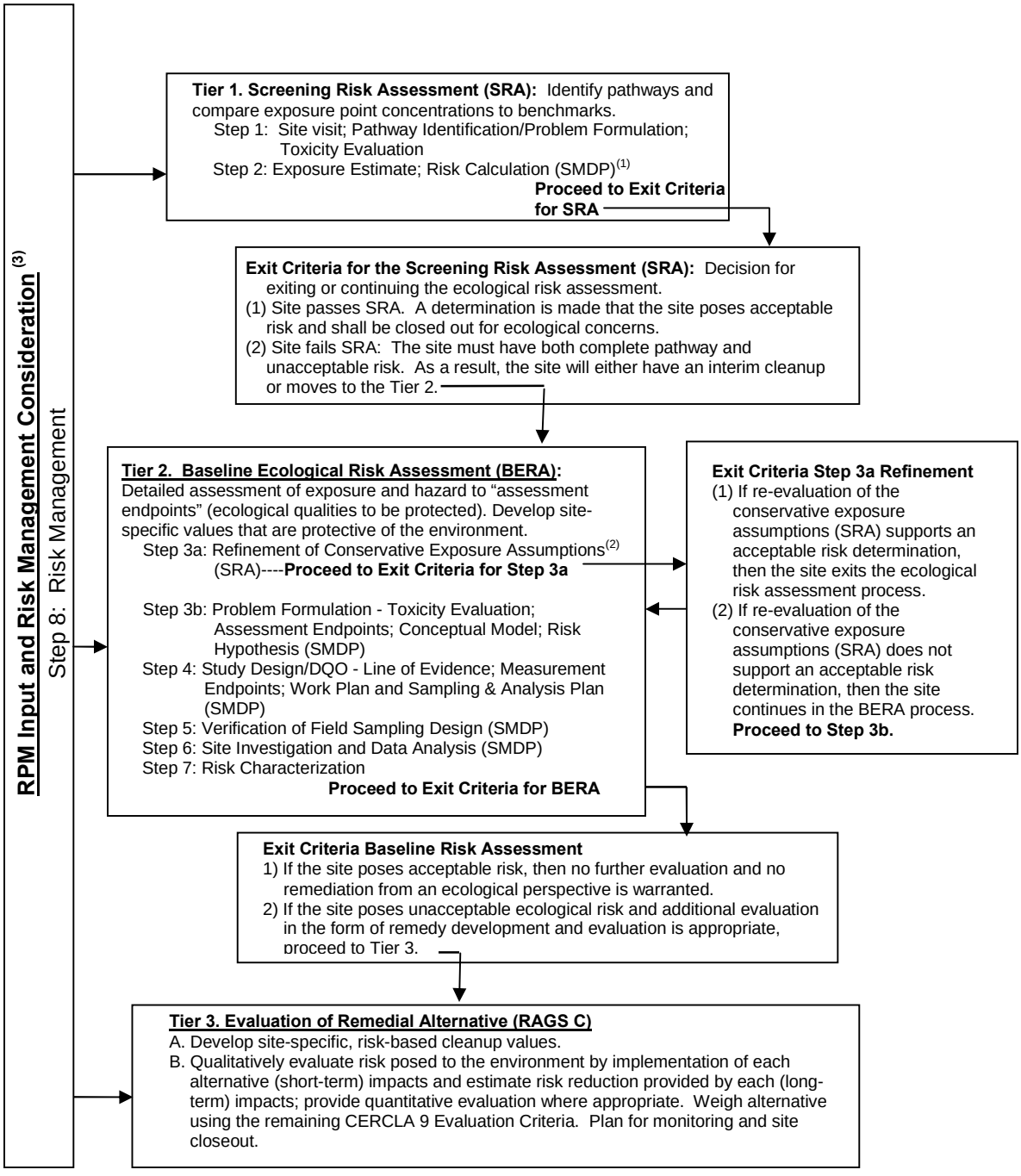
	Herbivorous Receptors EEQs				Invertivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		American Woodcock		Short-Tailed Shrew	
Chemical	NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based
METALS								
ANTIMONY	NV	NV	2.3E-02	4.9E-04	NV	NV	8.0E-01	1.7E-02
CADMIUM	2.6E-02	5.9E-03	2.9E-02	3.2E-03	4.4E-01	1.0E-01	6.0E-01	6.7E-02
COPPER	2.8E-01	3.2E-02	9.7E-02	6.6E-03	1.2E+00	1.4E-01	5.7E-01	3.9E-02
LEAD	4.0E-01	1.5E-02	4.4E-02	1.1E-03	2.6E+00	9.6E-02	5.7E-01	1.4E-02
MERCURY	1.5E+00	1.5E-01	1.8E-01	3.6E-02	1.2E+01	1.2E+00	1.7E+00	3.4E-01
THALLIUM	NV	NV	1.8E-02	1.8E-03	NV	NV	2.0E+00	2.0E-01
VANADIUM	1.9E-01	3.9E-02	2.5E-03	1.1E-03	4.8E-01	9.9E-02	1.4E-02	6.1E-03
ZINC	1.6E-01	6.3E-02	7.9E-02	2.0E-02	1.1E+00	4.2E-01	6.8E-01	1.7E-01
POLYNUCLEAR AROMATIC HYDROCARBONS								
FLUORANTHENE	2.9E-02	2.9E-03	5.1E-04	9.3E-05	2.5E-01	2.5E-02	5.5E-03	1.0E-03
PESTICIDES								
4,4'-DDE	5.7E-03	4.8E-04	4.2E-03	1.1E-04	6.9E-01	5.8E-02	7.6E-01	2.0E-02
4,4'-DDT	5.8E-03	4.9E-04	4.3E-03	1.1E-04	5.1E-01	4.3E-02	5.7E-01	1.5E-02
ALPHA-CHLORDANE	9.0E-04	1.8E-04	8.1E-05	4.0E-05	1.0E-01	2.1E-02	3.4E-02	1.7E-02
DIELDRIN	1.3E-03	1.2E-04	3.5E-03	4.1E-05	6.5E-02	5.8E-03	2.2E-01	2.6E-03
ENDRIN	4.4E-03	4.4E-04	1.6E-04	1.6E-05	2.6E-01	2.6E-02	2.1E-02	2.1E-03
ENDRIN ALDEHYDE	2.2E-03	2.2E-04	7.5E-05	7.5E-06	1.3E-01	1.3E-02	1.0E-02	1.0E-03
GAMMA-CHLORDANE	7.2E-04	1.4E-04	6.4E-05	3.2E-05	8.2E-02	1.6E-02	2.7E-02	1.4E-02
HEPTACHLOR	NV	NV	2.8E-04	2.8E-05	NV	NV	2.2E-01	2.2E-02
HEPTACHLOR EPOXIDE	NV	NV	2.6E-04	2.6E-05	NV	NV	2.3E-02	2.3E-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
NV - No value determined

FIGURE 7-1

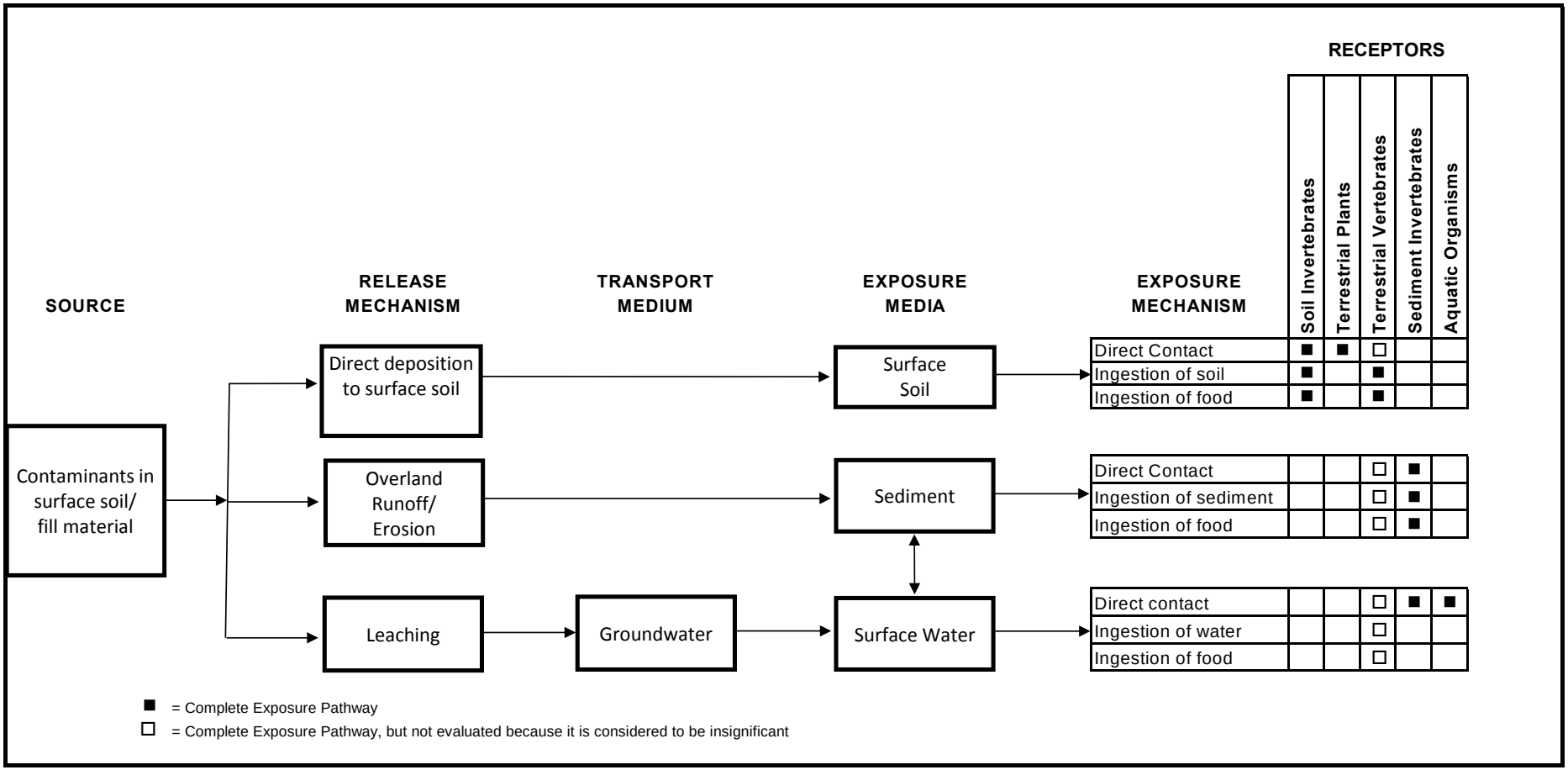
NAVY ECOLOGICAL RISK ASSESSMENT TIERED APPROACH
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES, ILLINOIS



Notes: 1 See USEPA's 8 Steps ERA Process for requirements for each Scientific Management Decision Point (SMDP).
2 Refinement includes but is not limited to background, bioavailability, detection frequency, etc.
3 Risk management is incorporated throughout the tiered approach.

FIGURE 7-2

ECOLOGICAL CONCEPTUAL SITE MODEL
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES, ILLINOIS



Blank space indicates incomplete exposure pathway or relatively insignificant or not applicable potential exposure.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 REMEDIAL INVESTIGATION RESULTS

The Site 12 RI required the collection of chemical data to be used to characterize the site and conduct a screening level HHRA and ERA. Both soil and groundwater sampling was conducted during the RI. Leachate from subsurface soil samples was evaluated to determine contaminants that could potentially migrate to groundwater. Groundwater was sampled to determine if contaminants in the soil had leached and impacted the groundwater and potentially migrated to surface water (Lake Michigan). Groundwater was generally not considered a media of concern because NSGL and the communities surrounding the base use a public water supply that obtains water from Lake Michigan. NSGL also has an ordinance that does not allow the use of groundwater and a Memorandum of Agreement with Illinois EPA that restricts the use of groundwater. The shallow groundwater at Site 12 is less than 10 feet bgs and generally flows eastward towards the lake.

8.1.1 Soil Sampling Results

The soil PALs are set at the lowest matrix-specific, risk-based or human health screening criteria appropriate for the site. The PALs for this investigation are as follows:

- USEPA, 2013. Residential RSLs for Chemical Contaminants in Soil at Superfund Sites, developed by ORNL. November. www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm.

- Illinois EPA, 2013a. Tiered Approach to Corrective Action Objectives (TACO). Illinois Environmental Protection Agency, Bureau of Land, available online at http://www.epa.state.il.us/land/taco/ (Accessed September 2013). TACO and Non-TACO screening criteria. TACO criteria are from Illinois Pollution Control Board, 2013a. Title 35 of the Illinois Administrative Code (IAC) Section 742: TACO. www.ipcb.state.il.us/SLR/IPCBandIEPAEnvironmentalRegulations-Title35.aspx (Accessed September 2013).

Soil analytical results were compared to TACO, Non-TACO, and USEPA screening criteria. The comparison to these screening values provides an indication of the nature and extent of contamination. These screening values as well as other criteria were used in the quantitative human health risk evaluation.

8.1.1.1 Comparison to Minimum Screening Criteria

Surface Soil

Metal Exceedances in Surface Soil

Parameter	Minimum Screening Criteria		
	Criteria (mg/kg)	Exceedances	Source
Antimony	0.27	3	MCL-based SSL
Arsenic	0.0013	10	Risk-based SSL
Barium	82	4	MCL-based SSL
Beryllium	3.2	1	MCL-based SSL
Cadmium	0.38	8	MCL-based SSL
Chromium	0.00059	10	Risk-based SSL
Cobalt	0.21	10	Risk-based SSL
Copper	22	7	Risk-based SSL
Iron	270	10	Risk-based SSL
Lead	14	10	MCL-based SSL
Manganese	21	10	Risk-based SSL
Mercury	0.033	9	Risk-based SSL
Nickel	20	5	Risk-based SSL
Selenium	0.26	7	MCL-based SSL
Silver	0.6	2	Risk-based SSL
Thallium	0.011	1	Risk-based SSL
Zinc	290	3	Risk-based SSL

Pesticide Exceedances in Surface Soil

Parameter	Minimum Screening Criteria		
	Criteria (µg/kg)	Exceedances	Source
4,4'-DDD	6.4	6	Risk-based SSL
4,4'-DDE	46	5	Risk-based SSL
4,4'-DDT	67	4	Risk-based SSL
Aldrin	0.65	3	Risk-based SSL
Alpha-BHC	0.036	3	Risk-based SSL
Alpha-Chlordane	13	3	Risk-based SSL
Beta-BHC	0.13	2	Risk-based SSL
Delta-BHC[1]	0.036	9	Risk-based SSL
Dieldrin	0.061	8	Risk-based SSL
Gamma-BHC (Lindane)	0.21	3	Risk-based SSL
Gamma-Chlordane	13	3	Risk-based SSL
Heptachlor	0.14	4	Risk-based SSL
Heptachlor Epoxide	0.068	7	Risk-based SSL

1 Alpha-BHC was used as a surrogate

PAH Exceedances in Surface Soil

Parameter	Minimum Screening Criteria		
	Criteria (µg/kg)	Exceedances	Source
Benzo(a)anthracene	10	10	Risk-based SSL
Benzo(a)pyrene	3.5	10	Risk-based SSL
Benzo(b)fluoranthene	35	9	Risk-based SSL
Benzo(k)fluoranthene	350	4	Risk-based SSL
Chrysene	1100	1	Risk-based SSL
Dibenzo(a,h)anthracene	11	9	Risk-based SSL
Indeno(1,2,3-cd)pyrene	150	5	Risk-based SSL
Naphthalene	0.47	10	Risk-based SSL

SVOC Exceedances in Surface Soil

Parameter	Minimum Screening Criteria		
	Criteria (µg/kg)	Exceedances	Source
Dibenzofuran	110	1	Risk-based SSL

Subsurface Soil

Metal Exceedances in Subsurface Soil

Parameter	Minimum Screening Criteria		
	Criteria (mg/kg)	Exceedances	Source
Antimony	0.27	6	MCL-based SSL
Arsenic	0.001	10	Risk-based SSL
Barium	82	6	MCL-based SSL
Cadmium	0.38	7	MCL-based SSL
Chromium	0.00059	10	Risk-based SSL
Cobalt	0.21	10	Risk-based SSL
Copper	22	8	Risk-based SSL
Iron	270	10	Risk-based SSL
Lead	14	10	MCL-based SSL
Manganese	21	10	Risk-based SSL
Mercury	0.033	9	Risk-based SSL
Nickel	20	7	Risk-based SSL
Selenium	0.26	8	MCL-based SSL
Silver	0.6	4	Risk-based SSL
Zinc	290	4	Risk-based SSL

Pesticide/PCB Exceedances in Subsurface Soil

Parameter	Minimum Screening Criteria		
	Criteria (µg/kg)	Exceedances	Source
PCBs			
Aroclor-1254	8.8	4	Risk-based SSL
Pesticides			
4,4'-DDD	6.4	6	Risk-based SSL
4,4'-DDE	46	4	Risk-based SSL
4,4'-DDT	67	2	Risk-based SSL
Aldrin	0.65	2	Risk-based SSL
Alpha-BHC	0.036	3	Risk-based SSL
Alpha-Chlordane	13	3	Risk-based SSL
Beta-BHC	0.13	3	Risk-based SSL
Delta-BHC[1]	0.036	8	Risk-based SSL
Dieldrin	0.061	7	Risk-based SSL
Gamma-BHC (Lindane)	0.21	3	Risk-based SSL
Gamma-Chlordane	13	3	Risk-based SSL
Heptachlor	0.14	4	Risk-based SSL
Heptachlor Epoxide	0.068	7	Risk-based SSL

1 Alpha-BHC was used as a surrogate

PAH Exceedances in Subsurface Soil

Parameter	Minimum Screening Criteria		
	Criteria (µg/kg)	Exceedances	Source
2-Methylnaphthalene	140	3	Risk-based SSL
Anthracene	4200	1	Risk-based SSL
Benzo(a)anthracene	10	10	Risk-based SSL
Benzo(a)pyrene	3.5	10	Risk-based SSL
Benzo(b)fluoranthene	35	10	Risk-based SSL
Benzo(k)fluoranthene	350	5	Risk-based SSL
Chrysene	1100	3	Risk-based SSL
Dibenzo(a,h)anthracene	11	7	Risk-based SSL
Indeno(1,2,3-cd)pyrene	150	5	Risk-based SSL
Naphthalene	0.47	10	Risk-based SSL
Phenanthrene[1]	9500	1	Risk-based SSL
Pyrene	9500	1	Risk-based SSL

1 Pyrene was used as a surrogate

SVOC Exceedances in Subsurface Soil

Parameter	Minimum Screening Criteria		
	Criteria (µg/kg)	Exceedances	Source
Carbazole	600	1	TACO soil to groundwater
Dibenzofuran	110	3	Risk-based SSL

SPLP Metal Exceedances from Subsurface Soil Samples

Parameter	Minimum Screening Criteria		
	Criteria (µg/L)	Exceedances	Source
Aluminum	3500	2	Non-TACO Class I
Antimony	6	5	TACO Class I
Iron	5000	3	TACO Class I
Lead	7.5	5	TACO Class I
Manganese	150	2	TACO Class I

8.1.1.2 Comparison to TACO Ingestion and Inhalation Remediation Objectives

Surface Soil

Four PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene), three pesticides (alpha-chlordane, gamma-chlordane, and heptachlor), and one metal (arsenic) were detected at concentrations above Illinois EPA TACO ingestion and/or inhalation Remediation Objectives (residential and/or industrial/commercial). Eight of the ten surface soil sampling locations had these TACO exceedances.

- Benzo(a)pyrene exceeded the TACO residential ingestion Soil Remediation Objective value of 90 µg/kg at eight of ten surface soil sampling locations. These exceedances were found in all the sample locations except the two shoreline sample locations, NTC12SB24 and NTC12SB30. Benzo(a)pyrene also exceeded the TACO industrial/commercial ingestion Soil Remediation Objective value of 800 µg/kg at four of ten surface soil sampling locations.

- Benzo(b)fluoranthene exceeded the TACO residential ingestion Soil Remediation Objective value of 900 µg/kg at four of ten surface soil sampling locations.

- Benzo(a)anthracene exceeded the TACO residential ingestion Soil Remediation Objective value of 900 µg/kg at three of ten surface soil sampling locations.

- Dibenzo(a,h)anthracene exceeded the TACO residential ingestion Soil Remediation Objective value of 90 µg/kg at four of ten surface soil sampling locations.

- Alpha-Chlordane (3200 µg/kg) and gamma-chlordane (2600 µg/kg) exceeded the TACO residential ingestion Soil Remediation Objective value of 1800 µg/kg at one of ten surface soil sampling locations, NTC12-SB25.

- Heptachlor (Pesticide) exceeded the TACO residential ingestion Soil Remediation Objective value of 100 µg/kg at one of 10 surface soil sampling locations, NTC12SB25, at a value of 236 µg/kg.

- Arsenic exceeded the TACO residential and industrial/commercial ingestion Soil Remediation Objective value of 13 mg/kg, based on background concentrations, at two of 10 surface soil sampling locations.

No VOCs, SVOCs (excluding PAHs), or PCBs exceeded the TACO residential ingestion Soil Remediation Objective criteria.

Subsurface Soil

Five PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)Pyrene) and two metals (arsenic and lead) were detected at concentrations above Illinois EPA TACO ingestion and/or inhalation Remediation Objectives (residential and/or industrial/commercial). In addition, lead concentrations exceeded the construction worker TACO ingestion Soil Remediation Objective and mercury concentrations exceeded the construction worker TACO inhalation Soil Remediation Objective. SPLP metals leachate data for subsurface soil samples exceeded TACO soil to groundwater Class I criteria for antimony, iron, lead, and manganese.

- Benzo(a)anthracene exceeded the TACO residential and industrial/commercial ingestion Soil Remediation Objective values of 900 µg/kg and 8000 µg/kg at three of ten subsurface soil sampling locations and one of ten subsurface soil sampling locations, respectively.

- Benzo(a)pyrene exceeded the TACO residential and industrial/commercial ingestion Soil Remediation Objective values of 90 µg/kg and 800 µg/kg at six of ten subsurface soil sampling locations and three of ten subsurface soil sampling locations, respectively.

- Benzo(b)fluoranthene exceeded the TACO residential ingestion and industrial/commercial ingestion Soil Remediation Objective value of 900 µg/kg and 8000 µg/kg at three of ten subsurface soil sampling locations and one of ten subsurface soil sampling locations, respectively.

- Dibenzo(a,h)anthracene exceeded the TACO residential ingestion Soil Remediation Objective value of 90 µg/kg at five of ten subsurface soil sampling locations.

- Indeno(1,2,3-cd)pyrene exceeded the TACO residential ingestion Soil Remediation Objective value of 900 µg/kg at one of ten subsurface soil sampling locations, NTC12SB28, at a value of 1330 µg/kg.

- Arsenic exceeded the TACO residential and industrial/commercial ingestion Soil Remediation Objective value of 13 mg/kg, which is based on background concentrations, at three of ten subsurface soil sampling locations.

- Lead exceeded the TACO residential ingestion Soil Remediation Objective value of 400 mg/kg, the TACO construction worker ingestion Soil Remediation Objective of 700 mg/kg, and the TACO industrial/commercial ingestion Soil Remediation Objective value of 800 mg/kg at one of ten subsurface soil sampling locations (i.e., NTC12SB29 at a concentration of 845 J mg/kg).

- Mercury exceeded the TACO construction inhalation Soil Remediation Objective value of 0.1 mg/kg, based on elemental mercury, at six of 10 subsurface soil sampling locations.

- Subsurface soil leachate samples exceeded TACO soil to groundwater Class I criteria for antimony (6 µg/L) in five samples, iron (5000 µg/L) in three samples, lead (7.5 µg/L) in five samples, and manganese (150 µg/L) in two samples. However, exposure to groundwater at Site 12 is not expected to occur under current and/or future land uses because the facility and the area surrounding the facility are supplied by public water, the facility has a groundwater use restriction in place, and there are no drinking water wells located immediately downgradient of the site.

No VOCs, SVOCs (excluding PAHs), or PCBs exceeded the TACO residential ingestion Soil Remediation Objective criteria.

8.1.2 Groundwater Sampling Results

The groundwater PALs are set at the lowest risk-based or human health screening criteria appropriate for the site. The groundwater PALs for this investigation are as follows:

- USEPA, 2013. RSLs for Chemical Contaminants at Superfund Sites, November. Tapwater values.

- USEPA, 2012a. Maximum Contaminant Level (MCLs).

- Illinois EPA, 2013a. TACO and Non-TACO values. Class I and Class II criteria from TACO Section 742 Table E, Tier 1 Groundwater Remediation Objectives.

- 35 IAC, 2013. Groundwater Standards for Class I and Class II. Title 35 Sections 620.410 and 620.420. Effective October 5, 2012 (Section 620.410), October 7, 2013 (Section 620.420). Accessed November 12, 2013.

Groundwater analytical results were compared to TACO, non-TACO, IAC, USEPA and MCL screening criteria. The summary of the exceedances compared to first the minimum screening criteria and then the IAC Groundwater Standards as presented below.

8.1.2.1 Comparison to Minimum Screening Criteria

Total Metal Exceedances in Groundwater

Parameter	Minimum Screening Criteria		
	Criteria (µg/L)	Exceedances	Source
Arsenic	0.045	3	USEPA RSL
Chromium	0.031	4	USEPA RSL
Cobalt	4.7	1	USEPA RSL
Iron	5000	2	IAC and TACO
Manganese	150	4	IAC and TACO

Dissolved Metal Exceedances in Groundwater

Parameter	Minimum Screening Criteria		
	Criteria (µg/L)	Exceedances	Source
Arsenic	0.045	3	USEPA RSL
Cobalt	4.7	1	USEPA RSL
Iron	5000	2	IAC and TACO
Manganese	150	4	IAC and TACO

8.1.2.2 Comparison to 35 IAC 620 Groundwater Remediation Objectives (Class I and Class II)

Three total and dissolved metals (arsenic, iron, and manganese) were detected at concentration above 35 IAC 620 Class I Groundwater Standards, which are for potable groundwater resources. As previously discussed, groundwater is not used for drinking water. 35 IAC 620Class II Groundwater Standards are

appropriate for general groundwater resources. Only total and dissolved iron concentrations exceeded the 35 IAC 620 Class II Groundwater Standards.

- Arsenic was detected at concentrations that exceeded the 35 IAC 620 Class I Groundwater Standard of 10 µg/L in two of four groundwater samples analyzed for total metals and dissolved metals.

- Iron was detected as concentrations that exceeded the 35 IAC 620 Class I and Class II Groundwater Standard of 5000 µg/L in two of four groundwater samples analyzed for total and dissolved metals.

- Manganese was detected at concentrations that exceeded the 35 IAC 620 Class I Groundwater Standard of 150 µg/L in the four groundwater samples analyzed for total and dissolved metals.

8.1.3 Harbor Sediment Data

Site soil (surface and subsurface) concentrations and sediment concentrations to evaluate whether the concentrations are similar. Sediment samples were collected in the outer harbor by Weston Solutions in 2006 and 2007 as part of the NSGL's harbor dredging project. Sediment samples collected near Site 12 are representative of chemical concentrations present in Lake Michigan sediment adjacent to the site. Surface soil samples are likely composed of land-based fill material, while subsurface soil samples are likely composed of lake dredge spoils. Therefore, a comparison between subsurface soil and sediment concentrations is more applicable then a comparison between surface soil and sediment concentrations. However, surface soil concentrations were also compared to sediment concentrations to determine if the surface soil could impact the lake sediment if it eroded and was deposited into the lake. This evaluation was completed even though erosion is not expected to be a significant migration concern because there is substantial vegetation cover over the site soil. Most maximum subsurface soil concentrations exceeded the maximum sediment concentrations. Average subsurface soil concentrations of calcium, magnesium, potassium, selenium, sodium, and vanadium were less than maximum sediment concentrations. Greater metals concentrations were generally found in soil samples compared to sediment samples.

8.1.4 Summary of RI Results

The initial comparison of the soil results to the minimum screening criteria identified a number of exceedances. The minimum screening criteria in many cases are the TACO or USEPA soil to groundwater criteria. However, when the soil results are compared to the TACO residential and industrial/commercial ingestion and inhalation screening criteria, PAHs, three pesticides (alpha-chlordane, gamma-chlordane, and heptachlor), and two metals (arsenic and lead) remained above these criteria.

The soil analytical results indicate that contamination is distributed throughout Site 12, although the soil sample locations along the shoreline, NTC12-SB24 and NTC12-SB30, have lower concentrations of COPCs than sample locations within the pre-1990 boundary. The contamination is most likely from the land-based fill material that was used to fill in Site 12. The concentrations of COPCs in the lake dredge soil along the shoreline are an order of magnitude lower than the land-based fill material found further inland at Site 12. COPCs are present directly above the shallow aquifer and SPLP leachate results indicate that several metals are potentially mobile.

However, a comparison of groundwater analytical results to the minimum screening criteria identified only a few metals in groundwater that may be impacted by the soil at Site 12. The initial comparison of the groundwater results to the minimum screening criteria identified five total metals and four dissolved metals as exceeding groundwater criteria. The minimum screening criteria in several cases are the USEPA RSLs. However, when the groundwater results are compared to 35 IAC 620 Class I Groundwater Standards only three total and dissolved metals (arsenic, iron, and manganese) remained above these criteria. The 35 IAC 620 Class I Groundwater Standards are for potable groundwater resources. Of the metals exceeding Class I Standards, only total and dissolved iron exceeded the 35 IAC 620 Class II Groundwater Standard for general groundwater resources.

8.2 HUMAN HEALTH SCREENING CONCLUSIONS

A baseline HHRA was performed to characterize and quantify potential health risks at Site 12. The objective of the HHRA was to determine whether detected concentrations of chemicals within the study area pose a significant threat to potential human receptors under current and/or future land use. The HHRA for Site 12 is based on chemical data for surface soil, subsurface soil, and groundwater. The potential risks to human receptors are estimated, based on the assumption that no actions will be taken to control contaminant releases.

Maximum surface soil PAH concentrations were compared to concentrations in the background data set established for use by the Illinois EPA. The background concentration in Metropolitan Statistical Area soil for benzo(a)pyrene (2.1 mg/kg), benzo(a)anthracene (1.8 mg/kg), dibenzo(a,h)anthracene (0.42 mg/kg) and indeno(1,2,3-cd)pyrene (1.6 mg/kg) is higher than or equal to the respective maximum soil sample results for these chemicals at Site 12. This indicates that it is probable that these PAHs at Site 12 are background constituents. Given that some of the c-PAHs were detected at concentrations greater than the Illinois background levels, BaP Eq is maintained as a COPC for the quantitative risk evaluation.

When the maximum concentrations of the metals detected at Site 12 in surface soil were compared to background data established for use by the Illinois EPA, no metals were found to be below background

based on maximum concentrations. However, if the average positive results of detected metals were compared to the background data set, most of the metals were below the background values. This indicates that it is possible that most of these inorganic compounds at Site 12 could be background constituents. However, the average concentration of barium, cadmium, chromium, copper, lead, and mercury were greater than the Illinois EPA background value in the soil samples.

The following receptors were evaluated for potential exposure to COPCs in Site 12 surface soil, subsurface soil, and groundwater: construction worker, occupational/maintenance worker, adolescent and adult recreational user/trespasser, and future resident (child and adult).

If cumulative cancer risk was greater than $1x10^{-4}$ or the hazard index for a target organ was greater than 1, then chemicals were retained as COCs if their individual carcinogenic risk contribution was greater than $1x10^{-6}$ or their non-carcinogenic HQ was greater than 0.1. Based on the non-cancer and cancer evaluations, the following contaminants were identified as COCs: c-PAHs, arsenic, chromium, alpha-chlordane, gamma-chlordane, and heptachlor for residential exposure through ingestion and dermal contact to surface soil and c-PAHs, arsenic, Aroclor-1254, and chromium for residential exposure through ingestion and dermal contact to subsurface soil.

Although no chemicals were removed based on comparison to background values, it is possible that the c-PAHs and some metals in soil are attributable to background at Site 12.

Although chromium, evaluated as hexavalent chromium, was identified as a COC in the HHRA, based on the historical information on the site, hexavalent chromium is not expected to be present. If chromium had been evaluated as trivalent chromium, then risks for chromium would be within acceptable levels. Therefore, chromium is not retained as a COC for Site 12.

Groundwater concentrations were screened against criteria for drinking water and some metals exceeded screening values. However, it is important to point out that direct exposure to groundwater at Site 12 is not expected to occur under current and/or future land uses because the facility and the area surrounding the facility are supplied by public water, the facility has a groundwater use restriction in place, and there are no drinking water wells located downgradient of the site.

As stipulated in 35 Ill. Adm. Code 742.915, in order to support the application of a risk target range of 10^{-4} to 10^{-6}, the following factors need to be addressed: sensitive populations, number of receptors affected, duration of risk at different target risk levels, and chemical characteristics.

Of the receptors evaluated in the HHRA, a residential child would be considered a sensitive receptor, though residential land use is hypothetically considered, and highly unlikely. The calculated summed risk and noncancer HI exceed the Tier 3 risk range for a hypothetical residential child. None of the other receptors for Site 12 would be considered sensitive receptors. The other receptors evaluated in the HHRA are a fulltime maintenance/industrial worker, construction worker, recreational/trespasser adolescent and adult receptors, and residential adult.

Numbers of receptors affected is low given that Site 12 is a relatively small area that is not frequently used. The duration of risk assumed for receptors with summed risks within the TACO Tier 3 risk range is long-term (e.g., 25 years for future full-time worker, 10 years for adolescent recreational/trespasser, 24 years for adult recreational/trespasser, 24 years for residential adult), and likely these are conservative assumptions for a Navy base and for the anticipated future land use.

Finally, with regard to chemical characteristics, a key observation is that c-PAHs and arsenic, the COPCs that contribute most to summed risks that exceed 1×10^{-6}, are generally within Illinois background levels for counties within Metropolitan Statistical Areas. The 95% UCL of BaP Eq for surface soil is 1.37 mg/kg compared with the Illinois background value of 2.1 mg/kg (Illinois EPA, 2013; Appendix A, Table G). The 95% UCL of arsenic in surface soil is also lower than the Illinois background value (11.4 mg/kg compared with 13 mg/kg). Therefore, applying the Tier 3 risk range of 10^{-4} to 10^{-6} is reasonable for the maintenance/industrial worker and recreational/trespasser receptor, given that a significant portion of the summed risk that exceeds 1×10^{-6} is attributable to background levels.

8.3 ECOLOGICAL SCREENING CONCLUSIONS

This ERA was conducted to determine whether adverse ecological impacts are potentially occurring from exposure to chemicals released to the environment through historical activities at Site 12 and whether or not further investigation and/or remedial action at Site 12 is warranted from an ecological perspective.

The site consists of a grass-covered field with some wooded areas, a beach area along the lake, and a paved parking lot. Chemicals in the soil may migrate to the sediments via erosion of the bluff and surface runoff. Erosion is likely minimal because heavy vegetation is present over most areas at the site. Based on the habitat, potential ecological receptors at the site include plants, soil and sediment invertebrates, aquatic organisms, birds, and mammals.

Terrestrial plants, soil invertebrates, birds, and mammals are exposed to chemicals in surface soil by direct contact (only pathway for plants) and ingestion of soil and food items that have accumulated chemicals from the soil. Based on the initial screening of the chemical data for Site 12, several chemicals were initially selected as COPCs for ecological receptors in surface soil because they were detected at

concentrations that exceeded conservative screening levels, they had EEQs greater than 1.0 in the conservative food chain model, or because they did not have screening levels. These chemicals were then further evaluated to refine the list of COPCs, and to better characterize risks to ecological receptors. No chemicals were retained as COPCs for terrestrial plants, soil invertebrates, mammals, or birds.

Potential impacts to sediment invertebrates from chemicals in surface soil, which may migrate to sediment via erosion and surface runoff, are not likely. Therefore, no chemicals were retained as COPCs for risks to sediment invertebrates.

Although based on the SPLP data, some metals in soil may present a risk to aquatic organisms after leaching from the soil and discharging to the surface water, groundwater data indicates only iron concentrations exceed surface water criteria. Any potential impacts would be limited to the area immediately adjacent to the shoreline before the concentrations are diluted. In addition, once the groundwater exits to surface water, the dissolved iron may precipitate, therefore, iron concentrations are expected to be lower in surface water than they are in groundwater, before factoring in dilution. Therefore, this pathway is not considered to present a significant potential ecological risk and it is not retained for further consideration.

8.4 RECOMMENDATIONS

Based on the results of this RI, preparation of a feasibility study is recommended for the soil at Site 12. Even though risks are acceptable under the current land use scenario in which the receptors are limited to recreational users, a feasibility study was recommended for surface and subsurface soil associated with Site 12. The recommendation is made primarily because land use could change in the future that could result in unacceptable risks to potential residential receptors. Potential remedial alternatives to be evaluated in the feasibility study would include, but not be limited to No Action, Limited Action (Land Use Controls), and Removal (Excavation). After completion of the feasibility study, a Proposed Plan and Record of Decision should be prepared to propose and document the selection of the preferred remedial alternative from the feasibility study.

Because of the unproductive nature of the shallow aquifer and the existing facility restriction on the use of groundwater as a potable water source, there are no current risks to human health and the only potential receptors to groundwater would be ecological receptors after it discharges to Lake Michigan. The potential soil-to-groundwater-to-surface water contaminant migration issue was evaluated in the ecological risk assessment along with various other risk scenarios. Based on the conclusions of the ecological risk assessment, risks to ecological receptors do not require further evaluation. Therefore, groundwater is not a major media of concern requiring significant further evaluation in the feasibility study; however, land use controls should be evaluated to formalize restrictions on groundwater use.

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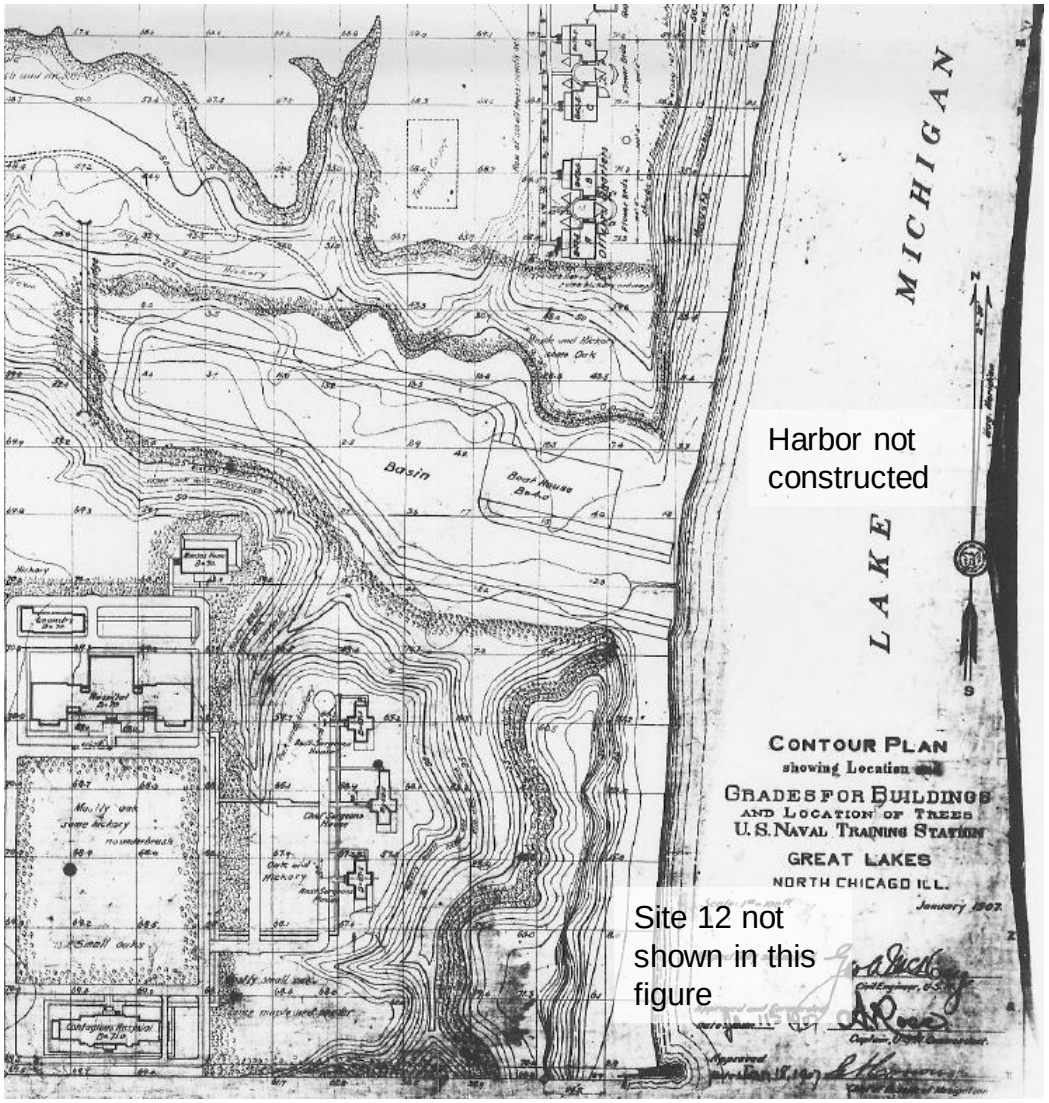
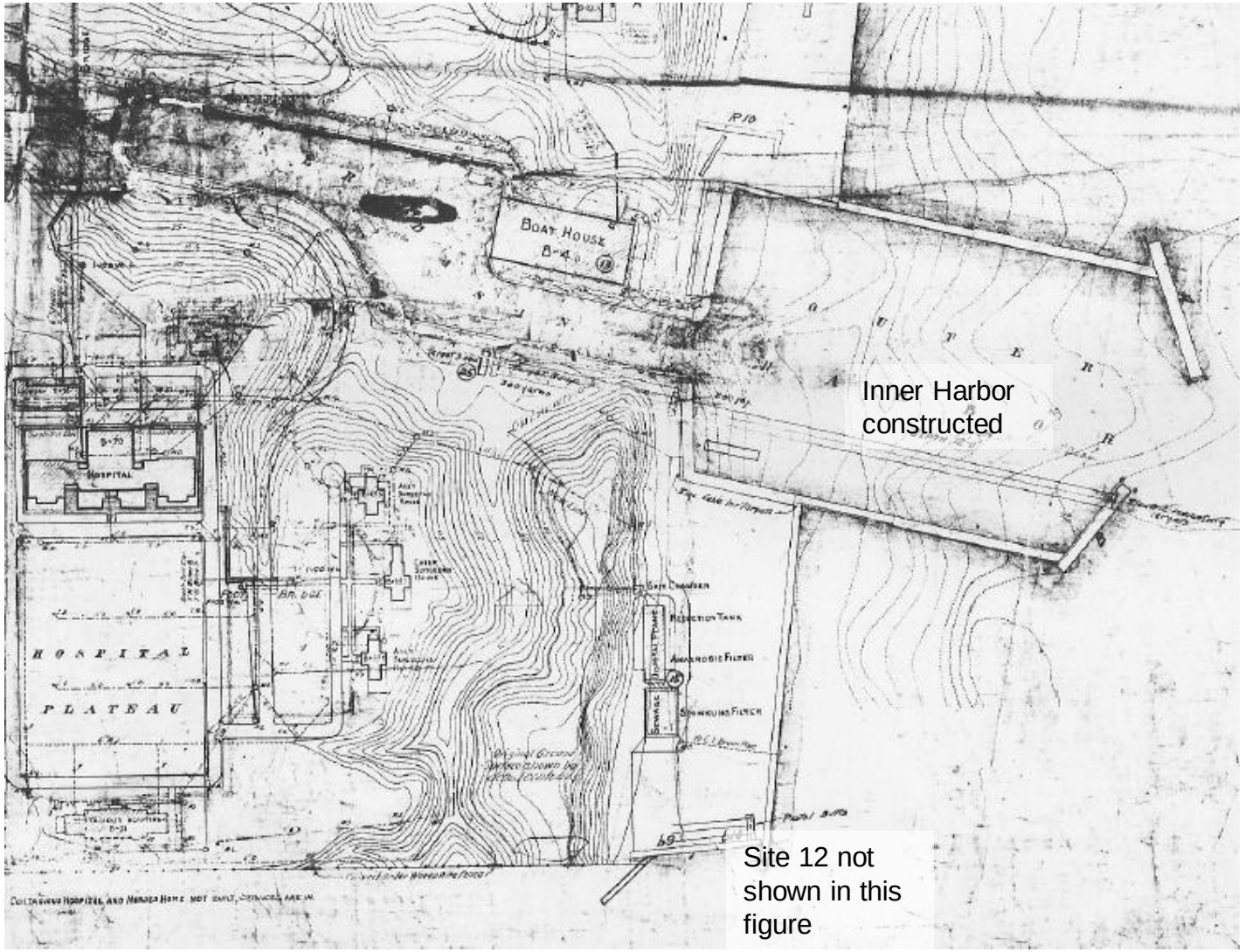
APPENDIX A

HISTORICAL DRAWINGS AND PHOTOGRAPHS

1907 Drawing

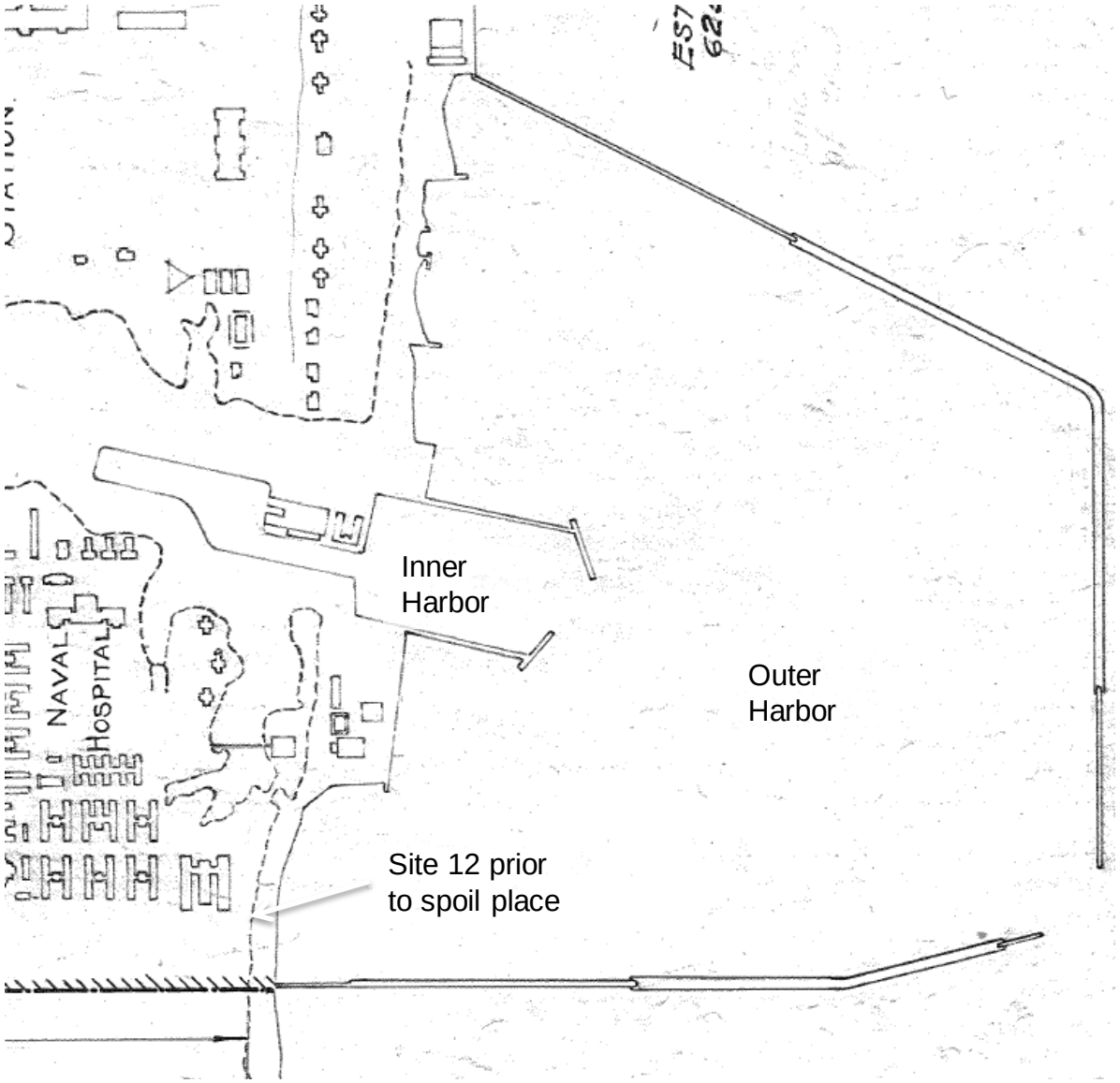


1909 Drawing

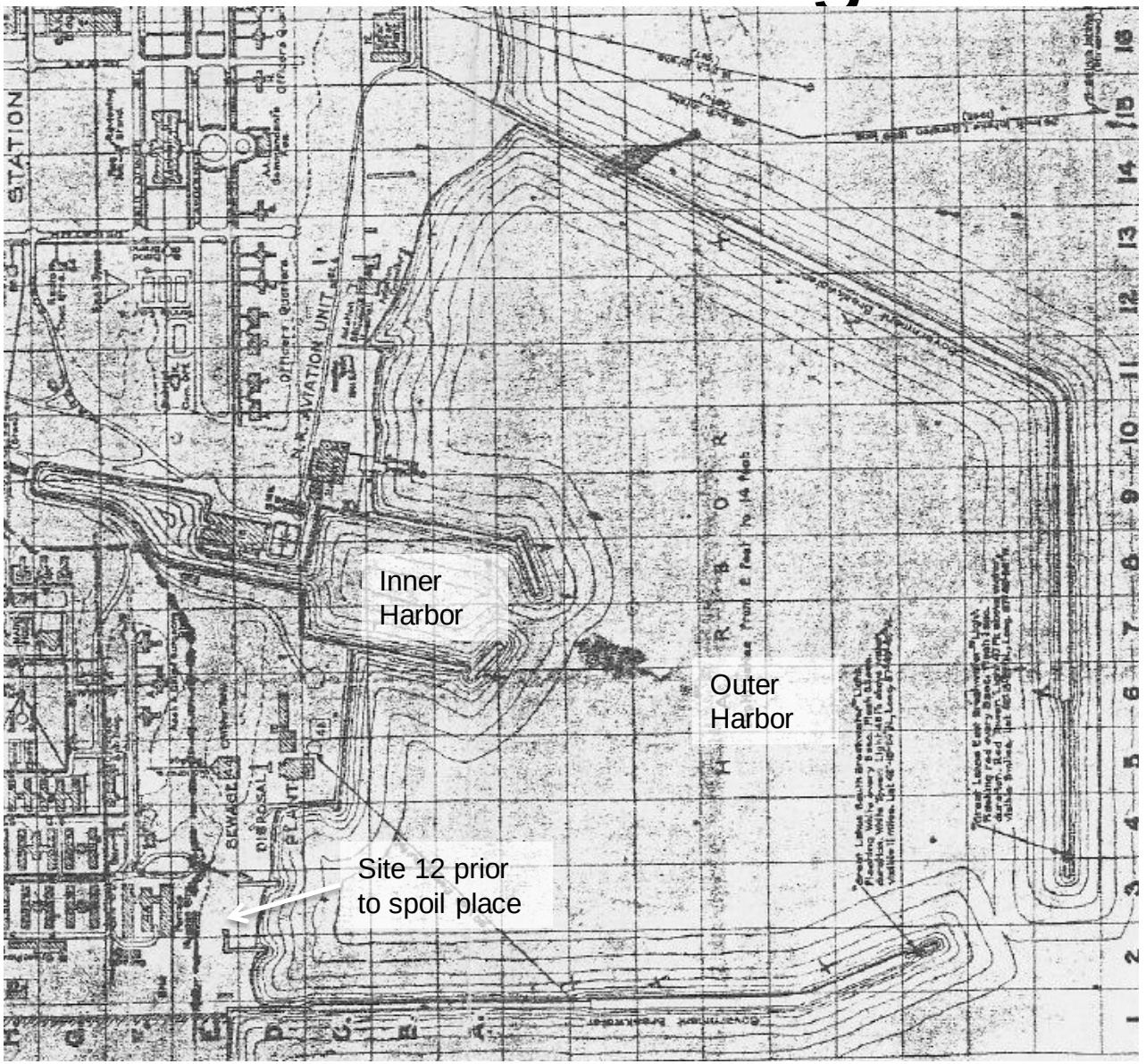


1923 Drawing

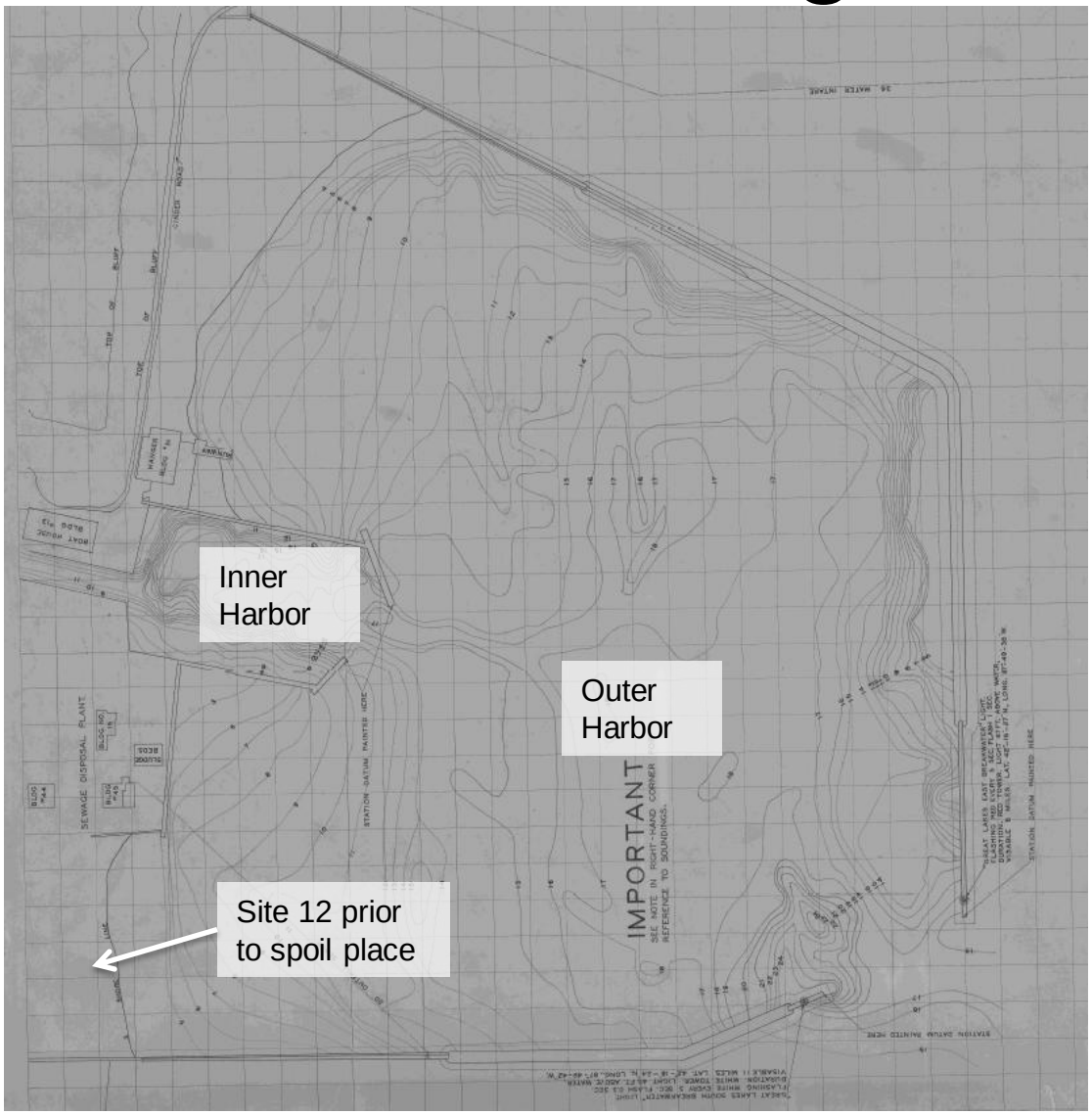
1929 Drawing



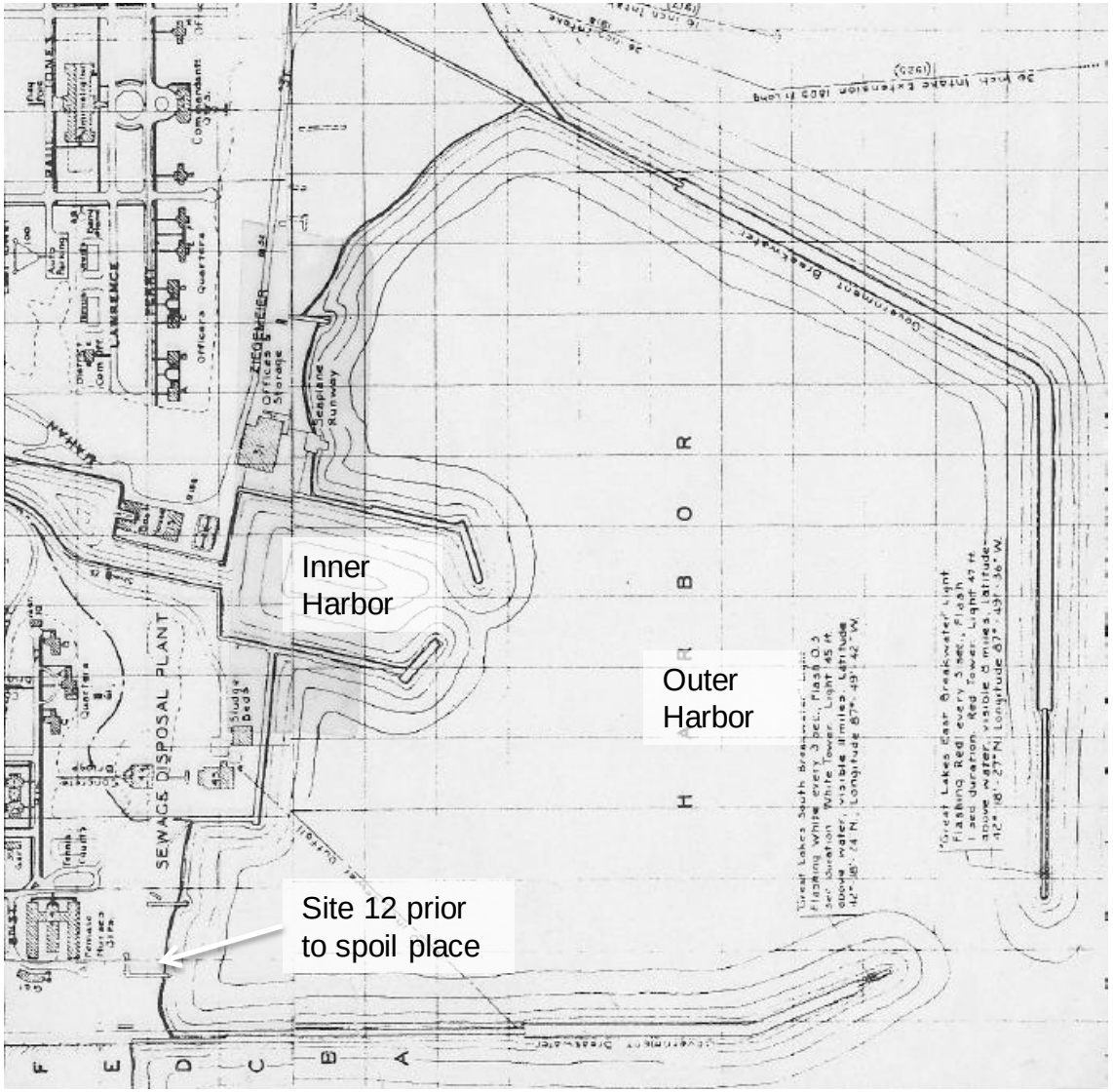
1930 Drawing



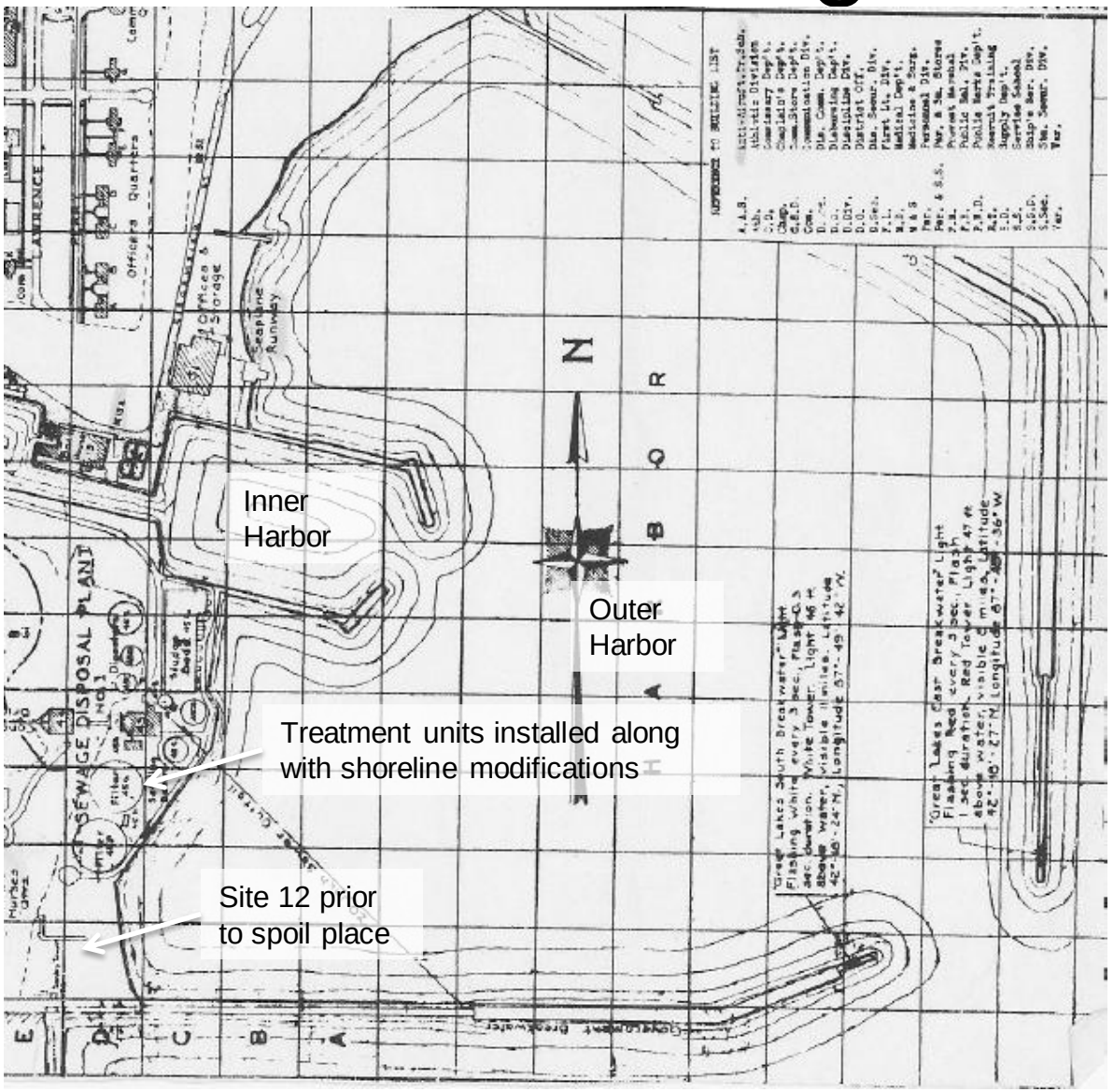
1936 Drawing



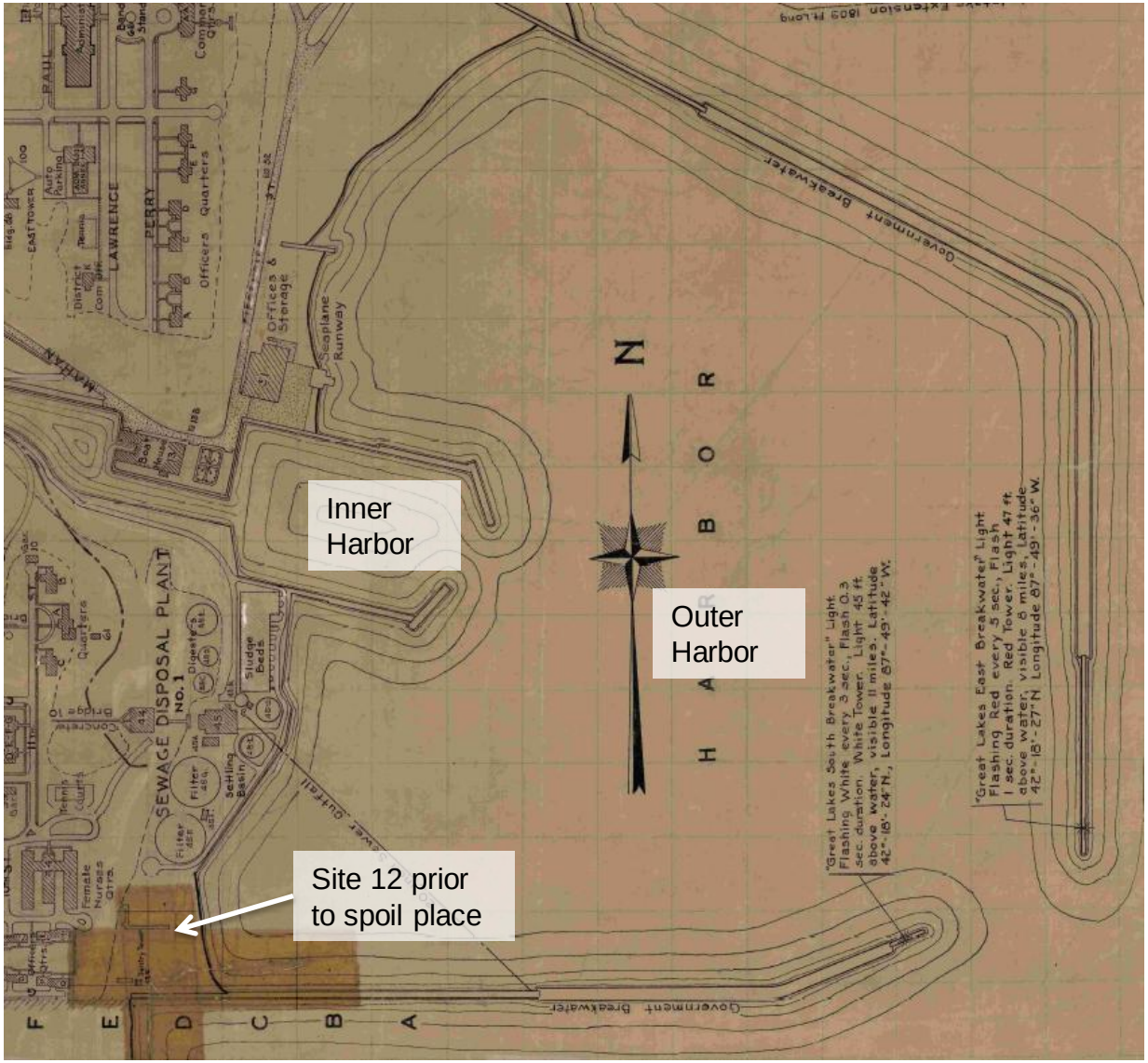
1941 Drawing



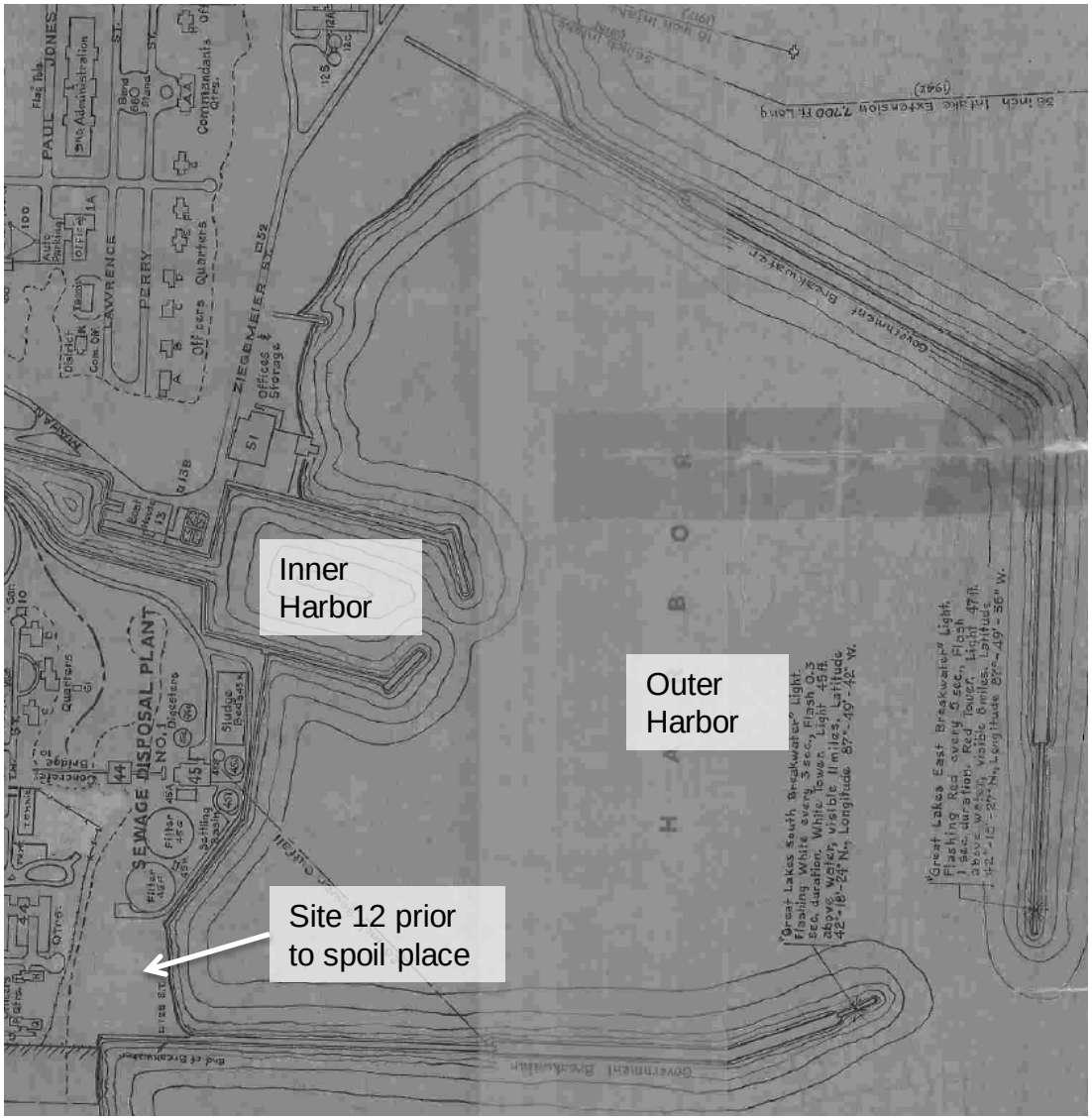
1943 Drawing



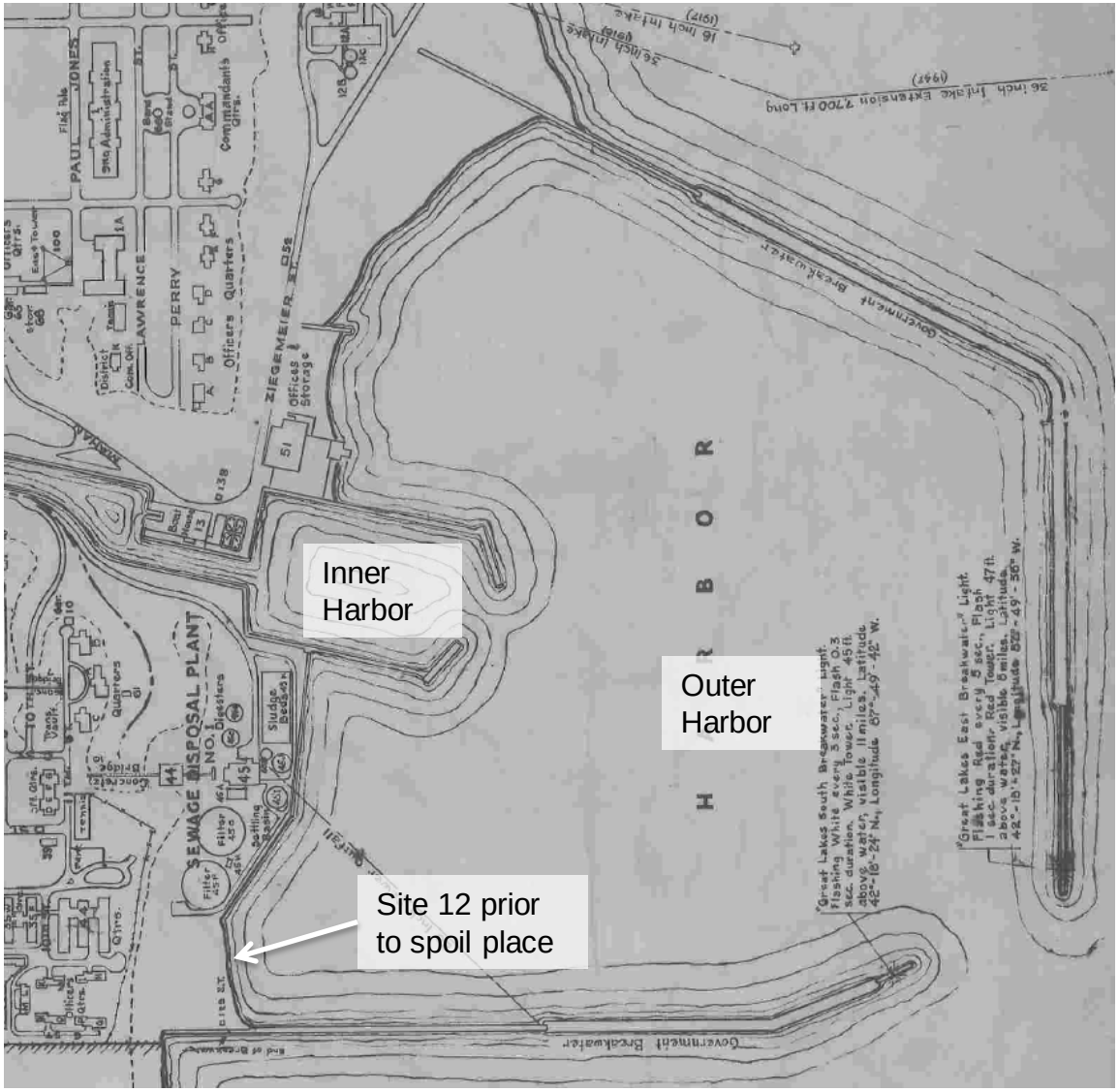
1946 Drawing



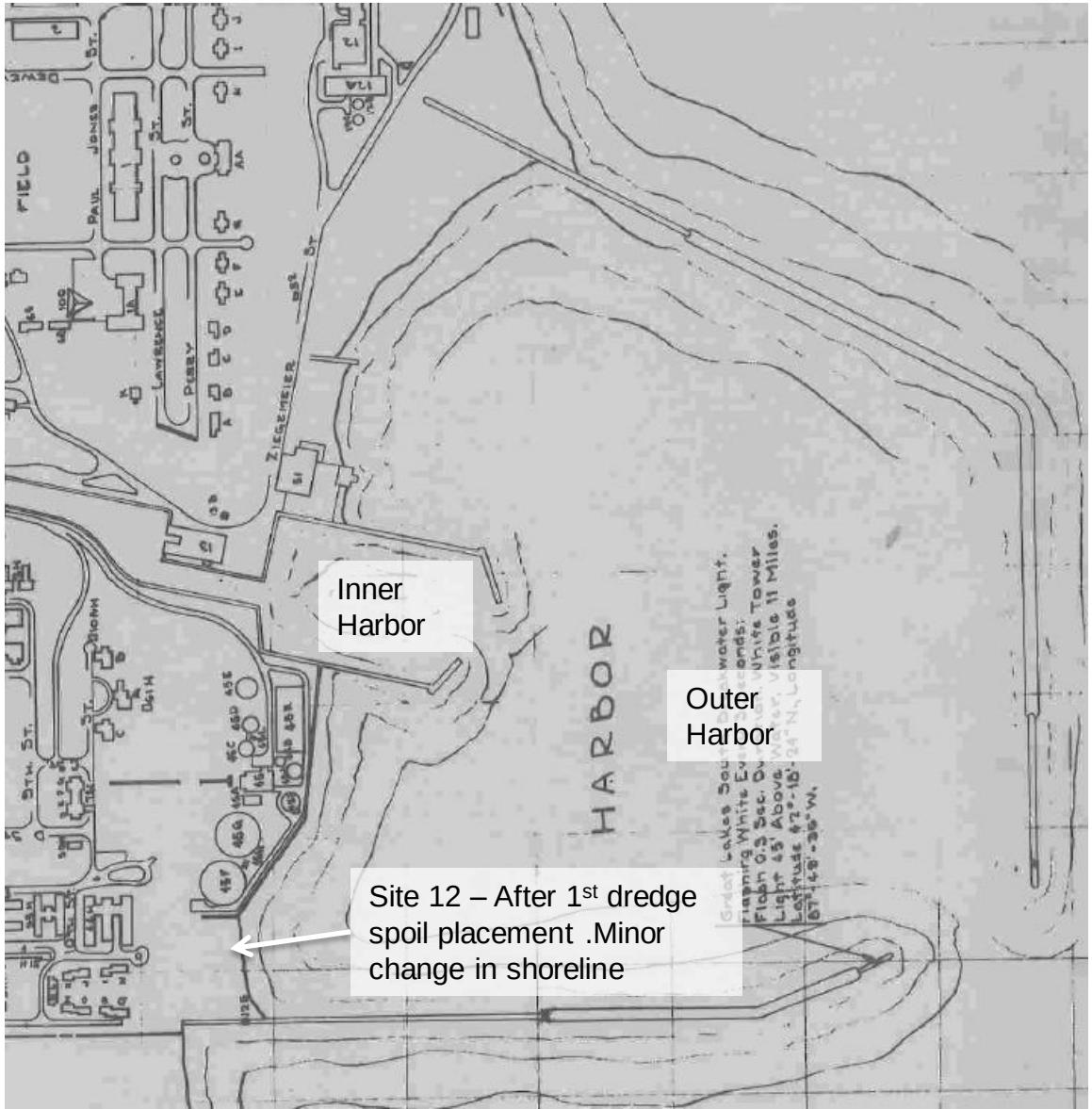
1949 Drawing



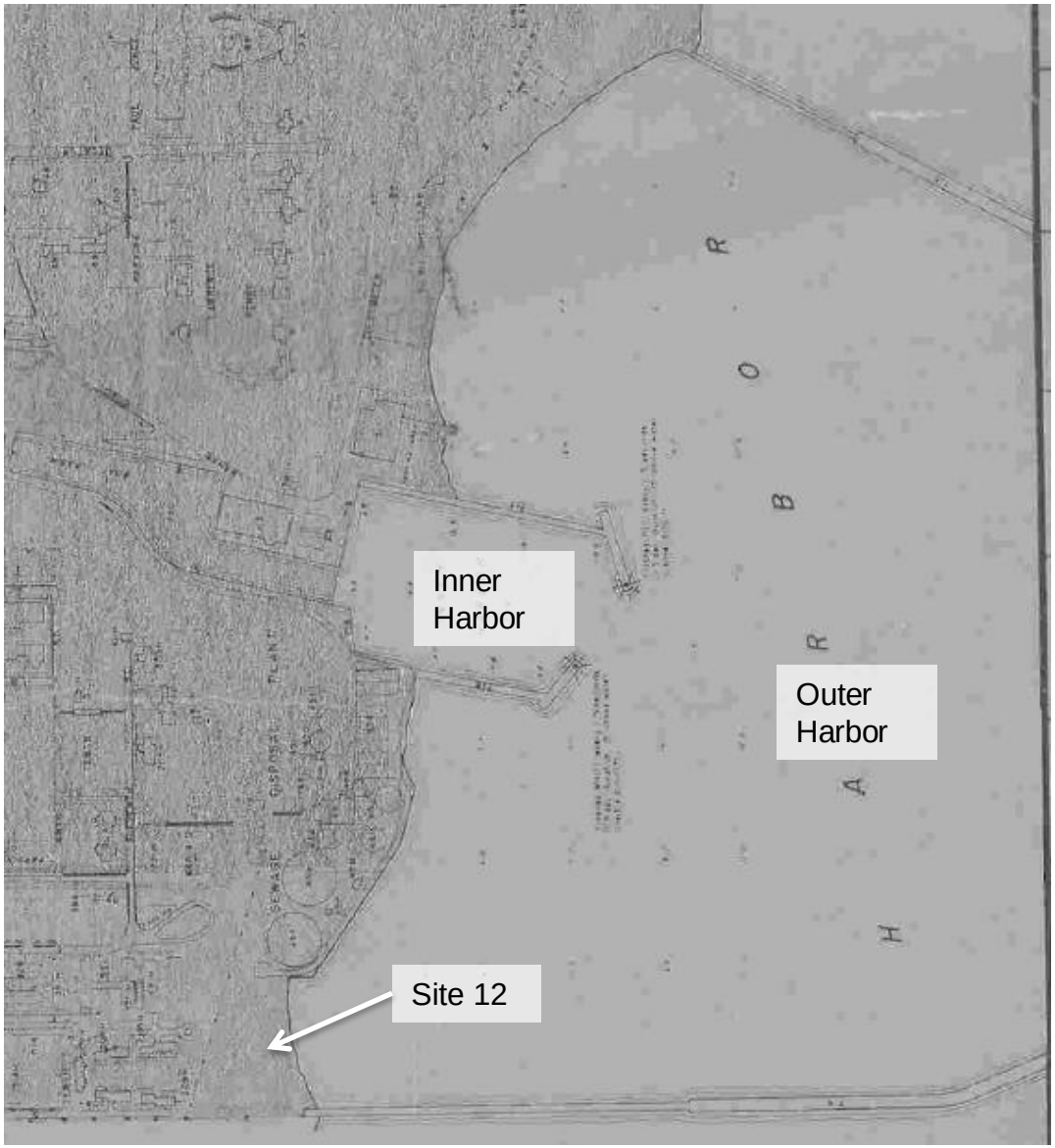
1950 Drawing



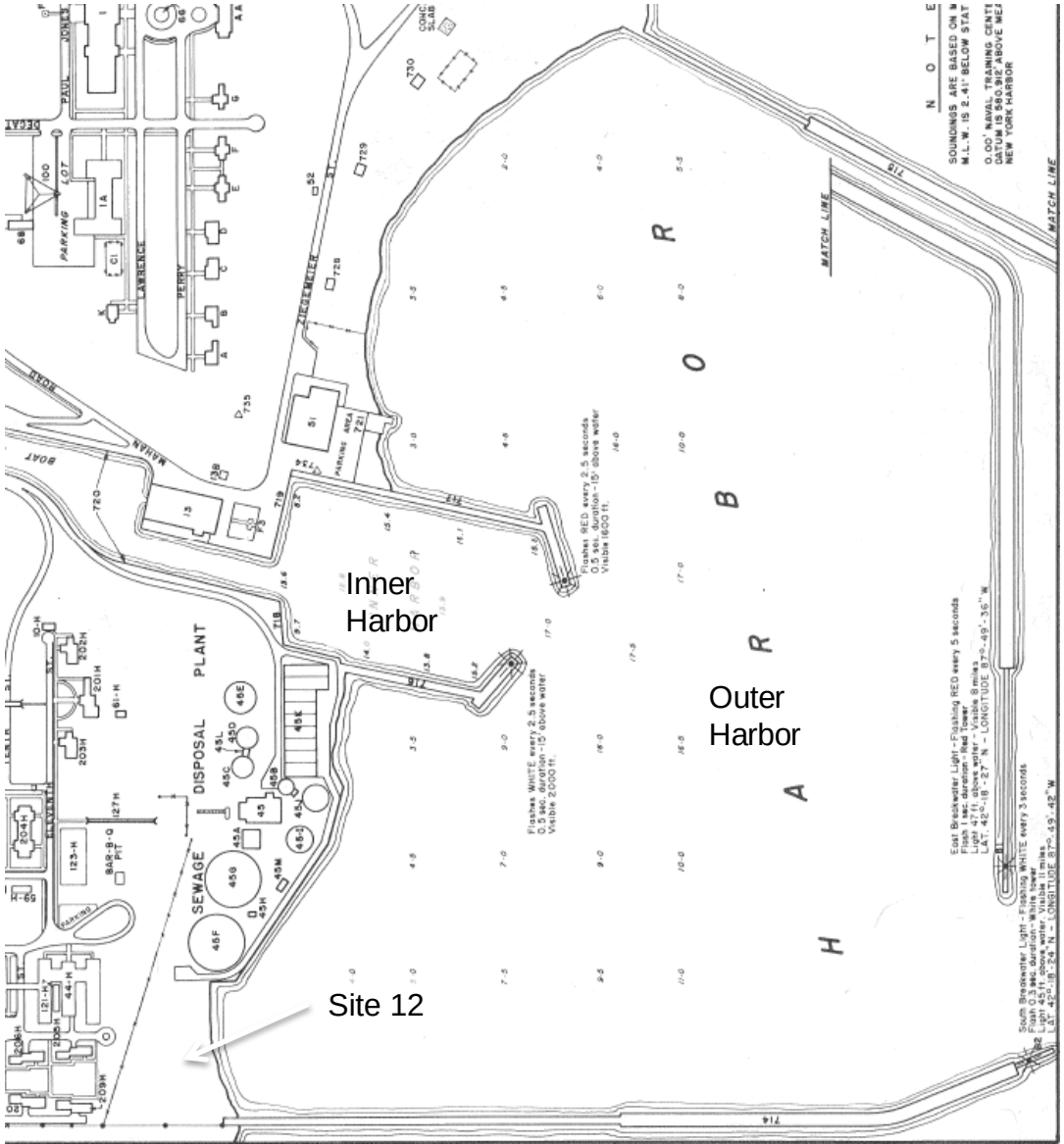
1957 Drawing



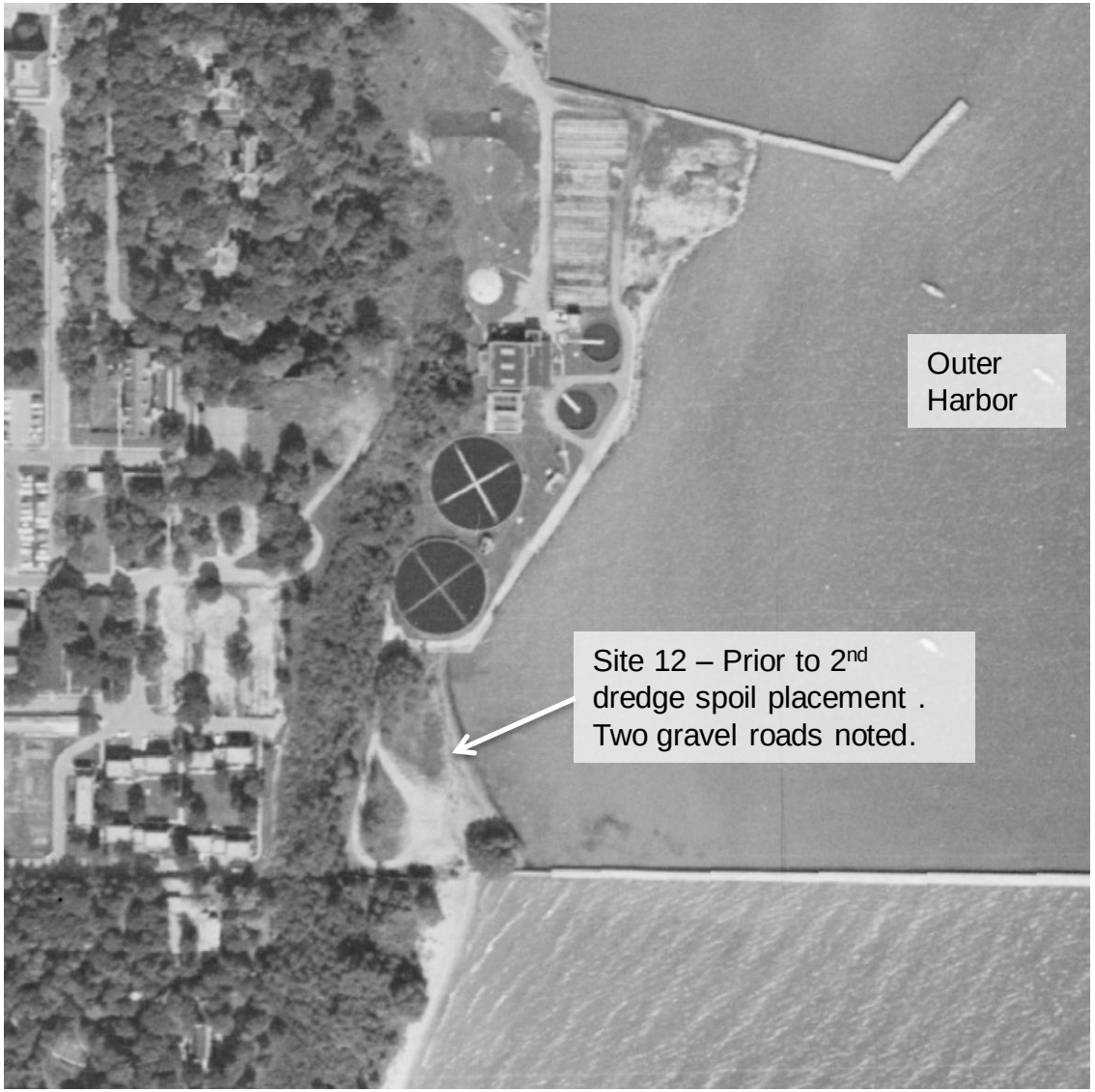
1958 Drawing



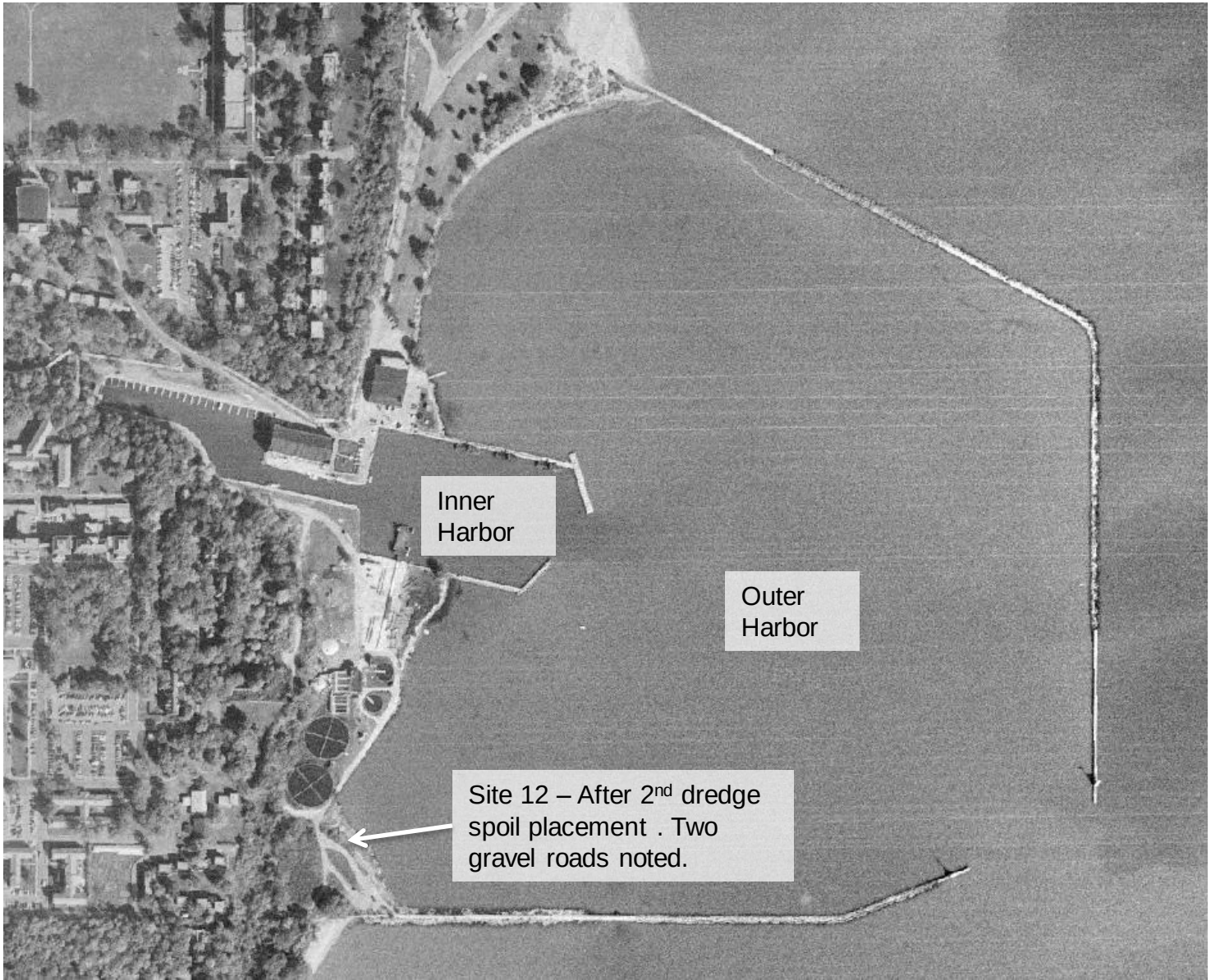
1959 Drawing



1961 Photo


Outer Harbor
Site 12 – Prior to 2nd dredge spoil placement . Two gravel roads noted.

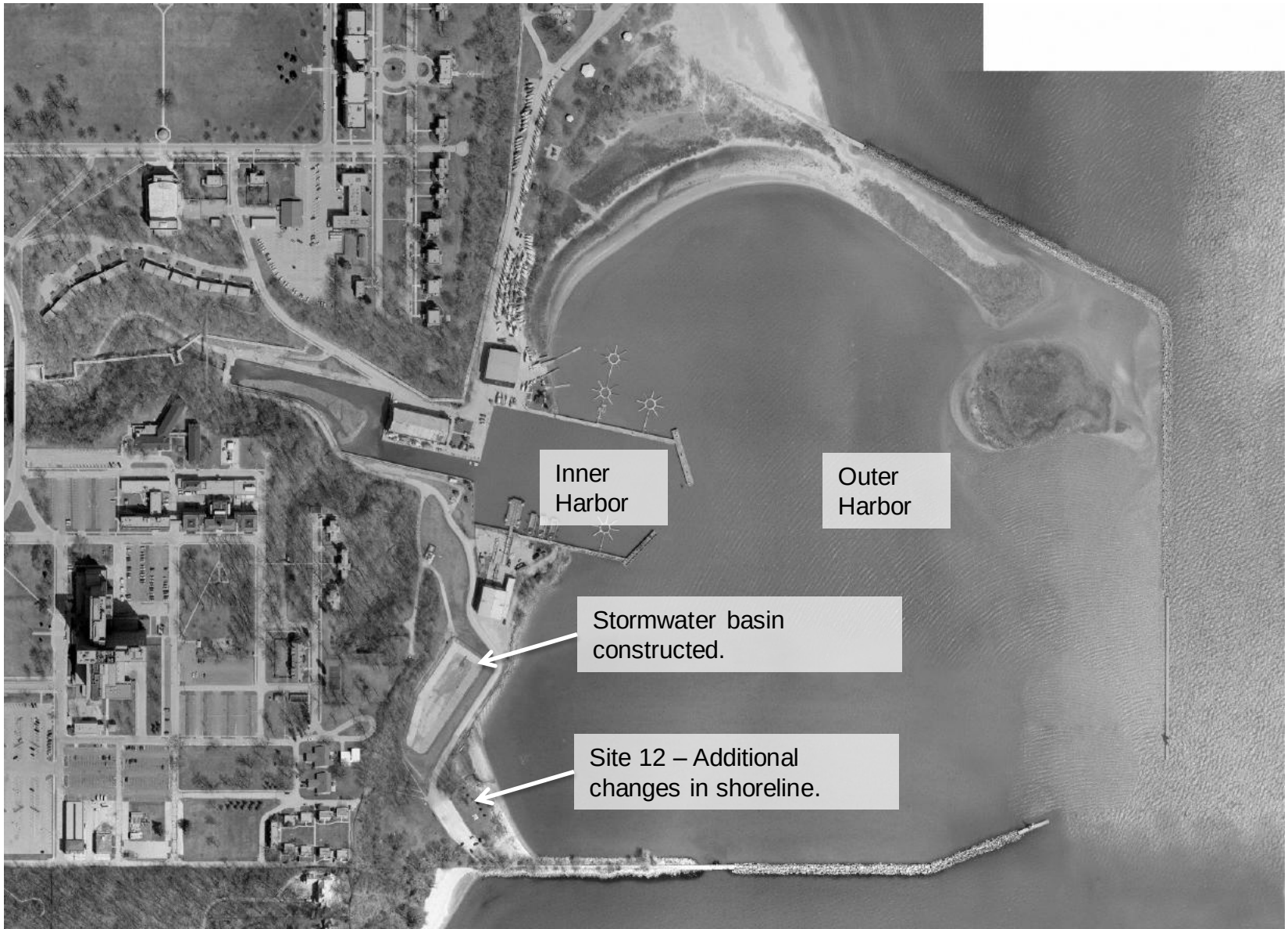
1974 Photo


Inner Harbor
Outer Harbor
Site 12 – After 2nd dredge spoil placement . Two gravel roads noted.

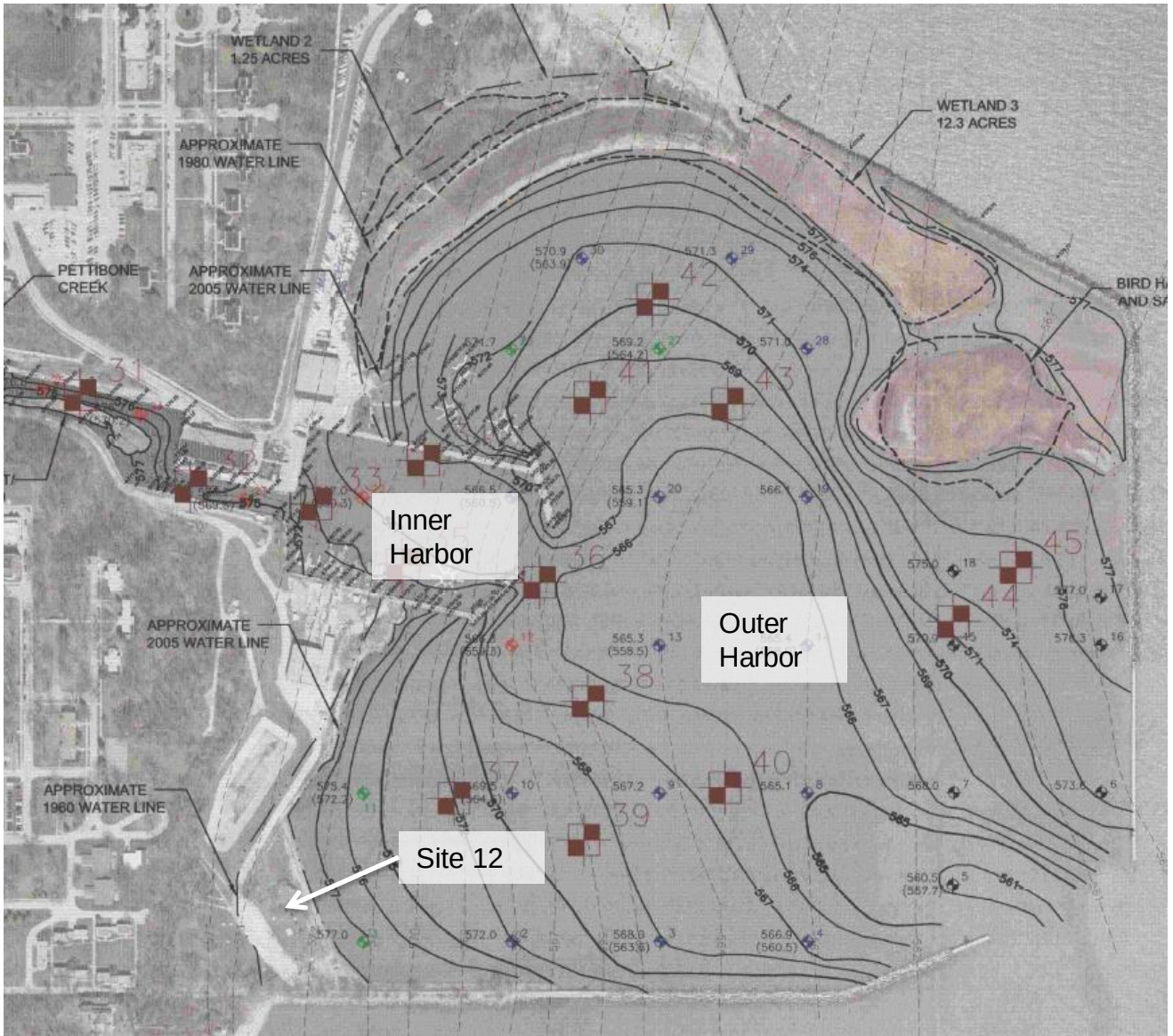
1988 Photo

Outer Harbor
Site 12 – After 2nd dredge spoil placement . Two gravel roads noted.

2002 Photo


Inner Harbor
Outer Harbor
Stormwater basin constructed.
Site 12 – Additional changes in shoreline.

2006 Drawing



Current Photo

APPENDIX B

FIELD FORMS - SITE 12 RI

B-1 PHASE 1

B-2 PHASE 2

B-3 PHASE 3

B-1 PHASE 1

- **Boring Logs**
- **Sample Log Sheets**
- **Calibration Log Sheets**
- **Chain of Custody Forms**

Boring Logs

Boring #NTC12-SB21				
Depth	**Moisture/Hardness**	**Color**	**Material Classification**	**USCS**
0	Moist	D. Brown	**Sandy Clay** with gravel pieces randomly spaced.	SC
1	"	"	"	"
2	"	"	"	"
3	"	"	"	"
4	"	"	"	"
5	"	"	Bits of shiny black pieces of material - asphalt - petroleum odor.	"
6	"	Black/Brown	"	"
7	"	Tan	Poorly graded **Fine Sand**	SP
8	Wet at 7.5 feet	"	"	"
9	"	"	"	"
10	**Termination**			

Boring #NTC12-SB22				
Depth	**Moisture/Hardness**	**Color**	**Material Classification**	**USCS**
0	Moist	D.Brown	**Topsoil** and native **Clayey Sand** (2.5 ') with some Fill gravel.	SC
1	"	"		"
2	"	"	**Clayey Sand** (2.5 ').	"
3	"	"	"	"
4	"	"	"	"
5	"	"	"	"
6	"	"	"	"
7	"	"	"	"
8	Wet at 7.5 feet	Tan	Poorly sorted **Fine Sand.**	SP
9	"	Black	"	"
10	**Termination**			

Boring #NTC12-SB23				
Depth	**Moisture/Hardness**	**Color**	**Material Classification**	**USCS**
0	Dry	White	Fill - **Sandy Gravel**	GW
1	"	Black	Well-Graded **Sand** Fill	SW
2	"	Gray/White	Fill - **Sandy Gravel**	GW
3	"	Gray/White	"	"
4	"	White	"	"
5	"	Gray	"	"
6	"	White	"	"
7	Moist	Black/White	Well-Graded **Sand** Fill	SW
8	Wet at 8.5	Black	Poorly sorted, fine Black **Sand**	SP
9	"	"	Poorly sorted, fine Black **Sand**	"
10	**Termination**			

Boring #NTC12-SB24				
Depth	**Moisture/Hardness**	**Color**	**Material Classification**	**USCS**
0	Moist	Tan	Poorly sorted fine **Sand**	SP
1	"	"	"	"
2	Wet at 2.5'	Black		
3	"	"	"	"
4	"	"	"	"
5	**Termination**			

Boring #NTC12-SB25				
Depth	**Moisture/Hardness**	**Color**	**Material Classification**	**USCS**
0	Moist	D.Brown	**Clayey Sand** with some gravel-fill	SC
1	"	"	"	"
2	"	"	**Clayey Sand** with some gravel-fill and a few small shiny pieces of black, hard, asphalt-like material.	"
3	"	"	**Clayey Sand** with some gravel-fill and a few small shiny pieces of black, hard, asphalt-like material.	"
4	"	"	**Clayey Sand** with some gravel-fill	"
5	"	"	"	"
6	"	Tan	Poorly grade fine Sand	SP
7	"	"	"	"
8	"	"	"	"
9	Wet at 9.5'	"	"	"
10	**Termination**			

Boring #NTC12-SB26				
Depth	**Moisture/Hardness**	**Color**	**Material Classification**	**USCS**
0	Moist/Hard	Brown	**Sandy Clay** with some gravel.	SC
1	"	White/Gray	"	"
2	"	"	"	"
3	"	"	"	"
4	"	Black	**Sandy Clay** with some gravel, and some black ashalt-like pieces.	"
5	"	"	**Sandy Clay** with some gravel, and some black ashalt-like pieces.	"
6	Wet	"	Poorly sorted Fine **Sand**	SP
7	"	"	"	"
8	"	"	"	"
9	"	"	"	"
10	**Termination**			

Boring #NTC12-SB27				
Depth	**Moisture/Hardness**	**Color**	**Material Classification**	**USCS**
0	Moist to dry	Brown to White	Topsoil - **Silt** (top 6 ") and Fill - **Sandy Gravel** (bottom 6 ")	ML/GW
1	Dry	Gray	Fill - **Sandy Gravel**	GW
2	Dry/Hard	White/Brown	Fill - **Clayey Sand**	SC
3	"	"	"	"
4	Dry/Hard	White/Gray	Fill - **Sandy Gravel**	GW
5	"	"	"	"
6	"	"	"	"
7	Moist	Tan	Poorly-graded fine **Sand**	SP
8	Wet at 8.5'	"	"	"
9	"	Tan to Black	"	"
10	**Termination**			

Boring #NTC12-SB28				
Depth	**Moisture/Hardness**	**Color**	**Material Classification**	**USCS**
0	Moist	Brown	**Sandy Clay** with bits of gravel.	SC
1	"	"	"	"
2	"	"	**Sandy Clay** with bits of gravel and some small pieces of asphalt-like material.	"
3	"	"	**Sandy Clay** with bits of gravel and some small pieces of asphalt-like material.	"
4	"	"	**Sandy Clay** grading into poorly graded Fine Sand at 4.5 '.	SC/SP
5	"	Tan	Poorly graded Fine **Sand**.	SP
6	Wet at 6'	"	"	"
7	"	"	"	"
8	"	"	"	"
9	"	Gray	Fat, Hard **Clay**	CH
10	**Termination**			

Boring #NTC12-SB29				
Depth	**Moisture/Hardness**	**Color**	**Material Classification**	**USCS**
0	Moist	Brown	**Sandy Clay** with gravel and bits of wood.	SC
1	"	"	"	"
2	"	"	**Sandy Clay** with gravel and asphalt-like pieces.	"
3	"	"	"	"
4	"	Brown to Tan	**Sandy Clay** with gravel grading into poorly graded **Fine Sand.**	SC/SP
5	"	Tan	Poorly graded **Fine Sand.**	SP
6	Wet	"	"	"
7	"	Black	Fine to Coarse, well-graded **Sand.**	SW
8	"	"	Poorly graded **Fine Sand.**	SP
9	"	"	"	"
10	**Termination**			

Boring #NTC12-SB30				
Depth	**Moisture/Hardness**	**Color**	**Material Classification**	**USCS**
0	Moist	Tan	Poorly graded **Fine Sand.**	SP
1	"	"	"	"
2	Wet	"	"	"
3	"	Black	"	"
4	"	"	"	"
5	**Termination**			

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAVSTAT Great Lakes
PROJECT NUMBER: 112G02416
DRILLING COMPANY: Miller Drilling Company
DRILLING RIG: Geoprobe 6620

BORING No.: NTC12-SB21
DATE: 12-20-10
GEOLOGIST: Ellen Berkhee
DRILLER: Miller

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	Sampler BZ	Borehole**	Driller BZ**
	0				Moist	Dark Brown	Sandy Clay w/Gravel	SC	~~Native Fill~~ E.B. 6/8/11*				
	1						Pieces ~~[illegible]~~ randomly spaced.						
	2		100%										
	3												
	4												
	5					Black & Brown	Bits of shiny black pieces of material - asphalt-like petroleum odor						
	6		100%										
	7					Tan	Poorly Graded Fine Sand	SP	~~Native~~ E.B. 6/9/11*				
	8			▼	Wet								
	9												
	10						Termination						

* 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): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

* Sand thought to be native, most likely dredge spoils.

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAVSTAT Great Lakes
PROJECT NUMBER: 112602416
DRILLING COMPANY: Miller Drilling Company
DRILLING RIG: Geoprobe 6620

BORING No.: NTC-SB22
DATE: 12-20-10
GEOLOGIST: Ellen Berklite
DRILLER: Miller

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	Sampler BZ	Borehole**	Driller BZ**
	0				Moist	Dark Brown	Topsoil + Native clayey sand with some Fill gravel	SC	~~Fill + Native~~				
	1												
	2		160*										
	3					Dark Brown	Clayey Sand	SC	~~Native~~				
	4												
	5												
	6		160*										
	7												
	8			▼	Wet	Tan	Poorly Sorted Fine Sand	SP					
	9					Black							
	10						Termination						

* 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): 0

Remarks: _____

Converted to Well: Yes _____ No ✓ Well I.D. #: _____

* Sand thought to be native, most likely dredge spoils.

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAVSTAT Great Lakes
PROJECT NUMBER: 112G02416
DRILLING COMPANY: Miller Drilling Company
DRILLING RIG: Geoprobe 6620

BORING No.: NTC12-SB23
DATE: 12-20-[redacted]10
GEOLOGIST: Ellen Berklite
DRILLER: Miller Drilling Company

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	Sampler BZ	Borehole**	Driller BZ**
0	0				Dry	White	Fill-Sandy Gravel	GW					
1	1					Black	Well-graded Sand FILL	SW					
	2					Gray/	Fill-Sandy Gravel	GW					
	3		100%			White							
	4					White							
	5					Gray							
	6		100%			White							
	7				Moist	Black	Fill-well-graded sand	SW	*E.B 6/6/11				
	8				Wet	Black	Poorly Sorted Fine,	SP	~~Native~~				
	9						Black Sand		~~Native~~				
	10						Termination						

* 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): 0

Remarks:

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

* Sand thought to be native, most likely dredge spoils.

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAVSTAT Great Lakes
PROJECT NUMBER: 112602416
DRILLING COMPANY: Miller Drilling Company
DRILLING RIG: Geoprobe 6620

BORING No.: NTC12-SB24
DATE: 12-20-10
GEOLOGIST: Ellen Berklite
DRILLER: Miller

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 (Native):	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0				Moist	Tan	Poorly Sorted Fine Sand	SP	~~Native~~				
	1												
	2		4ft		Wet	Black		SP					
	3												
	4												
	5						Termination						

* 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): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: _____

* Sand thought to be native, most likely dredge spoils.

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAVSTAT Great Lakes
PROJECT NUMBER: 112G0246
DRILLING COMPANY: Miller Drilling Company
DRILLING RIG: Geoprobe 6620

BORING No.: NTC12-SB25
DATE: 12-20-10
GEOLOGIST: Ellen Gorlitz
DRILLER: Miller

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	Sampler BZ	Borehole**	Driller BZ**
	0				Moist	D. Brown	clayey Sand w/some gravel - Fill	SC	~~Fill/Native~~				
	1												
	2		100%				*A few small shiny pieces of black hard-Asphalt-like material		2-4'				
	3												
	4												
	5												
	6		100%		Moist	Tan	Poorly graded Fine Sand	SP	~~Native~~				
	7												
	8												
	9				Wet								
	10						Termination						

* 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): 0

Remarks:

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

* Sand thought to be native, most likely dredge spoils.

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAVSTAT Great Lakes
PROJECT NUMBER: 112G02416
DRILLING COMPANY: Miller Drilling Company
DRILLING RIG: Geoprobe 6620

BORING No.: NTC21-SB-26
DATE: 12-21-10
GEOLOGIST: Ellen Berkitte
DRILLER: Miller

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 * E.B. 6/8/11	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0				Moist	Brown	Hard Sandy Clay w/ some gravel	SC	~~Native + Fill~~				
	1					Mixed							
	2					Gray							
	3												
	4					Black			Black Asphalt pieces 4-6				
	5												
	6				Wet	Black	Poorly sorted fine Sand	SP	~~Native~~				
	7												
	8												
	9												
	10						Termination						

* 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): 0

Remarks:

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

* Sand thought to be native, most likely dredge spoils.

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAVSTAT Great Lakes
PROJECT NUMBER: 112602416
DRILLING COMPANY: Miller Drilling Company
DRILLING RIG: Geoprobe 6620

BORING No.: NTC-SB2[illegible]7
DATE: 12-2010
GEOLOGIST: E. Berkitte
DRILLER: Miller

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	Sampler BZ	Borehole**	Driller BZ**
	0				MOIST	Brown	Topsoil - Silt	ML	Fill				
	1				DRY	White & Gray	Fill - Sandy Gravel	GW					
	2		WAT			White Brown	Fill - Clayey Sand	SC	- Hand*				
	3												
	4					White & Gray	Fill - Sandy Gravel	GW					
	5								Fill				
	6		WAT										
	7				MOIST	Tan	Poorly Graded Fine Sand	SP	Native				
	8			▼									
	9		-		WET								
	10				WET	Black							
							Termination						

* 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): 0

Remarks: *E.B. 6/8/11

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

* Sand thought to be native, most likely dredge spoils.

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAVSTAT Great Lakes
PROJECT NUMBER: 112G02416
DRILLING COMPANY: Miller Drilling Company
DRILLING RIG: Geoprobe 6620

BORING No.: NTC12-SB-28
DATE: 12-21-10
GEOLOGIST: Ellen Berkithe
DRILLER: Miller Drilling Company

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	Sampler BZ	Borehole**	Driller BZ**
	0		6		Moist	Brown	Sandy clay w/ bits of gravel	SC	Manmade Fill				
	1		4										
	2		9@4				Some small pieces of asphalt-like material		24"				
	3												
	4				Moist	Brown	Poorly graded Fine Sand	SP	Native				
	5			▼	Moist	Tan							
	6				Wet								
	7		6@4										
	8												
	9					Gray	Fat, Hard clay	CH					
	10						Termination						

* 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): 0

Remarks: *EB. 6/8/11

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

* Sand thought to be native, most likely dredge spoils.

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAVSTAT Great Lakes
PROJECT NUMBER: 112G0246
DRILLING COMPANY: Miller Drilling Company
DRILLING RIG: Geoprobe 6620

BORING No.: NTC12-SB-29
DATE: 12-20-10
GEOLOGIST: Ellen Berkitte
DRILLER: Miller

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 *E.B. 6/8/11	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0				Moist	Brown	Sandy Clay w/gravel and bits of wood.	SC	~~Native~~ Fill				
	1		100%										
	2						Asphalt-like pieces from 2-4'.						
	3												
	4					tan	Poorly graded Sand *fine	SP	~~Native~~				
	5			▼									
	6		100%		Wet								
	7					Black	Well graded Sand *fine & coarse	SW					
	8					Black	Poorly graded Sand *fine	SP					
	9												
	10						Termination						

* 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): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

* Sand thought to be native, most likely dredge spoils.

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAVSTAT Great Lakes
PROJECT NUMBER: 112G02416
DRILLING COMPANY: Miller Drilling Company
DRILLING RIG: Geoprobe 6620

BORING No.: NTC-SB30
DATE: 12-30-10
GEOLOGIST: Evan Berkitte
DRILLER: Miller

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	MATERIAL DESCRIPTION: Color	MATERIAL DESCRIPTION: Material Classification (Native):	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0				Moist	Tan	Poorly Sorted Fine Sand	SP	~~Native~~ * E.B. 6/11				
	1												
	2		90%		Wet								
	3					Black							
	4												
	5						Termination						
	6												
	7												
	8												
	9												
	10												

* 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): 0

Remarks:

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

* Sand thought to native, most likely dredge spoils.

Sample Log Sheets

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Site 12
Project No.: 112602416

Sample ID No.: NTC-SB21
Sample Location: SB21
Sampled By: C. Metz
C.O.C. No.: 1240

- [x] Surface Soil
- [x] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [ ] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Date: / Time: / Method: / Monitor Reading (ppm):	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

COMPOSITE SAMPLE DATA: PID

Date: 12-2-10	Time	Depth Interval	~~Color~~	Description (Sand, Silt, Clay, Moisture, etc.)
	1620	0-0.5 *	2.0	
Method: DPT		0.5-2		See boring log
		2-4		
Monitor Readings (Range in ppm):	1625	5-7 *	2.4	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOCs / PAHs	(1) 4oz Jar	✓	
PCBs		✓	
Pesticides		✓	
TAL METALS	(1) 4oz Jar	✓	

OBSERVATIONS / NOTES:

PCB analysis run on 05-07' interval only

* Sample interval

MAP:

Circle if Applicable: MS/MSD Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Site 2
Project No.: 112602116

Sample ID No.: NTC-SB22
Sample Location: SB22
Sampled By: CM
C.O.C. No.: 1244

- [X] Surface Soil
- [X] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [ ] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Date: / Time: / Method: / Monitor Reading (ppm):	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

COMPOSITE SAMPLE DATA: PID

Date:	Time	Depth Interval	Color	~~Description (Sand, Silt, Clay, Moisture, etc.)~~
12-20-10	1555	0-0.5 *	Fill + Native	0.8
Method:	1600	0.5-2 *	↓	47
		2-4	Native	
Monitor Readings (Range in ppm):		4-6		
		6-8	↓	
		8-10		

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOCs / PAHs	(1) 4oz jar	✓	
Pesticides	~~(1) 4oz glass jar~~	✓	
TAL Metals	(1) 4oz glass jar	✓	

OBSERVATIONS / NOTES:

See boring log for description of soil

* Sample interval

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): CM

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC02-SB23-
Project No.: 112602416

Sample ID No.: NTC Great Lakes Steel7
Sample Location: SB23
Sampled By: CM
C.O.C. No.: 12439

[X] Surface Soil
[X] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[ ] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Date: 12-20-10	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
	1300	0.0-0.5	*	PID 7.6
Method:		0.5-2.0		1.3
		2.0-4.0		0.7
Monitor Readings		4-6		2.2
(Range in ppm):		6-8		0.4
	1320	8-10	*(Saturated)	0.8

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Pesticides	(1) 4oz glass jar	✓	
SVOCs/PAHs		✓	
TAL Metals	(1) 4oz glass jar	✓	

OBSERVATIONS / NOTES:

* Sample depth
See boring log for description

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): CM

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: SITE 12
Project No.: 112602416

Sample ID No.: NTC12-SB24
Sample Location: SB24
Sampled By: CM
C.O.C. No.: 12439

[X] Surface Soil
[X] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[ ] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA: RID

Date: 12-2010	Time	Depth Interval	~~Color~~	Description (Sand, Silt, Clay, Moisture, etc.)
	1400	0-0.5 *	0.4	
Method:	1405	0.5-2 *	1	See boring log
		2-4	1	
Monitor Readings		4-6	NA	
(Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Pesticides	(1) 4oz glass jar	✓	
SVOCs/PAHs		✓	
TAL Metals	(1) 4oz glass jar	✓	

OBSERVATIONS / NOTES:

* Sampled

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): CM

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Site 12
Project No.: 112G02416

Sample ID No.: NTC12-SB25
Sample Location: SB25
Sampled By: cm
C.O.C. No.: 12446

- [X] Surface Soil
- [X] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [ ] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Date: / Time: / Method: / Monitor Reading (ppm):	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

COMPOSITE SAMPLE DATA: PID

Date: 12/2/10 / Method: / Monitor Readings (Range in ppm):	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
	1635	0-0.5 *	1.6	
		0.5-2	21.6	See Boring Log
	1640	2-4 *	22	DUP02
		5-7	1.0	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOCs/PAHs	(1) 4oz glass jar	✓	
Pesticides		✓	
PCBs		✓	
TAL Metals	(1) 4oz glass jar	✓	

OBSERVATIONS / NOTES:

PCB analysis on 2-4' interval

*Sampled

DUP02 = NTC12-SB25-0204

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
	NTC12-DUP02

Signature(s): cm

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Site 12
Project No.: 112602916

Sample ID No.: NTC21-SB-26
Sample Location: SB26
Sampled By: cm
C.O.C. No.: 12939

- [x] Surface Soil
- [x] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [ ] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Date: / Time: / Method: / Monitor Reading (ppm):	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
12-20-10	1735	0-0.5 *	<2.8	
Method:		0.5-2		See Boring Log
		2-4		
Monitor Readings	1740	4-6 *		
(Range in ppm):		~~0-6~~		

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOCs/PAHs	(1) 4oz glass jar	✓	
Pesticides		✓	
TAL Metals	(1) 4-oz glass jar	✓	

OBSERVATIONS / NOTES:

* Sample Interval

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): cm

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: STA 12
Project No.: 112602416

Sample ID No.: NTC-SB27
Sample Location: SB27
Sampled By: CM
C.O.C. No.: 12440

- [x] Surface Soil
- [x] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [ ] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date: 12-12-10	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
	1530	0-0.5 *	<1.0	See boring log
Method:		0.5-2		
	1535	2-4 *		DUP01
Monitor Readings (Range in ppm):		4-6		
		6-8		
		8-10		

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOCs/PAHs	(1) 4oz glass jar	✓	
Pesticides		✓	
PCBs		✓	
TAL Metals	(1) 4oz glass jar	✓	

OBSERVATIONS/NOTES:

DUP01 collected on 2-4' interval

* Sample depth

PCB analysis only run on 2-4' interval

MAP:

Circle if applicable: MS/MSD yes

Duplicate ID No.: NTC12-DUP01

Signature(s): CM

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Site 12
Project No.: 112G02416

Sample ID No.: NTC28B-28
Sample Location: SB28
Sampled By: CM
C.O.C. No.: 12990

[X] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA: PID

Date: 12-20-10	Time	Depth Interval	~~Color~~	Description (Sand, Silt, Clay, Moisture, etc.)
	1700	0-0.5 *	<2.0	See Boring Log
Method:		0.5-2		
	1705	2-4 *		
Monitor Readings		4-6		
(Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOCs / PAHs	(1) 4oz glass jar	✓	
Pesticides		✓	
PCBs		✓	
TAL Metals	(1) 4oz glass jar	✓	

OBSERVATIONS / NOTES:

* Sample Intervals

#PCB analysis only on 2-4' interval

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): CM

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Site 12
Project No.: 112602416

Sample ID No.: NTC12-SB-29
Sample Location: SB29
Sampled By: cm
C.O.C. No.: 12440

[X] Surface Soil
[X] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[ ] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA: PID

Date: 12-20-18	Time	Depth Interval	~~Color~~	Description (Sand, Silt, Clay, Moisture, etc.)
	1720	0-0.5 *	L20	See Boring Log
Method:		0.5-2		
	1725	2-4 *		
Monitor Readings		4-6		
(Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOCs/PAHs	(1) 4-oz glass jar	✓	
Pesticides		✓	
PCBs		✓	
TAL Metals	(1) 4-oz glass jar	✓	

OBSERVATIONS / NOTES:

* Sample interval
PCB analysis only on 2-4' interval

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): cm

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Site 12
Project No.: 112602416

Sample ID No.: NTC12-SB30
Sample Location: SB30
Sampled By: CMC
C.O.C. No.: 12439

- [x] Surface Soil
- [x] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [ ] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date: 12-20-10	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
	1420	0-0.5 *	4.0	See Boring Log
Method:	1425	0.5-2 *	0.4	
		2-4		
Monitor Readings		4-6		
(Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOCs/PAHs	3 (1) 8oz glass jar	✓	
Pesticides		✓	
TAL Metals	(1) 4-oz. glass jar	✓	

OBSERVATIONS / NOTES

* Sample Interval

MAP

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): CMC

Calibration Log Sheets

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : NAVSTA Great Lakes

SITE NAME: Site # 12

PROJECT No.: 112G02416 ~~02120~~

INSTRUMENT NAME/MODEL: Mini Rae 2000 PID

MANUFACTURER: Mini Rae

SERIAL NUMBER: U54688x

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Readings		Calibration Standard (Lot No.)	Notes and Comments
			Pre-calibration	Post-calibration		
12-20-10		C. Metz	100 ppm		10-434, From Field Environmental	No calibration required
12-20-10		C. Metz	100 ppm			AM

Chain of Custody Forms

EMPIRICAL LABORATORIES, LLC - CHAIN OF CUSTODY RECORD

SHIP TO: 621 Mainstream Drive, Suite 270 ♦ Nashville, TN 37228 ♦ 615-345-1115 ♦ (fax) 615-846-5426

12439

Send Results to:	Send Invoice to:
Name Bob Davis	Name Accounting
Company Tetra Tech	Company Tetra Tech
Address 661 Andersen Dr. # 2	Address
City Pittsburgh ~~PA 15220~~	City
State, Zip PA 15220	State, Zip SAME
Phone 412-921-7251	Phone
Fax 412-921-4090	Fax
E-mail Robert.Davis@TetraTech.com	E-mail
Project No./Name: #TET10CTOF27A CTO F27A	**Sampler's (Signature):**

Analysis Requirements: SVOCs+PAHs (8270C); ~~PCBs (8082A)~~; Pesticides (8081B); TAL Metals (6010C); VOCs (8260B); * Multiple IDW parameters

Lab Use Only:

VOA Headspace	Y	N	(NA)
Field Filtered	Y	(N)	NA
Correct Containers	(Y)	N	NA
Discrepancies	Y	(N)	NA
Cust. Seals Intact	Y	N	(NA)
Containers Intact	(Y)	N	NA

Airbill #: 6345

CAR #:

Lab Use Only Lab #	Date/Time Sampled	Sample Description	Sample Matrix	Comments	No. of Bottles	Lab Use Only Containers/Pres.
10/2185-01	12-20-10/1300	NTC12-SB23-0005	SO		2	2402
-02	/1320	NTC12-SB24-0810	SO		2	
-03	/1400	NTC12-SB24-0005	SO		2	
-04	/1405	NTC12-SB24-00502			2	
-05	——	TB01 #9060			2	* WS 12/21/10
-06	/1420	NTC12-SB30-0005			2	
-07	/1425	NTC12-SB30-00502			2	
-08	1735/~~1800~~	NTC12-SB26-0005			2	
-09	1740/~~1815~~	NTC12-SB26-0406			2	
-10	/0000	NTC12-DUP01			2	
-11	/0000	NTC12-DUP02			2	
-12	1800	NTC12-Soil-IDW			8	

	Date/Time	Received By: (Signature)
Sample Kit Prep'd by: (Signature)		
Relinquished by: (Signature)	12/20/10 1700	Received By: (Signature)
Relinquished by: (Signature)	Date/Time	Received By: (Signature)
Received for Laboratory by: (Signature)	Date/Time 12-21-10 09:15	Temperature 4.4 °C

REMARKS: = All correction completed on 12-20-10

* See PO# for CTO F27A for full suite of parameters & not rec'd in shipment WS 12/21/10

Details:

Page 1 of 2

Cooler No. 2 of 2

Date Shipped 12-20-10

Shipped By Fed Ex

Turnaround

Distribution: Original and yellow copies accompany sample shipment to laboratory; Pink retained by samplers.

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EMPIRICAL LABORATORIES, LLC - CHAIN OF CUSTODY RECORD

SHIP TO: 621 Mainstream Drive, Suite 270 ♦ Nashville, TN 37228 ♦ 615-345-1115 ♦ (fax) 615-846-5426

12440

Send Results to:	Send Invoice to:
Name Bob Davis	Name
Company Tetra Tech NUS Inc	Company
Address 661 Andersen Dr. #7	Address
City Pittsburgh	City SAME
State, Zip PA, 15220	State, Zip
Phone 412-921-7251	Phone
Fax	Fax
E-mail Robert.Davis@TetraTech.com	E-mail
Project No./Name: #TET10CTOF27A	**Sampler's (Signature):**

Lab Use Only:

VOA Headspace	Y	N	NA
Field Filtered	Y	N	NA
Correct Containers	Y	N	NA
Discrepancies	Y	N	NA
Cust. Seals Intact	Y	N	NA
Containers Intact	Y	N	NA

Airbill #: 6349

CAR #: —

Lab Use Only Lab #	Date/Time Sampled	Sample Description	Sample Matrix	SVOCs, PAHs (8270C)	PCBs (8082A)	Pesticides (8081B)	TAL Metals (6010C)	Comments	No. of Bottles	Lab Use Only Containers/Pres.
102185 -13	1530	NTC12-SB27-0005	SO	✓	[redacted]	✓	✓		2	2 4oz
-14	1535	-SB27-0204		✓	✓	✓	✓	MS/MSD, pcbs	6	6 4oz
-15	1555	-SB22-0005		✓		✓	✓		2	2 4oz
-16	1600	-SB22-0502		✓		✓	✓		2	
-17	1620	-SB21-0005		✓		✓	✓		2	
-18	1625	-SB21-0507		✓	✓	✓	✓	PCB analysis	2	
-19	1635	-SB25-0005		✓		✓	✓		2	
-20	1640	-SB25-0204		✓	✓	✓	✓	pcb analysis	2	
-21	1700	-SB28-0005		✓		✓	✓		2	
-22	1705	-SB28-0204		✓	✓	✓	✓	pcb analysis	2	
-23	1720	-SB29-0005		✓	[redacted]	✓	✓		2	
-24	1725	-SB29-0204		✓	✓	✓	✓	pcb analysis	2	

Sample Kit Prep'd by: (Signature)	Date/Time 12-17-10/1000	Received By: (Signature)
Relinquished by: (Signature)	Date/Time 12-20-10/1700	Received By: (Signature)
Relinquished by: (Signature)	Date/Time	Received By: (Signature)
Received for Laboratory by: (Signature)	Date/Time 12-21-10 09:15	Temperature 4.4°C

REMARKS:

= All corrections completed on 12-20-10

Details:

Page 2 of 2

Cooler No. 2 of 2

Date Shipped 12-20-10

Shipped By Fed Ex

Turnaround

Distribution: Original and yellow copies accompany sample shipment to laboratory; Pink retained by samplers.

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CTOF27AGI 001

B-2 PHASE 2

- **Boring Logs**
- **Sample Log Sheets**
- **Chain of Custody Forms**

Boring Logs

Tetra Tech, Inc.

BORING LOG

PROJECT NAME: NAVST Great Lakes
PROJECT NUMBER: 112G02416
DRILLING COMPANY: EFS
DRILLING RIG: DPT 6620 DT

BORING No.: NTC12-SB31
DATE: 12/17/12
GEOLOGIST: Conti
DRILLER: J BOESH

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	Sampler BZ	Borehole**	Driller BZ**
	0				DENSE	BRN TAN	GRASS - SANDY CLAY ROCK	SC	MOIST	0			
S1 @			3.2/4				FRAGS		COULD BE				
1420						TAN	ROCK/SAND @ 3'±		FILL TO 3@4'				
	4			4'					TOOK	0			
					M		SAND/ROCK FRAGS		•(0305)(SPLP)				
S2 @					DENSE	TAN BRN	SILTY F SAND	SM	MOIST				
1425			3.8/4				TR CLAY LENS ~6'		TOOK	0			
	8			8'					•(0307)(SPLP)				
				TD									
									TOOK 2 SAMPLES FOR (SPLP)				
							• = SOIL SAMPLE						

* 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): 0

Remarks:

Converted to Well: Yes ____ No ✓ Well I.D. #: NA

Tetra Tech, Inc.

BORING LOG

PROJECT NAME: NAVST Great Lakes
PROJECT NUMBER: 112G02416
DRILLING COMPANY: EFS
DRILLING RIG: DPT 6620 DT

BORING No.: NTC12-SB32
DATE: 12-17-12
GEOLOGIST: Conti
DRILLER: J BOESCH

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	Sampler BZ	Borehole**	Driller BZ**
	0			-5	SOFT	BRN	6" CLAY ROOTS, ROCK FRAG	SC	MOIST	0			
S1 @ 1435			3/4		M DENSE	TAN	SAND/CLAY/ROCK FRAGS		• 0204 (SPLP)				
				•		GRAY				0			
	4			-3.5	STIFF	DK GRAY	CLAY ROCK FRAGS						
							SAND	SC	DAMP → MOIST	0			
S2 @ 1440				•					LOOKS LIKE FILL MATL				
				7.-					TO 7' • (0406)	0			
	8				M DENSE	TAN	F/C SAND	SM	MOIST				
								SW	COULD BE NAT. ~ 7.0'	0			
				TD									
				8'									
							• = SOIL SAMPLE						

* 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): 0

Remarks:

Converted to Well: Yes ____ No ✓ Well I.D. #: NA

Tetra Tech, Inc.

BORING LOG

PROJECT NAME: NAVST Great Lakes
PROJECT NUMBER: 112602416
DRILLING COMPANY: EFS
DRILLING RIG: DPT 6620DT

BORING No.: NTC12-SB33
DATE: 12/17/12
GEOLOGIST: Conti
DRILLER: J. BOESCH

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	Sampler BZ	Borehole**	Driller BZ**
	0				STIFF / DENSE	BRN / GRAY	CLAY AND ROCK FRAGS (FILL)	S.	DAMP ↓	0			
S1 @ 1525			35/4	3' @					MOIST. (0204)	0			
	4				STIFF	DK GRAY	SANDY CLAY, ROCK PCS OF COAL, GRAVEL	SC	MOIST FILL				
S-2 @ 1530			3.8/4	@ 6'±	M DENSE	DK GRAY	F/M SAND	SM	• (0406) WET ~ 6	0			
	8								LOOKS NAT. TR. LAMINATIONS TOOK (0402) (MICACEOUS)	0			
				TD 8'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: • = SOIL SAMPLE

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: NA

Tetra Tech, Inc.

BORING LOG

PROJECT NAME: NAVST Great Lakes
PROJECT NUMBER: 112G02416
DRILLING COMPANY: EFS
DRILLING RIG: DPT 6620 DT

BORING No.: NTC12-SB34
DATE: 12/17/12
GEOLOGIST: Conti
DRILLER: J. BOESCH

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	Sampler BZ	Borehole**	Driller BZ**
	0			.5	SOFT	BRN	6" TOPSOIL, ROOTS CLAYEY SILT	ML	MOIST	0			
S-1 @			3/4		DENSE	TAN	SAND CLAY, ROCK	SC	DAMP TO				
1500				•		TO BRN	FRAGS		MOIST (0204)•	0			
	4					TO							
						BRN	SILTY SAND-TR DK	SM	FILL TO 7'±	0			
S-2 @				•	DENSE	TO	GRAY STAINED CLAY @ 5'±	CL	? (0406)•				
1510				7.0		GRAY	SAND-TR ROCK FR.		WET ~ 6'±	0			
	8				M DENSE	DARK GRAY	SILTY F SAND	SM	WET				
				TD @ 8'						0			
							• = SOIL SAMPLE						

* 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): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: NA

Sample Log Sheets

MULTIPLE SAMPLE LOG SHEET

Tetra Tech, Inc.

[] SURFACE SOIL [] SEDIMENT
[X] SUBSURFACE SOIL [] LAGOON / POND
[] OTHER _____

SIGNATURE(S): SJ Conti

SAMPLER (S): SJ CONTI

PROJECT NAME **NAVST Great Lakes**
PROJECT NUMBER: **112G02416**

LOCATION: **Great Lakes, IL. Site**

SAMPLE No.	SAMPLE METHOD	DEPTH (Ft.)	DATE 2012	TIME	CONCENTRATION (L)LOW (H)HIGH	(G) GRAB (C) COMPOSITE	TOTAL No. OF CONTAINERS	ANALYSES: SPLP TAL METALS						SOIL GROUP #	PID READING	SOIL DESCRIPTION
NTC12-SB31-0305	MC	3-5	12/17	1420	L	G	1	1						SC/SM	0	MOIST TAN SAND/ROCK FRAGS
NTC12-SB31-0507	"	5-7	"	1425	L	G	1	1						SM	0	MOIST SILTY F SAND TR CLAY
NTC12-SB32-0204	"	2-4	"	1435	L	G	1	1						SC/	0	MOIST SAND/CLAY/ROCK FR.
NTC12-SB32-0406	"	4-6	"	1440	L	G	(2)	(2)						SM	0	" " " "
NTC12-SB34-0204	"	2-4	"	1500	L	G	1	1						SC	0	DAMP TO MOIST SAND/CLAY/ROCK FRAGS
NTC12-SB34-0406	"	4-6	"	1510	L	G	1	1						SM/CL	0	MOIST→WET DK. SILTY SAND/STAINED CLAY
NTC12-SB33-0204	"	2-4	"	1525	L	G	1	1						SC	0	MOIST CLAY/ROCK FRAGS
NTC12-SB33-0406	"	4-6	"	1530	L	G	1	1						SM	0	MOIST→WET F/M SAND

REMARKS: (2) = DO MS/MSD
MC = MACROCORE SAMPLER (DPT)

LABORATORY: **TRIMATRIX**

COC No.: 0495

Chain of Custody Forms

(SITE 12 SOILS)

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 0495 | PAGE 1 OF 1

PROJECT NO: 2416 112GO~~2429~~	FACILITY: NAVST GREAT LAKES	PROJECT MANAGER: BOB DAVIS/ COREY RICH	PHONE NUMBER 4129217251	LABORATORY NAME AND CONTACT: TRIMATRIX / GARY WOOD
SAMPLERS (SIGNATURE) SJConti SITE 12		FIELD OPERATIONS LEADER SCONTI	PHONE NUMBER 412 551 2629	ADDRESS 5560 CORPORATE EX. COURT SE
		CARRIER/WAYBILL NUMBER FED EX # 8020 3157 8634		CITY, STATE GRAND RAPIDS, MI

STANDARD TAT ☐
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☒ 14 day

DATE YEAR 2012	TIME	SAMPLE ID (SITE 12)	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: SPLP TAL METALS (6OZ)								COMMENTS
12/17	1420	NTC12-SB31-0305	SB 31	3	5	SO	G	1	1										
12/17	1425	NTC12-SB31-0507	"	5	7	SO	G	1	1										
12/17	1435	NTC12-SB32-0204	SB 32	2	4	SO	G	1	1										
12/17	1440	NTC12-SB32-0406	"	4	6	SO	G	(2)	(2)										DO MS/MSD
12/17	1500	NTC12-SB34-0204	SB 34	2	4	SO	G	1	1										
12/17	1510	NTC12-SB34-0406	"	4	6	SO	G	1	1										
12/17	1525	NTC12-SB33-0204	SB 33	2	4	SO	G	1	1										
12/17	1530	NTC12-SB33-0406	"	4	6	SO	G	1	1										

1. RELINQUISHED BY SJConti	DATE 12/17/12	TIME 1800	1. RECEIVED BY FED EX	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

B-3 PHASE 3

- **Boring Logs**
- **Monitoring Well Construction Sheets**
- **Monitoring Well Development Records**
- **Log Flow Groundwater Purge Data Sheets**
- **Sample Log Sheets**
- **Equipment Calibration Forms**
- **Chain of Custody Forms**
- **Survey Data**
- **Slug Test Data and Calculations**

Boring Logs

Tetra Tech, Inc.

BORING LOG

PROJECT NAME: Site 12 Phase 3 RI
PROJECT NUMBER: 112G02416-Great Lakes
DRILLING COMPANY: EFS
DRILLING RIG: DPT/Hollow Stem Auger

BORING No.: NTC12-MW01
DATE: 2-13-13
GEOLOGIST: Conti
DRILLER: J. BOECHE

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	MATERIAL DESCRIPTION: Color	MATERIAL DESCRIPTION: Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0				FRIABLE	BRN	SILT - FINE S - CONC.	SM	DAMP	0			
S-1			2/4				FRAGS.		SL CALCAREOUS				
@													
1315	4						(FILL)		ALL THE SOIL				
S-2					DENSE		SILT, SAND, ROCK		IS SL. CALCAR.	0			
@ 1320			2.5/4				FRAGS 8'		TO 16'				
	8			▽ 8'±		LT.	SILTY SAND		WET: 8'±				
					M DENSE	BRN		SM	LOOKS NAT @ 8'.				
S-3			3/4							0			
@ 1325													
	12			11.5	STIFF	GRAY	SILTY CLAY	CL	MOIST				
S-4				CLAY					13.5 ROCK FRAGS IN CLAY				
@ 1345			3.5/4										
										0			
	16			16.					MOVE 10' WEST				
				TD OF BORING			AUGER TO 14.0		HIT ROCKS @ 16'				
							WELL 3.5→13.5		2' WET				
							SAND 2→14.0		MOVE WEST AGAIN				
									TOO MUCH TIFF LINE				
									SEE NOTES				
									NB 3'.				

* 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): 0

Remarks: DPT MACRO CORE TO 16'
THEN 4" ID HSA

Converted to Well: Yes x No _____ Well I.D. #: NTC12-MW01

Tetra Tech, Inc.

BORING LOG

PROJECT NAME: Site 12 Phase 3 RI
PROJECT NUMBER: 112G02416-Great Lakes
DRILLING COMPANY: EFS
DRILLING RIG: DPT/Hollow Stem Auger

BORING No.: NTC12-MW02
DATE: 8/13/13
GEOLOGIST: Conti
DRILLER: T. BOECKE

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	Sampler BZ	Borehole**	Driller BZ**
	0				LOOSE	BRN	FINE SAND - ROOTS TR ROCK AND	SM	DAMP	0			
S-1			2/4				CONC FRAGS AT 3' TO 4'±		CALCAREOUS				
1630													
	4												
							TO 6'±						
S-2				6±			(FILL)		LOOKS NAT ~ 6'	0			
@ 1635			3.1/4		M DENSE	BRN TO GRAY	SILTY F. SAND	SM	WET @ 6 TO 7'				
	8								SAND IS ALSO SL. CALCAREOUS				
S-3 @ 1640			3.3/4							0			
	12			11'±	STIFF	GRAY	CLAYEY SILT	ML	MOIST IS ALSO SL. CALCAREOUS				
	14.5			14.5 TD AUGERS			AUGER TO ~ 14.5						
							WELL 4-14						
							SAND 2-14.5						

* 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): 0

Remarks: DPT MACROCORE TO 12' THEN 4" ID HSA

Converted to Well: Yes x No _____ Well I.D. #: NTC12-MW02

Tetra Tech, Inc.

BORING LOG

PROJECT NAME: **Site 12 Phase 3 RI**
PROJECT NUMBER: **112G02416-Great Lakes**
DRILLING COMPANY: **EFS**
DRILLING RIG: **DPT/Hollow Stem Auger**

BORING No.: NTC12-MW03
DATE: 8-12-13
GEOLOGIST: **Conti**
DRILLER: JEREMY BOESCH

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	Sampler BZ	Borehole**	Driller BZ**
	0												
					M DENSE	BRN	TOP 3" TOPSOIL TO CLAYEY SILT - TR		SOIL IS	0			
S-1 @			2/4				ROOTS AND ROCK FRAGS.		CALCAREOUS DAMP				
1245				3'		LT.							
	4				M HARD	GRAY	ROCK FRAGS (LIMESTONE)		DAMP				
							(PC. CONCRETE) ~1'		CALCAREOUS	0			
S-2 @			2.6/4	6' ±			AND SILT.						
1250					M DENSE	BRN	SILTY FINE SAND	SM					
	8			▽ ± 8'					HIT H_2O ~ 8' ±				
					M DENSE	DARK GRAY	SILTY FINE SAND	SM	WET SL. CALCAREOUS				
S-3 @			3/4							0			
1255									THIS BORING				
	12								WAS INITIAL				
									BORING AT ORIGINAL LOCATION				
				13.5									
				TD @ 13.5									
							SET 2" WELL 3-13		1. AUGER REF				
							SAND 2-13.5		3' DOWN CONCRETE.				
									2. MOVE SW 4'				
							FINAL LOCATION		3' [illegible]				
							~ 30' EAST OF		MOVED 7 TIME				
							ORIGINAL - DOWN		SEE NOTES				
							OVER THE BANK"		NB 311				
							WL= 2 TO 3'. DC						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: DPT RIG 6650 LT - MACROCORE TO 12' THEN 4" Φ HSA

Drilling Area Background (ppm): [illegible]

Converted to Well: Yes x No _____ Well I.D. #: NTC12-MW03

Tetra Tech, Inc.

BORING LOG

PROJECT NAME: **Site 12 Phase 3 RI**
PROJECT NUMBER: **112G02416-Great Lakes**
DRILLING COMPANY: **EFS**
DRILLING RIG: **DPT/Hollow Stem Auger**

BORING No.: NTC12-MW04
DATE: 8/13/13
GEOLOGIST: **Conti**
DRILLER: J. BOECHE

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	Sampler BZ	Borehole**	Driller BZ**
	0				LOOSE	TAN BRN	SAND - SOME CONCRETE		DAMP	0			
S-1 @ 0730			3/4		TO M DENSE	TO BRN	PCS TO ~ 1'. SILTY SAND	SM	SL. CALCAREOUS. MOIST				
	4			3.8					FILL TO ~ 3'	0			
					M. DENSE	DARK GRAY	SILTY SAND	SM	WET - SL. CALCAREOUS WET @ 4'				
S-2 @ 0740			3.5/4						TO SATURATED				
	8									0			
	13.5			13.5 BOT.									
							SCREEN 3 - 13		10 SLOT				
							SAND 2 - 13.5						

* 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): 0

Remarks: MACRO CORE TO 8' THEN 1" ID HSA

Converted to Well: Yes x No _____ Well I.D. #: NTC12-MW04

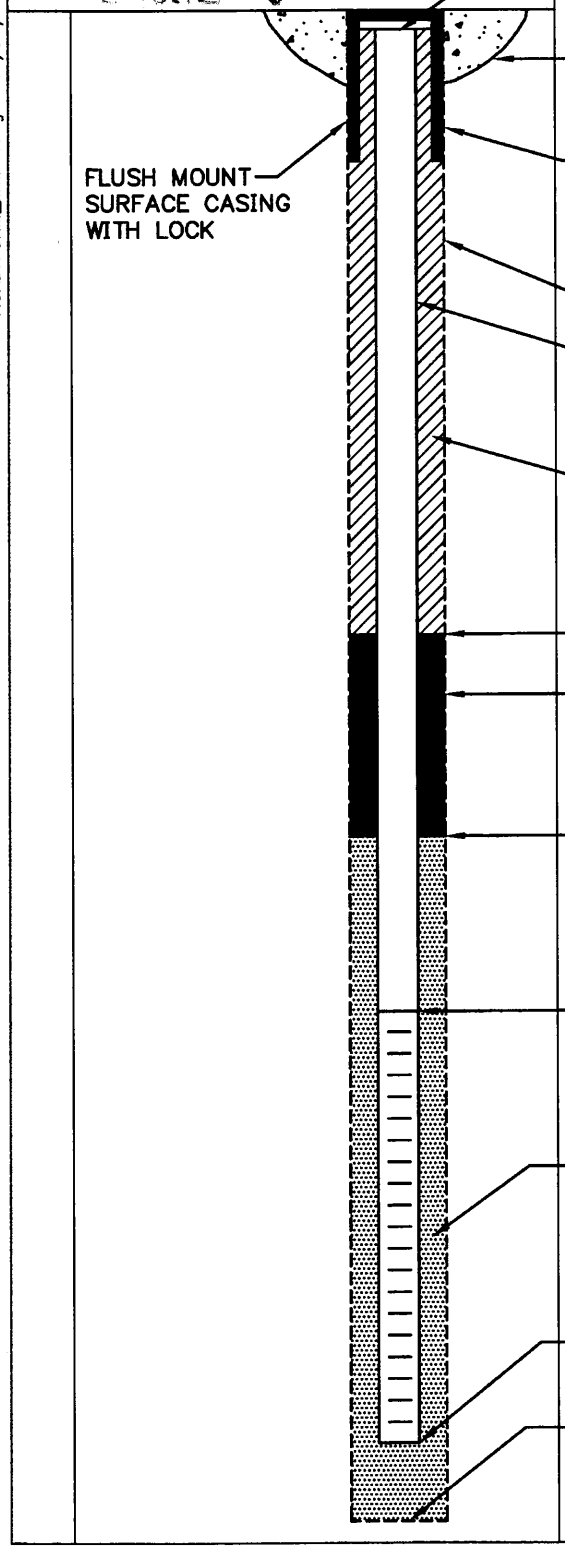
Monitoring Well Construction Sheets

WELL NO.: NTC12-MW01

Tetra Tech

OVERBURDEN
MONITORING WELL SHEET
FLUSH - MOUNT

PROJECT NS GREAT LAKES	LOCATION SITE 12	DRILLER J BOECHE
PROJECT NO. 112G02116	BORING NTC12-MW01	DRILLING METHOD HSA
DATE BEGUN 8-13-13	DATE COMPLETED 8-13-13	
FIELD GEOLOGIST CONTI		DEVELOPMENT METHOD PUMP
GROUND ELEVATION 590.15	DATUM MSL	



ELEVATION TOP OF RISER: 589.76

TYPE OF SURFACE SEAL: FLUSH MOUNT

TYPE OF PROTECTIVE CASING: STEEL

I.D. OF PROTECTIVE CASING: 10"

DIAMETER OF HOLE: 8"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: CETCO PURE GOLD MEDIUM CHIPS

ELEVATION/DEPTH TOP OF SEAL: 589.15 / 1

TYPE OF SEAL: CETCO PURE GOLD MEDIUM CHIPS

ELEVATION/DEPTH TOP OF SAND: 588.15 / 2

ELEVATION/DEPTH TOP OF SCREEN: 586.65 / 3.5

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 10 SLX10'

TYPE OF SAND PACK: FLAT ROCK FILTER SAND #7

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: 576.65 / 13.5

ELEVATION / DEPTH BOTTOM OF SAND: 576.15 / 14.0

ELEVATION/DEPTH BOTTOM OF HOLE: 576.15 / 14.0

BACKFILL MATERIAL BELOW SAND: NA

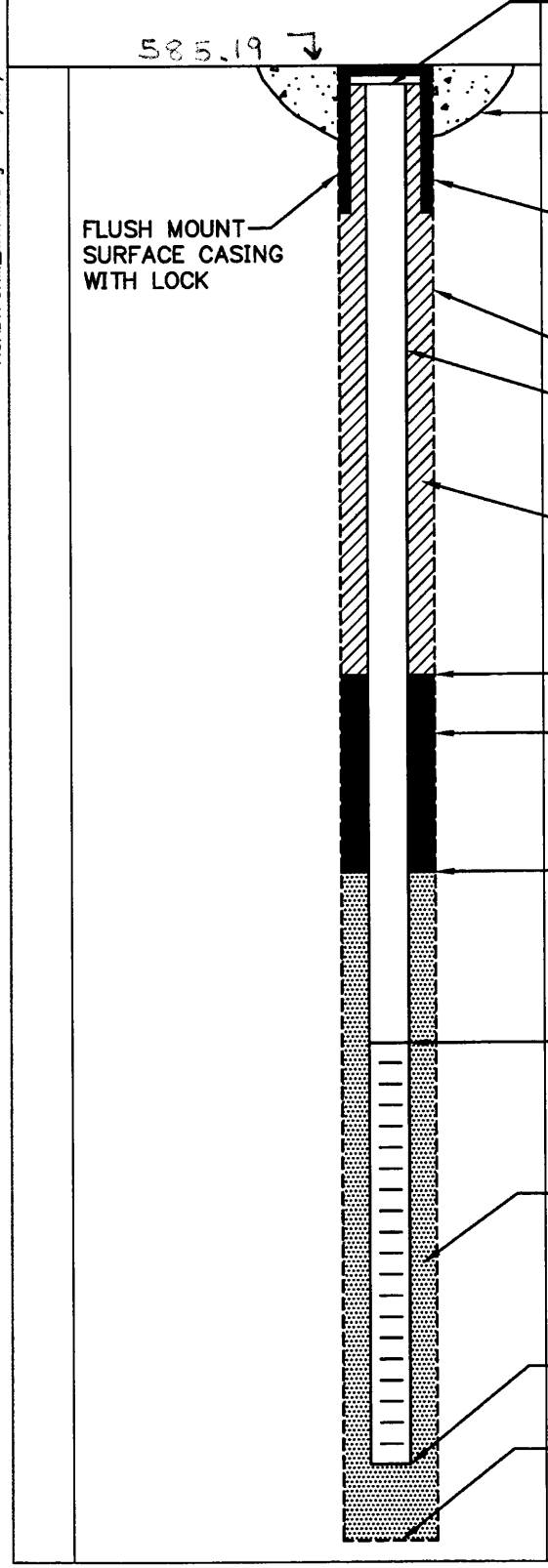
ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: NTC12-MW02

Tetra Tech

OVERBURDEN
MONITORING WELL SHEET
FLUSH - MOUNT

PROJECT NS GREAT LAKES	LOCATION SITE 12	DRILLER J BOECHE	
PROJECT NO. 112G02416	BORING NTC12-MW02	DRILLING METHOD HSA	
DATE BEGUN 8/13/15	DATE COMPLETED 8/13/15		
FIELD GEOLOGIST CONTI		DEVELOPMENT METHOD PUMP	
GROUND ELEVATION 585.19	DATUM MSL		



ELEVATION TOP OF RISER: 584.86

TYPE OF SURFACE SEAL: FLUSH MOUNT

TYPE OF PROTECTIVE CASING: STEEL

I.D. OF PROTECTIVE CASING: 10"

DIAMETER OF HOLE: 8"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: QUIKRETE PORTLAND CEMENT GOLD MED CHIPS

ELEVATION/DEPTH TOP OF SEAL: 584.19 / 1

TYPE OF SEAL: QUIKRETE PORTLAND CEMENT MED CHIPS

ELEVATION/DEPTH TOP OF SAND: 583.19 / 2

ELEVATION/DEPTH TOP OF SCREEN: 581.19 / 4

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 10 SL x 10'

TYPE OF SAND PACK: FLAT ROCK FILTER SAND #7

DIAMETER OF HOLE IN BEDROCK: _____

ELEVATION / DEPTH BOTTOM OF SCREEN: 571.19 / 14

ELEVATION / DEPTH BOTTOM OF SAND: 570.69 / 14.5

ELEVATION/DEPTH BOTTOM OF HOLE: 570.69 / 14.5

BACKFILL MATERIAL BELOW SAND: NA

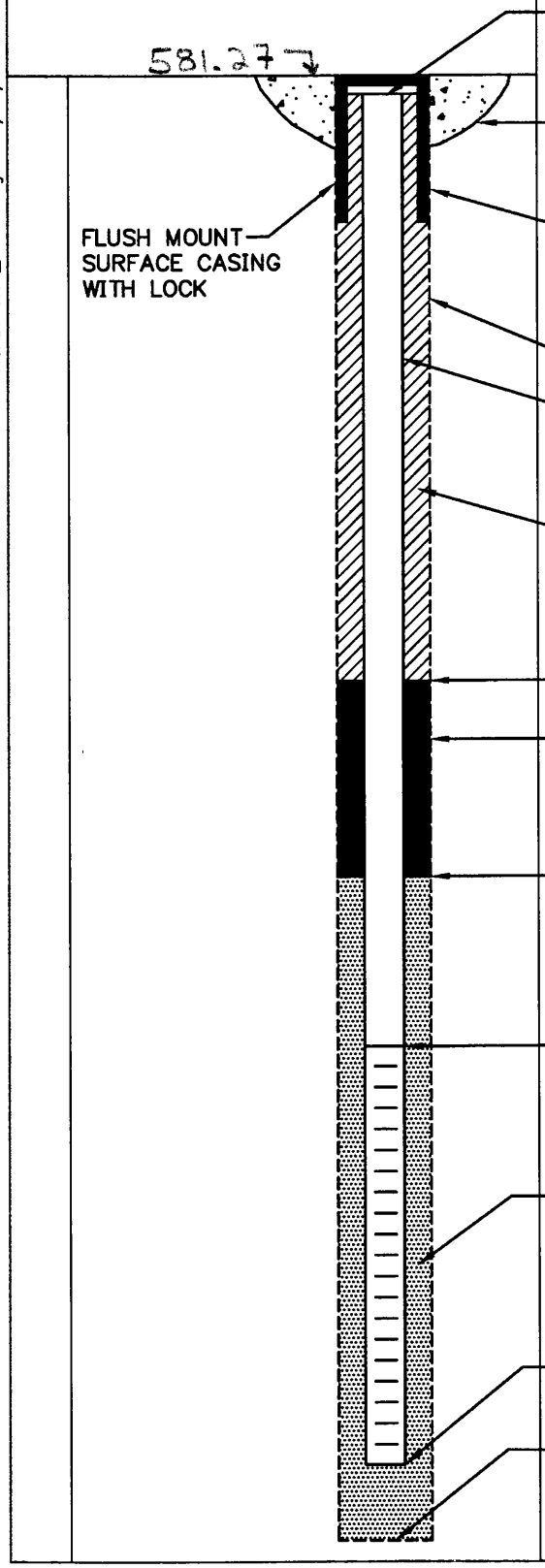
ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: NTC12-MW03

Tetra Tech

OVERBURDEN
MONITORING WELL SHEET
FLUSH - MOUNT

PROJECT NS GREAT LAKES	LOCATION SITE 12	DRILLER J BOESCH
PROJECT NO. 112G02416	BORING NTC12-MW03	DRILLING METHOD HSA
DATE BEGUN 8/13/13	DATE COMPLETED 8/13/13	
FIELD GEOLOGIST CONTI		DEVELOPMENT METHOD PUMP
GROUND ELEVATION 581.27	DATUM MSL	



ELEVATION TOP OF RISER: 580.77

TYPE OF SURFACE SEAL: FLUSH MOUNT

TYPE OF PROTECTIVE CASING: STEEL

I.D. OF PROTECTIVE CASING: 10"

DIAMETER OF HOLE: 8"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: CETCO PURE GOLD MED CHIPS

ELEVATION/DEPTH TOP OF SEAL: 580.27 / 1

TYPE OF SEAL: CETCO PURE GOLD MED CHIPS

ELEVATION/DEPTH TOP OF SAND: 579.27 / 2

ELEVATION/DEPTH TOP OF SCREEN: 578.27 / 3

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 10SLX10'

TYPE OF SAND PACK: FLAT ROCK FILTER SAND #7

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: 568.27 / 13

ELEVATION / DEPTH BOTTOM OF SAND: 567.77 / 13.5

ELEVATION/DEPTH BOTTOM OF HOLE: 567.77 / 13.5

BACKFILL MATERIAL BELOW SAND: NA

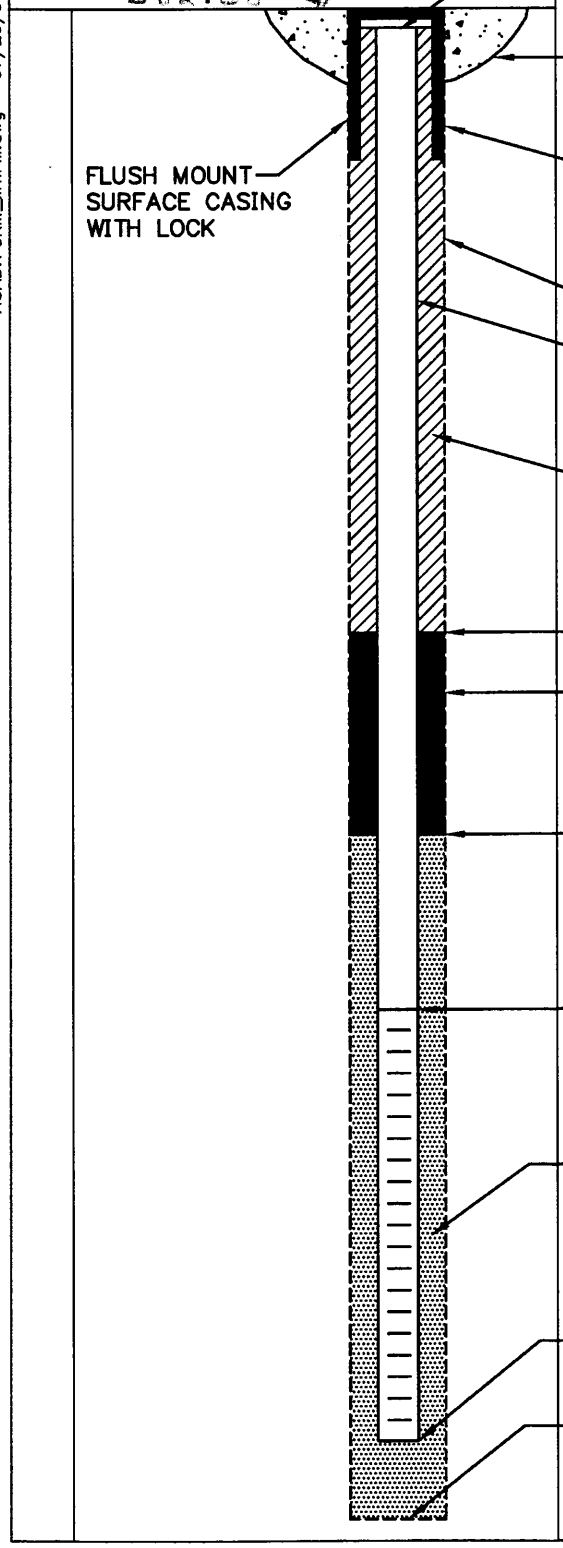
ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: NTC12-MW04

Tetra Tech

OVERBURDEN
MONITORING WELL SHEET
FLUSH - MOUNT

PROJECT NS GREAT LAKES	LOCATION SITE 12	DRILLER J. BOECHE	
PROJECT NO. 112G02416	BORING NTC12-MW04	DRILLING METHOD HSA	
DATE BEGUN 8/13/13	DATE COMPLETED 8/13/13		
FIELD GEOLOGIST CONTI		DEVELOPMENT METHOD PUMP	
GROUND ELEVATION 582.58	DATUM MSL		



ELEVATION TOP OF RISER: 582.25

TYPE OF SURFACE SEAL: FLUSH MOUNT

TYPE OF PROTECTIVE CASING: MANHOLE SLEEVE

I.D. OF PROTECTIVE CASING: 10"

DIAMETER OF HOLE: 8" ϕ

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2" ϕ

TYPE OF BACKFILL/SEAL: CETCO PURE GOLD MED CHIPS

ELEVATION/DEPTH TOP OF SEAL: 581.58 / 1

TYPE OF SEAL: CETCO PURE GOLD MEDIUM CHIPS

ELEVATION/DEPTH TOP OF SAND: 580.58 / 2

ELEVATION/DEPTH TOP OF SCREEN: 579.58 / 3

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: '010 x '10'

TYPE OF SAND PACK: FLAT ROCK FILTER SAND #7

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: 569.58 / 13

ELEVATION / DEPTH BOTTOM OF SAND: 569.08 / 13.5

ELEVATION/DEPTH BOTTOM OF HOLE: 569.08 / 13.5

BACKFILL MATERIAL BELOW SAND: NA

ACAD:FORM_MWFM.dwg 07/20/99 INL

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) _____ Depth (ft.) _____

b. **Bored Well**: Casing Diameter (in.) 2 Buried Slab? No

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) _____

d. **Drilled Well**: Steel Casing Mechanically Driven _____

e. Hole Diameter (in.) 8.5 to (ft.) 13 ; (in.) ___ to (ft.) ___ ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Bentonite	1	50 lbs.	1	3	
Concrete	2	160 lbs.	0	1	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
Washed Quartz Filter Sand	Global #7	3	13

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: 8-13-13 Driller's Estimated Well Yield (gpm): _____

4. Date Permanent Pump Installed: _____ Set at Depth (ft.): _____

5. Pump Capacity (gpm): _____

6. Pitless Adapter Model and Manufacturer: _____ Attachment to Casing: _____

7. Well Cap Type & Manufacturer: Expansion / Morrison

8. Pressure Tank Working Cycle (gals.): _____ Captive Air? _____ 9. Pump System Disinfected: _____

10. Name of Pump Company _____

11. Pump Installer: _____ License # _____

12. _____ Date _____
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IL 482-0126
Revised 6/09

IMPORTANCE NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is Mandatory. This form has been approved by the Forms Management Center.

13. Property Owner: U.S. Navy Well # NTC12-MW01

14. Driller: Jeremy Boeche License # N/A

15. Name of Drilling Company : Environmental Field Services 16. Permit Number: N/A

Date Issued: _____ 17. Date Drilling Started Aug 13, 2013

18. Well Site Address: Naval Training Center-Great Lakes, IL Site 12 Recreational Area

19. Township Name: Shields Land I.D. # _____

20. Subdivision Name _____ Lot # _____

21. Location a. County Lake b. Site Elevation 590.15 ft. (above msl)

c. Township _____ Range: _____ Section: _____

d. _____ Quarter of the _____ Quarter of the _____ Quarter

e. GPS: Lat: Degrees 42 Minutes 18 Seconds 18 N

Lon: Degrees 87 Minutes 50 Seconds 6 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	PVC - Flush Thread	0	3

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	10	0.01	3	13

24. Water from _____ at a depth of (ft.) _____ To (ft.) _____

a. Static water level (ft.) below top of casing _____ which is (in.) above ground _____

b. pumping level is (ft.) _____ pumping (gpm) _____ for (hours) _____

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
Gray Silty Sand	0	13

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

_____ License # N/A
Licensed Water Well Contractor Signature

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) _____ Depth (ft.) _____

b. **Bored Well**: Casing Diameter (in.) 2 Buried Slab? No

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) _____

d. **Drilled Well**: Steel Casing Mechanically Driven _____

e. Hole Diameter (in.) 8.5 to (ft.) 13 ; (in.) ___ to (ft.) ___ ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Bentonite	1	50 lbs.	1	3	
Concrete	2	160 lbs.	0	1	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
Washed Quartz Filter Sand	Global #7	3	13

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: 8-13-13 Driller's Estimated Well Yield (gpm): _____

4. Date Permanent Pump Installed: _____ Set at Depth (ft.): _____

5. Pump Capacity (gpm): _____

6. Pitless Adapter Model and Manufacturer: _____ Attachment to Casing: _____

7. Well Cap Type & Manufacturer: Expansion / Morrison

8. Pressure Tank Working Cycle (gals.): _____ Captive Air? _____ 9. Pump System Disinfected: _____

10. Name of Pump Company _____

11. Pump Installer: _____ License # _____

12. _____ Date _____
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IL 482-0126
Revised 6/09

IMPORTANCE NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is Mandatory. This form has been approved by the Forms Management Center.

13. Property Owner: U.S. Navy Well # NTC12-MW02

14. Driller: Jeremy Boeche License # N/A

15. Name of Drilling Company : Environmental Field Services 16. Permit Number: N/A

Date Issued: _____ 17. Date Drilling Started Aug 13, 2013

18. Well Site Address: Naval Training Center-Great Lakes, IL Site 12 Recreational Area

19. Township Name: Shields Land I.D. # _____

20. Subdivision Name: _____ Lot # _____

21. Location: a. County Lake b. Site Elevation 585.19 ft. (above msl)

c. Township: _____ Range: _____ Section: _____

d. _____ Quarter of the _____ Quarter of the _____ Quarter

e. GPS: Lat: Degrees 42 Minutes 18 Seconds 18 N

Lon: Degrees 87 Minutes 50 Seconds 6 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	PVC - Flush Thread	0	3

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	10	0.01	3	13

24. Water from _____ at a depth of (ft.) _____ To (ft.) _____

a. Static water level (ft.) below top of casing _____ which is (in.) above ground _____

b. pumping level is (ft.) _____ pumping (gpm) _____ for (hours) _____

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
Gray Silty Sand	0	13

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

_____ License # N/A
Licensed Water Well Contractor Signature

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) _____ Depth (ft.) _____

b. **Bored Well**: Casing Diameter (in.) 2 Buried Slab? No

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) _____

d. **Drilled Well**: Steel Casing Mechanically Driven _____

e. Hole Diameter (in.) 8.5 to (ft.) 13 ; (in.) ___ to (ft.) ___ ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Bentonite	1	50 lbs.	1	3	
Concrete	2	160 lbs.	0	1	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
Washed Quartz Filter Sand	Global #7	3	13

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: 8-13-13 Driller's Estimated Well Yield (gpm): _____

4. Date Permanent Pump Installed: _____ Set at Depth (ft.): _____

5. Pump Capacity (gpm): _____

6. Pitless Adapter Model and Manufacturer: _____ Attachment to Casing: _____

7. Well Cap Type & Manufacturer: Expansion / Morrison

8. Pressure Tank Working Cycle (gals.): _____ Captive Air? _____ 9. Pump System Disinfected: _____

10. Name of Pump Company _____

11. Pump Installer: _____ License # _____

12. _____ Date _____
Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IMPORTANCE NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is Mandatory. This form has been approved by the Forms Management Center.

IL 482-0126
Revised 6/09

13. Property Owner: U.S. Navy Well # NTC12-MW03

14. Driller: Jeremy Boeche License # N/A

15. Name of Drilling Company : Environmental Field Services 16. Permit Number: N/A

Date Issued: _____ 17. Date Drilling Started Aug 13, 2013

18. Well Site Address: Naval Training Center-Great Lakes, IL Site 12 Recreational Area

19. Township Name: Shields Land I.D. # _____

20. Subdivision Name: _____ Lot # _____

21. Location: a. County Lake b. Site Elevation 581.27 ft. (above msl)

c. Township: _____ Range: _____ Section: _____

d. _____ Quarter of the _____ Quarter of the _____ Quarter

e. GPS: Lat: Degrees 42 Minutes 18 Seconds 18 N

Lon: Degrees 87 Minutes 50 Seconds 6 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	PVC - Flush Thread	0	3

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	10	0.01	3	13

24. Water from _____ at a depth of (ft.) _____ To (ft.) _____

a. Static water level (ft.) below top of casing _____ which is (in.) above ground _____

b. pumping level is (ft.) _____ pumping (gpm) _____ for (hours) _____

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
Gray Silty Sand	0	13

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

_____ License # N/A
Licensed Water Well Contractor Signature

State of Illinois
Department of Public Health

WATER WELL CONSTRUCTION REPORT

Complete within 30 days of well completion and send to the appropriate Health Department

Print Form

1. Type of Well

a. **Driven Well**: Casing Diameter (in.) _____ Depth (ft.) _____

b. **Bored Well**: Casing Diameter (in.) 2 Buried Slab? No

c. **Drilled Well**: PVC Casing Formation Packer Set at Depth of (ft.) _____

d. **Drilled Well**: Steel Casing Mechanically Driven _____

e. Hole Diameter (in.) 8.5 to (ft.) 13 ; (in.) ___ to (ft.) ___ ; (in.) ___ to (ft.) ___

f.

Type of Grout	# of bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)
Bentonite	1	50 lbs.	1	3	
Concrete	2	160 lbs.	0	1	

g. Well Finished within Unconsolidated Materials

h.

Kind of Gravel/Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
Washed Quartz Filter Sand	Global #7	3	13

2. Well Use: Monitoring Well Disinfected? No

3. Date Well Completed: 8-13-13 Driller's Estimated Well Yield (gpm): _____

4. Date Permanent Pump Installed: _____ Set at Depth (ft.): _____

5. Pump Capacity (gpm): _____

6. Pitless Adapter Model and Manufacturer: _____ Attachment to Casing: _____

7. Well Cap Type & Manufacturer: Expansion / Morrison

8. Pressure Tank Working Cycle (gals.): _____ Captive Air? _____ 9. Pump System Disinfected: _____

10. Name of Pump Company _____

11. Pump Installer: _____ License # _____

12. _____ Date _____

Licensed Pump Installation Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761

IMPORTANCE NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act-0863. Disclosure of this information is Mandatory. This form has been approved by the Forms Management Center.

IL 482-0126
Revised 6/09

13. Property Owner: U.S. Navy Well # NTC12-MW04

14. Driller: Jeremy Boeche License # N/A

15. Name of Drilling Company : Environmental Field Services 16. Permit Number: N/A

Date Issued: _____ 17. Date Drilling Started Aug 13, 2013

18. Well Site Address: Naval Training Center-Great Lakes, IL Site 12 Recreational Area

19. Township Name: Shields Land I.D. # _____

20. Subdivision Name: _____ Lot # _____

21. Location: a. County Lake b. Site Elevation 582.58 ft. (above msl)

c. Township: _____ Range: _____ Section: _____

d. _____ Quarter of the _____ Quarter of the _____ Quarter

e. GPS: Lat: Degrees 42 Minutes 18 Seconds 18 N

Lon: Degrees 87 Minutes 50 Seconds 6 W

Survey use only

22. Casing and Liner Information

Diameter (in.)	Material, Joint Type	From (ft.)	To (ft.)
2	PVC - Flush Thread	0	3

23. Is the well screened? Yes If yes

Diameter (in.)	Length (ft.)	Slot Size (in.)	From (ft.)	To (ft.)
2	10	0.01	3	13

24. Water from _____ at a depth of (ft.) _____ To (ft.) _____

a. Static water level (ft.) below top of casing _____ which is (in.) above ground _____

b. pumping level is (ft.) _____ pumping (gpm) _____ for (hours) _____

25.

Earth Materials Passed Through	From (ft.)	To (ft.)
Gray Silty Sand	0	13

(Attach 2nd page, if necessary) (If DRY HOLE, fill out log & indicate how hole was sealed)

_____ License # N/A

Licensed Water Well Contractor Signature

Monitoring Well Development Records

Tetra Tech, Inc.

MONITORING WELL DEVELOPMENT RECORD

TPVC

Well: NTC12-MW01 | Depth to Bottom (ft.): 13.40 | Responsible Personnel: Conti
Site: 12 | Static Water Level Before (ft.): 9.31 | Drilling Co.: EFS, Inc.
Date Installed: 8-13-13 | Static Water Level After (ft.): — | Project Name: Site 12 Phase 3 RI
Date Developed: 8-14-13 | Screen Length (ft.): 10' | Project Number: 112G02416
Dev. Method: PUMP | Specific Capacity:
Pump Type: WHALE | Casing ID (in.): 2" Φ

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
0955	0							
0958	0	.5	DRY	15.72	6.88	2.00	—	
1000	0	1.0	"	15.23	6.89	2.02	3190	BRN-TURBID
1005	0	1.5	"	15.49	6.92	2.03	1916	" "
1015	0	2.0	"	15.63	6.92	2.02	825	" "
1025	0	2.5	"	15.93	6.91	2.04	861	" "
1035	0	3.0	"	16.20	6.91	2.05	893	" "
								WELL GOES DRY, BUT
								RECOVERS OK.

Tetra Tech, Inc.

MONITORING WELL DEVELOPMENT RECORD

TPVC

Well: NTC12-MW02
Site: 12
Date Installed: 8-13-13
Date Developed: 8-14-13
Dev. Method: PUMP
Pump Type: WHALE

Depth to Bottom (ft.): 13.80
Static Water Level Before (ft.): 5.80
Static Water Level After (ft.): ±12'
Screen Length (ft.): 10'
Specific Capacity: ~ 1 GPM
Casing ID (in.): 2" Φ

Responsible Personnel: Conti
Drilling Co.: EFS, Inc.
Project Name: Site 12 Phase 3 RI
Project Number: 112G02416

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1100	.2	—	5.80	—	—	—	—	
1105	0	5	—	15.61	7.06	1.95	721	LT BRN - TURBID
1110	0	10	12'±	15.42	7.00	1.96	77.3	SL. TURBID
1120	0	20	"	15.61	7.01	1.94	8.8	CLEAR.
1130	0	30	"	15.63	7.03	1.94	6.5	"
1140	0	40	"	15.26	7.04	1.95	5.6	"

Tetra Tech, Inc.

MONITORING WELL DEVELOPMENT RECORD

TPVC

Well: NTC12-MW03 | Depth to Bottom (ft.): 12.40 | Responsible Personnel: Conti
Site: 12 | Static Water Level Before (ft.): 1.97 | Drilling Co.: EFS, Inc.
Date Installed: 8-13-13 | Static Water Level After (ft.): 7.33 | Project Name: Site 12 Phase 3 RI
Date Developed: 8-14-13 | Screen Length (ft.): 10' | Project Number: 112G02416
Dev. Method: PUMP | Specific Capacity:
Pump Type: WHALE | Casing ID (in.): 2" Φ

(~ 2 GPM)

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
0850	.5	—	1.97	—	—	—	—	LT GRAY TO CLEAR.
0900	0	20	7.31	15.43	7.23	1.32	-34.2	" "
0905	0	30	7.25	15.10	7.08	1.33	14.9	CLEAR
0915	0	50	7.33	15.23	7.10	1.33	11.5	"
0920	0	60	7.31	15.09	7.08	1.33	10.9	"
0925	0	70	7.33	15.16	7.07	1.32	11.9	"

Tetra Tech, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: NTC12-MW04
Site: 12
Date Installed: 8/13/13
Date Developed: 8/14/13
Dev. Method: PUMP
Pump Type: WHALE

Depth to Bottom (ft.): 11.60
Static Water Level Before (ft.): 3.35
Static Water Level After (ft.): 5.40
Screen Length (ft.): 10'
Specific Capacity:
Casing ID (in.): 2" ϕ

Responsible Personnel: Conti
Drilling Co.: EFS, Inc.
Project Name: Site 12 Phase 3 RI
Project Number: 112G02416

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
0800	~1'	—	—	—	—	—	—	GRAY, TURBID ~2GPM
0805	0	10	5.38	15.34	7.14	1.74	15.4	CLEAR.
0810	0	20	5.40	15.30	7.13	1.70	7.7	"
0815	0	30	5.40	15.23	7.10	1.69	5.7	"
0820	0	40	5.40	15.25	7.07	1.71	6.7	"
0825	0	50	5.40	15.28	7.06	1.71	5.1	"

Log Flow Groundwater Purge Data Sheets

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Site 12 Phase 3 RI
PROJECT NUMBER: 112G02416-Great Lakes
WELL ID.: NTC12-MW01
DATE: 8-15-13

	Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
	0850	9.35	~100	—	—	—	—	—	—	NA	LT GRAY SL. TURBID
1000	0900	9.50	"	6.83	2.03	10.6	0.00	14.53	-13	—	CLEAR (HORIBA 13.1)
2000	0910	9.50	"	6.82	2.02	3.7	0.00	14.63	-19	—	"
3000	0920	9.50	"	6.82	2.02	1.3	0.00	14.61	-14	—	" (" 6.9)
4000	0930	9.50	"	6.82	2.01	.9	0.00	14.57	-6	—	" (" 3.3)
5000	0940	9.50	"	6.83	2.00	.8	0.00	14.73	2	—	" (" 0.6)
6000	0950	9.50	"	6.83	1.99	.8	0.00	14.97	6	—	" (" 0)
		SAMPLE @	0950	HRS							

SIGNATURE(S): SJ Conti

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Site 12 Phase 3 RI
PROJECT NUMBER: 112G02416-Great Lakes

WELL ID.: NTC12-MW02
DATE: 8-15-13

mL	Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments	HORIBA NTU
	1040	5.85	~200	—	—	—	—	—	—	—	CLEAR	7.1
2000	1050	5.85	"	6.88	1.94	3.9	0.00	18.17	-45	—	"	7.0
4000	1100	5.85	"	6.88	1.81	1.1	0.00	18.71	-53	—	"	0
6000	1110	5.85	"	6.88	1.76	0.8	0.00	19.53	-53	—	"	0
8000	1120	5.85	"	6.88	1.74	0.8	0.00	20.15	-53	—	"	0
10000	1130	5.85	"	6.89	1.73	0.9	0.00	20.85	-55	—	"	0
12,000	1140	5.85	"	6.89	1.72	0.8	0.00	21.25	-56	—	"	0
		SAMPLE @	1140	HRS								

SIGNATURE(S): SJ Conti

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Site 12 Phase 3 RI
PROJECT NUMBER: 112G02416-Great Lakes
WELL ID.: NTC12-MW03
DATE: 8-15-13

LAMOTTE

mL	Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments (HORIBA NTU)
	1320	2.18	~200	—	—	—	—	—	—	—	CLEAR
2000	1330	2.31	"	7.02	1.15	12.8	0.00	21.13	-119	—	" (48.1)
4,000	1340	2.32	"	7.05	1.14	13.0	0.00	20.62	-127	—	" (37.4)
6,000	1350	2.32	"	7.06	1.14	12.9	0.00	20.53	-129	—	" (30.3)
8,000	1400	2.32	"	7.07	1.15	10.8	0.00	20.19	-130	—	" (36)
10,000	1410	2.32	"	7.08	1.16	8.9	0.00	19.77	-131	—	" (31.5)
12,000	1420	2.32	"	7.08	1.16	6.6	0.00	19.99	-132	—	" (16.3)
14,000	1430	2.32	"	7.08	1.16	5.7	0.00	19.78	-133	—	" (20.0)
16,000	1440	2.32	"	7.09	1.15	5.4	0.00	20.08	-133	—	" (16.5)
18,000	1450	2.32	"	7.10	1.15	4.6	0.00	20.01	-134	—	" (11.8)
		SAMPLE @	1450	NPS							

SIGNATURE(S): SJ Conti

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Site 12 Phase 3 RI
PROJECT NUMBER: 112G02416-Great Lakes
WELL ID.: NTC12-MW04
DATE: 8-15-13

	Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments (HORIBA NTU)
*	1600	3.56	~200	—	—	—	—	—	—	—	CLEAR —
2000	1610	3.65	"	7.03	1.65	16.1	0.00	20.71	-145	—	" (20.1)
4000	1620	3.62	"	7.04	1.64	15.7	0.00	20.82	-147	—	" (19.6)
6000	1630	3.62	"	7.04	1.63	13.6	0.00	20.84	-148	—	" (19.6)
8000	1640	3.63	"	7.05	1.65	11.9	0.00	20.33	-147	—	" (17.7)
10000	1650	3.62	"	7.05	1.65	11.2	0.00	20.53	-147	—	" (15.4)
12000	1700	3.62	"	7.05	1.66	10.5	0.00	20.01	-146	—	" (15.3)
14000	1710	3.62	"	7.05	1.66	9.8	0.00	19.94	-145	—	" (14.5)
											##
		SAMPLE @	1710 HRS								
											* HAD TROUBLE WITH
											PUMP (~20 min delay)

SIGNATURE(S): SJ Conta

Sample Log Sheets

Tetra Tech, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 12 Phase 3 RI
Project No.: 112G02416
Great Lakes, IL

Sample ID No.: NTC12-IDW-P3-081613
Sample Location: DRUM 8
Sampled By: SJC

[ ] Domestic Well Data
[x] Monitoring Well Data
[ ] Other Well Type:
(X) QA Sample Type: IDW

C.O.C. No.: 1225
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 08 / 16 / 13	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	NA
Time: 0845								
Method: Peristaltic Pump	LT GRAY	7.38	1.48	19.86	36.8	1.32	-32	-

PURGE DATA: NA

Date: 08 / — / 13								
Method: Peristaltic Pump								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2-in ID-PVC								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION: Strike thru analysis not required

Analysis	Preservative	Container Requirements		Collected
TAL Metals (Total)	HNO3-4 Deg C	1-500 mL PE	GW	
TAL Metals (Dissolved)	HNO3-4 Deg C	1-5oo mL PE	GW	
TCLP-VOCs	HCL-4 Deg C	3-40 mL Vials	IDW	✓
Phenolics	H2SO4-4 Deg C	1-500 mL Amber	IDW	✓
TCLP(SVOCs, Pests, Herbs,Metals)	4-Deg C	4-1 L Amber	IDW	✓
Flash Point, pH, React., BTUs,Total PCBs				

OBSERVATIONS / NOTES:

2" MW = 0.163 gal/ft

From Drum 8

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	SJ Conti

Tetra Tech, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 12 Phase 3 RI
Project No.: 112G02416
Great Lakes, IL

Sample ID No.: NTC12GW-01
Sample Location: NTC12-MW01
Sampled By: SJC

[ ] Domestic Well Data
[X] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

C.O.C. No.: 1225
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 08 / 15 / 13	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 0950	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	NA
Method: Peristaltic Pump	CLEAR	6.83	1.99	14.97	0.8	0.00	6	—

PURGE DATA:

Date: 08 / 15 / 13								
Method: Peristaltic Pump								
Monitor Reading (ppm): 0								
Well Casing Diameter & Material								
Type: 2-in ID-PVC								
Total Well Depth (TD): 13.40								
Static Water Level (WL): 9.35	(TPVC)							
One Casing Volume (gal/L): .7								
Start Purge (hrs): 0850								
End Purge (hrs): 0950								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 6000								

SAMPLE COLLECTION INFORMATION: Strike thru analysis not required

Analysis	Preservative	Container Requirements		Collected
TAL Metals (Total)	HNO3-4 Deg C	1-~~500~~ mL PE 250 mL	GW	✓
TAL Metals (Dissolved)	HNO3-4 Deg C	1-500 mL PE	GW	✓
TCLP-VOCs	HCL-4 Deg C	3-40 mL Vials	IDW	
Phenolics	H2SO4-4 Deg C	1-500 mL Amber	IDW	
TCLP(SVOCs, Pests, Herbs,Metals)	4-Deg C	4-1 L Amber	IDW	
Flash Point, pH, React., BTUs,Total PCBs				

OBSERVATIONS / NOTES:

2" MW = 0.163 gal/ft

4.05' WATER = .7gal
or 2.5L

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

SJ Conte

Tetra Tech, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 12 Phase 3 RI
Project No.: 112G02416
Great Lakes, IL

Sample ID No.: NTC12GW-02
Sample Location: NTC12-MW02
Sampled By: SJC

[ ] Domestic Well Data
[(X)] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

C.O.C. No.: 1225
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 08/15/13	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	NA
Time: 1140								
Method: Peristaltic Pump	CLEAR	6.89	1.72	21.25	0.8	0.00	-56	—

PURGE DATA:

Date: 08/15/13								
Method: Peristaltic Pump								
Monitor Reading (ppm): 0								
Well Casing Diameter & Material Type: 2-in ID-PVC								
Total Well Depth (TD): 13.80	TPVC							
Static Water Level (WL): 5.85	TPVC							
One Casing Volume(gal/L): 4.9								
Start Purge (hrs): 1040								
End Purge (hrs): 1140								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 12								

SAMPLE COLLECTION INFORMATION: Strike thru analysis not required

Analysis	Preservative	Container Requirements		Collected
TAL Metals (Total)	HNO3-4 Deg C	1-~~500~~mL PE 250mL	GW	✓
TAL Metals (Dissolved)	HNO3-4 Deg C	1-5oo mL PE	GW	✓
TCLP-VOCs	HCL-4 Deg C	3-40 mL Vials	IDW	
Phenolics	H2SO4-4 Deg C	1-500 mL Amber	IDW	
TCLP(SVOCs, Pests, Herbs,Metals)	4-Deg C	4-1 L Amber	IDW	
Flash Point, pH, React., BTUs,Total PCBs				

OBSERVATIONS / NOTES:

2" MW = 0.163 gal/ft

7.95' H2O 1.3 gal/vol

4.9 L/vol

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

SJ Conti

Tetra Tech, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 12 Phase 3 RI
Project No.: 112G02416
Great Lakes, IL

Sample ID No.: NTC12GW-03
Sample Location: NTC12-MW03
Sampled By: SJC

[ ] Domestic Well Data
[x] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

C.O.C. No.: 1225
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 08 / 15 / 13	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1450	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	NA
Method: Peristaltic Pump	CLEAR	7.10	1.15	20.01	4.6	0.00	-134	-

PURGE DATA:

Date: 08 / 15 / 13	
Method: Peristaltic Pump	
Monitor Reading (ppm): 0	
Well Casing Diameter & Material Type: 2-in ID-PVC	
Total Well Depth (TD): 12.40	TPVC
Static Water Level (WL): 2.18	TPVC
One Casing Volume(gal/L): 6.2	
Start Purge (hrs): 1320	
End Purge (hrs): 1450	
Total Purge Time (min): 90	
Total Vol. Purged (gal/L): ~ 18	

SAMPLE COLLECTION INFORMATION: Strike thru analysis not required

Analysis	Preservative	Container Requirements		Collected
TAL Metals (Total)	HNO3-4 Deg C	1-~~500~~ mL PE 250 mL	GW	✓
TAL Metals (Dissolved)	HNO3-4 Deg C	1-5oo mL PE	GW	✓
TCLP-VOCs	HCL-4 Deg C	3-40 mL Vials	IDW	
Phenolics	H2SO4-4 Deg C	1-500 mL Amber	IDW	
TCLP(SVOCs, Pests, Herbs,Metals)	4-Deg C	4-1 L Amber	IDW	
Flash Point, pH, React., BTUs,Total PCBs				

OBSERVATIONS / NOTES:

2" MW = 0.163 gal/ft

12.40
2.18
10.22' WATER 1.6 GAL/VOL
6.2 L/VOL

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): SJ Conti

Tetra Tech, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 12 Phase 3 RI
Project No.: 112G02416
Great Lakes, IL

Sample ID No.: NTC12GW-04
Sample Location: NTC12-MW04
Sampled By: SJC

[ ] Domestic Well Data
[x] Monitoring Well Data
[ ] Other Well Type: _____
[ ] QA Sample Type: _____

C.O.C. No.: 1225
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 08 / 15 / 13	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1710	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	NA
Method: Peristaltic Pump	CLEAR	7.05	1.66	19.94	9.8	0.00	-145	—

PURGE DATA:

Date: 08 / 15 / 13								
Method: Peristaltic Pump								
Monitor Reading (ppm): 0								
Well Casing Diameter & Material								
Type: 2-in ID-PVC								
Total Well Depth (TD): 12.25								
Static Water Level (WL): 3.56	TPVC							
One Casing Volume(gal/L): 1.5	TPVC							
Start Purge (hrs): 1600								
End Purge (hrs): 1710								
Total Purge Time (min): 70								
Total Vol. Purged (gal/L): 14								

SAMPLE COLLECTION INFORMATION: Strike thru analysis not required

Analysis	Preservative	Container Requirements		Collected
TAL Metals (Total)	HNO3-4 Deg C	1-~~500~~ mL PE 250 mL	GW	✓
TAL Metals (Dissolved)	HNO3-4 Deg C	1-500 mL PE	GW	✓
TCLP-VOCs	HCL-4 Deg C	3-40 mL Vials	IDW	
Phenolics	H2SO4-4 Deg C	1-500 mL Amber	IDW	
TCLP(SVOCs, Pests, Herbs,Metals)	4-Deg C	4-1 L Amber	IDW	
Flash Point, pH, React., BTUs,Total PCBs				

OBSERVATIONS / NOTES:

2" MW = 0.163 gal/ft

8.69' H2O SAY 9'

1.5 GAL/VOL

5.6 L/VOL

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

SJConti

Equipment Calibration Forms

Tetra Tech, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : **Site 12 Phase 3 RI**

SITE NAME: **Naval Station Great Lakes**

PROJECT No.: **112G02416**

INSTRUMENT NAME/MODEL: TURBID METER

MANUFACTURER: LaMOTTE

SERIAL NUMBER: 229-4110

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			1.0	1.0	10.0	10.0		
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
8-14-13	229-4110	SJC	.90	1.00	9.89	10.0		
8-15-13	"	SJC	.79	1.00	9.71	10.0		
8-16-13	"	SJC	.56	1.00	9.62	10.0		

Tetra Tech, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : **Site 12 Phase 3 RI**

SITE NAME: **Naval Station Great Lakes**

PROJECT No.: **112G02416**

INSTRUMENT NAME/MODEL: MINI RAE 2000

MANUFACTURER: MINI RAE

SERIAL NUMBER: 110-902953

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
8-12-13	902953	SJC				100		ISOBUTYLENE
8-13-13	"	SJC				100		"
8-14-13	"	SJC				100		"
8-15-13	"	SJC				100		"

Tetra Tech, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : **Site 12 Phase 3 RI**

SITE NAME: **Naval Station Great Lakes**

PROJECT No.: **112G02416**

INSTRUMENT NAME/MODEL: U-52 WATER QUAL

MANUFACTURER: HORIBA

SERIAL NUMBER: JTLY4ST2

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			PH Pre-calibration	PH Post-calibration	COND Pre-calibration	COND Post-calibration		
8/13/13	JTLY4ST2	SJC	4.12	4.00	4.62	4.48	3AE666	EXP 5/30/2014
8/14/13	"	"	4.08	4.00	4.59	4.49		pH=4.0 COND=4.49
8/15/13	"	"	4.13	4.00	4.61	4.49		
8/16/13	"	"	4.03	4.00	4.50	4.49		

Chain of Custody Forms

TETRA TECH NUS, INC. | **CHAIN OF CUSTODY** | **NUMBER** NC 1225 | **PAGE** 1 **OF** 1

PROJECT NO: 112G02416	**FACILITY:** SITE 12 PHASE 3	**PROJECT MANAGER** C RICH	**PHONE NUMBER** 412-921-8984	**LABORATORY NAME AND CONTACT:** TRIMATRIX / G. WOOD
SAMPLERS (SIGNATURE) SJ Conti	NS GREAT LAKES	**FIELD OPERATIONS LEADER** S CONTI	**PHONE NUMBER** 412 551 2629	**ADDRESS** 5560 CORP EXCH CT. SE
		CARRIER/WAYBILL NUMBER FED EX # 8020 3157 8174		**CITY, STATE** GRAND RAPIDS, MI 49512

STANDARD TAT ☐
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE / YEAR 3013	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			4°C HNO3	4°C HNO3		4°C HCL	4°C			
									TYPE OF ANALYSIS	TAL METALS (TOT) 500mL	TAL METALS (DISS) 500mL	TCLP VOCS	PHENOLICS 500mL	TCLP (SVOCS, PEST, HERB)	METALS	FLASH PT, REACT, BTU	TOT PCBs		COMMENTS
8/15	0950	NTC12GW-01	NTC12 MW01	–	–	GW	G	2		1	1								
8/15	1110	NTC12GW-02	NTC12 MW02	–	–	GW	G	2		1	1								
8/15	1150	NTC12GW-03	NTC12 MW03	–	–	GW	G	2		1	1								
8/15	1710	NTC12 GW-04	NTC12 MW04	–	–	GW	G	2		1	1								DO MATRIX SPIKE HERE
8/16	0845	NTC12 IDW-P3-081613	IDW			IDW	G	8					3	1	4				Drum 8
8/15	0000	NTC12-DUP-P3-081513	DUP	–	–	GW	G	2		1	1								DUP OF MW03
		TRIP BLANK																	

1. RELINQUISHED BY SJ Conti	DATE 8/16/13	TIME 1300	1. RECEIVED BY FED EX	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

Survey Data

Note:

All elevations shown are referenced to North American Vertical Datum 1988 (NAVD 88)

LEGEND

+	Found/set chiseled cross
×	Found/set PK nail
	Utility pole
	Light pole
	Manhole
	Inlet
	Catch Basin
	Monitoring Well
	Water valve
	Water vault
	Gas valve
	Fire hydrant
ELEC-TR	Electric transformer
	Telephone pedestal
	Traffic Signal
	Control Box
	CATV pedestal
	Benchmark
	Sprinkler control valve
	Deciduous tree
	Coniferous tree
	Bush
	Sign
GUY	Guy wire
	Guard post
	Mailbox
	Concrete planter
	Trash receptacle
FL-P	Flagpole
	Cleanout
I.P.	Iron pipe
	Property line
	Gas line
	Electric line
	Telephone line
	Cable TV
	Water line
	Fence
	Storm sewer line
	Bush line
	Overhead utility line
(12.34')	Record Distance
12.34'	Measured Distance

Prepared by:

GRAEF
8501 West Higgins Road
Suite 280
Chicago, IL 60631-2801
773 / 399 0112
www.graef-usa.com
Illinois Professional Design Corporation 184-000938

GRAEF Project: 20133005.00

TOPOGRAPHIC SURVEY

SCALE: 1"=20'

PLAN NORTH

10' 0 10' 20' 30'

SCALE: 1"=20'

NAVFAC

SYM | DESCRIPTION | DATE | APPR

SEAL

A/E INFO

APPROVED

FOR COMMANDER NAVFAC

ACTIVITY

SATISFACTORY TO | DATE

DES | DRW | CHK

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND ~ MIDWEST
PWD-GL FEAD
NAVAL STATION GREAT LAKES
NAVFAC MIDWEST
GREAT LAKES, IL

Site 12 - Harbor Dredge Spoil Area

TOPOGRAPHIC SURVEY

SCALE:

EPROJECT NO.

CONSTR. CONTR. NO.

NAVFAC DRAWING NO.

SHEET 1 OF 1

DRAWFORM REVISION: 10 MARCH 2009

Site 12 MW_Coordinates

MW-01 2054223.25,1119276.26,Elev 590.15 ft

MW-02 2054364.19,1119468.28,Elev 585.19 ft

MW-03 2054278.17,1119581.47,Elev 581.27 ft

MW-04 2054133.78,1119621.76,Elev 582.58 ft

Site 12 Coordinates_AllLocs

1,2054228.16,1119526.60,587.96,65
1001,2054228.16,1119526.60,587.69,65
1002,2054322.83,1119381.08,585.56,62
1003,2055689.15,1119158.93,588.25,62
1004,2055564.12,1119401.26,585.84,119
2000,2054322.84,1119381.07,585.70,125
2001,2054260.57,1119393.83,585.69,182.1
2002,2054259.38,1119390.48,585.35,88.1
2003,2054259.12,1119389.72,585.42,88.2
2004,2054257.96,1119386.41,585.74,89.1
2005,2054252.23,1119355.80,587.07,150
2006,2054242.77,1119324.78,587.77,150
2007,2054236.24,1119297.05,588.72,13.1
2008,2054223.25,1119276.26,590.15,162
2009,2054226.06,1119275.38,589.90,13.1
2010,2054226.06,1119275.38,589.90,150
2011,2054221.05,1119259.80,591.53,150
2012,2054221.05,1119259.82,591.53,13.1
2013,2054163.46,1119270.64,591.71,150
2014,2054168.66,1119292.74,590.15,150
2015,2054175.44,1119324.43,589.42,150
2016,2054184.60,1119357.16,588.75,150
2017,2054203.60,1119417.17,586.26,89.1
2018,2054204.92,1119420.01,585.43,88.2
2019,2054205.23,1119420.68,585.52,88.1
2020,2054205.70,1119421.83,585.72,182.1
2021,2054164.55,1119450.33,585.77,182.1
2022,2054163.14,1119448.91,585.53,88.1
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2026,2054124.82,1119389.79,587.90,150
2027,2054085.31,1119412.98,587.35,150
2028,2054103.02,1119440.49,587.03,150
2029,2054125.44,1119477.74,586.20,89.1
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2032,2054130.14,1119482.55,586.08,182.1
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2034,2054062.05,1119482.37,584.85,80.1
2035,2054057.68,1119482.23,584.85,16.1
2036,2054057.82,1119541.64,584.88,16.1
2037,2054061.82,1119541.40,584.88,80.1
2038,2054066.00,1119541.88,585.03,80.1
2039,2054062.67,1119541.69,585.01,16.1
2040,2054062.15,1119559.92,584.90,16.1
2041,2054065.23,1119559.87,584.63,80.1
2042,2054089.07,1119552.01,586.14,182.1
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2044,2054132.69,1119555.33,585.73,176.1
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2056,2054241.93,1119490.61,586.85,89.1
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2066,2054308.53,1119470.93,587.83,55.2
2067,2054309.47,1119470.92,587.99,89.1
2068,2054303.78,1119445.80,585.01,88.1
2069,2054313.57,1119464.28,584.67,88.1
2070,2054329.35,1119462.85,583.64,88.1
2071,2054343.33,1119481.96,581.87,88.1
2072,2054346.55,1119482.21,581.66,88.2
2073,2054334.87,1119485.76,586.96,89.1
2074,2054327.72,1119501.65,586.78,89.1
2075,2054332.00,1119505.32,582.14,88.1
2076,2054320.14,1119521.08,587.14,89.1
2077,2054327.01,1119520.65,580.14,88.1
2078,2054299.31,1119544.76,587.53,89.1
2079,2054310.12,1119549.36,581.95,88.1
2080,2054278.17,1119581.47,581.27,162
2081,2054277.34,1119578.02,581.21,88.1
2082,2054264.74,1119563.20,587.74,89.1
2083,2054239.09,1119581.80,587.40,89.1
2084,2054245.35,1119595.68,581.80,88.1
2085,2054184.60,1119606.45,582.91,88.1
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Site 12 Coordinates_AllLocs

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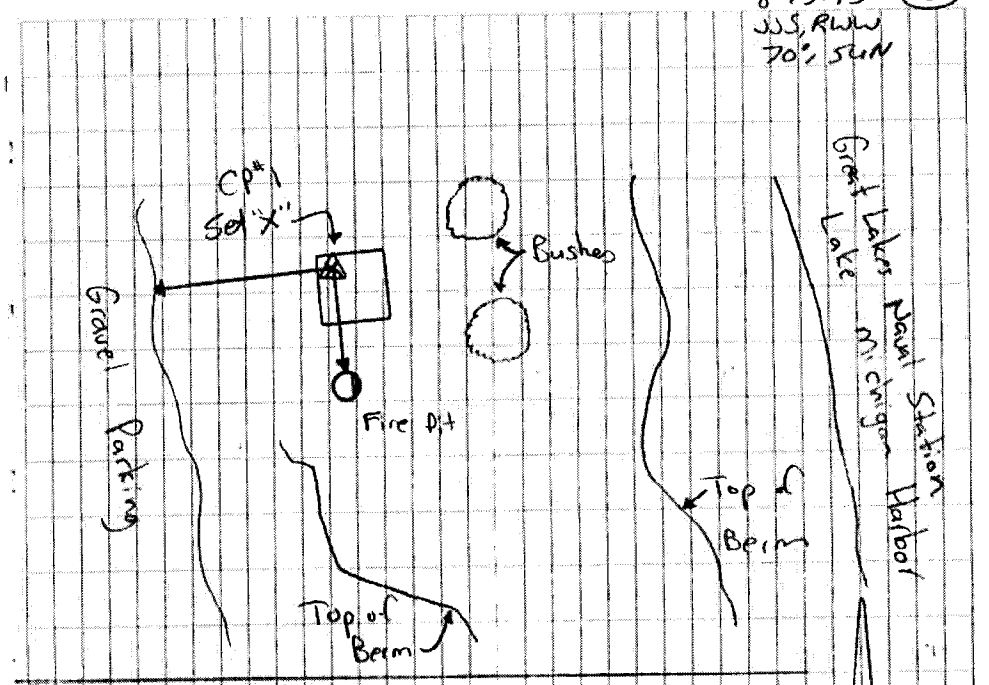
20133005.00

Site 12 Harbor Dredge Spoil Area Monitoring Wells

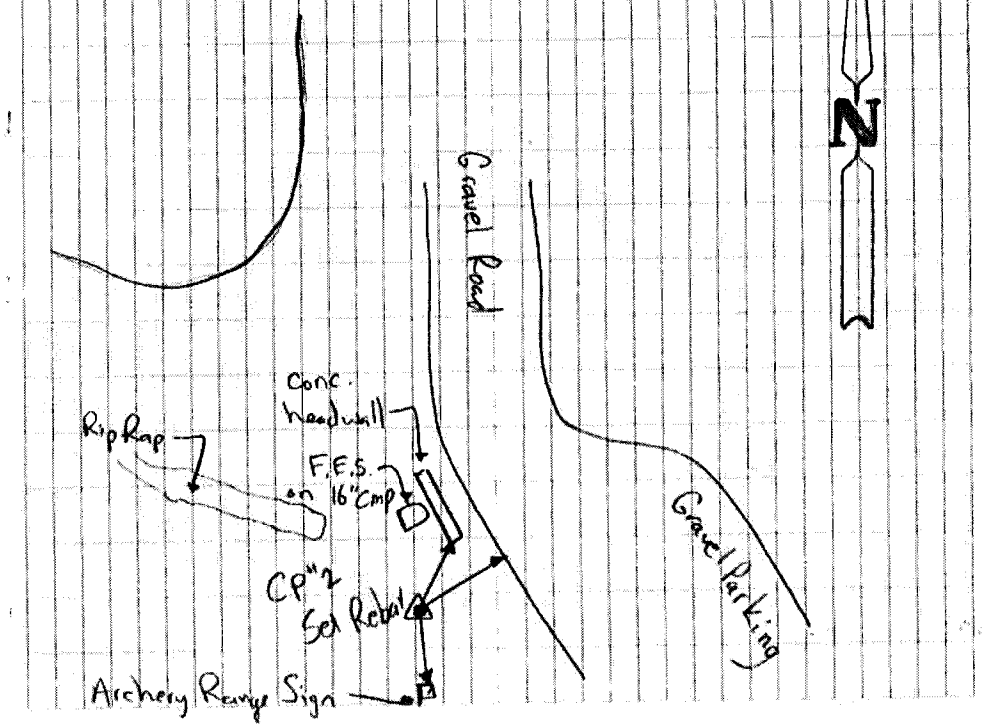
File: 3005G01

PT#	Desc.
1001	CP#1 Set "X" in N.W. corner of conc. pad. @ S.W. corner of the Naval Stations Lake Michigan Harbor.
	29.50' N. of N. edge fire pit
	37.50' E. of E edge of gravel parking

GPS HD= 173.61'



1002	CP#2 Set Rebar on West side of gravel road curve into gravel parking @ S.W. corner of Naval Stations Lake Michigan Harbor.
	7.80' S.W. of S.W. corner conc. headwall
	11.60' N. of N. edge Archery Range Sign
	6.25' W. of west edge of gravel road
1003	Check on CP# 19 Rebar from 20110213-01 Bldg. 13 Boat Howe W.M. " "
1004	Check on CP# 20 Pk nail from " " " "



20133005.00

Site 12 Harbor Dredge Spoil Area Monitoring Wells

Control Level Loop

Desc.	+	HI	−	ELEV.
Bm#3				587.43
	3.44	590.87		
cp#20			4.98	585.89
	4.45	590.34		
cp#19			1.68	588.66
	1.76	590.42		
BM"A"			0.92	589.50
	4.96	594.46		
TP#1			4.70	589.76
	3.27	593.03		
cp#2			7.32	585.71
	6.47	592.18		
T/mw#02			6.99	585.19
T/PVC			7.32	584.86
cp#1			4.22	587.96
	4.86	592.82		
NTC12-mw03			11.55	581.27
NTC12-mw04			10.24	582.58

Bm#3 RR Spike in N. face of power pole @ N.E. corner of Bldg. 13 Boat House from Job# 20110213-01 Bldg. 13 Boat House Water Main

cp#20 FND Pk nail from Job# 20110213-01 Bldg. 13 Boat House Water Main

cp#19 FND Rebar from Job# 20110213-01 Bldg. 13 Boat House Water Main

Bm"A" W. Flange Bolt on HYD#248; Between Bldg. #52 & 13 on N'ly Side of road.

cp#2 Set Rebar Desc. on Pg. 31 This book

mw# NTC12-MW02 Top of Cover

Top of PVC @ NTC12-MW02

cp#1 Set "X" Desc. on Pg. 31, This book

Top of Cover NTC12-MW03

Top of Cover NTC12-MW04

8-15-13
JJS, RWW
70°, PS

(33)

2013005.00

Site 12 Harbor Dredge Spoil Area Monitoring Wells
Control Level Loop

Desc	+	HI 592.82	−	ELEV.	
NTC12-MW01			2.67	590.15	Top of Cover NTC12-MW01
CP# 2			7.10	585.72	
	7.43	593.15			
TP#1			3.39	589.76	
	4.64	594.40			
BM "A"			4.90	589.50	
	0.97	590.47			
CP# 19			1.81	588.66	
	2.05	590.71			
CP# 20			4.81	585.90	
BM# 3			3.28	587.43 (587.43)	(closed 0.00)

2013005.00

Site 12 Harbor Dredge Spoil Area Monitoring Wells

Monitoring Wells Loading

Desc	+	HI	−	ELEV.
Cp# 1				587.96
	5.17	593.13		
NTC12-MW04			10.88	582.25
NTC12-MW03			12.16	580.97
NTC12-MW01			3.37	589.76
Cp# 1			5.17	587.96

Cp#1 Set x: Desc. & Elev. on Pgs. 31 & 32 of this book.

Top of PVC Pipe NTC12-MW04

Top of PVC Pipe NTC12-MW03

Top of PVC Pipe NTC12-MW01

check

8-15-13
JJS, RWW
70°, PS

20133005.00

Site 12 Harbor Dredge Spoil Area Monitoring Wells

File: 300St01

	TBCP#1 "X"	BSCP#2 Rebar
	HI: 5.35	HR: 5.11
	HD: 173.60	VA: 90-49-27

PT#	Desc.
2000	BS
2007	Edge of woods
2008	NTC12-MW01
2035	6' CLF w/3 strands of barbed wire
2080	NTC12-MW03
2089	NTC12-MW04
2097-2101	Center of 10'Ø Bush
2121	NTC12-MW02
2127	INV. 16" CMP
2128	BS

	TBCP#2 Rebar	BSCP#1 "X"
	HI: 5.36	HR: 5.11
	HD: 173.61	VA: 89-20-44

PT#	Desc.
2129	BS
2157	INV 16" CMP
2158	Conc. headwall
2172	BS

GRAEF O'Hare Survey Point Codes

Chainable Point Codes — **Most Commonly Used**

X-Section Point Code

Point Code	Code Description	Point Code	Code Description	Point Code	Code Description
1	Pole, Power	78	Curb, Asphalt (Gutter)	154	Wood Post
2	Pole, Light	79	Curb, Asphalt (Top Back)	155	High Tension Utility Tower
3	Pole, Telephone	80	Sidewalk, Concrete (Face)	156	Overhead Electric
4	Pole, Service	81	Sidewalk, Concrete (Back)	157	Overhead Telephone
5	Pole, Flag	82	Sidewalk, Asphalt (Face)	158	Occupation Line
6	Manhole	83	Sidewalk, Asphalt (Back)	159	Parapet
7	Inlet, Storm	84	Centerline	160	Wetland Boundary
8	Valve, Water	85	Shoulder, Gravel Edge (Agg)	161	Sample Point (Wetland)
9	Valve, Gas	86	Shoulder, Asphalt Edge (Bit)	162	Monitoring Well
10	Fire Hydrant	87	Should, Concrete Edge	163	Pole, Combined Power
11	Tree, Deciduous	88	Ditch	164	Pole, Abandoned
12	Tree, Pine	89	Break Point	165	Fence Post
13	Woods, Edge of	90	High Point	166	Planter
14	Hedge Row	91	Low Point	167	Front Top of Slope
15	Bush	92	First Floor	168	Front Toe of Slope
16	Fence, Cyclone	93	Sill, Door	169	Back Top of Slope
17	Fence, Barbed Wire	94	Low Steel	170	Back Toe of Slope
18	Fence, Woven Wire	95	Low Concrete	171	Field Entrance
19	Fence, Wood	96	Water, Top of	172	Buried Steamline
20	Fence, Split Rail	97	River Bed	173	NOT USED
21	Sign	98	River Bank (Bottom)	174	Delineator
23	Transformer, Electric	99	River Bank (Top)	175	Yard Light
24	Pedestal, Telephone	100	Slotted Drain	176	Concrete Slab
25	Box, Control	101	Billboard	177	PullBox
26	Signal, R.R.	102	Power Pole w/ Light	178	Air Conditioner
27	Signal, Traffic	103	Catch Basin	179	Concrete Wall
28	Guy Wire	105	B-Box (Water)	180	Concrete Driveway
29	Track, R.R.	106	B-Box (Gas)	181	Bituminous Driveway
30	Radius Point	107	CATV Pedestal	182	Gravel Driveway
31	Monument	108	Profile Grade Line	183	Dirt Driveway
32	Iron Pipe, 1" Dia.	109	Wingwall/Bridge Line	201 - 250	Trees, Decid, 1" to 50"
33	Iron Pipe, 2" Dia.	110	Retaining Wall	301 - 350	Trees, Pine 1" to 50"
34	Vent Pipe	111	C/L Column	401 - 450	Stump, 1" to 50"
35	Well	112	Scupper		
36	Riser, Electric	113	Back of Abutment		
37	Gas, Buried	114	Face of Abutment		
38	Telephone, Buried	115	B-Steel Beam		
39	Electric, Buried	116	B-Conc Beam		
40	CATV, Buried	117	Flared End Section		
41	Building Corner	118	Flow Line		
42	Wall, R.R. Tie	119	Pk-Nail or Hub		
43	Wall, Stone	120	Driveway		
44	Culvert	121	Rip Rap		
45	Post, Guard	122	Rumble Strip		
46	Post, R/W	123	Ground Light		
47	Asphalt, Road Edge	124	Underground Tank		
48	Gravel, Road Edge	125	Back Sight		
49	Concrete Edge, Road	126	Miscellaneous Point		
50	Culvert, C.M.C.P.	127	Grate		
51	Culvert, Concrete	128	Phone Booth		
52	Tank, Septic	129	Concrete Ditch		
53	Guard Rail	130	Gate Post		
54	Stump	131	Metal Post		
56	Marsh, Edge	132	629		
57	Tile, Drain	133	Berm		
58	Pipe, PVC	134	Fuel		
59	Cleanout	135	Parking Meter		
60	Sump Pump Discharge	136	Expansion/ Conc. Joint		
61	Pipe, Iron	137	Sprinkler		
62	Re-Bar	138	Hand Hole		
63	Benchmark	139	Crown		
64	Chiseled Square	140	Coal Chute		
65	Chiseled Cross	141	Water Meter		
66	Soil Boring	142	Fire Alarm		
67	Doorway	143	Police Phone		
68	Manhole, Signal	144	Misc. Meter		
69	Manhole, Electric	145	Lowest Point Of Entry		
70	Manhole, Telephone	146	Under Ground Water		
71	Manhole, Gas	147	Sanitary, Buried		
72	Water Valve Pit	148	Storm, Buried		
73	Pole, Guy	149	Forcemain, Buried		
74	Valve, Gas Service	150	Ground Shot		
75	Valve, Water Service	151	Propane Tank		
76	Curb, Concrete (Gutter)	152	Grain Bin		
77	Curb, Concrete (Top Back)	153	Loading Dock		

Slug Test Data and Calculations

TETRA TECH **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT	NAVY – GREAT LAKES	JOB NUMBER	112G02416
SUBJECT	GW CONTOURS & FLOW VELOCITY (SITE 12)		
BASED ON	FIGURE	DRAWING NUMBER	
BY	SJC (8/28/13)	CHECKED BY	REVISED CAL 11/12/13
APPROVED BY		DATE	

① Determine i (hydraulic gradient)

AVG. DISTANCE BETWEEN 579 AND 580 CONTOUR = 200 ft

$i = 1 \text{ ft} / 200 \text{ ft} = 0.005 \text{ ft/ft}$

$i = \underline{0.005}$ ft/ft

② DETERMINE THE AVERAGE HYDRAULIC CONDUCTIVITY (K)

WELL	K (SLUG TEST) ft/day
MW01	5.78
MW02	17.74
MW03	4.64
MW04	10.96

$K_{(\text{GEOMETRIC MEAN})} = (5.78 \times 17.74 \times 4.64 \times 10.96)^{1/4}$

$= \underline{8.50 \text{ ft/day}}$

③ DETERMINE THE GROUNDWATER VELOCITY

$V_{GW} = \frac{Ki}{n} = \frac{(8.50)(0.005)}{0.40}$

$V_{GW} = 0.106$ ft/day

$= \underline{38.78}$ ft/yr

[K = 8.50 ft/day (GEO MEAN)
i = 0.005 ft/ft (AVERAGE)
n = 0.40 (FINE SAND)]

MW01

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	14
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-1.895
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.084
Actual Y-intercept is set to 0.	0.000
T_0 (min):	0.528
K (ft/min):	4.01E-03
K (ft/day):	**5.779**

$$m = \frac{n(\sum xy) - (\sum x)(\sum y)}{n(\sum (x^2)) - (\sum x)^2}$$

$$b = \frac{(\sum y)(\sum (x^2)) - (\sum x)(\sum xy)}{n(\sum (x^2)) - (\sum x)^2}$$

T_0: Time at which ln(H/H0)=-1

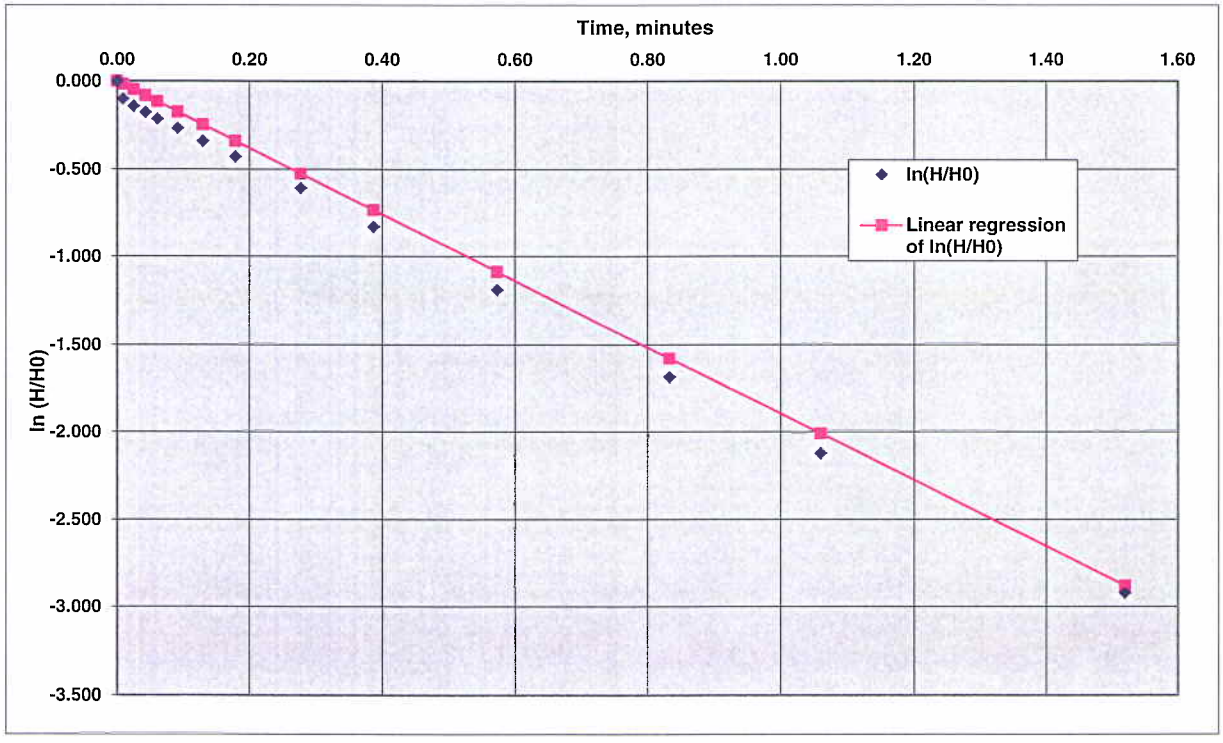
$K = r^2 * \ln(L/R)/(2LT_0)$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	Naval Station Great Lakes
Project No.:	112G02416
Method of Inducing Water Level Change:	1 Section Slug
Reference Pt (Top of Casing, Transducer, etc):	Top of Casing
Test Type (Rising Head / Falling Head):	Rising Head

Well / Boring No.:	NTC12-MW01
Test No.:	1
Date:	8/16/2013
Geologist:	Conti
Checked by / Date:	

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.333
Screened / Monitored Interval Below Water Table, L (ft):	4.12
Static Water Level (Depth/ Elevation) (ft.):	9.38
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	1.67	0.00	-1.67	1.00	0.0000	0.00
	0.01	1.51	0.01	-1.51	0.90	-0.1007	-0.02
	0.03	1.45	0.03	-1.45	0.87	-0.1413	-0.05
	0.04	1.40	0.04	-1.40	0.84	-0.1764	-0.08
	0.06	1.35	0.06	-1.35	0.81	-0.2127	-0.12
	0.09	1.28	0.09	-1.28	0.77	-0.2660	-0.17
	0.13	1.19	0.13	-1.19	0.71	-0.3389	-0.25
	0.18	1.09	0.18	-1.09	0.65	-0.4266	-0.34
	0.28	0.91	0.28	-0.91	0.54	-0.6071	-0.52
	0.39	0.73	0.39	-0.73	0.44	-0.8275	-0.73
	0.57	0.51	0.57	-0.51	0.31	-1.1862	-1.09
	0.83	0.31	0.83	-0.31	0.19	-1.6840	-1.58
	1.06	0.20	1.06	-0.20	0.12	-2.1223	-2.01
	1.52	0.09	1.52	-0.09	0.05	-2.9208	-2.88
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

Tetra Tech

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

HTC12

PROJECT NAME: NS GREAT LAKES WELL/BORING NO.: MW01

PROJECT NO.: 112G02116 GEOLOGIST: CONN

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10'/13.4 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 9.38 TPVC DATE: 8-16-13

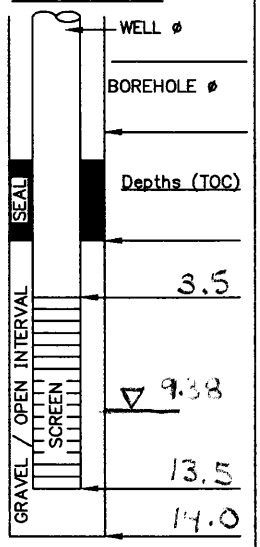
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: 2" SLUG (GRAY) PAGE 1 OF 1

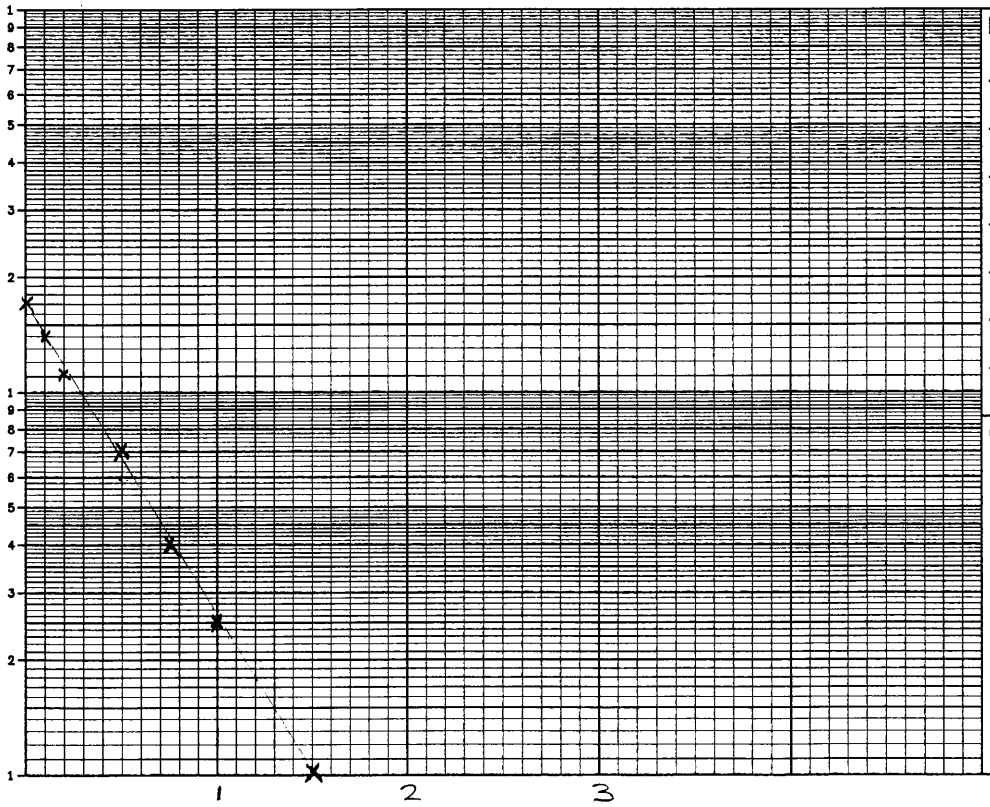
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

ELAPSED TIME (min.) or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
.058		1.7			
.063		1.5			
.09		1.4			
.14		1.3			
.22		1.1			
.28		1.0			
.50		.7			
.72		.4			
1.0		.25			
1.5		.10			
2		.05			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

CALCS, SKETCH MAPS, ETC.:

r = 1" = .083'

R = 4" = .333'

L = 4.12'

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

Report Date:	8/16/2013 16:10
Report User Name:	Stanley.Conti
Report Computer Nam	NUSL-6L250P1
Application:	WinSitu.exe
Application Version:	5.6.24.4

Log File Properties

File Name	NTC12-MW01_Append_2013-08-16_16-09-51-928.wsl
Create Date	8/16/2013 16:09

Device Properties

Device	Level TROLL 700		
Site	NS Great Lakes		
Device Name			
Serial Number	156141		
Firmware Version	2.09		
Hardware Version	3		
Device Address	1		
Device Comm Cfg	19200	8 Even	1 (Modbus-RTU)
Used Memory	0		
Used Battery	23		

Log Configuration

Log Name	NTC12-MW01
Created By	Stanley.Conti
Computer Name	NUSL-6L250P1
Application	WinSitu.exe
Application Versior	5.6.24.4
Create Date	8/16/2013 3:43:27 PM Eastern Daylight Time
Log Setup Time Zor	Eastern Daylight Time
Notes Size(bytes)	4096
Overwrite when ful	Disabled
Scheduled Start Tin	Manual Start
Scheduled Stop Tin	No Stop Time
Type	True Logarithmic
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measure	Level Surface Elevation
Specific Gra	0.999
Level Referen	Set first logged value to offset
Level Referenc	0 (ft)

Other Log Settings

Zero Pressure Offse	0.00551605 (PSI)
Depth of Probe:	-0.175088 (ft)
Head Pressure:	-0.0758295 (PSI)
Temperature:	93.6317 (F)

Log Notes:

Date and Time	Note
8/16/2013 15:43	Used Battery: 23% Used Memory: 1% User Name: Stanley.Conti
8/16/2013 16:02	Manual Start Command
8/16/2013 16:06	Log Download - Used Battery: 23% Used Memory: 1% User Name: Stanley.Conti
8/16/2013 16:07	Log Download - Used Battery: 23% Used Memory: 1% User Name: Stanley.Conti
8/16/2013 16:09	Used Battery: 23% Used Memory: 1% User Name: Stanley.Conti
8/16/2013 16:09	Manual Stop Command

Log Data:

Record Count	99
Sensors	1
	1 156141 Pressure/Temp 30 PSIG (21m/69ft)

Time Zone: Eastern Daylight Time

Date and Time	Elapsed Time Minutes	Sensor: Pre SN#: 1561 Pressure (F	Sensor: Pre SN#: 1561 Temperatu	Sensor: Pres(G) 69ft SN#: 156141 Level Surface Elevation (ft)
8/16/2013 16:02	0	1.757	59.276	0
8/16/2013 16:02	0.005	1.756	59.296	-0.003
8/16/2013 16:02	0.008	1.755	59.322	-0.005
8/16/2013 16:02	0.013	1.755	59.321	-0.006
8/16/2013 16:02	0.017	1.76	59.336	0.006
8/16/2013 16:02	0.021	1.755	59.335	-0.006
8/16/2013 16:02	0.025	1.756	59.343	-0.003
8/16/2013 16:02	0.029	1.754	59.343	-0.007
8/16/2013 16:02	0.033	1.755	59.345	-0.005
8/16/2013 16:02	0.038	1.753	59.341	-0.009
8/16/2013 16:02	0.042	1.754	59.341	-0.008
8/16/2013 16:02	0.046	1.756	59.335	-0.004
8/16/2013 16:02	0.05	1.008	59.335	-1.73
8/16/2013 16:02	0.054	1.36	59.333	-0.917
8/16/2013 16:02	0.058	1.036	59.334	-1.666
8/16/2013 16:02	0.063	1.108	59.326	-1.499
8/16/2013 16:02	0.067	1.102	59.317	-1.513

8/16/2013 16:02		0.073	1.11	59.354	-1.495
8/16/2013 16:02		0.076	1.12	59.3	-1.47
8/16/2013 16:02	.025	0.083	1.131	59.272	-1.446 1.45
8/16/2013 16:02		0.09	1.138	59.281	-1.429
8/16/2013 16:02		0.094	1.141	59.294	-1.423
8/16/2013 16:02		0.098	1.149	59.295	-1.405
8/16/2013 16:02	.013	0.101	1.152	59.296	-1.398 1.40
8/16/2013 16:02		0.105	1.156	59.296	-1.388
8/16/2013 16:02		0.109	1.161	59.295	-1.377
8/16/2013 16:02		0.112	1.165	59.287	-1.368
8/16/2013 16:02	.061	0.119	1.172	59.253	-1.35 1.35
8/16/2013 16:02		0.126	1.179	59.241	-1.335
8/16/2013 16:02		0.133	1.186	59.216	-1.319
8/16/2013 16:02		0.141	1.195	59.192	-1.299
8/16/2013 16:02	.092	0.15	1.203	59.173	-1.28 1.28
8/16/2013 16:02		0.16	1.213	59.187	-1.257
8/16/2013 16:02		0.168	1.22	59.164	-1.241
8/16/2013 16:02		0.178	1.232	59.137	-1.214
8/16/2013 16:02		0.188	1.241	59.117	-1.192
8/16/2013 16:02		0.199	1.253	59.099	-1.164
8/16/2013 16:02		0.211	1.263	59.069	-1.141
8/16/2013 16:02		0.224	1.274	59.05	-1.116
8/16/2013 16:02		0.237	1.287	59.074	-1.087
8/16/2013 16:02		0.251	1.299	59.024	-1.058
8/16/2013 16:02		0.266	1.312	58.994	-1.029
8/16/2013 16:02		0.282	1.324	58.965	-1.002
8/16/2013 16:02		0.298	1.336	58.941	-0.972
8/16/2013 16:02		0.316	1.352	58.916	-0.935
8/16/2013 16:02	.237	0.335	1.363	58.9	-0.909 .91
8/16/2013 16:02		0.355	1.38	58.854	-0.87
8/16/2013 16:02		0.376	1.396	58.826	-0.834
8/16/2013 16:02		0.398	1.41	58.796	-0.802
8/16/2013 16:02		0.422	1.425	58.772	-0.767
8/16/2013 16:02	.304	0.447	1.441	58.739	-0.73 .73
8/16/2013 16:02		0.473	1.457	58.7	-0.693
8/16/2013 16:02		0.501	1.471	58.672	-0.661
8/16/2013 16:02		0.531	1.488	58.624	-0.622
8/16/2013 16:02		0.562	1.504	58.584	-0.584
8/16/2013 16:02		0.596	1.521	58.547	-0.545
8/16/2013 16:02	.573	0.631	1.535	58.496	-0.513 .51
8/16/2013 16:02		0.668	1.551	58.456	-0.476
8/16/2013 16:02		0.708	1.565	58.393	-0.443
8/16/2013 16:02		0.75	1.58	58.348	-0.408
8/16/2013 16:02		0.794	1.595	58.275	-0.375
8/16/2013 16:02		0.841	1.608	58.22	-0.345
8/16/2013 16:03	.782	0.891	1.622	58.145	-0.313 .31
8/16/2013 16:03		0.944	1.637	58.076	-0.278

8/16/2013 16:03	1	1.649	58.011	-0.25
8/16/2013 16:03	1.06	1.66	57.922	-0.224
8/16/2013 16:03	1.12	1.67	57.852	-0.201
8/16/2013 16:03	1.19	1.68	57.769	-0.178
8/16/2013 16:03	1.26	1.692	57.692	-0.151
8/16/2013 16:03	1.33	1.699	57.631	-0.135
8/16/2013 16:03	1.412	1.705	57.541	-0.12
8/16/2013 16:03	1.5	1.712	57.445	-0.104
8/16/2013 16:03	1.58	1.718	57.367	-0.09
8/16/2013 16:03	1.68	1.723	57.261	-0.08
8/16/2013 16:03	1.78	1.727	57.171	-0.07
8/16/2013 16:04	1.88	1.729	57.079	-0.065
8/16/2013 16:04	1.991	1.733	57.012	-0.057
8/16/2013 16:04	2.11	1.735	56.898	-0.051
8/16/2013 16:04	2.241	1.735	56.82	-0.052
8/16/2013 16:04	2.37	1.736	56.698	-0.049
8/16/2013 16:04	2.51	1.739	56.602	-0.043
8/16/2013 16:04	2.662	1.739	56.518	-0.041
8/16/2013 16:04	2.82	1.74	56.449	-0.039
8/16/2013 16:05	2.98	1.742	56.307	-0.035
8/16/2013 16:05	3.162	1.743	56.225	-0.032
8/16/2013 16:05	3.35	1.742	56.111	-0.036
8/16/2013 16:05	3.55	1.744	56.016	-0.03
8/16/2013 16:05	3.76	1.745	55.926	-0.028
8/16/2013 16:06	3.98	1.746	55.826	-0.025
8/16/2013 16:06	4.22	1.746	55.735	-0.026
8/16/2013 16:06	4.47	1.743	55.644	-0.033
8/16/2013 16:06	4.733	1.744	55.589	-0.031
8/16/2013 16:07	5.01	1.743	55.473	-0.032
8/16/2013 16:07	5.31	1.745	55.388	-0.029
8/16/2013 16:07	5.62	1.746	55.31	-0.026
8/16/2013 16:08	5.96	1.747	55.243	-0.024
8/16/2013 16:08	6.312	1.745	55.207	-0.028
8/16/2013 16:08	6.68	1.746	55.085	-0.026
8/16/2013 16:09	7.08	1.745	55.02	-0.028

MW02

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	13
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-8.834
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	0.112
Actual Y-intercept is set to 0.	0.000
T_0 (min):	0.113
K (ft/min):	1.23E-02
K (ft/day):	**17.735**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

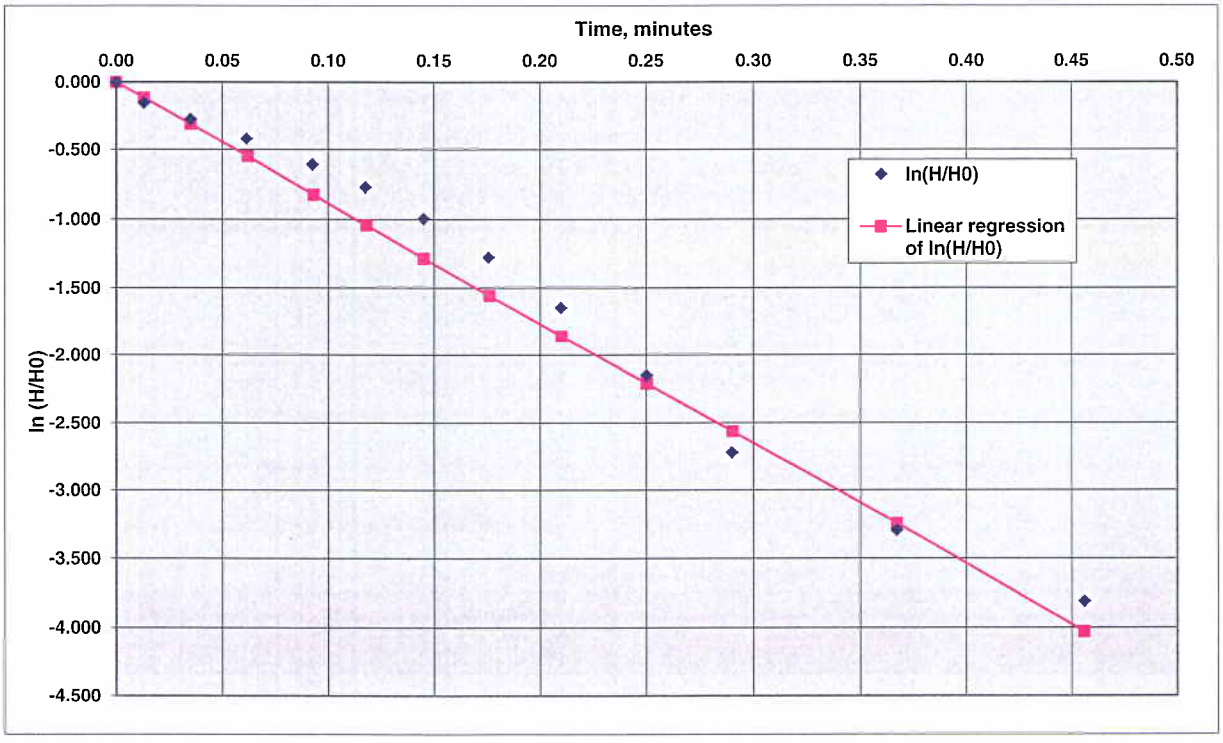
T_0: Time at which ln(H/H0)=-1

$K = r^2 * \ln(L/R)/(2LT_0)$

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	Naval Station Great Lakes
Project No.:	112G02416
Method of Inducing Water Level Change:	2 Section Slug
Reference Pt (Top of Casing, Transducer, etc):	Top of Casing
Test Type (Rising Head / Falling Head):	Rising Head

Well / Boring No.:	NTC12-MW02
Test No.:	1
Date:	8/17/2013
Geologist:	Conti
Checked by / Date:	

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.333
Screened / Monitored Interval Below Water Table, L (ft):	7.87
Static Water Level (Depth/ Elevation) (ft.):	5.93
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	1.97	0.00	-1.97	1.00	0.0000	0.00
	0.01	1.69	0.01	-1.69	0.86	-0.1533	-0.11
	0.04	1.50	0.04	-1.50	0.76	-0.2726	-0.31
	0.06	1.29	0.06	-1.29	0.65	-0.4234	-0.55
	0.09	1.07	0.09	-1.07	0.54	-0.6104	-0.82
	0.12	0.91	0.12	-0.91	0.46	-0.7723	-1.04
	0.15	0.73	0.15	-0.73	0.37	-0.9927	-1.28
	0.18	0.55	0.18	-0.55	0.28	-1.2759	-1.55
	0.21	0.38	0.21	-0.38	0.19	-1.6456	-1.86
	0.25	0.23	0.25	-0.23	0.12	-2.1477	-2.21
	0.29	0.13	0.29	-0.13	0.07	-2.7183	-2.56
	0.37	0.07	0.37	-0.07	0.04	-3.2953	-3.24
	0.46	0.04	0.46	-0.04	0.02	-3.8016	-4.03
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

Tetra Tech

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

HTC 12

PROJECT NAME: NS GREAT LAKES WELL/BORING NO.: MW02

PROJECT NO.: 112G02416 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10'/ 13.80 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 5.93 DATE: 8/17/13

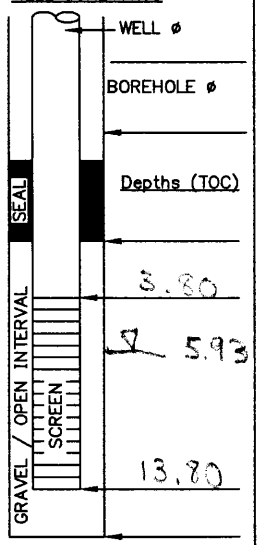
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: SLUG 2 SEC WHITE PAGE 1 OF 1

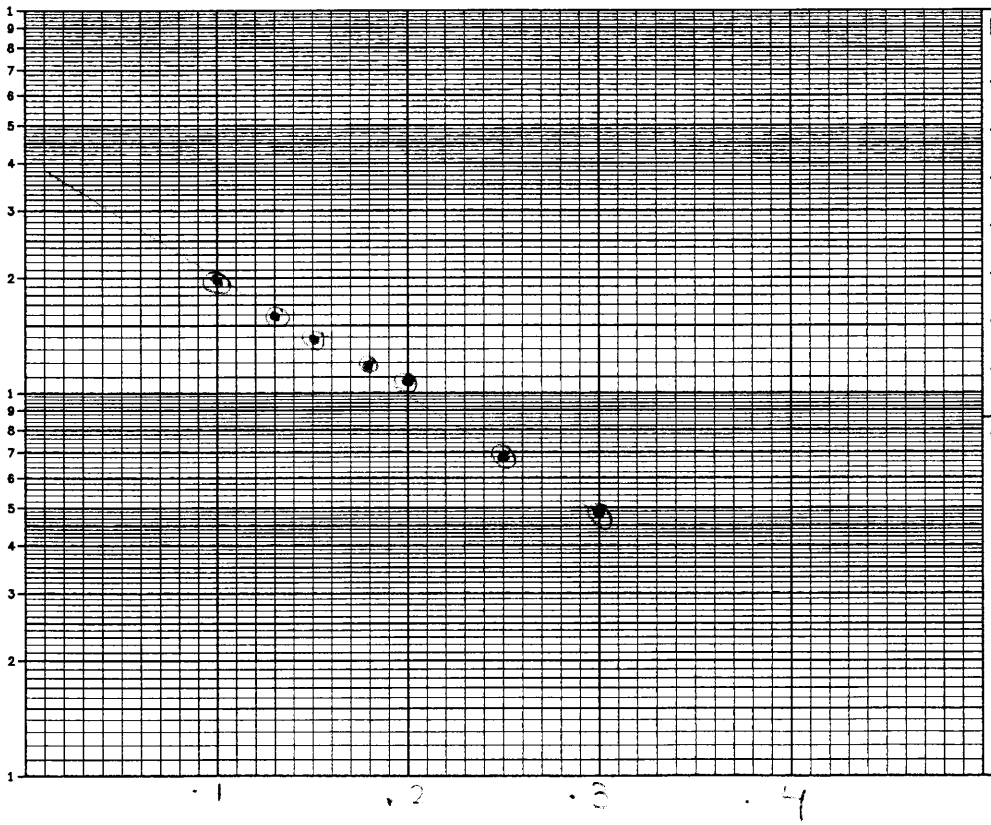
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
.106		2.0			
.133		1.6			
.15		1.4			
.18		1.2			
[illegible]		1.1			
[illegible]		[illegible]			
[illegible]		[illegible]			
[illegible]		[illegible]			
[illegible]		[illegible]			
[illegible]		.06			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

CALCS, SKETCH MAPS, ETC.:

r = 1" = .083'

R = 4" = .333'

L = 7.87'

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

Report Date:	8/17/2013 9:17
Report User Name:	Stanley.Conti
Report Computer Nam	NUSL-6L250P1
Application:	WinSitu.exe
Application Version:	5.6.24.4

Log File Properties

File Name	NTC12-MW02_Append_2013-08-17_09-15-31-433.wsl
Create Date	8/17/2013 9:15

Device Properties

Device	Level TROLL 700		
Site	NS Great Lakes		
Device Name			
Serial Number	156141		
Firmware Version	2.09		
Hardware Version	3		
Device Address	1		
Device Comm Cfg	19200	8 Even	1 (Modbus-RTU)
Used Memory	1		
Used Battery	23		

Log Configuration

Log Name	NTC12-MW02
Created By	Stanley.Conti
Computer Name	NUSL-6L250P1
Application	WinSitu.exe
Application Version	5.6.24.4
Create Date	8/17/2013 9:05:22 AM Eastern Daylight Time
Log Setup Time Zone	Eastern Daylight Time
Notes Size(bytes)	4096
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Type	True Logarithmic
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurem	Level Surface Elevation
Specific Gravi	0.999
Level Reference	Set first logged value to offset
Level Reference	0 (ft)

Other Log Settings

Zero Pressure Offset:	0.00551605 (PSI)
Depth of Probe:	7.62515 (ft)
Head Pressure:	3.3024 (PSI)
Temperature:	53.1134 (F)

Log Notes:

Date and Time	Note
8/17/2013 9:05	Used Battery: 23% Used Memory: 3% User Name: Stanley.Conti
8/17/2013 9:11	Manual Start Command
8/17/2013 9:12	Log Download - Used Battery: 23% Used Memory: 3% User Name: Stanley.Conti
8/17/2013 9:14	Used Battery: 23% Used Memory: 3% User Name: Stanley.Conti
8/17/2013 9:14	Manual Stop Command

Log Data:

Record Count	86		
Sensors	1		
	1	156141	Pressure/Temp 30 PSIG (21m/69ft)

Time Zone: Eastern Daylight Time

Date and Time	Elapsed Time Minutes	Sensor: Pres(G) 6 SN#: 156141 Pressure (PSI)	Sensor: Pre SN#: 1561 Temperatu	Sensor: Pres(G) 69ft SN#: 156141 Level Surface Elevation (ft)
8/17/2013 9:11	0	3.313	52.471	0
8/17/2013 9:11	0.005	3.314	52.499	0.002
8/17/2013 9:11	0.008	3.312	52.523	-0.002
8/17/2013 9:11	0.013	3.303	52.548	-0.023
8/17/2013 9:11	0.017	3.309	52.558	-0.008
8/17/2013 9:11	0.021	3.311	52.568	-0.004
8/17/2013 9:11	0.025	3.314	52.576	0.003
8/17/2013 9:11	0.029	3.311	52.575	-0.005
8/17/2013 9:11	0.033	3.312	52.586	-0.002
8/17/2013 9:11	0.037	3.311	52.591	-0.004
8/17/2013 9:11	0.042	3.311	52.599	-0.005
8/17/2013 9:11	0.046	3.311	52.601	-0.004
8/17/2013 9:11	0.05	3.31	52.603	-0.006
8/17/2013 9:11	0.054	3.314	52.641	0.003
8/17/2013 9:11	0.059	3.313	52.628	0
8/17/2013 9:11	0.063	3.311	52.628	-0.004
8/17/2013 9:11	0.067	3.312	52.632	-0.002
8/17/2013 9:11	0.071	3.311	52.623	-0.005

8/17/2013 9:11		0.075	3.311	52.623	-0.003		
8/17/2013 9:11		0.079	3.311	52.628	-0.004		
8/17/2013 9:11		0.083	3.381	52.627	0.156		
8/17/2013 9:11		0.087	3.359	52.623	0.106		
8/17/2013 9:11		0.092	2.655	52.63	-1.519		
8/17/2013 9:11		0.096	3.069	52.624	-0.563		
8/17/2013 9:11		0.1	2.977	52.63	-0.777		
8/17/2013 9:11	0	0.106	2.462	52.612	-1.965	1.97	.08
8/17/2013 9:11		0.112	2.554	52.606	-1.752		
8/17/2013 9:11	.018	0.119	2.581	52.595	-1.691	1.69	
8/17/2013 9:11		0.126	2.611	52.582	-1.62		
8/17/2013 9:11		0.133	2.634	52.582	-1.568		
8/17/2013 9:11	.028	0.141	2.664	52.573	-1.499	1.50	
8/17/2013 9:11		0.15	2.695	52.572	-1.427		
8/17/2013 9:11		0.158	2.721	52.57	-1.367		
8/17/2013 9:11	.062	0.168	2.753	52.56	-1.293	1.29	
8/17/2013 9:11		0.178	2.785	52.559	-1.22		
8/17/2013 9:11		0.188	2.815	52.557	-1.15		
8/17/2013 9:11	.093	0.199	2.848	52.545	-1.074	1.07	
8/17/2013 9:11		0.211	2.884	52.546	-0.991		
8/17/2013 9:11	.113	0.224	2.92	52.542	-0.908	.9	
8/17/2013 9:11		0.237	2.957	52.539	-0.823		
8/17/2013 9:11	.145	0.251	2.995	52.535	-0.734	.73	
8/17/2013 9:11		0.266	3.033	52.53	-0.647		
8/17/2013 9:11	.1	0.282	3.073	52.529	-0.553	.57	
8/17/2013 9:11		0.298	3.11	52.527	-0.469		
8/17/2013 9:11	.21	0.316	3.15	52.524	-0.377	.39	
8/17/2013 9:11		0.335	3.184	52.52	-0.298		
8/17/2013 9:11	.25	0.355	3.213	52.519	-0.23	.23	
8/17/2013 9:11		0.376	3.239	52.519	-0.172		
8/17/2013 9:11	.29	0.398	3.256	52.518	-0.131	.13	
8/17/2013 9:11		0.422	3.269	52.517	-0.102		
8/17/2013 9:11		0.447	3.277	52.505	-0.082		
8/17/2013 9:11	.364	0.473	3.281	52.506	-0.073	.073	
8/17/2013 9:11		0.501	3.288	52.511	-0.057		
8/17/2013 9:11		0.531	3.292	52.498	-0.048		
8/17/2013 9:11	.496	0.562	3.294	52.499	-0.044	.044	
8/17/2013 9:11		0.596	3.296	52.497	-0.038		
8/17/2013 9:11		0.631	3.296	52.494	-0.039		
8/17/2013 9:11		0.668	3.3	52.491	-0.031		
8/17/2013 9:11	.662	0.708	3.301	52.491	-0.028	.028	
8/17/2013 9:11		0.75	3.302	52.484	-0.026		
8/17/2013 9:11		0.794	3.302	52.479	-0.025		
8/17/2013 9:11		0.841	3.302	52.48	-0.026		
8/17/2013 9:12	.785	0.891	3.302	52.477	-0.025	.025	
8/17/2013 9:12		0.944	3.305	52.476	-0.017		
8/17/2013 9:12		1	3.303	52.472	-0.023		

8/17/2013 9:12	1.06	3.303	52.468	-0.024
8/17/2013 9:12	1.12	3.305	52.465	-0.018
8/17/2013 9:12	1.19	3.305	52.453	-0.018
8/17/2013 9:12	1.26	3.308	52.455	-0.012
8/17/2013 9:12	1.33	3.306	52.451	-0.016
8/17/2013 9:12	1.412	3.31	52.448	-0.007
8/17/2013 9:12	1.501	3.312	52.437	-0.003
8/17/2013 9:12	1.58	3.308	52.441	-0.012
8/17/2013 9:12	1.68	3.307	52.433	-0.014
8/17/2013 9:12	1.78	3.307	52.436	-0.013
8/17/2013 9:13	1.88	3.309	52.425	-0.009
8/17/2013 9:13	1.99	3.309	52.422	-0.009
8/17/2013 9:13	2.11	3.309	52.419	-0.008
8/17/2013 9:13	2.24	3.309	52.417	-0.009
8/17/2013 9:13	2.37	3.309	52.411	-0.008
8/17/2013 9:13	2.51	3.31	52.399	-0.008
8/17/2013 9:13	2.66	3.309	52.39	-0.01
8/17/2013 9:13	2.82	3.311	52.383	-0.006
8/17/2013 9:14	2.98	3.309	52.374	-0.01
8/17/2013 9:14	3.16	3.31	52.361	-0.006
8/17/2013 9:14	3.35	3.31	52.359	-0.007

MW03

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	13
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-2.729
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.141
Actual Y-intercept is set to 0.	0.000
T_0 (min):	0.366
K (ft/min):	3.22E-03
K (ft/day):	**4.638**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

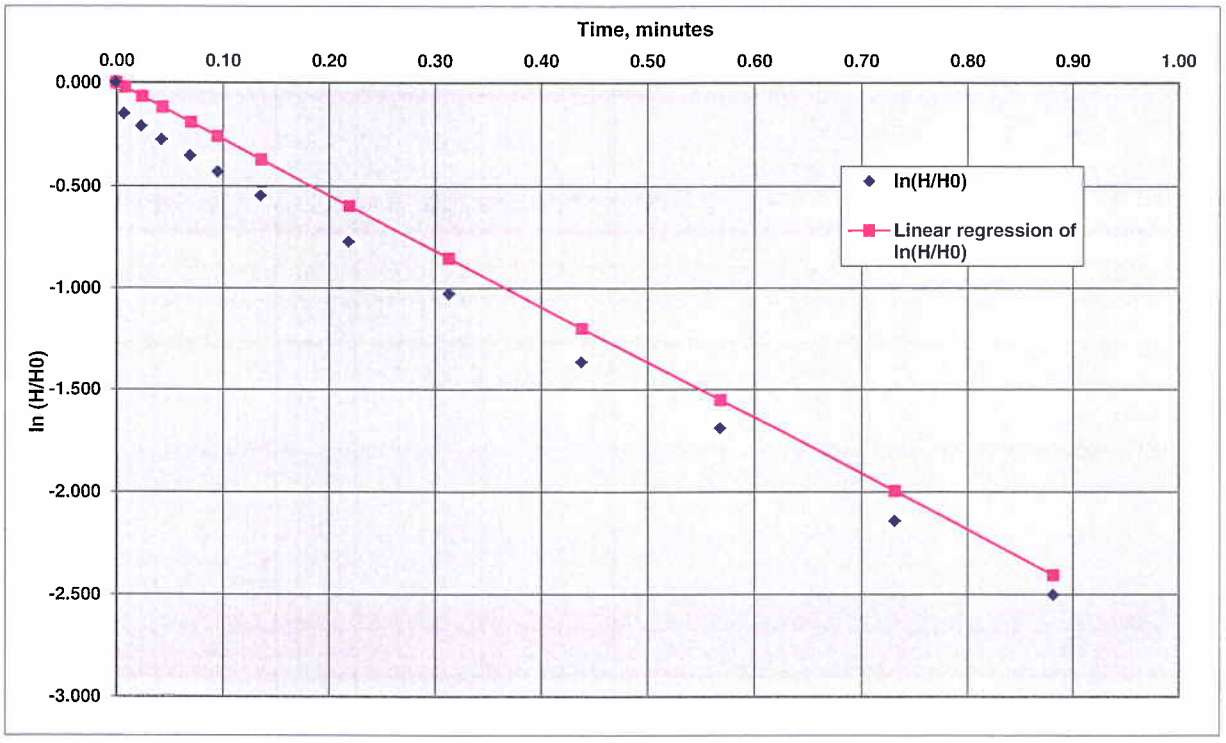
T_0: Time at which ln(H/H0)=-1

$K = r^2 * \ln(L/R)/(2LT_0)$

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	Naval Station Great Lakes
Project No.:	112G02416
Method of Inducing Water Level Change:	2 Section Slug
Reference Pt (Top of Casing, Transducer, etc):	Top of Casing
Test Type (Rising Head / Falling Head):	Rising Head

Well / Boring No.:	NTC12-MW03
Test No.:	1
Date:	8/17/2013
Geologist:	Conti
Checked by / Date:	

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.333
Screened / Monitored Interval Below Water Table, L (ft):	10
Static Water Level (Depth/ Elevation) (ft.):	2.19
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	1.95	0.00	-1.95	1.00	0.0000	0.00
	0.01	1.68	0.01	-1.68	0.86	-0.1490	-0.02
	0.02	1.58	0.02	-1.58	0.81	-0.2104	-0.07
	0.04	1.48	0.04	-1.48	0.76	-0.2758	-0.12
	0.07	1.37	0.07	-1.37	0.70	-0.3530	-0.19
	0.10	1.27	0.10	-1.27	0.65	-0.4288	-0.26
	0.14	1.13	0.14	-1.13	0.58	-0.5456	-0.37
	0.22	0.90	0.22	-0.90	0.46	-0.7732	-0.60
	0.31	0.70	0.31	-0.70	0.36	-1.0245	-0.85
	0.44	0.50	0.44	-0.50	0.26	-1.3610	-1.20
	0.57	0.36	0.57	-0.36	0.18	-1.6895	-1.55
	0.73	0.23	0.73	-0.23	0.12	-2.1375	-1.99
	0.88	0.16	0.88	-0.16	0.08	-2.5004	-2.40
x	1.13	0.09	0.00			0.0000	
x	1.27	0.07	0.00			0.0000	
x	1.52	0.04	0.00			0.0000	
x	1.93	0.02	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech

NTC12

PROJECT NAME: NS GREAT LAKES WELL/BORING NO.: MW03

PROJECT NO.: 112G02416 GEOLOGIST: CONTI

WELL DIAMETER: SCREEN LENGTH/DEPTH: 10 / 12.40 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 2.19 DATE: 8/17/12

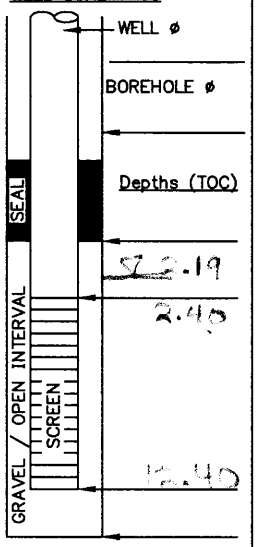
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: 2 SEC [illegible] PAGE 1 OF 1

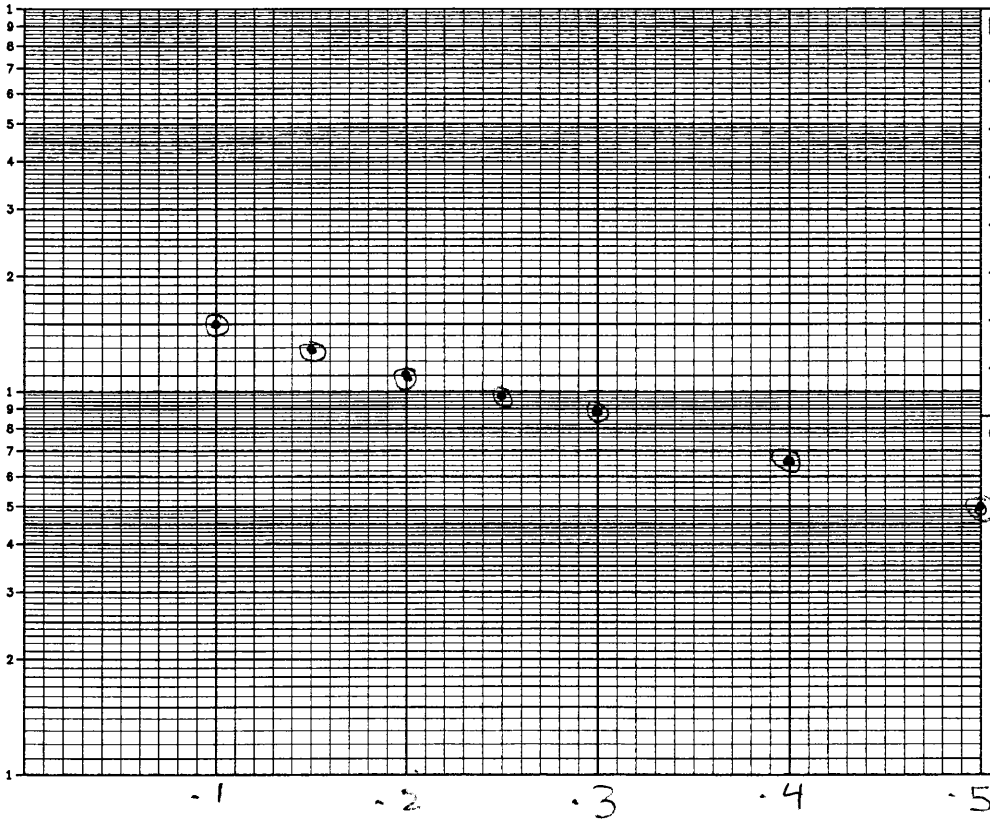
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
.063		1.9			
.075		1.7			
.1		1.5			
.12		1.3			
.139		1.1			
.25		.98			
.5		.5			
.75		.3			
1		.1			
1.5		.05			
.298		.8			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

CALCS, SKETCH MAPS, ETC.:

r: 1" = .083'

R: 4" = .333'

L: 10'

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

Report Date:	8/17/2013 10:08
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL-6L250P1
Application:	WinSitu.exe
Application Version:	5.6.24.4

Log File Properties

File Name	NTC12-MW03_Append_2013-08-17_10-08-36-603.wsl
Create Date	8/17/2013 10:08

Device Properties

Device	Level TROLL 700		
Site	NS Great Lakes		
Device Name			
Serial Number	156141		
Firmware Version	2.09		
Hardware Version	3		
Device Address	1		
Device Comm Cfg	19200	8 Even	1 (Modbus-RTU)
Used Memory	3		
Used Battery	23		

Log Configuration

Log Name	NTC12-MW03
Created By	Stanley.Conti
Computer Name	NUSL-6L250P1
Application	WinSitu.exe
Application Version	5.6.24.4
Create Date	8/17/2013 9:56:26 AM Eastern Daylight Time
Log Setup Time Zone	Eastern Daylight Time
Notes Size(bytes)	4096
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Type	True Logarithmic
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement	Level Surface Elevation
Specific Gravity	0.999
Level Reference M	Set first logged value to offset
Level Reference Off	0 (ft)

Other Log Settings

Zero Pressure Offset:	0.00551605 (PSI)
Depth of Probe:	9.6452 (ft)
Head Pressure:	4.17727 (PSI)
Temperature:	54.8862 (F)

Log Notes:

Date and Time	Note
8/17/2013 9:56	Used Battery: 23% Used Memory: 4% User Name: Stanley.Conti
8/17/2013 10:03	Manual Start Command
8/17/2013 10:04	Log Download - Used Battery: 23% Used Memory: 4% User Name: Stanley.Conti
8/17/2013 10:07	Log Download - Used Battery: 23% Used Memory: 4% User Name: Stanley.Conti
8/17/2013 10:08	Used Battery: 23% Used Memory: 4% User Name: Stanley.Conti
8/17/2013 10:08	Manual Stop Command

Log Data:

Record Count	92		
Sensors	1		
	1	156141	Pressure/Temp 30 PSIG (21m/69ft)

Time Zone: Eastern Daylight Time

Date and Time	Elapsed Time Minutes	Sensor: Pres SN#: 15614 Pressure (PS	Sensor: Pres SN#: 15614 Temperatur	Sensor: Pres(G) 69ft SN#: 156141 Level Surface Elevation (ft)
8/17/2013 10:03	0	4.192	54.456	0
8/17/2013 10:03	0.005	4.192	54.489	0
8/17/2013 10:03	0.008	4.191	54.514	-0.003
8/17/2013 10:03	0.013	4.192	54.533	-0.001
8/17/2013 10:03	0.017	4.197	54.603	0.011
8/17/2013 10:03	0.022	4.194	54.59	0.003
8/17/2013 10:03	0.026	4.192	54.59	0
8/17/2013 10:03	0.03	4.192	54.595	-0.001
8/17/2013 10:03	0.033	4.206	54.599	0.032
8/17/2013 10:03	0.037	4.193	54.597	0.002
8/17/2013 10:03	0.042	4.19	54.6	-0.005
8/17/2013 10:03	0.046	3.541	54.602	-1.503
8/17/2013 10:03	0.05	3.474	54.608	-1.659
8/17/2013 10:03	0.054	4.051	54.611	-0.325
8/17/2013 10:03	0.058	3.667	54.608	-1.212
8/17/2013 10:03	0.063	3.346	54.608	-1.954
8/17/2013 10:03	0.067	3.459	54.614	-1.692

1.95

						1.75
8/17/2013 10:03	.009	0.071	3.467	54.616	-1.675	1.68
8/17/2013 10:03		0.075	3.478	54.622	-1.65	
8/17/2013 10:03		0.079	3.49	54.621	-1.62	
8/17/2013 10:03		0.083	3.498	54.627	-1.602	
8/17/2013 10:03	.024	0.087	3.51	54.622	-1.576	1.58
8/17/2013 10:03		0.092	3.52	54.63	-1.553	
8/17/2013 10:03		0.096	3.53	54.63	-1.53	
8/17/2013 10:03		0.1	3.537	54.629	-1.513	
8/17/2013 10:03	.043	0.106	3.55	54.62	-1.483	1.48
8/17/2013 10:03		0.112	3.559	54.607	-1.461	
8/17/2013 10:03		0.119	3.572	54.601	-1.431	
8/17/2013 10:03		0.126	3.587	54.596	-1.397	
8/17/2013 10:03	.07	0.133	3.599	54.596	-1.369	1.37
8/17/2013 10:03		0.141	3.614	54.589	-1.335	
8/17/2013 10:03		0.15	3.628	54.583	-1.304	
8/17/2013 10:03	.09	0.158	3.641	54.58	-1.274	1.27
8/17/2013 10:03		0.168	3.656	54.577	-1.238	
8/17/2013 10:03		0.178	3.671	54.572	-1.204	
8/17/2013 10:03		0.188	3.686	54.575	-1.169	
8/17/2013 10:03	.13	0.199	3.701	54.571	-1.134	1.13
8/17/2013 10:03		0.211	3.72	54.568	-1.091	
8/17/2013 10:03		0.224	3.737	54.571	-1.052	
8/17/2013 10:03		0.237	3.751	54.566	-1.018	
8/17/2013 10:03		0.251	3.77	54.571	-0.975	
8/17/2013 10:03		0.266	3.787	54.567	-0.935	
8/17/2013 10:03	.21	0.282	3.803	54.571	-0.898	.90
8/17/2013 10:03		0.298	3.821	54.564	-0.858	
8/17/2013 10:03		0.316	3.836	54.567	-0.823	
8/17/2013 10:03		0.335	3.855	54.573	-0.778	
8/17/2013 10:03		0.355	3.872	54.569	-0.739	
8/17/2013 10:03	.33	0.376	3.891	54.567	-0.696	.70
8/17/2013 10:03		0.398	3.908	54.572	-0.656	
8/17/2013 10:03		0.422	3.924	54.574	-0.619	
8/17/2013 10:03		0.447	3.943	54.57	-0.575	
8/17/2013 10:03		0.473	3.96	54.578	-0.537	
8/17/2013 10:03	.53	0.501	3.977	54.576	-0.497	.50
8/17/2013 10:03		0.531	3.993	54.58	-0.46	
8/17/2013 10:03		0.562	4.008	54.589	-0.425	
8/17/2013 10:03		0.596	4.023	54.591	-0.392	
8/17/2013 10:03	.63	0.631	4.038	54.594	-0.356	.36
8/17/2013 10:03		0.668	4.052	54.602	-0.323	
8/17/2013 10:03		0.708	4.067	54.604	-0.289	
8/17/2013 10:03		0.75	4.079	54.605	-0.261	
8/17/2013 10:04	.79	0.794	4.092	54.605	-0.23	.2
8/17/2013 10:04		0.841	4.102	54.614	-0.208	
8/17/2013 10:04		0.891	4.113	54.62	-0.183	
8/17/2013 10:04	.94	0.944	4.122	54.629	-0.162	.1

8/17/2013 10:04	1	4.133	54.628	-0.137
8/17/2013 10:04	1.06	4.14	54.637	-0.122
8/17/2013 10:04	1.12	4.147	54.643	-0.104
8/17/2013 10:04	1.19	4.153	54.655	-0.09
8/17/2013 10:04	1.26	4.161	54.654	-0.073
8/17/2013 10:04	1.33	4.164	54.667	-0.065
8/17/2013 10:04	1.41	4.176	54.668	-0.038
8/17/2013 10:04	1.5	4.173	54.678	-0.045
8/17/2013 10:04	1.58	4.175	54.676	-0.041
8/17/2013 10:04	1.68	4.18	54.688	-0.029
8/17/2013 10:05	1.78	4.183	54.698	-0.022
8/17/2013 10:05	1.88	4.181	54.706	-0.025
8/17/2013 10:05	1.99	4.184	54.721	-0.019
8/17/2013 10:05	2.11	4.187	54.739	-0.011
8/17/2013 10:05	2.24	4.186	54.754	-0.015
8/17/2013 10:05	2.37	4.186	54.765	-0.014
8/17/2013 10:05	2.51	4.187	54.776	-0.012
8/17/2013 10:05	2.662	4.192	54.789	0
8/17/2013 10:06	2.82	4.187	54.803	-0.013
8/17/2013 10:06	2.98	4.188	54.821	-0.01
8/17/2013 10:06	3.16	4.19	54.837	-0.006
8/17/2013 10:06	3.35	4.189	54.855	-0.008
8/17/2013 10:06	3.55	4.189	54.874	-0.008
8/17/2013 10:07	3.76	4.19	54.889	-0.005
8/17/2013 10:07	3.98	4.188	54.913	-0.01
8/17/2013 10:07	4.22	4.19	54.926	-0.004
8/17/2013 10:07	4.47	4.189	54.94	-0.008
8/17/2013 10:07	4.73	4.189	54.968	-0.007

MW04

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	13
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-5.850
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.012
Actual Y-intercept is set to 0.	0.000
T_0 (min):	0.171
K (ft/min):	7.61E-03
K (ft/day):	**10.962**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

T_0: Time at which ln(H/H0)=-1

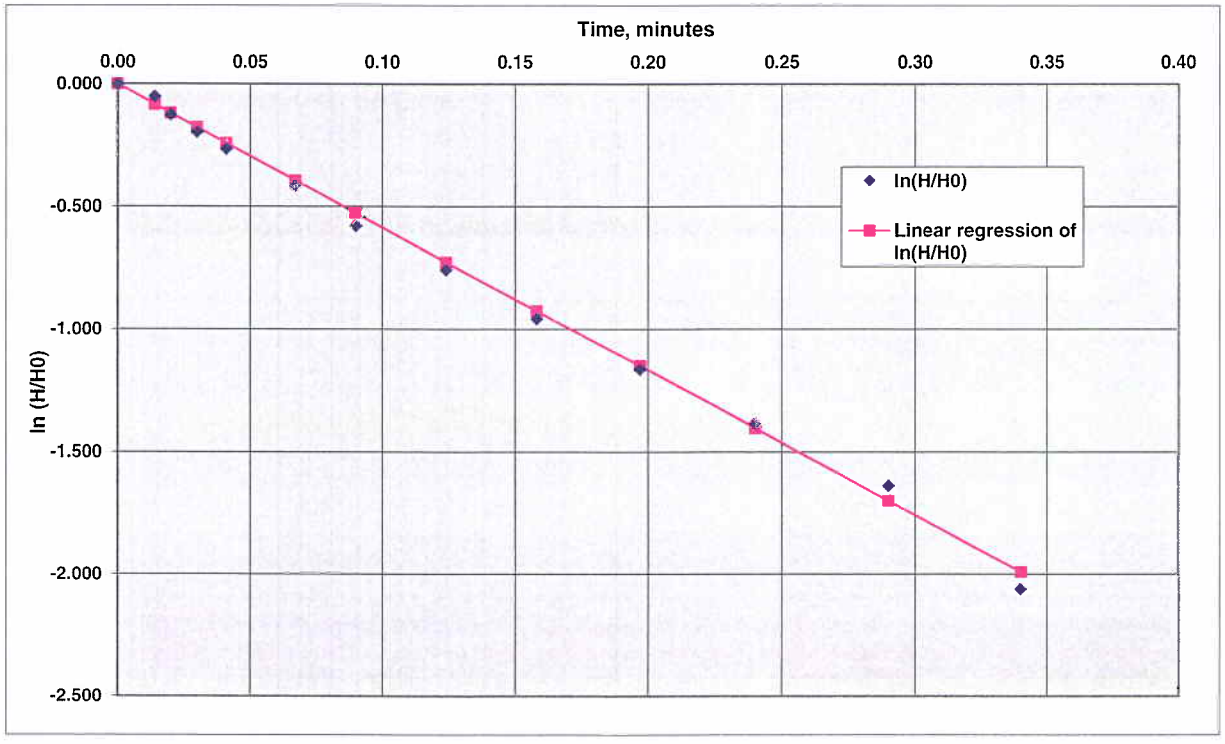
$K = r^2 * \ln(L/R)/(2LT_0)$

n: Number of data points. **x: Elapsed time point.** **y: ln(H/H0) point**

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	Naval Station Great Lakes
Project No.:	112G02416
Method of Inducing Water Level Change:	2 Section Slug
Reference Pt (Top of Casing, Transducer, etc):	Top of Casing
Test Type (Rising Head / Falling Head):	Rising Head

Well / Boring No.:	NTC12-MW04
Test No.:	1
Date:	8/17/2013
Geologist:	Conti
Checked by / Date:	

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.333
Screened / Monitored Interval Below Water Table, L (ft):	8.7
Static Water Level (Depth/ Elevation) (ft.):	3.55
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	1.64	0.00	-1.64	1.00	0.0000	0.00
	0.01	1.56	0.01	-1.56	0.95	-0.0500	-0.08
	0.02	1.45	0.02	-1.45	0.88	-0.1231	-0.12
	0.03	1.35	0.03	-1.35	0.82	-0.1946	-0.18
	0.04	1.26	0.04	-1.26	0.77	-0.2636	-0.24
	0.07	1.08	0.07	-1.08	0.66	-0.4177	-0.39
	0.09	0.92	0.09	-0.92	0.56	-0.5781	-0.53
	0.12	0.77	0.12	-0.77	0.47	-0.7561	-0.73
	0.16	0.63	0.16	-0.63	0.38	-0.9567	-0.92
	0.20	0.51	0.20	-0.51	0.31	-1.1680	-1.15
	0.24	0.41	0.24	-0.41	0.25	-1.3863	-1.40
	0.29	0.32	0.29	-0.32	0.20	-1.6341	-1.70
	0.34	0.21	0.34	-0.21	0.13	-2.0553	-1.99
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech

NTC 12

PROJECT NAME: NS GREAT LAKES WELL/BORING NO.: MW04

PROJECT NO.: 112G02416 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10'/ 12.25 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 3.55 DATE: 8/17/13

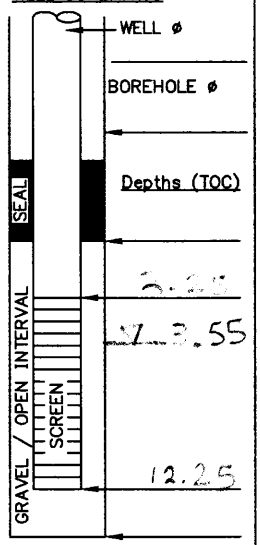
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: 2.5FT WATER SLUG PAGE 1 OF 1

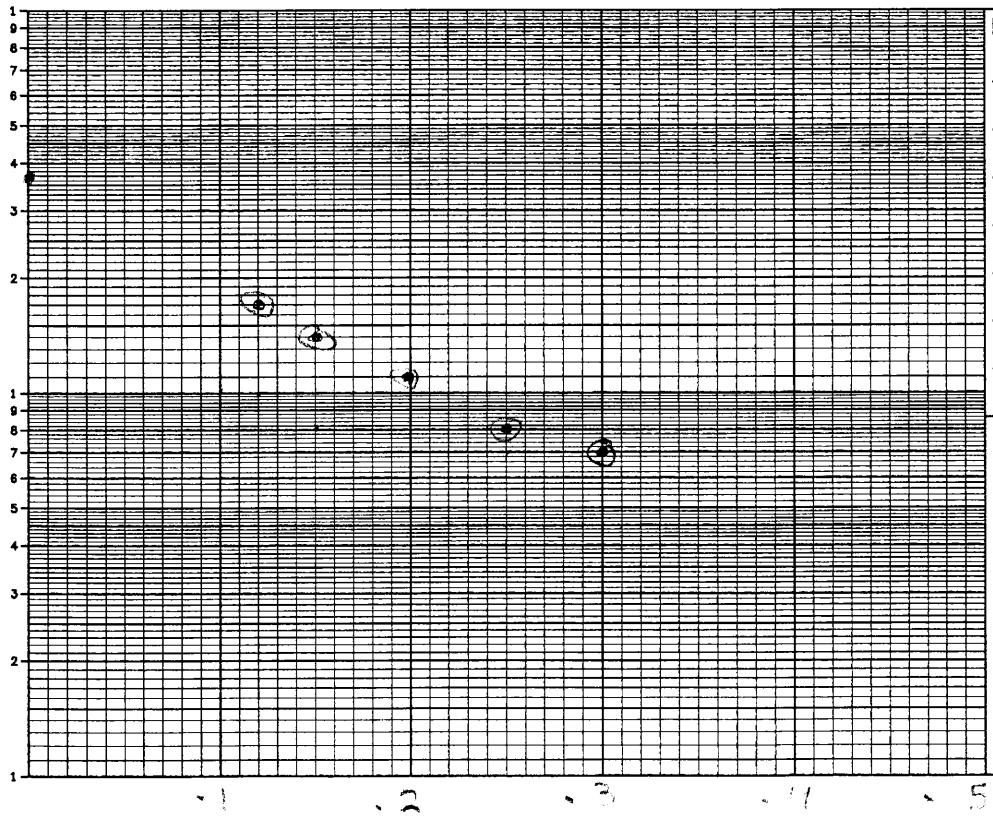
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
.119		1.7			
.15		1.4			
.199		1.1			
.25		.8			
.318		.7			
.35		.5			
.5		.3			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

CALCS, SKETCH MAPS, ETC.:

r = 1" = .083'

R = 4" = .333'

L = 8.1'

ACAD: FORM_HYDCONTST.dwg 07/06/99 INL

Report Date: 8/17/2013 11:06
Report User Name: Stanley.Conti
Report Computer N NUSL-6L250P1
Application: WinSitu.exe
Application Version 5.6.24.4

Log File Properties
File Name NTC12-MW04 Trial 2_Append_2013-08-17_11-06-29-385.wsl
Create Date 8/17/2013 11:06

Device Properties

Device	Level TROLL 700		
Site	NS Great Lakes		
Device Name			
Serial Number	156141		
Firmware Version	2.09		
Hardware Version	3		
Device Address	1		
Device Comm Cfg	19200	8 Even	1 (Modbus-RTU)
Used Memory	7		
Used Battery	23		

Log Configuration

Log Name	NTC12-MW04 Trial 2
Created By	Stanley.Conti
Computer Name	NUSL-6L250P1
Application	WinSitu.exe
Application Version	5.6.24.4
Create Date	8/17/2013 10:59:28 AM Eastern Daylight Time
Log Setup Time Zone	Eastern Daylight Time
Notes Size(bytes)	4096
Overwrite when full	Disabled
Scheduled Start Tim	Manual Start
Scheduled Stop Time	No Stop Time
Type	True Logarithmic
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measuren	Level Surface Elevation
Specific Grav	0.999
Level Referenc	Set first logged value to offset
Level Reference	0 (ft)

Other Log Settings

Zero Pressure Offset	0.00551605 (PSI)
Depth of Probe:	8.14055 (ft)
Head Pressure:	3.52562 (PSI)
Temperature:	56.0971 (F)

Log Notes:

Date and Time	Note
8/17/2013 10:59	Used Battery: 23% Used Memory: 9% User Name: Stanley.Conti
8/17/2013 11:02	Manual Start Command
8/17/2013 11:05	Log Download - Used Battery: 23% Used Memory: 9% User Name: Stanley.Conti
8/17/2013 11:06	Used Battery: 23% Used Memory: 9% User Name: Stanley.Conti
8/17/2013 11:06	Manual Stop Command

Log Data:

Record Count	89		
Sensors	1		
	1	156141	Pressure/Temp 30 PSIG (21m/69ft)

Time Zone: Eastern Daylight Time

Date and Time	Elapsed Time Minutes	Sensor: Pres SN#: 156141 Pressure (PS	Sensor: Pre SN#: 15614 Temperatur	Sensor: Pres(G) 69ft SN#: 156141 Level Surface Elevation (ft)
8/17/2013 11:02	0	3.532	56.101	0
8/17/2013 11:02	0.005	3.53	56.131	-0.003
8/17/2013 11:02	0.008	3.532	56.159	0.002
8/17/2013 11:02	0.013	3.531	56.171	-0.001
8/17/2013 11:02	0.017	3.53	56.188	-0.003
8/17/2013 11:02	0.021	3.529	56.196	-0.005
8/17/2013 11:02	0.025	3.529	56.204	-0.006
8/17/2013 11:02	0.029	3.529	56.21	-0.005
8/17/2013 11:02	0.033	3.53	56.219	-0.003
8/17/2013 11:02	0.037	3.53	56.224	-0.004
8/17/2013 11:02	0.042	3.53	56.228	-0.003
8/17/2013 11:02	0.046	3.53	56.234	-0.003
8/17/2013 11:02	0.05	3.529	56.235	-0.006
8/17/2013 11:02	0.054	3.53	56.24	-0.003
8/17/2013 11:02	0.058	3.529	56.239	-0.006
8/17/2013 11:02	0.063	3.529	56.239	-0.006
8/17/2013 11:02	0.067	3.529	56.246	-0.006
8/17/2013 11:02	0.071	3.528	56.255	-0.009

8/17/2013 11:02	0.075	3.528	56.257	-0.008	
8/17/2013 11:02	0.079	3.53	56.252	-0.003	
8/17/2013 11:02	0.083	3.53	56.257	-0.004	
8/17/2013 11:02	0.087	3.53	56.26	-0.004	
8/17/2013 11:02	0.092	3.529	56.258	-0.005	
8/17/2013 11:02	0.096	3.528	56.263	-0.008	
8/17/2013 11:02	0.1	3.528	56.266	-0.008	
8/17/2013 11:02	0.109	3.531	56.223	-0.003	
8/17/2013 11:02	0.113	3.529	56.247	-0.006	
8/17/2013 11:02	0.119	3.528	56.24	-0.008	
8/17/2013 11:02	0.126	3.527	56.228	-0.011	
8/17/2013 11:02	0.133	3.529	56.226	-0.006	
8/17/2013 11:02	0.141	2.538	56.221	-2.294	2.29
8/17/2013 11:02	0.15	3.307	56.208	-0.518	
8/17/2013 11:02	0.158	2.823	56.209	-1.636	1.64
8/17/2013 11:02	0.168	2.855	56.2	-1.563	
8/17/2013 11:02	0.178	2.905	56.197	-1.448	1.45
8/17/2013 11:02	0.188	2.946	56.191	-1.352	
8/17/2013 11:02	0.199	2.986	56.19	-1.259	1.26
8/17/2013 11:02	0.211	3.026	56.186	-1.167	
8/17/2013 11:02	0.224	3.064	56.182	-1.079	
8/17/2013 11:02	0.237	3.099	56.183	-0.998	1.00
8/17/2013 11:02	0.251	3.135	56.183	-0.917	
8/17/2013 11:02	0.266	3.168	56.176	-0.839	.84
8/17/2013 11:02	0.282	3.199	56.178	-0.768	
8/17/2013 11:02	0.298	3.228	56.175	-0.701	.70
8/17/2013 11:02	0.316	3.258	56.173	-0.631	
8/17/2013 11:02	0.335	3.284	56.165	-0.571	
8/17/2013 11:02	0.355	3.309	56.161	-0.513	.51
8/17/2013 11:02	0.376	3.334	56.166	-0.456	
8/17/2013 11:02	0.398	3.354	56.161	-0.41	
8/17/2013 11:02	0.422	3.374	56.167	-0.364	.36
8/17/2013 11:02	0.447	3.394	56.161	-0.318	
8/17/2013 11:02	0.473	3.408	56.163	-0.285	
8/17/2013 11:02	0.501	3.426	56.158	-0.243	
8/17/2013 11:02	0.531	3.439	56.157	-0.213	.21
8/17/2013 11:02	0.562	3.451	56.157	-0.185	
8/17/2013 11:02	0.596	3.463	56.154	-0.158	
8/17/2013 11:02	0.631	3.473	56.15	-0.134	.13
8/17/2013 11:02	0.668	3.481	56.148	-0.118	
8/17/2013 11:02	0.708	3.489	56.144	-0.098	
8/17/2013 11:02	0.75	3.494	56.144	-0.086	.09
8/17/2013 11:02	0.794	3.5	56.141	-0.072	
8/17/2013 11:02	0.841	3.504	56.137	-0.063	
8/17/2013 11:02	0.891	3.507	56.134	-0.056	.06
8/17/2013 11:02	0.944	3.512	56.129	-0.045	
8/17/2013 11:03	1	3.514	56.131	-0.041	.041

8/17/2013 11:03		1.06	3.517	56.124	-0.034	
8/17/2013 11:03		1.12	3.517	56.124	-0.033	
8/17/2013 11:03		1.19	3.52	56.119	-0.027	
8/17/2013 11:03	1.117	1.26	3.521	56.117	-0.023	.023
8/17/2013 11:03		1.33	3.522	56.116	-0.022	
8/17/2013 11:03		1.41	3.524	56.108	-0.017	
8/17/2013 11:03		1.5	3.525	56.103	-0.016	
8/17/2013 11:03		1.58	3.525	56.109	-0.016	
8/17/2013 11:03		1.68	3.526	56.101	-0.013	
8/17/2013 11:03	1.629	1.78	3.526	56.1	-0.012	.012
8/17/2013 11:03		1.88	3.527	56.101	-0.011	
8/17/2013 11:03		1.99	3.528	56.095	-0.009	
8/17/2013 11:04		2.11	3.527	56.095	-0.01	
8/17/2013 11:04		2.24	3.528	56.1	-0.009	
8/17/2013 11:04		2.37	3.528	56.099	-0.008	
8/17/2013 11:04		2.51	3.528	56.102	-0.008	
8/17/2013 11:04		2.66	3.528	56.104	-0.008	
8/17/2013 11:04		2.82	3.528	56.109	-0.009	
8/17/2013 11:04		2.98	3.527	56.107	-0.01	
8/17/2013 11:05		3.16	3.525	56.105	-0.014	
8/17/2013 11:05		3.35	3.527	56.108	-0.012	
8/17/2013 11:05		3.55	3.525	56.119	-0.014	
8/17/2013 11:05		3.76	3.525	56.127	-0.014	
8/17/2013 11:05		3.98	3.527	56.128	-0.01	

APPENDIX C

INVESTIGATIVE DERIVED WASTE

C-1 PHASE 1

C-2 PHASE 2

C-3 PHASE 3

C-1 PHASE 1

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	IL7170024577	1	847-688-4820	000411867WAS

5. Generator's Name and Mailing Address
Naval Station Great Lakes
201 Decatur Avenue
Great Lakes, IL 60088
Generator's Phone: 847-688-6934

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: HazChem Environmental Corporation — U.S. EPA ID Number: ILD984785238

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
Tradebe
4343 Kennedy Avenue
East Chicago, IN 46312
Facility's Phone: 800-366-7242

U.S. EPA ID Number: IND000646943

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. Non Hazardous, Non Regulated Material (Solids)	14	DAQ	5000	P	None
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
1) 338578 14X55 #12881

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: [illegible] — Signature: [illegible] — Month: [illegible] Day: [illegible] Year: [illegible]

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: [illegible] — Signature: [illegible] — Month: [illegible] Day: [illegible] Year: [illegible]
Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name — Signature — Month Day Year

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

GENERATOR'S INITIAL C

FROM : POLLUTION CONTROL INDUSTRIES PHONE NO. : 2193917042 Apr. 25 2011 10:32AM P2/2

000411867WAS 92132

Form Approved. OMB No. 2050-0039

Please print or type (Form designed for use on elite (12-pitch) typewriter.)

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	IL7170024577	1	847-688-4820	000411867WAS

5. Generator's Name and Mailing Address
Naval Station Great Lakes
201 Decatur Avenue
Great Lakes, IL 60088
Generator's Phone: 847-688-6934

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: HazChem Environmental Corporation — U.S. EPA ID Number: ILD984785238

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Tradebe
4343 Kennedy Avenue
East Chicago, IN 46312
Facility's Phone: 800-388-7242
U.S. EPA ID Number: IND000648943

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. Non Hazardous, Non Regulated Material (Solids)	014	DM	5000	P	None
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
1) 338578 14x55 #12889
COD required within 45 days C#92132

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Norman Lucas — Signature: [signature] — Month 03 Day 16 Year 11

16. International Shipments - ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Bruce Sroka — Signature: [signature] — Month 03 Day 16 Year 11
Transporter 2 Printed/Typed Name — Signature — Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. NA 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: [signature] — Signature: [signature] — Month 3 Day 21 Year 11

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete. DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

ANALYTICAL SUMMARY DATA PACKAGE
SDG # CTOF27AGL_001

PROJECT NAME: GREAT LAKES CTO F27A
PROJECT LOCATION: GREAT LAKES, IL
CONTRACT #: N62470-08-D-1001

SUBMITTAL TO:
Tobrena Skeen
Tetra Tech NUS, Inc.
Foster Plaza 7
661 Andersen Drive
Pittsburgh, PA 15220

SUBMITTAL BY:
Empirical Laboratories, LLC (EL)
621 Mainstream Drive, Suite 270
Nashville, TN 37228
Tel (615)345-1115
Fax (615)846-5426

LABORATORY CONTACT PERSON:
Project Manager: Kim Kostzer
Tel (615)345-1115
Fax (615)846-5426
Email: kkostzer@empirlabs.com

Original Report Date: January 12, 2011
Report Revision #: 01
Revision Date: January 13, 2011
Total # of Pages: 811

THIS DOCUMENT MEETS DoD QSM 4.1 STANDARDS

The results relate to only the samples associated with the referenced SDG and the submitted data has been produced in accordance with laboratory procedures. The Laboratory's Technical Lab Director, Mr. Rick Davis, is responsible for the final data produced and reported. His signature is listed at the end of the Case Narrative within the Analytical Data Package. If applicable to this report package, details on report revisions and the information on subcontracted analysis are listed in the package Case Narrative. This report shall not be reproduced, except in full, without the written approval of Empirical Laboratories, LLC.

Sample Delivery Group Case Narrative

Receipt Information
The samples were received within the preservation guidelines for the associated methods. The information associated with sample receipt and the Sample Delivery Group (SDG) are included within section 4 of this package, which also provides information on the link between the client sample ID listed on the COC and laboratory's assigned unique sample ID or WorkOrder #. The sample is tracked through the laboratory for all analysis via the assigned WorkOrder #.

All samples that were received were analyzed and none of the samples were placed on hold without analyses. Samples were subcontracted to Test America for BTU Content by ASTM D240.

A trip blank was not received in the shipment.

Changes to the Revision
Revision 01: The package was revised to replace the batch spike and matrix spike Analysis Data forms to include missing "U" qualifiers for SW8081A, SW8081B and SW8082A.

Analytical Information
All samples were prepped (where applicable) and analyzed within the standard allowed holding times, unless noted within the exceptions listed below. The laboratory analyzed all samples within the program and method guidelines. The following information is provided specific to individual methods:

Chromatographic Flags for Manual Integration:
The following letters are used to denote manual integrations on the laboratory's raw data in association with chromatographic integrations:

A: The peak was manually integrated as it was not integrated in the original chromatogram.
B: The peak was manually integrated due to resolution or coelution issues in the original chromatogram.
C: The peak was manually integrated to correct the baseline from the original chromatogram.
D: The peak was manually integrated to identify the correct peak as the wrong peak was identified in the original chromatogram.
E: The peak was manually integrated to include the entire peak as the original chromatogram only integrated part of the peak.

SW8260B TCLP:
The matrix spike associated to sample 1012185-12 exceeded criteria with a positive bias for Vinyl Chloride.

The continuing calibration verification 0L36401-CCV1 exceeded criteria with a positive

bias for 2-Butanone.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW8270C TCLP:
The batch spike associated to batch 0L29008 exceeded criteria with a positive bias for Pentachlorophenol and with a negative bias for Hexachlorobutadiene and Hexachloroethane. The adjusted LOD for Hexachlorobutadiene and Hexachloroethane remains below the regulatory limit.

The matrix spikes associated to sample 1012185-12 exceeded recovery criteria with a positive bias for 2,4-Dinitrotoluene and Pentachlorophenol, exceeded recovery criteria with a negative bias for Hexachlorobutadiene and Hexachloroethane and exceeded the relative percent difference criteria for Hexachlorobutadiene and Hexachloroethane.

The continuing calibration verification 1A00501-CCV1 exceeded criteria with a positive bias for Nitrobenzene-d5 and Terphenyld-14.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW8270C BNA:
The surrogate Nitrobenzene-d5 exceeded criteria with a positive bias for 0L27012-BS1, -BLK1, 0L22011-BLK1, -BS1, -MSD1 and samples 1012185-23, -24, -03, -07, -01, -11, -15, -16, -10, -14, -13 and -08. The surrogate Terphenyld-14 exceeded criteria with a positive bias in sample 1012185-08.

The batch spike associated to batch 0L22011 exceeded criteria with a positive bias for Bis(2-chloroethyoxy)methane, 2,4-Dimethylphenol, Hexachlorobutadiene, Nitrobenzene and Phenol and with a negative bias for N-nitroso-di-n-propylamine. The batch spike associated to batch 0L27012 exceeded criteria with a positive bias for Butylbenzylphthalate, 4-Chloro-3-methylphenol, Bis(2-chloroethoxy)methane, 2,2'-Oxybis-1-chloropropane, Dib-n-butylphthalate, 2,4-Dimethylphenol, 2,4-Dinitrophenol, Di-n-octylphthalate, Bis(2-ethylhexyl)phthalate, 4-Nitroaniline, 2-Nitroaniline, Nitrobenzene, 2-Nitrophenol, N-nitroso-di-n-propylamine and Pentachlorophenol.

The matrix spikes associated to sample 1012185-14 exceeded criteria with a positive bias for Di-n-ocytlphthalate, Hexachlorobutadiene, Bis(2-chloroethoxy)methane and Nitrobenzene and with a negative bias for N-nitrosodiphenylamine. The matrix spikes associated to sample 1012185-23 exceeded criteria with a positive bias for Butylbenzylphthalate, Di-n-octylphthalate, Bis(2-ethylhexyl)phthalate, Di-n-butylphthalate, and 2-Nitroaniline and with a negative bias for Hexachlorocyclopentadiene, 2,3,4,6-Tetrachlorophenol and 3,3'-Dichlorobenzidine and exceeded the relative percent difference criteria for Hexachlorocyclopentadiene.

The internal standards Chrysene-d12 and Perylene-d12 exceeded criteria with a negative bias in sample 1012185-08. Compounds associated to these iinternal standards are qualified.

The continuing calibration verifications exceeded criteria in 1A00601-CCV1 with a positive bias for Butylbenzylphthalate, 2,2'-Oxybis-1-chloropropane, 2,4-Dinitrophenol, Di-n-octylphthalate, Bis(2-ethylhexyl)phthalate, 4-Nitroaniline 2-Nitroaniline, Nitrobenzene, 4-Nitrophenol, N-noitroso-di-n-propylamine and Nitrobenzene-d5, in 1A00701-CCV1 with a negative bias for 3,3'-Dichlorobenzidine and Carbazole and with a positive bias for Hexachlorobutadiene, Hexachlorocyclopentadiene, Isophorone, 2-Nitroaniline, Nitrobenzene, N-nitroso-di-n-propylamine and Nitrobenzene-d5 and in 1A01104-CCV1 with a negative bias for 3,3'-Dichlorobenzidine and Carbazole and with a positive bias for Caprolactam, Di-n-octylphthalate, Hexachlorobutadiene, Isophorone, 2-Nitroaniline, Nitrobenzene, N-nitroso-di-n-propylamine, Nitrobenzene-d5 and Terphenyl-d14.

The method blank 0L27012-BLK1 has a positive result for Diethylphthalate.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW8270C PAH:
The batch spike associated to batch 0L22011-BS2 exceeded criteria with a positive bias for Benzo(k)fluoranthene.

The matrix spikes associated to sample 1012185-23 exceeded recovery criteria with a positive bias for Benzo(b)fluoranthene and exceeded relative percent difference criteria for 2-Methylnaphthalene.

The internal standard Perylene-d12 exceeded criteria in sample 1012185-08. Compounds associated to Perleyene-d12 in sample 1012185-08 are qualified.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW8082A:
Samples 1012185-12, -18, -20, -22 and -24 are qualified with a Z-01 to indicate that the DL, LOD and/or LOQ have been elevated due to interference.

The surrogate Tetrachloro-m-xylene exceeded criteria with a negative bias on both columns in sample 1012185-12 and on column 2 in sample 1012185-22RE1. The surrogate Decachlorobiphenyl exceeded criteria with a negative bias on column 2 in samples 1012185-20RE1 and 0L2109-MSD2 and on column 1 in sample 1012185-22. The surrogates Tetrachloro-m-xylene and Decachlorobiphenyl exceeded criteria with a negative bias on both columns in samples 1012185-18, -18RE1 and 0L2109-MS2 and exceeded criteria with a negative bias on column 2 iin samples 1012185-20, -24 and -24RE1.

The continuing calibration verifications exceeded criteria in 0L36408-CCV6 with a positive bias on column 2 for Aroclor-1016 and 1260, in 1A00604-CCV3 and 1A00705-CCV3 with a positive bias on column 2 for Aroclor-1260, in 1A00604-CCV7 on column 2 for Aroclor-1016 and 1260, in 1A00604-CCV8 and 1A02007-CCV2 with a positive bias on column 2 for Aroclor-1254, in 1A00705-CCV6 with a positive bias on column 2 for Aroclor-1016 and on both columns for Aroclor-1260, in 1A00705-CCV7 and 1A01007-CCV3 with a negative bias on column 2 for Decachlorobiphenyl and in 1A01007-CCV1 with a negative bias on column 1 for Decachlorobiphenyl.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW8081A TCLP:
The continuing calibration verifications exceeded criteria in 1A00502-CCV2 with a positive bias for Chlordane on column 2, in 1A00502-CCV4 with a positive bias on column 1 for Heptachlor and with a negative bias on column 2 for Methoxychlor and Decachlorobiphenyl and in 1A00502-CCV6 with a negative bias on column 2 for Toxaphene.

The surrogate Decachlorobiphenyl exceeded criteria with a negative bias in OL29007-BS1 on column 1.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW8081B:
Some analytes in samples 1012185-04, -06, -07,-08, -0RE1, -09, -09RE, -11, -11RE1, -13, -13RE1, -15, -15RE1, -16, -16RE1, -18, -18RE1, -19, -19RE1, -19RE2, -20, -22, -23 and -24 are qualified with a Z-01 to indicate that due to interference, the result for this analyte may be biased high.

The continuing calibration verifications exceeded criteria in 0L36408-CCV4 with a positive bias for Delta-BHC on column 1, in 1A00502-CCV4 on column 1 with a positive bias for Delta-BHC and Heptachlor and on column 2 with a negative bias for Methoxychlor and Decachlorobiphenyl, in 1A00502-CCV6 and 1A00705-CCV8 with a negative bias for Toxaphene on column 2, in 1A00604-CCV5 with a positive bias for Beta-BHC on column 2 and in 1A00705-CCV7 with a positive bias for 4,4'-DDD on column 1, with a negative bias on both columns for 4,4'-DDT and with a negative bias on column 2 for Methoxychlor and Decachlorobiphenyl.

The surrogate Tetrachloro-m-xylene and Decachlorobiphenyl exceeded criteria with a negative bias on one or both columns in samples 1012185-02, -08, -08RE1, -09, -11, -10, -18, 16RE1, -20 and -24. The surrogate Tetrachloro-m-xylene exceeded criteria with a negative bias on one or both columns in samples 1012185-03, -06, -07, -23, -04, -19, -18RE1, -17RE1, -09RE1, -11RE1 and -19RE2. The surrogate Decachlorobiphenyl exceeded criteria with a negative bias on one or both columns in samples

1012185-19RE1, -22 and 0L21019-MS1.

The matrix spike associated to sample 1012185-14 exceeded criteria with a negative bias on column 2 for 4,4'-DDE.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW8151A TCLP:
The surrogate 2,4-Dichlorophenylacetic Acid exceeded criteria with a negative bias on both columns in sample 1012185-12 and on column 2 with a negative bias for 1012185-12MS and -12MSD.

The matrix spike duplicate associated to sample 1012185-12 exceeded criteria with a negative bias on both columns for 2,4,5-TP(Silvex) and exceeded the relative percent difference criteria for 2,4,5-TP(Silvex) on column 1.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW6010B/SW7471A/SW7470A:
The following samples are qualified with an M, for the compound indicated, to indicate that the LOD and/or DL were raised due to interference: 1012185-01, -03, -06, -13 and -15 (Thallium), 1012185-10 (Silver) and 1012185-11 and -18 (Beryllium).

The digestion blank 1A04001-BLK has positive results for Chromium and Zinc. The continuing calibration blanks 1A00702-CCB3 and –CCB4 have positive results for Iron. The digestion blank 1A04002-BLK1 has positive results for Chromium, Iron, Thallium and Zinc. The continuing calibration blank 1A00702-CCB5 has a positive result for Lead.

The matrix spikes associated to sample 1012185-14 exceeded criteria with a negative bias for Antimony and Chromium, with a positive bias for Cadmium, Arsenic, Barium and Sodium and exceeded the relative percent difference for Copper. Copper, Magnesium, Manganese and Potassium also exceeded criteria but the concentrations in the parent sample are greater then 4 times that amount spiked. The post spike associated to sample 1012185-14 exceeded criteria with a positive bias for Antimony, Arsenic, Cadmium, Magnesium, Manganese and Selenium and with a negative bias for Iron.

The serial dilution associated to sample 1012185-14 exceeded criteria for Iron and Manganese.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

Wet Chemistry:

Sample 1012185-12 was received after the EPA recommended holding time for pH.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

Data Qualifiers
As applicable and where required, the following general qualifiers are associated with the sample results. Additional qualifiers will be specified within the reporting sections of the data package or within the body of the Case Narrative.

Analytical Report Terms and Qualifiers

MDL: The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The MDL is determined from analysis of a sample containing the analyte in a given matrix. For DoD QSM 4.1 reporting purposes, this definition is also applied to the reported Detection Limit (DL).

LOD: The Limit of Detection is an estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte- and matrix-specific and may be laboratory-dependent. This definition is further clarified in the DoD QSM 4.1 revisions as the smallest amount or concentration of a substance that must be present in a sample in order to be detected at a high level of confidence (99%). At the LOD, the false negative rate (Type II error) is 1%.

LOQ: The Limit of Quantitation is the minimum level, concentration, or quantity of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. This term is further clarified within the DoD QSM 4.1 as the lowest concentration that produces a quantitative result within specified limits of precision and bias.

*****: An exceeding quality control criteria is associated with the reported result.

B: The presence of a "B" to the right of an analytical value indicates that this compound was also detected in the method blank and the data should be interpreted with caution. One should consider the possibility that the correct sample result might be less than the reported result and, perhaps, zero.

D: When a sample (or sample extract) is rerun diluted because one of the compound concentrations exceeded the highest concentration range for the standard curve, all of the values obtained in the dilution run will be flagged with a "D".

E: The concentration for any compound found which exceeds the highest concentration level on the standard curve for that compound will be flagged with an "E". Usually the sample will be rerun at a dilution to quantitate the flagged compound.

H1: The result was analyzed outside of the EPA recommended holding time.

H2: The result was extracted outside of the EPA recommended holding time.

H3: The sample for this analyte was received outside of the EPA recommended holding time.

J: The presence of a "J" to the right of an analytical result indicates that the reported result is estimated. The mass spectral data pass the identification criteria showing that the compound is present, but the calculated result is less than the EQL. One should feel confident that the result is greater than zero and less than the EQL.

M: Indicates that the sample matrix interfered with the quantitation of the analyte. In dual column analysis the result is reported from the column with the lower concentration. In inorganics, it indicates that the parameters MDL/RL has been raised.

N: The MS/MSD accuracy and/or precision are outside criteria. The predigested spike recovery is not within control limits for the associated parameter.

P: The associated numerical value is an estimated quantity. There is greater than a 40% difference between the two GC columns for the detected concentrations. The higher of the two values is reported unless matrix interference is obvious or for HPLC analysis where the primary column is reported.

Q: The RPD and/or percent recovery exceeded limits in the associated Blank Spike and/or Blank Spike Duplicate.

S: The associated internal standard failed criteria.

U: The presence of a "U" indicates that the analyte was analyzed for but was not detected or the concentration of the analyte quantitated below the DL.

X: The parameter shows a potential positive bias on a reported concentration due to an ICV or CCV exceeding the upper control limit on the high side.

Y: The parameter shows a potential negative bias on a reported concentration due to an ICV or CCV exceeding the lower control limit on the low side.

Z: The parameter shows lack of confirmation/detection, which may be due to a negative bias in the ICV or CCV which exceeds the lower control limit.

LIMS Definitions / Naming Conventions:

The following are general naming conventions that are used throughout the laboratory; however, on a method by method basis, there are additional QAQC items that are named in a consistent format.

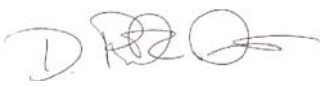
BLK: LIMS assigns a unique identifier to the Method Blank by naming it as the letters BLK appended to the Batch ID. A Method Blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The Method Blank is used to assess for possible contamination during preparation and/or analysis steps. Method Blanks within a Batch or Analytical sequence will be appended with a numerical value beginning with 1 that will increase incrementally.

BS: LIMS assigns a unique identifier to the Blank Spike by naming it as the letters BS appended to the Batch ID. The Blank Spike or Lab Control Sample is a controlled analyte-free matrix, which is spiked with known and verified concentrations of target analytes. Spiking concentrations can be referenced in the method SOP. The BS is used to evaluate the viability of analytes taken through the entire prep (when applicable) and analytical process. Blank Spikes within a Batch or Analytical sequence will be appended with a numerical value beginning with 1 that will increase incrementally. A duplicate Blank Spike will be designated as a BSD.

MS: The LIMS assigns each Client sample with a unique identifier. The Matrix Spike is designated with a MS at the end of the sample's unique identifier. The Matrix Spike sample is used to assess the effect of the sample matrix on the precision and accuracy of the results generated using the selected method. A duplicate Matrix Spike will be designated as a MSD.

IDs: The LIMS assigns each Client sample with a unique identifier. The letter "RE" may potentially be appended to the end of the LIMS Sample ID. And "**RE"** implies that the sample was either re-prepped, re-analyzed straight, or re-analyzed at a dilution. Subsequent re-analysis for the sample will be appended with a numerical value beginning with 1 that will increase incrementally. Eg: RE1, RE2, RE3, etc.

Statement of Data Authenticity:
I certify that, based upon my inquiry of those individuals immediately responsible for obtaining the information and to the best of my knowledge, the data package is in compliance with the terms and conditions of the contract, both technically and for completeness, with the exception of the conditions detailed in this Case Narrative, as verified by my signature below. During absences, Ms. Marcia K. McGinnity is authorized to sign this Statement of Data Authenticity.



Mr. Rick D. Davis
Laboratory Technical Director / VP Operations

ANALYSIS DATA SHEET

NTC12-SOIL-IDW

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-12 File ID: 1218512T.D

Sampled: 12/20/10 18:00 Prepared: 12/29/10 00:00 Analyzed: 12/29/10 15:05

Solids: Preparation: 5030B Dilution: 1

Batch: 0L29013 Sequence: 0L36401 Calibration: 0349001 Instrument: MS-VOA3

CAS NO.	COMPOUND	CONC. (mg/L)	TCLP Reg Limit	LOD	LOQ	Q
71-43-2	Benzene		0.5	0.00500	0.0100	U
78-93-3	2-Butanone		200	0.0500	0.100	X, U
56-23-5	Carbon tetrachloride		0.5	0.00500	0.0100	U
108-90-7	Chlorobenzene		100	0.00500	0.0100	U
67-66-3	Chloroform		6	0.00500	0.0100	U
106-46-7	1,4-Dichlorobenzene		7.5	0.00500	0.0100	U
107-06-2	1,2-Dichloroethane		0.5	0.00500	0.0100	U
75-35-4	1,1-Dichloroethene		0.7	0.00500	0.0100	U
127-18-4	Tetrachloroethene		0.7	0.00500	0.0100	U
79-01-6	Trichloroethene		0.5	0.00500	0.0100	U
75-01-4	Vinyl chloride		0.2	0.00500	0.0100	N, U

SYSTEM MONITORING COMPOUND	ADDED (mg/L)	CONC (mg/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	0.03000	0.02814	93.8	75 - 120	
Dibromofluoromethane	0.03000	0.02999	100	85 - 115	
1,2-Dichloroethane-d4	0.03000	0.02943	98.1	70 - 120	
Toluene-d8	0.03000	0.03048	102	85 - 120	

ANALYSIS DATA SHEET

NTC12-SOIL-IDW

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-12 File ID: 1218512T.D

Sampled: 12/20/10 18:00 Prepared: 12/29/10 16:16 Analyzed: 01/04/11 18:46

Solids: Preparation: EXT_3510 Dilution: 1

Batch: 0L29008 Sequence: 1A00501 Calibration: 0362004 Instrument: MS-BNA1

CAS NO.	COMPOUND	CONC. (mg/L)	TCLP Reg Limit	LOD	LOQ	Q
121-14-2	2,4-Dinitrotoluene		0.13	0.0250	0.0500	N, U
118-74-1	Hexachlorobenzene		0.13	0.0250	0.0500	U
87-68-3	Hexachlorobutadiene		0.5	0.0250	0.0500	Q, N, U
67-72-1	Hexachloroethane		3	0.0250	0.0500	Q, N, U
95-48-7	2-Methylphenol		200	0.0250	0.0500	U
108-39-4	3-Methylphenol		200	0.0250	0.0500	U
106-44-5	4-Methylphenol		200	0.0250	0.0500	U
98-95-3	Nitrobenzene		2	0.0250	0.0500	U
87-86-5	Pentachlorophenol		100	0.100	0.200	Q, N, U
110-86-1	Pyridine		5	0.0250	0.0500	U
88-06-2	2,4,6-Trichlorophenol		2	0.0250	0.0500	U
95-95-4	2,4,5-Trichlorophenol		400	0.0250	0.0500	U

SYSTEM MONITORING COMPOUND	ADDED (mg/L)	CONC (mg/L)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	0.5000	0.3034	60.7	50 - 110	
2-Fluorophenol	1.000	0.6232	62.3	20 - 110	
Nitrobenzene-d5	0.5000	0.4118	82.4	40 - 110	X
Phenol-d6	1.000	0.5309	53.1	10 - 110	
Terphenyl-d14	0.5000	0.5419	108	50 - 135	X
2,4,6-Tribromophenol	1.000	0.7401	74.0	40 - 125	

ANALYSIS DATA SHEET

NTC12-SOIL-IDW

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-12 File ID: 1218512D.D

Sampled: 12/20/10 18:00 Prepared: 12/28/10 09:56 Analyzed: 01/06/11 00:49

Solids: 88.72 Preparation: EXT_3546 Dilution: 5

Batch: 0L27012 Sequence: 1A00601 Calibration: 0362004 Instrument: MS-BNA1

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
59-50-7	4-Chloro-3-methylphenol		469	941	1860	Q, U
95-57-8	2-Chlorophenol		469	941	1860	U
87-65-0	2,6-Dichlorophenol		469	941	1860	U
120-83-2	2,4-Dichlorophenol		469	941	1860	U
105-67-9	2,4-Dimethylphenol		1880	3760	7330	Q, U
534-52-1	4,6-Dinitro-2-methylphenol		4690	9410	18600	U
51-28-5	2,4-Dinitrophenol		4690	9410	18600	Q, X, U
95-48-7	2-Methylphenol		469	941	1860	U
108-39-4	3-Methylphenol		469	941	1860	U
106-44-5	4-Methylphenol		469	941	1860	U
88-75-5	2-Nitrophenol		469	941	1860	Q, U
87-86-5	Pentachlorophenol		1880	3760	7330	Q, U
108-95-2	Phenol		469	941	1860	U
58-90-2	2,3,4,6-Tetrachlorophenol		469	941	1860	U
88-06-2	2,4,6-Trichlorophenol		469	941	1860	U
95-95-4	2,4,5-Trichlorophenol		469	941	1860	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorophenol	7514	5087	67.7	35 - 105	
Phenol-d6	7514	6008	80.0	40 - 100	
2,4,6-Tribromophenol	7514	5575	74.2	35 - 125	

ANALYSIS DATA SHEET

NTC12-SOIL-IDW

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-12 File ID: 018F1801.D

Sampled: 12/20/10 18:00 Prepared: 12/22/10 14:30 Analyzed: 01/04/11 16:34

Solids: 88.72 Preparation: EXT_3546 Dilution: 1

Batch: 0L21019 Sequence: 1A00604 Calibration: 1005002 Instrument: GL-ECD3

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
12674-11-2	Aroclor-1016		36.0	36.0	36.0	UZ-01
11104-28-2	Aroclor-1221		36.0	36.0	36.0	UZ-01
11141-16-5	Aroclor-1232		36.0	36.0	36.0	UZ-01
53469-21-9	Aroclor-1242		36.0	36.0	36.0	UZ-01
12672-29-6	Aroclor-1248		54.5	54.5	54.5	UZ-01
11097-69-1	Aroclor-1254	394	4.58	9.09	18.5	
11096-82-5	Aroclor-1260	585	4.58	9.09	18.5	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.18	10.36	57.0	70 - 125	*
Tetrachloro-m-xylene [2C]	18.18	10.14	55.8	70 - 125	*
Decachlorobiphenyl	18.18	11.39	62.6	60 - 125	
Decachlorobiphenyl [2C]	18.18	13.42	73.8	60 - 125	

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SOIL-IDW

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-12 File ID: 008F0801.D

Sampled: 12/20/10 18:00 Prepared: 12/29/10 16:14 Analyzed: 01/03/11 14:43

Solids: Preparation: EXT_3510 Dilution: 1

Batch: 0L29007 Sequence: 1A00502 Calibration: 0362003 Instrument: GL-ECD3

CAS NO.	COMPOUND	CONC. (mg/L)	TCLP Reg Limit	LOD	LOQ	Q
72-20-8	Endrin		0.02	0.000100	0.000200	U
58-89-9	gamma-BHC (Lindane)		0.4	0.000100	0.000200	U
76-44-8	Heptachlor		0.008	0.000100	0.000200	U
1024-57-3	Heptachlor epoxide		0.008	0.000100	0.000200	U
72-43-5	Methoxychlor		10	0.000100	0.000200	U
57-74-9	Chlordane (tech)		0.03	0.000250	0.000500	U
8001-35-2	Toxaphene		0.5	0.00670	0.0100	U

SYSTEM MONITORING COMPOUND	ADDED (mg/L)	CONC (mg/L)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	0.005000	0.003696	73.9	25 - 140	
Tetrachloro-m-xylene [2C]	0.005000	0.003715	74.3	25 - 140	
Decachlorobiphenyl	0.005000	0.002660	53.2	40 - 135	
Decachlorobiphenyl [2C]	0.005000	0.002784	55.7	40 - 135	Y

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SOIL-IDW

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix: Soil
Laboratory ID: 1012185-12
File ID: 005R0501.D
Sampled: 12/20/10 18:00
Prepared: 12/29/10 10:35
Analyzed: 12/30/10 17:23
Solids:
Preparation: EXT_8151
Dilution: 1
Batch: 0L29009
Sequence: 1A00307
Calibration: 0333002
Instrument: GL-ECD4

CAS NO.	COMPOUND	CONC. (mg/L)	TCLP Reg Limit	LOD	LOQ	Q
93-72-1	2,4,5-TP (Silvex)		1	0.000500	0.00100	UN
94-75-7	2,4-D		10	0.00500	0.0100	U

SYSTEM MONITORING COMPOUND	ADDED (mg/L)	CONC (mg/L)	% REC	QC LIMITS	Q
2,4-Dichlorophenylacetic acid	0.01000	0.0004546	4.55	20 - 140	*
2,4-Dichlorophenylacetic acid [2C]	0.01000	0.001532	15.3	20 - 140	*

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SOIL-IDW

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 18:00
% Solids: 0.00

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-12
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/L)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury TCLP		0.000800	0.00200	0.00200	1	U	SW1311_7470A	0L29004	12/29/10 14:16
7440-38-2	Arsenic TCLP		0.0300	0.0600	0.100	1	U	SW1311_6010C	1A03005	01/05/11 12:21
7440-39-3	Barium TCLP	0.726	0.0500	0.100	0.400	1		SW1311_6010C	1A03005	01/05/11 12:21
7440-43-9	Cadmium TCLP	0.0167	0.0100	0.0200	0.0500	1	J	SW1311_6010C	1A03005	01/05/11 12:21
7440-47-3	Chromium TCLP		0.0200	0.0400	0.100	1	U	SW1311_6010C	1A03005	01/05/11 12:21
7439-92-1	Lead TCLP	0.119	0.0150	0.0300	0.0300	1		SW1311_6010C	1A03005	01/05/11 12:21
7782-49-2	Selenium TCLP	0.0490	0.0300	0.0500	0.100	1	J	SW1311_6010C	1A03005	01/05/11 12:21
7440-22-4	Silver TCLP		0.0100	0.0200	0.100	1	U	SW1311_6010C	1A03005	01/05/11 12:21

ANALYSIS DATA SHEET

NTC12-SOIL-IDW

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 18:00
% Solids: 0.00

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-12
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (pH Units)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
12408-02-5	pH	7.58	0.100	0.100	0.100	1	H3	SW9045C	0L29027	12/29/10 15:10
CAS NO.	**Analyte**	**Conc. (N/A dry)**	**DL**	**LOD**	**LOQ**	**D.F.**	**Q**	**Method**	**Batch**	**Analyzed**
NA	Free Liquid	Absent				1		SW9095B	1A05018	01/05/11 19:29
CAS NO.	**Analyte**	**Conc. (mg/Kg dry)**	**DL**	**LOD**	**LOQ**	**D.F.**	**Q**	**Method**	**Batch**	**Analyzed**
57-12-5	Cyanide		0.141	0.282	0.845	1	U	SW9012A	0L28013	12/29/10 16:01
CAS NO.	**Analyte**	**Conc. (mg/Kg)**	**DL**	**LOD**	**LOQ**	**D.F.**	**Q**	**Method**	**Batch**	**Analyzed**
C-015	Reactive Sulfide		50.0	150	300	1	U	WChap.7.3.4.2MODIFIE	1A03008	01/03/11 15:52
CAS NO.	**Analyte**	**Conc. (°F)**	**DL**	**LOD**	**LOQ**	**D.F.**	**Q**	**Method**	**Batch**	**Analyzed**
NA	Ignitability	> 158				1		SW1010A	1A05008	01/05/11 14:22

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

CASE NARRATIVE

Client:	Empirical Laboratories, LLC (4017)	**Date Sampled:**	12/20/2010
Project:	Empirical Laboratories, LLC 1012185 / Great Lakes CTO F27A	**Date Received:**	12/29/2010
Lab:	NTL3554	**Case Narrative:**	1/04/2011

SAMPLE RECEIPT: Sample was received intact, on ice, with chain of custody documentation. 1 cooler was received and the sample temperature was measured at 2.6°C upon receipt at the laboratory.

HOLDING TIMES: The sample was analyzed within holding time.

PROBLEMS ENCOUNTERED: No problems were encountered.

QA/QC CRITERIA: **BTU Content by ASTM D240:**
One sample was analyzed for BTU Content by ASTM D240.

The blank analysis was below the method detection limit.

Blank spike (LCS) analysis was within target range.

Duplicate analysis was performed on sample NTL3554-01 (NTC12-SOIL-IDW). Results were within general acceptance guidelines.

Please let me know if there are any questions regarding this data package, or if I may be of assistance by calling 1-800-765-0980, ext. 1237 or by email at kristy.ricke@testamericainc.com.

Kristy Ricke
Data Package Coordinator
TestAmerica, Inc – Nashville

2960 Foster Creighton Road Nashville, TN 37204 800-765-0980 615-726-3404

The case narrative is an integral part of the report. This report shall not be reproduced, except in full, without written permission from TestAmerica.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

January 04, 2011 10:25:58AM

Client: Empirical Laboratories, LLC (4017)
621 Mainstream Drive, Suite 270
Nashville, TN 37228
Attn: Kim Kostzer

Work Order: NTL3554
Project Name: Empirical Laboratories, LLC
Project Nbr: 1012185 / Great Lakes CTO F27A
P/O Nbr: 10-1463
Date Received: 12/29/10

SAMPLE IDENTIFICATION	LAB NUMBER	COLLECTION DATE AND TIME
NTC12-SOIL-IDW	NTL3554-01	12/20/10 18:00

An executed copy of the chain of custody, the project quality control data, and the sample receipt form are also included as an addendum to this report. If you have any questions relating to this analytical report, please contact your Laboratory Project Manager at 1-800-765-0980. Any opinions, if expressed, are outside the scope of the Laboratory's accreditation.

This material is intended only for the use of the individual(s) or entity to whom it is addressed, and may contain information that is privileged and confidential. If you are not the intended recipient, or the employee or agent responsible for delivering this material to the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this material is strictly prohibited. If you have received this material in error, please notify us immediately at 615-726-0177.

Tennessee Certification Number: 02008

The Chain(s) of Custody, 2 pages, are included and are an integral part of this report.

These results relate only to the items tested. This report shall not be reproduced except in full and with permission of the laboratory.

All solids results are reported in wet weight unless specifically stated.
Estimated uncertainty is available upon request.
This report has been electronically signed.
Report Approved By:

Roxanne L. Connor

Roxanne Connor

Program Manager - Conventional Accou

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	Empirical Laboratories, LLC (4017)	Work Order:	NTL3554
	621 Mainstream Drive, Suite 270	Project Name:	Empirical Laboratories, LLC
	Nashville, TN 37228	Project Number:	1012185 / Great Lakes CTO F27A
Attn	Kim Kostzer	Received:	12/29/10 14:00

ANALYTICAL REPORT

Analyte	Result	Flag	Units	MDL	MRL	Dilution Factor	Analysis Date/Time	Method	Batch
Sample ID: NTL3554-01 (NTC12-SOIL-IDW - Soil) Sampled: 12/20/10 18:00									
General Chemistry Parameters									
BTU Content	ND		BTU/Lb	200	200	1	01/03/11 11:52	ASTM D240	11A0091

C-2 PHASE 2

Fax Cover Sheet

MAILING ADDRESS:
Naval Station Great Lakes
Environmental Dept. Bldg. 1A
~~201 Decatur Ave.~~ 605 Clark Ave.
Great Lakes, IL 60088-2801
BLdG. 221

LOCATION:
Naval Station Great Lakes
Environmental Dept., Bldg.221
605 Clark Ave.
Great Lakes, IL 60088-5600

TO: BOB DAVIS
Fax: 1412-921-4040
Phone:
Date:

FROM: MARK HOYER
Fax: (846) 688-6910
Phone: (846) 688-6934 x
Pages:
(Including this cover sheet)

RE: IDW

Message:

MANIFESTS

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: IL7170024877
2. Page 1 of
3. Emergency Response Phone: (847) 698-4820
4. Manifest Tracking Number: 000516744[illegible]

5. Generator's Name and Mailing Address: [illegible] Great Lakes
201 Decatur Avenue Great Lakes, Illinois 60086
Generator's Phone: 847-698-6[illegible]

Generator's Site Address (if different than mailing address): Building 221

6. Transporter 1 Company Name: Hazchem Environmental Corporation — U.S. EPA ID Number: ILD981785239

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: Tradebe
4343 Kennedy Avenue, East Chicago, Indiana 46312
Facility's Phone: (800) 383-7212
U.S. EPA ID Number: IND000648943

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. Non Hazardous Material, Not Regulated by DOT (Dental Solids)	002	DF	256	P	None
	2. Non Hazardous Material, Not Regulated by DOT (Decon Water)	006	DM	1856	P	None
	3. Non Hazardous Material, Not Regulated by DOT (Petroleum Soil)	011	DM	5759	P	None
	4. Non Hazardous Material, Not Regulated by DOT (Brick Dust)	006	DM	1803	P	None

14. Special Handling Instructions and Additional Information
18001369 #303, #316 2 x55
348394 #337, #336, #335, #303, #333, #334 6 x55
338678 #304, #317, #318, #345, #339, #344, #339, #343, #340, #341, #342 11x55
~~[illegible]~~ #290, #291, #292, #293, #294, #295
18001371 6 x55
#13228

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: [illegible] Lucas — Signature: [signature] — Month 3 Day 11 Year 13

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: [illegible] — Signature: [signature] — Month 3 Day 11 Year 13
Transporter 2 Printed/Typed Name — Signature — Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name — Signature — Month Day Year

GENERATOR / INT'L / TRANSPORTER / DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

GENERATOR'S INITIAL COPY

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number IL7170021577	2. Page 1 of	3. Emergency Response Phone (847) 688-6910	4. Manifest Tracking Number

GENERATOR

5. Generator's Name and Mailing Address: Naval Station Great Lakes, 201 Decatur Avenue, Great Lakes, Illinois 60088
Generator's Site Address (if different than mailing address): Building 1517
Generator's Phone: 847-688-6931

6. Transporter 1 Company Name: HazChem Environmental Corporation — U.S. EPA ID Number: ILD984785230

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address: Tradebe, 4343 Kennedy Avenue, East Chicago, Indiana 46312 — U.S. EPA ID Number: IND000646913
Facility's Phone: (800) 388-7242

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. Non Hazardous Material, Not Regulated by DOT (Oil Filter)	302	DM	4400	P	None
	2. Non Hazardous Material, Not Regulated by DOT (Dental Solids)	002	DM	440	P	None
	3. Non Hazardous Material, Not Regulated by DOT (Petroleum Solids)	002	DM	3101	P	None
	4.					

14. Special Handling Instructions and Additional Information
338678 #311, #312
18001368 #307, #308, #309
338678 #316, #378, #379, #360, #381, #382, #310

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name — Signature — Month 3 Day 11 Year 13

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name — Signature — Month 3 Day 11 Year 13
Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
18b. Alternate Facility (or Generator) — Manifest Reference Number: — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

GENERATOR'S INITIAL COPY

C-3 PHASE 3

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	IL7170024577	2	847-688-4820	012202542 JJK

5. Generator's Name and Mailing Address
Naval Station Great Lakes
201 Decatur Street
Great Lakes, IL 60088
Generator's Phone: 847-688-4820

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: Advanced Waste Services, Inc. — U.S. EPA ID Number: WI0000815381

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
ChemWorks, INc.
3801k West McKinley Ave
Milwaukee, WI 53208
Facility's Phone: 414/475-3100
U.S. EPA ID Number: WI8120200000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. UN3077, Environmentally Hazardous Substance, Solid, n.o.s., 9, III (Universal Waste - Lamps)	002	CW	0621	P	None
X	2. UN3077, Environmentally Hazardous Substance, Solid, n.o.s., 9, III (Universal Waste - Lamps)	003	CF	0180	P	None
X	3. UN3077, Environmentally Hazardous Substance, Solid, n.o.s., 9, III (Universal Waste - Lamps)	001	DM	0070	P	None
	4. Non Regulated Solids (Oily Waste, IDW Solids)	015	DM	5806	P	None

14. Special Handling Instructions and Additional Information #13464
1) ERG # 171
2) ERG # 171
3) ERG # 171 COD required within 35 Days

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Norman Lucas — Signature: [signature] — Month 11 Day 21 Year 13

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Chris Currier — Signature: [signature] — Month 11 Day 21 Year 13
Transporter 2 Printed/Typed Name — Signature — Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: R. Grotes — Signature: [signature] — Month 11 Day 21 Year 13

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR

2014-Jun-24 02:33 PM NAVFACMW EV 8476886910 1/2
Received: Jun 24 2014 03:40pm

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator ID Number	22. Page	23. Manifest Tracking Number
	IL7170024577	2	~~012202538 JJK~~ 017707542 JJK

24. Generator's Name
Naval Station Great Lakes
Great Lakes, IL 60088

25. Transporter _____ Company Name — U.S. EPA ID Number

26. Transporter _____ Company Name — U.S. EPA ID Number

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		
	5. Non Regulated Solids (Non PCB Ballasts)	001	DM	0053	P	None		
X	6. Non Regulated Liquids (Oily Waste). IDW Liquids	012	DM	5497	P	None		

32. Special Handling Instructions and Additional Information

GENERATOR

TRANSPORTER

33. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

34. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 6700-22A (Rev. 3-05) Previous editions are obsolete. DESIGNATED FACILITY TO GENERATOR

Received: Jun 24 2014 03:41pm
2014-Jun-24 02:33 PM NAVFACMW EV 8476868910
2/2

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	IL7 1 7 0 0 2 4 5 7 7	2	847-688-4820	012202542 JJK

5. Generator's Name and Mailing Address
Naval Station Great Lakes
201 Decatur Street
Great Lakes, IL 60088
Generator's Phone: 847-688-4820

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: Advanced Waste Services, Inc. — U.S. EPA ID Number: WI0000819381

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
ChemWorks, INc.
3801k West McKinley Ave
Milwaukee, WI 53208
Facility's Phone: 414/475-3100
U.S. EPA ID Number: WIB120200000

9a. HM	9b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. UN3077, Environmentally Hazardous Substance, Solid, n.o.s., 9, III (Universal Waste - Lamps)	002	CW	0621	P	None
X	2. UN3077, Environmentally Hazardous Substance, Solid, n.o.s., 9, III (Universal Waste - Lamps)	003	CF	0180	P	None
X	3. UN3077, Environmentally Hazardous Substance, Solid, n.o.s., 9, III (Universal Waste - Lamps)	001	DM	0070	P	None
	4. Non Regulated Solids (Oily Waste, IDW Solids)	15 01	DM	5806	P	None

14. Special Handling Instructions and Additional Information #13964
1) ERG # 171
2) ERG # 171
3) ERG # 171 COD [illegible] Within 35 Days

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: NORMAN LUCAS — Signature: [signature] — Month: 11 Day: 21 Year: 13

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit: Date leaving U.S.:
Transporter signature (for exports only):

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: CHRIS [illegible] — Signature: [signature] — Month: 11 Day: 21 Year: 13

Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month — Day — Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: R. Grabes — Signature: [signature] — Month: 11 Day: 21 Year: 13

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete. DESIGNATED FACILITY TO GENERATOR

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator ID Number	22. Page	23. Manifest Tracking Number
	I L 7 1 7 0 0 2 4 5 7 7	2	~~012202538 JJK~~ 012702542 JJK

24. Generator's Name
Naval Station Great Lakes
Great Lakes, IL 60088

25. Transporter ____ Company Name — U.S. EPA ID Number

26. Transporter ____ Company Name — U.S. EPA ID Number

27a. HM	27b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		
	5. Non Regulated Solids (Non PCB Ballasts)	0 0 1	DM	0 0 5 3	P	None		
X	6. Non Regulated Liquids (Oily Waste) IDW Liquids	0 1 2	DM	5 4 9 7	P	None		

GENERATOR

32. Special Handling Instructions and Additional Information

TRANSPORTER

33. Transporter ____ Acknowledgment of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

34. Transporter ____ Acknowledgment of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete. DESIGNATED FACILITY TO GENERATOR

TRIMATRIX LABORATORIES

September 06, 2013

TETRA TECH NUS - Pittsburgh
Attn: Robert Davis
661 Anderson Drive, Foster Plaza 7
Pittsburgh, PA 15220

Project: NS Great Lakes IDW

Dear Robert Davis,

Enclosed is a copy of the laboratory report for the following work order(s) received by TriMatrix Laboratories:

Work Order	Received	Description
1308344	08/17/2013	Drum 8

This report relates only to the sample(s) as received. Test results are in compliance with the requirements of the National Environmental Laboratory Accreditation Program (NELAP) and/or one of the following certification programs:

ACLASS DoD-ELAP/ISO17025 (#ADE-1542); Arkansas DEP (#88-0730/12-056-0); Florida DEP (#E87622-24); Georgia EPD (#E87622-24); Illinois DEP (#200026/003059); Kansas DPH (#E-10302); Kentucky DEP (#0021); Louisiana DEP (#83658); Michigan DPH (#0034); Minnesota DPH (#491715); New York ELAP (#11776/48855); North Carolina DNRE (#659); Texas CEQ (#T104704495-13-3); Virginia DCLS (#460153/1622); Wisconsin DNR (#999472650); USDA Soil Import Permit (#P330-12-00236).

Any qualification or narration of results, including sample acceptance requirements and test exceptions to the above referenced programs, is presented in the Statement of Data Qualifications section of this report. Estimates of analytical uncertainties and certification documents for the test results contained within this report are available upon request.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Gary L. Wood
Project Chemist

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Individual sample results relate only to the sample tested.
5560 Corporate Exchange Court SE ♦ Grand Rapids, MI 49512 ♦ 616.975.4500 ♦ Fax 616.942.7463 ♦ www.trimatrixlabs.com

TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**TETRA TECH NUS - Pittsburgh**	Work Order:	**1308344**
Project:	NS Great Lakes IDW	Description:	Drum 8
Client Sample ID:	**NTC12-IDW-P3-081613**	Sampled:	08/16/13 08:45
Lab Sample ID:	**1308344-01**	Sampled By:	Mr. Stan Conti
Matrix:	Water	Received:	08/17/13 09:10

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Analyte	Analytical Result	RL	Action Limit	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Flashpoint, Closed-Cup	> 200	68		°F	1	USEPA-1020A	08/22/13 12:20	SKA	1308809
***pH**	**7.6**	0.1		pH Units	1	USEPA-9040C	08/22/13 11:49	SKA	1308810
*Cyanide Reactivity	<10	10		mg/kg	1	USEPA-7.3.3.2	08/28/13 13:18	LMA	1309086
Sulfide Reactivity	<10	10		mg/kg	1	USEPA-7.3.4.2	08/23/13 10:00	WAH	1308918

*See Statement of Data Qualifications

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Individual sample results relate only to the sample tested.
5560 Corporate Exchange Court SE ♦ Grand Rapids, MI 49512 ♦ 616.975.4500 ♦ Fax 616.942.7463 ♦ www.trimatrixlabs.com

TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**TETRA TECH NUS - Pittsburgh**	Work Order:	**1308344**
Project:	NS Great Lakes IDW	Description:	Drum 8
Client Sample ID:	**NTC12-IDW-P3-081613**	Sampled:	08/16/13 08:45
Lab Sample ID:	**1308344-01**	Sampled By:	Mr. Stan Conti
Matrix:	Water	Received:	08/17/13 09:10

TCLP Metals by EPA 1311/6000/7000 Series Methods

Analyte	Analytical Result	RL	Action Limit	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
*Arsenic	<0.50	0.50	5	mg/L	1	USEPA-6010C	08/26/13 13:09	CKD	1308883
Barium	<0.35	0.35	100	mg/L	1	USEPA-6010C	08/26/13 13:09	CKD	1308883
Cadmium	<0.050	0.050	1	mg/L	1	USEPA-6010C	08/26/13 13:09	CKD	1308883
Chromium	<0.25	0.25	5	mg/L	1	USEPA-6010C	08/26/13 13:09	CKD	1308883
*Lead	<0.25	0.25	5	mg/L	1	USEPA-6010C	08/26/13 13:09	CKD	1308883
Mercury	<0.00020	0.00020	0.2	mg/L	1	USEPA-7470A	08/29/13 15:40	CKD	1309035
*Selenium	<0.20	0.20	1	mg/L	1	USEPA-6010C	08/26/13 13:09	CKD	1308883
*Silver	<0.050	0.050	5	mg/L	1	USEPA-6010C	08/26/13 13:09	CKD	1308883

*See Statement of Data Qualifications

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**TETRA TECH NUS - Pittsburgh**	Work Order:	**1308344**
Project:	NS Great Lakes IDW	Description:	Drum 8
Client Sample ID:	**NTC12-IDW-P3-081613**	Sampled:	08/16/13 08:45
Lab Sample ID:	**1308344-01**	Sampled By:	Mr. Stan Conti
Matrix:	Water	Received:	08/17/13 09:10
Unit:	mg/L	Prepared:	08/23/13 By: JTS
Dilution Factor:	1	Analyzed:	08/26/13 By: JMF
QC Batch:	1308870	Analytical Batch:	3H28015

TCLP Organochlorine Pesticides by EPA Method 1311/8081B

CAS Number	Analyte	Analytical Result	RL	Action Limit
58-89-9	gamma-BHC (Lindane)	<0.0050	0.0050	0.4
72-20-8	Endrin	<0.0050	0.0050	0.02
76-44-8	Heptachlor	<0.0050	0.0050	0.008
1024-57-3	Heptachlor Epoxide	<0.0050	0.0050	0.008
72-43-5	Methoxychlor	<0.0050	0.0050	10

Surrogates:	***% Recovery***	***Control Limits***
Tetrachloro-m-xylene	*83*	*29-137*
Decachlorobiphenyl	*82*	*30-134*

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**TETRA TECH NUS - Pittsburgh**	Work Order:	**1308344**
Project:	NS Great Lakes IDW	Description:	Drum 8
Client Sample ID:	**NTC12-IDW-P3-081613**	Sampled:	08/16/13 08:45
Lab Sample ID:	**1308344-01**	Sampled By:	Mr. Stan Conti
Matrix:	Water	Received:	08/17/13 09:10
Unit:	mg/L	Prepared:	08/28/13 By: JTS
Dilution Factor:	1	Analyzed:	08/29/13 By: BJH
QC Batch:	1308868	Analytical Batch:	3H30006

TCLP Chlorinated Herbicides by EPA Method 1311/8151A

CAS Number	Analyte	Analytical Result	RL	Action Limit
94-75-7	2,4-D	<0.62	0.62	10
93-72-1	2,4,5-TP (Silvex)	<0.062	0.062	1

Surrogates:	*% Recovery*	*Control Limits*
2,4-Dichlorophenylacetic Acid	*94*	*33-153*

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**TETRA TECH NUS - Pittsburgh**	Work Order:	**1308344**
Project:	NS Great Lakes IDW	Description:	Drum 8
Client Sample ID:	**NTC12-IDW-P3-081613**	Sampled:	08/16/13 08:45
Lab Sample ID:	**1308344-01**	Sampled By:	Mr. Stan Conti
Matrix:	Water	Received:	08/17/13 09:10
Unit:	mg/L	Prepared:	08/26/13 By: BAG
Dilution Factor:	100	Analyzed:	08/27/13 By: BAG
QC Batch:	1309009	Analytical Batch:	3H27048

TCLP Volatile Organics by EPA Method 1311/8260B

CAS Number	Analyte	Analytical Result	RL	Action Limit
71-43-2	Benzene	<0.10	0.10	0.5
56-23-5	Carbon Tetrachloride	<0.10	0.10	0.5
108-90-7	Chlorobenzene	<0.10	0.10	100
67-66-3	Chloroform	<0.10	0.10	6
107-06-2	1,2-Dichloroethane	<0.10	0.10	0.5
75-35-4	1,1-Dichloroethene	<0.10	0.10	0.7
78-93-3	2-Butanone (MEK)	<5.0	5.0	200
127-18-4	Tetrachloroethene	<0.10	0.10	0.7
79-01-6	Trichloroethene	<0.10	0.10	0.5
75-01-4	Vinyl Chloride	<0.10	0.10	0.2

Surrogates:	*% Recovery*	*Control Limits*
Dibromofluoromethane	*98*	*79-124*
1,2-Dichloroethane-d4	*99*	*75-128*
Toluene-d8	*99*	*87-113*
4-Bromofluorobenzene	*97*	*70-121*

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**TETRA TECH NUS - Pittsburgh**	Work Order:	**1308344**
Project:	NS Great Lakes IDW	Description:	Drum 8
Client Sample ID:	**NTC12-IDW-P3-081613**	Sampled:	08/16/13 08:45
Lab Sample ID:	**1308344-01**	Sampled By:	Mr. Stan Conti
Matrix:	Water	Received:	08/17/13 09:10
Unit:	mg/L	Prepared:	08/23/13 By: JTS
Dilution Factor:	1	Analyzed:	08/27/13 By: DWJ
QC Batch:	1308865	Analytical Batch:	3H27086

TCLP Semivolatile Organic Compounds by EPA Method 1311/8270C

CAS Number	Analyte	Analytical Result	RL	Action Limit
106-46-7	1,4-Dichlorobenzene	<0.10	0.10	7.5
121-14-2	2,4-Dinitrotoluene	<0.10	0.10	0.13
118-74-1	Hexachlorobenzene	<0.10	0.10	0.13
87-68-3	Hexachlorobutadiene	<0.10	0.10	0.5
67-72-1	Hexachloroethane	<0.10	0.10	3
98-95-3	Nitrobenzene	<0.10	0.10	2
110-86-1	Pyridine	<1.0	1.0	5
87-86-5	Pentachlorophenol	<0.10	0.10	100
88-06-2	2,4,6-Trichlorophenol	<0.10	0.10	2
95-95-4	2,4,5-Trichlorophenol	<0.10	0.10	400
95-48-7	2-Methylphenol	<0.10	0.10	200
108-39-4	3+4-Methylphenol	<0.10	0.10	200

Surrogates:	***% Recovery***	***Control Limits***
2-Fluorophenol	*76*	*20-121*
Phenol-d6	*60*	*10-105*
Nitrobenzene-d5	*89*	*38-141*
2-Fluorobiphenyl	*92*	*41-132*
2,4,6-Tribromophenol	*63*	*20-142*
o-Terphenyl	*95*	*39-148*

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**TETRA TECH NUS - Pittsburgh**	Work Order:	**1308344**
Project:	NS Great Lakes IDW	Description:	Drum 8
Client Sample ID:	**NTC12-IDW-P3-081613**	Sampled:	08/16/13 08:45
Lab Sample ID:	**1308344-03**	Sampled By:	Mr. Stan Conti
Matrix:	Water	Received:	08/17/13 09:10
Unit:	ug/L	Prepared:	08/28/13 By: JTS
Dilution Factor:	1	Analyzed:	09/04/13 By: MSZ
QC Batch:	1309046	Analytical Batch:	3I05029

Polychlorinated Biphenyls (PCBs) by EPA Method 8082A

CAS Number	Analyte	Analytical Result	RL	Action Limit
12674-11-2	PCB-1016	<0.20	0.20	
11104-28-2	PCB-1221	<0.20	0.20	
11141-16-5	PCB-1232	<0.20	0.20	
53469-21-9	PCB-1242	<0.20	0.20	
12672-29-6	PCB-1248	<0.20	0.20	
11097-69-1	PCB-1254	<0.20	0.20	
11096-82-5	PCB-1260	<0.20	0.20	

Surrogates:	***% Recovery***	***Control Limits***
Decachlorobiphenyl	*99*	*40-135*
Tetrachloro-m-xylene	*86*	*36-114*

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**TETRA TECH NUS - Pittsburgh**	Work Order:	**1308344**
Project:	NS Great Lakes IDW	Description:	Drum 8
Client Sample ID:	**NTC12-IDW-P3-081613**	Sampled:	08/16/13 08:45
Lab Sample ID:	**1308344-03**	Sampled By:	Mr. Stan Conti
Matrix:	Water	Received:	08/17/13 09:10

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Analyte	Analytical Result	RL	Action Limit	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Phenolics, Total	<0.0500	0.0500		mg/L	1	USEPA-9065	08/23/13 08:47	LMA	1308845

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Polychlorinated Biphenyls (PCBs) by EPA Method 8082A

Analyte	Sample Conc.	Spike Qty.	Result	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
QC Batch: 1309046 3510C Liquid-Liquid Extraction/USEPA-8082A								
Method Blank					Analyzed:		09/04/2013	By: MSZ
Unit: ug/L					Analytical Batch:		3I05029	
PCB-1016			<0.20					0.20
PCB-1016			<0.20					0.20
PCB-1221			<0.20					0.20
PCB-1221			<0.20					0.20
PCB-1232			<0.20					0.20
PCB-1232			<0.20					0.20
PCB-1242			<0.20					0.20
PCB-1242			<0.20					0.20
PCB-1248			<0.20					0.20
PCB-1248			<0.20					0.20
PCB-1254			<0.20					0.20
PCB-1254			<0.20					0.20
PCB-1260			<0.20					0.20
PCB-1260			<0.20					0.20
Surrogates:								
Decachlorobiphenyl				*100*	*40-135*			
Decachlorobiphenyl				*90*	*40-135*			
Tetrachloro-m-xylene				*80*	*36-114*			
Tetrachloro-m-xylene				*71*	*36-114*			
Laboratory Control Sample					Analyzed:		09/04/2013	By: MSZ
Unit: ug/L					Analytical Batch:		3I05029	
PCB-1016	0.600		**0.575**	96	25-145	--		0.20
PCB-1016	0.600		**0.537**	90	25-145	--		0.20
PCB-1260	0.600		**0.701**	117	30-145	--		0.20
PCB-1260	0.600		**0.615**	103	30-145	--		0.20
Surrogates:								
Decachlorobiphenyl				*106*	*40-135*			
Decachlorobiphenyl				*96*	*40-135*			
Tetrachloro-m-xylene				*89*	*36-114*			
Tetrachloro-m-xylene				*78*	*36-114*			

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QUALITY CONTROL REPORT

TCLP Organochlorine Pesticides by EPA Method 1311/8081B

Analyte	Sample Conc.	Spike Qty.	Result	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
QC Batch: 1308870 3510C TCLP Liquid-Liquid Ext./USEPA-8081B								
Method Blank					Analyzed:		08/26/2013	By: JMF
Unit: mg/L					Analytical Batch:		3H28015	
gamma-BHC (Lindane)			<0.0050					0.0050
gamma-BHC (Lindane)			<0.0050					0.0050
Endrin			<0.0050					0.0050
Endrin			<0.0050					0.0050
Heptachlor			<0.0050					0.0050
Heptachlor			<0.0050					0.0050
Heptachlor Epoxide			<0.0050					0.0050
Heptachlor Epoxide			<0.0050					0.0050
Methoxychlor			<0.0050					0.0050
Methoxychlor			<0.0050					0.0050
Surrogates:								
Tetrachloro-m-xylene				*87*	*29-137*			
Tetrachloro-m-xylene				*89*	*29-137*			
Decachlorobiphenyl				*87*	*30-134*			
Decachlorobiphenyl				*87*	*30-134*			
Laboratory Control Sample					Analyzed:		08/26/2013	By: JMF
Unit: mg/L					Analytical Batch:		3H28015	
gamma-BHC (Lindane)		0.0400	**0.0384**	96	67-120	–		0.0050
gamma-BHC (Lindane)		0.0400	**0.0378**	95	67-120	–		0.0050
Endrin		0.0400	**0.0397**	99	64-129	–		0.0050
Endrin		0.0400	**0.0392**	98	64-129	–		0.0050
Heptachlor		0.0400	**0.0366**	92	61-116	–		0.0050
Heptachlor		0.0400	**0.0365**	91	61-116	–		0.0050
Heptachlor Epoxide		0.0400	**0.0384**	96	68-117	–		0.0050
Heptachlor Epoxide		0.0400	**0.0385**	96	68-117	–		0.0050
Methoxychlor		0.0400	**0.0388**	97	71-131	–		0.0050
Methoxychlor		0.0400	**0.0379**	95	71-131	–		0.0050
Surrogates:								
Tetrachloro-m-xylene				*85*	*29-137*			
Tetrachloro-m-xylene				*86*	*29-137*			
Decachlorobiphenyl				*86*	*30-134*			
Decachlorobiphenyl				*85*	*30-134*			
Matrix Spike 1308344-01 NTC12-IDW-P3-081613					Analyzed:		08/26/2013	By: JMF
Unit: mg/L					Analytical Batch:		3H28015	
gamma-BHC (Lindane)	<0.0050	0.0400	**0.0376**	94	73-113	–		0.0050

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QUALITY CONTROL REPORT

TCLP Organochlorine Pesticides by EPA Method 1311/8081B (Continued)

Analyte	Sample Conc.	Spike Qty.	Result	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
QC Batch: 1308870 (Continued) 3510C TCLP Liquid-Liquid Ext./USEPA-8081B								
Matrix Spike (Continued) 1308344-01 NTC12-IDW-P3-081613					Analyzed:	08/26/2013	By: JMF	
Unit: mg/L					Analytical Batch:	3H28015		
gamma-BHC (Lindane)	<0.0050	0.0400	**0.0384**	96	73-113	--		0.0050
Endrin	<0.0050	0.0400	**0.0365**	91	73-117	--		0.0050
Endrin	<0.0050	0.0400	**0.0364**	91	73-117	--		0.0050
Heptachlor	<0.0050	0.0400	**0.0362**	90	43-123	--		0.0050
Heptachlor	<0.0050	0.0400	**0.0352**	88	43-123	--		0.0050
Heptachlor Epoxide	<0.0050	0.0400	**0.0366**	91	70-109	--		0.0050
Heptachlor Epoxide	<0.0050	0.0400	**0.0372**	93	70-109	--		0.0050
Methoxychlor	<0.0050	0.0400	**0.0365**	91	67-128	--		0.0050
Methoxychlor	<0.0050	0.0400	**0.0347**	87	67-128	--		0.0050
Surrogates:								
Tetrachloro-m-xylene				*84*	*29-137*			
Tetrachloro-m-xylene				*85*	*29-137*			
Decachlorobiphenyl				*82*	*30-134*			
Decachlorobiphenyl				*82*	*30-134*			
Matrix Spike Duplicate 1308344-01 NTC12-IDW-P3-081613					Analyzed:	08/26/2013	By: JMF	
Unit: mg/L					Analytical Batch:	3H28015		
gamma-BHC (Lindane)	<0.0050	0.0400	**0.0396**	99	73-113	5	30	0.0050
gamma-BHC (Lindane)	<0.0050	0.0400	**0.0398**	100	73-113	4	30	0.0050
Endrin	<0.0050	0.0400	**0.0391**	98	73-117	7	30	0.0050
Endrin	<0.0050	0.0400	**0.0389**	97	73-117	7	30	0.0050
Heptachlor	<0.0050	0.0400	**0.0369**	92	43-123	2	30	0.0050
Heptachlor	<0.0050	0.0400	**0.0367**	92	43-123	4	30	0.0050
Heptachlor Epoxide	<0.0050	0.0400	**0.0386**	97	70-109	5	30	0.0050
Heptachlor Epoxide	<0.0050	0.0400	**0.0384**	96	70-109	3	30	0.0050
Methoxychlor	<0.0050	0.0400	**0.0380**	95	67-128	4	30	0.0050
Methoxychlor	<0.0050	0.0400	**0.0369**	92	67-128	6	30	0.0050
Surrogates:								
Tetrachloro-m-xylene				*86*	*29-137*			
Tetrachloro-m-xylene				*87*	*29-137*			
Decachlorobiphenyl				*87*	*30-134*			
Decachlorobiphenyl				*85*	*30-134*			

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QUALITY CONTROL REPORT

TCLP Chlorinated Herbicides by EPA Method 1311/8151A

Analyte	Sample Conc.	Spike Qty.	Result	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
QC Batch: 1308868 3510C TCLP Liquid-Liquid Ext./USEPA-8151A								
Method Blank					Analyzed:		08/29/2013	By: BJH
Unit: mg/L					Analytical Batch:		3H30006	
2,4-D			<0.62					0.62
2,4-D			<0.62			--		0.62
2,4,5-TP (Silvex)			<0.062			--		0.062
2,4,5-TP (Silvex)			<0.062			--		0.062
Surrogates:								
2,4-Dichlorophenylacetic Acid				*82*	*33-153*			
2,4-Dichlorophenylacetic Acid				*83*	*33-153*			
Laboratory Control Sample					Analyzed:		08/29/2013	By: BJH
Unit: mg/L					Analytical Batch:		3H30006	
2,4-D		5.05	**4.42**	88	66-148	--		0.62
2,4-D		5.05	**4.48**	89	66-148	--		0.62
2,4,5-TP (Silvex)		0.500	**0.408**	82	50-152	--		0.062
2,4,5-TP (Silvex)		0.500	**0.462**	92	50-152	--		0.062
Surrogates:								
2,4-Dichlorophenylacetic Acid				*90*	*33-153*			
2,4-Dichlorophenylacetic Acid				*93*	*33-153*			
Matrix Spike 1308344-01 NTC12-IDW-P3-081613					Analyzed:		08/29/2013	By: BJH
Unit: mg/L					Analytical Batch:		3H30006	
2,4-D	<0.62	5.05	**4.64**	92	29-173	--		0.62
2,4-D	<0.62	5.05	**4.50**	89	29-173	--		0.62
2,4,5-TP (Silvex)	<0.062	0.500	**0.428**	86	25-152	--		0.062
2,4,5-TP (Silvex)	<0.062	0.500	**0.456**	91	25-152	--		0.062
Surrogates:								
2,4-Dichlorophenylacetic Acid				*96*	*33-153*			
2,4-Dichlorophenylacetic Acid				*93*	*33-153*			
Matrix Spike Duplicate 1308344-01 NTC12-IDW-P3-081613					Analyzed:		08/29/2013	By: BJH
Unit: mg/L					Analytical Batch:		3H30006	
2,4-D	<0.62	5.05	**4.52**	89	29-173	3	20	0.62
2,4-D	<0.62	5.05	**4.54**	90	29-173	0.9	20	0.62
2,4,5-TP (Silvex)	<0.062	0.500	**0.428**	86	25-152	0	20	0.062
2,4,5-TP (Silvex)	<0.062	0.500	**0.478**	96	25-152	5	20	0.062
Surrogates:								
2,4-Dichlorophenylacetic Acid				*93*	*33-153*			

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QUALITY CONTROL REPORT

TCLP Chlorinated Herbicides by EPA Method 1311/8151A (Continued)

Analyte	Sample Conc.	Spike Qty.	Result	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
QC Batch: 1308868 (Continued) 3510C TCLP Liquid-Liquid Ext./USEPA-8151A								
Matrix Spike Duplicate (Continued) 1308344-01 NTC12-IDW-P3-081613					Analyzed:		08/29/2013	By: BJH
Unit: mg/L					Analytical Batch:		3H30006	
Surrogates (Continued):								
2,4-Dichlorophenylacetic Acid				*95*	*33-153*			

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QUALITY CONTROL REPORT

TCLP Volatile Organics by EPA Method 1311/8260B

Analyte	Sample Conc.	Spike Qty.	Result	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
QC Batch: 1309009 5030B Aqueous Purge & Trap/USEPA-8260B								
Method Blank					Analyzed:		08/26/2013	By: BAG
Unit: mg/L					Analytical Batch:		3H27048	
Benzene			<0.10					0.10
Carbon Tetrachloride			<0.10					0.10
Chlorobenzene			<0.10					0.10
Chloroform			<0.10					0.10
1,2-Dichloroethane			<0.10					0.10
1,1-Dichloroethene			<0.10					0.10
2-Butanone (MEK)			<5.0					5.0
Tetrachloroethene			<0.10					0.10
Trichloroethene			<0.10					0.10
Vinyl Chloride			<0.10					0.10
Method Blank					Analyzed:		08/26/2013	By: BAG
Unit: ug/L					Analytical Batch:		3H27048	
Surrogates:								
Dibromofluoromethane				*100*	*79-124*			
1,2-Dichloroethane-d4				*98*	*75-128*			
Toluene-d8				*100*	*87-113*			
4-Bromofluorobenzene				*97*	*70-121*			
Laboratory Control Sample					Analyzed:		08/26/2013	By: BAG
Unit: mg/L					Analytical Batch:		3H27048	
Benzene		4.00	**4.04**	101	77-122	--		0.10
Carbon Tetrachloride		4.00	**4.15**	104	77-132	--		0.10
Chlorobenzene		4.00	**3.96**	99	76-128	--		0.10
Chloroform		4.00	**4.04**	101	78-127	--		0.10
1,2-Dichloroethane		4.00	**3.93**	98	78-125	--		0.10
1,1-Dichloroethene		4.00	**4.20**	105	71-129	--		0.10
2-Butanone (MEK)		4.00	**3.58**	89	32-178	--		5.0
Tetrachloroethene		4.00	**4.05**	101	78-131	--		0.10
Trichloroethene		4.00	**4.18**	104	72-129	--		0.10
Vinyl Chloride		4.00	**4.10**	103	66-139	--		0.10
Laboratory Control Sample					Analyzed:		08/26/2013	By: BAG
Unit: ug/L					Analytical Batch:		3H27048	

Continued on next page

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TCLP Volatile Organics by EPA Method 1311/8260B (Continued)

Analyte	Sample Conc.	Spike Qty.	Result	Spike % Rec.	Control Limits	RPD	RPD Limits	RL

QC Batch: 1309009 (Continued) 5030B Aqueous Purge & Trap/USEPA-8260B

Laboratory Control Sample (Continued) Analyzed: 08/26/2013 By: BAG

Unit: ug/L Analytical Batch: 3H27048

Surrogates:		
Dibromofluoromethane	*102*	*79-124*
1,2-Dichloroethane-d4	*99*	*75-128*
Toluene-d8	*101*	*87-113*
4-Bromofluorobenzene	*99*	*70-121*

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QUALITY CONTROL REPORT

TCLP Semivolatile Organic Compounds by EPA Method 1311/8270C

Analyte	Sample Conc.	Spike Qty.	Result	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
QC Batch: 1308865 3510C TCLP Liquid-Liquid Ext./USEPA-8270C								
Method Blank					Analyzed:		08/24/2013	By: JLB
Unit: mg/L					Analytical Batch:		3H26008	
1,4-Dichlorobenzene			<0.10					0.10
2,4-Dinitrotoluene			<0.10					0.10
Hexachlorobenzene			<0.10					0.10
Hexachlorobutadiene			<0.10					0.10
Hexachloroethane			<0.10					0.10
Nitrobenzene			<0.10					0.10
Pyridine			<1.0					1.0
Pentachlorophenol			<0.10					0.10
2,4,6-Trichlorophenol			<0.10					0.10
2,4,5-Trichlorophenol			<0.10					0.10
2-Methylphenol			<0.10					0.10
3+4-Methylphenol			<0.10					0.10
Surrogates:								
2-Fluorophenol				*62*	*20-121*			
Phenol-d6				*52*	*10-105*			
Nitrobenzene-d5				*97*	*38-141*			
2-Fluorobiphenyl				*102*	*41-132*			
**2,4,6-Tribromophenol*				*71*	*20-142*			
o-Terphenyl				*106*	*39-148*			
Laboratory Control Sample					Analyzed:		08/24/2013	By: JLB
Unit: mg/L					Analytical Batch:		3H26008	
1,4-Dichlorobenzene	2.00		**1.87**	93	36-120	--		0.10
2,4-Dinitrotoluene	2.00		**1.58**	79	42-125	--		0.10
Hexachlorobenzene	2.00		**2.14**	107	26-141	--		0.10
Hexachlorobutadiene	2.00		**1.87**	94	39-120	--		0.10
Hexachloroethane	2.00		**1.88**	94	34-125	--		0.10
Nitrobenzene	2.00		**1.90**	95	52-129	--		0.10
Pyridine	2.00		**1.54**	77	5-120	--		1.0
Pentachlorophenol	2.00		**1.82**	91	39-112	--		0.10
2,4,6-Trichlorophenol	2.00		**1.94**	97	41-135	--		0.10
2,4,5-Trichlorophenol	2.00		**2.00**	100	36-137	--		0.10

Continued on next page

*See Statement of Data Qualifications

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TCLP Semivolatile Organic Compounds by EPA Method 1311/8270C (Continued)

Analyte	Sample Conc.	Spike Qty.	Result	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
QC Batch: 1308865 (Continued) 3510C TCLP Liquid-Liquid Ext./USEPA-8270C								
Laboratory Control Sample (Continued)					Analyzed:		08/24/2013	By: JLB
Unit: mg/L					Analytical Batch:		3H26008	
2-Methylphenol		2.00	**1.84**	92	37-125	--		0.10
3+4-Methylphenol		4.00	**3.58**	89	45-125	--		0.10
Surrogates:								
2-Fluorophenol				*85*	*20-121*			
Phenol-d6				*68*	*10-105*			
Nitrobenzene-d5				*100*	*38-141*			
2-Fluorobiphenyl				*100*	*41-132*			
2,4,6-Tribromophenol				*101*	*20-142*			
o-Terphenyl				*104*	*39-148*			

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

QC Type	Sample Conc.	Spike Qty.	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
Analyte: **Cyanide Reactivity**/USEPA-7.3.3.2									
QC Batch: 1309086 (9010C Cyanide Distillation)							Analyzed:	08/28/2013	By: LMA
Method Blank			<10	mg/kg					10
Laboratory Control Sample		2.50	**2.29**	mg/kg	91	80-120			10
Laboratory Control Sample		1.25	**1.16**	mg/kg	93	80-120			10
1308344-01 [NTC12-IDW-P3-081613]									
Duplicate	0.57		**0.57**	mg/kg			0.9	20	10
Analyte: **Flashpoint, Closed-Cup**/USEPA-1020A									
QC Batch: 1308809 (Method Specific Preparation)							Analyzed:	08/22/2013	By: SKA
Method Blank			> 200	°F					68
Laboratory Control Sample		81.0	**80**	°F	99	80-120			68
Analyte: **Phenolics, Total**/USEPA-9065									
QC Batch: 1308845 (9065 Phenolics)							Analyzed:	08/23/2013	By: LMA
Method Blank			<0.0500	mg/L					0.0500
Laboratory Control Sample		0.250	**0.258**	mg/L	103	90-110			0.0500
Analyte: **pH**/USEPA-9040C									
QC Batch: 1308810 (Method Specific Preparation)							Analyzed:	08/22/2013	By: SKA
1308344-01 [NTC12-IDW-P3-081613]									
Duplicate	7.56		**7.59**	pH Units			0.4	20	0.1
Analyte: **Sulfide Reactivity**/USEPA-7.3.4.2									
QC Batch: 1308918 (Method Specific Preparation)							Analyzed:	08/23/2013	By: WAH
Method Blank			<10	mg/kg					10
Laboratory Control Sample		642	**435**	mg/kg	68	29-113			10
1308344-01 [NTC12-IDW-P3-081613]									
Matrix Spike	<10	640	**428**	mg/kg	67	1-138			10
Duplicate	<10		<10	mg/kg				20	10

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TRIMATRIX LABORATORIES

QUALITY CONTROL REPORT

TCLP Metals by EPA 1311/6000/7000 Series Methods

QC Type	Sample Conc.	Spike Qty.	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
Analyte: **Arsenic**/USEPA-6010C									
QC Batch: 1308883 (3010A TCLP Digestion)							Analyzed:	08/26/2013	By: CKD
Method Blank			<0.50	mg/L					0.50
Laboratory Control Sample		2.00	**2.00**	mg/L	100	80-120			0.50
1308344-01 [NTC12-IDW-P3-081613]									
Matrix Spike	<0.50	2.00	**1.66**	mg/L	83	75-125			0.50
Matrix Spike Duplicate	<0.50	2.00	**2.21**	mg/L	110	75-125	**28**	20	0.50
Analyte: **Barium**/USEPA-6010C									
QC Batch: 1308883 (3010A TCLP Digestion)							Analyzed:	08/26/2013	By: CKD
Method Blank			<0.35	mg/L					0.35
Laboratory Control Sample		0.400	**0.400**	mg/L	100	80-120			0.35
1308344-01 [NTC12-IDW-P3-081613]									
Matrix Spike	0.215	0.400	**0.627**	mg/L	103	75-125			0.35
Matrix Spike Duplicate	0.215	0.400	**0.640**	mg/L	106	75-125	2	20	0.35
Analyte: **Cadmium**/USEPA-6010C									
QC Batch: 1308883 (3010A TCLP Digestion)							Analyzed:	08/26/2013	By: CKD
Method Blank			<0.050	mg/L					0.050
Laboratory Control Sample		0.400	**0.402**	mg/L	101	80-120			0.050
1308344-01 [NTC12-IDW-P3-081613]									
Matrix Spike	<0.050	0.400	**0.400**	mg/L	100	75-125			0.050
Matrix Spike Duplicate	<0.050	0.400	**0.405**	mg/L	101	75-125	1	20	0.050
Analyte: **Chromium**/USEPA-6010C									
QC Batch: 1308883 (3010A TCLP Digestion)							Analyzed:	08/26/2013	By: CKD
Method Blank			<0.25	mg/L					0.25
Laboratory Control Sample		0.400	**0.405**	mg/L	101	80-120			0.25
1308344-01 [NTC12-IDW-P3-081613]									
Matrix Spike	<0.25	0.400	**0.352**	mg/L	88	75-125			0.25
Matrix Spike Duplicate	<0.25	0.400	**0.424**	mg/L	106	75-125	19	20	0.25
Analyte: **Lead**/USEPA-6010C									
QC Batch: 1308883 (3010A TCLP Digestion)							Analyzed:	08/26/2013	By: CKD
Method Blank			<0.25	mg/L					0.25

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QUALITY CONTROL REPORT

TCLP Metals by EPA 1311/6000/7000 Series Methods (Continued)

QC Type	Sample Conc.	Spike Qty.	Result	Unit	Spike % Rec.	Control Limits	RPD	RPD Limits	RL
Analyte: **Lead**/USEPA-6010C (Continued)									
QC Batch: 1308883 (Continued) (3010A TCLP Digestion)							Analyzed:	08/26/2013	By: CKD
Laboratory Control Sample		0.400	**0.393**	mg/L	98	80-120			0.25
1308344-01 [NTC12-IDW-P3-081613]									
Matrix Spike	<0.25	0.400	**0.314**	mg/L	78	75-125			0.25
Matrix Spike Duplicate	<0.25	0.400	**0.431**	mg/L	108	75-125	**32**	20	0.25
Analyte: **Mercury**/USEPA-7470A									
QC Batch: 1309035 (7470A TCLP Digestion)							Analyzed:	08/29/2013	By: CKD
Method Blank			<0.00020	mg/L					0.00020
Laboratory Control Sample		0.00200	**0.00213**	mg/L	106	80-120			0.00020
Analyte: **Selenium**/USEPA-6010C									
QC Batch: 1308883 (3010A TCLP Digestion)							Analyzed:	08/26/2013	By: CKD
Method Blank			<0.20	mg/L					0.20
Laboratory Control Sample		2.00	**2.03**	mg/L	101	80-120			0.20
1308344-01 [NTC12-IDW-P3-081613]									
Matrix Spike	<0.20	2.00	**1.47**	mg/L	**73**	75-125			0.20
Matrix Spike Duplicate	<0.20	2.00	**2.34**	mg/L	117	75-125	**46**	20	0.20
Analyte: **Silver**/USEPA-6010C									
QC Batch: 1308883 (3010A TCLP Digestion)							Analyzed:	08/26/2013	By: CKD
Method Blank			<0.050	mg/L					0.050
Laboratory Control Sample		0.400	**0.393**	mg/L	98	80-120			0.050
1308344-01 [NTC12-IDW-P3-081613]									
Matrix Spike	<0.050	0.400	**0.180**	mg/L	**45**	75-125			0.050
Matrix Spike Duplicate	<0.050	0.400	**0.482**	mg/L	120	75-125	**91**	20	0.050

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STATEMENT OF DATA QUALIFICATIONS

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Qualification: Reactive Cyanide analysis was not performed since the corresponding Total Cyanide result is <250 mg/kg.

Analysis: USEPA-7.3.3.2

Sample/Analyte:	1308344-01	NTC12-IDW-P3-081613	Cyanide Reactivity

Qualification: The aqueous phase of the sample constituted greater than 20% of the total sample volume which requires EPA Method 9040C as the analytical procedure.

Analysis: USEPA-9040C

Sample/Analyte:	1308344-01	NTC12-IDW-P3-081613	pH

Qualification: The following reported test methods and analyte(s) are exceptions to our NELAP Fields of Accreditation, or for which accreditation is not required, applicable, or available.

Analysis: USEPA-7.3.3.2

Analyte(s): Cyanide Reactivity

Analysis: USEPA-7.3.4.2

Analyte(s): Sulfide Reactivity

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STATEMENT OF DATA QUALIFICATIONS

TCLP Metals by EPA 1311/6000/7000 Series Methods

Qualification: The MS and/or MSD recovery was outside the laboratory or method control limit.

Analysis: USEPA-6010C

Sample/Analyte:	1308344-01	NTC12-IDW-P3-081613	Selenium
	1308344-01	NTC12-IDW-P3-081613	Silver

Qualification: The RPD between the MS and MSD results exceeded the laboratory or method control limit.

Analysis: USEPA-6010C

Sample/Analyte:	1308344-01	NTC12-IDW-P3-081613	Arsenic
	1308344-01	NTC12-IDW-P3-081613	Lead
	1308344-01	NTC12-IDW-P3-081613	Selenium
	1308344-01	NTC12-IDW-P3-081613	Silver

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TRIMATRIX LABORATORIES

STATEMENT OF DATA QUALIFICATIONS

TCLP Semivolatile Organic Compounds by EPA Method 1311/8270C

Qualification: Manual integration was required on the analytes listed below. All manual integrations were performed and reviewed in accordance with TriMatrix laboratory policy.

Analysis: USEPA-8270C

Sample/Analyte: 1308865-BLK1 2,4,6-Tribromophenol

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#1630-B (19-2) Cart 7

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER Nº 1225 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02416	SITE 12 PHASE 3	C. RICH	412-921-8984	TRIMATRIX | G. WOOD
SAMPLERS (SIGNATURE)	NS GREAT LAKES	**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
SJ Conti		S CONTI	412 551 2629	5560 CORP EXCH. CT. SE
		CARRIER/WAYBILL NUMBER		**CITY, STATE**
		FED EX # 8020 3157 8174		GRAND RAPIDS, MI 49512

STANDARD TAT ☐
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2013	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	TAL METALS (TOT) 500 mL 250 mL	TAL METALS (DISS) 500 mL	TCLP VOCs 40 ml VIALS	PHENOLICS 500 mL	TCLP (SVOCs) HERB + METALS PEST/ PEST PT, PEST, STC TOT PCBs			
										4°C HNO3	4°C HNO3	4°C HCL	4°C H2SO4					
										P	P	G	G					
8/15	0950	NTC12GW-01	NTC12 MW01	–	–	GW	G	2		1	1							#1308344
8/15	1140	NTC12GW-02	NTC12 MW02	–	–	GW	G	2		1	1							
8/15	1450	NTC12GW-03	NTC12 MW03	–	–	GW	G	2		1	1							
8/15	1710	NTC12GW-04	NTC12 MW04	–	–	GW	G	2		1	1							DO MATRIX SPIKE HERE
8/16	0845	NTC12-IDW-P3-081613	IDW			IDW	G	8				3	1	4				Drum 8 -01
8/15	0000	NTC12-DUP-P3-081513	DUP	–	–	GW	G	2		1	1							
		TRIP BLANK. TM1349																-02

1. RELINQUISHED BY	SJ Conti	DATE 8/16/13	TIME 1200	1. RECEIVED BY FED EX		DATE	TIME
2. RELINQUISHED BY		DATE	TIME	2. RECEIVED BY		DATE	TIME
3. RELINQUISHED BY		DATE	TIME	3. RECEIVED BY	Linda Jonuya	DATE 8/17/13	TIME 0910
COMMENTS							

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R
FORM NO. TINUS-001

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TRIMATRIX LABORATORIES

SAMPLE RECEIVING / LOG-IN CHECKLIST

TRIMATRIX LABORATORIES

Client: Tetra Tech Nus Inc
Receipt Record Page/Line #: 19-2
Work Order #: 1308344
New / Add To
Project Chemist: (AW) Sample #s

Recorded by (initials/date): LR 8/17/13

Cooler / Box / Other ____ Qty Received: 1

IR Gun (#202)
Thermometer Used: Digital Thermometer (#54) / Other (#____)

See Additional Cooler Information Form

Cooler # TM1349 Time 1010

Custody Seals:
- None
- Present / Intact
- Present / Not Intact

Coolant Location:
Dispersed / Top / Middle / Bottom

Coolant/Temperature Taken Via:
- Loose Ice / Avg 2-3 containers
- Bagged Ice / Avg 2-3 containers
- Blue Ice / Avg 2-3 containers
- None / Avg 2-3 containers

Alternate Temperature Taken Via:
- Temperature Blank (TB)
- 1 Container

	Recorded °C	Correction Factor °C	Actual °C
Temp Blank	—		3.3
TB location: Representative / Not Representative			
1	4.6	—	4.6
2	5.4	—	5.4
3	5.3	—	5.3
Average °C			5.1

Cooler ID on COC?
VOC Trip Blank received?

Cooler # ____ Time ____

Custody Seals: None / Present / Intact / Present / Not Intact

Coolant Location: Dispersed / Top / Middle / Bottom

Coolant/Temperature Taken Via: Loose Ice / Avg 2-3 containers / Bagged Ice / Avg 2-3 containers / Blue Ice / Avg 2-3 containers / None / Avg 2-3 containers

Alternate Temperature Taken Via: Temperature Blank (TB) / 1 Container

	Recorded °C	Correction Factor °C	Actual °C
Temp Blank			
TB location: Representative / Not Representative			
1			
2			
3			
Average °C			

Cooler ID on COC?
VOC Trip Blank received?

Cooler # ____ Time ____

Custody Seals: None / Present / Intact / Present / Not Intact

Coolant Location: Dispersed / Top / Middle / Bottom

Coolant/Temperature Taken Via: Loose Ice / Avg 2-3 containers / Bagged Ice / Avg 2-3 containers / Blue Ice / Avg 2-3 containers / None / Avg 2-3 containers

Alternate Temperature Taken Via: Temperature Blank (TB) / 1 Container

	Recorded °C	Correction Factor °C	Actual °C
Temp Blank			
TB location: Representative / Not Representative			
1			
2			
3			
Average °C			

Cooler ID on COC?
VOC Trip Blank received?

Cooler # ____ Time ____

Custody Seals: None / Present / Intact / Present / Not Intact

Coolant Location: Dispersed / Top / Middle / Bottom

Coolant/Temperature Taken Via: Loose Ice / Avg 2-3 containers / Bagged Ice / Avg 2-3 containers / Blue Ice / Avg 2-3 containers / None / Avg 2-3 containers

Alternate Temperature Taken Via: Temperature Blank (TB) / 1 Container

	Recorded °C	Correction Factor °C	Actual °C
Temp Blank			
TB location: Representative / Not Representative			
1			
2			
3			
Average °C			

Cooler ID on COC?
VOC Trip Blank received?

If any shaded areas checked, complete Sample Receiving Non-Conformance and/or Inventory Form

Paperwork Received

Yes	No	
☐	☒	Chain of Custody record(s)? If No, Initiated By ____
☒	☐	Received for Lab Signed/Date/Time?
☒	☐	Shipping document?
☐	☒	Other: ____

COC Information

☐ TriMatrix COC ☒ Other 1225

COC ID Numbers:

Check COC for Accuracy

Yes	No	
☒	☐	Analysis Requested?
☒	☐	Sample ID matches COC?
☒	☐	Sample Date and Time matches COC?
☒	☐	Container type completed on COC?
☒	☐	All container types indicated are received?

Check Sample Preservation

N/A	Yes	No	
	☒	☐	Average sample temperature ≤6° C?
☒	☐	☐	Was thermal preservation required?
☒	☐		If "No", Project Chemist Approval Initials: ____
☒	☐		If "Yes" Completed Non Con Cooler - Cont Inventory Form?
☐	☒		Completed Sample Preservation Verification Form?
☐	☒		Samples chemically preserved correctly?
☒	☐		If "No", added orange tag?
	☐	☒	Received pre-preserved VOC soils? ☐ MeOH ☐ Na_2SO_4

Check for Short Hold-Time Prep/Analyses

- ☐ Bacteriological
- ☐ Air Bags
- ☐ EnCores / Methanol Pre-Preserved
- ☐ Formaldehyde/Aldehyde
- ☐ Green-tagged containers
- ☐ Yellow/White-tagged 1L ambers (SV Prep-Lab)

AFTER HOURS ONLY:
COPIES OF COC TO LAB AREA(S)
☒ NONE RECEIVED
☐ RECEIVED, COCs TO LAB(S)

Sample Condition Summary

N/A	Yes	No	
	☐	☒	Broken containers/lids?
	☐	☒	Missing or incomplete labels?
	☐	☒	Illegible information on labels?
	☐	☒	Low volume received?
	☐	☒	Inappropriate or non-TriMatrix containers received?
☐	☐	☒	VOC vials / TOX containers have headspace?
☒	☐	☐	Extra sample locations / containers not listed on COC?

Notes

☒ Trip Blank received ☐ Trip Blank not listed on COC

Cooler Received (Date/Time)	Paperwork Delivered (Date/Time)	≤1 Hour Goal Met?
8/17/13 0910	8/17/13 1020	Yes / (No)

Log In Forms - Receiving\Log-In_Checklist

revision: 3.4

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Individual sample results relate only to the sample tested.

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TRIMATRIX LABORATORIES

SAMPLE PRESERVATION VERIFICATION FORM

page ____ of ____

Client: Tetra Tech Nus, Inc	Work Order #: 1308344
Receipt Log #: 19-2	Completed By (initials/date): LR 8/17/13
	Project Chemist: GLW

COC ID #	Adjusted by: ____ Date: ____				DO NOT ADJUST pH FOR THESE CONTAINER TYPES			
1225								
Container Type	5 / 23	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1						✓	✓	
COC Line #2						✓	✓	
COC Line #3						✓	✓	
COC Line #4			✓					
COC Line #5						✓	✓	
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

Ph Strip Lot #	
☑	HC270245
☐	

Aqueous Samples: For each sample and container type, check the box if pH is acceptable. If pH is not acceptable for any sample container, record pH in box, and note on Sample Receiving Checklist and on Sample Receiving Non-Conformance Form. If approved by Project Chemist, add acid or base to the sample to achieve the correct pH. Add up to, but do not exceed 2x the volume initially added at container prep (see table below for initial volumes used). Add orange pH tag to sample container and record information requested. Record adjusted pH on this form. Do not adjust pH for container types 3, 6, and 15.

COC ID #	Adjusted by: ____ Date: ____				DO NOT ADJUST pH FOR THESE CONTAINER TYPES			
Container Type	5 / 23	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1								
COC Line #2								
COC Line #3								
COC Line #4								
COC Line #5								
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

Container Size (mL)	Original Vol. of Preservative (mL)
Container Type 5	NaOH
500	2.5
1000	5.0
Container Type 4	H_2SO_4
125	0.5
250	1.0
500	2.0
1000	4.0
Container Type 13	H_2SO_4
500	2.5

Log In Forms -- Sample_Preserve_Verification , version: 3.0

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Keystone Materials Testing
600 E 17th St S
Newton, IA 50208

ANALYTICAL REPORT

August 28, 2013

Work Order: 93H0045

Report To
Gary Wood TriMatrix Laboratories 5560 Corporate Exchange Court Grand Rapids, MI 49512

Project : BTU

Project Number: BTU

PO : GLW/1308344

Analyte	Result		Method	Limits
ID:NTC12-IDW-P3-081613		Matrix:Water		Collected: 08/22/13 00:00
Calorific Value	<100	BTU/lb	ASTM D240	

End of Report

Keystone Materials Testing, Inc.

Jerry Dawson
Laboratory Manager

APPENDIX D

DATA VALIDATION REPORTS

GROUNDWATER

Tetra Tech **INTERNAL CORRESPONDENCE**

TO:	**C. RICH**	**DATE:**	**September 24, 2013**
FROM:	**MEGAN CARSON**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – TOTAL AND DISSOLVED METALS**
NAVAL STATION (NS) GREAT LAKES CTO F27A
SAMPLE DELIVERY GROUP (SDG) – 1308343

SAMPLES: 5/Aqueous/

NTC12GW-01	NTC12GW-02
NTC12GW-03	NTC12GW-04
NTC12-DUP-P3-081513	

Overview

The sample set for NS Great Lakes CTO F27A, SDG 1308343, consists of five (5) aqueous environmental samples. This SDG contained one field duplicate pair: NTC12-DUP-P3-081513/NTC12GW-03.

All samples were analyzed for total and dissolved metals. The samples were collected by Tetra Tech on August 15th, 2013 and analyzed by Empirical Laboratories LLC. Metals analyses were conducted using SW-846 methods 6010C and 6020. Mercury analyses were conducted using method 7470A.

The data contained in this SDG were validated with regard to the following parameters:

* • Data Completeness
* • Holding Times
* • Instrument performance and tuning
* • Initial and Continuing Calibrations
• Laboratory Method / Preparation Blanks
* • ICP Interference Analysis
* • Laboratory Control Sample Recoveries
• Matrix Spike / Matrix Spike Duplicate Recoveries
* • ICP Serial Dilution Results
* • Surrogate Recoveries
* • Internal Standard Recoveries
* • Field Duplicate Results
* • Laboratory Duplicate Results
* • Detection Limits
• Analyte Quantitation

* - All quality control criteria were met for this parameter.

Qualified (if applicable) analytical results are summarized in Appendix A. Results as reported by the laboratory are presented in Appendix B. Appendix C contains the documentation to support the findings as discussed in this validation report.

Metals:

The following contaminants were detected in preparation and calibration blank at the following maximum concentrations:

Analyte	Maximum Concentration	Action Level
Selenium [1]	0.39 ug/L	1.95 ug/L
Chromium [2]	0.34 ug/L	1.7 ug/L
Vanadium [2]	0.15 ug/L	0.75 ug/L
Selenium [2]	0.83 ug/L	4.15 ug/L
Chromium [3]	0.25 ug/L	1.25 ug/L
Vanadium [3]	0.13 ug/L	0.65 ug/L
Selenium [4]	0.80 ug/L	4.0 ug/L
Arsenic [4]	0.28 ug/L	1.4 ug/L
Antimony [5]	0.48 ug/L	2.4 ug/L

(1) Maximum concentration found in a preparation blank affecting samples in preparation batch 1308841.
(2) Maximum concentration found in a preparation blank affecting samples in preparation batch 1308852.
(3) Maximum concentration found in a calibration blank affecting samples analyzed on 9/3/13 before 12:55.
(4) Maximum concentration found in a calibration blank affecting samples analyzed on 9/3/13 after 14:12.
(5) Maximum concentration found in a calibration blank affecting samples analyzed on 9/4/13.

An action level of 5X the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot and dilution factors were taken into consideration when evaluating for blank contamination. Detected antimony, arsenic, chromium, selenium, and vanadium results less than the blank action level were qualified as non-detected (U).

The matrix spike and matrix spike duplicate for preparation batch 1308841 (total metals) had percent recoveries < 80% for copper, barium, and manganese. Post digestion spike recoveries were acceptable for the referenced analytes. Detected results were qualified as estimated (J).

The matrix spike and matrix spike duplicate for preparation batch 1308852 (dissolved metals) had a percent recovery < 80% for copper and greater than 120% for manganese. Post digestion spike recoveries were acceptable for the referenced analytes. Detected results were qualified as estimated (J).

Notes

Non-detected results were reported to the limit of detection (LOD).

Executive Summary

Laboratory Performance: Preparation and calibration blank non-compliances for antimony, arsenic, chromium, selenium, and vanadium resulted in the qualification of sample results.

Other Factors Affecting Data Quality: MS/MSD percent recovery non-compliances resulted in the qualification non-compliances.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", (January 2010) and the DOD document entitled "Quality System Manual (QSM) for Environmental Laboratories", (July 2013).

The text of this report has been formulated to address only those problem areas affecting data quality.

Tetra Tech
Megan Carson
Chemist/Data Validator

Tetra Tech
Joseph A. Samchuck
Data Validation Manager

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

Qualifier Codes:

A	=	Lab Blank Contamination
B	=	Field Blank Contamination
C	=	Calibration Noncompliance (i.e., % 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	=	ICP PDS Recovery Noncompliance; 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 (i.e., base-time drifting)
P	=	Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q	=	Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R	=	Surrogates Recovery Noncompliance
S	=	Pesticide/PCB Resolution
T	=	% Breakdown Noncompliance for DDT and Endrin
U	=	RPD between columns/detectors >40% 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 less than sample activity
Z1	=	Tentatively Identified Compound considered presumptively present
Z2	=	Tentatively Identified Compound column bleed

PROJ_NO: 02416	NSAMPLE	NTC12-DUP-P3-081513			NTC12GW-01			NTC12GW-02			NTC12GW-03		
SDG: 1308343	LAB_ID	1308343-05			1308343-01			1308343-02			1308343-03		
FRACTION: M	SAMP_DATE	8/15/2013			8/15/2013			8/15/2013			8/15/2013		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF	NTC12GW-03											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		50	U		50	U		50	U		50	U	
ANTIMONY		0.5	U	A	1.8	U	A	1.8	U	A	0.5	U	
ARSENIC		29			1	U	A	5.3			28		
BARIUM		120	J	D	45	J	D	150	J	D	120	J	D
BERYLLIUM		0.4	U		0.4	U		0.4	U		0.4	U	
CADMIUM		0.1	U		0.39			0.11	J	P	0.1	U	
CALCIUM		130000			190000			240000			130000		
CHROMIUM		1	U	A	0.81	J	P	0.48	J	P	0.24	J	P
COBALT		0.21	J	P	2.6			7			0.19	J	P
COPPER		0.78	J	DP	7	J	D	1.6	J	D	0.72	J	DP
IRON		9200			66			3700			9300		
LEAD		0.21	J	P	0.5	U		0.21	J	P	0.2	J	P
MAGNESIUM		51000			160000			56000			51000		
MANGANESE		280	J	D	220	J	D	610	J	D	280	J	D
MERCURY		0.1	U		0.1	U		0.1	U		0.1	U	
NICKEL		0.98	J	P	7.2			40			0.91	J	P
POTASSIUM		5300			5700			6400			5300		
SELENIUM		1	U		1	U	A	4.2			1	U	
SILVER		0.046	J	P	0.06	J	P	0.1	U		0.1	U	
SODIUM		92000			65000			160000			92000		
THALLIUM		0.1	U		0.056	J	P	0.035	J	P	0.1	U	
VANADIUM		1	U	A	0.37	J	P	0.22	J	P	0.11	J	P
ZINC		4.9	J	P	41			130			4.8	J	P

PROJ_NO: 02416	NSAMPLE	NTC12GW-04		
SDG: 1308343	LAB_ID	1308343-04		
FRACTION: M	SAMP_DATE	8/15/2013		
MEDIA: WATER	QC_TYPE	NM		
	UNITS	UG/L		
	PCT_SOLIDS	0.0		
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
ALUMINUM		57	J	P
ANTIMONY		0.5	U	A
ARSENIC		78		
BARIUM		240	J	D
BERYLLIUM		0.4	U	
CADMIUM		0.054	J	P
CALCIUM		210000		
CHROMIUM		0.5	J	P
COBALT		0.68	J	P
COPPER		2.5	J	D
IRON		19000		
LEAD		2.1		
MAGNESIUM		87000		
MANGANESE		740	J	D
MERCURY		0.1	U	
NICKEL		1.4		
POTASSIUM		7100		
SELENIUM		1	U	A
SILVER		0.1	U	
SODIUM		110000		
THALLIUM		0.1	U	
VANADIUM		0.42	J	P
ZINC		12		

PROJ_NO: 02416	NSAMPLE	NTC12-DUP-P3-081513			NTC12GW-01			NTC12GW-02			NTC12GW-03		
SDG: 1308343	LAB_ID	1308343-05			1308343-01			1308343-02			1308343-03		
FRACTION: MF	SAMP_DATE	8/15/2013			8/15/2013			8/15/2013			8/15/2013		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF	NTC12GW-03											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		50	U		50	U		50	U		50	U	
ANTIMONY		0.5	U	A	1.9	U	A	1.8	U	A	0.5	U	A
ARSENIC		28			1.1	U	A	5.8			27		
BARIUM		120			48			160			110		
BERYLLIUM		0.4	U		0.4	U		0.4	U		0.4	U	
CADMIUM		0.1	U		0.45			0.12	J	P	0.1	U	
CALCIUM		140000			190000			240000			130000		
CHROMIUM		0.5	U	A	0.95	U	A	0.69	U	A	0.5	U	A
COBALT		0.21	J	P	3.3			9			0.21	J	P
COPPER		0.75	J	DP	7.4	J	D	1.8	J	D	0.66	J	DP
IRON		9600			55			3800			9100		
LEAD		0.5	U		0.5	U		0.22	J	P	0.5	U	
MAGNESIUM		54000			150000			58000			52000		
MANGANESE		280	J	D	240	J	D	640	J	D	270	J	D
MERCURY		0.1	U		0.1	U		0.1	U		0.1	U	
NICKEL		0.96	J	P	9.3			48			0.59	J	P
POTASSIUM		5700			5500			6700			5500		
SELENIUM		1	U		1	U	A	3.9	U	A	1	U	A
SILVER		0.056	J	P	0.077	J	P	0.1	U		0.1	U	
SODIUM		98000			63000			160000			95000		
THALLIUM		0.1	U		0.055	J	P	0.029	J	P	0.1	U	
VANADIUM		0.21	U	A	0.55	U	A	0.47	U	A	0.21	U	A
ZINC		3.7	J	P	44			130			4.1	J	P

9-24-13
JAS

PROJ_NO: 02416	NSAMPLE	NTC12GW-04		
SDG: 1308343	LAB_ID	1308343-04		
FRACTION: MF	SAMP_DATE	8/15/2013		
MEDIA: WATER	QC_TYPE	NM		
	UNITS	UG/L		
	PCT_SOLIDS	0.0		
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
ALUMINUM		50	U	
ANTIMONY		0.5	U	A
ARSENIC		71		
BARIUM		220		
BERYLLIUM		0.4	U	
CADMIUM		0.1	U	
CALCIUM		210000		
CHROMIUM		0.5	U	A
COBALT		0.7	J	P
COPPER		0.98	J	DP
IRON		18000		
LEAD		0.5	U	
MAGNESIUM		85000		
MANGANESE		670	J	D
MERCURY		0.1	U	
NICKEL		1.4		
POTASSIUM		6900		
SELENIUM		1	U	A
SILVER		0.1	U	
SODIUM		110000		
THALLIUM		0.1	U	
VANADIUM		0.27	U	A
ZINC		6.9	J	P

APPENDIX B

RESULTS AS REPORTED BY THE LABORATORY

INORGANIC ANALYSIS DATA SHEET
USEPA-6010C

NTC12-DUP-P3-081513

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 00:00
Solids: 0.00
QC Batch: 1308853

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-05
Prepared: 08/22/13 07:00
Preparation: 3010A Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, Total	1	50	ug/L	13	50	100	U	08/26/13 17:17
7440-70-2	Calcium, Total	1	130000	ug/L	230	500	500		08/26/13 17:17
7439-89-6	Iron, Total	1	9200	ug/L	6.5	10	10		08/26/13 17:17
7439-95-4	Magnesium, Total	1	51000	ug/L	140	500	500		08/26/13 17:17
7440-09-7	Potassium, Total	1	5300	ug/L	33	100	100		08/26/13 17:17
7440-23-5	Sodium, Total	1	92000	ug/L	130	500	500		08/26/13 17:17

00043

INORGANIC ANALYSIS DATA SHEET

USEPA-6010C

NTC12GW-01

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Matrix: Water
Laboratory ID: 1308343-01
Sampled: 08/15/13 09:50
Prepared: 08/22/13 07:00
Solids: 0.00
Preparation: 3010A Digestion
QC Batch: 1308853
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, Total	1	50	ug/L	13	50	100	U	08/26/13 16:43
7440-70-2	Calcium, Total	1	190000	ug/L	230	500	500		08/26/13 16:43
7439-89-6	Iron, Total	1	66	ug/L	6.5	10	10		08/26/13 16:43
7439-95-4	Magnesium, Total	1	160000	ug/L	140	500	500		08/26/13 16:43
7440-09-7	Potassium, Total	1	5700	ug/L	33	100	100		08/26/13 16:43
7440-23-5	Sodium, Total	1	65000	ug/L	130	500	500		08/26/13 16:43

INORGANIC ANALYSIS DATA SHEET
USEPA-6010C

NTC12GW-02

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 11:40
Solids: 0.00
QC Batch: 1308853

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-02
Prepared: 08/22/13 07:00
Preparation: 3010A Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, Total	1	50	ug/L	13	50	100	U	08/26/13 16:47
7440-70-2	Calcium, Total	1	240000	ug/L	230	500	500		08/26/13 16:47
7439-89-6	Iron, Total	1	3700	ug/L	6.5	10	10		08/26/13 16:47
7439-95-4	Magnesium, Total	1	56000	ug/L	140	500	500		08/26/13 16:47
7440-09-7	Potassium, Total	1	6400	ug/L	33	100	100		08/26/13 16:47
7440-23-5	Sodium, Total	1	160000	ug/L	130	500	500		08/26/13 16:47

: 66037

INORGANIC ANALYSIS DATA SHEET
USEPA-6010C

NTC12GW-03

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Matrix: Water
Laboratory ID: 1308343-03
Sampled: 08/15/13 14:50
Prepared: 08/22/13 07:00
Solids: 0.00
Preparation: 3010A Digestion
QC Batch: 1308853
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, Total	1	50	ug/L	13	50	100	U	08/26/13 16:50
7440-70-2	Calcium, Total	1	130000	ug/L	230	500	500		08/26/13 16:50
7439-89-6	Iron, Total	1	9300	ug/L	6.5	10	10		08/26/13 16:50
7439-95-4	Magnesium, Total	1	51000	ug/L	140	500	500		08/26/13 16:50
7440-09-7	Potassium, Total	1	5300	ug/L	33	100	100		08/26/13 16:50
7440-23-5	Sodium, Total	1	92000	ug/L	130	500	500		08/26/13 16:50

: 68039

INORGANIC ANALYSIS DATA SHEET
USEPA-6010C

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 17:10
Solids: 0.00
QC Batch: 1308853

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-04
Prepared: 08/22/13 07:00
Preparation: 3010A Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, Total	1	57	ug/L	13	50	100	J	08/26/13 16:53
7440-70-2	Calcium, Total	25	210000	ug/L	5800	12000	12000		08/26/13 17:39
7439-89-6	Iron, Total	25	19000	ug/L	160	250	250		08/26/13 17:39
7439-95-4	Magnesium, Total	1	87000	ug/L	140	500	500		08/26/13 16:53
7440-09-7	Potassium, Total	1	7100	ug/L	33	100	100		08/26/13 16:53
7440-23-5	Sodium, Total	1	110000	ug/L	130	500	500		08/26/13 16:53

INORGANIC ANALYSIS DATA SHEET
USEPA-6010C

NTC12-DUP-P3-081513

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 00:00
Solids: 0.00
QC Batch: 1308854

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-05
Prepared: 08/22/13 07:00
Preparation: 3010A Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, Dissolved	1	50	ug/L	13	50	100	U	08/26/13 16:33
7440-70-2	Calcium, Dissolved	1	140000	ug/L	230	500	500		08/26/13 16:33
7439-89-6	Iron, Dissolved	1	9600	ug/L	6.5	10	10		08/26/13 16:33
7439-95-4	Magnesium, Dissolved	1	54000	ug/L	140	500	500		08/26/13 16:33
7440-09-7	Potassium, Dissolved	1	5700	ug/L	33	100	100		08/26/13 16:33
7440-23-5	Sodium, Dissolved	1	98000	ug/L	130	500	500		08/26/13 16:33

: 88844

INORGANIC ANALYSIS DATA SHEET
USEPA-6010C

NTC12GW-01

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 09:50
Solids: 0.00
QC Batch: 1308854

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-01
Prepared: 08/22/13 07:00
Preparation: 3010A Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, Dissolved	1	50	ug/L	13	50	100	U	08/26/13 15:58
7440-70-2	Calcium, Dissolved	1	190000	ug/L	230	500	500		08/26/13 15:58
7439-89-6	Iron, Dissolved	1	55	ug/L	6.5	10	10		08/26/13 15:58
7439-95-4	Magnesium, Dissolved	1	150000	ug/L	140	500	500		08/26/13 15:58
7440-09-7	Potassium, Dissolved	1	5500	ug/L	33	100	100		08/26/13 15:58
7440-23-5	Sodium, Dissolved	1	63000	ug/L	130	500	500		08/26/13 15:58

INORGANIC ANALYSIS DATA SHEET
USEPA-6010C

NTC12GW-02

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 11:40
Solids: 0.00
QC Batch: 1308854

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-02
Prepared: 08/22/13 07:00
Preparation: 3010A Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, Dissolved	1	50	ug/L	13	50	100	U	08/26/13 16:02
7440-70-2	Calcium, Dissolved	1	240000	ug/L	230	500	500		08/26/13 16:02
7439-89-6	Iron, Dissolved	1	3800	ug/L	6.5	10	10		08/26/13 16:02
7439-95-4	Magnesium, Dissolved	1	58000	ug/L	140	500	500		08/26/13 16:02
7440-09-7	Potassium, Dissolved	1	6700	ug/L	33	100	100		08/26/13 16:02
7440-23-5	Sodium, Dissolved	1	160000	ug/L	130	500	500		08/26/13 16:02

INORGANIC ANALYSIS DATA SHEET
USEPA-6010C

NTC12GW-03

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 14:50
Solids: 0.00
QC Batch: 1308854

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-03
Prepared: 08/22/13 07:00
Preparation: 3010A Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, Dissolved	1	50	ug/L	13	50	100	U	08/26/13 16:05
7440-70-2	Calcium, Dissolved	1	130000	ug/L	230	500	500		08/26/13 16:05
7439-89-6	Iron, Dissolved	1	9100	ug/L	6.5	10	10		08/26/13 16:05
7439-95-4	Magnesium, Dissolved	1	52000	ug/L	140	500	500		08/26/13 16:05
7440-09-7	Potassium, Dissolved	1	5500	ug/L	33	100	100		08/26/13 16:05
7440-23-5	Sodium, Dissolved	1	95000	ug/L	130	500	500		08/26/13 16:05

INORGANIC ANALYSIS DATA SHEET
USEPA-6010C

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Matrix: Water
Laboratory ID: 1308343-04
Sampled: 08/15/13 17:10
Prepared: 08/22/13 07:00
Solids: 0.00
Preparation: 3010A Digestion
QC Batch: 1308854
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, Dissolved	1	50	ug/L	13	50	100	U	08/26/13 16:09
7440-70-2	Calcium, Dissolved	25	210000	ug/L	5800	12000	12000		08/27/13 10:17
7439-89-6	Iron, Dissolved	25	18000	ug/L	160	250	250		08/27/13 10:17
7439-95-4	Magnesium, Dissolved	1	85000	ug/L	140	500	500		08/26/13 16:09
7440-09-7	Potassium, Dissolved	1	6900	ug/L	33	100	100		08/26/13 16:09
7440-23-5	Sodium, Dissolved	25	110000	ug/L	3200	12000	12000		08/27/13 10:17

: 88042

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12-DUP-P3-081513

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 00:00
Solids: 0.00
QC Batch: 1308841

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-05
Prepared: 08/22/13 07:00
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, Total	1	0.24	ug/L	0.15	0.50	1.0	J	09/04/13 09:12
7440-38-2	Arsenic, Total	1	29	ug/L	0.18	0.50	1.0		09/03/13 14:43
7440-39-3	Barium, Total	5	120	ug/L	0.68	2.5	5.0		09/03/13 12:21
7440-41-7	Beryllium, Total	1	0.40	ug/L	0.11	0.40	1.0	U	09/04/13 12:10
7440-43-9	Cadmium, Total	1	0.10	ug/L	0.038	0.10	0.20	U	08/30/13 11:59
7440-47-3	Chromium, Total	1	0.78	ug/L	0.20	0.50	1.0	J	09/03/13 10:47
7440-48-4	Cobalt, Total	1	0.21	ug/L	0.050	0.20	1.0	J	08/30/13 11:59
7440-50-8	Copper, Total	1	0.78	ug/L	0.13	0.50	1.0	J	08/30/13 11:59
7439-92-1	Lead, Total	1	0.21	ug/L	0.15	0.50	1.0	J	08/30/13 11:59
7439-96-5	Manganese, Total	5	280	ug/L	0.70	2.5	5.0		09/03/13 16:17
7440-02-0	Nickel, Total	1	0.98	ug/L	0.17	0.50	1.0	J	09/03/13 10:47
7782-49-2	Selenium, Total	1	1.0	ug/L	0.31	1.0	1.0	U	09/03/13 14:43
7440-22-4	Silver, Total	1	0.046	ug/L	0.037	0.10	0.20	J	09/03/13 10:47
7440-28-0	Thallium, Total	1	0.10	ug/L	0.027	0.10	1.0	U	08/30/13 11:59
7440-62-2	Vanadium, Total	1	0.36	ug/L	0.066	0.20	1.0	J	09/03/13 10:47
7440-66-6	Zinc, Total	1	4.9	ug/L	1.5	4.0	10	J	08/30/13 11:59

: 00225

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12GW-01

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Matrix: Water
Laboratory ID: 1308343-01
Sampled: 08/15/13 09:50
Prepared: 08/22/13 07:00
Solids: 0.00
Preparation: 3020A Digestion
QC Batch: 1308841
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, Total	1	1.8	ug/L	0.15	0.50	1.0		09/04/13 08:40
7440-38-2	Arsenic, Total	1	1.0	ug/L	0.18	0.50	1.0		09/03/13 14:12
7440-39-3	Barium, Total	1	45	ug/L	0.14	0.50	1.0		08/30/13 11:12
7440-41-7	Beryllium, Total	1	0.40	ug/L	0.11	0.40	1.0	U	09/04/13 08:40
7440-43-9	Cadmium, Total	1	0.39	ug/L	0.038	0.10	0.20		08/30/13 11:12
7440-47-3	Chromium, Total	1	0.81	ug/L	0.20	0.50	1.0	J	08/30/13 11:12
7440-48-4	Cobalt, Total	1	2.6	ug/L	0.050	0.20	1.0		08/30/13 11:12
7440-50-8	Copper, Total	1	7.0	ug/L	0.13	0.50	1.0		08/30/13 11:12
7439-92-1	Lead, Total	1	0.50	ug/L	0.15	0.50	1.0	U	08/30/13 11:12
7439-96-5	Manganese, Total	5	220	ug/L	0.70	2.5	5.0		09/03/13 15:39
7440-02-0	Nickel, Total	1	7.2	ug/L	0.17	0.50	1.0		08/30/13 11:12
7782-49-2	Selenium, Total	1	0.73	ug/L	0.31	1.0	1.0	J	09/03/13 14:12
7440-22-4	Silver, Total	1	0.060	ug/L	0.037	0.10	0.20	J	09/03/13 09:44
7440-28-0	Thallium, Total	1	0.056	ug/L	0.027	0.10	1.0	J	08/30/13 11:12
7440-62-2	Vanadium, Total	1	0.37	ug/L	0.066	0.20	1.0	J	08/30/13 11:12
7440-66-6	Zinc, Total	1	41	ug/L	1.5	4.0	10		08/30/13 11:12

00218

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12GW-02

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 11:40
Solids: 0.00
QC Batch: 1308841

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-02
Prepared: 08/22/13 07:00
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, Total	1	1.8	ug/L	0.15	0.50	1.0		09/04/13 08:43
7440-38-2	Arsenic, Total	1	5.3	ug/L	0.18	0.50	1.0		09/03/13 14:15
7440-39-3	Barium, Total	5	150	ug/L	0.68	2.5	5.0		09/03/13 11:57
7440-41-7	Beryllium, Total	1	0.40	ug/L	0.11	0.40	1.0	U	09/04/13 08:43
7440-43-9	Cadmium, Total	1	0.11	ug/L	0.038	0.10	0.20	J	08/30/13 11:17
7440-47-3	Chromium, Total	1	0.48	ug/L	0.20	0.50	1.0	J	08/30/13 11:17
7440-48-4	Cobalt, Total	1	7.0	ug/L	0.050	0.20	1.0		08/30/13 11:17
7440-50-8	Copper, Total	1	1.6	ug/L	0.13	0.50	1.0		08/30/13 11:17
7439-92-1	Lead, Total	1	0.21	ug/L	0.15	0.50	1.0	J	08/30/13 11:17
7439-96-5	Manganese, Total	10	610	ug/L	1.4	5.0	10		09/03/13 15:42
7440-02-0	Nickel, Total	1	40	ug/L	0.17	0.50	1.0		08/30/13 11:17
7782-49-2	Selenium, Total	1	4.2	ug/L	0.31	1.0	1.0		09/03/13 14:15
7440-22-4	Silver, Total	1	0.10	ug/L	0.037	0.10	0.20	U	09/03/13 09:48
7440-28-0	Thallium, Total	1	0.035	ug/L	0.027	0.10	1.0	J	08/30/13 11:17
7440-62-2	Vanadium, Total	1	0.22	ug/L	0.066	0.20	1.0	J	08/30/13 11:17
7440-66-6	Zinc, Total	5	130	ug/L	7.5	20	50		09/03/13 11:57

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12GW-03

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 14:50
Solids: 0.00
QC Batch: 1308841

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-03
Prepared: 08/22/13 07:00
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, Total	1	0.50	ug/L	0.15	0.50	1.0	U	09/04/13 08:46
7440-38-2	Arsenic, Total	1	28	ug/L	0.18	0.50	1.0		09/03/13 14:18
7440-39-3	Barium, Total	5	120	ug/L	0.68	2.5	5.0		09/03/13 12:00
7440-41-7	Beryllium, Total	1	0.40	ug/L	0.11	0.40	1.0	U	09/04/13 08:46
7440-43-9	Cadmium, Total	1	0.10	ug/L	0.038	0.10	0.20	U	08/30/13 11:21
7440-47-3	Chromium, Total	1	0.24	ug/L	0.20	0.50	1.0	J	08/30/13 11:21
7440-48-4	Cobalt, Total	1	0.19	ug/L	0.050	0.20	1.0	J	08/30/13 11:21
7440-50-8	Copper, Total	1	0.72	ug/L	0.13	0.50	1.0	J	08/30/13 11:21
7439-92-1	Lead, Total	1	0.20	ug/L	0.15	0.50	1.0	J	08/30/13 11:21
7439-96-5	Manganese, Total	5	280	ug/L	0.70	2.5	5.0		09/03/13 15:45
7440-02-0	Nickel, Total	1	0.91	ug/L	0.17	0.50	1.0	J	08/30/13 11:21
7782-49-2	Selenium, Total	1	1.0	ug/L	0.31	1.0	1.0	U	09/03/13 14:18
7440-22-4	Silver, Total	1	0.10	ug/L	0.037	0.10	0.20	U	09/03/13 09:51
7440-28-0	Thallium, Total	1	0.10	ug/L	0.027	0.10	1.0	U	08/30/13 11:21
7440-62-2	Vanadium, Total	1	0.11	ug/L	0.066	0.20	1.0	J	08/30/13 11:21
7440-66-6	Zinc, Total	1	4.8	ug/L	1.5	4.0	10	J	08/30/13 11:21

08222

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 17:10
Solids: 0.00
QC Batch: 1308841

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-04
Prepared: 08/22/13 07:00
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, Total	1	0.27	ug/L	0.15	0.50	1.0	J	09/04/13 08:49
7440-38-2	Arsenic, Total	5	78	ug/L	0.88	2.5	5.0		09/04/13 15:03
7440-39-3	Barium, Total	10	240	ug/L	1.4	5.0	10		09/03/13 12:03
7440-41-7	Beryllium, Total	1	0.40	ug/L	0.11	0.40	1.0	U	09/04/13 08:49
7440-43-9	Cadmium, Total	1	0.054	ug/L	0.038	0.10	0.20	J	08/30/13 11:26
7440-47-3	Chromium, Total	1	0.50	ug/L	0.20	0.50	1.0	J	08/30/13 11:26
7440-48-4	Cobalt, Total	1	0.68	ug/L	0.050	0.20	1.0	J	08/30/13 11:26
7440-50-8	Copper, Total	1	2.5	ug/L	0.13	0.50	1.0		08/30/13 11:26
7439-92-1	Lead, Total	1	2.1	ug/L	0.15	0.50	1.0		08/30/13 11:26
7439-96-5	Manganese, Total	10	740	ug/L	1.4	5.0	10		09/03/13 15:48
7440-02-0	Nickel, Total	1	1.4	ug/L	0.17	0.50	1.0		08/30/13 11:26
7782-49-2	Selenium, Total	1	0.39	ug/L	0.31	1.0	1.0	J	09/03/13 14:21
7440-22-4	Silver, Total	1	0.10	ug/L	0.037	0.10	0.20	U	09/03/13 09:55
7440-28-0	Thallium, Total	1	0.10	ug/L	0.027	0.10	1.0	U	08/30/13 11:26
7440-62-2	Vanadium, Total	1	0.42	ug/L	0.066	0.20	1.0	J	08/30/13 11:26
7440-66-6	Zinc, Total	1	12	ug/L	1.5	4.0	10		08/30/13 11:26

: 00224

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12-DUP-P3-081513

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 00:00
Solids: 0.00
QC Batch: 1308852

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-05
Prepared: 08/22/13 07:00
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, Dissolved	1	0.32	ug/L	0.15	0.50	1.0	J	09/04/13 09:55
7440-38-2	Arsenic, Dissolved	1	28	ug/L	0.18	0.50	1.0		09/04/13 15:01
7440-39-3	Barium, Dissolved	5	120	ug/L	0.68	2.5	5.0		09/03/13 12:55
7440-41-7	Beryllium, Dissolved	1	0.40	ug/L	0.11	0.40	1.0	U	09/04/13 12:48
7440-43-9	Cadmium, Dissolved	1	0.10	ug/L	0.038	0.10	0.20	U	08/30/13 13:06
7440-47-3	Chromium, Dissolved	1	0.31	ug/L	0.20	0.50	1.0	J	09/03/13 11:37
7440-48-4	Cobalt, Dissolved	1	0.21	ug/L	0.050	0.20	1.0	J	09/03/13 11:37
7440-50-8	Copper, Dissolved	1	0.75	ug/L	0.13	0.50	1.0	J	08/30/13 13:06
7439-92-1	Lead, Dissolved	1	0.50	ug/L	0.15	0.50	1.0	U	08/30/13 13:06
7439-96-5	Manganese, Dissolved	5	280	ug/L	0.70	2.5	5.0		09/03/13 16:50
7440-02-0	Nickel, Dissolved	1	0.96	ug/L	0.17	0.50	1.0	J	09/03/13 11:37
7782-49-2	Selenium, Dissolved	1	1.0	ug/L	0.31	1.0	1.0	U	09/03/13 15:24
7440-22-4	Silver, Dissolved	1	0.056	ug/L	0.037	0.10	0.20	J	09/03/13 11:37
7440-28-0	Thallium, Dissolved	1	0.10	ug/L	0.027	0.10	1.0	U	08/30/13 13:06
7440-62-2	Vanadium, Dissolved	1	0.21	ug/L	0.066	0.20	1.0	J	09/03/13 11:37
7440-66-6	Zinc, Dissolved	1	3.7	ug/L	1.5	4.0	10	J	08/30/13 13:06

00227

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12GW-01

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 09:50
Solids: 0.00
QC Batch: 1308852

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-01
Prepared: 08/22/13 07:00
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, Dissolved	1	1.9	ug/L	0.15	0.50	1.0		09/04/13 09:22
7440-38-2	Arsenic, Dissolved	1	1.1	ug/L	0.18	0.50	1.0		09/03/13 14:52
7440-39-3	Barium, Dissolved	1	48	ug/L	0.14	0.50	1.0		08/30/13 12:13
7440-41-7	Beryllium, Dissolved	1	0.40	ug/L	0.11	0.40	1.0	U	09/04/13 12:18
7440-43-9	Cadmium, Dissolved	1	0.45	ug/L	0.038	0.10	0.20		08/30/13 12:13
7440-47-3	Chromium, Dissolved	1	0.95	ug/L	0.20	0.50	1.0	J	09/03/13 10:59
7440-48-4	Cobalt, Dissolved	1	3.3	ug/L	0.050	0.20	1.0		09/03/13 10:59
7440-50-8	Copper, Dissolved	1	7.4	ug/L	0.13	0.50	1.0		08/30/13 12:13
7439-92-1	Lead, Dissolved	1	0.50	ug/L	0.15	0.50	1.0	U	08/30/13 12:13
7439-96-5	Manganese, Dissolved	5	240	ug/L	0.70	2.5	5.0		09/03/13 16:20
7440-02-0	Nickel, Dissolved	1	9.3	ug/L	0.17	0.50	1.0		09/03/13 10:59
7782-49-2	Selenium, Dissolved	1	0.87	ug/L	0.31	1.0	1.0	JB	09/03/13 14:52
7440-22-4	Silver, Dissolved	1	0.077	ug/L	0.037	0.10	0.20	J	09/03/13 10:59
7440-28-0	Thallium, Dissolved	1	0.055	ug/L	0.027	0.10	1.0	J	08/30/13 12:13
7440-62-2	Vanadium, Dissolved	1	0.55	ug/L	0.066	0.20	1.0	J	09/03/13 10:59
7440-66-6	Zinc, Dissolved	1	44	ug/L	1.5	4.0	10		08/30/13 12:13

00219

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12GW-02

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 11:40
Solids: 0.00
QC Batch: 1308852

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-02
Prepared: 08/22/13 07:00
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, Dissolved	1	1.8	ug/L	0.15	0.50	1.0		09/04/13 09:25
7440-38-2	Arsenic, Dissolved	1	5.8	ug/L	0.18	0.50	1.0		09/03/13 14:55
7440-39-3	Barium, Dissolved	5	160	ug/L	0.68	2.5	5.0		09/03/13 12:29
7440-41-7	Beryllium, Dissolved	1	0.40	ug/L	0.11	0.40	1.0	U	09/04/13 12:21
7440-43-9	Cadmium, Dissolved	1	0.12	ug/L	0.038	0.10	0.20	J	08/30/13 12:17
7440-47-3	Chromium, Dissolved	1	0.69	ug/L	0.20	0.50	1.0	J	09/03/13 11:02
7440-48-4	Cobalt, Dissolved	1	9.0	ug/L	0.050	0.20	1.0		09/03/13 11:02
7440-50-8	Copper, Dissolved	1	1.8	ug/L	0.13	0.50	1.0		08/30/13 12:17
7439-92-1	Lead, Dissolved	1	0.22	ug/L	0.15	0.50	1.0	J	08/30/13 12:17
7439-96-5	Manganese, Dissolved	10	640	ug/L	1.4	5.0	10		09/03/13 16:23
7440-02-0	Nickel, Dissolved	1	48	ug/L	0.17	0.50	1.0		09/03/13 11:02
7782-49-2	Selenium, Dissolved	1	3.9	ug/L	0.31	1.0	1.0	B	09/03/13 14:55
7440-22-4	Silver, Dissolved	1	0.10	ug/L	0.037	0.10	0.20	U	09/03/13 11:02
7440-28-0	Thallium, Dissolved	1	0.029	ug/L	0.027	0.10	1.0	J	08/30/13 12:17
7440-62-2	Vanadium, Dissolved	1	0.47	ug/L	0.066	0.20	1.0	J	09/03/13 11:02
7440-66-6	Zinc, Dissolved	5	130	ug/L	7.5	20	50		09/03/13 12:29

08221

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12GW-03

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 14:50
Solids: 0.00
QC Batch: 1308852

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-03
Prepared: 08/22/13 07:00
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, Dissolved	1	0.15	ug/L	0.15	0.50	1.0	J	09/04/13 09:28
7440-38-2	Arsenic, Dissolved	1	27	ug/L	0.18	0.50	1.0		09/03/13 14:58
7440-39-3	Barium, Dissolved	5	110	ug/L	0.68	2.5	5.0		09/03/13 12:32
7440-41-7	Beryllium, Dissolved	1	0.40	ug/L	0.11	0.40	1.0	U	09/04/13 12:24
7440-43-9	Cadmium, Dissolved	1	0.10	ug/L	0.038	0.10	0.20	U	08/30/13 12:22
7440-47-3	Chromium, Dissolved	1	0.26	ug/L	0.20	0.50	1.0	J	09/03/13 11:06
7440-48-4	Cobalt, Dissolved	1	0.21	ug/L	0.050	0.20	1.0	J	09/03/13 11:06
7440-50-8	Copper, Dissolved	1	0.66	ug/L	0.13	0.50	1.0	J	08/30/13 12:22
7439-92-1	Lead, Dissolved	1	0.50	ug/L	0.15	0.50	1.0	U	08/30/13 12:22
7439-96-5	Manganese, Dissolved	5	270	ug/L	0.70	2.5	5.0		09/03/13 16:26
7440-02-0	Nickel, Dissolved	1	0.59	ug/L	0.17	0.50	1.0	J	09/03/13 11:06
7782-49-2	Selenium, Dissolved	1	0.52	ug/L	0.31	1.0	1.0	JB	09/03/13 14:58
7440-22-4	Silver, Dissolved	1	0.10	ug/L	0.037	0.10	0.20	U	09/03/13 11:06
7440-28-0	Thallium, Dissolved	1	0.10	ug/L	0.027	0.10	1.0	U	08/30/13 12:22
7440-62-2	Vanadium, Dissolved	1	0.21	ug/L	0.066	0.20	1.0	J	09/03/13 11:06
7440-66-6	Zinc, Dissolved	1	4.1	ug/L	1.5	4.0	10	J	08/30/13 12:22

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 17:10
Solids: 0.00
QC Batch: 1308852

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-04
Prepared: 08/22/13 07:00
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, Dissolved	1	0.18	ug/L	0.15	0.50	1.0	J	09/04/13 09:31
7440-38-2	Arsenic, Dissolved	5	71	ug/L	0.88	2.5	5.0		09/05/13 10:04
7440-39-3	Barium, Dissolved	10	220	ug/L	1.4	5.0	10		09/03/13 12:42
7440-41-7	Beryllium, Dissolved	1	0.40	ug/L	0.11	0.40	1.0	U	09/04/13 12:27
7440-43-9	Cadmium, Dissolved	1	0.10	ug/L	0.038	0.10	0.20	U	08/30/13 12:26
7440-47-3	Chromium, Dissolved	1	0.31	ug/L	0.20	0.50	1.0	J	09/03/13 11:10
7440-48-4	Cobalt, Dissolved	1	0.70	ug/L	0.050	0.20	1.0	J	09/03/13 11:10
7440-50-8	Copper, Dissolved	1	0.98	ug/L	0.13	0.50	1.0	J	08/30/13 12:26
7439-92-1	Lead, Dissolved	1	0.50	ug/L	0.15	0.50	1.0	U	08/30/13 12:26
7439-96-5	Manganese, Dissolved	10	670	ug/L	1.4	5.0	10		09/03/13 16:29
7440-02-0	Nickel, Dissolved	1	1.4	ug/L	0.17	0.50	1.0		09/03/13 11:10
7782-49-2	Selenium, Dissolved	1	0.55	ug/L	0.31	1.0	1.0	JB	09/03/13 15:01
7440-22-4	Silver, Dissolved	1	0.10	ug/L	0.037	0.10	0.20	U	09/03/13 11:10
7440-28-0	Thallium, Dissolved	1	0.10	ug/L	0.027	0.10	1.0	U	08/30/13 12:26
7440-62-2	Vanadium, Dissolved	1	0.27	ug/L	0.066	0.20	1.0	J	09/03/13 11:10
7440-66-6	Zinc, Dissolved	1	6.9	ug/L	1.5	4.0	10	J	08/30/13 12:26

00225

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

NTC12-DUP-P3-081513

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 00:00
Solids: 0.00
QC Batch: 1308910

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-05
Prepared: 08/26/13 13:00
Preparation: 7470A Digestion - Total
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, Total	1	0.10	ug/L	0.055	0.10	0.20	U	08/27/13 13:33

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

NTC12GW-01

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 09:50
Solids: 0.00
QC Batch: 1308910

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-01
Prepared: 08/26/13 13:00
Preparation: 7470A Digestion - Total
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, Total	1	0.10	ug/L	0.055	0.10	0.20	U	08/27/13 15:10

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

NTC12GW-02

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 11:40
Solids: 0.00
QC Batch: 1308910

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-02
Prepared: 08/26/13 13:00
Preparation: 7470A Digestion - Total
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, Total	1	0.10	ug/L	0.055	0.10	0.20	U	08/27/13 15:16

00546

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 17:10
Solids: 0.00
QC Batch: 1308910

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-04
Prepared: 08/26/13 13:00
Preparation: 7470A Digestion - Total
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, Total	1	0.10	ug/L	0.055	0.10	0.20	U	08/27/13 15:27

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

NTC12GW-03

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 14:50
Solids: 0.00
QC Batch: 1308910

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-03
Prepared: 08/26/13 13:00
Preparation: 7470A Digestion - Total
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, Total	1	0.10	ug/L	0.055	0.10	0.20	U	08/27/13 15:21

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

NTC12-DUP-P3-081513

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 00:00
Solids: 0.00
QC Batch: 1308911

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-05
Prepared: 08/26/13 13:00
Preparation: 7470A Digestion - Dissolved
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, Dissolved	1	0.10	ug/L	0.055	0.10	0.20	U	08/27/13 14:37

00953

INORGANIC ANALYSIS DATA SHEET

USEPA-7470A

NTC12GW-01

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 09:50
Solids: 0.00
QC Batch: 1308911

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-01
Prepared: 08/26/13 13:00
Preparation: 7470A Digestion - Dissolved
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, Dissolved	1	0.10	ug/L	0.055	0.10	0.20	U	08/27/13 13:50

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

NTC12GW-02

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 11:40
Solids: 0.00
QC Batch: 1308911

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-02
Prepared: 08/26/13 13:00
Preparation: 7470A Digestion - Dissolved
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, Dissolved	1	0.10	ug/L	0.055	0.10	0.20	U	08/27/13 13:55

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

NTC12GW-03

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 14:50
Solids: 0.00
QC Batch: 1308911

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-03
Prepared: 08/26/13 13:00
Preparation: 7470A Digestion - Dissolved
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, Dissolved	1	0.10	ug/L	0.055	0.10	0.20	U	08/27/13 14:01

INORGANIC ANALYSIS DATA SHEET

USEPA-7470A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
Sampled: 08/15/13 17:10
Solids: 0.00
QC Batch: 1308911

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigation
Laboratory ID: 1308343-04
Prepared: 08/26/13 13:00
Preparation: 7470A Digestion - Dissolved
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, Dissolved	1	0.10	ug/L	0.055	0.10	0.20	U	08/27/13 14:06

: 88551

APPENDIX C

SUPPORT DOCUMENTATION

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER № 1225 PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02416	SITE 12 PHASE 3 NS GREAT LAKES	C. RICH	412-921-8984	TRIMATRIX / G. WOOD
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
SJ Conti		S CONTI	412 551 2629	5560 CORP EXCH. CT. SE
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED EX # 8020 3157 8174		GRAND RAPIDS, MI 49512

STANDARD TAT ☐
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): P, P, G, G

PRESERVATIVE USED: 4°C HNO3, 4°C HNO3, 4°C HCL, 4°C H2SO4

TYPE OF ANALYSIS: TAL METALS (TOT) 500 mL 250 mL; TAL METALS (DISS) 500 mL; TCLP VOCS 40 ml VIALS; PHENOLICS 500 mL; TCLP → (SVOCS, PEST HERB, METALS) PH FLASH PT, REACT, BTU TOT PCBs

	DATE YEAR 2013	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 (TOT) 500 mL 250 mL	TAL METALS (DISS) 500 mL	TCLP VOCS 40 ml VIALS	PHENOLICS 500 mL	TCLP → (SVOCS, PEST HERB, METALS) PH FLASH PT, REACT, BTU TOT PCBs			COMMENTS
01	8/15	0950	NTC12GW-01	NTC12 MW01	–	–	GW	G	2	1	1					-01	#1308343
	8/15	1140	NTC12GW-02	NTC12 MW02	–	–	GW	G	2	1	1					-02	
	8/15	1450	NTC12GW-03	NTC12 MW03	–	–	GW	G	2	1	1					-03	
03	8/15	1710	NTC12 GW-04	NTC12 MW04	–	–	GW	G	2	1	1					-04	DO MATRIX SPIKE HERE
	8/16	0845	NTC12-IDW-P3-081613	IDW			IDW	G	8				3	1	4		Drum 8
02	8/15	0000	NTC12-DUP-P3-081513	DUP	–	–	GW	G	2	1	1					-05	
			TRIP BLANK. TM1349														

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY SJ Conti	8/16/13	1200	1. RECEIVED BY FED EX		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY Linda Romeyn	8/17/13	0910

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

00012

STATEMENT OF DATA QUALIFICATIONS

Dissolved Metals by EPA 6000/7000 Series Methods

Qualification:	The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.	
Analysis:	USEPA-6020A	
Sample/Analyte:	1308343-04 NTC12GW-04	Copper
Qualification:	The RPD between the MS and MSD results exceeded the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.	
Analysis:	USEPA-6020A	
Sample/Analyte:	1308343-04 NTC12GW-04	Zinc
Qualification:	The analyte concentration in the associated MB was greater than or equal to 1/2 the LOQ. The positive sample result, which was less than 10 times the MB value, is considered estimated.	
Analysis:	USEPA-6020A	
Sample/Analyte:	1308343-01 NTC12GW-01	Selenium
	1308343-02 NTC12GW-02	Selenium
	1308343-03 NTC12GW-03	Selenium
	1308343-04 NTC12GW-04	Selenium
Qualification:	The % difference between the values of the isotopes monitored for this analyte exceeded 25%; the lower of the two results has been reported.	
Analysis:	USEPA-6020A	
Sample/Analyte:	1308343-01 NTC12GW-01	Nickel
	1308343-02 NTC12GW-02	Copper
	1308343-03 NTC12GW-03	Copper
	1308343-03 NTC12GW-03	Nickel
	1308343-04 NTC12GW-04	Copper
	1308343-04 NTC12GW-04	Nickel
	1308343-05 NTC12-DUP-P3-081513	Copper
	1308343-05 NTC12-DUP-P3-081513	Nickel
Qualification:	This analyte was not present in this sample at a concentration greater than 100 times the MDL, therefore serial dilution is not required.	
Analysis:	USEPA-6020A	
Sample/Analyte:	1308343-04 NTC12GW-04	Antimony
	1308343-04 NTC12GW-04	Copper
	1308343-04 NTC12GW-04	Nickel
	1308343-04 NTC12GW-04	Selenium
	1308343-04 NTC12GW-04	Vanadium
Qualification:	The MS and/or MSD recovery was outside the laboratory or method control limit. The non-spiked sample concentration for this analyte was greater than or equal to 4 times the spiked amount and cannot be used to evaluate matrix quality control.	
Analysis:	USEPA-6010C	
Sample/Analyte:	1308343-04 NTC12GW-04	Magnesium
Analysis:	USEPA-6020A	
Sample/Analyte:	1308343-04 NTC12GW-04	Manganese
Qualification:	Matrix QC results are not available due to sample dilution.	
Analysis:	USEPA-6010C	
Sample/Analyte:	1308343-04 NTC12GW-04	Calcium

Continued on next page

STATEMENT OF DATA QUALIFICATIONS

Dissolved Metals by EPA 6000/7000 Series Methods (Continued)

Qualification:	Matrix QC results are not available due to sample dilution.	
Analysis:	USEPA-6010C	
Sample/Analyte:	1308343-04 NTC12GW-04	Iron
	1308343-04 NTC12GW-04	Sodium

Field Duplicate

		NTC12-DUP-P3-081513		NTC12GW-03		units	RPD	%D	CRDL	MDL
ALUMINUM	MF	50	U	50	U	UG/L	0	0	100	13
ANTIMONY	MF	0.32	J	0.15	J	UG/L	72.3	0.17	1	0.15
ARSENIC	MF	28		27		UG/L	3.6	1	1	0.18
BARIUM	MF	120		110		UG/L	8.7	10	5	0.68
BERYLLIUM	MF	0.4	U	0.4	U	UG/L	0	0	1	0.11
CADMIUM	MF	0.1	U	0.1	U	UG/L	0	0	0.2	0.038
CALCIUM	MF	140000		130000		UG/L	7.4	10000	500	230
CHROMIUM	MF	0.31	J	0.26	J	UG/L	17.5	0.05	1	0.2
COBALT	MF	0.21	J	0.21	J	UG/L	0	0	1	0.05
COPPER	MF	0.75	J	0.66	J	UG/L	12.8	0.09	1	0.13
IRON	MF	9600		9100		UG/L	5.3	500	10	6.5
LEAD	MF	0.5	U	0.5	U	UG/L	0	0	1	0.15
MAGNESIUM	MF	54000		52000		UG/L	3.8	2000	500	140
MANGANESE	MF	280		270		UG/L	3.6	10	5	0.7
MERCURY	MF	0.1	U	0.1	U	UG/L	0	0	0.2	0.055
NICKEL	MF	0.96	J	0.59	J	UG/L	47.7	0.37	1	0.17
POTASSIUM	MF	5700		5500		UG/L	3.6	200	100	33
SELENIUM	MF	1	U	0.52	BJ	UG/L	63.2	0.48	1	0.31
SILVER	MF	0.056	J	0.1	U	UG/L	-56.4	-0.044	0.2	0.037
SODIUM	MF	98000		95000		UG/L	3.1	3000	500	130
THALLIUM	MF	0.1	U	0.1	U	UG/L	0	0	1	0.027
VANADIUM	MF	0.21	J	0.21	J	UG/L	0	0	1	0.066
ZINC	MF	3.7	J	4.1	J	UG/L	-10.3	-0.4	10	1.5

		Field Duplicate								
		NTC12-DUP-P3-081513		NTC12GW-03		units	RPD	%D	CRDL	MDL
ALUMINUM	M	50	U	50	U	UG/L	0	0	100	13
ANTIMONY	M	0.24	J	0.5	U	UG/L	-70.3	-0.26	1	0.15
ARSENIC	M	29		28		UG/L	3.5	1	1	0.18
BARIUM	M	120		120		UG/L	0	0	5	0.68
BERYLLIUM	M	0.4	U	0.4	U	UG/L	0	0	1	0.11
CADMIUM	M	0.1	U	0.1	U	UG/L	0	0	0.2	0.038
CALCIUM	M	130000		130000		UG/L	0	0	500	230
CHROMIUM	M	0.78	J	0.24	J	UG/L	105.9	0.54	1	0.2
COBALT	M	0.21	J	0.19	J	UG/L	10	0.02	1	0.05
COPPER	M	0.78	J	0.72	J	UG/L	8	0.06	1	0.13
IRON	M	9200		9300		UG/L	-1.1	-100.00	10	6.5
LEAD	M	0.21	J	0.2	J	UG/L	4.9	0.01	1	0.15
MAGNESIUM	M	51000		51000		UG/L	0	0	500	140
MANGANESE	M	280		280		UG/L	0	0	5	0.7
MERCURY	M	0.1	U	0.1	U	UG/L	0	0	0.2	0.055
NICKEL	M	0.98	J	0.91	J	UG/L	7.4	0.07	1	0.17
POTASSIUM	M	5300		5300		UG/L	0	0	100	33
SELENIUM	M	1	U	1	U	UG/L	0	0	1	0.31
SILVER	M	0.046	J	0.1	U	UG/L	-74.0	-0.054	0.2	0.037
SODIUM	M	92000		92000		UG/L	0	0	500	130
THALLIUM	M	0.1	U	0.1	U	UG/L	0	0	1	0.027
VANADIUM	M	0.36	J	0.11	J	UG/L	106.4	0.25	1	0.066
ZINC	M	4.9	J	4.8	J	UG/L	2.1	0.1	10	1.5

2	B 249.769†	14115.5	13847.0	436.401 ug/L	436.401 ug/L	16:35:06
2	Ba 455.403†	50178.8	50974.9	124.008 ug/L	124.008 ug/L	16:35:06
2	Be 234.863†	460.9	312.9	0.224874 ug/L	0.224874 ug/L	16:35:06
2	Ca 315.874†	1689753.9	1727941.5	135.247 mg/L	135.247 mg/L	16:35:00
2	Cd 214.436†	-84.8	-19.8	-4.44077 ug/L	-4.44077 ug/L	16:35:26
2	Ce 413.764†	267.5	104.3	20.6304 ug/L	20.6304 ug/L	16:35:06
2	Co 228.616†	-25.7	10.3	-0.537953 ug/L	-0.537953 ug/L	16:35:26
2	Cr 205.563†	40.7	-10.6	-5.33275 ug/L	-5.33275 ug/L	16:35:26
2	Cu 324.741†	-7.1	-0.5	3.03242 ug/L	3.03242 ug/L	16:35:06
2	Fe 238.204†	102723.0	104991.0	9586.02 ug/L	9586.02 ug/L	16:35:06
2	K 766.490†	28181.6	27376.8	5.67792 mg/L	5.67792 mg/L	16:35:06
2	Li 670.784†	8626.2	7283.3	38.7386 ug/L	38.7386 ug/L	16:35:06
2	Mg 279.071†	151697.3	155205.9	54.3474 mg/L	54.3474 mg/L	16:35:06
2	Mn 257.610†	32800.0	33569.9	286.983 ug/L	286.983 ug/L	16:35:06
2	Mo 202.031†	74.7	73.3	14.3621 ug/L	14.3621 ug/L	16:35:26
2	Na 589.592†	942859.1	963852.8	98.0334 mg/L	98.0334 mg/L	16:35:00
2	Ni 231.604†	-38.6	15.0	-0.444425 ug/L	-0.444425 ug/L	16:35:26
2	Pb 220.353†	6.9	18.7	-5.32680 ug/L	-5.32680 ug/L	16:35:26
2	Sb 217.582	-21.0	-9.4			16:35:26
2	Se 196.026†	7.8	25.8	30.1499 ug/L	30.1499 ug/L	16:35:26
2	Sn 189.927†	-11.6	-12.2	-24.4267 ug/L	-24.4267 ug/L	16:35:26
2	Sr 407.771†	2342993.2	2394403.3	1364.43 ug/L	1364.43 ug/L	16:35:00
2	Ti 334.946†	-2238.5	-3997.5	0.592366 ug/L	0.592366 ug/L	16:35:06
2	Tl 190.801†	-8.0	-3.2	-18.2094 ug/L	-18.2094 ug/L	16:35:26
2	V 292.395†	-335.8	27.0	-1.06621 ug/L	-1.06621 ug/L	16:35:26
2	Zn 206.200†	152.2	115.6	11.3945 ug/L	11.3945 ug/L	16:35:26

AD

Mean Data: 1308343-05

Analyte	Mean Corrected Intensity	Conc.	Calib. Units	Std.Dev.	Sample Conc.	Sample Units	Sample Std.Dev.	RSD
Sc 357.234	366403.1	97.78	%	0.014				0.01%
Y 371.029	457890.2	96.73	%	0.050				0.05%
Ag 328.068†	26.1	0.574347	ug/L	0.9277992	0.574347	ug/L	0.9277992	161.54%
Al 396.146†	277.6	-44.3842	ug/L	0.14608	-44.3842	ug/L	0.14608	0.33%
As 188.979†	52.5	51.1010	ug/L	10.27586	51.1010	ug/L	10.27586	20.11%
B 249.769†	13780.5	434.249	ug/L	3.0436	434.249	ug/L	3.0436	0.70%
Ba 455.403†	50943.7	123.930	ug/L	0.1105	123.930	ug/L	0.1105	0.09%
Be 234.863†	314.9	0.233612	ug/L	0.0123579	0.233612	ug/L	0.0123579	5.29%
Ca 315.874†	1725781.5	135.078	mg/L	0.2391	135.078	mg/L	0.2391	0.18%
Cd 214.436†	-16.1	-4.19238	ug/L	0.351276	-4.19238	ug/L	0.351276	8.38%
Ce 413.764†	73.2	14.4663	ug/L	8.71729	14.4663	ug/L	8.71729	60.26%
Co 228.616†	10.3	-0.538895	ug/L	0.0013322	-0.538895	ug/L	0.0013322	0.25%
Cr 205.563†	-10.9	-5.38782	ug/L	0.077880	-5.38782	ug/L	0.077880	1.45%
Cu 324.741†	-11.1	2.07096	ug/L	1.359702	2.07096	ug/L	1.359702	65.66%
Fe 238.204†	104979.7	9584.98	ug/L	1.472	9584.98	ug/L	1.472	0.02%
K 766.490†	27373.4	5.67719	mg/L	0.001022	5.67719	mg/L	0.001022	0.02%
Li 670.784†	7311.9	38.8969	ug/L	0.22375	38.8969	ug/L	0.22375	0.58%
Mg 279.071†	155264.4	54.3680	mg/L	0.02902	54.3680	mg/L	0.02902	0.05%
Mn 257.610†	33542.8	286.750	ug/L	0.3298	286.750	ug/L	0.3298	0.12%
Mo 202.031†	76.4	15.6203	ug/L	1.77932	15.6203	ug/L	1.77932	11.39%
Na 589.592†	963026.7	97.9494	mg/L	0.11884	97.9494	mg/L	0.11884	0.12%
Ni 231.604†	9.2	-1.19652	ug/L	1.063620	-1.19652	ug/L	1.063620	88.89%
Pb 220.353†	13.1	-9.71315	ug/L	6.203235	-9.71315	ug/L	6.203235	63.86%
Sb 217.582	-11.2						2.47	22.08%
Se 196.026†	18.2	4.97152	ug/L	35.607629	4.97152	ug/L	35.607629	716.23%
Sn 189.927†	-13.0	-26.9327	ug/L	3.54408	-26.9327	ug/L	3.54408	13.16%
Sr 407.771†	2390754.8	1362.35	ug/L	2.950	1362.35	ug/L	2.950	0.22%
Ti 334.946†	-3995.5	0.568834	ug/L	0.0332800	0.568834	ug/L	0.0332800	5.85%
Tl 190.801†	-3.0	-16.8501	ug/L	1.92237	-16.8501	ug/L	1.92237	11.41%
V 292.395†	3.9	-1.79238	ug/L	1.026957	-1.79238	ug/L	1.026957	57.30%
Zn 206.200†	114.5	11.1960	ug/L	0.28084	11.1960	ug/L	0.28084	2.51%

Sequence No.: 27
Sample ID: 1308853-BLK1
Analyst:
Initial Sample Wt:
Dilution:

NTC12-DUP-P3-081513

Autosampler Location: 28
Date Collected: 8/26/2013 4:36:40 PM
Data Type: Original
Initial Sample Vol:
Sample Prep Vol:

Replicate Data: 1308853-BLK1

$135.078\ \frac{mg}{L} \times \frac{1000\ ug}{1\ mg} = 135078\ \frac{ug}{L}$ reported as $140000\ \frac{ug}{L}$: 60128

STATEMENT OF DATA QUALIFICATIONS

Total Metals by EPA 6000/7000 Series Methods

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-6020A

Sample/Analyte:		
	1308343-04 NTC12GW-04	Copper

Qualification: The % difference between the values of the isotopes monitored for this analyte exceeded 25%; the lower of the two results has been reported.

Analysis: USEPA-6020A

Sample/Analyte:		
	1308343-01 NTC12GW-01	Nickel
	1308343-01 NTC12GW-01	Selenium
	1308343-02 NTC12GW-02	Copper
	1308343-03 NTC12GW-03	Copper
	1308343-03 NTC12GW-03	Nickel
	1308343-04 NTC12GW-04	Nickel
	1308343-05 NTC12-DUP-P3-081513	Copper
	1308343-05 NTC12-DUP-P3-081513	Nickel

Qualification: This analyte was not present in this sample at a concentration greater than 100 times the MDL, therefore serial dilution is not required.

Analysis: USEPA-6020A

Sample/Analyte:		
	1308343-04 NTC12GW-04	Antimony
	1308343-04 NTC12GW-04	Copper

Qualification: The MS and/or MSD recovery was outside the laboratory or method control limit. The non-spiked sample concentration for this analyte was greater than or equal to 4 times the spiked amount and cannot be used to evaluate matrix quality control.

Analysis: USEPA-6010C

Sample/Analyte:		
	1308343-04 NTC12GW-04	Calcium
	1308343-04 NTC12GW-04	Iron
	1308343-04 NTC12GW-04	Magnesium
	1308343-04 NTC12GW-04	Sodium

Analysis: USEPA-6020A

Sample/Analyte:		
	1308343-04 NTC12GW-04	Barium
	1308343-04 NTC12GW-04	Manganese

TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

TETRA TECH NUS - Pittsburgh
NS Great Lakes CTO F27A Site 12 Investigation

SDG Executive Summary

This case narrative applies to samples received on August 17, 2013. All samples were scheduled for analysis in accordance with parameters outlined on the field chain of custody record, the TriMatrix bid form, and/or oral and written correspondence between TETRA TECH NUS - Pittsburgh and TriMatrix Laboratories, Inc.

Each sample receipt event was assigned a unique TriMatrix work order number. Sample receipt documentation is included in section A of this data package.

Project Technical Issues/Problems

Project-related data qualification designations and reporting conventions are included in Attachment 1 - *Project Technical Narrative.*

QA/QC Data Qualifications/Narrations

Quality assurance issues and/or quality control data qualifications and narrations related to the analysis and reporting of this SDG are presented in Attachment 2 - *Statement of Data Qualifications*. The absence of a statement page for a particular analyte group (*e.g.* Percent Solids) implies that no qualifying statements were generated for that analyte.

Data Review and Approval

All data was peer-reviewed by a second analyst, and then by appropriate data management staff against laboratory quality control requirements and project specifications. It was then reviewed and approved by the group supervisor/manager prior to further review by the project chemist.

Data Deliverables

This report relates only to the sample(s) as received. Estimates of analytical uncertainties for the test results contained within this report are available upon request. Test results are in compliance with the requirements of the DoD Quality Systems Manual for Environmental Laboratories Version 4.2, the National Environmental Laboratory Accreditation Conference (NELAC), and one or more of the following certification programs:

ACLASS DoD-ELAP/ISO17025 (#ADE-1542); Arkansas DEP (#88-0730/12-056-0); Florida DEP (#E87622-24); Georgia EPD (#E87622-24); Illinois DEP (#200026/003059); Kansas DPH (#E-10302); Kentucky DEP (#0021); Louisiana DEP (#83658); Michigan DPH (#0034); Minnesota DPH (#491715); New York ELAP (#11776/48855); North Carolina DNRE (#659); Texas CEQ (#T104704495-13-3); Virginia DCLS (#460153/1622); Wisconsin DNR (#999472650); USDA Soil Import Permit (#P330-12-00236).

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Individual sample results relate only to the sample tested.
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TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

The data deliverables, both hardcopy and/or electronic (EDD), that comprise this data package are intended to comply with the documents referenced in the introductory section of this narrative. If requested, the EDD will be issued separately from this hardcopy report. Hold time reports for each test procedure are presented following the CLP-like forms section of this report.

Gary L. Wood, Project Chemist

9/11/13
Date

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TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

Sample Receipt and Login -- Work Order: 1308343

TriMatrix Laboratories received the cooler(s) for this work order on August 17, 2013, at 09:10am. Receiving documents include field chain-of-custody (COC) record(s), sample receipt form(s), and FedEx shipping document(s). The condition of the custody seals, the type and location of the coolant, and the temperatures recorded for each cooler are presented on the TriMatrix *Sample Receiving / Log-In Checklist* provided in section A of this package. The receipt temperature of the samples was determined by using an infrared thermometer to record the temperature of three random samples of varying container types and the accompanying temperature blank, if present.

Samples were scheduled for the analyses listed on the corresponding COC form. Field IDs and assigned laboratory identifiers are presented in the table below.

Field Sample Name	Laboratory Sample ID	Matrix	Date Sampled
NTC12GW-01	1308343-01	Water	8/15/2013
NTC12GW-02	1308343-02	Water	8/15/2013
NTC12GW-03	1308343-03	Water	8/15/2013
NTC12GW-04	1308343-04	Water	8/15/2013
NTC12-DUP-P3-081513	1308343-05	Water	8/15/2013

No administrative issues were encountered during the receipt and analysis of this work order.

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TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

Attachment 1
Project Technical Narrative

Sample Result Reporting Convention

Sample results are reported as LOD "U" (e.g. 0.001 U) if the target analyte was not detected at or above the detection limit (DL). The LOD is the Limit of Detection as defined in the DoD QSM and numerically determined by TriMatrix.

If a sample for an organic analyte is reanalyzed and also reported, the second analysis includes the suffix "RE*n*" where *n* = the first, second, etc. reanalysis. If a sample is reanalyzed for confirmation purposes but that confirmation was not performed simultaneously, the second set of sample results is reported on a second Form 1 since the confirmation analysis did not occur at the same time and/or date.

Percent Solids and Metals Data Reporting

Unless otherwise noted, all soil samples requiring metals analysis are dried at 50° to 60° C to a constant weight prior to acid digestion. In order to report results on a dry weight basis, correction for percent solids is not applicable.

Data Qualifier Designation

If applicable, sample results are qualified with:

- a "U" flag as defined above;
- a "J" flag if the analyte was detected, but the concentration is greater than the DL and less than the LOQ (the Limit of Quantitation as defined in the DoD QSM);
- a "B" flag if the analyte was detected above one-half the LOQ (above the LOQ for a common laboratory contaminant) in the associated method blank, and the sample concentration was less than or equal to ten times the method blank result;
- a "E" flag if the analyte exceeded the instrument calibration range;
- a "N" flag for a non-target analyte identified as a tentatively identified compound using mass spectrometry;
- a LIMS-generated statement of qualification that will be reported in Attachment 2 to this narrative.

Batch and Analytical Batch Designation

A Quality Control (QC) Batch is a seven-digit number that associates all samples that have been prepared together (or analyzed together if there is no preparation). Quality Control batches are limited to no more than twenty samples, excluding batch QC (method blanks, control spikes, etc.). Some batches may contain multiple sets of method blanks (BLK) and laboratory control samples (BS), where a set of method quality control analyses were prepared in concert with each set of samples on a given day.

An Analytical Batch (or Sequence) is a seven-digit number that associates all samples analyzed as a set under one analytical run.

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TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Dissolved Metals by EPA 6000/7000 Series Methods

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-6020A

Sample/Analyte:		
	1308343-04 NTC12GW-04	Copper

Qualification: The RPD between the MS and MSD results exceeded the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-6020A

Sample/Analyte:		
	1308343-04 NTC12GW-04	Zinc

Qualification: The analyte concentration in the associated MB was greater than or equal to 1/2 the LOQ. The positive sample result, which was less than 10 times the MB value, is considered estimated.

Analysis: USEPA-6020A

Sample/Analyte:		
	1308343-01 NTC12GW-01	Selenium
	1308343-02 NTC12GW-02	Selenium
	1308343-03 NTC12GW-03	Selenium
	1308343-04 NTC12GW-04	Selenium

Qualification: The % difference between the values of the isotopes monitored for this analyte exceeded 25%; the lower of the two results has been reported.

Analysis: USEPA-6020A

Sample/Analyte:		
	1308343-01 NTC12GW-01	Nickel
	1308343-02 NTC12GW-02	Copper
	1308343-03 NTC12GW-03	Copper
	1308343-03 NTC12GW-03	Nickel
	1308343-04 NTC12GW-04	Copper
	1308343-04 NTC12GW-04	Nickel
	1308343-05 NTC12-DUP-P3-081513	Copper
	1308343-05 NTC12-DUP-P3-081513	Nickel

Qualification: This analyte was not present in this sample at a concentration greater than 100 times the MDL, therefore serial dilution is not required.

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TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Dissolved Metals by EPA 6000/7000 Series Methods

Analysis:	USEPA-6020A	
Sample/Analyte:	1308343-04 NTC12GW-04	Antimony
	1308343-04 NTC12GW-04	Copper
	1308343-04 NTC12GW-04	Nickel
	1308343-04 NTC12GW-04	Selenium
	1308343-04 NTC12GW-04	Vanadium

Qualification: The MS and/or MSD recovery was outside the laboratory or method control limit. The non-spiked sample concentration for this analyte was greater than or equal to 4 times the spiked amount and cannot be used to evaluate matrix quality control.

Analysis:	USEPA-6010C	
Sample/Analyte:	1308343-04 NTC12GW-04	Magnesium
Analysis:	USEPA-6020A	
Sample/Analyte:	1308343-04 NTC12GW-04	Manganese

Qualification: Matrix QC results are not available due to sample dilution.

Analysis:	USEPA-6010C	
Sample/Analyte:	1308343-04 NTC12GW-04	Calcium
	1308343-04 NTC12GW-04	Iron
	1308343-04 NTC12GW-04	Sodium

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TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Total Metals by EPA 6000/7000 Series Methods

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-6020A

Sample/Analyte:	
1308343-04 NTC12GW-04	Copper

Qualification: The % difference between the values of the isotopes monitored for this analyte exceeded 25%; the lower of the two results has been reported.

Analysis: USEPA-6020A

Sample/Analyte:	
1308343-01 NTC12GW-01	Nickel
1308343-01 NTC12GW-01	Selenium
1308343-02 NTC12GW-02	Copper
1308343-03 NTC12GW-03	Copper
1308343-03 NTC12GW-03	Nickel
1308343-04 NTC12GW-04	Nickel
1308343-05 NTC12-DUP-P3-081513	Copper
1308343-05 NTC12-DUP-P3-081513	Nickel

Qualification: This analyte was not present in this sample at a concentration greater than 100 times the MDL, therefore serial dilution is not required.

Analysis: USEPA-6020A

Sample/Analyte:	
1308343-04 NTC12GW-04	Antimony
1308343-04 NTC12GW-04	Copper

Qualification: The MS and/or MSD recovery was outside the laboratory or method control limit. The non-spiked sample concentration for this analyte was greater than or equal to 4 times the spiked amount and cannot be used to evaluate matrix quality control.

Analysis: USEPA-6010C

Sample/Analyte:	
1308343-04 NTC12GW-04	Calcium
1308343-04 NTC12GW-04	Iron
1308343-04 NTC12GW-04	Magnesium
1308343-04 NTC12GW-04	Sodium

Analysis: USEPA-6020A

Sample/Analyte:	
1308343-04 NTC12GW-04	Barium

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TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Total Metals by EPA 6000/7000 Series Methods

Sample/Analyte: 1308343-04 NTC12GW-04 Manganese

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SAMPLE RECEIVING / LOG-IN CHECKLIST

TRIMATRIX LABORATORIES

Client: Tetra Tech Nus Inc
Receipt Record Page/Line #: 19-2
Work Order #: 1308343
New / Add To
Project Chemist: GLW
Sample #s

Recorded by (initials/date): LR 8/17/13

☑ Cooler ☐ Box ☐ Other
Qty Received: 1

☑ IR Gun (#202)
Thermometer Used ☐ Digital Thermometer (#54) ☐ Other (#_____)
☐ See Additional Cooler Information Form

Cooler #	Time
TM 1349	1010

Custody Seals: ☐ None ☑ Present / Intact ☐ Present / Not Intact
Coolant Location: (Dispersed) / Top / Middle / Bottom
Coolant/Temperature Taken Via: ☑ Loose Ice / Avg 2-3 containers ☐ Bagged Ice / Avg 2-3 containers ☐ Blue Ice / Avg 2-3 containers ☐ None / Avg 2-3 containers
Alternate Temperature Taken Via: ☐ Temperature Blank (TB) ☐ 1 Container

	Recorded °C	Correction Factor °C	Actual °C
Temp Blank:	—		3.3
TB location: Representative / Not Representative			
1	4.6	—	4.6
2	5.4	—	5.4
3	5.3	—	5.3
Average °C			5.1

☑ Cooler ID on COC? ☑ VOC Trip Blank received?

Cooler #	Time

Custody Seals: ☐ None ☐ Present / Intact ☐ Present / Not Intact
Coolant Location: Dispersed / Top / Middle / Bottom
Coolant/Temperature Taken Via: ☐ Loose Ice / Avg 2-3 containers ☐ Bagged Ice / Avg 2-3 containers ☐ Blue Ice / Avg 2-3 containers ☐ None / Avg 2-3 containers
Alternate Temperature Taken Via: ☐ Temperature Blank (TB) ☐ 1 Container

	Recorded °C	Correction Factor °C	Actual °C
Temp Blank:			
TB location: Representative / Not Representative			
1			
2			
3			
Average °C			

☐ Cooler ID on COC? ☐ VOC Trip Blank received?

Cooler #	Time

Custody Seals: ☐ None ☐ Present / Intact ☐ Present / Not Intact
Coolant Location: Dispersed / Top / Middle / Bottom
Coolant/Temperature Taken Via: ☐ Loose Ice / Avg 2-3 containers ☐ Bagged Ice / Avg 2-3 containers ☐ Blue Ice / Avg 2-3 containers ☐ None / Avg 2-3 containers
Alternate Temperature Taken Via: ☐ Temperature Blank (TB) ☐ 1 Container

	Recorded °C	Correction Factor °C	Actual °C
Temp Blank:			
TB location: Representative / Not Representative			
1			
2			
3			
Average °C			

☐ Cooler ID on COC? ☐ VOC Trip Blank received?

Cooler #	Time

Custody Seals: ☐ None ☐ Present / Intact ☐ Present / Not Intact
Coolant Location: Dispersed / Top / Middle / Bottom
Coolant/Temperature Taken Via: ☐ Loose Ice / Avg 2-3 containers ☐ Bagged Ice / Avg 2-3 containers ☐ Blue Ice / Avg 2-3 containers ☐ None / Avg 2-3 containers
Alternate Temperature Taken Via: ☐ Temperature Blank (TB) ☐ 1 Container

	Recorded °C	Correction Factor °C	Actual °C
Temp Blank:			
TB location: Representative / Not Representative			
1			
2			
3			
Average °C			

☐ Cooler ID on COC? ☐ VOC Trip Blank received?

If any shaded areas checked, complete Sample Receiving Non-Conformance and/or Inventory Form

Paperwork Received

Yes	No	
☑	☐	Chain of Custody record(s)? If No, Initiated By _____
☑		Received for Lab Signed/Date/Time?
☑	☐	Shipping document?
☐	☑	Other _____

COC Information

☐ TriMatrix COC ☑ Other 1225
COC ID Numbers:

Check COC for Accuracy

Yes	No	
☑	☐	Analysis Requested?
☑	☐	Sample ID matches COC?
☑	☐	Sample Date and Time matches COC?
☑		Container type completed on COC?
☑	☐	All container types indicated are received?

Sample Condition Summary

N/A	Yes	No	
	☐	☑	Broken containers/lids?
	☐	☑	Missing or incomplete labels?
	☐	☑	Illegible information on labels?
	☐	☑	Low volume received?
	☐	☑	Inappropriate or non-TriMatrix containers received?
☐	☐	☑	VOC vials / TOX containers have headspace?
☑	☐	☐	Extra sample locations / containers not listed on COC?

Check Sample Preservation

N/A	Yes	No	
	☑	☐	Average sample temperature ≤6° C?
☑	☐	☐	Was thermal preservation required?
☑	☐	☐	If "No", Project Chemist Approval Intials: _____
☑	☐	☐	If "Yes" Completed Non Con Cooler - Cont Inventory Form?
☐	☑		Completed Sample Preservation Verification Form?
☐	☑	☐	Samples chemically preserved correctly?
☑	☐	☐	If "No", added orange tag?
	☐	☑	Received pre-preserved VOC soils? ☐ MeOH ☐ Na_2SO_4

Check for Short Hold-Time Prep/Analyses

☐ Bacteriological
☐ Air Bags
☐ EnCores / Methanol Pre-Preserved
☐ Formaldehyde/Aldehyde
☐ Green-tagged containers
☐ Yellow/White-tagged 1L ambers (SV Prep-Lab)

AFTER HOURS ONLY:
COPIES OF COC TO LAB AREA(S)
☑ NONE RECEIVED
☐ RECEIVED, COCs TO LAB(S)

Notes

☑ Trip Blank received ☐ Trip Blank not listed on COC

Cooler Received (Date/Time)	Paperwork Delivered (Date/Time)	≤1 Hour Goal Met?
8/17/13 0910	8/17/13 1020	Yes / (No)

TRIMATRIX LABORATORIES — SAMPLE PRESERVATION VERIFICATION FORM

page ____ of ____

Client	Work Order #
Tetra Tech NUS, INC	1308343
Receipt Log #	Completed By (initials/date)	Project Chemist
19-2	LR 8/17/13	GLW

COC ID #	Adjusted by:	DO NOT ADJUST pH FOR THESE CONTAINER TYPES
1225	Date:	

Container Type	5 / 23	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1						✓	✓	
COC Line #2						✓	✓	
COC Line #3						✓	✓	
COC Line #4			✓					
COC Line #5						✓	✓	
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

Ph Strip Lot # ☑ HC270245 ☐ ____

Aqueous Samples: For each sample and container type, check the box if pH is acceptable. If pH is not acceptable for any sample container, record pH in box, and note on Sample Receiving Checklist and on Sample Receiving Non-Conformance Form. If approved by Project Chemist, add acid or base to the sample to achieve the correct pH. Add up to, but do not exceed 2x the volume initially added at container prep (see table below for initial volumes used). Add orange pH tag to sample container and record information requested. Record adjusted pH on this form. Do not adjust pH for container types 3, 6, and 15.

COC ID #	Adjusted by:	DO NOT ADJUST pH FOR THESE CONTAINER TYPES
	Date:	

Container Type	5 / 23	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1								
COC Line #2								
COC Line #3								
COC Line #4								
COC Line #5								
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

Container Size (mL)	Original Vol. of Preservative (mL)
Container Type 5	NaOH
500	2.5
1000	5.0
Container Type 4	H_2SO_4
125	0.5
250	1.0
500	2.0
1000	4.0
Container Type 13	H_2SO_4
500	2.5

SDG 1308343

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
HG	UG/L	NTC12GW-01	1308343-01	NM	8/15/2013	8/26/2013	8/27/2013	11	1	12
HG	UG/L	NTC12GW-02	1308343-02	NM	8/15/2013	8/26/2013	8/27/2013	11	1	12
HG	UG/L	NTC12GW-03	1308343-03	NM	8/15/2013	8/26/2013	8/27/2013	11	1	12
HG	UG/L	NTC12GW-04	1308343-04	NM	8/15/2013	8/26/2013	8/27/2013	11	1	12
HG	UG/L	NTC12-DUP-P3-081513	1308343-05	NM	8/15/2013	8/26/2013	8/27/2013	11	1	12
M	UG/L	NTC12GW-01	1308343-01	NM	8/15/2013	8/22/2013	8/26/2013	7	4	11
M	UG/L	NTC12GW-04	1308343-04	NM	8/15/2013	8/22/2013	8/26/2013	7	4	11
M	UG/L	NTC12GW-03	1308343-03	NM	8/15/2013	8/22/2013	8/26/2013	7	4	11
M	UG/L	NTC12GW-02	1308343-02	NM	8/15/2013	8/22/2013	9/4/2013	7	13	20
M	UG/L	NTC12GW-02	1308343-02	NM	8/15/2013	8/22/2013	9/3/2013	7	12	19
M	UG/L	NTC12GW-02	1308343-02	NM	8/15/2013	8/22/2013	8/26/2013	7	4	11
M	UG/L	NTC12GW-04	1308343-04	NM	8/15/2013	8/22/2013	9/4/2013	7	13	20
M	UG/L	NTC12GW-01	1308343-01	NM	8/15/2013	8/22/2013	8/30/2013	7	8	15
M	UG/L	NTC12GW-04	1308343-04	NM	8/15/2013	8/22/2013	9/3/2013	7	12	19
M	UG/L	NTC12-DUP-P3-081513	1308343-05	NM	8/15/2013	8/22/2013	9/3/2013	7	12	19

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	UG/L	NTC12-DUP-P3-081513	1308343-05	NM	8/15/2013	8/22/2013	8/30/2013	7	8	15
M	UG/L	NTC12-DUP-P3-081513	1308343-05	NM	8/15/2013	8/22/2013	8/26/2013	7	4	11
M	UG/L	NTC12GW-01	1308343-01	NM	8/15/2013	8/22/2013	9/3/2013	7	12	19
M	UG/L	NTC12GW-03	1308343-03	NM	8/15/2013	8/22/2013	9/3/2013	7	12	19
HGF	UG/L	NTC12-DUP-P3-081513	1308343-05	NM	8/15/2013	8/26/2013	8/27/2013	11	1	12
HGF	UG/L	NTC12GW-01	1308343-01	NM	8/15/2013	8/26/2013	8/27/2013	11	1	12
HGF	UG/L	NTC12GW-02	1308343-02	NM	8/15/2013	8/26/2013	8/27/2013	11	1	12
HGF	UG/L	NTC12GW-03	1308343-03	NM	8/15/2013	8/26/2013	8/27/2013	11	1	12
HGF	UG/L	NTC12GW-04	1308343-04	NM	8/15/2013	8/26/2013	8/27/2013	11	1	12
MF	UG/L	NTC12GW-03	1308343-03	NM	8/15/2013	8/22/2013	8/30/2013	7	8	15
MF	UG/L	NTC12GW-04	1308343-04	NM	8/15/2013	8/22/2013	9/4/2013	7	13	20
MF	UG/L	NTC12GW-04	1308343-04	NM	8/15/2013	8/22/2013	9/3/2013	7	12	19
MF	UG/L	NTC12GW-04	1308343-04	NM	8/15/2013	8/22/2013	8/30/2013	7	8	15
MF	UG/L	NTC12GW-04	1308343-04	NM	8/15/2013	8/22/2013	8/27/2013	7	5	12
MF	UG/L	NTC12GW-04	1308343-04	NM	8/15/2013	8/22/2013	8/26/2013	7	4	11
MF	UG/L	NTC12GW-03	1308343-03	NM	8/15/2013	8/22/2013	9/3/2013	7	12	19
MF	UG/L	NTC12-DUP-P3-081513	1308343-05	NM	8/15/2013	8/22/2013	8/26/2013	7	4	11
MF	UG/L	NTC12GW-03	1308343-03	NM	8/15/2013	8/22/2013	8/26/2013	7	4	11

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
MF	UG/L	NTC12GW-02	1308343-02	NM	8/15/2013	8/22/2013	9/4/2013	7	13	20
MF	UG/L	NTC12GW-02	1308343-02	NM	8/15/2013	8/22/2013	9/3/2013	7	12	19
MF	UG/L	NTC12GW-02	1308343-02	NM	8/15/2013	8/22/2013	8/26/2013	7	4	11
MF	UG/L	NTC12GW-01	1308343-01	NM	8/15/2013	8/22/2013	9/4/2013	7	13	20
MF	UG/L	NTC12GW-01	1308343-01	NM	8/15/2013	8/22/2013	9/3/2013	7	12	19
MF	UG/L	NTC12GW-01	1308343-01	NM	8/15/2013	8/22/2013	8/26/2013	7	4	11
MF	UG/L	NTC12-DUP-P3-081513	1308343-05	NM	8/15/2013	8/22/2013	9/4/2013	7	13	20
MF	UG/L	NTC12GW-04	1308343-04	NM	8/15/2013	8/22/2013	9/5/2013	7	14	21
MF	UG/L	NTC12-DUP-P3-081513	1308343-05	NM	8/15/2013	8/22/2013	9/3/2013	7	12	19
MF	UG/L	NTC12GW-03	1308343-03	NM	8/15/2013	8/22/2013	9/4/2013	7	13	20

TriMatrix Laboratories, Inc.

PREPARATION BATCH **1308853** Page 1 of 1

Printed: 9/10/2013 8:30:32AM

Metals, Water, 3010A Digestion

Batch comments:

MAS 08/22/13 7:00am-4:00pm
inst#220@91.2-93.9c#276
hotblock vessel lot#1303205

Lab Number	Container	Prepared	By	Initial (mL)	Final (mL)	Client Source ID	Client Spike ID	Client uL Spike	Comments
1308343-01	A	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh			
Al Total 6010C (DoD)	Ca Total 6010C (DoD)	Fe Total 6010C (DoD)	K Total 6010C (DoD)	Mg Total 6010C (DoD)	Na Total 6010C (DoD)				
1308343-02	A	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh			
Al Total 6010C (DoD)	Ca Total 6010C (DoD)	Fe Total 6010C (DoD)	K Total 6010C (DoD)	Mg Total 6010C (DoD)	Na Total 6010C (DoD)				
1308343-03	A	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh			
Al Total 6010C (DoD)	Ca Total 6010C (DoD)	Fe Total 6010C (DoD)	K Total 6010C (DoD)	Mg Total 6010C (DoD)	Na Total 6010C (DoD)				
1308343-04	A	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh			
Al Total 6010C (DoD)	Ca Total 6010C (DoD)	Fe Total 6010C (DoD)	K Total 6010C (DoD)	Mg Total 6010C (DoD)	Na Total 6010C (DoD)				
1308343-05	A	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh			
Al Total 6010C (DoD)	Ca Total 6010C (DoD)	Fe Total 6010C (DoD)	K Total 6010C (DoD)	Mg Total 6010C (DoD)	Na Total 6010C (DoD)				
1308853-BLK1		Aug-22-13 07:00	MAS	25	25				
1308853-BS1		Aug-22-13 07:00	MAS	25	25		2101174	200	
1308853-MS1		Aug-22-13 07:00	MAS	25	25	1308343-04	2101174	200	
1308853-MSD1		Aug-22-13 07:00	MAS	25	25	1308343-04	2101174	200	
1308853-PS1		Aug-26-13 15:00	CKD	4	4	1308343-04	2101174	20	
1308853-PS2		Aug-26-13 15:00	CKD	0.4	0.4	1308343-04	2101174	50	

Comments:	Analyst Initials:

QC BATCH SUMMARY
USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatior
QC Batch: 1308853
QC Batch Matrix: Water
Preparation: 3010A Digestion

Sample Name	Lab Sample ID	Date Prepared	Observations
NTC12GW-01	1308343-01	08/22/13 07:00	
NTC12GW-02	1308343-02	08/22/13 07:00	
NTC12GW-03	1308343-03	08/22/13 07:00	
NTC12GW-04	1308343-04	08/22/13 07:00	
NTC12-DUP-P3-081513	1308343-05	08/22/13 07:00	
Blank	1308853-BLK1	08/22/13 07:00	
LCS	1308853-BS1	08/22/13 07:00	
NTC12GW-04	1308853-MS1	08/22/13 07:00	
NTC12GW-04	1308853-MSD1	08/22/13 07:00	

: 66068

METHOD BLANK DATA SHEET
USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308853-BLK1
File ID: 3H26042-027
Prepared: 08/22/13 07:00
Analyzed: 08/26/13 16:36
Preparation: 3010A Digestion
Initial/Final: 25 mL / 25 mL
QC Batch: 1308853
Sequence: 3H26042
Calibration: 3H26019
Instrument: 116

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7429-90-5	Aluminum, Total	50	ug/L	13	50	100	U
7440-70-2	Calcium, Total	500	ug/L	230	500	500	U
7439-89-6	Iron, Total	10	ug/L	6.5	10	10	U
7439-95-4	Magnesium, Total	500	ug/L	140	500	500	U
7440-09-7	Potassium, Total	100	ug/L	33	100	100	U
7440-23-5	Sodium, Total	500	ug/L	130	500	500	U

00062

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308853

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308853-MS1

Preparation: 3010A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Aluminum, Total	2000	57.4	1910	93	80 - 120	ug/L
Calcium, Total	20000	207000	198000	-420 *	80 - 120	ug/L
Iron, Total	400	18500	16700	-4650 *	80 - 120	ug/L
Magnesium, Total	20000	87400	96800	47 *	80 - 120	ug/L
Potassium, Total	20000	7070	25500	92	80 - 120	ug/L
Sodium, Total	20000	111000	117000	32 *	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

00664

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308853

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308853-MSD1

Preparation: 3010A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Aluminum, Total	2000	1980	96	3	20	80 - 120	ug/L
Calcium, Total	20000	203000	-17	3	20	80 - 120	ug/L
Iron, Total	400	17000	-367	2	20	80 - 120	ug/L
Magnesium, Total	20000	99000	58	2	20	80 - 120	ug/L
Potassium, Total	20000	26000	95	2	20	80 - 120	ug/L
Sodium, Total	20000	120000	46	2	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

68065

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6010C

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308853-PS1
% Solids:
Lab Source ID: 1308343-04
Preparation: 3010A Digestion
Initial/Final: 4 mL / 4 mL
QC Batch: 1308853
Sequence: 3H26042

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Aluminum, Total	1360	57.4	ug/L	1250	104	75 - 125
Magnesium, Total	99.0	87.4	mg/L	12.5	93	75 - 125
Potassium, Total	20.0	7.07	mg/L	12.5	104	75 - 125
Sodium, Total	122	111	mg/L	12.5	89	75 - 125

* Values outside of QC limits

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6010C

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308853-PS2
% Solids:
Lab Source ID: 1308343-04
Preparation: 3010A Digestion
Initial/Final: 0.4 mL / 0.4 mL
QC Batch: 1308853
Sequence: 3H26042

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Calcium, Total	517	207	mg/L	312	99	75 - 125
Iron, Total	24700	18500	ug/L	6250	98	75 - 125

* Values outside of QC limits

: 00655

LCS / LCS DUPLICATE RECOVERY

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308853

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308853-BS1

Preparation: 3010A Digestion

Initial/Final: 25 mL / 25 mL

Sequence: 3H26042

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Aluminum, Total	2000	1900	95	80 - 120	ug/L
Calcium, Total	20000	19300	96	80 - 120	ug/L
Iron, Total	400	391	98	80 - 120	ug/L
Magnesium, Total	20000	19700	98	80 - 120	ug/L
Potassium, Total	20000	19400	97	80 - 120	ug/L
Sodium, Total	20000	19300	97	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00072

SERIAL DILUTION

USEPA-6010C

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation

Matrix: Water
Laboratory ID: 3H26042-SRD1

% Solids:
Lab Source ID: 1308343-04

QC Batch: 3H26042
Sequence: 3H26042

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Aluminum, Dissolved	-50.7	U	-90.9	U	79.0 DL#		ug/L	10
Magnesium, Dissolved	85.0		87.6		3.0		mg/L	10
Potassium, Dissolved	6.90		7.00		1.0		mg/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

: 00074

SERIAL DILUTION

USEPA-6010C

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Matrix: Water
Laboratory ID: 3H26042-SRD2
% Solids:
Lab Source ID: 1308343-04
QC Batch: 3H26042
Sequence: 3H26042

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Aluminum, Total	57.4	J	46.1	U	20.0 6T#		ug/L	10
Magnesium, Total	87.4		87.0				mg/L	10
Potassium, Total	7.07		6.78		4.0		mg/L	10
Sodium, Total	111		109		2.0		mg/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

SERIAL DILUTION

USEPA-6010C

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Matrix: Water
Laboratory ID: 3H26042-SRD4
% Solids:
Lab Source ID: 1308343-04
QC Batch: 3H26042
Sequence: 3H26042

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Calcium, Total	8.26		8.24		0.2 (#)		mg/L	10
Iron, Total	741		745		1.0		ug/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

: 00076

TriMatrix Laboratories, Inc.

PREPARATION BATCH 1308854

Printed: 9/10/2013 7:44:38AM

Metals, Water, 3010A Digestion

Batch comments:

mas 08/22/13 7:00am-4:00pm
inst#220@91.2-93.9c#276
hotblock vessel lot#1303205

Lab Number	Container	Prepared	By	Initial (mL)	Final (mL)	Client: Source ID	Client: Spike ID	Client: uL Spike	Comments	
1308343-01	B	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh				
Al Diss 6010C (DoD)	Ca Diss 6010C (DoD)	Fe Diss 6010C (DoD)		K Diss 6010C (DoD)		Mg Diss 6010C (DoD)		Na Diss 6010C (DoD)		
1308343-02	B	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh				
Al Diss 6010C (DoD)	Ca Diss 6010C (DoD)	Fe Diss 6010C (DoD)		K Diss 6010C (DoD)		Mg Diss 6010C (DoD)		Na Diss 6010C (DoD)		
1308343-03	B	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh				
Al Diss 6010C (DoD)	Ca Diss 6010C (DoD)	Fe Diss 6010C (DoD)		K Diss 6010C (DoD)		Mg Diss 6010C (DoD)		Na Diss 6010C (DoD)		
1308343-04	B	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh				
Al Diss 6010C (DoD)	Ca Diss 6010C (DoD)	Fe Diss 6010C (DoD)		K Diss 6010C (DoD)		Mg Diss 6010C (DoD)		Na Diss 6010C (DoD)		
1308343-04RE1	B	Aug-22-13 07:00		25	25	TETRA TECH NUS - Pittsburgh			Added for SequenceQC in: 3H26042	Added for SequenceQC in: 3H26042
Ca Diss 6010C (DoD)	Fe Diss 6010C (DoD)	Na Diss 6010C (DoD)								
1308343-05	B	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh				
Al Diss 6010C (DoD)	Ca Diss 6010C (DoD)	Fe Diss 6010C (DoD)		K Diss 6010C (DoD)		Mg Diss 6010C (DoD)		Na Diss 6010C (DoD)		
1308854-BLK1		Aug-22-13 07:00	MAS	25	25					
1308854-BS1		Aug-22-13 07:00	MAS	25	25		2101174	200		
1308854-MS1		Aug-22-13 07:00	MAS	25	25	1308343-04	2101174	200		
1308854-MSD1		Aug-22-13 07:00	MAS	25	25	1308343-04	2101174	200		
1308854-PS1		Aug-26-13 15:00	CKD	4	4	1308343-04	2101174	20		
1308854-PS2		Aug-27-13 09:00	CKD	0.4	0.4	1308343-04	2101174	50		

Comments:	Analyst Initials:

QC BATCH SUMMARY
USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatior
QC Batch: 1308854
QC Batch Matrix: Water
Preparation: 3010A Digestion

Sample Name	Lab Sample ID	Date Prepared	Observations
NTC12GW-01	1308343-01	08/22/13 07:00	
NTC12GW-02	1308343-02	08/22/13 07:00	
NTC12GW-03	1308343-03	08/22/13 07:00	
NTC12GW-04	1308343-04	08/22/13 07:00	
NTC12-DUP-P3-081513	1308343-05	08/22/13 07:00	
Blank	1308854-BLK1	08/22/13 07:00	
LCS	1308854-BS1	08/22/13 07:00	
NTC12GW-04	1308854-MS1	08/22/13 07:00	
NTC12GW-04	1308854-MSD1	08/22/13 07:00	

00061

METHOD BLANK DATA SHEET
USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308854-BLK1
File ID: 3H26042-014
Prepared: 08/22/13 07:00
Analyzed: 08/26/13 15:52
Preparation: 3010A Digestion
Initial/Final: 25 mL / 25 mL
QC Batch: 1308854
Sequence: 3H26042
Calibration: 3H26019
Instrument: 116

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7429-90-5	Aluminum, Dissolved	50	ug/L	13	50	100	U
7440-70-2	Calcium, Dissolved	500	ug/L	230	500	500	U
7439-89-6	Iron, Dissolved	10	ug/L	6.5	10	10	U
7439-95-4	Magnesium, Dissolved	500	ug/L	140	500	500	U
7440-09-7	Potassium, Dissolved	100	ug/L	33	100	100	U
7440-23-5	Sodium, Dissolved	500	ug/L	130	500	500	U

00065

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatior
Matrix: Water
Laboratory ID: 1308854-MS1
Preparation: 3010A Digestion
QC Batch: 1308854
Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Aluminum, Dissolved	2000	ND	1950	97	80 - 120	ug/L
Magnesium, Dissolved	20000	85000	105000	98	80 - 120	ug/L
Potassium, Dissolved	20000	6900	26900	100	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00066

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308854

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308854-MSD1

Preparation: 3010A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Aluminum, Dissolved	2000	1860	93	4	20	80 - 120	ug/L
Magnesium, Dissolved	20000	97200	61 J1L*	7	20	80 - 120	ug/L
Potassium, Dissolved	20000	25500	93	5	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00067

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6010C

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308854-PS1
% Solids:
Lab Source ID: 1308343-04
Preparation: 3010A Digestion
Initial/Final: 4 mL / 4 mL
QC Batch: 1308854
Sequence: 3H26042

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Aluminum, Dissolved	1270	-50.7	ug/L	1250	105	75 - 125
Magnesium, Dissolved	98.8	85.0	mg/L	12.5	110	75 - 125
Potassium, Dissolved	20.2	6.90	mg/L	12.5	106	75 - 125

* Values outside of QC limits

: 89979

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6010C

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308854-PS2
% Solids:
Lab Source ID: 1308343-04
Preparation: 3010A Digestion
Initial/Final: 0.4 mL / 0.4 mL
QC Batch: 1308854
Sequence: 3H27031

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Calcium, Dissolved	522	205	mg/L	312	101	75 - 125
Iron, Dissolved	24400	17900	ug/L	6250	104	75 - 125
Sodium, Dissolved	427	111	mg/L	312	101	75 - 125

* Values outside of QC limits

00071

LCS / LCS DUPLICATE RECOVERY

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308854

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308854-BS1

Preparation: 3010A Digestion

Initial/Final: 25 mL / 25 mL

Sequence: 3H26042

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Aluminum, Dissolved	2000	1920	96	80 - 120	ug/L
Calcium, Dissolved	20000	19600	98	80 - 120	ug/L
Iron, Dissolved	400	394	99	80 - 120	ug/L
Magnesium, Dissolved	20000	19900	100	80 - 120	ug/L
Potassium, Dissolved	20000	19700	99	80 - 120	ug/L
Sodium, Dissolved	20000	19600	98	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00073

SERIAL DILUTION

USEPA-6010C

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation

Matrix: Water
Laboratory ID: 3H27031-SRD1

% Solids:
Lab Source ID: 1308343-04

QC Batch: 3H27031
Sequence: 3H27031

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Calcium, Dissolved	8.22		8.30		1.0 (#)		mg/L	10
Iron, Dissolved	717		725		1.0		ug/L	10
Sodium, Dissolved	4.43		4.38		1.0 (#)		mg/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

00077

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Sequence: 3H26042
Calibration: 3H26019
Instrument: 116

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	3H26042-CAL1	3H26042-001	08/26/13 15:08
Cal Standard	3H26042-CAL2	3H26042-002	08/26/13 15:11
Cal Standard	3H26042-CAL3	3H26042-003	08/26/13 15:15
Cal Standard	3H26042-CAL4	3H26042-004	08/26/13 15:18
Cal Standard	3H26042-CAL5	3H26042-005	08/26/13 15:21
Secondary Cal Check	3H26042-SCV1	3H26042-006	08/26/13 15:25
Calibration Check	3H26042-CCV1	3H26042-006	08/26/13 15:25
Calibration Blank	3H26042-CCB1	3H26042-007	08/26/13 15:28
Interference Check A	3H26042-IFA1	3H26042-008	08/26/13 15:31
Interference Check A	3H26042-IFA2	3H26042-009	08/26/13 15:35
Interference Check B	3H26042-IFB1	3H26042-010	08/26/13 15:38
Interference Check B	3H26042-IFB2	3H26042-011	08/26/13 15:42
Calibration Check	3H26042-CCV2	3H26042-012	08/26/13 15:45
Calibration Blank	3H26042-CCB2	3H26042-013	08/26/13 15:49
Blank	1308854-BLK1	3H26042-014	08/26/13 15:52
LCS	1308854-BS1	3H26042-015	08/26/13 15:55
NTC12GW-01	1308343-01	3H26042-016	08/26/13 15:58
NTC12GW-01	1308343-01	3H26042-016	08/26/13 15:58
NTC12GW-01	1308343-01	3H26042-016	08/26/13 15:58
NTC12GW-01	1308343-01	3H26042-016	08/26/13 15:58
NTC12GW-01	1308343-01	3H26042-016	08/26/13 15:58
NTC12GW-01	1308343-01	3H26042-016	08/26/13 15:58
NTC12GW-02	1308343-02	3H26042-017	08/26/13 16:02
NTC12GW-02	1308343-02	3H26042-017	08/26/13 16:02
NTC12GW-02	1308343-02	3H26042-017	08/26/13 16:02
NTC12GW-02	1308343-02	3H26042-017	08/26/13 16:02
NTC12GW-02	1308343-02	3H26042-017	08/26/13 16:02
NTC12GW-02	1308343-02	3H26042-017	08/26/13 16:02
NTC12GW-03	1308343-03	3H26042-018	08/26/13 16:05
NTC12GW-03	1308343-03	3H26042-018	08/26/13 16:05
NTC12GW-03	1308343-03	3H26042-018	08/26/13 16:05
NTC12GW-03	1308343-03	3H26042-018	08/26/13 16:05

: 00045

ANALYSIS BATCH (SEQUENCE) SUMMARY
USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 3H26042

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Calibration: 3H26019
Instrument: 116

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
NTC12GW-03	1308343-03	3H26042-018	08/26/13 16:05
NTC12GW-03	1308343-03	3H26042-018	08/26/13 16:05
NTC12GW-04	1308343-04	3H26042-019	08/26/13 16:09
NTC12GW-04	1308343-04	3H26042-019	08/26/13 16:09
NTC12GW-04	1308343-04	3H26042-019	08/26/13 16:09
NTC12GW-04	1308854-MS1	3H26042-020	08/26/13 16:12
NTC12GW-04	1308854-MSD1	3H26042-021	08/26/13 16:16
NTC12GW-04	3H26042-SRD1	3H26042-022	08/26/13 16:19
NTC12GW-04	1308854-PS1	3H26042-023	08/26/13 16:23
Calibration Check	3H26042-CCV3	3H26042-024	08/26/13 16:26
Calibration Blank	3H26042-CCB3	3H26042-025	08/26/13 16:30
NTC12-DUP-P3-081513	1308343-05	3H26042-026	08/26/13 16:33
NTC12-DUP-P3-081513	1308343-05	3H26042-026	08/26/13 16:33
NTC12-DUP-P3-081513	1308343-05	3H26042-026	08/26/13 16:33
NTC12-DUP-P3-081513	1308343-05	3H26042-026	08/26/13 16:33
NTC12-DUP-P3-081513	1308343-05	3H26042-026	08/26/13 16:33
NTC12-DUP-P3-081513	1308343-05	3H26042-026	08/26/13 16:33
Blank	1308853-BLK1	3H26042-027	08/26/13 16:36
LCS	1308853-BS1	3H26042-028	08/26/13 16:39
NTC12GW-01	1308343-01	3H26042-029	08/26/13 16:43
NTC12GW-01	1308343-01	3H26042-029	08/26/13 16:43
NTC12GW-01	1308343-01	3H26042-029	08/26/13 16:43
NTC12GW-01	1308343-01	3H26042-029	08/26/13 16:43
NTC12GW-01	1308343-01	3H26042-029	08/26/13 16:43
NTC12GW-01	1308343-01	3H26042-029	08/26/13 16:43
NTC12GW-02	1308343-02	3H26042-030	08/26/13 16:47
NTC12GW-02	1308343-02	3H26042-030	08/26/13 16:47
NTC12GW-02	1308343-02	3H26042-030	08/26/13 16:47
NTC12GW-02	1308343-02	3H26042-030	08/26/13 16:47
NTC12GW-02	1308343-02	3H26042-030	08/26/13 16:47
NTC12GW-02	1308343-02	3H26042-030	08/26/13 16:47
NTC12GW-03	1308343-03	3H26042-031	08/26/13 16:50

00045

ANALYSIS BATCH (SEQUENCE) SUMMARY
USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Sequence: 3H26042
Calibration: 3H26019
Instrument: 116

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
NTC12GW-03	1308343-03	3H26042-031	08/26/13 16:50
NTC12GW-03	1308343-03	3H26042-031	08/26/13 16:50
NTC12GW-03	1308343-03	3H26042-031	08/26/13 16:50
NTC12GW-03	1308343-03	3H26042-031	08/26/13 16:50
NTC12GW-03	1308343-03	3H26042-031	08/26/13 16:50
NTC12GW-04	1308343-04	3H26042-032	08/26/13 16:53
NTC12GW-04	1308343-04	3H26042-032	08/26/13 16:53
NTC12GW-04	1308343-04	3H26042-032	08/26/13 16:53
NTC12GW-04	1308343-04	3H26042-032	08/26/13 16:53
NTC12GW-04	1308853-MS1	3H26042-033	08/26/13 16:57
NTC12GW-04	1308853-MSD1	3H26042-034	08/26/13 17:00
NTC12GW-04	3H26042-SRD2	3H26042-035	08/26/13 17:03
Calibration Check	3H26042-CCV4	3H26042-036	08/26/13 17:07
Calibration Blank	3H26042-CCB4	3H26042-037	08/26/13 17:10
NTC12GW-04	1308853-PS1	3H26042-038	08/26/13 17:13
NTC12-DUP-P3-081513	1308343-05	3H26042-039	08/26/13 17:17
NTC12-DUP-P3-081513	1308343-05	3H26042-039	08/26/13 17:17
NTC12-DUP-P3-081513	1308343-05	3H26042-039	08/26/13 17:17
NTC12-DUP-P3-081513	1308343-05	3H26042-039	08/26/13 17:17
NTC12-DUP-P3-081513	1308343-05	3H26042-039	08/26/13 17:17
NTC12-DUP-P3-081513	1308343-05	3H26042-039	08/26/13 17:17
NTC12GW-04	1308343-04	3H26042-044	08/26/13 17:39
NTC12GW-04	1308343-04	3H26042-044	08/26/13 17:39
NTC12GW-04	3H26042-SRD4	3H26042-045	08/26/13 17:43
NTC12GW-04	1308853-PS2	3H26042-046	08/26/13 17:46
Calibration Check	3H26042-CCV5	3H26042-047	08/26/13 17:49
Calibration Blank	3H26042-CCB5	3H26042-048	08/26/13 17:53

: 88417

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3H26042
Calibration: 3H26019
Control Limt: +/- 10.00%
Instrument ID: 116

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
3H26042-CCV1	Aluminum	2500	2550	102	ug/L	08/26/13 15:25
	Aluminum	2500	2550	102	ug/L	08/26/13 15:25
	Calcium	5.00	5.17	103	mg/L	08/26/13 15:25
	Calcium	5.00	5.17	103	mg/L	08/26/13 15:25
	Iron	500	513	103	ug/L	08/26/13 15:25
	Iron	500	513	103	ug/L	08/26/13 15:25
	Magnesium	5.00	5.09	102	mg/L	08/26/13 15:25
	Magnesium	5.00	5.09	102	mg/L	08/26/13 15:25
	Potassium	5.00	5.08	102	mg/L	08/26/13 15:25
	Potassium	5.00	5.08	102	mg/L	08/26/13 15:25
	Sodium	5.00	5.08	102	mg/L	08/26/13 15:25
	Sodium	5.00	5.08	102	mg/L	08/26/13 15:25
3H26042-CCV2	Aluminum	2500	2590	103	ug/L	08/26/13 15:45
	Aluminum	2500	2590	103	ug/L	08/26/13 15:45
	Calcium	5.00	5.20	104	mg/L	08/26/13 15:45
	Calcium	5.00	5.20	104	mg/L	08/26/13 15:45
	Iron	500	524	105	ug/L	08/26/13 15:45
	Iron	500	524	105	ug/L	08/26/13 15:45
	Magnesium	5.00	5.20	104	mg/L	08/26/13 15:45
	Magnesium	5.00	5.20	104	mg/L	08/26/13 15:45
	Potassium	5.00	5.18	104	mg/L	08/26/13 15:45
	Potassium	5.00	5.18	104	mg/L	08/26/13 15:45
	Sodium	5.00	5.17	103	mg/L	08/26/13 15:45
	Sodium	5.00	5.17	103	mg/L	08/26/13 15:45
3H26042-CCV3	Aluminum	2500	2550	102	ug/L	08/26/13 16:26
	Aluminum	2500	2550	102	ug/L	08/26/13 16:26
	Calcium	5.00	5.13	103	mg/L	08/26/13 16:26
	Calcium	5.00	5.13	103	mg/L	08/26/13 16:26
	Iron	500	516	103	ug/L	08/26/13 16:26
	Iron	500	516	103	ug/L	08/26/13 16:26
	Magnesium	5.00	5.14	103	mg/L	08/26/13 16:26
	Magnesium	5.00	5.14	103	mg/L	08/26/13 16:26
	Potassium	5.00	5.11	102	mg/L	08/26/13 16:26
	Potassium	5.00	5.11	102	mg/L	08/26/13 16:26
	Sodium	5.00	5.11	102	mg/L	08/26/13 16:26
	Sodium	5.00	5.11	102	mg/L	08/26/13 16:26
3H26042-CCV4	Aluminum	2500	2480	99	ug/L	08/26/13 17:07
	Aluminum	2500	2480	99	ug/L	08/26/13 17:07

: 00049

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3H26042
Calibration: 3H26019
Control Limt: +/- 10.00%
Instrument ID: 116

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
3H26042-CCV4	Calcium	5.00	4.99	100	mg/L	08/26/13 17:07
	Calcium	5.00	4.99	100	mg/L	08/26/13 17:07
	Iron	500	503	101	ug/L	08/26/13 17:07
	Iron	500	503	101	ug/L	08/26/13 17:07
	Magnesium	5.00	5.01	100	mg/L	08/26/13 17:07
	Magnesium	5.00	5.01	100	mg/L	08/26/13 17:07
	Potassium	5.00	5.01	100	mg/L	08/26/13 17:07
	Potassium	5.00	5.01	100	mg/L	08/26/13 17:07
	Sodium	5.00	4.98	100	mg/L	08/26/13 17:07
	Sodium	5.00	4.98	100	mg/L	08/26/13 17:07
3H26042-CCV5	Aluminum	2500	2490	100	ug/L	08/26/13 17:49
	Aluminum	2500	2490	100	ug/L	08/26/13 17:49
	Calcium	5.00	5.01	100	mg/L	08/26/13 17:49
	Calcium	5.00	5.01	100	mg/L	08/26/13 17:49
	Iron	500	504	101	ug/L	08/26/13 17:49
	Iron	500	504	101	ug/L	08/26/13 17:49
	Magnesium	5.00	5.00	100	mg/L	08/26/13 17:49
	Magnesium	5.00	5.00	100	mg/L	08/26/13 17:49
	Potassium	5.00	5.03	101	mg/L	08/26/13 17:49
	Potassium	5.00	5.03	101	mg/L	08/26/13 17:49
	Sodium	5.00	4.98	100	mg/L	08/26/13 17:49
	Sodium	5.00	4.98	100	mg/L	08/26/13 17:49

* Values outside of QC limits

00050

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Inv
Laboratory ID: 3H26042-SCV1
Instrument: 116
Sequence: 3H26042
Calibration: 3H26019

Analyte	Expected	Found	% R	QC Limit	Units
Aluminum	2500	2550	102	90-110	ug/L
Aluminum	2500	2550	102	90-110	ug/L
Calcium	5.00	5.17	103	90-110	mg/L
Calcium	5.00	5.17	103	90-110	mg/L
Iron	500	513	103	90-110	ug/L
Iron	500	513	103	90-110	ug/L
Magnesium	5.00	5.09	102	90-110	mg/L
Magnesium	5.00	5.09	102	90-110	mg/L
Potassium	5.00	5.08	102	90-110	mg/L
Potassium	5.00	5.08	102	90-110	mg/L
Sodium	5.00	5.08	102	90-110	mg/L
Sodium	5.00	5.08	102	90-110	mg/L

* Values outside of QC limits

000052

BLANKS
USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3H26042
Calibration: 3H26019
Instrument ID: 116

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
3H26042-CCB1	Aluminum	-9.7	ug/L	13	50	100	U	08/26/13 15:28
	Aluminum	-9.7	ug/L	13	50	100	U	08/26/13 15:28
	Calcium	0.018	mg/L	0.23	0.50	0.50	U	08/26/13 15:28
	Calcium	0.018	mg/L	0.23	0.50	0.50	U	08/26/13 15:28
	Iron	-3.5	ug/L	6.5	10	10	U	08/26/13 15:28
	Iron	-3.5	ug/L	6.5	10	10	U	08/26/13 15:28
	Magnesium	-0.0083	mg/L	0.14	0.50	0.50	U	08/26/13 15:28
	Magnesium	-0.0083	mg/L	0.14	0.50	0.50	U	08/26/13 15:28
	Potassium	-0.0091	mg/L	0.033	0.10	0.10	U	08/26/13 15:28
	Potassium	-0.0091	mg/L	0.033	0.10	0.10	U	08/26/13 15:28
	Sodium	-0.025	mg/L	0.13	0.50	0.50	U	08/26/13 15:28
	Sodium	-0.025	mg/L	0.13	0.50	0.50	U	08/26/13 15:28
3H26042-CCB2	Aluminum	-11	ug/L	13	50	100	U	08/26/13 15:49
	Aluminum	-11	ug/L	13	50	100	U	08/26/13 15:49
	Calcium	0.018	mg/L	0.23	0.50	0.50	U	08/26/13 15:49
	Calcium	0.018	mg/L	0.23	0.50	0.50	U	08/26/13 15:49
	Iron	-3.8	ug/L	6.5	10	10	U	08/26/13 15:49
	Iron	-3.8	ug/L	6.5	10	10	U	08/26/13 15:49
	Magnesium	-0.027	mg/L	0.14	0.50	0.50	U	08/26/13 15:49
	Magnesium	-0.027	mg/L	0.14	0.50	0.50	U	08/26/13 15:49
	Potassium	-0.0061	mg/L	0.033	0.10	0.10	U	08/26/13 15:49
	Potassium	-0.0061	mg/L	0.033	0.10	0.10	U	08/26/13 15:49
	Sodium	-0.027	mg/L	0.13	0.50	0.50	U	08/26/13 15:49
	Sodium	-0.027	mg/L	0.13	0.50	0.50	U	08/26/13 15:49
3H26042-CCB3	Aluminum	-9.5	ug/L	13	50	100	U	08/26/13 16:30
	Aluminum	-9.5	ug/L	13	50	100	U	08/26/13 16:30
	Calcium	0.017	mg/L	0.23	0.50	0.50	U	08/26/13 16:30
	Calcium	0.017	mg/L	0.23	0.50	0.50	U	08/26/13 16:30
	Iron	-4.5	ug/L	6.5	10	10	U	08/26/13 16:30
	Iron	-4.5	ug/L	6.5	10	10	U	08/26/13 16:30
	Magnesium	-0.016	mg/L	0.14	0.50	0.50	U	08/26/13 16:30
	Magnesium	-0.016	mg/L	0.14	0.50	0.50	U	08/26/13 16:30
	Potassium	-0.033	mg/L	0.033	0.10	0.10	J	08/26/13 16:30

: 00054

BLANKS
USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3H26042
Calibration: 3H26019
Instrument ID: 116

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
3H26042-CCB3	Potassium	-0.033	mg/L	0.033	0.10	0.10	J	08/26/13 16:30
	Sodium	-0.022	mg/L	0.13	0.50	0.50	U	08/26/13 16:30
	Sodium	-0.022	mg/L	0.13	0.50	0.50	U	08/26/13 16:30
3H26042-CCB4	Aluminum	-4.2	ug/L	13	50	100	U	08/26/13 17:10
	Aluminum	-4.2	ug/L	13	50	100	U	08/26/13 17:10
	Calcium	0.018	mg/L	0.23	0.50	0.50	U	08/26/13 17:10
	Calcium	0.018	mg/L	0.23	0.50	0.50	U	08/26/13 17:10
	Iron	-3.5	ug/L	6.5	10	10	U	08/26/13 17:10
	Iron	-3.5	ug/L	6.5	10	10	U	08/26/13 17:10
	Magnesium	-0.0024	mg/L	0.14	0.50	0.50	U	08/26/13 17:10
	Magnesium	-0.0024	mg/L	0.14	0.50	0.50	U	08/26/13 17:10
	Potassium	-0.00082	mg/L	0.033	0.10	0.10	U	08/26/13 17:10
	Potassium	-0.00082	mg/L	0.033	0.10	0.10	U	08/26/13 17:10
	Sodium	-0.016	mg/L	0.13	0.50	0.50	U	08/26/13 17:10
	Sodium	-0.016	mg/L	0.13	0.50	0.50	U	08/26/13 17:10
3H26042-CCB5	Aluminum	-16	ug/L	13	50	100	J	08/26/13 17:53
	Aluminum	-16	ug/L	13	50	100	J	08/26/13 17:53
	Calcium	0.013	mg/L	0.23	0.50	0.50	U	08/26/13 17:53
	Calcium	0.013	mg/L	0.23	0.50	0.50	U	08/26/13 17:53
	Iron	-4.8	ug/L	6.5	10	10	U	08/26/13 17:53
	Iron	-4.8	ug/L	6.5	10	10	U	08/26/13 17:53
	Magnesium	-0.010	mg/L	0.14	0.50	0.50	U	08/26/13 17:53
	Magnesium	-0.010	mg/L	0.14	0.50	0.50	U	08/26/13 17:53
	Potassium	-0.024	mg/L	0.033	0.10	0.10	U	08/26/13 17:53
	Potassium	-0.024	mg/L	0.033	0.10	0.10	U	08/26/13 17:53
	Sodium	-0.022	mg/L	0.13	0.50	0.50	U	08/26/13 17:53
	Sodium	-0.022	mg/L	0.13	0.50	0.50	U	08/26/13 17:53

* Values outside of QC limits

: 00055

ICP INTERFERENCE CHECK SAMPLE

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A Site 12 Inves

Sequence: 3H26042

Calibration: 3H26019

Instrument ID: 116

Lab Sample ID	Analyte	True	Found	%R	Units
3H26042-IFA1	Aluminum	100000	100000	100	ug/L
	Aluminum	100000	100000	100	ug/L
	Calcium	100	99.6	100	mg/L
	Calcium	100	99.6	100	mg/L
	Iron	40000	38600	96	ug/L
	Iron	40000	38600	96	ug/L
	Magnesium	100	99.5	99	mg/L
	Magnesium	100	99.5	99	mg/L
	Potassium	0.00	0.0193		mg/L
	Potassium	0.00	0.0193		mg/L
	Sodium	0.00	0.0112		mg/L
	Sodium	0.00	0.0112		mg/L
3H26042-IFA2	Aluminum	0.00	40.2		ug/L
	Aluminum	0.00	40.2		ug/L
	Calcium	0.00	-0.0263		mg/L
	Calcium	0.00	-0.0263		mg/L
	Iron	0.00	1.37		ug/L
	Iron	0.00	1.37		ug/L
	Magnesium	0.00	-0.0322		mg/L
	Magnesium	0.00	-0.0322		mg/L
	Potassium	0.00	-0.00600		mg/L
	Potassium	0.00	-0.00600		mg/L
	Sodium	0.00	0.0870		mg/L
	Sodium	0.00	0.0870		mg/L
3H26042-IFB1	Aluminum	100000	98100	98	ug/L
	Aluminum	100000	98100	98	ug/L
	Calcium	100	97.6	98	mg/L
	Calcium	100	97.6	98	mg/L
	Iron	40000	37700	94	ug/L
	Iron	40000	37700	94	ug/L
	Magnesium	100	97.4	97	mg/L
	Magnesium	100	97.4	97	mg/L

00057

ICP INTERFERENCE CHECK SAMPLE

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A Site 12 Inves

Sequence: 3H26042

Calibration: 3H26019

Instrument ID: 116

Lab Sample ID	Analyte	True	Found	%R	Units
3H26042-IFB2	Aluminum	1000	1010	101	ug/L
	Aluminum	1000	1010	101	ug/L
	Calcium	5.00	5.23	105	mg/L
	Calcium	5.00	5.23	105	mg/L
	Magnesium	5.00	5.26	105	mg/L
	Magnesium	5.00	5.26	105	mg/L
	Sodium	5.00	5.21	104	mg/L
	Sodium	5.00	5.21	104	mg/L

* Values outside of QC limits

00058

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Sequence: 3H27031
Calibration: 3H27019
Instrument: 116

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	3H27031-CAL1	3H27031-001	08/27/13 09:34
Cal Standard	3H27031-CAL2	3H27031-002	08/27/13 09:37
Cal Standard	3H27031-CAL3	3H27031-003	08/27/13 09:40
Cal Standard	3H27031-CAL4	3H27031-004	08/27/13 09:44
Cal Standard	3H27031-CAL5	3H27031-005	08/27/13 09:47
Secondary Cal Check	3H27031-SCV1	3H27031-006	08/27/13 09:50
Calibration Check	3H27031-CCV1	3H27031-006	08/27/13 09:50
Calibration Blank	3H27031-CCB1	3H27031-007	08/27/13 09:54
Interference Check A	3H27031-IFA1	3H27031-008	08/27/13 09:57
Interference Check A	3H27031-IFA2	3H27031-009	08/27/13 10:00
Interference Check B	3H27031-IFB1	3H27031-010	08/27/13 10:04
Interference Check B	3H27031-IFB2	3H27031-011	08/27/13 10:07
Calibration Check	3H27031-CCV2	3H27031-012	08/27/13 10:11
Calibration Blank	3H27031-CCB2	3H27031-013	08/27/13 10:14
NTC12GW-04	1308343-04	3H27031-014	08/27/13 10:17
NTC12GW-04	1308343-04	3H27031-014	08/27/13 10:17
NTC12GW-04	1308343-04	3H27031-014	08/27/13 10:17
NTC12GW-04	3H27031-SRD1	3H27031-015	08/27/13 10:20
NTC12GW-04	1308854-PS2	3H27031-016	08/27/13 10:24
Calibration Check	3H27031-CCV3	3H27031-017	08/27/13 10:27
Calibration Blank	3H27031-CCB3	3H27031-018	08/27/13 10:30

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3H27031
Calibration: 3H27019
Control Limt: +/- 10.00%
Instrument ID: 116

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
3H27031-CCV1	Calcium	5.00	5.27	105	mg/L	08/27/13 09:50
	Iron	500	521	104	ug/L	08/27/13 09:50
	Sodium	5.00	5.20	104	mg/L	08/27/13 09:50
3H27031-CCV2	Calcium	5.00	5.02	100	mg/L	08/27/13 10:11
	Iron	500	504	101	ug/L	08/27/13 10:11
	Sodium	5.00	5.01	100	mg/L	08/27/13 10:11
3H27031-CCV3	Calcium	5.00	5.03	101	mg/L	08/27/13 10:27
	Iron	500	503	101	ug/L	08/27/13 10:27
	Sodium	5.00	5.02	100	mg/L	08/27/13 10:27

* Values outside of QC limits

: 88951

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Inv
Laboratory ID: 3H27031-SCV1
Instrument: 116
Sequence: 3H27031
Calibration: 3H27019

Analyte	Expected	Found	% R	QC Limit	Units
Calcium	5.00	5.27	105	90-110	mg/L
Iron	500	521	104	90-110	ug/L
Sodium	5.00	5.20	104	90-110	mg/L

* Values outside of QC limits

: 00053

BLANKS
USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3H27031
Calibration: 3H27019
Instrument ID: 116

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
3H27031-CCB1	Calcium	0.013	mg/L	0.23	0.50	0.50	U	08/27/13 09:54
	Iron	-4.7	ug/L	6.5	10	10	U	08/27/13 09:54
	Sodium	-0.013	mg/L	0.13	0.50	0.50	U	08/27/13 09:54
3H27031-CCB2	Calcium	0.015	mg/L	0.23	0.50	0.50	U	08/27/13 10:14
	Iron	-4.9	ug/L	6.5	10	10	U	08/27/13 10:14
	Sodium	-0.021	mg/L	0.13	0.50	0.50	U	08/27/13 10:14
3H27031-CCB3	Calcium	0.018	mg/L	0.23	0.50	0.50	U	08/27/13 10:30
	Iron	-6.3	ug/L	6.5	10	10	U	08/27/13 10:30
	Sodium	-0.014	mg/L	0.13	0.50	0.50	U	08/27/13 10:30

* Values outside of QC limits

: 00056

ICP INTERFERENCE CHECK SAMPLE

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A Site 12 Invest

Sequence: 3H27031

Calibration: 3H27019

Instrument ID: 116

Lab Sample ID	Analyte	True	Found	%R	Units
3H27031-IFA1	Calcium	100	97.5	98	mg/L
	Iron	40000	37700	94	ug/L
	Sodium	0.00	0.0242		mg/L
3H27031-IFA2	Calcium	0.00	-0.0238		mg/L
	Iron	0.00	-0.330		ug/L
	Sodium	0.00	0.103		mg/L
3H27031-IFB1	Calcium	100	97.2	97	mg/L
	Iron	40000	37600	94	ug/L
3H27031-IFB2	Calcium	5.00	5.03	101	mg/L
	Sodium	5.00	5.04	101	mg/L

* Values outside of QC limits

00059

Metals, Water, 3020A Digestion

Batch comments:

MAS 08/22/13 7:00AM-4:00PM
INST#220@91.2C-93.9-C#276
HOTBLOCK VESSEL LOT#1303205

Lab Number	Container	Prepared	By	Initial (mL)	Final (mL)	Client Source ID	Client Spike ID	Client uL Spike	Comments		
1308343-01	A	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh					
Ag Total 6020A (DoD)	As Total 6020A (DoD)	Ba Total 6020A (DoD)	Be Total 6020A (DoD)	Cd Total 6020A (DoD)	Co Total 6020A (DoD)	Cr Total 6020A (DoD)	Cu Total 6020A (DoD)				
Mn Total 6020A (DoD)	Ni Total 6020A (DoD)	Pb Total 6020A (DoD)	Sb Total 6020A (DoD)	Se Total 6020A (DoD)	Tl Total 6020A (DoD)	V Total 6020A (DoD)	Zn Total 6020A (DoD)				
1308343-02	A	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh					
Ag Total 6020A (DoD)	As Total 6020A (DoD)	Ba Total 6020A (DoD)	Be Total 6020A (DoD)	Cd Total 6020A (DoD)	Co Total 6020A (DoD)	Cr Total 6020A (DoD)	Cu Total 6020A (DoD)				
Mn Total 6020A (DoD)	Ni Total 6020A (DoD)	Pb Total 6020A (DoD)	Sb Total 6020A (DoD)	Se Total 6020A (DoD)	Tl Total 6020A (DoD)	V Total 6020A (DoD)	Zn Total 6020A (DoD)				
1308343-03	A	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh					
Ag Total 6020A (DoD)	As Total 6020A (DoD)	Ba Total 6020A (DoD)	Be Total 6020A (DoD)	Cd Total 6020A (DoD)	Co Total 6020A (DoD)	Cr Total 6020A (DoD)	Cu Total 6020A (DoD)				
Mn Total 6020A (DoD)	Ni Total 6020A (DoD)	Pb Total 6020A (DoD)	Sb Total 6020A (DoD)	Se Total 6020A (DoD)	Tl Total 6020A (DoD)	V Total 6020A (DoD)	Zn Total 6020A (DoD)				
1308343-04	A	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh					
Ag Total 6020A (DoD)	As Total 6020A (DoD)	Ba Total 6020A (DoD)	Be Total 6020A (DoD)	Cd Total 6020A (DoD)	Co Total 6020A (DoD)	Cr Total 6020A (DoD)	Cu Total 6020A (DoD)				
Mn Total 6020A (DoD)	Ni Total 6020A (DoD)	Pb Total 6020A (DoD)	Sb Total 6020A (DoD)	Se Total 6020A (DoD)	Tl Total 6020A (DoD)	V Total 6020A (DoD)	Zn Total 6020A (DoD)				
1308343-04RE1	A	Aug-22-13 07:00		25	25	TETRA TECH NUS - Pittsburgh			Added for SequenceQC in: 3I03054	Added for SequenceQC in: 3I03054	
As Diss 6020A (DoD)	As Total 6020A (DoD)	Ba Diss 6020A (DoD)	Ba Total 6020A (DoD)	Cr Total 6020A (DoD)	Ni Total 6020A (DoD)	V Total 6020A (DoD)	Zn Diss 6020A (DoD)				
Zn Total 6020A (DoD)											
1308343-04RE2	A	Aug-22-13 07:00		25	25	TETRA TECH NUS - Pittsburgh			Added for SequenceQC in: 3I04031	Added for SequenceQC in: 3I04031	
As Diss 6020A (DoD)											
1308343-05	A	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh					
Ag Total 6020A (DoD)	As Total 6020A (DoD)	Ba Total 6020A (DoD)	Be Total 6020A (DoD)	Cd Total 6020A (DoD)	Co Total 6020A (DoD)	Cr Total 6020A (DoD)	Cu Total 6020A (DoD)				
Mn Total 6020A (DoD)	Ni Total 6020A (DoD)	Pb Total 6020A (DoD)	Sb Total 6020A (DoD)	Se Total 6020A (DoD)	Tl Total 6020A (DoD)	V Total 6020A (DoD)	Zn Total 6020A (DoD)				
1308841-BLK1		Aug-22-13 07:00	MAS	25	25						
1308841-BLK2		Aug-22-13 07:00	MAS	25	25						
1308841-BLK3		Aug-22-13 07:00	MAS	25	25						
1308841-BLK4		Aug-22-13 07:00	MAS	25	25						
1308841-BS1		Aug-22-13 07:00	MAS	25	25		3061264	25			

Comments:

Analyst Initials:

Metals, Water, 3020A Digestion

Batch comments:

MAS 08/22/13 7:00AM-4:00PM
INST#220@91.2C-93.9-C#276
HOTBLOCK VESSEL LOT#1303205

				Initial	Final	..... Client			
Lab Number	*Container*	*Prepared*	*By*	*(mL)*	*(mL)*	*Source ID*	*Spike ID*	*uL Spike*	*Comments*
1308841-BS2		Aug-22-13 07:00	MAS	25	25		3061264	25	
1308841-BS3		Aug-22-13 07:00	MAS	25	25		3061264	25	
1308841-BS4		Aug-22-13 07:00	MAS	25	25		3061264	25	
1308841-MS1		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308841-MS2		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308841-MS3		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308841-MS4		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308841-MS5		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308841-MSD1		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308841-MSD2		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308841-MSD3		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308841-MSD4		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308841-MSD5		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308841-PS1		Aug-30-13 07:00	KLV	4	4	1308343-04	3041028	20	
1308841-PS2		Sep-03-13 07:00	KLV	4	4	1308343-04	3041028	20	
1308841-PS3		Sep-03-13 07:00	KLV	1	1	1308343-04	3041028	50	
1308841-PS4		Sep-03-13 07:00	KLV	4	4	1308343-04	3041028	20	
1308841-PS5		Sep-03-13 07:00	KLV	1	1	1308343-04	3041028	50	
1308841-PS6		Sep-03-13 07:00	KLV	4	4	1308343-04	3041028	20	
1308841-PS7		Sep-03-13 07:00	KLV	1	1	1308343-04	3041028	25	

Comments:	Analyst Initials:

QC BATCH SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A Site 12 Investigatior

QC Batch: 1308841 QC Batch Matrix: Water

Preparation: 3020A Digestion

Sample Name	Lab Sample ID	Date Prepared	Observations
NTC12GW-01	1308343-01	08/22/13 07:00	
NTC12GW-02	1308343-02	08/22/13 07:00	
NTC12GW-03	1308343-03	08/22/13 07:00	
NTC12GW-04	1308343-04	08/22/13 07:00	
NTC12-DUP-P3-081513	1308343-05	08/22/13 07:00	
Blank	1308841-BLK1	08/22/13 07:00	
Blank	1308841-BLK2	08/22/13 07:00	
Blank	1308841-BLK3	08/22/13 07:00	
Blank	1308841-BLK4	08/22/13 07:00	
LCS	1308841-BS1	08/22/13 07:00	
LCS	1308841-BS2	08/22/13 07:00	
LCS	1308841-BS3	08/22/13 07:00	
LCS	1308841-BS4	08/22/13 07:00	
NTC12GW-04	1308841-MS1	08/22/13 07:00	
NTC12GW-04	1308841-MS2	08/22/13 07:00	
NTC12GW-04	1308841-MS3	08/22/13 07:00	
NTC12GW-04	1308841-MS4	08/22/13 07:00	
NTC12GW-04	1308841-MS5	08/22/13 07:00	
NTC12GW-04	1308841-MSD1	08/22/13 07:00	
NTC12GW-04	1308841-MSD2	08/22/13 07:00	
NTC12GW-04	1308841-MSD3	08/22/13 07:00	
NTC12GW-04	1308841-MSD4	08/22/13 07:00	
NTC12GW-04	1308841-MSD5	08/22/13 07:00	

: 00285

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308841-BLK1
File ID: 3h30011-018
Prepared: 08/22/13 07:00
Analyzed: 08/30/13 11:03
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL
QC Batch: 1308841
Sequence: 3H30011
Calibration: 3I03009
Instrument: 201

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7440-39-3	Barium, Total	0.50	ug/L	0.14	0.50	1.0	U
7440-43-9	Cadmium, Total	0.10	ug/L	0.038	0.10	0.20	U
7440-47-3	Chromium, Total	0.50	ug/L	0.20	0.50	1.0	U
7440-48-4	Cobalt, Total	0.20	ug/L	0.050	0.20	1.0	U
7440-50-8	Copper, Total	0.50	ug/L	0.13	0.50	1.0	U
7439-92-1	Lead, Total	0.50	ug/L	0.15	0.50	1.0	U
7439-96-5	Manganese, Total	0.50	ug/L	0.14	0.50	1.0	U
7440-02-0	Nickel, Total	0.50	ug/L	0.17	0.50	1.0	U
7440-28-0	Thallium, Total	0.10	ug/L	0.027	0.10	1.0	U
7440-62-2	Vanadium, Total	0.20	ug/L	0.066	0.20	1.0	U
7440-66-6	Zinc, Total	4.0	ug/L	1.5	4.0	10	U

00282

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308841-BLK2
File ID: 3i03002-018
Prepared: 08/22/13 07:00
Analyzed: 09/03/13 09:33
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL
QC Batch: 1308841
Sequence: 3I03002
Calibration: 3I03028
Instrument: 201

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7440-22-4	Silver, Total	0.10	ug/L	0.037	0.10	0.20	U

00283

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308841-BLK3
File ID: 3i03054-014
Prepared: 08/22/13 07:00
Analyzed: 09/03/13 14:06
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL
QC Batch: 1308841
Sequence: 3I03054
Calibration: 3I04002
Instrument: 201

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7440-38-2	Arsenic, Total	0.50	ug/L	0.18	0.50	1.0	U
7782-49-2	Selenium, Total	0.39	ug/L	0.31	1.0	1.0	J

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc. SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh Project: NS Great Lakes CTO F27A Site 12 Investigatio

Matrix: Water Laboratory ID: 1308841-BLK4 File ID: 3i04003-013

Prepared: 08/22/13 07:00 Analyzed: 09/04/13 08:33

Preparation: 3020A Digestion Initial/Final: 25 mL / 25 mL

QC Batch: 1308841 Sequence: 3I04003 Calibration: 3I04007 Instrument: 114

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7440-36-0	Antimony, Total	0.50	ug/L	0.15	0.50	1.0	U
7440-41-7	Beryllium, Total	0.40	ug/L	0.11	0.40	1.0	U

00285

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308841

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308841-MS1

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Cadmium, Total	50.0	0.0540	47.0	94	80 - 120	ug/L
Chromium, Total	50.0	0.497	43.8	87	80 - 120	ug/L
Cobalt, Total	50.0	0.680	42.4	83	80 - 120	ug/L
Copper, Total	50.0	2.46	40.8	77 *	80 - 120	ug/L
Lead, Total	50.0	2.10	48.0	92	80 - 120	ug/L
Nickel, Total	50.0	1.41	42.0	81	80 - 120	ug/L
Thallium, Total	50.0	ND	46.5	93	80 - 120	ug/L
Vanadium, Total	50.0	0.423	44.5	88	80 - 120	ug/L
Zinc, Total	50.0	11.9	54.9	86	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 66291

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308841

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308841-MSD1

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Cadmium, Total	50.0	47.0	94	0.04	20	80 - 120	ug/L
Chromium, Total	50.0	43.6	86	0.3	20	80 - 120	ug/L
Cobalt, Total	50.0	41.7	82	1	20	80 - 120	ug/L
Copper, Total	50.0	40.7	76 *	0.3	20	80 - 120	ug/L
Lead, Total	50.0	47.4	91	1	20	80 - 120	ug/L
Nickel, Total	50.0	41.7	81	0.8	20	80 - 120	ug/L
Thallium, Total	50.0	46.0	92	1	20	80 - 120	ug/L
Vanadium, Total	50.0	44.2	87	0.8	20	80 - 120	ug/L
Zinc, Total	50.0	55.3	87	0.7	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308841

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308841-MS2

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Barium, Total	50.0	236	275	78 *	80 - 120	ug/L
Silver, Total	50.0	ND	48.9	98	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00293

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308841

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308841-MSD2

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Barium, Total	50.0	272	73 *	0.9	20	80 - 120	ug/L
Silver, Total	50.0	51.1	102	5	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00294

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308841

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308841-MS3

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Manganese, Total	50.0	740	765	50 *	80 - 120	ug/L
Selenium, Total	50.0	0.386	49.3	98	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

00295

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308841

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308841-MSD3

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Manganese, Total	50.0	768	55 *	0.3	20	80 - 120	ug/L
Selenium, Total	50.0	51.7	103	5	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00255

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308841

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308841-MS4

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Antimony, Total	50.0	0.269	54.6	109	80 - 120	ug/L
Beryllium, Total	50.0	ND	48.7	97	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00297

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308841

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308841-MSD4

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Antimony, Total	50.0	58.4	116	7	20	80 - 120	ug/L
Beryllium, Total	50.0	51.2	102	5	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

00298

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308841

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308841-MS5

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Arsenic, Total	50.0	77.8	121	87	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

00299

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatior
Matrix: Water
Laboratory ID: 1308841-MSD5
Preparation: 3020A Digestion
QC Batch: 1308841
Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Arsenic, Total	50.0	120	84	1	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
% Solids:
Preparation: 3020A Digestion
QC Batch: 1308841

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Laboratory ID: 1308841-PS1
Lab Source ID: 1308343-04
Initial/Final: 4 mL / 4 mL
Sequence: 3H30011

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Cadmium, Total	19.4	0.0540	ug/L	20.0	97	75 - 125
Chromium, Total	18.1	0.497	ug/L	20.0	88	75 - 125
Cobalt, Total	17.9	0.680	ug/L	20.0	86	75 - 125
Copper, Total	18.6	2.46	ug/L	20.0	81	75 - 125
Lead, Total	21.2	2.10	ug/L	20.0	96	75 - 125
Nickel, Total	18.2	1.41	ug/L	20.0	84	75 - 125
Thallium, Total	19.4	0.0208	ug/L	20.0	97	75 - 125
Vanadium, Total	18.4	0.423	ug/L	20.0	90	75 - 125
Zinc, Total	30.9	11.9	ug/L	20.0	95	75 - 125

* Values outside of QC limits

00315

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308841-PS2
% Solids:
Lab Source ID: 1308343-04
Preparation: 3020A Digestion
Initial/Final: 4 mL / 4 mL
QC Batch: 1308841
Sequence: 3I03002

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Silver, Total	20.8	0.0233	ug/L	20.0	104	75 - 125

* Values outside of QC limits

: 00314

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
% Solids:
Preparation: 3020A Digestion
QC Batch: 1308841

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Laboratory ID: 1308841-PS3
Lab Source ID: 1308343-04
Initial/Final: 1 mL / 1 mL
Sequence: 3I03002

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Barium, Total	429	236	ug/L	200	97	75 - 125

* Values outside of QC limits

: 08315

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
% Solids:
Preparation: 3020A Digestion
QC Batch: 1308841

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Laboratory ID: 1308841-PS4
Lab Source ID: 1308343-04
Initial/Final: 4 mL / 4 mL
Sequence: 3I03054

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Selenium, Total	20.2	0.386	ug/L	20.0	99	75 - 125

* Values outside of QC limits

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308841-PS5
% Solids:
Lab Source ID: 1308343-04
Preparation: 3020A Digestion
Initial/Final: 1 mL / 1 mL
QC Batch: 1308841
Sequence: 3I03054

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Manganese, Total	910	740	ug/L	200	85	75 - 125

* Values outside of QC limits

: 66317

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308841-PS6
% Solids:
Lab Source ID: 1308343-04
Preparation: 3020A Digestion
Initial/Final: 4 mL / 4 mL
QC Batch: 1308841
Sequence: 3I04003

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Antimony, Total	23.5	0.269	ug/L	20.0	116	75 - 125
Beryllium, Total	20.4	0.0247	ug/L	20.0	102	75 - 125

* Values outside of QC limits

00318

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308841-PS7
% Solids:
Lab Source ID: 1308343-04
Preparation: 3020A Digestion
Initial/Final: 1 mL / 1 mL
QC Batch: 1308841
Sequence: 3I04031

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Arsenic, Total	178	77.8	ug/L	100	100	75 - 125

* Values outside of QC limits

00315

LCS / LCS DUPLICATE RECOVERY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigatior
Laboratory ID: 1308841-BS1
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL
Sequence: 3H30011

QC Batch: 1308841

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Barium, Total	50.0	41.8	84	80 - 120	ug/L
Cadmium, Total	50.0	41.5	83	80 - 120	ug/L
Chromium, Total	50.0	43.1	86	80 - 120	ug/L
Cobalt, Total	50.0	42.2	84	80 - 120	ug/L
Copper, Total	50.0	42.2	84	80 - 120	ug/L
Lead, Total	50.0	42.9	86	80 - 120	ug/L
Manganese, Total	50.0	43.3	87	80 - 120	ug/L
Nickel, Total	50.0	42.1	84	80 - 120	ug/L
Thallium, Total	50.0	42.9	86	80 - 120	ug/L
Vanadium, Total	50.0	43.4	87	80 - 120	ug/L
Zinc, Total	50.0	45.9	92	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00328

LCS / LCS DUPLICATE RECOVERY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
QC Batch: 1308841

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigatior
Laboratory ID: 1308841-BS2
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL
Sequence: 3I03002

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Silver, Total	50.0	48.1	96	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00329

LCS / LCS DUPLICATE RECOVERY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308841

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308841-BS3

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Sequence: 3I03054

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Arsenic, Total	50.0	46.8	94	80 - 120	ug/L
Selenium, Total	50.0	45.7	91	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00330

LCS / LCS DUPLICATE RECOVERY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigatior
Laboratory ID: 1308841-BS4
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL

QC Batch: 1308841
Sequence: 3I04003

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Antimony, Total	50.0	50.4	101	80 - 120	ug/L
Beryllium, Total	50.0	49.0	98	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00331

SERIAL DILUTION

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Matrix: Water
Laboratory ID: 3H30011-SRD1
% Solids:
Lab Source ID: 1308343-04
QC Batch: 3H30011
Sequence: 3H30011

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Cadmium, Total	0.0540	J	0.110	U	104.0 #		ug/L	10
Chromium, Total	0.497	J	-0.488	U	198.0 #		ug/L	10
Cobalt, Total	0.680	J	0.711	J	4.0 #		ug/L	10
Copper, Total	2.46		2.74	J	12.0 #		ug/L	10
Lead, Total	2.10		2.07	J	1.0 #		ug/L	10
Nickel, Total	1.41		1.50	J	7.0 #		ug/L	10
Thallium, Total	0.0208	U	0.0561	U	170.0 #		ug/L	10
Vanadium, Total	0.423	J	0.0637	U	85.0 #		ug/L	10
Zinc, Total	11.9		12.3	J	4.0 #		ug/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

SERIAL DILUTION

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

% Solids:

QC Batch: 3I03002

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigation

Laboratory ID: 3I03002-SRD1

Lab Source ID: 1308343-04

Sequence: 3I03002

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Silver, Total	0.0233	U	0.118	U	407.0 QL#		ug/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

: 88339

SERIAL DILUTION

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Matrix: Water
Laboratory ID: 3I03002-SRD3
% Solids:
Lab Source ID: 1308343-04
QC Batch: 3I03002
Sequence: 3I03002

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Barium, Total	23.6		23.5				ug/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

SERIAL DILUTION

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

% Solids:

QC Batch: 3I03054

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigation

Laboratory ID: 3I03054-SRD1

Lab Source ID: 1308343-04

Sequence: 3I03054

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Selenium, Total	0.386	J	-0.881	U	328.0	#	ug/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

SERIAL DILUTION

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Matrix: Water
Laboratory ID: 3I03054-SRD3
% Solids:
Lab Source ID: 1308343-04
QC Batch: 3I03054
Sequence: 3I03054

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Manganese, Total	74.0		73.2		1.0		ug/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

: 00345

SERIAL DILUTION

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Matrix: Water
Laboratory ID: 3I04003-SRD1
% Solids:
Lab Source ID: 1308343-04
QC Batch: 3I04003
Sequence: 3I04003

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Antimony, Total	0.269	J	1.04	J	285.0 OK #		ug/L	10
Beryllium, Total	0.0247	U	0.188	U	661.0 OK #		ug/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

: 88347

SERIAL DILUTION

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

% Solids:

QC Batch: 3I04031

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigation

Laboratory ID: 3I04031-SRD1

Lab Source ID: 1308343-04

Sequence: 3I04031

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Arsenic, Total	15.6		16.3		4.0 OK #		ug/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

00350

Metals, Water, 3020A Digestion

Batch comments:

MAS 08/22/13 7:00AM-4:00PM
INST#220@91.2-93.9C#276
HOTBLOCK VESSEL LOT#1303205

Lab Number	Container	Prepared	By	Initial (mL)	Final (mL)	Client Source ID	Client Spike ID	Client uL Spike	Comments		
1308343-01	B	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh					
Ag Diss 6020A (DoD)	As Diss 6020A (DoD)	Ba Diss 6020A (DoD)	Be Diss 6020A (DoD)	Cd Diss 6020A (DoD)	Co Diss 6020A (DoD)	Cr Diss 6020A (DoD)	Cu Diss 6020A (DoD)				
Mn Diss 6020A (DoD)	Ni Diss 6020A (DoD)	Pb Diss 6020A (DoD)	Sb Diss 6020A (DoD)	Se Diss 6020A (DoD)	Tl Diss 6020A (DoD)	V Diss 6020A (DoD)	Zn Diss 6020A (DoD)				
1308343-02	B	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh					
Ag Diss 6020A (DoD)	As Diss 6020A (DoD)	Ba Diss 6020A (DoD)	Be Diss 6020A (DoD)	Cd Diss 6020A (DoD)	Co Diss 6020A (DoD)	Cr Diss 6020A (DoD)	Cu Diss 6020A (DoD)				
Mn Diss 6020A (DoD)	Ni Diss 6020A (DoD)	Pb Diss 6020A (DoD)	Sb Diss 6020A (DoD)	Se Diss 6020A (DoD)	Tl Diss 6020A (DoD)	V Diss 6020A (DoD)	Zn Diss 6020A (DoD)				
1308343-03	B	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh					
Ag Diss 6020A (DoD)	As Diss 6020A (DoD)	Ba Diss 6020A (DoD)	Be Diss 6020A (DoD)	Cd Diss 6020A (DoD)	Co Diss 6020A (DoD)	Cr Diss 6020A (DoD)	Cu Diss 6020A (DoD)				
Mn Diss 6020A (DoD)	Ni Diss 6020A (DoD)	Pb Diss 6020A (DoD)	Sb Diss 6020A (DoD)	Se Diss 6020A (DoD)	Tl Diss 6020A (DoD)	V Diss 6020A (DoD)	Zn Diss 6020A (DoD)				
1308343-04	B	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh					
Ag Diss 6020A (DoD)	As Diss 6020A (DoD)	Ba Diss 6020A (DoD)	Be Diss 6020A (DoD)	Cd Diss 6020A (DoD)	Co Diss 6020A (DoD)	Cr Diss 6020A (DoD)	Cu Diss 6020A (DoD)				
Mn Diss 6020A (DoD)	Ni Diss 6020A (DoD)	Pb Diss 6020A (DoD)	Sb Diss 6020A (DoD)	Se Diss 6020A (DoD)	Tl Diss 6020A (DoD)	V Diss 6020A (DoD)	Zn Diss 6020A (DoD)				
1308343-04RE1	B	Aug-22-13 07:00		25	25	TETRA TECH NUS - Pittsburgh			Added for SequenceQC in: 3I04025	Added for SequenceQC in: 3I04025	
Be Total 6020A (DoD)											
1308343-05	B	Aug-22-13 07:00	MAS	25	25	TETRA TECH NUS - Pittsburgh					
Ag Diss 6020A (DoD)	As Diss 6020A (DoD)	Ba Diss 6020A (DoD)	Be Diss 6020A (DoD)	Cd Diss 6020A (DoD)	Co Diss 6020A (DoD)	Cr Diss 6020A (DoD)	Cu Diss 6020A (DoD)				
Mn Diss 6020A (DoD)	Ni Diss 6020A (DoD)	Pb Diss 6020A (DoD)	Sb Diss 6020A (DoD)	Se Diss 6020A (DoD)	Tl Diss 6020A (DoD)	V Diss 6020A (DoD)	Zn Diss 6020A (DoD)				
1308852-BLK1		Aug-22-13 07:00	MAS	25	25						
1308852-BLK2		Aug-22-13 07:00	MAS	25	25						
1308852-BLK3		Aug-22-13 07:00	MAS	25	25						
1308852-BLK4		Aug-22-13 07:00	MAS	25	25						
1308852-BLK5		Aug-22-13 07:00	MAS	25	25						
1308852-BS1		Aug-22-13 07:00	MAS	25	25		3061264	25			
1308852-BS2		Aug-22-13 07:00	MAS	25	25		3061264	25			
1308852-BS3		Aug-22-13 07:00	MAS	25	25		3061264	25			

Comments:

Analyst Initials:

Metals, Water, 3020A Digestion

Batch comments:

MAS 08/22/13 7:00AM-4:00PM
INST#220@91.2-93.9C#276
HOTBLOCK VESSEL LOT#1303205

Lab Number	Container	Prepared	By	Initial (mL)	Final (mL)	Client Source ID	Client Spike ID	Client uL Spike	Comments
1308852-BS4		Aug-22-13 07:00	MAS	25	25		3061265	25	
1308852-BS5		Aug-22-13 07:00	MAS	25	25		3061264	25	
1308852-MS1		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308852-MS2		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308852-MS3		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308852-MS4		Aug-22-13 07:00	MAS	25	25	1308343-04	3061265	25	
1308852-MS5		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308852-MS6		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308852-MSD1		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308852-MSD2		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308852-MSD3		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308852-MSD4		Aug-22-13 07:00	MAS	25	25	1308343-04	3061265	25	
1308852-MSD5		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308852-MSD6		Aug-22-13 07:00	MAS	25	25	1308343-04	3061264	25	
1308852-PS1		Aug-30-13 07:00	KLV	4	4	1308343-04	3041028	20	
1308852-PS2		Sep-03-13 07:00	KLV	4	4	1308343-04	3041028	20	
1308852-PS3		Sep-03-13 07:00	KLV	1	1	1308343-04	3041028	50	
1308852-PS4		Sep-03-13 07:00	KLV	4	4	1308343-04	3041028	20	
1308852-PS5		Sep-03-13 07:00	KLV	1	1	1308343-04	3041028	50	
1308852-PS6		Sep-03-13 07:00	KLV	4	4	1308343-04	3041029	20	
1308852-PS7		Sep-05-13 09:30	MSM	1	1	1308343-04	3041028	25	
1308852-PS8		Sep-03-13 07:00	KLV	4	4	1308343-04	3041028	20	

Comments:

Analyst Initials:

QC BATCH SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A Site 12 Investigatior

QC Batch: 1308852 QC Batch Matrix: Water

Preparation: 3020A Digestion

Sample Name	Lab Sample ID	Date Prepared	Observations
NTC12GW-01	1308343-01	08/22/13 07:00	
NTC12GW-02	1308343-02	08/22/13 07:00	
NTC12GW-03	1308343-03	08/22/13 07:00	
NTC12GW-04	1308343-04	08/22/13 07:00	
NTC12-DUP-P3-081513	1308343-05	08/22/13 07:00	
Blank	1308852-BLK1	08/22/13 07:00	
Blank	1308852-BLK2	08/22/13 07:00	
Blank	1308852-BLK3	08/22/13 07:00	
Blank	1308852-BLK4	08/22/13 07:00	
Blank	1308852-BLK5	08/22/13 07:00	
LCS	1308852-BS1	08/22/13 07:00	
LCS	1308852-BS2	08/22/13 07:00	
LCS	1308852-BS3	08/22/13 07:00	
LCS	1308852-BS4	08/22/13 07:00	
LCS	1308852-BS5	08/22/13 07:00	
NTC12GW-04	1308852-MS1	08/22/13 07:00	
NTC12GW-04	1308852-MS2	08/22/13 07:00	
NTC12GW-04	1308852-MS3	08/22/13 07:00	
NTC12GW-04	1308852-MS4	08/22/13 07:00	
NTC12GW-04	1308852-MS5	08/22/13 07:00	
NTC12GW-04	1308852-MS6	08/22/13 07:00	
NTC12GW-04	1308852-MSD1	08/22/13 07:00	
NTC12GW-04	1308852-MSD2	08/22/13 07:00	
NTC12GW-04	1308852-MSD3	08/22/13 07:00	
NTC12GW-04	1308852-MSD4	08/22/13 07:00	
NTC12GW-04	1308852-MSD5	08/22/13 07:00	
NTC12GW-04	1308852-MSD6	08/22/13 07:00	

00281

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308852-BLK1
File ID: 3h30011-031
Prepared: 08/22/13 07:00
Analyzed: 08/30/13 12:04
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL
QC Batch: 1308852
Sequence: 3H30011
Calibration: 3I03009
Instrument: 201

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7440-39-3	Barium, Dissolved	0.50	ug/L	0.14	0.50	1.0	U
7440-43-9	Cadmium, Dissolved	0.10	ug/L	0.038	0.10	0.20	U
7440-50-8	Copper, Dissolved	0.50	ug/L	0.13	0.50	1.0	U
7439-92-1	Lead, Dissolved	0.50	ug/L	0.15	0.50	1.0	U
7440-28-0	Thallium, Dissolved	0.10	ug/L	0.027	0.10	1.0	U
7440-66-6	Zinc, Dissolved	4.0	ug/L	1.5	4.0	10	U

00286

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc. SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh Project: NS Great Lakes CTO F27A Site 12 Investigatio

Matrix: Water Laboratory ID: 1308852-BLK2 File ID: 3i03002-033

Prepared: 08/22/13 07:00 Analyzed: 09/03/13 10:51

Preparation: 3020A Digestion Initial/Final: 25 mL / 25 mL

QC Batch: 1308852 Sequence: 3I03002 Calibration: 3I03028 Instrument: 201

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7440-47-3	Chromium, Dissolved	0.34	ug/L	0.20	0.50	1.0	J
7440-48-4	Cobalt, Dissolved	0.20	ug/L	0.050	0.20	1.0	U
7440-02-0	Nickel, Dissolved	0.50	ug/L	0.17	0.50	1.0	U
7440-22-4	Silver, Dissolved	0.10	ug/L	0.037	0.10	0.20	U
7440-62-2	Vanadium, Dissolved	0.15	ug/L	0.066	0.20	1.0	J

: 00287

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308852-BLK3
File ID: 3i03054-027
Prepared: 08/22/13 07:00
Analyzed: 09/03/13 14:46
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL
QC Batch: 1308852
Sequence: 3I03054
Calibration: 3I04002
Instrument: 201

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7440-38-2	Arsenic, Dissolved	0.50	ug/L	0.18	0.50	1.0	U
7782-49-2	Selenium, Dissolved	0.83	ug/L	0.31	1.0	1.0	J

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308852-BLK4
File ID: 3i04003-026
Prepared: 08/22/13 07:00
Analyzed: 09/04/13 09:15
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL
QC Batch: 1308852
Sequence: 3I04003
Calibration: 3I04007
Instrument: 114

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7440-36-0	Antimony, Dissolved	0.50	ug/L	0.15	0.50	1.0	U

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308852-BLK5
File ID: 3i04025-020
Prepared: 08/22/13 07:00
Analyzed: 09/04/13 12:13
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL
QC Batch: 1308852
Sequence: 3I04025
Calibration: 3I04008
Instrument: 114

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7440-41-7	Beryllium, Dissolved	0.40	ug/L	0.11	0.40	1.0	U

00295

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308852

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308852-MS1

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Cadmium, Dissolved	50.0	ND	45.6	91	80 - 120	ug/L
Copper, Dissolved	50.0	0.977	38.9	76 *	80 - 120	ug/L
Lead, Dissolved	50.0	ND	45.2	90	80 - 120	ug/L
Thallium, Dissolved	50.0	ND	45.7	91	80 - 120	ug/L
Zinc, Dissolved	50.0	6.86	60.8	108	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00361

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308852

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308852-MSD1

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Cadmium, Dissolved	50.0	46.3	93	1	20	80 - 120	ug/L
Copper, Dissolved	50.0	39.3	77 *	1	20	80 - 120	ug/L
Lead, Dissolved	50.0	45.4	91	0.5	20	80 - 120	ug/L
Thallium, Dissolved	50.0	46.2	92	1	20	80 - 120	ug/L
Zinc, Dissolved	50.0	48.5	83	23 *	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

00382

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308852

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308852-MS2

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Barium, Dissolved	50.0	219	276	114	80 - 120	ug/L
Chromium, Dissolved	50.0	0.307	51.4	102	80 - 120	ug/L
Cobalt, Dissolved	50.0	0.697	48.6	96	80 - 120	ug/L
Nickel, Dissolved	50.0	1.38	46.7	91	80 - 120	ug/L
Silver, Dissolved	50.0	ND	49.0	98	80 - 120	ug/L
Vanadium, Dissolved	50.0	0.267	52.9	105	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

00393

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308852

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308852-MSD2

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Barium, Dissolved	50.0	274	109	0.8	20	80 - 120	ug/L
Chromium, Dissolved	50.0	52.1	104	1	20	80 - 120	ug/L
Cobalt, Dissolved	50.0	48.8	96	0.4	20	80 - 120	ug/L
Nickel, Dissolved	50.0	47.5	92	2	20	80 - 120	ug/L
Silver, Dissolved	50.0	49.6	99	1	20	80 - 120	ug/L
Vanadium, Dissolved	50.0	53.4	106	1	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

00364

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308852

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308852-MS3

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Manganese, Dissolved	50.0	673	754	162 *	80 - 120	ug/L
Selenium, Dissolved	50.0	0.554	49.0	97	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

00365

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308852

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308852-MSD3

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Manganese, Dissolved	50.0	752	158 *	0.2	20	80 - 120	ug/L
Selenium, Dissolved	50.0	50.2	99	2	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

00396

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308852

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308852-MS4

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Antimony, Dissolved	50.0	0.177	55.1	110	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00367

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308852

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308852-MSD4

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Antimony, Dissolved	50.0	56.4	112	2	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 66388

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308852

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308852-MS5

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Beryllium, Dissolved	50.0	ND	50.1	100	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

00389

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308852

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308852-MSD5

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Beryllium, Dissolved	50.0	51.6	103	3	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00316

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308852

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308852-MS6

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Arsenic, Dissolved	50.0	70.7	119	97	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00314

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308852

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308852-MSD6

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Arsenic, Dissolved	50.0	119	96	0.1	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

00312

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308852-PS1
% Solids:
Lab Source ID: 1308343-04
Preparation: 3020A Digestion
Initial/Final: 4 mL / 4 mL
QC Batch: 1308852
Sequence: 3H30011

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Cadmium, Dissolved	19.8	0.0213	ug/L	20.0	99	75 - 125
Copper, Dissolved	17.7	0.977	ug/L	20.0	83	75 - 125
Lead, Dissolved	19.7	0.0315	ug/L	20.0	98	75 - 125
Thallium, Dissolved	19.9	0.00498	ug/L	20.0	99	75 - 125
Zinc, Dissolved	24.2	6.86	ug/L	20.0	86	75 - 125

* Values outside of QC limits

00326

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308852-PS2
% Solids:
Lab Source ID: 1308343-04
Preparation: 3020A Digestion
Initial/Final: 4 mL / 4 mL
QC Batch: 1308852
Sequence: 3I03002

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Chromium, Dissolved	22.1	0.307	ug/L	20.0	109	75 - 125
Cobalt, Dissolved	21.4	0.697	ug/L	20.0	104	75 - 125
Nickel, Dissolved	21.6	1.38	ug/L	20.0	101	75 - 125
Silver, Dissolved	21.3	0.0120	ug/L	20.0	106	75 - 125
Vanadium, Dissolved	22.6	0.267	ug/L	20.0	112	75 - 125

* Values outside of QC limits

: 03321

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308852-PS3
% Solids:
Lab Source ID: 1308343-04
Preparation: 3020A Digestion
Initial/Final: 1 mL / 1 mL
QC Batch: 1308852
Sequence: 3I03002

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Barium, Dissolved	411	219	ug/L	200	96	75 - 125

* Values outside of QC limits

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
% Solids:
Preparation: 3020A Digestion
QC Batch: 1308852

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Laboratory ID: 1308852-PS4
Lab Source ID: 1308343-04
Initial/Final: 4 mL / 4 mL
Sequence: 3I03054

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Selenium, Dissolved	21.6	0.554	ug/L	20.0	105	75 - 125

* Values outside of QC limits

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308852-PS5
% Solids:
Lab Source ID: 1308343-04
Preparation: 3020A Digestion
Initial/Final: 1 mL / 1 mL
QC Batch: 1308852
Sequence: 3I03054

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Manganese, Dissolved	866	673	ug/L	200	97	75 - 125

* Values outside of QC limits

00324

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308852-PS6
% Solids:
Lab Source ID: 1308343-04
Preparation: 3020A Digestion
Initial/Final: 4 mL / 4 mL
QC Batch: 1308852
Sequence: 3I04003

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Antimony, Dissolved	22.5	0.177	ug/L	20.0	112	75 - 125

* Values outside of QC limits

00325

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308852-PS7
% Solids:
Lab Source ID: 1308343-04
Preparation: 3020A Digestion
Initial/Final: 1 mL / 1 mL
QC Batch: 1308852
Sequence: 3I05002

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Arsenic, Dissolved	176	70.7	ug/L	100	105	75 - 125

* Values outside of QC limits

: 00326

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
% Solids:
Preparation: 3020A Digestion
QC Batch: 1308852

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Laboratory ID: 1308852-PS8
Lab Source ID: 1308343-04
Initial/Final: 4 mL / 4 mL
Sequence: 3I04025

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Beryllium, Dissolved	21.8	-0.0322	ug/L	20.0	109	75 - 125

* Values outside of QC limits

: 00327

LCS / LCS DUPLICATE RECOVERY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308852

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308852-BS1

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Sequence: 3H30011

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Barium, Dissolved	50.0	41.7	83	80 - 120	ug/L
Cadmium, Dissolved	50.0	42.5	85	80 - 120	ug/L
Copper, Dissolved	50.0	40.5	81	80 - 120	ug/L
Lead, Dissolved	50.0	42.6	85	80 - 120	ug/L
Thallium, Dissolved	50.0	42.6	85	80 - 120	ug/L
Zinc, Dissolved	50.0	43.8	88	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

00332

LCS / LCS DUPLICATE RECOVERY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Water
QC Batch: 1308852

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigatior
Laboratory ID: 1308852-BS2
Preparation: 3020A Digestion
Initial/Final: 25 mL / 25 mL
Sequence: 3I03002

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Chromium, Dissolved	50.0	51.6	103	80 - 120	ug/L
Cobalt, Dissolved	50.0	49.0	98	80 - 120	ug/L
Nickel, Dissolved	50.0	48.1	96	80 - 120	ug/L
Silver, Dissolved	50.0	48.3	97	80 - 120	ug/L
Vanadium, Dissolved	50.0	51.2	102	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308852-BS3

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

QC Batch: 1308852

Sequence: 3I03054

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Arsenic, Dissolved	50.0	47.1	94	80 - 120	ug/L
Selenium, Dissolved	50.0	45.8	92	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 69334

LCS / LCS DUPLICATE RECOVERY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308852

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308852-BS4

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Sequence: 3I04003

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Antimony, Dissolved	50.0	50.2	100	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308852

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308852-BS5

Preparation: 3020A Digestion

Initial/Final: 25 mL / 25 mL

Sequence: 3I04025

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Beryllium, Dissolved	50.0	47.6	95	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 60336

SERIAL DILUTION

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Matrix: Water
Laboratory ID: 3H30011-SRD2
% Solids:
Lab Source ID: 1308343-04
QC Batch: 3H30011
Sequence: 3H30011

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Cadmium, Dissolved	0.0213	U	0.0513	U	141.0 #		ug/L	10
Copper, Dissolved	0.977	J	1.17	J	19.0 #		ug/L	10
Lead, Dissolved	0.0315	U	0.0248	U	21.0 #		ug/L	10
Thallium, Dissolved	0.00498	U	0.0440	U	784.0 #		ug/L	10
Zinc, Dissolved	6.86	J	6.44	U	6.0 #		ug/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

SERIAL DILUTION

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Matrix: Water
Laboratory ID: 3I03002-SRD2
% Solids:
Lab Source ID: 1308343-04
QC Batch: 3I03002
Sequence: 3I03002

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Chromium, Dissolved	0.307	J	0.905	U	195.0 #		ug/L	10
Cobalt, Dissolved	0.697	J	0.709	J	2.0 #		ug/L	10
Nickel, Dissolved	1.38		1.07	J	22.0 #		ug/L	10
Silver, Dissolved	0.0120	U	0.248	J	1,963.0 #		ug/L	10
Vanadium, Dissolved	0.267	J	0.682	J	156.0 #		ug/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

SERIAL DILUTION

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Matrix: Water
Laboratory ID: 3I03002-SRD4
% Solids:
Lab Source ID: 1308343-04
QC Batch: 3I03002
Sequence: 3I03002

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Barium, Dissolved	21.9		21.8				ug/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

: 00342

SERIAL DILUTION

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Matrix: Water
Laboratory ID: 3I03054-SRD2
% Solids:
Lab Source ID: 1308343-04
QC Batch: 3I03054
Sequence: 3I03054

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Selenium, Dissolved	0.554	J	6.92		1,150.0 #		ug/L	10

* Values outside of QC limits

OK

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

: 60344

SERIAL DILUTION

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Matrix: Water
Laboratory ID: 3I03054-SRD4
% Solids:
Lab Source ID: 1308343-04
QC Batch: 3I03054
Sequence: 3I03054

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Manganese, Dissolved	67.3		68.5		2.0		ug/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

00346

SERIAL DILUTION

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Matrix: Water
Laboratory ID: 3I04003-SRD2
% Solids:
Lab Source ID: 1308343-04
QC Batch: 3I04003
Sequence: 3I04003

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Antimony, Dissolved	0.177	J	0.799	J	351.0	#	ug/L	10

* Values outside of QC limits

OK

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

20348

SERIAL DILUTION

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation

Matrix: Water
Laboratory ID: 3I04025-SRD1

% Solids:
Lab Source ID: 1308343-04

QC Batch: 3I04025
Sequence: 3I04025

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Beryllium, Dissolved	-0.0322	U	0.0680	U	311.0	#	ug/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

SERIAL DILUTION

USEPA-6020A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation

Matrix: Water
Laboratory ID: 3I05002-SRD1

% Solids:
Lab Source ID: 1308343-04

QC Batch: 3I05002
Sequence: 3I05002

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Arsenic, Dissolved	14.1		14.4		2.0 (#)		ug/L	10

* Values outside of QC limits

OK

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

: 00351

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 3H30011

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Calibration: 3I03009
Instrument: 201

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	3H30011-CAL1	3h30011-004	08/30/13 09:50
Cal Standard	3H30011-CAL2	3h30011-005	08/30/13 09:55
Cal Standard	3H30011-CAL3	3h30011-006	08/30/13 09:59
Cal Standard	3H30011-CAL4	3h30011-007	08/30/13 10:04
Cal Standard	3H30011-CAL5	3h30011-008	08/30/13 10:08
Cal Standard	3H30011-CAL6	3h30011-009	08/30/13 10:13
Cal Standard	3H30011-CAL7	3h30011-010	08/30/13 10:17
Secondary Cal Check	3H30011-SCV1	3h30011-011	08/30/13 10:22
Calibration Check	3H30011-CCV1	3h30011-011	08/30/13 10:22
Calibration Blank	3H30011-CCB1	3h30011-012	08/30/13 10:28
Interference Check B	3H30011-IFB1	3h30011-014	08/30/13 10:37
Interference Check A	3H30011-IFA1	3h30011-015	08/30/13 10:46
Calibration Check	3H30011-CCV2	3h30011-016	08/30/13 10:51
Calibration Blank	3H30011-CCB2	3h30011-017	08/30/13 10:58
Blank	1308841-BLK1	3h30011-018	08/30/13 11:03
LCS	1308841-BS1	3h30011-019	08/30/13 11:07
NTC12GW-01	1308343-01	3h30011-020	08/30/13 11:12
NTC12GW-01	1308343-01	3h30011-020	08/30/13 11:12
NTC12GW-01	1308343-01	3h30011-020	08/30/13 11:12
NTC12GW-01	1308343-01	3h30011-020	08/30/13 11:12
NTC12GW-01	1308343-01	3h30011-020	08/30/13 11:12
NTC12GW-01	1308343-01	3h30011-020	08/30/13 11:12
NTC12GW-01	1308343-01	3h30011-020	08/30/13 11:12
NTC12GW-01	1308343-01	3h30011-020	08/30/13 11:12
NTC12GW-01	1308343-01	3h30011-020	08/30/13 11:12
NTC12GW-02	1308343-02	3h30011-021	08/30/13 11:17
NTC12GW-02	1308343-02	3h30011-021	08/30/13 11:17
NTC12GW-02	1308343-02	3h30011-021	08/30/13 11:17
NTC12GW-02	1308343-02	3h30011-021	08/30/13 11:17
NTC12GW-02	1308343-02	3h30011-021	08/30/13 11:17
NTC12GW-02	1308343-02	3h30011-021	08/30/13 11:17

: 00228

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 3H30011

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Calibration: 3I03009
Instrument: 201

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
NTC12GW-02	1308343-02	3h30011-021	08/30/13 11:17
NTC12GW-02	1308343-02	3h30011-021	08/30/13 11:17
NTC12GW-03	1308343-03	3h30011-022	08/30/13 11:21
NTC12GW-03	1308343-03	3h30011-022	08/30/13 11:21
NTC12GW-03	1308343-03	3h30011-022	08/30/13 11:21
NTC12GW-03	1308343-03	3h30011-022	08/30/13 11:21
NTC12GW-03	1308343-03	3h30011-022	08/30/13 11:21
NTC12GW-03	1308343-03	3h30011-022	08/30/13 11:21
NTC12GW-03	1308343-03	3h30011-022	08/30/13 11:21
NTC12GW-03	1308343-03	3h30011-022	08/30/13 11:21
NTC12GW-03	1308343-03	3h30011-022	08/30/13 11:21
NTC12GW-04	1308343-04	3h30011-023	08/30/13 11:26
NTC12GW-04	1308343-04	3h30011-023	08/30/13 11:26
NTC12GW-04	1308343-04	3h30011-023	08/30/13 11:26
NTC12GW-04	1308343-04	3h30011-023	08/30/13 11:26
NTC12GW-04	1308343-04	3h30011-023	08/30/13 11:26
NTC12GW-04	1308343-04	3h30011-023	08/30/13 11:26
NTC12GW-04	1308343-04	3h30011-023	08/30/13 11:26
NTC12GW-04	1308343-04	3h30011-023	08/30/13 11:26
NTC12GW-04	1308841-MS1	3h30011-024	08/30/13 11:30
NTC12GW-04	1308841-MSD1	3h30011-025	08/30/13 11:35
NTC12GW-04	3H30011-SRD1	3h30011-026	08/30/13 11:39
NTC12GW-04	1308841-PS1	3h30011-027	08/30/13 11:44
Calibration Check	3H30011-CCV3	3h30011-028	08/30/13 11:48
Calibration Blank	3H30011-CCB3	3h30011-029	08/30/13 11:55
NTC12-DUP-P3-081513	1308343-05	3h30011-030	08/30/13 11:59
NTC12-DUP-P3-081513	1308343-05	3h30011-030	08/30/13 11:59
NTC12-DUP-P3-081513	1308343-05	3h30011-030	08/30/13 11:59
NTC12-DUP-P3-081513	1308343-05	3h30011-030	08/30/13 11:59
NTC12-DUP-P3-081513	1308343-05	3h30011-030	08/30/13 11:59
NTC12-DUP-P3-081513	1308343-05	3h30011-030	08/30/13 11:59

00229

ANALYSIS BATCH (SEQUENCE) SUMMARY
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Sequence: 3H30011
Calibration: 3I03009
Instrument: 201

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Blank	1308852-BLK1	3h30011-031	08/30/13 12:04
LCS	1308852-BS1	3h30011-032	08/30/13 12:08
NTC12GW-01	1308343-01	3h30011-033	08/30/13 12:13
NTC12GW-01	1308343-01	3h30011-033	08/30/13 12:13
NTC12GW-01	1308343-01	3h30011-033	08/30/13 12:13
NTC12GW-01	1308343-01	3h30011-033	08/30/13 12:13
NTC12GW-01	1308343-01	3h30011-033	08/30/13 12:13
NTC12GW-01	1308343-01	3h30011-033	08/30/13 12:13
NTC12GW-02	1308343-02	3h30011-034	08/30/13 12:17
NTC12GW-02	1308343-02	3h30011-034	08/30/13 12:17
NTC12GW-02	1308343-02	3h30011-034	08/30/13 12:17
NTC12GW-02	1308343-02	3h30011-034	08/30/13 12:17
NTC12GW-03	1308343-03	3h30011-035	08/30/13 12:22
NTC12GW-03	1308343-03	3h30011-035	08/30/13 12:22
NTC12GW-03	1308343-03	3h30011-035	08/30/13 12:22
NTC12GW-03	1308343-03	3h30011-035	08/30/13 12:22
NTC12GW-03	1308343-03	3h30011-035	08/30/13 12:22
NTC12GW-04	1308343-04	3h30011-036	08/30/13 12:26
NTC12GW-04	1308343-04	3h30011-036	08/30/13 12:26
NTC12GW-04	1308343-04	3h30011-036	08/30/13 12:26
NTC12GW-04	1308343-04	3h30011-036	08/30/13 12:26
NTC12GW-04	1308343-04	3h30011-036	08/30/13 12:26
NTC12GW-04	1308852-MS1	3h30011-037	08/30/13 12:31
NTC12GW-04	1308852-MSD1	3h30011-038	08/30/13 12:35
NTC12GW-04	3H30011-SRD2	3h30011-039	08/30/13 12:40
Calibration Check	3H30011-CCV4	3h30011-041	08/30/13 12:51
Calibration Blank	3H30011-CCB4	3h30011-042	08/30/13 12:57
NTC12GW-04	1308852-PS1	3h30011-043	08/30/13 13:02
NTC12-DUP-P3-081513	1308343-05	3h30011-044	08/30/13 13:06
NTC12-DUP-P3-081513	1308343-05	3h30011-044	08/30/13 13:06
NTC12-DUP-P3-081513	1308343-05	3h30011-044	08/30/13 13:06
NTC12-DUP-P3-081513	1308343-05	3h30011-044	08/30/13 13:06

: 00236

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Sequence: 3H30011
Calibration: 3I03009
Instrument: 201

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
NTC12-DUP-P3-081513	1308343-05	3h30011-044	08/30/13 13:06
Calibration Check	3H30011-CCV5	3h30011-046	08/30/13 13:16
Calibration Blank	3H30011-CCB5	3h30011-047	08/30/13 13:23

00231

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3H30011
Calibration: 3I03009
Control Limt: +/- 10.00%
Instrument ID: 201

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
3H30011-CCV1	Barium	40.0	38.5	96	ug/L	08/30/13 10:22
	Barium	40.0	38.5	96	ug/L	08/30/13 10:22
	Cadmium	40.0	38.8	97	ug/L	08/30/13 10:22
	Cadmium	40.0	38.8	97	ug/L	08/30/13 10:22
	Chromium	40.0	38.4	96	ug/L	08/30/13 10:22
	Chromium	40.0	38.4	96	ug/L	08/30/13 10:22
	Cobalt	40.0	38.3	96	ug/L	08/30/13 10:22
	Cobalt	40.0	38.3	96	ug/L	08/30/13 10:22
	Copper	40.0	38.2	96	ug/L	08/30/13 10:22
	Copper	40.0	38.2	96	ug/L	08/30/13 10:22
	Lead	40.0	39.1	98	ug/L	08/30/13 10:22
	Lead	40.0	39.1	98	ug/L	08/30/13 10:22
	Manganese	40.0	38.4	96	ug/L	08/30/13 10:22
	Manganese	40.0	38.4	96	ug/L	08/30/13 10:22
	Nickel	40.0	37.8	94	ug/L	08/30/13 10:22
	Nickel	40.0	37.8	94	ug/L	08/30/13 10:22
	Thallium	40.0	38.9	97	ug/L	08/30/13 10:22
	Thallium	40.0	38.9	97	ug/L	08/30/13 10:22
	Vanadium	40.0	37.8	94	ug/L	08/30/13 10:22
	Vanadium	40.0	37.8	94	ug/L	08/30/13 10:22
	Zinc	40.0	38.2	95	ug/L	08/30/13 10:22
	Zinc	40.0	38.2	95	ug/L	08/30/13 10:22
3H30011-CCV2	Barium	40.0	38.3	96	ug/L	08/30/13 10:51
	Barium	40.0	38.3	96	ug/L	08/30/13 10:51
	Cadmium	40.0	39.1	98	ug/L	08/30/13 10:51
	Cadmium	40.0	39.1	98	ug/L	08/30/13 10:51
	Chromium	40.0	39.6	99	ug/L	08/30/13 10:51
	Chromium	40.0	39.6	99	ug/L	08/30/13 10:51
	Cobalt	40.0	38.4	96	ug/L	08/30/13 10:51
	Cobalt	40.0	38.4	96	ug/L	08/30/13 10:51
	Copper	40.0	38.1	95	ug/L	08/30/13 10:51
	Copper	40.0	38.1	95	ug/L	08/30/13 10:51
	Lead	40.0	39.0	97	ug/L	08/30/13 10:51
	Lead	40.0	39.0	97	ug/L	08/30/13 10:51
	Manganese	40.0	39.1	98	ug/L	08/30/13 10:51
	Manganese	40.0	39.1	98	ug/L	08/30/13 10:51
	Nickel	40.0	38.1	95	ug/L	08/30/13 10:51
	Nickel	40.0	38.1	95	ug/L	08/30/13 10:51

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3H30011
Calibration: 3I03009
Control Limt: +/- 10.00%
Instrument ID: 201

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
3H30011-CCV2	Thallium	40.0	39.1	98	ug/L	08/30/13 10:51
	Thallium	40.0	39.1	98	ug/L	08/30/13 10:51
	Vanadium	40.0	39.3	98	ug/L	08/30/13 10:51
	Vanadium	40.0	39.3	98	ug/L	08/30/13 10:51
	Zinc	40.0	37.7	94	ug/L	08/30/13 10:51
	Zinc	40.0	37.7	94	ug/L	08/30/13 10:51
3H30011-CCV3	Barium	40.0	38.8	97	ug/L	08/30/13 11:48
	Barium	40.0	38.8	97	ug/L	08/30/13 11:48
	Cadmium	40.0	39.5	99	ug/L	08/30/13 11:48
	Cadmium	40.0	39.5	99	ug/L	08/30/13 11:48
	Chromium	40.0	36.8	92	ug/L	08/30/13 11:48
	Chromium	40.0	36.8	92	ug/L	08/30/13 11:48
	Cobalt	40.0	37.1	93	ug/L	08/30/13 11:48
	Cobalt	40.0	37.1	93	ug/L	08/30/13 11:48
	Copper	40.0	36.9	92	ug/L	08/30/13 11:48
	Copper	40.0	36.9	92	ug/L	08/30/13 11:48
	Lead	40.0	39.1	98	ug/L	08/30/13 11:48
	Lead	40.0	39.1	98	ug/L	08/30/13 11:48
	Manganese	40.0	37.6	94	ug/L	08/30/13 11:48
	Manganese	40.0	37.6	94	ug/L	08/30/13 11:48
	Nickel	40.0	36.3	91	ug/L	08/30/13 11:48
	Nickel	40.0	36.3	91	ug/L	08/30/13 11:48
	Thallium	40.0	39.0	98	ug/L	08/30/13 11:48
	Thallium	40.0	39.0	98	ug/L	08/30/13 11:48
	Vanadium	40.0	35.9	90	ug/L	08/30/13 11:48
	Vanadium	40.0	35.9	90	ug/L	08/30/13 11:48
	Zinc	40.0	38.2	95	ug/L	08/30/13 11:48
	Zinc	40.0	38.2	95	ug/L	08/30/13 11:48
3H30011-CCV4	Barium	40.0	38.2	95	ug/L	08/30/13 12:51
	Barium	40.0	38.2	95	ug/L	08/30/13 12:51
	Cadmium	40.0	39.0	98	ug/L	08/30/13 12:51
	Cadmium	40.0	39.0	98	ug/L	08/30/13 12:51
	Cobalt	40.0	35.9	90	ug/L	08/30/13 12:51
	Cobalt	40.0	35.9	90	ug/L	08/30/13 12:51
	Copper	40.0	36.4	91	ug/L	08/30/13 12:51
	Copper	40.0	36.4	91	ug/L	08/30/13 12:51
	Lead	40.0	39.1	98	ug/L	08/30/13 12:51
	Lead	40.0	39.1	98	ug/L	08/30/13 12:51

: 68244

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3H30011
Calibration: 3I03009
Control Limt: +/- 10.00%
Instrument ID: 201

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
3H30011-CCV4	Thallium	40.0	39.5	99	ug/L	08/30/13 12:51
	Thallium	40.0	39.5	99	ug/L	08/30/13 12:51
	Zinc	40.0	37.2	93	ug/L	08/30/13 12:51
	Zinc	40.0	37.2	93	ug/L	08/30/13 12:51
3H30011-CCV5	Barium	40.0	38.1	95	ug/L	08/30/13 13:16
	Barium	40.0	38.1	95	ug/L	08/30/13 13:16
	Cadmium	40.0	38.8	97	ug/L	08/30/13 13:16
	Cadmium	40.0	38.8	97	ug/L	08/30/13 13:16
	Copper	40.0	36.4	91	ug/L	08/30/13 13:16
	Copper	40.0	36.4	91	ug/L	08/30/13 13:16
	Lead	40.0	38.9	97	ug/L	08/30/13 13:16
	Lead	40.0	38.9	97	ug/L	08/30/13 13:16
	Thallium	40.0	39.1	98	ug/L	08/30/13 13:16
	Thallium	40.0	39.1	98	ug/L	08/30/13 13:16
	Zinc	40.0	37.6	94	ug/L	08/30/13 13:16
	Zinc	40.0	37.6	94	ug/L	08/30/13 13:16

* Values outside of QC limits

00245

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Inv
Laboratory ID: 3H30011-SCV1
Instrument: 201
Sequence: 3H30011
Calibration: 3I03009

Analyte	Expected	Found	% R	QC Limit	Units
Barium	40.0	38.5	96	90-110	ug/L
Barium	40.0	38.5	96	90-110	ug/L
Cadmium	40.0	38.8	97	90-110	ug/L
Cadmium	40.0	38.8	97	90-110	ug/L
Chromium	40.0	38.4	96	90-110	ug/L
Chromium	40.0	38.4	96	90-110	ug/L
Cobalt	40.0	38.3	96	90-110	ug/L
Cobalt	40.0	38.3	96	90-110	ug/L
Copper	40.0	38.2	96	90-110	ug/L
Copper	40.0	38.2	96	90-110	ug/L
Lead	40.0	39.1	98	90-110	ug/L
Lead	40.0	39.1	98	90-110	ug/L
Manganese	40.0	38.4	96	90-110	ug/L
Manganese	40.0	38.4	96	90-110	ug/L
Nickel	40.0	37.8	95	90-110	ug/L
Nickel	40.0	37.8	95	90-110	ug/L
Thallium	40.0	38.9	97	90-110	ug/L
Thallium	40.0	38.9	97	90-110	ug/L
Vanadium	40.0	37.8	95	90-110	ug/L
Vanadium	40.0	37.8	95	90-110	ug/L
Zinc	40.0	38.2	96	90-110	ug/L
Zinc	40.0	38.2	96	90-110	ug/L

* Values outside of QC limits

: 00254

BLANKS
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3H30011
Calibration: 3I03009
Instrument ID: 201

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
3H30011-CCB1	Barium	0.013	ug/L	0.14	0.50	1.0	U	08/30/13 10:28
	Barium	0.013	ug/L	0.14	0.50	1.0	U	08/30/13 10:28
	Cadmium	0.000056	ug/L	0.038	0.10	0.20	U	08/30/13 10:28
	Cadmium	0.000056	ug/L	0.038	0.10	0.20	U	08/30/13 10:28
	Chromium	-0.10	ug/L	0.20	0.50	1.0	U	08/30/13 10:28
	Chromium	-0.10	ug/L	0.20	0.50	1.0	U	08/30/13 10:28
	Cobalt	0.0030	ug/L	0.050	0.20	1.0	U	08/30/13 10:28
	Cobalt	0.0030	ug/L	0.050	0.20	1.0	U	08/30/13 10:28
	Copper	-0.0051	ug/L	0.13	0.50	1.0	U	08/30/13 10:28
	Copper	-0.0051	ug/L	0.13	0.50	1.0	U	08/30/13 10:28
	Lead	0.0065	ug/L	0.15	0.50	1.0	U	08/30/13 10:28
	Lead	0.0065	ug/L	0.15	0.50	1.0	U	08/30/13 10:28
	Manganese	-0.0022	ug/L	0.14	0.50	1.0	U	08/30/13 10:28
	Manganese	-0.0022	ug/L	0.14	0.50	1.0	U	08/30/13 10:28
	Nickel	0.0037	ug/L	0.17	0.50	1.0	U	08/30/13 10:28
	Nickel	0.0037	ug/L	0.17	0.50	1.0	U	08/30/13 10:28
	Thallium	0.0066	ug/L	0.027	0.10	1.0	U	08/30/13 10:28
	Thallium	0.0066	ug/L	0.027	0.10	1.0	U	08/30/13 10:28
	Vanadium	-0.0028	ug/L	0.066	0.20	1.0	U	08/30/13 10:28
	Vanadium	-0.0028	ug/L	0.066	0.20	1.0	U	08/30/13 10:28
	Zinc	-0.079	ug/L	1.5	4.0	10	U	08/30/13 10:28
	Zinc	-0.079	ug/L	1.5	4.0	10	U	08/30/13 10:28
3H30011-CCB2	Barium	0.0039	ug/L	0.14	0.50	1.0	U	08/30/13 10:58
	Barium	0.0039	ug/L	0.14	0.50	1.0	U	08/30/13 10:58
	Cadmium	-0.0010	ug/L	0.038	0.10	0.20	U	08/30/13 10:58
	Cadmium	-0.0010	ug/L	0.038	0.10	0.20	U	08/30/13 10:58
	Chromium	-0.066	ug/L	0.20	0.50	1.0	U	08/30/13 10:58
	Chromium	-0.066	ug/L	0.20	0.50	1.0	U	08/30/13 10:58
	Cobalt	0.0012	ug/L	0.050	0.20	1.0	U	08/30/13 10:58
	Cobalt	0.0012	ug/L	0.050	0.20	1.0	U	08/30/13 10:58
	Copper	-0.0092	ug/L	0.13	0.50	1.0	U	08/30/13 10:58
	Copper	-0.0092	ug/L	0.13	0.50	1.0	U	08/30/13 10:58
	Lead	0.0054	ug/L	0.15	0.50	1.0	U	08/30/13 10:58

BLANKS
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3H30011
Calibration: 3I03009
Instrument ID: 201

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
3H30011-CCB2	Lead	0.0054	ug/L	0.15	0.50	1.0	U	08/30/13 10:58
	Manganese	-0.00045	ug/L	0.14	0.50	1.0	U	08/30/13 10:58
	Manganese	-0.00045	ug/L	0.14	0.50	1.0	U	08/30/13 10:58
	Nickel	0.0021	ug/L	0.17	0.50	1.0	U	08/30/13 10:58
	Nickel	0.0021	ug/L	0.17	0.50	1.0	U	08/30/13 10:58
	Thallium	0.0051	ug/L	0.027	0.10	1.0	U	08/30/13 10:58
	Thallium	0.0051	ug/L	0.027	0.10	1.0	U	08/30/13 10:58
	Vanadium	0.000031	ug/L	0.066	0.20	1.0	U	08/30/13 10:58
	Vanadium	0.000031	ug/L	0.066	0.20	1.0	U	08/30/13 10:58
	Zinc	-0.055	ug/L	1.5	4.0	10	U	08/30/13 10:58
	Zinc	-0.055	ug/L	1.5	4.0	10	U	08/30/13 10:58
3H30011-CCB3	Barium	0.014	ug/L	0.14	0.50	1.0	U	08/30/13 11:55
	Barium	0.014	ug/L	0.14	0.50	1.0	U	08/30/13 11:55
	Cadmium	0.0031	ug/L	0.038	0.10	0.20	U	08/30/13 11:55
	Cadmium	0.0031	ug/L	0.038	0.10	0.20	U	08/30/13 11:55
	Chromium	-0.10	ug/L	0.20	0.50	1.0	U	08/30/13 11:55
	Chromium	-0.10	ug/L	0.20	0.50	1.0	U	08/30/13 11:55
	Cobalt	0.0015	ug/L	0.050	0.20	1.0	U	08/30/13 11:55
	Cobalt	0.0015	ug/L	0.050	0.20	1.0	U	08/30/13 11:55
	Copper	-0.015	ug/L	0.13	0.50	1.0	U	08/30/13 11:55
	Copper	-0.015	ug/L	0.13	0.50	1.0	U	08/30/13 11:55
	Lead	0.00048	ug/L	0.15	0.50	1.0	U	08/30/13 11:55
	Lead	0.00048	ug/L	0.15	0.50	1.0	U	08/30/13 11:55
	Manganese	0.0074	ug/L	0.14	0.50	1.0	U	08/30/13 11:55
	Manganese	0.0074	ug/L	0.14	0.50	1.0	U	08/30/13 11:55
	Nickel	0.0065	ug/L	0.17	0.50	1.0	U	08/30/13 11:55
	Nickel	0.0065	ug/L	0.17	0.50	1.0	U	08/30/13 11:55
	Thallium	0.0061	ug/L	0.027	0.10	1.0	U	08/30/13 11:55
	Thallium	0.0061	ug/L	0.027	0.10	1.0	U	08/30/13 11:55
	Vanadium	-0.029	ug/L	0.066	0.20	1.0	U	08/30/13 11:55
	Vanadium	-0.029	ug/L	0.066	0.20	1.0	U	08/30/13 11:55
	Zinc	-0.050	ug/L	1.5	4.0	10	U	08/30/13 11:55
	Zinc	-0.050	ug/L	1.5	4.0	10	U	08/30/13 11:55

BLANKS
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3H30011
Calibration: 3I03009
Instrument ID: 201

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
3H30011-CCB4	Barium	0.0022	ug/L	0.14	0.50	1.0	U	08/30/13 12:57
	Barium	0.0022	ug/L	0.14	0.50	1.0	U	08/30/13 12:57
	Cadmium	-0.00095	ug/L	0.038	0.10	0.20	U	08/30/13 12:57
	Cadmium	-0.00095	ug/L	0.038	0.10	0.20	U	08/30/13 12:57
	Cobalt	0.0010	ug/L	0.050	0.20	1.0	U	08/30/13 12:57
	Cobalt	0.0010	ug/L	0.050	0.20	1.0	U	08/30/13 12:57
	Copper	-0.011	ug/L	0.13	0.50	1.0	U	08/30/13 12:57
	Copper	-0.011	ug/L	0.13	0.50	1.0	U	08/30/13 12:57
	Lead	-0.00011	ug/L	0.15	0.50	1.0	U	08/30/13 12:57
	Lead	-0.00011	ug/L	0.15	0.50	1.0	U	08/30/13 12:57
	Thallium	0.0043	ug/L	0.027	0.10	1.0	U	08/30/13 12:57
	Thallium	0.0043	ug/L	0.027	0.10	1.0	U	08/30/13 12:57
	Zinc	-0.063	ug/L	1.5	4.0	10	U	08/30/13 12:57
	Zinc	-0.063	ug/L	1.5	4.0	10	U	08/30/13 12:57
3H30011-CCB5	Barium	0.0051	ug/L	0.14	0.50	1.0	U	08/30/13 13:23
	Barium	0.0051	ug/L	0.14	0.50	1.0	U	08/30/13 13:23
	Cadmium	-0.0014	ug/L	0.038	0.10	0.20	U	08/30/13 13:23
	Cadmium	-0.0014	ug/L	0.038	0.10	0.20	U	08/30/13 13:23
	Copper	-0.017	ug/L	0.13	0.50	1.0	U	08/30/13 13:23
	Copper	-0.017	ug/L	0.13	0.50	1.0	U	08/30/13 13:23
	Lead	-0.0014	ug/L	0.15	0.50	1.0	U	08/30/13 13:23
	Lead	-0.0014	ug/L	0.15	0.50	1.0	U	08/30/13 13:23
	Thallium	0.0050	ug/L	0.027	0.10	1.0	U	08/30/13 13:23
	Thallium	0.0050	ug/L	0.027	0.10	1.0	U	08/30/13 13:23
	Zinc	-0.054	ug/L	1.5	4.0	10	U	08/30/13 13:23
	Zinc	-0.054	ug/L	1.5	4.0	10	U	08/30/13 13:23

* Values outside of QC limits

ICP INTERFERENCE CHECK SAMPLE

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A Site 12 Inves

Sequence: 3H30011

Calibration: 3I03009

Instrument ID: 201

Lab Sample ID	Analyte	True	Found	%R	Units
3H30011-IFB1	Barium	20.0	19.1	96	ug/L
	Barium	20.0	19.1	96	ug/L
	Cadmium	20.0	20.2	101	ug/L
	Cadmium	20.0	20.2	101	ug/L
	Chromium	20.0	20.3	101	ug/L
	Chromium	20.0	20.3	101	ug/L
	Cobalt	20.0	19.4	97	ug/L
	Cobalt	20.0	19.4	97	ug/L
	Copper	20.0	19.0	95	ug/L
	Copper	20.0	19.0	95	ug/L
	Lead	20.0	19.8	99	ug/L
	Lead	20.0	19.8	99	ug/L
	Manganese	20.0	19.8	99	ug/L
	Manganese	20.0	19.8	99	ug/L
	Nickel	20.0	19.3	97	ug/L
	Nickel	20.0	19.3	97	ug/L
	Thallium	20.0	19.9	100	ug/L
	Thallium	20.0	19.9	100	ug/L
	Vanadium	20.0	20.0	100	ug/L
	Vanadium	20.0	20.0	100	ug/L
	Zinc	20.0	19.3	96	ug/L
	Zinc	20.0	19.3	96	ug/L
3H30011-IFA1	Barium	0.00	0.0276		ug/L
	Barium	0.00	0.0276		ug/L
	Cadmium	0.00	0.0370		ug/L
	Cadmium	0.00	0.0370		ug/L
	Chromium	0.00	0.154		ug/L
	Chromium	0.00	0.154		ug/L
	Cobalt	0.00	0.0161		ug/L
	Cobalt	0.00	0.0161		ug/L
	Copper	0.00	0.355		ug/L
	Copper	0.00	0.355		ug/L

00272

ICP INTERFERENCE CHECK SAMPLE

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A Site 12 Inves

Sequence: 3H30011

Calibration: 3I03009

Instrument ID: 201

Lab Sample ID	Analyte	True	Found	%R	Units
3H30011-IFA1	Lead	0.00	0.0262		ug/L
	Lead	0.00	0.0262		ug/L
	Manganese	0.00	-0.00494		ug/L
	Manganese	0.00	-0.00494		ug/L
	Nickel	0.00	0.303		ug/L
	Nickel	0.00	0.303		ug/L
	Thallium	0.00	0.00881		ug/L
	Thallium	0.00	0.00881		ug/L
	Vanadium	0.00	-0.0177		ug/L
	Vanadium	0.00	-0.0177		ug/L
	Zinc	0.00	0.461		ug/L
	Zinc	0.00	0.461		ug/L

* Values outside of QC limits

00275

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Sequence: 3I03002
Calibration: 3I03028
Instrument: 201

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	3I03002-CAL1	3i03002-002	09/03/13 08:05
Cal Standard	3I03002-CAL2	3i03002-003	09/03/13 08:08
Cal Standard	3I03002-CAL3	3i03002-004	09/03/13 08:12
Cal Standard	3I03002-CAL4	3i03002-005	09/03/13 08:16
Cal Standard	3I03002-CAL5	3i03002-006	09/03/13 08:20
Cal Standard	3I03002-CAL6	3i03002-007	09/03/13 08:24
Cal Standard	3I03002-CAL7	3i03002-008	09/03/13 08:28
Secondary Cal Check	3I03002-SCV1	3i03002-009	09/03/13 08:31
Calibration Check	3I03002-CCV1	3i03002-009	09/03/13 08:31
Calibration Blank	3I03002-CCB1	3i03002-011	09/03/13 08:46
Interference Check A	3I03002-IFA1	3i03002-012	09/03/13 08:53
Interference Check B	3I03002-IFB1	3i03002-014	09/03/13 09:13
Calibration Check	3I03002-CCV2	3i03002-015	09/03/13 09:18
Calibration Blank	3I03002-CCB2	3i03002-017	09/03/13 09:28
Blank	1308841-BLK2	3i03002-018	09/03/13 09:33
LCS	1308841-BS2	3i03002-019	09/03/13 09:37
NTC12GW-01	1308343-01	3i03002-020	09/03/13 09:44
NTC12GW-02	1308343-02	3i03002-021	09/03/13 09:48
NTC12GW-03	1308343-03	3i03002-022	09/03/13 09:51
NTC12GW-04	1308343-04	3i03002-023	09/03/13 09:55
NTC12GW-04	1308841-MS2	3i03002-024	09/03/13 09:59
NTC12GW-04	1308841-MSD2	3i03002-025	09/03/13 10:03
NTC12GW-04	3I03002-SRD1	3i03002-026	09/03/13 10:10
NTC12GW-04	1308841-PS2	3i03002-027	09/03/13 10:14
Calibration Check	3I03002-CCV3	3i03002-028	09/03/13 10:21
Calibration Blank	3I03002-CCB3	3i03002-029	09/03/13 10:28
Calibration Check	3I03002-CCV4	3i03002-030	09/03/13 10:33
Calibration Blank	3I03002-CCB4	3i03002-031	09/03/13 10:44
NTC12-DUP-P3-081513	1308343-05	3i03002-032	09/03/13 10:47
NTC12-DUP-P3-081513	1308343-05	3i03002-032	09/03/13 10:47
NTC12-DUP-P3-081513	1308343-05	3i03002-032	09/03/13 10:47
NTC12-DUP-P3-081513	1308343-05	3i03002-032	09/03/13 10:47

00232

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 3I03002

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Calibration: 3I03028
Instrument: 201

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Blank	1308852-BLK2	3i03002-033	09/03/13 10:51
LCS	1308852-BS2	3i03002-034	09/03/13 10:55
NTC12GW-01	1308343-01	3i03002-035	09/03/13 10:59
NTC12GW-01	1308343-01	3i03002-035	09/03/13 10:59
NTC12GW-01	1308343-01	3i03002-035	09/03/13 10:59
NTC12GW-01	1308343-01	3i03002-035	09/03/13 10:59
NTC12GW-01	1308343-01	3i03002-035	09/03/13 10:59
NTC12GW-02	1308343-02	3i03002-036	09/03/13 11:02
NTC12GW-02	1308343-02	3i03002-036	09/03/13 11:02
NTC12GW-02	1308343-02	3i03002-036	09/03/13 11:02
NTC12GW-02	1308343-02	3i03002-036	09/03/13 11:02
NTC12GW-02	1308343-02	3i03002-036	09/03/13 11:02
NTC12GW-03	1308343-03	3i03002-037	09/03/13 11:06
NTC12GW-03	1308343-03	3i03002-037	09/03/13 11:06
NTC12GW-03	1308343-03	3i03002-037	09/03/13 11:06
NTC12GW-03	1308343-03	3i03002-037	09/03/13 11:06
NTC12GW-03	1308343-03	3i03002-037	09/03/13 11:06
NTC12GW-04	1308343-04	3i03002-038	09/03/13 11:10
NTC12GW-04	1308343-04	3i03002-038	09/03/13 11:10
NTC12GW-04	1308343-04	3i03002-038	09/03/13 11:10
NTC12GW-04	1308343-04	3i03002-038	09/03/13 11:10
NTC12GW-04	1308343-04	3i03002-038	09/03/13 11:10
NTC12GW-04	1308852-MS2	3i03002-039	09/03/13 11:14
NTC12GW-04	1308852-MSD2	3i03002-040	09/03/13 11:18
NTC12GW-04	3I03002-SRD2	3i03002-041	09/03/13 11:21
Calibration Check	3I03002-CCV5	3i03002-042	09/03/13 11:25
Calibration Blank	3I03002-CCB5	3i03002-043	09/03/13 11:29
NTC12GW-04	1308852-PS2	3i03002-044	09/03/13 11:33
NTC12-DUP-P3-081513	1308343-05	3i03002-045	09/03/13 11:37
NTC12-DUP-P3-081513	1308343-05	3i03002-045	09/03/13 11:37
NTC12-DUP-P3-081513	1308343-05	3i03002-045	09/03/13 11:37
NTC12-DUP-P3-081513	1308343-05	3i03002-045	09/03/13 11:37

80233

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 3I03002

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Calibration: 3I03028
Instrument: 201

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
NTC12-DUP-P3-081513	1308343-05	3i03002-045	09/03/13 11:37
Calibration Check	3I03002-CCV6	3i03002-046	09/03/13 11:40
Calibration Blank	3I03002-CCB6	3i03002-047	09/03/13 11:44
NTC12GW-02	1308343-02	3i03002-050	09/03/13 11:57
NTC12GW-02	1308343-02	3i03002-050	09/03/13 11:57
NTC12GW-03	1308343-03	3i03002-051	09/03/13 12:00
NTC12GW-04	1308343-04	3i03002-052	09/03/13 12:03
NTC12GW-04	1308841-MS2	3i03002-053	09/03/13 12:05
NTC12GW-04	1308841-MSD2	3i03002-054	09/03/13 12:08
NTC12GW-04	3I03002-SRD3	3i03002-055	09/03/13 12:11
Calibration Check	3I03002-CCV7	3i03002-056	09/03/13 12:13
Calibration Blank	3I03002-CCB7	3i03002-057	09/03/13 12:16
NTC12GW-04	1308841-PS3	3i03002-058	09/03/13 12:19
NTC12-DUP-P3-081513	1308343-05	3i03002-059	09/03/13 12:21
NTC12GW-02	1308343-02	3i03002-062	09/03/13 12:29
NTC12GW-02	1308343-02	3i03002-062	09/03/13 12:29
NTC12GW-03	1308343-03	3i03002-063	09/03/13 12:32
Calibration Check	3I03002-CCV8	3i03002-064	09/03/13 12:35
Calibration Blank	3I03002-CCB8	3i03002-065	09/03/13 12:39
NTC12GW-04	1308343-04	3i03002-066	09/03/13 12:42
NTC12GW-04	1308852-MS2	3i03002-067	09/03/13 12:44
NTC12GW-04	1308852-MSD2	3i03002-068	09/03/13 12:47
NTC12GW-04	3I03002-SRD4	3i03002-069	09/03/13 12:50
NTC12GW-04	1308852-PS3	3i03002-070	09/03/13 12:52
NTC12-DUP-P3-081513	1308343-05	3i03002-071	09/03/13 12:55
Calibration Check	3I03002-CCV9	3i03002-072	09/03/13 12:58
Calibration Blank	3I03002-CCB9	3i03002-073	09/03/13 13:00

00234

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3I03002
Calibration: 3I03028
Control Limt: +/- 10.00%
Instrument ID: 201

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
3I03002-CCV1	Barium	40.0	39.6	99	ug/L	09/03/13 08:31
	Barium	40.0	39.6	99	ug/L	09/03/13 08:31
	Chromium	40.0	40.3	101	ug/L	09/03/13 08:31
	Chromium	40.0	40.3	101	ug/L	09/03/13 08:31
	Cobalt	40.0	40.3	101	ug/L	09/03/13 08:31
	Nickel	40.0	39.9	100	ug/L	09/03/13 08:31
	Nickel	40.0	39.9	100	ug/L	09/03/13 08:31
	Silver	40.0	38.2	95	ug/L	09/03/13 08:31
	Silver	40.0	38.2	95	ug/L	09/03/13 08:31
	Vanadium	40.0	39.7	99	ug/L	09/03/13 08:31
	Vanadium	40.0	39.7	99	ug/L	09/03/13 08:31
	Zinc	40.0	39.4	99	ug/L	09/03/13 08:31
	Zinc	40.0	39.4	99	ug/L	09/03/13 08:31
3I03002-CCV2	Barium	40.0	38.5	96	ug/L	09/03/13 09:18
	Barium	40.0	38.5	96	ug/L	09/03/13 09:18
	Chromium	40.0	42.4	106	ug/L	09/03/13 09:18
	Chromium	40.0	42.4	106	ug/L	09/03/13 09:18
	Cobalt	40.0	41.6	104	ug/L	09/03/13 09:18
	Nickel	40.0	40.9	102	ug/L	09/03/13 09:18
	Nickel	40.0	40.9	102	ug/L	09/03/13 09:18
	Silver	40.0	38.4	96	ug/L	09/03/13 09:18
	Silver	40.0	38.4	96	ug/L	09/03/13 09:18
	Vanadium	40.0	42.0	105	ug/L	09/03/13 09:18
	Vanadium	40.0	42.0	105	ug/L	09/03/13 09:18
	Zinc	40.0	39.4	98	ug/L	09/03/13 09:18
	Zinc	40.0	39.4	98	ug/L	09/03/13 09:18
3I03002-CCV3	Barium	40.0	37.6	94	ug/L	09/03/13 10:21
	Barium	40.0	37.6	94	ug/L	09/03/13 10:21
	Chromium	40.0	43.3	108	ug/L	09/03/13 10:21
	Chromium	40.0	43.3	108	ug/L	09/03/13 10:21
	Cobalt	40.0	41.2	103	ug/L	09/03/13 10:21
	Nickel	40.0	40.3	101	ug/L	09/03/13 10:21
	Nickel	40.0	40.3	101	ug/L	09/03/13 10:21
	Silver	40.0	38.2	96	ug/L	09/03/13 10:21
	Silver	40.0	38.2	96	ug/L	09/03/13 10:21
	Vanadium	40.0	42.3	106	ug/L	09/03/13 10:21
	Vanadium	40.0	42.3	106	ug/L	09/03/13 10:21
	Zinc	40.0	39.4	99	ug/L	09/03/13 10:21

: 00246

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3I03002
Calibration: 3I03028
Control Limt: +/- 10.00%
Instrument ID: 201

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
3I03002-CCV3	Zinc	40.0	39.4	99	ug/L	09/03/13 10:21
3I03002-CCV4	Barium	40.0	37.8	94	ug/L	09/03/13 10:33
	Barium	40.0	37.8	94	ug/L	09/03/13 10:33
	Chromium	40.0	42.2	106	ug/L	09/03/13 10:33
	Chromium	40.0	42.2	106	ug/L	09/03/13 10:33
	Cobalt	40.0	40.5	101	ug/L	09/03/13 10:33
	Nickel	40.0	39.5	99	ug/L	09/03/13 10:33
	Nickel	40.0	39.5	99	ug/L	09/03/13 10:33
	Silver	40.0	38.2	96	ug/L	09/03/13 10:33
	Silver	40.0	38.2	96	ug/L	09/03/13 10:33
	Vanadium	40.0	41.3	103	ug/L	09/03/13 10:33
	Vanadium	40.0	41.3	103	ug/L	09/03/13 10:33
	Zinc	40.0	39.2	98	ug/L	09/03/13 10:33
	Zinc	40.0	39.2	98	ug/L	09/03/13 10:33
3I03002-CCV5	Barium	40.0	38.5	96	ug/L	09/03/13 11:25
	Barium	40.0	38.5	96	ug/L	09/03/13 11:25
	Chromium	40.0	40.7	102	ug/L	09/03/13 11:25
	Chromium	40.0	40.7	102	ug/L	09/03/13 11:25
	Cobalt	40.0	39.7	99	ug/L	09/03/13 11:25
	Nickel	40.0	39.0	98	ug/L	09/03/13 11:25
	Nickel	40.0	39.0	98	ug/L	09/03/13 11:25
	Silver	40.0	38.1	95	ug/L	09/03/13 11:25
	Silver	40.0	38.1	95	ug/L	09/03/13 11:25
	Vanadium	40.0	39.5	99	ug/L	09/03/13 11:25
	Vanadium	40.0	39.5	99	ug/L	09/03/13 11:25
	Zinc	40.0	39.5	99	ug/L	09/03/13 11:25
	Zinc	40.0	39.5	99	ug/L	09/03/13 11:25
3I03002-CCV6	Barium	40.0	38.2	95	ug/L	09/03/13 11:40
	Barium	40.0	38.2	95	ug/L	09/03/13 11:40
	Chromium	40.0	40.1	100	ug/L	09/03/13 11:40
	Chromium	40.0	40.1	100	ug/L	09/03/13 11:40
	Cobalt	40.0	39.0	98	ug/L	09/03/13 11:40
	Nickel	40.0	38.3	96	ug/L	09/03/13 11:40
	Nickel	40.0	38.3	96	ug/L	09/03/13 11:40
	Silver	40.0	38.3	96	ug/L	09/03/13 11:40
	Silver	40.0	38.3	96	ug/L	09/03/13 11:40
	Vanadium	40.0	38.9	97	ug/L	09/03/13 11:40
	Vanadium	40.0	38.9	97	ug/L	09/03/13 11:40

00247

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3I03002
Calibration: 3I03028
Control Limt: +/- 10.00%
Instrument ID: 201

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
3I03002-CCV6	Zinc	40.0	38.9	97	ug/L	09/03/13 11:40
	Zinc	40.0	38.9	97	ug/L	09/03/13 11:40
3I03002-CCV7	Barium	40.0	37.9	95	ug/L	09/03/13 12:13
	Barium	40.0	37.9	95	ug/L	09/03/13 12:13
	Zinc	40.0	39.3	98	ug/L	09/03/13 12:13
	Zinc	40.0	39.3	98	ug/L	09/03/13 12:13
3I03002-CCV8	Barium	40.0	37.7	94	ug/L	09/03/13 12:35
	Barium	40.0	37.7	94	ug/L	09/03/13 12:35
	Zinc	40.0	39.2	98	ug/L	09/03/13 12:35
	Zinc	40.0	39.2	98	ug/L	09/03/13 12:35
3I03002-CCV9	Barium	40.0	38.0	95	ug/L	09/03/13 12:58
	Barium	40.0	38.0	95	ug/L	09/03/13 12:58
	Zinc	40.0	39.4	98	ug/L	09/03/13 12:58
	Zinc	40.0	39.4	98	ug/L	09/03/13 12:58

* Values outside of QC limits

00248

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Inv
Laboratory ID: 3I03002-SCV1
Instrument: 201
Sequence: 3I03002
Calibration: 3I03028

Analyte	Expected	Found	% R	QC Limit	Units
Barium	40.0	39.6	99	90-110	ug/L
Barium	40.0	39.6	99	90-110	ug/L
Chromium	40.0	40.3	101	90-110	ug/L
Chromium	40.0	40.3	101	90-110	ug/L
Cobalt	40.0	40.3	101	90-110	ug/L
Nickel	40.0	39.9	100	90-110	ug/L
Nickel	40.0	39.9	100	90-110	ug/L
Silver	40.0	38.2	96	90-110	ug/L
Silver	40.0	38.2	96	90-110	ug/L
Vanadium	40.0	39.7	99	90-110	ug/L
Vanadium	40.0	39.7	99	90-110	ug/L
Zinc	40.0	39.4	99	90-110	ug/L
Zinc	40.0	39.4	99	90-110	ug/L

* Values outside of QC limits

: 00255

BLANKS
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3I03002
Calibration: 3I03028
Instrument ID: 201

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
3I03002-CCB1	Barium	-0.0013	ug/L	0.14	0.50	1.0	U	09/03/13 08:46
	Barium	-0.0013	ug/L	0.14	0.50	1.0	U	09/03/13 08:46
	Chromium	-0.012	ug/L	0.20	0.50	1.0	U	09/03/13 08:46
	Chromium	-0.012	ug/L	0.20	0.50	1.0	U	09/03/13 08:46
	Cobalt	-0.0012	ug/L	0.050	0.20	1.0	U	09/03/13 08:46
	Nickel	-0.11	ug/L	0.17	0.50	1.0	U	09/03/13 08:46
	Nickel	-0.11	ug/L	0.17	0.50	1.0	U	09/03/13 08:46
	Silver	0.0068	ug/L	0.037	0.10	0.20	U	09/03/13 08:46
	Silver	0.0068	ug/L	0.037	0.10	0.20	U	09/03/13 08:46
	Vanadium	0.018	ug/L	0.066	0.20	1.0	U	09/03/13 08:46
	Vanadium	0.018	ug/L	0.066	0.20	1.0	U	09/03/13 08:46
	Zinc	-0.16	ug/L	1.5	4.0	10	U	09/03/13 08:46
	Zinc	-0.16	ug/L	1.5	4.0	10	U	09/03/13 08:46
3I03002-CCB2	Barium	-0.0016	ug/L	0.14	0.50	1.0	U	09/03/13 09:28
	Barium	-0.0016	ug/L	0.14	0.50	1.0	U	09/03/13 09:28
	Chromium	-0.042	ug/L	0.20	0.50	1.0	U	09/03/13 09:28
	Chromium	-0.042	ug/L	0.20	0.50	1.0	U	09/03/13 09:28
	Cobalt	-0.00017	ug/L	0.050	0.20	1.0	U	09/03/13 09:28
	Nickel	-0.11	ug/L	0.17	0.50	1.0	U	09/03/13 09:28
	Nickel	-0.11	ug/L	0.17	0.50	1.0	U	09/03/13 09:28
	Silver	0.0068	ug/L	0.037	0.10	0.20	U	09/03/13 09:28
	Silver	0.0068	ug/L	0.037	0.10	0.20	U	09/03/13 09:28
	Vanadium	-0.0019	ug/L	0.066	0.20	1.0	U	09/03/13 09:28
	Vanadium	-0.0019	ug/L	0.066	0.20	1.0	U	09/03/13 09:28
	Zinc	-0.29	ug/L	1.5	4.0	10	U	09/03/13 09:28
	Zinc	-0.29	ug/L	1.5	4.0	10	U	09/03/13 09:28
3I03002-CCB3	Barium	-0.0015	ug/L	0.14	0.50	1.0	U	09/03/13 10:28
	Barium	-0.0015	ug/L	0.14	0.50	1.0	U	09/03/13 10:28
	Chromium	0.25	ug/L	0.20	0.50	1.0	J	09/03/13 10:28
	Chromium	0.25	ug/L	0.20	0.50	1.0	J	09/03/13 10:28
	Cobalt	-0.00099	ug/L	0.050	0.20	1.0	U	09/03/13 10:28
	Nickel	-0.12	ug/L	0.17	0.50	1.0	U	09/03/13 10:28
	Nickel	-0.12	ug/L	0.17	0.50	1.0	U	09/03/13 10:28

BLANKS
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3I03002
Calibration: 3I03028
Instrument ID: 201

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
3I03002-CCB3	Silver	0.014	ug/L	0.037	0.10	0.20	U	09/03/13 10:28
	Silver	0.014	ug/L	0.037	0.10	0.20	U	09/03/13 10:28
	Vanadium	0.13	ug/L	0.066	0.20	1.0	J	09/03/13 10:28
	Vanadium	0.13	ug/L	0.066	0.20	1.0	J	09/03/13 10:28
	Zinc	-0.33	ug/L	1.5	4.0	10	U	09/03/13 10:28
	Zinc	-0.33	ug/L	1.5	4.0	10	U	09/03/13 10:28
3I03002-CCB4	Barium	-0.0066	ug/L	0.14	0.50	1.0	U	09/03/13 10:44
	Barium	-0.0066	ug/L	0.14	0.50	1.0	U	09/03/13 10:44
	Chromium	0.21	ug/L	0.20	0.50	1.0	J	09/03/13 10:44
	Chromium	0.21	ug/L	0.20	0.50	1.0	J	09/03/13 10:44
	Cobalt	-0.00039	ug/L	0.050	0.20	1.0	U	09/03/13 10:44
	Nickel	-0.13	ug/L	0.17	0.50	1.0	U	09/03/13 10:44
	Nickel	-0.13	ug/L	0.17	0.50	1.0	U	09/03/13 10:44
	Silver	0.014	ug/L	0.037	0.10	0.20	U	09/03/13 10:44
	Silver	0.014	ug/L	0.037	0.10	0.20	U	09/03/13 10:44
	Vanadium	0.10	ug/L	0.066	0.20	1.0	J	09/03/13 10:44
	Vanadium	0.10	ug/L	0.066	0.20	1.0	J	09/03/13 10:44
	Zinc	-0.28	ug/L	1.5	4.0	10	U	09/03/13 10:44
	Zinc	-0.28	ug/L	1.5	4.0	10	U	09/03/13 10:44
3I03002-CCB5	Barium	0.0070	ug/L	0.14	0.50	1.0	U	09/03/13 11:29
	Barium	0.0070	ug/L	0.14	0.50	1.0	U	09/03/13 11:29
	Chromium	0.18	ug/L	0.20	0.50	1.0	U	09/03/13 11:29
	Chromium	0.18	ug/L	0.20	0.50	1.0	U	09/03/13 11:29
	Cobalt	0.0021	ug/L	0.050	0.20	1.0	U	09/03/13 11:29
	Nickel	-0.11	ug/L	0.17	0.50	1.0	U	09/03/13 11:29
	Nickel	-0.11	ug/L	0.17	0.50	1.0	U	09/03/13 11:29
	Silver	0.033	ug/L	0.037	0.10	0.20	U	09/03/13 11:29
	Silver	0.033	ug/L	0.037	0.10	0.20	U	09/03/13 11:29
	Vanadium	0.12	ug/L	0.066	0.20	1.0	J	09/03/13 11:29
	Vanadium	0.12	ug/L	0.066	0.20	1.0	J	09/03/13 11:29
	Zinc	-0.21	ug/L	1.5	4.0	10	U	09/03/13 11:29
	Zinc	-0.21	ug/L	1.5	4.0	10	U	09/03/13 11:29
3I03002-CCB6	Barium	0.013	ug/L	0.14	0.50	1.0	U	09/03/13 11:44

BLANKS
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3I03002
Calibration: 3I03028
Instrument ID: 201

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
3I03002-CCB6	Barium	0.013	ug/L	0.14	0.50	1.0	U	09/03/13 11:44
	Chromium	0.13	ug/L	0.20	0.50	1.0	U	09/03/13 11:44
	Chromium	0.13	ug/L	0.20	0.50	1.0	U	09/03/13 11:44
	Cobalt	0.0015	ug/L	0.050	0.20	1.0	U	09/03/13 11:44
	Nickel	-0.12	ug/L	0.17	0.50	1.0	U	09/03/13 11:44
	Nickel	-0.12	ug/L	0.17	0.50	1.0	U	09/03/13 11:44
	Silver	0.030	ug/L	0.037	0.10	0.20	U	09/03/13 11:44
	Silver	0.030	ug/L	0.037	0.10	0.20	U	09/03/13 11:44
	Vanadium	0.093	ug/L	0.066	0.20	1.0	J	09/03/13 11:44
	Vanadium	0.093	ug/L	0.066	0.20	1.0	J	09/03/13 11:44
	Zinc	-0.27	ug/L	1.5	4.0	10	U	09/03/13 11:44
	Zinc	-0.27	ug/L	1.5	4.0	10	U	09/03/13 11:44
3I03002-CCB7	Barium	0.0058	ug/L	0.14	0.50	1.0	U	09/03/13 12:16
	Barium	0.0058	ug/L	0.14	0.50	1.0	U	09/03/13 12:16
	Zinc	-0.32	ug/L	1.5	4.0	10	U	09/03/13 12:16
	Zinc	-0.32	ug/L	1.5	4.0	10	U	09/03/13 12:16
3I03002-CCB8	Barium	-0.0043	ug/L	0.14	0.50	1.0	U	09/03/13 12:39
	Barium	-0.0043	ug/L	0.14	0.50	1.0	U	09/03/13 12:39
	Zinc	-0.23	ug/L	1.5	4.0	10	U	09/03/13 12:39
	Zinc	-0.23	ug/L	1.5	4.0	10	U	09/03/13 12:39
3I03002-CCB9	Barium	0.0025	ug/L	0.14	0.50	1.0	U	09/03/13 13:00
	Barium	0.0025	ug/L	0.14	0.50	1.0	U	09/03/13 13:00
	Zinc	-0.31	ug/L	1.5	4.0	10	U	09/03/13 13:00
	Zinc	-0.31	ug/L	1.5	4.0	10	U	09/03/13 13:00

* Values outside of QC limits

00266

ICP INTERFERENCE CHECK SAMPLE

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A Site 12 Inves

Sequence: 3I03002

Calibration: 3I03028

Instrument ID: 201

Lab Sample ID	Analyte	True	Found	%R	Units
3I03002-IFA1	Barium	0.00	0.00943		ug/L
	Barium	0.00	0.00943		ug/L
	Chromium	0.00	0.357		ug/L
	Chromium	0.00	0.357		ug/L
	Cobalt	0.00	0.0161		ug/L
	Nickel	0.00	0.207		ug/L
	Nickel	0.00	0.207		ug/L
	Silver	0.00	0.0375		ug/L
	Silver	0.00	0.0375		ug/L
	Vanadium	0.00	0.0114		ug/L
	Vanadium	0.00	0.0114		ug/L
	Zinc	0.00	0.0283		ug/L
	Zinc	0.00	0.0283		ug/L
3I03002-IFB1	Barium	20.0	19.3	96	ug/L
	Barium	20.0	19.3	96	ug/L
	Chromium	20.0	22.5	112	ug/L
	Chromium	20.0	22.5	112	ug/L
	Cobalt	20.0	21.6	108	ug/L
	Nickel	20.0	21.0	105	ug/L
	Nickel	20.0	21.0	105	ug/L
	Silver	20.0	19.9	100	ug/L
	Silver	20.0	19.9	100	ug/L
	Vanadium	20.0	22.1	110	ug/L
	Vanadium	20.0	22.1	110	ug/L
	Zinc	20.0	20.8	104	ug/L
	Zinc	20.0	20.8	104	ug/L

* Values outside of QC limits

00279

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 3I03054

SDG: 1308343
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Calibration: 3I04002
Instrument: 201

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	3I03054-CAL1	3i03054-001	09/03/13 13:19
Cal Standard	3I03054-CAL2	3i03054-002	09/03/13 13:22
Cal Standard	3I03054-CAL3	3i03054-003	09/03/13 13:25
Cal Standard	3I03054-CAL4	3i03054-004	09/03/13 13:28
Cal Standard	3I03054-CAL5	3i03054-005	09/03/13 13:31
Cal Standard	3I03054-CAL6	3i03054-006	09/03/13 13:34
Secondary Cal Check	3I03054-SCV1	3i03054-008	09/03/13 13:43
Calibration Check	3I03054-CCV1	3i03054-008	09/03/13 13:43
Calibration Blank	3I03054-CCB1	3i03054-009	09/03/13 13:49
Interference Check A	3I03054-IFA1	3i03054-010	09/03/13 13:53
Interference Check B	3I03054-IFB1	3i03054-011	09/03/13 13:56
Calibration Check	3I03054-CCV2	3i03054-012	09/03/13 13:59
Calibration Blank	3I03054-CCB2	3i03054-013	09/03/13 14:03
Blank	1308841-BLK3	3i03054-014	09/03/13 14:06
LCS	1308841-BS3	3i03054-015	09/03/13 14:09
NTC12GW-01	1308343-01	3i03054-016	09/03/13 14:12
NTC12GW-01	1308343-01	3i03054-016	09/03/13 14:12
NTC12GW-02	1308343-02	3i03054-017	09/03/13 14:15
NTC12GW-02	1308343-02	3i03054-017	09/03/13 14:15
NTC12GW-03	1308343-03	3i03054-018	09/03/13 14:18
NTC12GW-03	1308343-03	3i03054-018	09/03/13 14:18
NTC12GW-04	1308343-04	3i03054-019	09/03/13 14:21
NTC12GW-04	1308841-MS3	3i03054-020	09/03/13 14:25
NTC12GW-04	1308841-MSD3	3i03054-021	09/03/13 14:28
NTC12GW-04	3I03054-SRD1	3i03054-022	09/03/13 14:31
NTC12GW-04	1308841-PS4	3i03054-023	09/03/13 14:34
Calibration Check	3I03054-CCV3	3i03054-024	09/03/13 14:37
Calibration Blank	3I03054-CCB3	3i03054-025	09/03/13 14:40
NTC12-DUP-P3-081513	1308343-05	3i03054-026	09/03/13 14:43
NTC12-DUP-P3-081513	1308343-05	3i03054-026	09/03/13 14:43
Blank	1308852-BLK3	3i03054-027	09/03/13 14:46
LCS	1308852-BS3	3i03054-028	09/03/13 14:49

00235

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Sequence: 3I03054
Calibration: 3I04002
Instrument: 201

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
NTC12GW-01	1308343-01	3i03054-029	09/03/13 14:52
NTC12GW-01	1308343-01	3i03054-029	09/03/13 14:52
NTC12GW-02	1308343-02	3i03054-030	09/03/13 14:55
NTC12GW-02	1308343-02	3i03054-030	09/03/13 14:55
NTC12GW-03	1308343-03	3i03054-031	09/03/13 14:58
NTC12GW-03	1308343-03	3i03054-031	09/03/13 14:58
NTC12GW-04	1308343-04	3i03054-032	09/03/13 15:01
NTC12GW-04	1308852-MS3	3i03054-033	09/03/13 15:04
NTC12GW-04	1308852-MSD3	3i03054-034	09/03/13 15:07
NTC12GW-04	3I03054-SRD2	3i03054-035	09/03/13 15:10
Calibration Check	3I03054-CCV4	3i03054-036	09/03/13 15:14
Calibration Blank	3I03054-CCB4	3i03054-037	09/03/13 15:17
NTC12GW-04	1308852-PS4	3i03054-038	09/03/13 15:20
NTC12-DUP-P3-081513	1308343-05	3i03054-039	09/03/13 15:24
NTC12GW-01	1308343-01	3i03054-042	09/03/13 15:39
NTC12GW-02	1308343-02	3i03054-043	09/03/13 15:42
NTC12GW-03	1308343-03	3i03054-044	09/03/13 15:45
NTC12GW-04	1308343-04	3i03054-045	09/03/13 15:48
NTC12GW-04	1308841-MS3	3i03054-046	09/03/13 15:51
NTC12GW-04	1308841-MSD3	3i03054-047	09/03/13 15:54
Calibration Check	3I03054-CCV5	3i03054-048	09/03/13 15:57
Calibration Blank	3I03054-CCB5	3i03054-049	09/03/13 16:00
NTC12GW-04	3I03054-SRD3	3i03054-050	09/03/13 16:10
NTC12GW-04	1308841-PS5	3i03054-051	09/03/13 16:14
NTC12-DUP-P3-081513	1308343-05	3i03054-052	09/03/13 16:17
NTC12GW-01	1308343-01	3i03054-053	09/03/13 16:20
NTC12GW-02	1308343-02	3i03054-054	09/03/13 16:23
NTC12GW-03	1308343-03	3i03054-055	09/03/13 16:26
NTC12GW-04	1308343-04	3i03054-056	09/03/13 16:29
NTC12GW-04	1308852-MS3	3i03054-057	09/03/13 16:32
NTC12GW-04	1308852-MSD3	3i03054-058	09/03/13 16:35
NTC12GW-04	3I03054-SRD4	3i03054-059	09/03/13 16:38

00236

ANALYSIS BATCH (SEQUENCE) SUMMARY
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Sequence: 3I03054
Calibration: 3I04002
Instrument: 201

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Calibration Check	3I03054-CCV6	3i03054-060	09/03/13 16:41
Calibration Blank	3I03054-CCB6	3i03054-061	09/03/13 16:44
NTC12GW-04	1308852-PS5	3i03054-062	09/03/13 16:47
NTC12-DUP-P3-081513	1308343-05	3i03054-063	09/03/13 16:50
Calibration Check	3I03054-CCV7	3i03054-064	09/03/13 16:53
Calibration Blank	3I03054-CCB7	3i03054-065	09/03/13 16:56

: 66237

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3I03054
Calibration: 3I04002
Control Limt: +/- 10.00%
Instrument ID: 201

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
3I03054-CCV1	Arsenic	40.0	38.9	97	ug/L	09/03/13 13:43
	Arsenic	40.0	38.9	97	ug/L	09/03/13 13:43
	Manganese	40.0	40.2	101	ug/L	09/03/13 13:43
	Manganese	40.0	40.2	101	ug/L	09/03/13 13:43
	Selenium	40.0	40.4	101	ug/L	09/03/13 13:43
	Selenium	40.0	40.4	101	ug/L	09/03/13 13:43
3I03054-CCV2	Arsenic	40.0	39.0	97	ug/L	09/03/13 13:59
	Arsenic	40.0	39.0	97	ug/L	09/03/13 13:59
	Manganese	40.0	42.1	105	ug/L	09/03/13 13:59
	Manganese	40.0	42.1	105	ug/L	09/03/13 13:59
	Selenium	40.0	39.6	99	ug/L	09/03/13 13:59
	Selenium	40.0	39.6	99	ug/L	09/03/13 13:59
3I03054-CCV3	Arsenic	40.0	38.9	97	ug/L	09/03/13 14:37
	Arsenic	40.0	38.9	97	ug/L	09/03/13 14:37
	Manganese	40.0	40.6	102	ug/L	09/03/13 14:37
	Manganese	40.0	40.6	102	ug/L	09/03/13 14:37
	Selenium	40.0	40.4	101	ug/L	09/03/13 14:37
	Selenium	40.0	40.4	101	ug/L	09/03/13 14:37
3I03054-CCV4	Arsenic	40.0	39.1	98	ug/L	09/03/13 15:14
	Arsenic	40.0	39.1	98	ug/L	09/03/13 15:14
	Manganese	40.0	38.6	97	ug/L	09/03/13 15:14
	Manganese	40.0	38.6	97	ug/L	09/03/13 15:14
	Selenium	40.0	39.9	100	ug/L	09/03/13 15:14
	Selenium	40.0	39.9	100	ug/L	09/03/13 15:14
3I03054-CCV5	Manganese	40.0	38.2	96	ug/L	09/03/13 15:57
	Manganese	40.0	38.2	96	ug/L	09/03/13 15:57
	Selenium	40.0	43.0	108	ug/L	09/03/13 15:57
3I03054-CCV6	Manganese	40.0	38.4	96	ug/L	09/03/13 16:41
	Manganese	40.0	38.4	96	ug/L	09/03/13 16:41
3I03054-CCV7	Manganese	40.0	37.8	95	ug/L	09/03/13 16:53
	Manganese	40.0	37.8	95	ug/L	09/03/13 16:53

* Values outside of QC limits

: 00245

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Inv
Laboratory ID: 3I03054-SCV1
Instrument: 201
Sequence: 3I03054
Calibration: 3I04002

Analyte	Expected	Found	% R	QC Limit	Units
Arsenic	40.0	38.9	97	90-110	ug/L
Arsenic	40.0	38.9	97	90-110	ug/L
Manganese	40.0	40.2	101	90-110	ug/L
Manganese	40.0	40.2	101	90-110	ug/L
Selenium	40.0	40.4	101	90-110	ug/L
Selenium	40.0	40.4	101	90-110	ug/L

* Values outside of QC limits

00256

BLANKS
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3I03054
Calibration: 3I04002
Instrument ID: 201

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
3I03054-CCB1	Arsenic	-0.097	ug/L	0.18	0.50	1.0	U	09/03/13 13:49
	Arsenic	-0.097	ug/L	0.18	0.50	1.0	U	09/03/13 13:49
	Manganese	-0.00064	ug/L	0.14	0.50	1.0	U	09/03/13 13:49
	Manganese	-0.00064	ug/L	0.14	0.50	1.0	U	09/03/13 13:49
	Selenium	0.056	ug/L	0.31	1.0	1.0	U	09/03/13 13:49
	Selenium	0.056	ug/L	0.31	1.0	1.0	U	09/03/13 13:49
3I03054-CCB2	Arsenic	-0.24	ug/L	0.18	0.50	1.0	J	09/03/13 14:03
	Arsenic	-0.24	ug/L	0.18	0.50	1.0	J	09/03/13 14:03
	Manganese	0.0025	ug/L	0.14	0.50	1.0	U	09/03/13 14:03
	Manganese	0.0025	ug/L	0.14	0.50	1.0	U	09/03/13 14:03
	Selenium	-0.22	ug/L	0.31	1.0	1.0	U	09/03/13 14:03
	Selenium	-0.22	ug/L	0.31	1.0	1.0	U	09/03/13 14:03
3I03054-CCB3	Arsenic	-0.0067	ug/L	0.18	0.50	1.0	U	09/03/13 14:40
	Arsenic	-0.0067	ug/L	0.18	0.50	1.0	U	09/03/13 14:40
	Manganese	0.014	ug/L	0.14	0.50	1.0	U	09/03/13 14:40
	Manganese	0.014	ug/L	0.14	0.50	1.0	U	09/03/13 14:40
	Selenium	0.80	ug/L	0.31	1.0	1.0	J	09/03/13 14:40
	Selenium	0.80	ug/L	0.31	1.0	1.0	J	09/03/13 14:40
3I03054-CCB4	Arsenic	0.28	ug/L	0.18	0.50	1.0	J	09/03/13 15:17
	Arsenic	0.28	ug/L	0.18	0.50	1.0	J	09/03/13 15:17
	Manganese	0.017	ug/L	0.14	0.50	1.0	U	09/03/13 15:17
	Manganese	0.017	ug/L	0.14	0.50	1.0	U	09/03/13 15:17
	Selenium	0.74	ug/L	0.31	1.0	1.0	J	09/03/13 15:17
	Selenium	0.74	ug/L	0.31	1.0	1.0	J	09/03/13 15:17
3I03054-CCB5	Manganese	-0.0029	ug/L	0.14	0.50	1.0	U	09/03/13 16:00
	Manganese	-0.0029	ug/L	0.14	0.50	1.0	U	09/03/13 16:00
	Selenium	0.39	ug/L	0.31	1.0	1.0	J	09/03/13 16:00
3I03054-CCB6	Manganese	-0.010	ug/L	0.14	0.50	1.0	U	09/03/13 16:44
	Manganese	-0.010	ug/L	0.14	0.50	1.0	U	09/03/13 16:44
3I03054-CCB7	Manganese	-0.012	ug/L	0.14	0.50	1.0	U	09/03/13 16:56
	Manganese	-0.012	ug/L	0.14	0.50	1.0	U	09/03/13 16:56

* Values outside of QC limits

ICP INTERFERENCE CHECK SAMPLE

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A Site 12 Inves

Sequence: 3I03054

Calibration: 3I04002

Instrument ID: 201

Lab Sample ID	Analyte	True	Found	%R	Units
3I03054-IFA1	Arsenic	0.00	0.0430		ug/L
	Arsenic	0.00	0.0430		ug/L
	Manganese	0.00	-0.0782		ug/L
	Manganese	0.00	-0.0782		ug/L
	Selenium	0.00	0.625		ug/L
	Selenium	0.00	0.625		ug/L
3I03054-IFB1	Arsenic	20.0	20.3	101	ug/L
	Arsenic	20.0	20.3	101	ug/L
	Manganese	20.0	21.5	108	ug/L
	Manganese	20.0	21.5	108	ug/L
	Selenium	20.0	19.8	99	ug/L
	Selenium	20.0	19.8	99	ug/L

* Values outside of QC limits

: 00275

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Sequence: 3I04003
Calibration: 3I04007
Instrument: 114

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	3I04003-CAL1	3i04003-001	09/04/13 07:50
Cal Standard	3I04003-CAL2	3i04003-002	09/04/13 07:53
Cal Standard	3I04003-CAL3	3i04003-003	09/04/13 07:57
Cal Standard	3I04003-CAL4	3i04003-004	09/04/13 08:00
Cal Standard	3I04003-CAL5	3i04003-005	09/04/13 08:04
Cal Standard	3I04003-CAL6	3i04003-006	09/04/13 08:07
Secondary Cal Check	3I04003-SCV1	3i04003-007	09/04/13 08:11
Calibration Check	3I04003-CCV1	3i04003-007	09/04/13 08:11
Calibration Blank	3I04003-CCB1	3i04003-008	09/04/13 08:15
Interference Check A	3I04003-IFA1	3i04003-009	09/04/13 08:18
Interference Check B	3I04003-IFB1	3i04003-010	09/04/13 08:22
Calibration Check	3I04003-CCV2	3i04003-011	09/04/13 08:25
Calibration Blank	3I04003-CCB2	3i04003-012	09/04/13 08:29
Blank	1308841-BLK4	3i04003-013	09/04/13 08:33
LCS	1308841-BS4	3i04003-014	09/04/13 08:36
NTC12GW-01	1308343-01	3i04003-015	09/04/13 08:40
NTC12GW-01	1308343-01	3i04003-015	09/04/13 08:40
NTC12GW-02	1308343-02	3i04003-016	09/04/13 08:43
NTC12GW-02	1308343-02	3i04003-016	09/04/13 08:43
NTC12GW-03	1308343-03	3i04003-017	09/04/13 08:46
NTC12GW-03	1308343-03	3i04003-017	09/04/13 08:46
NTC12GW-04	1308343-04	3i04003-018	09/04/13 08:49
NTC12GW-04	1308343-04	3i04003-018	09/04/13 08:49
NTC12GW-04	1308841-MS4	3i04003-019	09/04/13 08:52
NTC12GW-04	1308841-MSD4	3i04003-020	09/04/13 08:55
NTC12GW-04	3I04003-SRD1	3i04003-021	09/04/13 08:58
NTC12GW-04	1308841-PS6	3i04003-022	09/04/13 09:01
Calibration Check	3I04003-CCV3	3i04003-023	09/04/13 09:05
Calibration Blank	3I04003-CCB3	3i04003-024	09/04/13 09:09
NTC12-DUP-P3-081513	1308343-05	3i04003-025	09/04/13 09:12
Blank	1308852-BLK4	3i04003-026	09/04/13 09:15
LCS	1308852-BS4	3i04003-027	09/04/13 09:18

00238

ANALYSIS BATCH (SEQUENCE) SUMMARY
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Sequence: 3I04003
Calibration: 3I04007
Instrument: 114

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
NTC12GW-01	1308343-01	3i04003-028	09/04/13 09:22
NTC12GW-02	1308343-02	3i04003-029	09/04/13 09:25
NTC12GW-03	1308343-03	3i04003-030	09/04/13 09:28
NTC12GW-04	1308343-04	3i04003-031	09/04/13 09:31
NTC12GW-04	1308852-MS4	3i04003-032	09/04/13 09:34
NTC12GW-04	1308852-MSD4	3i04003-033	09/04/13 09:37
NTC12GW-04	3I04003-SRD2	3i04003-034	09/04/13 09:40
Calibration Check	3I04003-CCV4	3i04003-035	09/04/13 09:43
Calibration Blank	3I04003-CCB4	3i04003-036	09/04/13 09:47
NTC12GW-04	1308852-PS6	3i04003-037	09/04/13 09:51
NTC12-DUP-P3-081513	1308343-05	3i04003-038	09/04/13 09:55
Calibration Check	3I04003-CCV5	3i04003-039	09/04/13 09:58
Calibration Blank	3I04003-CCB5	3i04003-040	09/04/13 10:02

: 00239

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3I04003
Calibration: 3I04007
Control Limt: +/- 10.00%
Instrument ID: 114

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
3I04003-CCV1	Antimony	40.0	40.3	101	ug/L	09/04/13 08:11
	Antimony	40.0	40.3	101	ug/L	09/04/13 08:11
	Beryllium	40.0	39.8	99	ug/L	09/04/13 08:11
3I04003-CCV2	Antimony	40.0	39.9	100	ug/L	09/04/13 08:25
	Antimony	40.0	39.9	100	ug/L	09/04/13 08:25
	Beryllium	40.0	39.0	98	ug/L	09/04/13 08:25
3I04003-CCV3	Antimony	40.0	39.8	99	ug/L	09/04/13 09:05
	Antimony	40.0	39.8	99	ug/L	09/04/13 09:05
	Beryllium	40.0	37.6	94	ug/L	09/04/13 09:05
3I04003-CCV4	Antimony	40.0	39.5	99	ug/L	09/04/13 09:43
	Antimony	40.0	39.5	99	ug/L	09/04/13 09:43
3I04003-CCV5	Antimony	40.0	39.6	99	ug/L	09/04/13 09:58
	Antimony	40.0	39.6	99	ug/L	09/04/13 09:58

* Values outside of QC limits

00250

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Inv
Laboratory ID: 3I04003-SCV1
Instrument: 114
Sequence: 3I04003
Calibration: 3I04007

Analyte	Expected	Found	% R	QC Limit	Units
Antimony	40.0	40.3	101	90-110	ug/L
Antimony	40.0	40.3	101	90-110	ug/L
Beryllium	40.0	39.8	100	90-110	ug/L

* Values outside of QC limits

00257

BLANKS
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3I04003
Calibration: 3I04007
Instrument ID: 114

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
3I04003-CCB1	Antimony	0.48	ug/L	0.15	0.50	1.0	J	09/04/13 08:15
	Antimony	0.48	ug/L	0.15	0.50	1.0	J	09/04/13 08:15
	Beryllium	0.021	ug/L	0.11	0.40	1.0	U	09/04/13 08:15
3I04003-CCB2	Antimony	0.39	ug/L	0.15	0.50	1.0	J	09/04/13 08:29
	Antimony	0.39	ug/L	0.15	0.50	1.0	J	09/04/13 08:29
	Beryllium	0.0068	ug/L	0.11	0.40	1.0	U	09/04/13 08:29
3I04003-CCB3	Antimony	0.38	ug/L	0.15	0.50	1.0	J	09/04/13 09:09
	Antimony	0.38	ug/L	0.15	0.50	1.0	J	09/04/13 09:09
	Beryllium	0.020	ug/L	0.11	0.40	1.0	U	09/04/13 09:09
3I04003-CCB4	Antimony	0.36	ug/L	0.15	0.50	1.0	J	09/04/13 09:47
	Antimony	0.36	ug/L	0.15	0.50	1.0	J	09/04/13 09:47
3I04003-CCB5	Antimony	0.37	ug/L	0.15	0.50	1.0	J	09/04/13 10:02
	Antimony	0.37	ug/L	0.15	0.50	1.0	J	09/04/13 10:02

* Values outside of QC limits

00268

ICP INTERFERENCE CHECK SAMPLE

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A Site 12 Invest

Sequence: 3I04003

Calibration: 3I04007

Instrument ID: 114

Lab Sample ID	Analyte	True	Found	%R	Units
3I04003-IFA1	Antimony	0.00	0.172		ug/L
	Antimony	0.00	0.172		ug/L
	Beryllium	0.00	-0.0162		ug/L
3I04003-IFB1	Antimony	20.0	20.9	104	ug/L
	Antimony	20.0	20.9	104	ug/L
	Beryllium	20.0	20.6	103	ug/L

* Values outside of QC limits

00276

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Sequence: 3I04025
Calibration: 3I04008
Instrument: 114

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	3I04025-CAL1	3i04025-007	09/04/13 11:30
Cal Standard	3I04025-CAL2	3i04025-008	09/04/13 11:34
Cal Standard	3I04025-CAL3	3i04025-009	09/04/13 11:37
Cal Standard	3I04025-CAL4	3i04025-010	09/04/13 11:40
Cal Standard	3I04025-CAL5	3i04025-011	09/04/13 11:44
Cal Standard	3I04025-CAL6	3i04025-012	09/04/13 11:47
Secondary Cal Check	3I04025-SCV1	3i04025-013	09/04/13 11:50
Calibration Check	3I04025-CCV1	3i04025-013	09/04/13 11:50
Calibration Blank	3I04025-CCB1	3i04025-014	09/04/13 11:53
Interference Check A	3I04025-IFA1	3i04025-015	09/04/13 11:57
Interference Check B	3I04025-IFB1	3i04025-016	09/04/13 12:00
Calibration Check	3I04025-CCV2	3i04025-017	09/04/13 12:03
Calibration Blank	3I04025-CCB2	3i04025-018	09/04/13 12:07
NTC12-DUP-P3-081513	1308343-05	3i04025-019	09/04/13 12:10
Blank	1308852-BLK5	3i04025-020	09/04/13 12:13
LCS	1308852-BS5	3i04025-021	09/04/13 12:15
NTC12GW-01	1308343-01	3i04025-022	09/04/13 12:18
NTC12GW-02	1308343-02	3i04025-023	09/04/13 12:21
NTC12GW-03	1308343-03	3i04025-024	09/04/13 12:24
NTC12GW-04	1308343-04	3i04025-025	09/04/13 12:27
NTC12GW-04	1308852-MS5	3i04025-026	09/04/13 12:29
NTC12GW-04	1308852-MSD5	3i04025-027	09/04/13 12:32
NTC12GW-04	3I04025-SRD1	3i04025-028	09/04/13 12:35
Calibration Check	3I04025-CCV3	3i04025-029	09/04/13 12:38
Calibration Blank	3I04025-CCB3	3i04025-030	09/04/13 12:41
NTC12GW-04	1308852-PS8	3i04025-031	09/04/13 12:45
NTC12-DUP-P3-081513	1308343-05	3i04025-032	09/04/13 12:48
Calibration Check	3I04025-CCV4	3i04025-034	09/04/13 12:54
Calibration Blank	3I04025-CCB4	3i04025-035	09/04/13 12:57

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3I04025
Calibration: 3I04008
Control Limt: +/- 10.00%
Instrument ID: 114

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
3I04025-CCV1	Beryllium	40.0	39.5	99	ug/L	09/04/13 11:50
	Beryllium	40.0	39.5	99	ug/L	09/04/13 11:50
3I04025-CCV2	Beryllium	40.0	41.0	102	ug/L	09/04/13 12:03
	Beryllium	40.0	41.0	102	ug/L	09/04/13 12:03
3I04025-CCV3	Beryllium	40.0	39.5	99	ug/L	09/04/13 12:38
	Beryllium	40.0	39.5	99	ug/L	09/04/13 12:38
3I04025-CCV4	Beryllium	40.0	39.8	99	ug/L	09/04/13 12:54
	Beryllium	40.0	39.8	99	ug/L	09/04/13 12:54

* Values outside of QC limits

00251

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Inv
Laboratory ID: 3I04025-SCV1
Instrument: 114
Sequence: 3I04025
Calibration: 3I04008

Analyte	Expected	Found	% R	QC Limit	Units
Beryllium	40.0	39.5	99	90-110	ug/L
Beryllium	40.0	39.5	99	90-110	ug/L

* Values outside of QC limits

00258

BLANKS
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3I04025
Calibration: 3I04008
Instrument ID: 114

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
3I04025-CCB1	Beryllium	-0.023	ug/L	0.11	0.40	1.0	U	09/04/13 11:53
	Beryllium	-0.023	ug/L	0.11	0.40	1.0	U	09/04/13 11:53
3I04025-CCB2	Beryllium	-0.0033	ug/L	0.11	0.40	1.0	U	09/04/13 12:07
	Beryllium	-0.0033	ug/L	0.11	0.40	1.0	U	09/04/13 12:07
3I04025-CCB3	Beryllium	-0.028	ug/L	0.11	0.40	1.0	U	09/04/13 12:41
	Beryllium	-0.028	ug/L	0.11	0.40	1.0	U	09/04/13 12:41
3I04025-CCB4	Beryllium	-0.049	ug/L	0.11	0.40	1.0	U	09/04/13 12:57
	Beryllium	-0.049	ug/L	0.11	0.40	1.0	U	09/04/13 12:57

* Values outside of QC limits

00269

ICP INTERFERENCE CHECK SAMPLE

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Sequence: 3I04025

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Inves

Calibration: 3I04008

Instrument ID: 114

Lab Sample ID	Analyte	True	Found	%R	Units
3I04025-IFA1	Beryllium	0.00	-0.0344		ug/L
	Beryllium	0.00	-0.0344		ug/L
3I04025-IFB1	Beryllium	20.0	20.5	103	ug/L
	Beryllium	20.0	20.5	103	ug/L

* Values outside of QC limits

: 00277

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Sequence: 3I04031

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatio

Calibration: 3I05007

Instrument: 114

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	3I04031-CAL1	3i04031-013	09/04/13 14:24
Cal Standard	3I04031-CAL2	3i04031-014	09/04/13 14:27
Cal Standard	3I04031-CAL3	3i04031-015	09/04/13 14:30
Cal Standard	3I04031-CAL4	3i04031-016	09/04/13 14:33
Cal Standard	3I04031-CAL5	3i04031-017	09/04/13 14:37
Cal Standard	3I04031-CAL6	3i04031-018	09/04/13 14:40
Secondary Cal Check	3I04031-SCV1	3i04031-019	09/04/13 14:43
Calibration Check	3I04031-CCV1	3i04031-019	09/04/13 14:43
Calibration Blank	3I04031-CCB1	3i04031-020	09/04/13 14:46
Interference Check A	3I04031-IFA1	3i04031-021	09/04/13 14:49
Interference Check B	3I04031-IFB1	3i04031-022	09/04/13 14:52
Calibration Check	3I04031-CCV2	3i04031-023	09/04/13 14:55
Calibration Blank	3I04031-CCB2	3i04031-024	09/04/13 14:58
NTC12-DUP-P3-081513	1308343-05	3i04031-025	09/04/13 15:01
NTC12GW-04	1308343-04	3i04031-026	09/04/13 15:03
NTC12GW-04	1308841-MS5	3i04031-027	09/04/13 15:06
NTC12GW-04	1308841-MSD5	3i04031-028	09/04/13 15:08
NTC12GW-04	3I04031-SRD1	3i04031-029	09/04/13 15:11
NTC12GW-04	1308841-PS7	3i04031-030	09/04/13 15:13
Calibration Check	3I04031-CCV3	3i04031-034	09/04/13 15:24
Calibration Blank	3I04031-CCB3	3i04031-035	09/04/13 15:27

: 60241

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3I04031
Calibration: 3I05007
Control Limt: +/- 10.00%
Instrument ID: 114

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
3I04031-CCV1	Arsenic	40.0	39.1	98	ug/L	09/04/13 14:43
	Arsenic	40.0	39.1	98	ug/L	09/04/13 14:43
3I04031-CCV2	Arsenic	40.0	38.8	97	ug/L	09/04/13 14:55
	Arsenic	40.0	38.8	97	ug/L	09/04/13 14:55
3I04031-CCV3	Arsenic	40.0	39.1	98	ug/L	09/04/13 15:24
	Arsenic	40.0	39.1	98	ug/L	09/04/13 15:24

* Values outside of QC limits

00252

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Inv
Laboratory ID: 3I04031-SCV1
Instrument: 114
Sequence: 3I04031
Calibration: 3I05007

Analyte	Expected	Found	% R	QC Limit	Units
Arsenic	40.0	39.1	98	90-110	ug/L
Arsenic	40.0	39.1	98	90-110	ug/L

* Values outside of QC limits

00259

BLANKS
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3I04031
Calibration: 3I05007
Instrument ID: 114

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
3I04031-CCB1	Arsenic	-0.48	ug/L	0.18	0.50	1.0	J	09/04/13 14:46
	Arsenic	-0.48	ug/L	0.18	0.50	1.0	J	09/04/13 14:46
3I04031-CCB2	Arsenic	-0.21	ug/L	0.18	0.50	1.0	J	09/04/13 14:58
	Arsenic	-0.21	ug/L	0.18	0.50	1.0	J	09/04/13 14:58
3I04031-CCB3	Arsenic	-0.0078	ug/L	0.18	0.50	1.0	U	09/04/13 15:27
	Arsenic	-0.0078	ug/L	0.18	0.50	1.0	U	09/04/13 15:27

* Values outside of QC limits

60276

ICP INTERFERENCE CHECK SAMPLE

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A Site 12 Invest

Sequence: 3I04031

Calibration: 3I05007

Instrument ID: 114

Lab Sample ID	Analyte	True	Found	%R	Units
3I04031-IFA1	Arsenic	0.00	-0.0104		ug/L
	Arsenic	0.00	-0.0104		ug/L
3I04031-IFB1	Arsenic	20.0	19.9	100	ug/L
	Arsenic	20.0	19.9	100	ug/L

* Values outside of QC limits

00278

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Sequence: 3I05002
Calibration: 3I05005
Instrument: 335

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	3I05002-CAL1	3i05002-001	09/05/13 09:55
Cal Standard	3I05002-CAL2	3i05002-002	09/05/13 09:56
Cal Standard	3I05002-CAL3	3i05002-003	09/05/13 09:57
Cal Standard	3I05002-CAL4	3i05002-004	09/05/13 09:57
Cal Standard	3I05002-CAL5	3i05002-005	09/05/13 09:58
Cal Standard	3I05002-CAL6	3i05002-006	09/05/13 09:59
Secondary Cal Check	3I05002-SCV1	3i05002-007	09/05/13 10:00
Calibration Check	3I05002-CCV1	3i05002-007	09/05/13 10:00
Calibration Blank	3I05002-CCB1	3i05002-008	09/05/13 10:00
Interference Check A	3I05002-IFA1	3i05002-009	09/05/13 10:01
Interference Check B	3I05002-IFB1	3i05002-010	09/05/13 10:02
Calibration Check	3I05002-CCV2	3i05002-011	09/05/13 10:03
Calibration Blank	3I05002-CCB2	3i05002-012	09/05/13 10:03
NTC12GW-04	1308343-04	3i05002-013	09/05/13 10:04
NTC12GW-04	1308852-MS6	3i05002-014	09/05/13 10:05
NTC12GW-04	1308852-MSD6	3i05002-015	09/05/13 10:06
NTC12GW-04	3I05002-SRD1	3i05002-016	09/05/13 10:07
NTC12GW-04	1308852-PS7	3i05002-017	09/05/13 10:07
Calibration Check	3I05002-CCV3	3i05002-018	09/05/13 10:08
Calibration Blank	3I05002-CCB3	3i05002-019	09/05/13 10:09

00242

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3I05002
Calibration: 3I05005
Control Limt: +/- 10.00%
Instrument ID: 335

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
3I05002-CCV1	Arsenic	40.0	41.0	103	ug/L	09/05/13 10:00
3I05002-CCV2	Arsenic	40.0	39.3	98	ug/L	09/05/13 10:03
3I05002-CCV3	Arsenic	40.0	40.3	101	ug/L	09/05/13 10:08

* Values outside of QC limits

: 00253

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Inv
Laboratory ID: 3I05002-SCV1
Instrument: 335
Sequence: 3I05002
Calibration: 3I05005

Analyte	Expected	Found	% R	QC Limit	Units
Arsenic	40.0	41.0	103	90-110	ug/L

* Values outside of QC limits

: 88260

BLANKS
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3I05002
Calibration: 3I05005
Instrument ID: 335

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
3I05002-CCB1	Arsenic	-0.028	ug/L	0.18	0.50	1.0	U	09/05/13 10:00
3I05002-CCB2	Arsenic	-0.078	ug/L	0.18	0.50	1.0	U	09/05/13 10:03
3I05002-CCB3	Arsenic	-0.015	ug/L	0.18	0.50	1.0	U	09/05/13 10:09

* Values outside of QC limits

00271

ICP INTERFERENCE CHECK SAMPLE

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A Site 12 Invest

Sequence: 3I05002

Calibration: 3I05005

Instrument ID: 335

Lab Sample ID	Analyte	True	Found	%R	Units
3I05002-IFA1	Arsenic	0.00	-0.00410		ug/L
3I05002-IFB1	Arsenic	20.0	20.3	102	ug/L

* Values outside of QC limits

00279

TriMatrix Laboratories, Inc.

PREPARATION BATCH **1308910** Page 1 of 1

Printed: 9/10/2013 7:45:20AM

Metals, Water, 7470A Digestion - Total

Batch comments:

MAS 08/26/13 1:00-3:00PM
INST#218@ 92.6-94.0C#269
HOTBLOCK VESSEL LOT#1303205
All standards, QC samples, and normal samples included in this batch were digested, using the reagents documented on this benchsheet.

Lab Number	*Container*	*Prepared*	*By*	*Initial (mL)*	*Final (mL)*	*Client* Source ID	*Client* Spike ID	*Client* uL Spike	*Comments*
1308343-01 Hg Total 7470A (DoD)	A	Aug-26-13 13:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
1308343-02 Hg Total 7470A (DoD)	A	Aug-26-13 13:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
1308343-03 Hg Total 7470A (DoD)	A	Aug-26-13 13:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
1308343-04 Hg Total 7470A (DoD)	A	Aug-26-13 13:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
1308343-05 Hg Total 7470A (DoD)	A	Aug-26-13 13:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
1308910-BLK1		Aug-26-13 13:00	MAS	30	30				
1308910-BS1		Aug-26-13 13:00	MAS	30	30		3061334	60	
1308910-MS1		Aug-26-13 13:00	MAS	30	30	1308343-04	3061334	60	
1308910-MSD1		Aug-26-13 13:00	MAS	30	30	1308343-04	3061334	60	

Comments:

Analyst Initials:

QC BATCH SUMMARY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A Site 12 Investigatior

QC Batch: 1308910 QC Batch Matrix: Water

Preparation: 7470A Digestion - Total

Sample Name	Lab Sample ID	Date Prepared	Observations
NTC12GW-01	1308343-01	08/26/13 13:00	
NTC12GW-02	1308343-02	08/26/13 13:00	
NTC12GW-03	1308343-03	08/26/13 13:00	
NTC12GW-04	1308343-04	08/26/13 13:00	
NTC12-DUP-P3-081513	1308343-05	08/26/13 13:00	
Blank	1308910-BLK1	08/26/13 13:00	
LCS	1308910-BS1	08/26/13 13:00	
NTC12GW-04	1308910-MS1	08/26/13 13:00	
NTC12GW-04	1308910-MSD1	08/26/13 13:00	

00955

METHOD BLANK DATA SHEET
USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308910-BLK1
File ID: u27wt-a2-241
Prepared: 08/26/13 13:00
Analyzed: 08/27/13 14:59
Preparation: 7470A Digestion - Total
Initial/Final: 30 mL / 30 mL
QC Batch: 1308910
Sequence: 3H27080
Calibration: 3H27025
Instrument: 216

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7439-97-6	Mercury, Total	0.10	ug/L	0.055	0.10	0.20	U

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-7470A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308910

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308910-MS1

Preparation: 7470A Digestion - Total

Initial/Final: 30 mL / 30 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Mercury, Total	2.00	ND	1.85	93	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

00563

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-7470A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308910

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308910-MSD1

Preparation: 7470A Digestion - Total

Initial/Final: 30 mL / 30 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Mercury, Total	2.00	1.91	95	3	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

66964

LCS / LCS DUPLICATE RECOVERY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308910

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308910-BS1

Preparation: 7470A Digestion - Total

Initial/Final: 30 mL / 30 mL

Sequence: 3H27080

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Mercury, Total	2.00	1.93	97	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

00567

TriMatrix Laboratories, Inc.

PREPARATION BATCH **1308911** Page 1 of 1

Printed: 9/10/2013 7:45:50AM

Metals, Water, 7470A Digestion - Dissolved

Batch comments:

MAS 08/26/13 1:00-3:00PM
INST#218@92.6-94.0C #269
HOTBLOCK VESSEL LOT#1303205
All standards, QC samples, and normal samples included in this batch were digested, using the reagents documented on this benchsheet.

Lab Number	Container	Prepared	By	Initial (mL)	Final (mL)	Client: Source ID	Client: Spike ID	Client: uL Spike	Comments
1308343-01 Hg Diss 7470A (DoD)	A	Aug-26-13 13:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
1308343-02 Hg Diss 7470A (DoD)	A	Aug-26-13 13:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
1308343-03 Hg Diss 7470A (DoD)	A	Aug-26-13 13:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
1308343-04 Hg Diss 7470A (DoD)	A	Aug-26-13 13:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
1308343-05 Hg Diss 7470A (DoD)	A	Aug-26-13 13:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
1308911-BLK1		Aug-26-13 13:00	MAS	30	30				
1308911-BS1		Aug-26-13 13:00	MAS	30	30		3061334	60	
1308911-MS1		Aug-26-13 13:00	MAS	30	30	1308343-04	3061334	60	
1308911-MSD1		Aug-26-13 13:00	MAS	30	30	1308343-04	3061334	60	

Comments:	Analyst Initials:

QC BATCH SUMMARY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 1308343

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A Site 12 Investigatior

QC Batch: 1308911 QC Batch Matrix: Water

Preparation: 7470A Digestion - Dissolved

Sample Name	Lab Sample ID	Date Prepared	Observations
NTC12GW-01	1308343-01	08/26/13 13:00	
NTC12GW-02	1308343-02	08/26/13 13:00	
NTC12GW-03	1308343-03	08/26/13 13:00	
NTC12GW-04	1308343-04	08/26/13 13:00	
NTC12-DUP-P3-081513	1308343-05	08/26/13 13:00	
Blank	1308911-BLK1	08/26/13 13:00	
LCS	1308911-BS1	08/26/13 13:00	
NTC12GW-04	1308911-MS1	08/26/13 13:00	
NTC12GW-04	1308911-MSD1	08/26/13 13:00	

60958

METHOD BLANK DATA SHEET
USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Matrix: Water
Laboratory ID: 1308911-BLK1
File ID: u27wt-a2-199
Prepared: 08/26/13 13:00
Analyzed: 08/27/13 13:39
Preparation: 7470A Digestion - Dissol
Initial/Final: 30 mL / 30 mL
QC Batch: 1308911
Sequence: 3H27080
Calibration: 3H27025
Instrument: 216

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7439-97-6	Mercury, Dissolved	0.10	ug/L	0.055	0.10	0.20	U

: 00582

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-7470A

NTC12GW-04

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308911

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308911-MS1

Preparation: 7470A Digestion - Dissolved

Initial/Final: 30 mL / 30 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Mercury, Dissolved	2.00	ND	1.90	95	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12GW-04

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308911

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308911-MSD1

Preparation: 7470A Digestion - Dissolved

Initial/Final: 30 mL / 30 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Mercury, Dissolved	2.00	1.99	99	4	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00965

LCS / LCS DUPLICATE RECOVERY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Water

QC Batch: 1308911

SDG: 1308343

Project: NS Great Lakes CTO F27A Site 12 Investigatior

Laboratory ID: 1308911-BS1

Preparation: 7470A Digestion - Dissolved

Initial/Final: 30 mL / 30 mL

Sequence: 3H27080

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Mercury, Dissolved	2.00	1.90	95	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00568

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Sequence: 3H27080
Calibration: 3H27025
Instrument: 216

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	3H27080-CAL1	u27wt-a2-001	08/27/13 07:26
Cal Standard	3H27080-CAL2	u27wt-a2-004	08/27/13 07:31
Cal Standard	3H27080-CAL3	u27wt-a2-007	08/27/13 07:36
Cal Standard	3H27080-CAL4	u27wt-a2-010	08/27/13 07:41
Cal Standard	3H27080-CAL5	u27wt-a2-013	08/27/13 07:46
Cal Standard	3H27080-CAL6	u27wt-a2-016	08/27/13 07:52
Calibration Check	3H27080-CCV1	u27wt-a2-019	08/27/13 07:57
Secondary Cal Check	3H27080-SCV1	u27wt-a2-022	08/27/13 08:03
Calibration Blank	3H27080-CCB1	u27wt-a2-025	08/27/13 08:08
Calibration Check	3H27080-CCV2	u27wt-a2-031	08/27/13 08:22
Calibration Blank	3H27080-CCB2	u27wt-a2-034	08/27/13 08:27
Calibration Check	3H27080-CCV3	u27wt-a2-070	08/27/13 09:33
Calibration Blank	3H27080-CCB3	u27wt-a2-073	08/27/13 09:38
Calibration Check	3H27080-CCV4	u27wt-a2-106	08/27/13 10:42
Calibration Blank	3H27080-CCB4	u27wt-a2-109	08/27/13 10:47
Calibration Check	3H27080-CCV5	u27wt-a2-142	08/27/13 11:47
Calibration Blank	3H27080-CCB5	u27wt-a2-145	08/27/13 11:52
Calibration Check	3H27080-CCV6	u27wt-a2-187	08/27/13 13:17
Calibration Blank	3H27080-CCB6	u27wt-a2-190	08/27/13 13:22
NTC12GW-04	1308910-MSD1	u27wt-a2-193	08/27/13 13:27
NTC12-DUP-P3-081513	1308343-05	u27wt-a2-196	08/27/13 13:33
Blank	1308911-BLK1	u27wt-a2-199	08/27/13 13:39
LCS	1308911-BS1	u27wt-a2-202	08/27/13 13:44
NTC12GW-01	1308343-01	u27wt-a2-205	08/27/13 13:50
NTC12GW-02	1308343-02	u27wt-a2-208	08/27/13 13:55
NTC12GW-03	1308343-03	u27wt-a2-211	08/27/13 14:01
NTC12GW-04	1308343-04	u27wt-a2-214	08/27/13 14:06
NTC12GW-04	1308911-MS1	u27wt-a2-217	08/27/13 14:12
NTC12GW-04	1308911-MSD1	u27wt-a2-220	08/27/13 14:18
Calibration Check	3H27080-CCV7	u27wt-a2-223	08/27/13 14:23
Calibration Blank	3H27080-CCB7	u27wt-a2-226	08/27/13 14:29
NTC12-DUP-P3-081513	1308343-05	u27wt-a2-229	08/27/13 14:37

: 00954

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigatio
Sequence: 3H27080
Calibration: 3H27025
Instrument: 216

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Blank	1308910-BLK1	u27wt-a2-241	08/27/13 14:59
LCS	1308910-BS1	u27wt-a2-244	08/27/13 15:04
NTC12GW-01	1308343-01	u27wt-a2-247	08/27/13 15:10
NTC12GW-02	1308343-02	u27wt-a2-250	08/27/13 15:16
NTC12GW-03	1308343-03	u27wt-a2-253	08/27/13 15:21
NTC12GW-04	1308343-04	u27wt-a2-256	08/27/13 15:27
Calibration Check	3H27080-CCV8	u27wt-a2-259	08/27/13 15:33
Calibration Blank	3H27080-CCB8	u27wt-a2-262	08/27/13 15:38
NTC12GW-04	1308910-MS1	u27wt-a2-265	08/27/13 15:44
Calibration Blank	3H27080-CCB9	u27wt-a2-298	08/27/13 16:46
Calibration Check	3H27080-CCV9	u27wt-a2-301	08/27/13 16:52
Calibration Check	3H27080-CCVA	u27wt-a2-334	08/27/13 18:00
Calibration Blank	3H27080-CCBA	u27wt-a2-337	08/27/13 18:05

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3H27080
Calibration: 3H27025
Control Limt: +/- 20.00%
Instrument ID: 216

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
3H27080-CCV1	Mercury	2.00	2.02	101	ug/L	08/27/13 07:57
	Mercury	2.00	2.02	101	ug/L	08/27/13 07:57
3H27080-CCV2	Mercury	2.00	2.04	102	ug/L	08/27/13 08:22
	Mercury	2.00	2.04	102	ug/L	08/27/13 08:22
3H27080-CCV3	Mercury	2.00	2.00	100	ug/L	08/27/13 09:33
	Mercury	2.00	2.00	100	ug/L	08/27/13 09:33
3H27080-CCV4	Mercury	2.00	1.99	99	ug/L	08/27/13 10:42
	Mercury	2.00	1.99	99	ug/L	08/27/13 10:42
3H27080-CCV5	Mercury	2.00	1.88	94	ug/L	08/27/13 11:47
	Mercury	2.00	1.88	94	ug/L	08/27/13 11:47
3H27080-CCV6	Mercury	2.00	1.90	95	ug/L	08/27/13 13:17
	Mercury	2.00	1.90	95	ug/L	08/27/13 13:17
3H27080-CCV7	Mercury	2.00	1.94	97	ug/L	08/27/13 14:23
	Mercury	2.00	1.94	97	ug/L	08/27/13 14:23
3H27080-CCV8	Mercury	2.00	1.95	97	ug/L	08/27/13 15:33
	Mercury	2.00	1.95	97	ug/L	08/27/13 15:33
3H27080-CCV9	Mercury	2.00	1.85	92	ug/L	08/27/13 16:52
	Mercury	2.00	1.85	92	ug/L	08/27/13 16:52
3H27080-CCVA	Mercury	2.00	1.86	93	ug/L	08/27/13 18:00
	Mercury	2.00	1.86	93	ug/L	08/27/13 18:00

* Values outside of QC limits

00956

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Inv
Laboratory ID: 3H27080-SCV1
Instrument: 216
Sequence: 3H27080
Calibration: 3H27025

Analyte	Expected	Found	% R	QC Limit	Units
Mercury	3.00	2.88	96	90-110	ug/L
Mercury	3.00	2.88	96	90-110	ug/L

* Values outside of QC limits

60557

BLANKS
USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1308343
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A Site 12 Investigation
Sequence: 3H27080
Calibration: 3H27025
Instrument ID: 216

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
3H27080-CCB1	Mercury	-0.037	ug/L	0.055	0.10	0.20	U	08/27/13 08:08
	Mercury	-0.037	ug/L	0.055	0.10	0.20	U	08/27/13 08:08
3H27080-CCB2	Mercury	-0.036	ug/L	0.055	0.10	0.20	U	08/27/13 08:27
	Mercury	-0.036	ug/L	0.055	0.10	0.20	U	08/27/13 08:27
3H27080-CCB3	Mercury	-0.018	ug/L	0.055	0.10	0.20	U	08/27/13 09:38
	Mercury	-0.018	ug/L	0.055	0.10	0.20	U	08/27/13 09:38
3H27080-CCB4	Mercury	-0.041	ug/L	0.055	0.10	0.20	U	08/27/13 10:47
	Mercury	-0.041	ug/L	0.055	0.10	0.20	U	08/27/13 10:47
3H27080-CCB5	Mercury	-0.046	ug/L	0.055	0.10	0.20	U	08/27/13 11:52
	Mercury	-0.046	ug/L	0.055	0.10	0.20	U	08/27/13 11:52
3H27080-CCB6	Mercury	-0.047	ug/L	0.055	0.10	0.20	U	08/27/13 13:22
	Mercury	-0.047	ug/L	0.055	0.10	0.20	U	08/27/13 13:22
3H27080-CCB7	Mercury	-0.014	ug/L	0.055	0.10	0.20	U	08/27/13 14:29
	Mercury	-0.014	ug/L	0.055	0.10	0.20	U	08/27/13 14:29
3H27080-CCB8	Mercury	-0.036	ug/L	0.055	0.10	0.20	U	08/27/13 15:38
	Mercury	-0.036	ug/L	0.055	0.10	0.20	U	08/27/13 15:38
3H27080-CCB9	Mercury	-0.053	ug/L	0.055	0.10	0.20	U	08/27/13 16:46
	Mercury	-0.053	ug/L	0.055	0.10	0.20	U	08/27/13 16:46
3H27080-CCBA	Mercury	-0.045	ug/L	0.055	0.10	0.20	U	08/27/13 18:05
	Mercury	-0.045	ug/L	0.055	0.10	0.20	U	08/27/13 18:05

* Values outside of QC limits

SOIL (ORGANICS)

Tetra Tech NUS

INTERNAL CORRESPONDENCE

TO: B. DAVIS **DATE:** FEBRUARY 9, 2011

FROM: EDWARD SEDLMYER **COPIES:** DV FILE

SUBJECT: ORGANIC DATA VALIDATION- SVOC/PEST/PCB/PAH
CTO F27A, NTC GREAT LAKES
SDG CTOF27AGL001

SAMPLES: 22/Solid

NTC12-DUP01	NTC12-DUP02	NTC12-SB21-0005
NTC12-SB21-0507	NTC12-SB22-0005	NTC12-SB22-00502
NTC12-SB23-0005	NTC12-SB23-0810	NTC12-SB24-0005
NTC12-SB24-00502	NTC12-SB25-0005	NTC12-SB25-0204
NTC12-SB26-0005	NTC12-SB26-0406	NTC12-SB27-0005
NTC12-SB27-0204	NTC12-SB28-0005	NTC12-SB28-0204
NTC12-SB29-0005	NTC12-SB29-0204	NTC12-SB30-0005
NTC12-SB30-00502		

OVERVIEW

The sample set for CTO F27A NTC Great Lakes, SDG CTOF27AGL001 consists of twenty-two (22) soil environmental samples. All samples were analyzed for Target Compound List (TAL) semivolatile organic compounds (SVOC), pesticides (PEST), polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs). Two field duplicate pairs were associated with this SDG: NTC12-SB27-0204 / NTC12-DUP01 and NTC12-SB25-0204 / NTC12-DUP02.

The samples were collected by TetraTech NUS on December 20, 2010 and analyzed by Empirical Laboratories. All analyses were conducted in accordance with USEPA SW 846 Method 8270C, 8270C SIM, 8081A, and 8082 analytical and reporting protocol. The data contained in this SDG were validated with regard to the following parameters:

* Data Completeness
* Holding Times
- Initial and Continuing Calibration
- Laboratory Blank Analyses
- Field Duplicate Results
* Detection Limits

In addition, samples NTC12-SB27-0204, NTC12-DUP01, NTC12-SB25-0204, NTC12-DUP02, and NTC12-SB30-0005 were also validated with regard to the following parameters:

- GC/MS Tuning
- Surrogate Recoveries
- Blank Spike/Blank Spike Duplicate Results
- Matrix Spike/Matrix Spike Duplicate Results
- Internal Standard Recoveries
* Compound Quantitation
- Compound Identification

The symbol (*) indicates that quality control criteria were met for this parameter. Problems affecting data quality are discussed below; documentation supporting these findings is presented in Appendix C. Qualified Analytical results are presented in Appendix A. Results as reported by the laboratory are presented in Appendix B.

Semivolatile

The following analyte was detected in the laboratory method blank associated with batch 0L27012:

Analyte	Maximum Concentration	Action Level
Diethylphthalate	145 µg/kg	1450 µg/kg

An action level of 10X the maximum contaminant level for diethylphthalate has been used to evaluate sample data for blank contamination. Sample aliquot, percent moisture, and dilution factors, if applicable, were taken into consideration when evaluating for blank contamination for each individual sample. No action was taken on this basis because diethylphthalate was not detected in any associated samples.

The surrogate percent recoveries for nitrobenzene-d5 were greater than the quality control limit for samples NTC12-29-0005, NTC12-29-00204, NTC12-24-0005, NTC12-30-00502, NTC12-23-0005, NTC12-DUP02, NTC12-22-0005, NTC12-22-00502, NTC12-DUP01, NTC12-27-0204, and NTC12-27-0005. No action was taken on this basis because only one surrogate per fraction was outside of quality control limits and qualification of the data is not required.

The surrogate percent recoveries for nitrobenzene-d5 and terphenyl-d14 were greater than the quality control limit for sample NTC12-SB26-0005. No action was taken on this basis because all results are non-detected.

The laboratory control sample (LCS) associated with batch 0L22011 had percent recoveries greater than the quality control limit for bis(2-chloroethoxy)methane, 2,4-dimethylphenol, hexachlorobutadiene, nitrobenzene, and phenol and a low recovery for N-nitrosodiphenylamine. The positive phenol result for sample NTC12-SB25-0204 has been qualified as estimated (J) and the nondetected results for N-nitrosodiphenylamine in samples NTC12-SB27-0204, NTC12-DUP01, NTC12-SB25-0204, NTC12-DUP02, and NTC12-SB30-0005 have been qualified as estimated (UJ). No action was taken on the nondetected results for bis(2-chloroethoxy)methane, 2,4-dimethylphenol, hexachlorobutadiene, and nitrobenzene in the associated samples.

The LCS associated with batch 0L27012 had percent recoveries greater than the quality control limit for butylbenzylphthalate, 4-chloro-3-methylphenol, bis(2-chloroethoxy)methane, 2,2'-oxybis-1-chloropropane, di-n-butylphthalate, 2,4-dimethylphenol, 2,4-dinitrophenol, di-n-octylphthalate, bis(2-ethylhexyl)phthalate, 4-nitroaniline, 2-nitroaniline, nitrobenzene, 2-nitrophenol, n-nitrosodiphenylamine, and pentachlorophenol. No action was taken on the aforementioned compounds because they were nondetected in the associated samples.

The matrix spike / matrix spike duplicate (MS/MSD) performed on sample NTC12-SB27-0204 had percent recoveries greater than the quality control limit for bis(2-chloroethoxy)methane, di-n-octylphthalate, hexachlorobutadiene, and nitrobenzene in the MS and/or MSD and low recoveries for N-nitrosodiphenylamine iin the MS/MSD. The nondetected result for N-nitrosodiphenylamine has been qualified as estimated (UJ) in sample NTC12-SB27-0204. No action was taken on the nondetected results for bis(2-chloroethoxy)methane, di-n-octylphthalate, hexachlorobutadiene, and nitrobenzene.

The MS/MSD performed on sample NTC12-SB29-0005 had percent recoveries greater than the quality control limit for butylbenzylphthalate ,di-n-butylphthalate, di-n-octylphthalate, bis(2-ethylhexyl)phthalate, hexachlorocyclopentadiene, and 2-nitroaniline in the MS and/or MSD and low recoveries for 2,3,4,6-tetrachlorophenol in the MS. In addition, the relative percent difference (RPD) for 3,3'-dichlorobenzidine and

hexachlorocyclopentadiene were outside the quality control limits. No action was taken on the results for the aforementioned compounds because either the MS or MSD had acceptable recoveries or the results were nondetected.

Continuing calibration percent differences (%Ds) on instrument MS-BNA3 on 1/6/11 @13:23 were greater than the 20% quality control limit for 3,3'-dichlorobenzidine, carbazole, hexachlorobutadiene, hexachlorocyclopentadiene, isophorone, 2-nitroaniline, nitrobenzene, and N-nitroso-di-n-propylamine. The positive and nondetected results for the aforementioned compounds in all samples except NTC12-DUP01, NTC12-SB27-0204, NTC12-SB28-0005, NTC12-SB27-0005, NTC12-SB25-0204, NTC12-SB26-0005, NTC12-SB29-0005, and NTC12-SB29-0204 have been qualified as estimated (J) and (UJ), respectively.

Continuing calibration %Ds on instrument MS-BNA3 on 1/10/11 @16:38 were greater than the 20% quality control limit for 3,3'-dichlorobenzidine, caprolactam, carbazole, di-n-octylphthalate, hexachlorobutadiene, isophorone, 2-nitroaniline, nitrobenzene, and N-nitroso-di-n-propylamine. The nondetected results for the aforementioned compounds in samples NTC12-DUP01, NTC12-SB27-0204, NTC12-SB28-0005, NTC12-SB27-0005, NTC12-SB25-0204, and NTC12-SB26-0005 have been qualified as estimated (UJ),

Continuing calibration %Ds on instrument MS-BNA1 on 1/5/11 @15:05 were greater than the 20% quality control limit for butylbenzylphthalate, 2,2'-oxybis-1-chloropropane, 2,4-dinitrophenol, di-n-octylphthalate, bis(2-ethylhexyl)phthalate, 4-nitroaniline, 2-nitroaniline, nitrobenzene, 4-nitrophenol, and N-nitroso-di-n-propylamine. The nondetected results for the aforementioned compounds in samples NTC12-SB29-0005 and NTC12-SB29-0204 have been qualified as estimated (UJ),

The internal standards chrysene-d12 and perylene-d12 had percent recoveries less than the quality control limit for sample NTC12-SB26-0005. No action was taken on this basis because this sample received a limited validation.

Polycyclic Aromatic Hydrocarbons

The LCS associated with batch 0L22011 had a percent recovery greater than the quality control limit for benzo(k)fluoranthene.The positive results for benzo(k)fluroanthene in samples NTC12-SB27-0204, NTC12-DUP01, NTC12-SB25-0204, NTC12-DUP02, and NTC12-SB30-0005 have been qualified as estimated (J).

The MS/MSD performed on sample NTC12-SB29-0005 had a percent recovery greater than the quality control limit for benzo(b)fluoranthene in the MSD. In addition, the relative percent difference (RPD) for 2-methylnaphthalene was outside the quality control limit. No action was taken on the results for the aforementioned compounds because the MS had an acceptable recovery.

The internal standard perylene-d12 had a percent recovery less than the quality control limit for sample NTC12-SB26-0005. No action was taken on this basis because this sample received a limited validation.

The field duplicate precision exceeded the 50% relative percent difference (RPD) quality control limit for 2-methylnaphthalene, naphthalene, and phenanthrene in the field duplicate pair NTC12-SB27-0204 / NTC12-DUP01. The aforementioned results were qualified as estimated in the field duplicate pair NTC12-SB27-0204 / NTC12-DUP01.

The field duplicate precision exceeded the 50% relative percent difference (RPD) quality control limit for 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene in the field duplicate pair NTC12-SB25-0204 / NTC12_DUP02. The aforementioned results were qualified as estimated in the field duplicate pair NTC12-SB25-0204 / NTC12_DUP02.

PCBs

The surrogate decachlorobiphenyl had a percent recovery greater than the quality control limit for sample NTC12-SB28-0204 on the primary column. No action was taken on this basis because all other surrogate recoveries met control limits.

The surrogates tetrachloro-m-xylene and decachlorobiphenyl had percent recoveries less than the quality control limits for samples NTC12-SB29-0204 and NTC12-SB25-0204 on the secondary column. No action was taken on this basis because the surrogates had acceptable recoveries on the primary column.

The surrogates tetrachloro-m-xylene and decachlorobiphenyl had percent recoveries less than the quality control limits for sample NTC12-SB21-0507 on the primary and secondary columns. No action was taken on this basis because a limited validation was performed on sample NTC12-SB21-0507.

The continuing calibration on instrument GL-ECD3 on 12/30/10 @01:14 had average %Ds greater than 20% for Aroclor-1016 and Aroclor-1260 on the secondary column. No action was taken on this basis because the primary column had acceptable average %Ds.

The continuing calibration on instrument GL-ECD3 on 01/04/11 @15:57 had an average %D greater than 20% for Aroclor-1260 on the secondary column. No action was taken on this basis because the primary column had an acceptable average %D.

The continuing calibration on instrument GL-ECD3 on 01/04/11 @19:03 had average %Ds greater than 20% for Aroclor-1016 and Aroclor-1260 on the secondary column. No action was taken on this basis because the primary column had an acceptable average %Ds.

The continuing calibration on instrument GL-ECD3 on 01/04/11 @19:21 had an average %D greater than 20% for Aroclor-1254 on the secondary column. No action was taken on this basis because the primary column had an acceptable average %D.

The continuing calibration on instrument GL-ECD3 on 01/05/11 @19:13 had an average %D greater than 20% for Aroclor-1260 on the secondary column. No action was taken on this basis because the primary column had an acceptable average %D.

The continuing calibration on instrument GL-ECD3 on 01/06/11 @00:29 had an average %D greater than 20% for Aroclor-1260 on the secondary and primary columns. The nondetected Aroclor-1260 results for samples NTC12-SB27-0204 and NTC12-SB25-0204 have been qualified as estimated (UJ).

The continuing calibration on instrument GL-ECD3 on 01/06/11 @16:42 had an average %D greater than 20% for Aroclor-1254 on the secondary column. No action was taken on this basis because the primary column had an acceptable average %D.

The relative percent difference between columns exceeded 40% for the following compounds. The positive results were reported as estimated, J for the compounds below:

Sample	Compound	%D
NTC12-SB28-0204	Aroclor-1254	84%
NTC12-SB29-0204	Aroclor-1254	42%

A field duplicate analysis was not performed for the PCB fraction. No action was taken on this basis and is noted for completeness only.

Pesticides

The surrogate tetrachloro-m-xylene had low recoveries on the primary and secondary column and decachlorobiphenyl had a low recovery on the secondary column for samples NTC12-SB23-0810, NTC12-SB26-0005, NTC12-SB26-0406, and NTC12-DUP02. The positive and nondetected results for all compounds reported from the undiluted sample NTC12-DUP02 have been qualified as estimated (J) and (UJ), respectively. No action was taken on samples NTC12-SB23-0810, NTC12-SB26-0005, and NTC12-SB26-0406 because a limited validation was performed on these samples.

The surrogate tetrachloro-m-xylene had low recoveries on the primary and secondary column for samples NTC12-SB24-0005, NTC12-SB30-0005, NTC12-SB30-0502, and NTC12-SB29-0005. The recoveries for decachlorobiphenyl were acceptable. No action was taken on samples NTC12-SB24-0005, NTC12-SB30-0005, NTC12-SB30-0502, and NTC12-SB29-0005 because a limited validation was performed on these samples.

The surrogate tetrachloro-m-xylene had a low recovery on the secondary column for samples NTC12-SB24-0502 and NTC-SB25-0005. All other surrogate recoveries were acceptable. No qualification action was taken on this basis.

The surrogates tetrachloro-m-xylene and decachlorobiphenyl had low recoveries on both the primary and secondary columns for samples NTC12-DUP01 and NTC12-SB21-0507. The positive and nondetected results for all compounds in sample NTC12-DUP01 have been qualified as estimated (J) and (UJ), respectively. No action was taken on sample NTC12-SB21-0507 because a limited validation was performed on this sample.

The surrogate tetrachloro-m-xylene had a low recovery on the primary column for sample NTC12-SB21-0005. All other surrogate recoveries were acceptable. No qualification action was taken on this basis.

The surrogate decachlorobiphenyl had a low recovery on the primary column for sample NTC12-SB28-0204. All other surrogate recoveries were acceptable. No qualification action was taken on this basis.

The surrogate recoveries for tetrachloro-m-xylene and decachlorobiphenyl had low recoveries on the secondary column for sample NTC12-SB29-0204. All other surrogate recoveries were acceptable. No qualification action was taken on this basis.

The surrogate recoveries for tetrachloro-m-xylene and decachlorobiphenyl had low recoveries on the secondary column for sample NTC12-SB25-0204. The positive and nondetected results for compounds aldrin, alpha-BHC, alpha-chlordane, dieldrin, endrin, endrin aldehyde, gamma-BHC, and methoxychlor reported from the secondary column have been qualified as estimated (J) and (UJ), respectively. No action was taken for compounds reported from the primary column.

The continuing calibration on instrument GL-ECD3 on 12/30/10 @00:18 had a %D greater than 20% for delta-BHC on the secondary column. The positive delta-BHC result for samples NTC12-SB23-0005 and NTC12-SB23-0810 reported from the secondary column have been qualified as estimated (J).

The continuing calibration on instrument GL-ECD3 on 1/03/11 @19:03 had a %D greater than 20% for delta-BHC and heptachlor on the primary column and methyoxychlor on the secondary column. The positive and nondetected results for the aforementioned compounds in samples NTC12-SB24-00502, NTC12-SB30-0005, NTC12-SB30-00502, NTC12-SB26-0005, NTC12-DUP01, and NTC12-SB26-0406 have been qualified as estimated (J) and (UJ), respectively, if the result was reported from the appropriate column.

The continuing calibration on instrument GL-ECD3 on 01/04/11 @18:25 had a %D greater than 20% for beta-BHC on the secondary column. No action was taken on this basis because all results were reported from the primary column.

The continuing calibration on instrument GL-ECD3 on 1/06/11 @03:16 had a %D greater than 20% for 4,4'-DDD and 4.4'-DDT on the primary column and 4,4'-DDT and methyoxychlor on the secondary column. The positive and nondetected results for 4,4'-DDT in undiluted samples NTC12-SB21-0005, NTC12-SB21-0507, NTC12-SB25-0005, and NTC12-SB25-0204 have been qualified as estimated (J) and (UJ), respectively, if the result was reported from the appropriate column.

The field duplicate precision exceeded the 50% relative percent difference (RPD) quality control limit for 4,4'-DDD in the field duplicate pair NTC12-SB27-0204 / NTC12-DUP01. The 4,4'-DDD results were qualified as estimated in the field duplicate pair NTC12-SB27-0204 / NTC12-DUP01.

The field duplicate precision exceeded the 50% relative percent difference (RPD) quality control limit for 4,4'-DDE, 4,4'-DDT, aldrin, alpha-chlordane, beta-BHC, delta-BHC, endosulfan sulfate, endrin, endrin aldehyde, and gamma-chlordane in the field duplicate pair NTC12-SB25-0204 / NTC12-DUP02. The 4,4'-DDE, 4,4'-DDT, aldrin, alpha-chlordane, beta-BHC, delta-BHC, endosulfan sulfate, endrin, endrin aldehyde, and gamma-chlordane results were qualified as estimated in the field duplicate pair NTC12-SB25-0204 / NTC12-DUP02.

The relative percent difference between columns exceeded 40% for the following compounds. The positive results were reported as estimated (J) for the compounds below:

Sample	Compound	%D
NTC12-DUP01	gamma-Chlordane	123%
NTC12-DUP02	4,4'-DDE	77%
	Aldrin	72%
	alpha-BHC	141%
	alpha-Chlordane	47%
	beta-BHC	124%
	delta-BHC	80%
	Dieldrin	147%
	Endosulfan II	189%
	Endosulfan sulfate	123%
	Endrin	162%
	gamma-BHC	89%
	Heptachlor epoxide	174%
NTC12-SB25-0204	alpha-Chlordane	125%
	Endosulfan I	128%
	Endosulfan II	164%
	Endosulfan sulfate	174%
	Endrin	59%
	Endrin aldehyde	98%
	gamma-Chlordane	183%
	Heptachlor epoxide	78%
	Methoxychlor	173
NTC12-SB27-0204	gamma-Chlordane	113%
NTC12-SB30-0005	4,4'-DDT	76%
	alpha-Chlordane	77%
	delta-BHC	59%
	Dieldrin	135%
	Heptachlor epoxide	68%

Additional Comments:

Positive results less than the reporting limit (RL) were qualified as estimated, J, due to uncertainty near the detection limit.

EXECUTIVE SUMMARY

Laboratory Performance Issues: Diethylphthalate was detected in a SVOC method blank. Continuing calibration %D noncompliances resulted in the qualification of data in the SVOC, PCB, and PEST fractions. Surrogate recovery noncompliances resulted in the qualification of data in the PEST fraction. Laboratory control sample recovery noncompliances resulted in the qualification of data in the SVOC and PAH fractions.

Other factors affecting data quality: Matrix spike recovery noncompliances resulted in the qualification of data in the SVOC fraction. Field duplicate imprecision resulted in qualification of the data in the PAH and PEST fractions. Percent differences between columns resulted in the qualification of data in the PCB and PEST fractions.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (October 1999) 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

Edward Sedlmyer
Chemist/Data Validator

TetraTech NUS

Joseph A. Samchuck
Data Validation 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 $r < 0.995$ / 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: 02416	NSAMPLE	NTC12-DUP01			NTC12-DUP02			NTC12-SB21-0005			NTC12-SB21-0507		
SDG: CTOF27AGL001	LAB_ID	1012185-10			1012185-11			1012185-17			1012185-18		
FRACTION: OS	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	89.4			82.9			85.0			85.3		
	DUP_OF	NTC12-SB27-0204			NTC12-SB25-0204								
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1-BIPHENYL		187	U		201	U		195	U		193	U	
2,2'-OXYBIS(1-CHLOROPROPANE)		187	U		201	U		195	U		193	U	
2,4,5-TRICHLOROPHENOL		187	U		201	U		195	U		193	U	
2,4,6-TRICHLOROPHENOL		187	U		201	U		195	U		193	U	
2,4-DICHLOROPHENOL		187	U		201	U		195	U		193	U	
2,4-DIMETHYLPHENOL		746	U		805	U		779	U		772	U	
2,4-DINITROPHENOL		1870	U		2010	U		1950	U		1930	U	
2,4-DINITROTOLUENE		187	U		201	U		195	U		193	U	
2,6-DINITROTOLUENE		187	U		201	U		195	U		193	U	
2-CHLORONAPHTHALENE		187	U		201	U		195	U		193	U	
2-CHLOROPHENOL		187	U		201	U		195	U		193	U	
2-METHYLPHENOL		187	U		201	U		195	U		193	U	
2-NITROANILINE		746	UJ	C	805	UJ	C	779	UJ	C	772	UJ	C
2-NITROPHENOL		187	U		201	U		195	U		193	U	
3,3'-DICHLOROBENZIDINE		187	UJ	C	201	UJ	C	195	UJ	C	193	UJ	C
3-NITROANILINE		746	U		805	U		779	U		772	U	
4,6-DINITRO-2-METHYLPHENOL		1870	U		2010	U		1950	U		1930	U	
4-BROMOPHENYL PHENYL ETHER		187	U		201	U		195	U		193	U	
4-CHLORO-3-METHYLPHENOL		187	U		201	U		195	U		193	U	
4-CHLOROANILINE		187	U		201	U		195	U		193	U	
4-CHLOROPHENYL PHENYL ETHER		187	U		201	U		195	U		193	U	
4-METHYLPHENOL		187	U		348	J	P	195	U		268	J	P
4-NITROANILINE		746	U		805	U		779	U		772	U	
4-NITROPHENOL		746	U		805	U		779	U		772	U	
ACETOPHENONE		187	UJ	C	201	U		195	U		193	U	
ATRAZINE		187	U		201	U		195	U		193	U	
BENZALDEHYDE		187	U		201	U		195	U		193	U	
BIS(2-CHLOROETHOXY)METHANE		187	U		201	U		195	U		193	U	
BIS(2-CHLOROETHYL)ETHER		187	U		201	U		195	U		193	U	
BIS(2-ETHYLHEXYL)PHTHALATE		187	U		201	U		195	U		193	U	
BUTYL BENZYL PHTHALATE		187	U		201	U		195	U		193	U	
CAPROLACTAM		187	U		201	U		195	U		193	U	
CARBAZOLE		187	UJ	C	201	UJ	C	254	J	CP	193	UJ	C
DIBENZOFURAN		187	U		371	J	P	195	U		204	J	P
DIETHYL PHTHALATE		187	U		201	U		195	U		193	U	

PROJ_NO: 02416	NSAMPLE	NTC12-SB22-0005			NTC12-SB22-00502			NTC12-SB23-0005			NTC12-SB23-0810		
SDG: CTOF27AGL001	LAB_ID	1012185-15			1012185-16			1012185-01			1012185-02		
FRACTION: OS	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	87.1			85.8			94.2			84.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1-BIPHENYL		190	U		195	U		173	U		194	U	
2,2'-OXYBIS(1-CHLOROPROPANE)		190	U		195	U		173	U		194	U	
2,4,5-TRICHLOROPHENOL		190	U		195	U		173	U		194	U	
2,4,6-TRICHLOROPHENOL		190	U		195	U		173	U		194	U	
2,4-DICHLOROPHENOL		190	U		195	U		173	U		194	U	
2,4-DIMETHYLPHENOL		761	U		777	U		690	U		777	U	
2,4-DINITROPHENOL		1900	U		1950	U		1730	U		1940	U	
2,4-DINITROTOLUENE		190	U		195	U		173	U		194	U	
2,6-DINITROTOLUENE		190	U		195	U		173	U		194	U	
2-CHLORONAPHTHALENE		190	U		195	U		173	U		194	U	
2-CHLOROPHENOL		190	U		195	U		173	U		194	U	
2-METHYLPHENOL		190	U		195	U		173	U		194	U	
2-NITROANILINE		761	UJ	C	777	UJ	C	690	UJ	C	777	UJ	C
2-NITROPHENOL		190	U		195	U		173	U		194	U	
3,3'-DICHLOROBENZIDINE		190	UJ	C	195	UJ	C	173	UJ	C	194	UJ	C
3-NITROANILINE		761	U		777	U		690	U		777	U	
4,6-DINITRO-2-METHYLPHENOL		1900	U		1950	U		1730	U		1940	U	
4-BROMOPHENYL PHENYL ETHER		190	U		195	U		173	U		194	U	
4-CHLORO-3-METHYLPHENOL		190	U		195	U		173	U		194	U	
4-CHLOROANILINE		190	U		195	U		173	U		194	U	
4-CHLOROPHENYL PHENYL ETHER		190	U		195	U		173	U		194	U	
4-METHYLPHENOL		190	U		195	U		173	U		194	U	
4-NITROANILINE		761	U		777	U		690	U		777	U	
4-NITROPHENOL		761	U		777	U		690	U		777	U	
ACETOPHENONE		190	U		195	U		173	U		194	U	
ATRAZINE		190	U		195	U		173	U		194	U	
BENZALDEHYDE		190	U		195	U		173	U		194	U	
BIS(2-CHLOROETHOXY)METHANE		190	U		195	U		173	U		194	U	
BIS(2-CHLOROETHYL)ETHER		190	U		195	U		173	U		194	U	
BIS(2-ETHYLHEXYL)PHTHALATE		190	U		195	U		173	U		194	U	
BUTYL BENZYL PHTHALATE		190	U		195	U		173	U		194	U	
CAPROLACTAM		190	U		195	U		173	U		194	U	
CARBAZOLE		190	UJ	C	195	UJ	C	173	UJ	C	194	UJ	C
DIBENZOFURAN		190	U		195	U		173	U		194	U	
DIETHYL PHTHALATE		190	U		195	U		173	U		194	U	

PROJ_NO: 02416	NSAMPLE	NTC12-SB24-0005			NTC12-SB24-00502			NTC12-SB25-0005			NTC12-SB25-0204		
SDG: CTOF27AGL001	LAB_ID	1012185-03			1012185-04			1012185-19			1012185-20		
FRACTION: OS	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	83.6			89.6			87.5			83.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1-BIPHENYL		199	U		182	U		191	U		197	U	
2,2'-OXYBIS(1-CHLOROPROPANE)		199	U		182	U		191	U		197	U	
2,4,5-TRICHLOROPHENOL		199	U		182	U		191	U		197	U	
2,4,6-TRICHLOROPHENOL		199	U		182	U		191	U		197	U	
2,4-DICHLOROPHENOL		199	U		182	U		191	U		197	U	
2,4-DIMETHYLPHENOL		793	U		725	U		762	U		788	U	
2,4-DINITROPHENOL		1990	U		1820	U		1910	U		1970	U	
2,4-DINITROTOLUENE		199	U		182	U		191	U		197	U	
2,6-DINITROTOLUENE		199	U		182	U		191	U		197	U	
2-CHLORONAPHTHALENE		199	U		182	U		191	U		197	U	
2-CHLOROPHENOL		199	U		182	U		191	U		197	U	
2-METHYLPHENOL		199	U		182	U		191	U		197	U	
2-NITROANILINE		793	UJ	C	725	UJ	C	762	UJ	C	788	UJ	C
2-NITROPHENOL		199	U		182	U		191	U		197	U	
3,3'-DICHLOROBENZIDINE		199	UJ	C	182	UJ	C	191	UJ	C	197	UJ	C
3-NITROANILINE		793	U		725	U		762	U		788	U	
4,6-DINITRO-2-METHYLPHENOL		1990	U		1820	U		1910	U		1970	U	
4-BROMOPHENYL PHENYL ETHER		199	U		182	U		191	U		197	U	
4-CHLORO-3-METHYLPHENOL		199	U		182	U		191	U		197	U	
4-CHLOROANILINE		199	U		182	U		191	U		197	U	
4-CHLOROPHENYL PHENYL ETHER		199	U		182	U		191	U		197	U	
4-METHYLPHENOL		199	U		182	U		191	U		375	J	P
4-NITROANILINE		793	U		725	U		762	U		788	U	
4-NITROPHENOL		793	U		725	U		762	U		788	U	
ACETOPHENONE		199	U		182	U		191	U		197	UJ	C
ATRAZINE		199	U		182	U		191	U		197	U	
BENZALDEHYDE		199	U		182	U		191	U		197	U	
BIS(2-CHLOROETHOXY)METHANE		199	U		182	U		191	U		197	U	
BIS(2-CHLOROETHYL)ETHER		199	U		182	U		191	U		197	U	
BIS(2-ETHYLHEXYL)PHTHALATE		199	U		182	U		149	J	P	197	U	
BUTYL BENZYL PHTHALATE		199	U		182	U		191	U		197	U	
CAPROLACTAM		199	U		182	U		191	U		197	U	
CARBAZOLE		199	UJ	C	182	UJ	C	191	UJ	C	197	UJ	C
DIBENZOFURAN		199	U		182	U		191	U		197	U	
DIETHYL PHTHALATE		199	U		182	U		191	U		197	U	

PROJ_NO: 02416	NSAMPLE	NTC12-SB26-0005			NTC12-SB26-0406			NTC12-SB27-0005			NTC12-SB27-0204		
SDG: CTOF27AGL001	LAB_ID	1012185-08			1012185-09			1012185-13			1012185-14		
FRACTION: OS	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	89.7			79.9			83.5			86.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1-BIPHENYL		185	U		208	U		197	U		189	U	
2,2'-OXYBIS(1-CHLOROPROPANE)		185	U		208	U		197	U		189	U	
2,4,5-TRICHLOROPHENOL		185	U		208	U		197	U		189	U	
2,4,6-TRICHLOROPHENOL		185	U		208	U		197	U		189	U	
2,4-DICHLOROPHENOL		185	U		208	U		197	U		189	U	
2,4-DIMETHYLPHENOL		738	U		829	U		788	U		755	U	
2,4-DINITROPHENOL		1850	U		2080	U		1970	U		1890	U	
2,4-DINITROTOLUENE		185	U		208	U		197	U		189	U	
2,6-DINITROTOLUENE		185	U		208	U		197	U		189	U	
2-CHLORONAPHTHALENE		185	U		208	U		197	U		189	U	
2-CHLOROPHENOL		185	U		208	U		197	U		189	U	
2-METHYLPHENOL		185	U		208	U		197	U		189	U	
2-NITROANILINE		738	UJ	C	829	UJ	C	788	UJ	C	755	UJ	C
2-NITROPHENOL		185	U		208	U		197	U		189	U	
3,3'-DICHLOROBENZIDINE		185	UJ	C	208	UJ	C	197	UJ	C	189	UJ	C
3-NITROANILINE		738	U		829	U		788	U		755	U	
4,6-DINITRO-2-METHYLPHENOL		1850	U		2080	U		1970	U		1890	U	
4-BROMOPHENYL PHENYL ETHER		185	U		208	U		197	U		189	U	
4-CHLORO-3-METHYLPHENOL		185	U		208	U		197	U		189	U	
4-CHLOROANILINE		185	U		208	U		197	U		189	U	
4-CHLOROPHENYL PHENYL ETHER		185	U		208	U		197	U		189	U	
4-METHYLPHENOL		185	U		167	J	P	197	U		189	U	
4-NITROANILINE		738	U		829	U		788	U		755	U	
4-NITROPHENOL		738	U		829	U		788	U		755	U	
ACETOPHENONE		185	UJ	C	208	U		197	UJ	C	189	UJ	C
ATRAZINE		185	U		208	U		197	U		189	U	
BENZALDEHYDE		185	U		208	U		197	U		189	U	
BIS(2-CHLOROETHOXY)METHANE		185	U		208	U		197	U		189	U	
BIS(2-CHLOROETHYL)ETHER		185	U		208	U		197	U		189	U	
BIS(2-ETHYLHEXYL)PHTHALATE		185	U		201	J	P	197	U		189	U	
BUTYL BENZYL PHTHALATE		185	U		208	U		197	U		189	U	
CAPROLACTAM		185	U		208	U		197	U		189	U	
CARBAZOLE		185	UJ	C	494	J	C	167	J	CP	189	UJ	C
DIBENZOFURAN		185	U		366	J	P	144	J	P	189	U	
DIETHYL PHTHALATE		185	U		208	U		197	U		189	U	

PROJ_NO: 02416	NSAMPLE	NTC12-SB28-0005			NTC12-SB28-0204			NTC12-SB29-0005			NTC12-SB29-0204		
SDG: CTOF27AGL001	LAB_ID	1012185-21			1012185-22			1012185-23			1012185-24		
FRACTION: OS	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	87.7			89.0			86.5			83.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1-BIPHENYL		185	U		186	U		193	U		201	U	
2,2'-OXYBIS(1-CHLOROPROPANE)		185	U		186	U		193	UJ	C	201	UJ	C
2,4,5-TRICHLOROPHENOL		185	U		186	U		193	U		201	U	
2,4,6-TRICHLOROPHENOL		185	U		186	U		193	U		201	U	
2,4-DICHLOROPHENOL		185	U		186	U		193	U		201	U	
2,4-DIMETHYLPHENOL		741	U		745	U		771	U		804	U	
2,4-DINITROPHENOL		1850	U		1860	U		1930	UJ	C	2010	UJ	C
2,4-DINITROTOLUENE		185	U		186	U		193	U		201	U	
2,6-DINITROTOLUENE		185	U		186	U		193	U		201	U	
2-CHLORONAPHTHALENE		185	U		186	U		193	U		201	U	
2-CHLOROPHENOL		185	U		186	U		193	U		201	U	
2-METHYLPHENOL		185	U		186	U		193	U		201	U	
2-NITROANILINE		741	UJ	C	745	UJ	C	771	UJ	C	804	UJ	C
2-NITROPHENOL		185	U		186	U		193	U		201	U	
3,3'-DICHLOROBENZIDINE		185	UJ	C	186	UJ	C	193	U		201	U	
3-NITROANILINE		741	U		745	U		771	U		804	U	
4,6-DINITRO-2-METHYLPHENOL		1850	U		1860	U		1930	U		2010	U	
4-BROMOPHENYL PHENYL ETHER		185	U		186	U		193	U		201	U	
4-CHLORO-3-METHYLPHENOL		185	U		186	U		193	U		201	U	
4-CHLOROANILINE		185	U		186	U		193	U		201	U	
4-CHLOROPHENYL PHENYL ETHER		185	U		186	U		193	U		201	U	
4-METHYLPHENOL		185	U		186	U		193	U		201	U	
4-NITROANILINE		741	U		745	U		771	UJ	C	804	UJ	C
4-NITROPHENOL		741	U		745	U		771	UJ	C	804	UJ	C
ACETOPHENONE		185	UJ	C	186	U		193	U		201	U	
ATRAZINE		185	U		186	U		193	U		201	U	
BENZALDEHYDE		185	U		186	U		193	U		201	U	
BIS(2-CHLOROETHOXY)METHANE		185	U		93	U		193	U		201	U	
BIS(2-CHLOROETHYL)ETHER		185	U		186	U		193	U		201	U	
BIS(2-ETHYLHEXYL)PHTHALATE		185	U		186	U		193	UJ	C	201	UJ	C
BUTYL BENZYL PHTHALATE		185	U		186	U		193	UJ	C	201	UJ	C
CAPROLACTAM		185	U		186	U		193	U		201	U	
CARBAZOLE		185	UJ	C	1080	J	C	193	U		201	U	
DIBENZOFURAN		185	U		1140			193	U		201	U	
DIETHYL PHTHALATE		185	U		186	U		193	U		201	U	

PROJ_NO: 02416	NSAMPLE	NTC12-SB30-0005			NTC12-SB30-00502		
SDG: CTOF27AGL001	LAB_ID	1012185-06			1012185-07		
FRACTION: OS	SAMP_DATE	12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM		
	UNITS	UG/KG			UG/KG		
	PCT_SOLIDS	91.1			87.5		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1-BIPHENYL		181	U		188	U	
2,2'-OXYBIS(1-CHLOROPROPANE)		181	U		188	U	
2,4,5-TRICHLOROPHENOL		181	U		188	U	
2,4,6-TRICHLOROPHENOL		181	U		188	U	
2,4-DICHLOROPHENOL		181	U		188	U	
2,4-DIMETHYLPHENOL		723	U		752	U	
2,4-DINITROPHENOL		1810	U		1880	U	
2,4-DINITROTOLUENE		181	U		188	U	
2,6-DINITROTOLUENE		181	U		188	U	
2-CHLORONAPHTHALENE		181	U		188	U	
2-CHLOROPHENOL		181	U		188	U	
2-METHYLPHENOL		181	U		188	U	
2-NITROANILINE		723	UJ	C	752	UJ	C
2-NITROPHENOL		181	U		188	U	
3,3'-DICHLOROBENZIDINE		181	UJ	C	188	UJ	C
3-NITROANILINE		723	U		752	U	
4,6-DINITRO-2-METHYLPHENOL		1810	U		1880	U	
4-BROMOPHENYL PHENYL ETHER		181	U		188	U	
4-CHLORO-3-METHYLPHENOL		181	U		188	U	
4-CHLOROANILINE		181	U		188	U	
4-CHLOROPHENYL PHENYL ETHER		181	U		188	U	
4-METHYLPHENOL		181	U		188	U	
4-NITROANILINE		723	U		752	U	
4-NITROPHENOL		723	U		752	U	
ACETOPHENONE		181	U		188	U	
ATRAZINE		181	U		188	U	
BENZALDEHYDE		181	U		188	U	
BIS(2-CHLOROETHOXY)METHANE		181	U		188	U	
BIS(2-CHLOROETHYL)ETHER		181	U		188	U	
BIS(2-ETHYLHEXYL)PHTHALATE		181	U		188	U	
BUTYL BENZYL PHTHALATE		181	U		188	U	
CAPROLACTAM		181	U		188	U	
CARBAZOLE		181	UJ	C	188	UJ	C
DIBENZOFURAN		181	U		188	U	
DIETHYL PHTHALATE		181	U		188	U	

PROJ_NO: 02416	NSAMPLE	NTC12-DUP01			NTC12-DUP02			NTC12-SB21-0005			NTC12-SB21-0507		
SDG: CTOF27AGL001	LAB_ID	1012185-10			1012185-11			1012185-17			1012185-18		
FRACTION: OS	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	89.4			82.9			85.0			85.3		
	DUP_OF	NTC12-SB27-0204			NTC12-SB25-0204								
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DIMETHYL PHTHALATE		187	U		201	U		195	U		193	U	
DI-N-BUTYL PHTHALATE		187	U		201	U		195	U		193	U	
DI-N-OCTYL PHTHALATE		187	UJ	C	201	U		195	U		193	U	
HEXACHLOROBENZENE		187	U		201	U		195	U		193	U	
HEXACHLOROBUTADIENE		187	UJ	C	201	UJ	C	195	UJ	C	193	UJ	C
HEXACHLOROCYCLOPENTADIENE		187	U		201	UJ	C	195	UJ	C	193	UJ	C
HEXACHLOROETHANE		187	U		201	U		195	U		193	U	
ISOPHORONE		187	UJ	C	201	UJ	C	195	UJ	C	193	UJ	C
NITROBENZENE		187	UJ	C	201	UJ	C	195	UJ	C	193	UJ	C
N-NITROSO-DI-N-PROPYLAMINE		187	UJ	C	201	UJ	C	195	UJ	C	193	UJ	C
N-NITROSODIPHENYLAMINE		187	UJ	E	201	UJ	E	195	U		193	U	
PENTACHLOROPHENOL		746	U		805	U		779	U		772	U	
PHENOL		187	U		201	U		195	U		193	U	

PROJ_NO: 02416	NSAMPLE	NTC12-SB22-0005			NTC12-SB22-00502			NTC12-SB23-0005			NTC12-SB23-0810		
SDG: CTOF27AGL001	LAB_ID	1012185-15			1012185-16			1012185-01			1012185-02		
FRACTION: OS	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	87.1			85.8			94.2			84.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DIMETHYL PHTHALATE		190	U		195	U		173	U		194	U	
DI-N-BUTYL PHTHALATE		190	U		195	U		173	U		194	U	
DI-N-OCTYL PHTHALATE		190	U		195	U		173	U		194	U	
HEXACHLOROBENZENE		190	U		195	U		173	U		194	U	
HEXACHLOROBUTADIENE		190	UJ	C	195	UJ	C	173	UJ	C	194	UJ	C
HEXACHLOROCYCLOPENTADIENE		190	UJ	C	195	UJ	C	173	UJ	C	194	UJ	C
HEXACHLOROETHANE		190	U		195	U		173	U		194	U	
ISOPHORONE		190	UJ	C	195	UJ	C	173	UJ	C	194	UJ	C
NITROBENZENE		190	UJ	C	195	UJ	C	173	UJ	C	194	UJ	C
N-NITROSO-DI-N-PROPYLAMINE		190	UJ	C	195	UJ	C	173	UJ	C	194	UJ	C
N-NITROSODIPHENYLAMINE		190	U		195	U		173	U		194	U	
PENTACHLOROPHENOL		761	U		777	U		690	U		777	U	
PHENOL		190	U		195	U		173	U		194	U	

PROJ_NO: 02416	NSAMPLE	NTC12-SB24-0005			NTC12-SB24-00502			NTC12-SB25-0005			NTC12-SB25-0204		
SDG: CTOF27AGL001	LAB_ID	1012185-03			1012185-04			1012185-19			1012185-20		
FRACTION: OS	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	83.6			89.6			87.5			83.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DIMETHYL PHTHALATE		199	U		182	U		191	U		197	U	
DI-N-BUTYL PHTHALATE		199	U		182	U		191	U		197	U	
DI-N-OCTYL PHTHALATE		199	U		182	U		191	U		197	UJ	C
HEXACHLOROBENZENE		199	U		182	U		191	U		197	U	
HEXACHLOROBUTADIENE		199	UJ	C	182	UJ	C	191	UJ	C	197	UJ	C
HEXACHLOROCYCLOPENTADIENE		199	UJ	C	182	UJ	C	191	UJ	C	197	U	
HEXACHLOROETHANE		199	U		182	U		191	U		197	U	
ISOPHORONE		199	UJ	C	182	UJ	C	191	UJ	C	197	UJ	C
NITROBENZENE		199	UJ	C	182	UJ	C	191	UJ	C	197	UJ	C
N-NITROSO-DI-N-PROPYLAMINE		199	UJ	C	182	UJ	C	191	UJ	C	197	UJ	C
N-NITROSODIPHENYLAMINE		199	U		182	U		191	U		197	UJ	E
PENTACHLOROPHENOL		793	U		725	U		762	U		788	U	
PHENOL		199	U		182	U		191	U		99.7	J	EP

PROJ_NO: 02416	NSAMPLE	NTC12-SB26-0005			NTC12-SB26-0406			NTC12-SB27-0005			NTC12-SB27-0204		
SDG: CTOF27AGL001	LAB_ID	1012185-08			1012185-09			1012185-13			1012185-14		
FRACTION: OS	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	89.7			79.9			83.5			86.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DIMETHYL PHTHALATE		185	U		208	U		197	U		189	U	
DI-N-BUTYL PHTHALATE		185	U		208	U		197	U		189	U	
DI-N-OCTYL PHTHALATE		185	UJ	C	208	U		197	UJ	C	189	UJ	C
HEXACHLOROBENZENE		185	U		208	U		197	U		189	U	
HEXACHLOROBUTADIENE		185	UJ	C	208	UJ	C	197	UJ	C	189	UJ	C
HEXACHLOROCYCLOPENTADIENE		185	U		208	UJ	C	197	U		189	U	
HEXACHLOROETHANE		185	U		208	U		197	U		189	U	
ISOPHORONE		185	UJ	C	208	UJ	C	197	UJ	C	189	UJ	C
NITROBENZENE		185	UJ	C	208	UJ	C	197	UJ	C	189	UJ	C
N-NITROSO-DI-N-PROPYLAMINE		185	UJ	C	208	UJ	C	197	UJ	C	189	UJ	C
N-NITROSODIPHENYLAMINE		185	U		208	U		197	U		189	UJ	DE
PENTACHLOROPHENOL		738	U		829	U		788	U		755	U	
PHENOL		185	U		208	U		197	U		189	U	

PROJ_NO: 02416	NSAMPLE	NTC12-SB28-0005			NTC12-SB28-0204			NTC12-SB29-0005			NTC12-SB29-0204		
SDG: CTOF27AGL001	LAB_ID	1012185-21			1012185-22			1012185-23			1012185-24		
FRACTION: OS	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	87.7			89.0			86.5			83.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DIMETHYL PHTHALATE		185	U		186	U		193	U		201	U	
DI-N-BUTYL PHTHALATE		185	U		186	U		193	U		201	U	
DI-N-OCTYL PHTHALATE		185	UJ	C	186	U		193	UJ	C	201	UJ	C
HEXACHLOROBENZENE		185	U		186	U		193	U		201	U	
HEXACHLOROBUTADIENE		185	UJ	C	186	UJ	C	193	U		201	U	
HEXACHLOROCYCLOPENTADIENE		185	U		186	UJ	C	193	U		201	U	
HEXACHLOROETHANE		185	U		186	U		193	U		201	U	
ISOPHORONE		185	UJ	C	186	UJ	C	193	U		201	U	
NITROBENZENE		185	UJ	C	186	UJ	C	193	UJ	C	201	UJ	C
N-NITROSO-DI-N-PROPYLAMINE		185	UJ	C	186	UJ	C	193	UJ	C	201	UJ	C
N-NITROSODIPHENYLAMINE		185	U		186	U		193	U		201	U	
PENTACHLOROPHENOL		741	U		745	U		771	U		804	U	
PHENOL		185	U		186	U		193	U		201	U	

PROJ_NO: 02416	NSAMPLE	NTC12-SB30-0005			NTC12-SB30-00502		
SDG: CTOF27AGL001	LAB_ID	1012185-06			1012185-07		
FRACTION: OS	SAMP_DATE	12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM		
	UNITS	UG/KG			UG/KG		
	PCT_SOLIDS	91.1			87.5		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
DIMETHYL PHTHALATE		181	U		188	U	
DI-N-BUTYL PHTHALATE		181	U		188	U	
DI-N-OCTYL PHTHALATE		181	U		188	U	
HEXACHLOROBENZENE		181	U		188	U	
HEXACHLOROBUTADIENE		181	UJ	C	188	UJ	C
HEXACHLOROCYCLOPENTADIENE		181	UJ	C	188	UJ	C
HEXACHLOROETHANE		181	U		188	U	
ISOPHORONE		181	UJ	C	188	UJ	C
NITROBENZENE		181	UJ	C	188	UJ	C
N-NITROSO-DI-N-PROPYLAMINE		181	UJ	C	188	UJ	C
N-NITROSODIPHENYLAMINE		181	UJ	E	188	U	
PENTACHLOROPHENOL		723	U		752	U	
PHENOL		181	U		188	U	

PROJ_NO: 02416	NSAMPLE	NTC12-DUP01			NTC12-DUP02			NTC12-DUP02RE			NTC12-SB21-0005		
SDG: CTOF27AGL001	LAB_ID	1012185-10			1012185-11			1012185-11RE1			1012185-17		
FRACTION: PAH	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	89.4			82.9			82.9			85.0		
	DUP_OF	NTC12-SB27-0204			NTC12-SB25-0204			NTC12-SB25-0204					
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
2-METHYLNAPHTHALENE		180	J	G	682	J	G				28.8		
ACENAPHTHENE		5.33	J	P	222	J	G				141		
ACENAPHTHYLENE		6.46	J	P	82.9	J	G				98.1		
ANTHRACENE		14.1			734	J	G				581		
BENZO(A)ANTHRACENE		65.1			2790	J	G				1830		
BENZO(A)PYRENE		74.2			1700	J	G				1430		
BENZO(B)FLUORANTHENE		106			2580	J	G				919		
BENZO(G,H,I)PERYLENE		44			757	J	G				711		
BENZO(K)FLUORANTHENE		37.5	J	E	746	J	E				2280		
CHRYSENE		63.7			1950	J	G				1530		
DIBENZO(A,H)ANTHRACENE		11.8			320	J	G				287		
FLUORANTHENE		110						6030	J	G			
FLUORENE		4.42	J	P	303	J	G				179		
INDENO(1,2,3-CD)PYRENE		38.1			804	J	G				674		
NAPHTHALENE		82.9	J	G	472	J	G				24.5		
PHENANTHRENE		71	J	G	2840	J	G				2370		
PYRENE		103						5340	J	G	3190		

PROJ_NO: 02416	NSAMPLE	NTC12-SB21-0005RE			NTC12-SB21-0507			NTC12-SB22-0005			NTC12-SB22-00502		
SDG: CTOF27AGL001	LAB_ID	1012185-17RE1			1012185-18			1012185-15			1012185-16		
FRACTION: PAH	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	85.0			85.3			87.1			85.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
2-METHYLNAPHTHALENE					431			28.4			26.5		
ACENAPHTHENE					275			22.4			26.6		
ACENAPHTHYLENE					75.3			56.2			39.7		
ANTHRACENE					481			209			115		
BENZO(A)ANTHRACENE					1290			1080			475		
BENZO(A)PYRENE					1350			1040			632		
BENZO(B)FLUORANTHENE					830			1490			801		
BENZO(G,H,I)PERYLENE					620			531			417		
BENZO(K)FLUORANTHENE					1450			621			515		
CHRYSENE					1120			953			518		
DIBENZO(A,H)ANTHRACENE					336			183			106		
FLUORANTHENE		4290			2790			2250			1400		
FLUORENE					282			24.7			41.7		
INDENO(1,2,3-CD)PYRENE					639			490			366		
NAPHTHALENE					255			28.5			18.2		
PHENANTHRENE					2140			529			775		
PYRENE					2500			1880			1150		

PROJ_NO: 02416	NSAMPLE	NTC12-SB23-0005			NTC12-SB23-0810			NTC12-SB24-0005			NTC12-SB24-00502		
SDG: CTOF27AGL001	LAB_ID	1012185-01			1012185-02			1012185-03			1012185-04		
FRACTION: PAH	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	94.2			84.2			83.6			89.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
2-METHYLNAPHTHALENE		10.8			49.4			11.2			8.5		
ACENAPHTHENE		5.48	J	P	72.9			12.3			7.48		
ACENAPHTHYLENE		4.21	J	P	25.8			3.96	U		3.62	U	
ANTHRACENE		24.7			199			43.1			19		
BENZO(A)ANTHRACENE		90.3			204			86.5			41.3		
BENZO(A)PYRENE		111			149			76.8			40.1		
BENZO(B)FLUORANTHENE		149			179			98.3			53.7		
BENZO(G,H,I)PERYLENE		61.2			52.4			44.4			26.9		
BENZO(K)FLUORANTHENE		67			87.7			42.6			27.6		
CHRYSENE		122			223			98.6			63		
DIBENZO(A,H)ANTHRACENE		17.8			17.4			14			3.62	U	
FLUORANTHENE		204			500			213			118		
FLUORENE		5.63	J	P	73.7			22.1			10		
INDENO(1,2,3-CD)PYRENE		58.2			50.4			40.1			19.9		
NAPHTHALENE		10.3			61.3			17.6			8.38		
PHENANTHRENE		108			415			214			92.6		
PYRENE		180			478			170			104		

PROJ_NO: 02416	NSAMPLE	NTC12-SB25-0005			NTC12-SB25-0204			NTC12-SB26-0005			NTC12-SB26-0406		
SDG: CTOF27AGL001	LAB_ID	1012185-19			1012185-20			1012185-08			1012185-09		
FRACTION: PAH	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	87.5			83.0			89.7			79.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
2-METHYLNAPHTHALENE		35.6			69.7	J	G	49.2			545		
ACENAPHTHENE		42.2			76.8	J	G	30.3			403		
ACENAPHTHYLENE		95.3			20.8	J	G	31			73.1		
ANTHRACENE		370			216	J	G	109			887		
BENZO(A)ANTHRACENE		832			493	J	G	252			2580		
BENZO(A)PYRENE		988			770	J	G	546			1840		
BENZO(B)FLUORANTHENE		927			1080	J	G	853			1380		
BENZO(G,H,I)PERYLENE		437			314	J	G	247			841		
BENZO(K)FLUORANTHENE		1080			486	J	E	288			2570		
CHRYSENE		943			478	J	G	267			2090		
DIBENZO(A,H)ANTHRACENE		258			109	J	G	87.4			283		
FLUORANTHENE		2110			1360	J	G	644					
FLUORENE		63.1			77.4	J	G	34.5			608		
INDENO(1,2,3-CD)PYRENE		430			309	J	G	243			848		
NAPHTHALENE		31.1			122	J	G	38.2			439		
PHENANTHRENE		970			881	J	G	428					
PYRENE		1860			1120	J	G	553					

PROJ_NO: 02416	NSAMPLE	NTC12-SB26-0406RE			NTC12-SB27-0005			NTC12-SB27-0204			NTC12-SB28-0005		
SDG: CTOF27AGL001	LAB_ID	1012185-09RE1			1012185-13			1012185-14			1012185-21		
FRACTION: PAH	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	79.9			83.5			86.6			87.7		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
2-METHYLNAPHTHALENE					72.7			15	J	G	8.03		
ACENAPHTHENE					205			9.79			4.96	J	P
ACENAPHTHYLENE					75.3			3.7	J	P	37.6		
ANTHRACENE					606			22.3			31.4		
BENZO(A)ANTHRACENE					1070			75.6			158		
BENZO(A)PYRENE					1460			87.8			211		
BENZO(B)FLUORANTHENE					2260			129			273		
BENZO(G,H,I)PERYLENE					594			43.2			101		
BENZO(K)FLUORANTHENE					800			47.4	J	E	97.5		
CHRYSENE					886			83.4			151		
DIBENZO(A,H)ANTHRACENE					204			12			29.1		
FLUORANTHENE		6480			2630			169			318		
FLUORENE					254			10.3			6.02	J	P
INDENO(1,2,3-CD)PYRENE					579			38			91.2		
NAPHTHALENE					91.5			7.68	J	G	11.2		
PHENANTHRENE		5520			2130			121	J	G	92.4		
PYRENE		5890			2260			143			323		

PROJ_NO: 02416	NSAMPLE	NTC12-SB28-0204			NTC12-SB28-0204RE			NTC12-SB29-0005			NTC12-SB29-0204		
SDG: CTOF27AGL001	LAB_ID	1012185-22			1012185-22RE1			1012185-23			1012185-24		
FRACTION: PAH	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	89.0			89.0			86.5			83.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
2-METHYLNAPHTHALENE		266						87.9			22.7		
ACENAPHTHENE		1120						28.5			6.64	J	P
ACENAPHTHYLENE		253						17.3			4.01	U	
ANTHRACENE					5280			80.7			23.8		
BENZO(A)ANTHRACENE					9780			298			76.8		
BENZO(A)PYRENE					7740			296			75.7		
BENZO(B)FLUORANTHENE					10300			475			123		
BENZO(G,H,I)PERYLENE		1110						158			49.3		
BENZO(K)FLUORANTHENE		1500						135			47.6		
CHRYSENE					7940			305			86.6		
DIBENZO(A,H)ANTHRACENE		705						44.5			4.01	U	
FLUORANTHENE					21100			597			158		
FLUORENE		2510						36.4			10.2		
INDENO(1,2,3-CD)PYRENE		1330						139			36.3		
NAPHTHALENE		323						45			43.2		
PHENANTHRENE					20200			418			120		
PYRENE					16800			495			129		

PROJ_NO: 02416	NSAMPLE	NTC12-SB30-0005			NTC12-SB30-00502		
SDG: CTOF27AGL001	LAB_ID	1012185-06			1012185-07		
FRACTION: PAH	SAMP_DATE	12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM		
	UNITS	UG/KG			UG/KG		
	PCT_SOLIDS	91.1			87.5		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
2-METHYLNAPHTHALENE		4.77	J	P	3.31	J	P
ACENAPHTHENE		2.96	J	P	5.87	J	P
ACENAPHTHYLENE		3.61	U		3.67	J	P
ANTHRACENE		8.45			20.3		
BENZO(A)ANTHRACENE		29.3			46.2		
BENZO(A)PYRENE		21.8			53.5		
BENZO(B)FLUORANTHENE		31.8			69.9		
BENZO(G,H,I)PERYLENE		13.5			34.8		
BENZO(K)FLUORANTHENE		14.1	J	E	25.7		
CHRYSENE		38.5			65.7		
DIBENZO(A,H)ANTHRACENE		3.61	U		3.75	U	
FLUORANTHENE		74.3			123		
FLUORENE		3.61	U		3.75	U	
INDENO(1,2,3-CD)PYRENE		12.8			29.8		
NAPHTHALENE		4.25	J	P	4	J	P
PHENANTHRENE		56.4			75.4		
PYRENE		66			105		

PROJ_NO: 02416	NSAMPLE	NTC12-DUP01			NTC12-DUP02			NTC12-DUP02RE			NTC12-SB21-0005		
SDG: CTOF27AGL001	LAB_ID	1012185-10			1012185-11			1012185-11RE1			1012185-17		
FRACTION: PEST	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	89.4			82.9			82.9			85.0		
	DUP_OF	NTC12-SB27-0204			NTC12-SB25-0204			NTC12-SB25-0204					
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
4,4'-DDD		2.86	J	GR				434			15.2	J	C
4,4'-DDE		12.1	J	R				71.9	J	GU			
4,4'-DDT		6.29	J	R				168	J	G			
ALDRIN		0.373	UJ	R	8.74	J	GRU				0.374	J	P
ALPHA-BHC		0.373	UJ	R	1.03	J	RU				0.382	U	
ALPHA-CHLORDANE		0.373	UJ	R	42.1	J	GRU				54.8		
BETA-BHC		0.373	UJ	R	1.43	J	GRU				0.382	U	
DELTA-BHC		0.373	UJ	CR	7.68	J	GRU				1.62		
DIELDRIN		0.373	UJ	R	5.98	J	RU				1.77		
ENDOSULFAN I		0.373	UJ	R	0.405	UJ	R				1.17		
ENDOSULFAN II		0.373	UJ	R	0.493	J	PRU				0.504	J	P
ENDOSULFAN SULFATE		0.373	UJ	R	3.17	J	GRU				2.59		
ENDRIN		0.373	UJ	R	5.5	J	GRU				0.74	J	P
ENDRIN ALDEHYDE		0.373	UJ	R	3.55	J	GR				0.894		
ENDRIN KETONE		0.373	UJ	R	0.405	UJ	R				0.382	U	
GAMMA-BHC (LINDANE)		0.373	UJ	R	0.998	J	RU				0.382	U	
GAMMA-CHLORDANE		0.206	J	PRU	36.2	J	GR				30.6		
HEPTACHLOR		0.373	UJ	CR	1.43	J	R				1.36		
HEPTACHLOR EPOXIDE		0.373	UJ	R	2.47	J	RU				5.22		
METHOXYCHLOR		0.373	UJ	CR	0.405	UJ	R				0.595	J	CP
TOXAPHENE		24.1	UJ	R	26.2	UJ	R				24.7	U	

PROJ_NO: 02416	NSAMPLE	NTC12-SB21-0005RE			NTC12-SB21-0507			NTC12-SB21-0507RE			NTC12-SB22-0005		
SDG: CTOF27AGL001	LAB_ID	1012185-17RE1			1012185-18			1012185-18RE1			1012185-15		
FRACTION: PEST	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	85.0			85.3			85.3			87.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
4,4'-DDD								696			42.2		
4,4'-DDE		119						107					
4,4'-DDT		83.5						823					
ALDRIN					17						1.87		
ALPHA-BHC					1.02						0.641	J	P
ALPHA-CHLORDANE								141			243		
BETA-BHC					1.12						0.702	J	P
DELTA-BHC					6.05						2.09		
DIELDRIN					5.47						1.63		
ENDOSULFAN I					4.35						2.63		
ENDOSULFAN II					5.63						2.07		
ENDOSULFAN SULFATE					2.62						3.7		
ENDRIN					7.4						2.52		
ENDRIN ALDEHYDE					5.64						4.32		
ENDRIN KETONE					0.388	U					0.378	U	
GAMMA-BHC (LINDANE)					0.346	J	P				0.268	J	P
GAMMA-CHLORDANE					129						171		
HEPTACHLOR					1.83						4.7		
HEPTACHLOR EPOXIDE					2.36						10.1		
METHOXYCHLOR					0.388	U					0.378	U	
TOXAPHENE					25.1	U					24.4	U	

PROJ_NO: 02416	NSAMPLE	NTC12-SB22-0005RE			NTC12-SB22-00502			NTC12-SB23-0005			NTC12-SB23-0810		
SDG: CTOF27AGL001	LAB_ID	1012185-15RE1			1012185-16			1012185-01			1012185-02		
FRACTION: PEST	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	87.1			85.8			94.2			84.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
4,4'-DDD					15.8			5.82			2.37		
4,4'-DDE		168			70.3			4.16			0.692	J	P
4,4'-DDT		147			64.4			8.12			0.9		
ALDRIN					0.463	J	P	0.347	U		0.391	U	
ALPHA-BHC					0.391	U		0.347	U		0.391	U	
ALPHA-CHLORDANE					51.3			0.512	J	P	0.391	U	
BETA-BHC					0.391	U		0.347	U		0.391	U	
DELTA-BHC					0.389	J	P	0.151	J	CP	0.217	J	CP
DIELDRIN					4.32			0.271	J	P	0.391	U	
ENDOSULFAN I					0.506	J	P	0.347	U		0.391	U	
ENDOSULFAN II					0.322	J	P	0.478	J	P	0.391	U	
ENDOSULFAN SULFATE					0.391	U		0.347	U		0.391	U	
ENDRIN					6.75			1.18			0.391	U	
ENDRIN ALDEHYDE					1.5			0.347	U		0.391	U	
ENDRIN KETONE					0.391	U		0.347	U		0.391	U	
GAMMA-BHC (LINDANE)					0.391	U		0.347	U		0.391	U	
GAMMA-CHLORDANE					29.2			0.848			0.308	J	P
HEPTACHLOR					1.45			0.347	U		0.391	U	
HEPTACHLOR EPOXIDE					7			0.347	U		0.391	U	
METHOXYCHLOR					0.391	U		0.347	U		0.391	U	
TOXAPHENE					25.3	U		22.5	U		25.3	U	

PROJ_NO: 02416	NSAMPLE	NTC12-SB24-0005			NTC12-SB24-00502			NTC12-SB25-0005			NTC12-SB25-0005RE		
SDG: CTOF27AGL001	LAB_ID	1012185-03			1012185-04			1012185-19			1012185-19RE1		
FRACTION: PEST	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	83.6			89.6			87.5			87.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
4,4'-DDD		3.01			4.31								
4,4'-DDE		1.29			1.78								
4,4'-DDT		0.391	U		0.362	J	P						
ALDRIN		0.391	U		0.365	U		20.8					
ALPHA-BHC		0.391	U		0.365	U		1.1					
ALPHA-CHLORDANE		0.14	J	P	0.25	J	P				3220		
BETA-BHC		0.391	U		0.365	U		6.55					
DELTA-BHC		0.722	J	P	2.43	J	C	4.65					
DIELDRIN		0.391	U		0.321	J	P	16.6					
ENDOSULFAN I		0.391	U		0.365	U		36.8					
ENDOSULFAN II		0.394	J	P	0.365	U		53.5					
ENDOSULFAN SULFATE		0.391	U		0.365	U		12.1					
ENDRIN		0.391	U		0.235	J	P	12.2					
ENDRIN ALDEHYDE		0.391	U		0.365	U		19.5					
ENDRIN KETONE		0.391	U		0.365	U		1.14					
GAMMA-BHC (LINDANE)		0.391	U		0.365	U		0.538	J	P			
GAMMA-CHLORDANE		0.309	J	P	0.578	J	P				2600		
HEPTACHLOR		0.391	U		0.365	UJ	C						
HEPTACHLOR EPOXIDE		0.391	U		1.61			64					
METHOXYCHLOR		0.383	J	P	0.954			0.381	U				
TOXAPHENE		25.3	U		23.6	U		24.6	U				

PROJ_NO: 02416	NSAMPLE	NTC12-SB25-0005REDL			NTC12-SB25-0204			NTC12-SB25-0204RE			NTC12-SB26-0005		
SDG: CTOF27AGL001	LAB_ID	1012185-19RE2			1012185-20			1012185-20RE1			1012185-08		
FRACTION: PEST	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	87.5			83.0			83.0			89.7		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
4,4'-DDD		195						545					
4,4'-DDE		197						986	J	G			
4,4'-DDT		282			77.2	J	CG				66.7		
ALDRIN					0.626	J	GPR				0.44	J	P
ALPHA-BHC					0.401	UJ	R				0.376	U	
ALPHA-CHLORDANE					1.68	J	GRU				1.88		
BETA-BHC					0.401	UJ	G				0.376	U	
DELTA-BHC					0.401	UJ	G				0.325	J	CP
DIELDRIN					4.79	J	R				1.54		
ENDOSULFAN I					0.194	J	PU				0.376	U	
ENDOSULFAN II					0.28	J	PU				0.376	U	
ENDOSULFAN SULFATE					0.204	J	GPU				0.691	J	P
ENDRIN					9.89	J	GRU				13.7		
ENDRIN ALDEHYDE					0.953	J	GRU				1.24		
ENDRIN KETONE					0.401	U					0.376	U	
GAMMA-BHC (LINDANE)					0.401	UJ	R				0.376	U	
GAMMA-CHLORDANE					1.16	J	GU				4.35		
HEPTACHLOR		236			0.401	U					0.376	UJ	C
HEPTACHLOR EPOXIDE					1.77	J	U				0.122	J	P
METHOXYCHLOR					0.528	J	CPRU				3.04	J	C
TOXAPHENE					26	U					24.4	U	

PROJ_NO: 02416	NSAMPLE	NTC12-SB26-0005RE			NTC12-SB26-0406			NTC12-SB26-0406RE			NTC12-SB27-0005		
SDG: CTOF27AGL001	LAB_ID	1012185-08RE1			1012185-09			1012185-09RE1			1012185-13		
FRACTION: PEST	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	89.7			79.9			79.9			83.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
4,4'-DDD		63.8						1090			28.8		
4,4'-DDE		95.4						196					
4,4'-DDT								55.8					
ALDRIN					2.48						1.29		
ALPHA-BHC					1.05						0.509	J	P
ALPHA-CHLORDANE					19.3						4.74		
BETA-BHC					0.919						0.399	U	
DELTA-BHC					1.53	J	C				3.55		
DIELDRIN					13.4						1.81		
ENDOSULFAN I					4.51						0.399	U	
ENDOSULFAN II					4.04						0.855		
ENDOSULFAN SULFATE					2.17						0.772	J	P
ENDRIN					12.9						22.6		
ENDRIN ALDEHYDE					10.9						0.769	J	P
ENDRIN KETONE					0.415	U					0.399	U	
GAMMA-BHC (LINDANE)					0.581	J	P				0.144	J	P
GAMMA-CHLORDANE					47.1						4.31		
HEPTACHLOR					1.19						0.399	U	
HEPTACHLOR EPOXIDE					1.9						4.18		
METHOXYCHLOR					0.415	U					0.399	U	
TOXAPHENE					26.8	U					25.8	U	

PROJ_NO: 02416	NSAMPLE	NTC12-SB27-0005RE			NTC12-SB27-0204			NTC12-SB28-0005			NTC12-SB28-0204		
SDG: CTOF27AGL001	LAB_ID	1012185-13RE1			1012185-14			1012185-21			1012185-22		
FRACTION: PEST	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	83.5			86.6			87.7			89.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
4,4'-DDD					5.41	J	G	2.92			55.1		
4,4'-DDE		143			12.9			6.92			29.4		
4,4'-DDT		160			9.1			5.44			16.7		
ALDRIN					0.385	U		0.378	U		0.375	U	
ALPHA-BHC					0.385	U		0.378	U		0.172	J	P
ALPHA-CHLORDANE					0.466	J	P	0.203	J	P	0.61	J	P
BETA-BHC					0.385	U		0.378	U		0.375	U	
DELTA-BHC					0.385	U		0.378	U		0.164	J	P
DIELDRIN					0.385	U		0.378	U		1.05		
ENDOSULFAN I					0.385	U		0.378	U		1.68		
ENDOSULFAN II					0.385	U		0.378	U		1.13		
ENDOSULFAN SULFATE					0.385	U		0.378	U		3.95		
ENDRIN					0.385	U		0.378	U		2.95		
ENDRIN ALDEHYDE					0.385	U		0.378	U		1.13		
ENDRIN KETONE					0.385	U		0.378	U		0.715	J	P
GAMMA-BHC (LINDANE)					0.385	U		0.378	U		3.61		
GAMMA-CHLORDANE					0.301	J	PU	0.326	J	P	3.57		
HEPTACHLOR					0.385	U		0.378	U		0.182	J	P
HEPTACHLOR EPOXIDE					0.385	U		0.378	U		0.375	U	
METHOXYCHLOR					0.385	U		0.378	U		1.33		
TOXAPHENE					24.9	U		24.4	U		24.2	U	

PROJ_NO: 02416	NSAMPLE	NTC12-SB29-0005			NTC12-SB29-0204			NTC12-SB30-0005			NTC12-SB30-00502		
SDG: CTOF27AGL001	LAB_ID	1012185-23			1012185-24			1012185-06			1012185-07		
FRACTION: PEST	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	86.5			83.0			91.1			87.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
4,4'-DDD		26			19.7			5.19			2.96		
4,4'-DDE		41.7			10.5			1.91			0.989		
4,4'-DDT		47.4			4.07			1.28	J	U	0.872		
ALDRIN		0.378	U		0.557	J	P	0.364	U		0.383	U	
ALPHA-BHC		0.378	U		0.394	U		0.364	U		0.383	U	
ALPHA-CHLORDANE		1.74			1.88			0.628	J	PU	0.202	J	P
BETA-BHC		0.378	U		0.722	J	P	0.364	U		0.383	U	
DELTA-BHC		1.06			0.282	J	P	1.16	J	CU	0.31	J	CP
DIELDRIN		0.893			0.919			0.246	J	PU	0.383	U	
ENDOSULFAN I		0.378	U		0.394	U		0.364	U		0.383	U	
ENDOSULFAN II		0.24	J	P	0.54	J	P	0.364	U		0.383	U	
ENDOSULFAN SULFATE		0.378	U		0.394	U		0.364	U		0.383	U	
ENDRIN		5.65			0.371	J	P	0.364	U		0.383	U	
ENDRIN ALDEHYDE		0.66	J	P	0.394	U		0.364	U		0.383	U	
ENDRIN KETONE		0.378	U		0.394	U		0.364	U		0.383	U	
GAMMA-BHC (LINDANE)		0.6	J	P	0.394	U		0.364	U		0.383	U	
GAMMA-CHLORDANE		2.2			2.36			0.512	J	P	0.383	U	
HEPTACHLOR		0.18	J	P	0.394	U		0.364	UJ	C	0.383	UJ	C
HEPTACHLOR EPOXIDE		0.288	J	P	0.213	J	P	1.13	J	U	0.435	J	P
METHOXYCHLOR		0.378	U		0.394	U		0.364	UJ	C	0.383	UJ	C
TOXAPHENE		24.4	U		25.5	U		23.5	U		24.8	U	

PROJ_NO: 02416	NSAMPLE	NTC12-SB21-0507			NTC12-SB25-0204			NTC12-SB27-0204			NTC12-SB28-0204		
SDG: CTOF27AGL001	LAB_ID	1012185-18			1012185-20			1012185-14			1012185-22		
FRACTION: PCB	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	85.3			83.0			86.6			89.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
AROCLOR-1016		80	U		9.84	U		9.43	U		22	U	
AROCLOR-1221		80	U		11.8	U		9.43	U		22	U	
AROCLOR-1232		80	U		9.84	U		9.43	U		22	U	
AROCLOR-1242		80	U		17.7	U		9.43	U		22	U	
AROCLOR-1248		80	U		23.6	U		9.43	U		22	U	
AROCLOR-1254		799			105			9.43	U		48.1	J	PU
AROCLOR-1260		80	U		59	UJ	C	9.43	UJ	C	22	U	

PROJ_NO: 02416	NSAMPLE	NTC12-SB29-0204
SDG: CTOF27AGL001	LAB_ID	1012185-24
FRACTION: PCB	SAMP_DATE	12/20/2010
MEDIA: SOIL	QC_TYPE	NM
	UNITS	UG/KG
	PCT_SOLIDS	83.0
	DUP_OF	

PARAMETER	RESULT	VQL	QLCD
AROCLOR-1016	11.6	U	
AROCLOR-1221	11.6	U	
AROCLOR-1232	11.6	U	
AROCLOR-1242	11.6	U	
AROCLOR-1248	11.6	U	
AROCLOR-1254	29.8	J	PU
AROCLOR-1260	11.6	U	

APPENDIX B

RESULTS AS REPORTED BY THE LABORATORY

ANALYSIS DATA SHEET

NTC12-DUP01

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-10	File ID:	1218510.D
Sampled:	12/20/10 00:00	Prepared:	12/23/10 13:30	Analyzed:	01/10/11 17:17
Solids:	89.40	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A01104	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		93.2	187	369	Y, U
98-86-2	Acetophenone		93.2	187	369	U
1912-24-9	Atrazine		93.2	187	369	U
100-52-7	Benzaldehyde		93.2	187	369	U
92-52-4	1,1-Biphenyl		93.2	187	369	U
101-55-3	4-Bromophenyl-phenylether		93.2	187	369	U
85-68-7	Butylbenzylphthalate		93.2	187	369	U
105-60-2	Caprolactam		93.2	187	369	X, U
86-74-8	Carbazole		93.2	187	369	Y, U
59-50-7	4-Chloro-3-methylphenol		93.2	187	369	U
106-47-8	4-Chloroaniline		93.2	187	369	U
111-91-1	Bis(2-chloroethoxy)methane		93.2	187	369	Q, U
111-44-4	Bis(2-chloroethyl)ether		93.2	187	369	U
108-60-1	2,2'-Oxybis-1-chloropropane		93.2	187	369	U
91-58-7	2-Chloronaphthalene		93.2	187	369	U
95-57-8	2-Chlorophenol		93.2	187	369	U
7005-72-3	4-Chlorophenyl phenyl ether		93.2	187	369	U
132-64-9	Dibenzofuran		93.2	187	369	U
84-74-2	Di-n-butylphthalate		93.2	187	369	U
120-83-2	2,4-Dichlorophenol		93.2	187	369	U
84-66-2	Diethylphthalate		93.2	187	369	U
105-67-9	2,4-Dimethylphenol		372	746	1450	Q, U
131-11-3	Dimethyl phthalate		93.2	187	369	U
534-52-1	4,6-Dinitro-2-methylphenol		932	1870	3690	U
51-28-5	2,4-Dinitrophenol		932	1870	3690	U
121-14-2	2,4-Dinitrotoluene		93.2	187	369	U
606-20-2	2,6-Dinitrotoluene		93.2	187	369	U
117-84-0	Di-n-octylphthalate		93.2	187	369	X, U
117-81-7	Bis(2-ethylhexyl)phthalate		93.2	187	369	U
118-74-1	Hexachlorobenzene		93.2	187	369	U
87-68-3	Hexachlorobutadiene		93.2	187	369	Q, X, U
77-47-4	Hexachlorocyclopentadiene		93.2	187	369	U
67-72-1	Hexachloroethane		93.2	187	369	U
78-59-1	Isophorone		93.2	187	369	X, U
95-48-7	2-Methylphenol		93.2	187	369	U
106-44-5	4-Methylphenol		93.2	187	369	U
100-01-6	4-Nitroaniline		372	746	1450	U
99-09-2	3-Nitroaniline		372	746	1450	U
88-74-4	2-Nitroaniline		372	746	1450	X, U
98-95-3	Nitrobenzene		93.2	187	369	Q, X, U

ANALYSIS DATA SHEET

NTC12-DUP01

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-10	File ID:	1218510.D
Sampled:	12/20/10 00:00	Prepared:	12/23/10 13:30	Analyzed:	01/10/11 17:17
Solids:	89.40	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A01104	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		372	746	1450	U
88-75-5	2-Nitrophenol		93.2	187	369	U
86-30-6	N-Nitrosodiphenylamine		93.2	187	369	Q, U
621-64-7	N-Nitroso-di-n-propylamine		93.2	187	369	X, U
87-86-5	Pentachlorophenol		372	746	1450	U
108-95-2	Phenol		93.2	187	369	Q, U
88-06-2	2,4,6-Trichlorophenol		93.2	187	369	U
95-95-4	2,4,5-Trichlorophenol		93.2	187	369	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3729	3002	80.5	45 - 105	
2-Fluorophenol	7457	5437	72.9	35 - 105	
Nitrobenzene-d5	3729	3847	103	35 - 100	*X
Phenol-d6	7457	6009	80.6	40 - 100	
Terphenyl-d14	3729	4031	108	30 - 125	X
2,4,6-Tribromophenol	7457	4745	63.6	35 - 125	

ANALYSIS DATA SHEET

NTC12-DUP02

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-11	File ID:	1218511.D
Sampled:	12/20/10 00:00	Prepared:	12/23/10 13:30	Analyzed:	01/06/11 21:09
Solids:	82.90	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00701	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		100	201	398	Y, U
98-86-2	Acetophenone		100	201	398	U
1912-24-9	Atrazine		100	201	398	U
100-52-7	Benzaldehyde		100	201	398	U
92-52-4	1,1-Biphenyl		100	201	398	U
101-55-3	4-Bromophenyl-phenylether		100	201	398	U
85-68-7	Butylbenzylphthalate		100	201	398	U
105-60-2	Caprolactam		100	201	398	U
86-74-8	Carbazole		100	201	398	Y, U
59-50-7	4-Chloro-3-methylphenol		100	201	398	U
106-47-8	4-Chloroaniline		100	201	398	U
111-91-1	Bis(2-chloroethoxy)methane		100	201	398	Q, U
111-44-4	Bis(2-chloroethyl)ether		100	201	398	U
108-60-1	2,2'-Oxybis-1-chloropropane		100	201	398	U
91-58-7	2-Chloronaphthalene		100	201	398	U
95-57-8	2-Chlorophenol		100	201	398	U
7005-72-3	4-Chlorophenyl phenyl ether		100	201	398	U
132-64-9	Dibenzofuran	371	100	201	398	J
84-74-2	Di-n-butylphthalate		100	201	398	U
120-83-2	2,4-Dichlorophenol		100	201	398	U
84-66-2	Diethylphthalate		100	201	398	U
105-67-9	2,4-Dimethylphenol		402	805	1570	Q, U
131-11-3	Dimethyl phthalate		100	201	398	U
534-52-1	4,6-Dinitro-2-methylphenol		1000	2010	3980	U
51-28-5	2,4-Dinitrophenol		1000	2010	3980	U
121-14-2	2,4-Dinitrotoluene		100	201	398	U
606-20-2	2,6-Dinitrotoluene		100	201	398	U
117-84-0	Di-n-octylphthalate		100	201	398	U
117-81-7	Bis(2-ethylhexyl)phthalate		100	201	398	U
118-74-1	Hexachlorobenzene		100	201	398	U
87-68-3	Hexachlorobutadiene		100	201	398	Q, X, U
77-47-4	Hexachlorocyclopentadiene		100	201	398	X, U
67-72-1	Hexachloroethane		100	201	398	U
78-59-1	Isophorone		100	201	398	X, U
95-48-7	2-Methylphenol		100	201	398	U
106-44-5	4-Methylphenol	348	100	201	398	J
100-01-6	4-Nitroaniline		402	805	1570	U
99-09-2	3-Nitroaniline		402	805	1570	U
88-74-4	2-Nitroaniline		402	805	1570	X, U
98-95-3	Nitrobenzene		100	201	398	Q, X, U

ANALYSIS DATA SHEET

NTC12-DUP02

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-11	File ID:	1218511.D
Sampled:	12/20/10 00:00	Prepared:	12/23/10 13:30	Analyzed:	01/06/11 21:09
Solids:	82.90	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00701	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		402	805	1570	U
88-75-5	2-Nitrophenol		100	201	398	U
86-30-6	N-Nitrosodiphenylamine		100	201	398	Q, U
621-64-7	N-Nitroso-di-n-propylamine		100	201	398	X, U
87-86-5	Pentachlorophenol		402	805	1570	U
108-95-2	Phenol		100	201	398	Q, U
88-06-2	2,4,6-Trichlorophenol		100	201	398	U
95-95-4	2,4,5-Trichlorophenol		100	201	398	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	4021	3103	77.2	45 - 105	
2-Fluorophenol	8042	6032	75.0	35 - 105	
Nitrobenzene-d5	4021	4061	101	35 - 100	*X
Phenol-d6	8042	6628	82.4	40 - 100	
Terphenyl-d14	4021	4081	101	30 - 125	
2,4,6-Tribromophenol	8042	5660	70.4	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB21-0005

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-17	File ID:	1218517.D
Sampled:	12/20/10 16:20	Prepared:	12/23/10 13:30	Analyzed:	01/06/11 20:09
Solids:	85.01	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00701	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		97.3	195	386	Y, U
98-86-2	Acetophenone		97.3	195	386	U
1912-24-9	Atrazine		97.3	195	386	U
100-52-7	Benzaldehyde		97.3	195	386	U
92-52-4	1,1-Biphenyl		97.3	195	386	U
101-55-3	4-Bromophenyl-phenylether		97.3	195	386	U
85-68-7	Butylbenzylphthalate		97.3	195	386	U
105-60-2	Caprolactam		97.3	195	386	U
86-74-8	Carbazole	254	97.3	195	386	Y, J
59-50-7	4-Chloro-3-methylphenol		97.3	195	386	U
106-47-8	4-Chloroaniline		97.3	195	386	U
111-91-1	Bis(2-chloroethoxy)methane		97.3	195	386	Q, U
111-44-4	Bis(2-chloroethyl)ether		97.3	195	386	U
108-60-1	2,2'-Oxybis-1-chloropropane		97.3	195	386	U
91-58-7	2-Chloronaphthalene		97.3	195	386	U
95-57-8	2-Chlorophenol		97.3	195	386	U
7005-72-3	4-Chlorophenyl phenyl ether		97.3	195	386	U
132-64-9	Dibenzofuran		97.3	195	386	U
84-74-2	Di-n-butylphthalate		97.3	195	386	U
120-83-2	2,4-Dichlorophenol		97.3	195	386	U
84-66-2	Diethylphthalate		97.3	195	386	U
105-67-9	2,4-Dimethylphenol		389	779	1520	Q, U
131-11-3	Dimethyl phthalate		97.3	195	386	U
534-52-1	4,6-Dinitro-2-methylphenol		973	1950	3860	U
51-28-5	2,4-Dinitrophenol		973	1950	3860	U
121-14-2	2,4-Dinitrotoluene		97.3	195	386	U
606-20-2	2,6-Dinitrotoluene		97.3	195	386	U
117-84-0	Di-n-octylphthalate		97.3	195	386	U
117-81-7	Bis(2-ethylhexyl)phthalate		97.3	195	386	U
118-74-1	Hexachlorobenzene		97.3	195	386	U
87-68-3	Hexachlorobutadiene		97.3	195	386	Q, X, U
77-47-4	Hexachlorocyclopentadiene		97.3	195	386	X, U
67-72-1	Hexachloroethane		97.3	195	386	U
78-59-1	Isophorone		97.3	195	386	X, U
95-48-7	2-Methylphenol		97.3	195	386	U
106-44-5	4-Methylphenol		97.3	195	386	U
100-01-6	4-Nitroaniline		389	779	1520	U
99-09-2	3-Nitroaniline		389	779	1520	U
88-74-4	2-Nitroaniline		389	779	1520	X, U
98-95-3	Nitrobenzene		97.3	195	386	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB21-0005

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix: Soil
Laboratory ID: 1012185-17
File ID: 1218517.D
Sampled: 12/20/10 16:20
Prepared: 12/23/10 13:30
Analyzed: 01/06/11 20:09
Solids: 85.01
Preparation: EXT_3546
Dilution: 1
Batch: 0L22011
Sequence: 1A00701
Calibration: 0351002
Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		389	779	1520	U
88-75-5	2-Nitrophenol		97.3	195	386	U
86-30-6	N-Nitrosodiphenylamine		97.3	195	386	O, U
621-64-7	N-Nitroso-di-n-propylamine		97.3	195	386	X, U
87-86-5	Pentachlorophenol		389	779	1520	U
108-95-2	Phenol		97.3	195	386	O, U
88-06-2	2,4,6-Trichlorophenol		97.3	195	386	U
95-95-4	2,4,5-Trichlorophenol		97.3	195	386	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3895	2580	66.2	45 - 105	
2-Fluorophenol	7790	4544	58.3	35 - 105	
Nitrobenzene-d5	3895	3423	87.9	35 - 100	X
Phenol-d6	7790	5045	64.8	40 - 100	
Terphenyl-d14	3895	3419	87.8	30 - 125	
2,4,6-Tribromophenol	7790	4069	52.2	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB21-0507

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-18 File ID: 1218518.D

Sampled: 12/20/10 16:25 Prepared: 12/23/10 13:30 Analyzed: 01/06/11 23:13

Solids: 85.25 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		96.4	193	382	Y, U
98-86-2	Acetophenone		96.4	193	382	U
1912-24-9	Atrazine		96.4	193	382	U
100-52-7	Benzaldehyde		96.4	193	382	U
92-52-4	1,1-Biphenyl		96.4	193	382	U
101-55-3	4-Bromophenyl-phenylether		96.4	193	382	U
85-68-7	Butylbenzylphthalate		96.4	193	382	U
105-60-2	Caprolactam		96.4	193	382	U
86-74-8	Carbazole		96.4	193	382	Y, U
59-50-7	4-Chloro-3-methylphenol		96.4	193	382	U
106-47-8	4-Chloroaniline		96.4	193	382	U
111-91-1	Bis(2-chloroethoxy)methane		96.4	193	382	Q, U
111-44-4	Bis(2-chloroethyl)ether		96.4	193	382	U
108-60-1	2,2'-Oxybis-1-chloropropane		96.4	193	382	U
91-58-7	2-Chloronaphthalene		96.4	193	382	U
95-57-8	2-Chlorophenol		96.4	193	382	U
7005-72-3	4-Chlorophenyl phenyl ether		96.4	193	382	U
132-64-9	Dibenzofuran	204	96.4	193	382	J
84-74-2	Di-n-butylphthalate		96.4	193	382	U
120-83-2	2,4-Dichlorophenol		96.4	193	382	U
84-66-2	Diethylphthalate		96.4	193	382	U
105-67-9	2,4-Dimethylphenol		385	772	1500	Q, U
131-11-3	Dimethyl phthalate		96.4	193	382	U
534-52-1	4,6-Dinitro-2-methylphenol		964	1930	3820	U
51-28-5	2,4-Dinitrophenol		964	1930	3820	U
121-14-2	2,4-Dinitrotoluene		96.4	193	382	U
606-20-2	2,6-Dinitrotoluene		96.4	193	382	U
117-84-0	Di-n-octylphthalate		96.4	193	382	U
117-81-7	Bis(2-ethylhexyl)phthalate		96.4	193	382	U
118-74-1	Hexachlorobenzene		96.4	193	382	U
87-68-3	Hexachlorobutadiene		96.4	193	382	Q, X, U
77-47-4	Hexachlorocyclopentadiene		96.4	193	382	X, U
67-72-1	Hexachloroethane		96.4	193	382	U
78-59-1	Isophorone		96.4	193	382	X, U
95-48-7	2-Methylphenol		96.4	193	382	U
106-44-5	4-Methylphenol	268	96.4	193	382	J
100-01-6	4-Nitroaniline		385	772	1500	U
99-09-2	3-Nitroaniline		385	772	1500	U
88-74-4	2-Nitroaniline		385	772	1500	X, U
98-95-3	Nitrobenzene		96.4	193	382	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB21-0507

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-18 File ID: 1218518.D

Sampled: 12/20/10 16:25 Prepared: 12/23/10 13:30 Analyzed: 01/06/11 23:13

Solids: 85.25 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		385	772	1500	U
88-75-5	2-Nitrophenol		96.4	193	382	U
86-30-6	N-Nitrosodiphenylamine		96.4	193	382	Q, U
621-64-7	N-Nitroso-di-n-propylamine		96.4	193	382	X, U
87-86-5	Pentachlorophenol		385	772	1500	U
108-95-2	Phenol		96.4	193	382	Q, U
88-06-2	2,4,6-Trichlorophenol		96.4	193	382	U
95-95-4	2,4,5-Trichlorophenol		96.4	193	382	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3859	2468	64.0	45 - 105	
2-Fluorophenol	7717	5134	66.5	35 - 105	
Nitrobenzene-d5	3859	3187	82.6	35 - 100	X
Phenol-d6	7717	5370	69.6	40 - 100	
Terphenyl-d14	3859	3580	92.8	30 - 125	
2,4,6-Tribromophenol	7717	4527	58.7	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB22-0005

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-15	File ID:	1218515.D
Sampled:	12/20/10 15:55	Prepared:	12/23/10 13:30	Analyzed:	01/06/11 21:40
Solids:	87.11	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00701	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		95.0	190	376	Y, U
98-86-2	Acetophenone		95.0	190	376	U
1912-24-9	Atrazine		95.0	190	376	U
100-52-7	Benzaldehyde		95.0	190	376	U
92-52-4	1,1-Biphenyl		95.0	190	376	U
101-55-3	4-Bromophenyl-phenylether		95.0	190	376	U
85-68-7	Butylbenzylphthalate		95.0	190	376	U
105-60-2	Caprolactam		95.0	190	376	U
86-74-8	Carbazole		95.0	190	376	Y, U
59-50-7	4-Chloro-3-methylphenol		95.0	190	376	U
106-47-8	4-Chloroaniline		95.0	190	376	U
111-91-1	Bis(2-chloroethoxy)methane		95.0	190	376	Q, U
111-44-4	Bis(2-chloroethyl)ether		95.0	190	376	U
108-60-1	2,2'-Oxybis-1-chloropropane		95.0	190	376	U
91-58-7	2-Chloronaphthalene		95.0	190	376	U
95-57-8	2-Chlorophenol		95.0	190	376	U
7005-72-3	4-Chlorophenyl phenyl ether		95.0	190	376	U
132-64-9	Dibenzofuran		95.0	190	376	U
84-74-2	Di-n-butylphthalate		95.0	190	376	U
120-83-2	2,4-Dichlorophenol		95.0	190	376	U
84-66-2	Diethylphthalate		95.0	190	376	U
105-67-9	2,4-Dimethylphenol		380	761	1480	Q, U
131-11-3	Dimethyl phthalate		95.0	190	376	U
534-52-1	4,6-Dinitro-2-methylphenol		950	1900	3760	U
51-28-5	2,4-Dinitrophenol		950	1900	3760	U
121-14-2	2,4-Dinitrotoluene		95.0	190	376	U
606-20-2	2,6-Dinitrotoluene		95.0	190	376	U
117-84-0	Di-n-octylphthalate		95.0	190	376	U
117-81-7	Bis(2-ethylhexyl)phthalate		95.0	190	376	U
118-74-1	Hexachlorobenzene		95.0	190	376	U
87-68-3	Hexachlorobutadiene		95.0	190	376	Q, X, U
77-47-4	Hexachlorocyclopentadiene		95.0	190	376	X, U
67-72-1	Hexachloroethane		95.0	190	376	U
78-59-1	Isophorone		95.0	190	376	X, U
95-48-7	2-Methylphenol		95.0	190	376	U
106-44-5	4-Methylphenol		95.0	190	376	U
100-01-6	4-Nitroaniline		380	761	1480	U
99-09-2	3-Nitroaniline		380	761	1480	U
88-74-4	2-Nitroaniline		380	761	1480	X, U
98-95-3	Nitrobenzene		95.0	190	376	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB22-0005

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-15 File ID: 1218515.D

Sampled: 12/20/10 15:55 Prepared: 12/23/10 13:30 Analyzed: 01/06/11 21:40

Solids: 87.11 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		380	761	1480	U
88-75-5	2-Nitrophenol		95.0	190	376	U
86-30-6	N-Nitrosodiphenylamine		95.0	190	376	Q, U
621-64-7	N-Nitroso-di-n-propylamine		95.0	190	376	X, U
87-86-5	Pentachlorophenol		380	761	1480	U
108-95-2	Phenol		95.0	190	376	Q, U
88-06-2	2,4,6-Trichlorophenol		95.0	190	376	U
95-95-4	2,4,5-Trichlorophenol		95.0	190	376	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3801	3000	78.9	45 - 105	
2-Fluorophenol	7602	5555	73.1	35 - 105	
Nitrobenzene-d5	3801	3866	102	35 - 100	*X
Phenol-d6	7602	6016	79.1	40 - 100	
Terphenyl-d14	3801	4401	116	30 - 125	
2,4,6-Tribromophenol	7602	5043	66.3	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB22-00502

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-16	File ID:	1218516.D
Sampled:	12/20/10 16:00	Prepared:	12/23/10 13:30	Analyzed:	01/06/11 22:42
Solids:	85.85	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00701	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		97.0	195	384	Y, U
98-86-2	Acetophenone		97.0	195	384	U
1912-24-9	Atrazine		97.0	195	384	U
100-52-7	Benzaldehyde		97.0	195	384	U
92-52-4	1,1-Biphenyl		97.0	195	384	U
101-55-3	4-Bromophenyl-phenylether		97.0	195	384	U
85-68-7	Butylbenzylphthalate		97.0	195	384	U
105-60-2	Caprolactam		97.0	195	384	U
86-74-8	Carbazole		97.0	195	384	Y, U
59-50-7	4-Chloro-3-methylphenol		97.0	195	384	U
106-47-8	4-Chloroaniline		97.0	195	384	U
111-91-1	Bis(2-chloroethoxy)methane		97.0	195	384	Q, U
111-44-4	Bis(2-chloroethyl)ether		97.0	195	384	U
108-60-1	2,2'-Oxybis-1-chloropropane		97.0	195	384	U
91-58-7	2-Chloronaphthalene		97.0	195	384	U
95-57-8	2-Chlorophenol		97.0	195	384	U
7005-72-3	4-Chlorophenyl phenyl ether		97.0	195	384	U
132-64-9	Dibenzofuran		97.0	195	384	U
84-74-2	Di-n-butylphthalate		97.0	195	384	U
120-83-2	2,4-Dichlorophenol		97.0	195	384	U
84-66-2	Diethylphthalate		97.0	195	384	U
105-67-9	2,4-Dimethylphenol		388	777	1510	Q, U
131-11-3	Dimethyl phthalate		97.0	195	384	U
534-52-1	4,6-Dinitro-2-methylphenol		970	1950	3840	U
51-28-5	2,4-Dinitrophenol		970	1950	3840	U
121-14-2	2,4-Dinitrotoluene		97.0	195	384	U
606-20-2	2,6-Dinitrotoluene		97.0	195	384	U
117-84-0	Di-n-octylphthalate		97.0	195	384	U
117-81-7	Bis(2-ethylhexyl)phthalate		97.0	195	384	U
118-74-1	Hexachlorobenzene		97.0	195	384	U
87-68-3	Hexachlorobutadiene		97.0	195	384	Q, X, U
77-47-4	Hexachlorocyclopentadiene		97.0	195	384	X, U
67-72-1	Hexachloroethane		97.0	195	384	U
78-59-1	Isophorone		97.0	195	384	X, U
95-48-7	2-Methylphenol		97.0	195	384	U
106-44-5	4-Methylphenol		97.0	195	384	U
100-01-6	4-Nitroaniline		388	777	1510	U
99-09-2	3-Nitroaniline		388	777	1510	U
88-74-4	2-Nitroaniline		388	777	1510	X, U
98-95-3	Nitrobenzene		97.0	195	384	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB22-00502

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-16 File ID: 1218516.D

Sampled: 12/20/10 16:00 Prepared: 12/23/10 13:30 Analyzed: 01/06/11 22:42

Solids: 85.85 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		388	777	1510	U
88-75-5	2-Nitrophenol		97.0	195	384	U
86-30-6	N-Nitrosodiphenylamine		97.0	195	384	Q, U
621-64-7	N-Nitroso-di-n-propylamine		97.0	195	384	X, U
87-86-5	Pentachlorophenol		388	777	1510	U
108-95-2	Phenol		97.0	195	384	Q, U
88-06-2	2,4,6-Trichlorophenol		97.0	195	384	U
95-95-4	2,4,5-Trichlorophenol		97.0	195	384	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3883	3192	82.2	45 - 105	
2-Fluorophenol	7766	5715	73.6	35 - 105	
Nitrobenzene-d5	3883	3967	102	35 - 100	*X
Phenol-d6	7766	6061	78.1	40 - 100	
Terphenyl-d14	3883	4699	121	30 - 125	
2,4,6-Tribromophenol	7766	5480	70.6	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB23-0005

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-01 File ID: 1218501.D

Sampled: 12/20/10 13:00 Prepared: 12/23/10 13:30 Analyzed: 01/06/11 19:07

Solids: 94.21 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		86.1	173	341	Y, U
98-86-2	Acetophenone		86.1	173	341	U
1912-24-9	Atrazine		86.1	173	341	U
100-52-7	Benzaldehyde		86.1	173	341	U
92-52-4	1,1-Biphenyl		86.1	173	341	U
101-55-3	4-Bromophenyl-phenylether		86.1	173	341	U
85-68-7	Butylbenzylphthalate		86.1	173	341	U
105-60-2	Caprolactam		86.1	173	341	U
86-74-8	Carbazole		86.1	173	341	Y, U
59-50-7	4-Chloro-3-methylphenol		86.1	173	341	U
106-47-8	4-Chloroaniline		86.1	173	341	U
111-91-1	Bis(2-chloroethoxy)methane		86.1	173	341	Q, U
111-44-4	Bis(2-chloroethyl)ether		86.1	173	341	U
108-60-1	2,2'-Oxybis-1-chloropropane		86.1	173	341	U
91-58-7	2-Chloronaphthalene		86.1	173	341	U
95-57-8	2-Chlorophenol		86.1	173	341	U
7005-72-3	4-Chlorophenyl phenyl ether		86.1	173	341	U
132-64-9	Dibenzofuran		86.1	173	341	U
84-74-2	Di-n-butylphthalate		86.1	173	341	U
120-83-2	2,4-Dichlorophenol		86.1	173	341	U
84-66-2	Diethylphthalate		86.1	173	341	U
105-67-9	2,4-Dimethylphenol		344	690	1340	Q, U
131-11-3	Dimethyl phthalate		86.1	173	341	U
534-52-1	4,6-Dinitro-2-methylphenol		861	1730	3410	U
51-28-5	2,4-Dinitrophenol		861	1730	3410	U
121-14-2	2,4-Dinitrotoluene		86.1	173	341	U
606-20-2	2,6-Dinitrotoluene		86.1	173	341	U
117-84-0	Di-n-octylphthalate		86.1	173	341	U
117-81-7	Bis(2-ethylhexyl)phthalate		86.1	173	341	U
118-74-1	Hexachlorobenzene		86.1	173	341	U
87-68-3	Hexachlorobutadiene		86.1	173	341	Q, X, U
77-47-4	Hexachlorocyclopentadiene		86.1	173	341	X, U
67-72-1	Hexachloroethane		86.1	173	341	U
78-59-1	Isophorone		86.1	173	341	X, U
95-48-7	2-Methylphenol		86.1	173	341	U
106-44-5	4-Methylphenol		86.1	173	341	U
100-01-6	4-Nitroaniline		344	690	1340	U
99-09-2	3-Nitroaniline		344	690	1340	U
88-74-4	2-Nitroaniline		344	690	1340	X, U
98-95-3	Nitrobenzene		86.1	173	341	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB23-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-01	File ID:	1218501.D
Sampled:	12/20/10 13:00	Prepared:	12/23/10 13:30	Analyzed:	01/06/11 19:07
Solids:	94.21	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00701	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		344	690	1340	U
88-75-5	2-Nitrophenol		86.1	173	341	U
86-30-6	N-Nitrosodiphenylamine		86.1	173	341	Q, U
621-64-7	N-Nitroso-di-n-propylamine		86.1	173	341	X, U
87-86-5	Pentachlorophenol		344	690	1340	U
108-95-2	Phenol		86.1	173	341	Q, U
88-06-2	2,4,6-Trichlorophenol		86.1	173	341	U
95-95-4	2,4,5-Trichlorophenol		86.1	173	341	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3446	2784	80.8	45 - 105	
2-Fluorophenol	6893	5882	85.3	35 - 105	
Nitrobenzene-d5	3446	3733	108	35 - 100	*X
Phenol-d6	6893	6299	91.4	40 - 100	
Terphenyl-d14	3446	3596	104	30 - 125	
2,4,6-Tribromophenol	6893	5357	77.7	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB23-0810

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-02 File ID: 1218502.D

Sampled: 12/20/10 13:20 Prepared: 12/23/10 13:30 Analyzed: 01/06/11 19:37

Solids: 84.20 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		97.0	194	384	Y, U
98-86-2	Acetophenone		97.0	194	384	U
1912-24-9	Atrazine		97.0	194	384	U
100-52-7	Benzaldehyde		97.0	194	384	U
92-52-4	1,1-Biphenyl		97.0	194	384	U
101-55-3	4-Bromophenyl-phenylether		97.0	194	384	U
85-68-7	Butylbenzylphthalate		97.0	194	384	U
105-60-2	Caprolactam		97.0	194	384	U
86-74-8	Carbazole		97.0	194	384	Y, U
59-50-7	4-Chloro-3-methylphenol		97.0	194	384	U
106-47-8	4-Chloroaniline		97.0	194	384	U
111-91-1	Bis(2-chloroethoxy)methane		97.0	194	384	Q, U
111-44-4	Bis(2-chloroethyl)ether		97.0	194	384	U
108-60-1	2,2'-Oxybis-1-chloropropane		97.0	194	384	U
91-58-7	2-Chloronaphthalene		97.0	194	384	U
95-57-8	2-Chlorophenol		97.0	194	384	U
7005-72-3	4-Chlorophenyl phenyl ether		97.0	194	384	U
132-64-9	Dibenzofuran		97.0	194	384	U
84-74-2	Di-n-butylphthalate		97.0	194	384	U
120-83-2	2,4-Dichlorophenol		97.0	194	384	U
84-66-2	Diethylphthalate		97.0	194	384	U
105-67-9	2,4-Dimethylphenol		388	777	1510	Q, U
131-11-3	Dimethyl phthalate		97.0	194	384	U
534-52-1	4,6-Dinitro-2-methylphenol		970	1940	3840	U
51-28-5	2,4-Dinitrophenol		970	1940	3840	U
121-14-2	2,4-Dinitrotoluene		97.0	194	384	U
606-20-2	2,6-Dinitrotoluene		97.0	194	384	U
117-84-0	Di-n-octylphthalate		97.0	194	384	U
117-81-7	Bis(2-ethylhexyl)phthalate		97.0	194	384	U
118-74-1	Hexachlorobenzene		97.0	194	384	U
87-68-3	Hexachlorobutadiene		97.0	194	384	Q, X, U
77-47-4	Hexachlorocyclopentadiene		97.0	194	384	X, U
67-72-1	Hexachloroethane		97.0	194	384	U
78-59-1	Isophorone		97.0	194	384	X, U
95-48-7	2-Methylphenol		97.0	194	384	U
106-44-5	4-Methylphenol		97.0	194	384	U
100-01-6	4-Nitroaniline		388	777	1510	U
99-09-2	3-Nitroaniline		388	777	1510	U
88-74-4	2-Nitroaniline		388	777	1510	X, U
98-95-3	Nitrobenzene		97.0	194	384	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB23-0810

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-02 File ID: 1218502.D

Sampled: 12/20/10 13:20 Prepared: 12/23/10 13:30 Analyzed: 01/06/11 19:37

Solids: 84.20 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		388	777	1510	U
88-75-5	2-Nitrophenol		97.0	194	384	U
86-30-6	N-Nitrosodiphenylamine		97.0	194	384	Q, U
621-64-7	N-Nitroso-di-n-propylamine		97.0	194	384	X, U
87-86-5	Pentachlorophenol		388	777	1510	U
108-95-2	Phenol		97.0	194	384	Q, U
88-06-2	2,4,6-Trichlorophenol		97.0	194	384	U
95-95-4	2,4,5-Trichlorophenol		97.0	194	384	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3881	3094	79.7	45 - 105	
2-Fluorophenol	7763	6472	83.4	35 - 105	
Nitrobenzene-d5	3881	3780	97.4	35 - 100	X
Phenol-d6	7763	6836	88.1	40 - 100	
Terphenyl-d14	3881	3987	103	30 - 125	
2,4,6-Tribromophenol	7763	5319	68.5	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB24-0005

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-03 File ID: 1218503.D

Sampled: 12/20/10 14:00 Prepared: 12/23/10 13:30 Analyzed: 01/06/11 17:03

Solids: 83.57 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		99.0	199	392	Y, U
98-86-2	Acetophenone		99.0	199	392	U
1912-24-9	Atrazine		99.0	199	392	U
100-52-7	Benzaldehyde		99.0	199	392	U
92-52-4	1,1-Biphenyl		99.0	199	392	U
101-55-3	4-Bromophenyl-phenylether		99.0	199	392	U
85-68-7	Butylbenzylphthalate		99.0	199	392	U
105-60-2	Caprolactam		99.0	199	392	U
86-74-8	Carbazole		99.0	199	392	Y, U
59-50-7	4-Chloro-3-methylphenol		99.0	199	392	U
106-47-8	4-Chloroaniline		99.0	199	392	U
111-91-1	Bis(2-chloroethoxy)methane		99.0	199	392	Q, U
111-44-4	Bis(2-chloroethyl)ether		99.0	199	392	U
108-60-1	2,2'-Oxybis-1-chloropropane		99.0	199	392	U
91-58-7	2-Chloronaphthalene		99.0	199	392	U
95-57-8	2-Chlorophenol		99.0	199	392	U
7005-72-3	4-Chlorophenyl phenyl ether		99.0	199	392	U
132-64-9	Dibenzofuran		99.0	199	392	U
84-74-2	Di-n-butylphthalate		99.0	199	392	U
120-83-2	2,4-Dichlorophenol		99.0	199	392	U
84-66-2	Diethylphthalate		99.0	199	392	U
105-67-9	2,4-Dimethylphenol		396	793	1550	Q, U
131-11-3	Dimethyl phthalate		99.0	199	392	U
534-52-1	4,6-Dinitro-2-methylphenol		990	1990	3920	U
51-28-5	2,4-Dinitrophenol		990	1990	3920	U
121-14-2	2,4-Dinitrotoluene		99.0	199	392	U
606-20-2	2,6-Dinitrotoluene		99.0	199	392	U
117-84-0	Di-n-octylphthalate		99.0	199	392	U
117-81-7	Bis(2-ethylhexyl)phthalate		99.0	199	392	U
118-74-1	Hexachlorobenzene		99.0	199	392	U
87-68-3	Hexachlorobutadiene		99.0	199	392	Q, X, U
77-47-4	Hexachlorocyclopentadiene		99.0	199	392	X, U
67-72-1	Hexachloroethane		99.0	199	392	U
78-59-1	Isophorone		99.0	199	392	X, U
95-48-7	2-Methylphenol		99.0	199	392	U
106-44-5	4-Methylphenol		99.0	199	392	U
100-01-6	4-Nitroaniline		396	793	1550	U
99-09-2	3-Nitroaniline		396	793	1550	U
88-74-4	2-Nitroaniline		396	793	1550	X, U
98-95-3	Nitrobenzene		99.0	199	392	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB24-0005

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-03 File ID: 1218503.D

Sampled: 12/20/10 14:00 Prepared: 12/23/10 13:30 Analyzed: 01/06/11 17:03

Solids: 83.57 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		396	793	1550	U
88-75-5	2-Nitrophenol		99.0	199	392	U
86-30-6	N-Nitrosodiphenylamine		99.0	199	392	Q, U
621-64-7	N-Nitroso-di-n-propylamine		99.0	199	392	X, U
87-86-5	Pentachlorophenol		396	793	1550	U
108-95-2	Phenol		99.0	199	392	Q, U
88-06-2	2,4,6-Trichlorophenol		99.0	199	392	U
95-95-4	2,4,5-Trichlorophenol		99.0	199	392	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3962	3334	84.1	45 - 105	
2-Fluorophenol	7925	6780	85.6	35 - 105	
Nitrobenzene-d5	3962	4393	111	35 - 100	*X
Phenol-d6	7925	7168	90.4	40 - 100	
Terphenyl-d14	3962	4187	106	30 - 125	
2,4,6-Tribromophenol	7925	5710	72.1	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB24-00502

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-04 File ID: 1218504.D

Sampled: 12/20/10 14:05 Prepared: 12/23/10 13:30 Analyzed: 01/06/11 17:33

Solids: 89.56 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		90.6	182	359	Y, U
98-86-2	Acetophenone		90.6	182	359	U
1912-24-9	Atrazine		90.6	182	359	U
100-52-7	Benzaldehyde		90.6	182	359	U
92-52-4	1,1-Biphenyl		90.6	182	359	U
101-55-3	4-Bromophenyl-phenylether		90.6	182	359	U
85-68-7	Butylbenzylphthalate		90.6	182	359	U
105-60-2	Caprolactam		90.6	182	359	U
86-74-8	Carbazole		90.6	182	359	Y, U
59-50-7	4-Chloro-3-methylphenol		90.6	182	359	U
106-47-8	4-Chloroaniline		90.6	182	359	U
111-91-1	Bis(2-chloroethoxy)methane		90.6	182	359	Q, U
111-44-4	Bis(2-chloroethyl)ether		90.6	182	359	U
108-60-1	2,2'-Oxybis-1-chloropropane		90.6	182	359	U
91-58-7	2-Chloronaphthalene		90.6	182	359	U
95-57-8	2-Chlorophenol		90.6	182	359	U
7005-72-3	4-Chlorophenyl phenyl ether		90.6	182	359	U
132-64-9	Dibenzofuran		90.6	182	359	U
84-74-2	Di-n-butylphthalate		90.6	182	359	U
120-83-2	2,4-Dichlorophenol		90.6	182	359	U
84-66-2	Diethylphthalate		90.6	182	359	U
105-67-9	2,4-Dimethylphenol		362	725	1410	Q, U
131-11-3	Dimethyl phthalate		90.6	182	359	U
534-52-1	4,6-Dinitro-2-methylphenol		906	1820	3590	U
51-28-5	2,4-Dinitrophenol		906	1820	3590	U
121-14-2	2,4-Dinitrotoluene		90.6	182	359	U
606-20-2	2,6-Dinitrotoluene		90.6	182	359	U
117-84-0	Di-n-octylphthalate		90.6	182	359	U
117-81-7	Bis(2-ethylhexyl)phthalate		90.6	182	359	U
118-74-1	Hexachlorobenzene		90.6	182	359	U
87-68-3	Hexachlorobutadiene		90.6	182	359	Q, X, U
77-47-4	Hexachlorocyclopentadiene		90.6	182	359	X, U
67-72-1	Hexachloroethane		90.6	182	359	U
78-59-1	Isophorone		90.6	182	359	X, U
95-48-7	2-Methylphenol		90.6	182	359	U
106-44-5	4-Methylphenol		90.6	182	359	U
100-01-6	4-Nitroaniline		362	725	1410	U
99-09-2	3-Nitroaniline		362	725	1410	U
88-74-4	2-Nitroaniline		362	725	1410	X, U
98-95-3	Nitrobenzene		90.6	182	359	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB24-00502

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-04	File ID:	1218504.D
Sampled:	12/20/10 14:05	Prepared:	12/23/10 13:30	Analyzed:	01/06/11 17:33
Solids:	89.56	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00701	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		362	725	1410	U
88-75-5	2-Nitrophenol		90.6	182	359	U
86-30-6	N-Nitrosodiphenylamine		90.6	182	359	Q, U
621-64-7	N-Nitroso-di-n-propylamine		90.6	182	359	X, U
87-86-5	Pentachlorophenol		362	725	1410	U
108-95-2	Phenol		90.6	182	359	Q, U
88-06-2	2,4,6-Trichlorophenol		90.6	182	359	U
95-95-4	2,4,5-Trichlorophenol		90.6	182	359	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3625	2718	75.0	45 - 105	
2-Fluorophenol	7250	5330	73.5	35 - 105	
Nitrobenzene-d5	3625	3421	94.4	35 - 100	X
Phenol-d6	7250	5644	77.8	40 - 100	
Terphenyl-d14	3625	3179	87.7	30 - 125	
2,4,6-Tribromophenol	7250	4865	67.1	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB25-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-19	File ID:	1218519.D
Sampled:	12/20/10 16:35	Prepared:	12/23/10 13:30	Analyzed:	01/06/11 23:44
Solids:	87.55	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00701	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		95.1	191	377	Y, U
98-86-2	Acetophenone		95.1	191	377	U
1912-24-9	Atrazine		95.1	191	377	U
100-52-7	Benzaldehyde		95.1	191	377	U
92-52-4	1,1-Biphenyl		95.1	191	377	U
101-55-3	4-Bromophenyl-phenylether		95.1	191	377	U
85-68-7	Butylbenzylphthalate		95.1	191	377	U
105-60-2	Caprolactam		95.1	191	377	U
86-74-8	Carbazole		95.1	191	377	Y, U
59-50-7	4-Chloro-3-methylphenol		95.1	191	377	U
106-47-8	4-Chloroaniline		95.1	191	377	U
111-91-1	Bis(2-chloroethoxy)methane		95.1	191	377	Q, U
111-44-4	Bis(2-chloroethyl)ether		95.1	191	377	U
108-60-1	2,2'-Oxybis-1-chloropropane		95.1	191	377	U
91-58-7	2-Chloronaphthalene		95.1	191	377	U
95-57-8	2-Chlorophenol		95.1	191	377	U
7005-72-3	4-Chlorophenyl phenyl ether		95.1	191	377	U
132-64-9	Dibenzofuran		95.1	191	377	U
84-74-2	Di-n-butylphthalate		95.1	191	377	U
120-83-2	2,4-Dichlorophenol		95.1	191	377	U
84-66-2	Diethylphthalate		95.1	191	377	U
105-67-9	2,4-Dimethylphenol		380	762	1480	Q, U
131-11-3	Dimethyl phthalate		95.1	191	377	U
534-52-1	4,6-Dinitro-2-methylphenol		951	1910	3770	U
51-28-5	2,4-Dinitrophenol		951	1910	3770	U
121-14-2	2,4-Dinitrotoluene		95.1	191	377	U
606-20-2	2,6-Dinitrotoluene		95.1	191	377	U
117-84-0	Di-n-octylphthalate		95.1	191	377	U
117-81-7	Bis(2-ethylhexyl)phthalate	149	95.1	191	377	J
118-74-1	Hexachlorobenzene		95.1	191	377	U
87-68-3	Hexachlorobutadiene		95.1	191	377	Q, X, U
77-47-4	Hexachlorocyclopentadiene		95.1	191	377	X, U
67-72-1	Hexachloroethane		95.1	191	377	U
78-59-1	Isophorone		95.1	191	377	X, U
95-48-7	2-Methylphenol		95.1	191	377	U
106-44-5	4-Methylphenol		95.1	191	377	U
100-01-6	4-Nitroaniline		380	762	1480	U
99-09-2	3-Nitroaniline		380	762	1480	U
88-74-4	2-Nitroaniline		380	762	1480	X, U
98-95-3	Nitrobenzene		95.1	191	377	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB25-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-19	File ID:	1218519.D
Sampled:	12/20/10 16:35	Prepared:	12/23/10 13:30	Analyzed:	01/06/11 23:44
Solids:	87.55	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00701	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		380	762	1480	U
88-75-5	2-Nitrophenol		95.1	191	377	U
86-30-6	N-Nitrosodiphenylamine		95.1	191	377	Q, U
621-64-7	N-Nitroso-di-n-propylamine		95.1	191	377	X, U
87-86-5	Pentachlorophenol		380	762	1480	U
108-95-2	Phenol		95.1	191	377	Q, U
88-06-2	2,4,6-Trichlorophenol		95.1	191	377	U
95-95-4	2,4,5-Trichlorophenol		95.1	191	377	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3807	2630	69.1	45 - 105	
2-Fluorophenol	7615	3960	52.0	35 - 105	
Nitrobenzene-d5	3807	2942	77.3	35 - 100	X
Phenol-d6	7615	3540	46.5	40 - 100	
Terphenyl-d14	3807	4247	112	30 - 125	
2,4,6-Tribromophenol	7615	4218	55.4	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB25-0204

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-20	File ID:	1218520.D
Sampled:	12/20/10 16:40	Prepared:	12/23/10 13:30	Analyzed:	01/10/11 20:14
Solids:	83.03	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A01104	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		98.4	197	390	Y, U
98-86-2	Acetophenone		98.4	197	390	U
1912-24-9	Atrazine		98.4	197	390	U
100-52-7	Benzaldehyde		98.4	197	390	U
92-52-4	1,1-Biphenyl		98.4	197	390	U
101-55-3	4-Bromophenyl-phenylether		98.4	197	390	U
85-68-7	Butylbenzylphthalate		98.4	197	390	U
105-60-2	Caprolactam		98.4	197	390	X, U
86-74-8	Carbazole		98.4	197	390	Y, U
59-50-7	4-Chloro-3-methylphenol		98.4	197	390	U
106-47-8	4-Chloroaniline		98.4	197	390	U
111-91-1	Bis(2-chloroethoxy)methane		98.4	197	390	Q, U
111-44-4	Bis(2-chloroethyl)ether		98.4	197	390	U
108-60-1	2,2'-Oxybis-1-chloropropane		98.4	197	390	U
91-58-7	2-Chloronaphthalene		98.4	197	390	U
95-57-8	2-Chlorophenol		98.4	197	390	U
7005-72-3	4-Chlorophenyl phenyl ether		98.4	197	390	U
132-64-9	Dibenzofuran		98.4	197	390	U
84-74-2	Di-n-butylphthalate		98.4	197	390	U
120-83-2	2,4-Dichlorophenol		98.4	197	390	U
84-66-2	Diethylphthalate		98.4	197	390	U
105-67-9	2,4-Dimethylphenol		393	788	1530	Q, U
131-11-3	Dimethyl phthalate		98.4	197	390	U
534-52-1	4,6-Dinitro-2-methylphenol		984	1970	3900	U
51-28-5	2,4-Dinitrophenol		984	1970	3900	U
121-14-2	2,4-Dinitrotoluene		98.4	197	390	U
606-20-2	2,6-Dinitrotoluene		98.4	197	390	U
117-84-0	Di-n-octylphthalate		98.4	197	390	X, U
117-81-7	Bis(2-ethylhexyl)phthalate		98.4	197	390	U
118-74-1	Hexachlorobenzene		98.4	197	390	U
87-68-3	Hexachlorobutadiene		98.4	197	390	Q, X, U
77-47-4	Hexachlorocyclopentadiene		98.4	197	390	U
67-72-1	Hexachloroethane		98.4	197	390	U
78-59-1	Isophorone		98.4	197	390	X, U
95-48-7	2-Methylphenol		98.4	197	390	U
106-44-5	4-Methylphenol	375	98.4	197	390	J
100-01-6	4-Nitroaniline		393	788	1530	U
99-09-2	3-Nitroaniline		393	788	1530	U
88-74-4	2-Nitroaniline		393	788	1530	X, U
98-95-3	Nitrobenzene		98.4	197	390	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB25-0204

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-20 File ID: 1218520.D

Sampled: 12/20/10 16:40 Prepared: 12/23/10 13:30 Analyzed: 01/10/11 20:14

Solids: 83.03 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A01104 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		393	788	1530	U
88-75-5	2-Nitrophenol		98.4	197	390	U
86-30-6	N-Nitrosodiphenylamine		98.4	197	390	Q, U
621-64-7	N-Nitroso-di-n-propylamine		98.4	197	390	X, U
87-86-5	Pentachlorophenol		393	788	1530	U
108-95-2	Phenol	99.7	98.4	197	390	Q, J
88-06-2	2,4,6-Trichlorophenol		98.4	197	390	U
95-95-4	2,4,5-Trichlorophenol		98.4	197	390	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3936	2824	71.7	45 - 105	
2-Fluorophenol	7872	5576	70.8	35 - 105	
Nitrobenzene-d5	3936	3384	86.0	35 - 100	X
Phenol-d6	7872	6042	76.8	40 - 100	
Terphenyl-d14	3936	4815	122	30 - 125	X
2,4,6-Tribromophenol	7872	5052	64.2	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB26-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-08	File ID:	1218508.D
Sampled:	12/20/10 17:35	Prepared:	12/23/10 13:30	Analyzed:	01/10/11 20:44
Solids:	89.73	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A01104	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		92.2	185	365	S, Y, U
98-86-2	Acetophenone		92.2	185	365	U
1912-24-9	Atrazine		92.2	185	365	U
100-52-7	Benzaldehyde		92.2	185	365	U
92-52-4	1,1-Biphenyl		92.2	185	365	U
101-55-3	4-Bromophenyl-phenylether		92.2	185	365	U
85-68-7	Butylbenzylphthalate		92.2	185	365	S, U
105-60-2	Caprolactam		92.2	185	365	X, U
86-74-8	Carbazole		92.2	185	365	Y, U
59-50-7	4-Chloro-3-methylphenol		92.2	185	365	U
106-47-8	4-Chloroaniline		92.2	185	365	U
111-91-1	Bis(2-chloroethoxy)methane		92.2	185	365	Q, U
111-44-4	Bis(2-chloroethyl)ether		92.2	185	365	U
108-60-1	2,2'-Oxybis-1-chloropropane		92.2	185	365	U
91-58-7	2-Chloronaphthalene		92.2	185	365	U
95-57-8	2-Chlorophenol		92.2	185	365	U
7005-72-3	4-Chlorophenyl phenyl ether		92.2	185	365	U
132-64-9	Dibenzofuran		92.2	185	365	U
84-74-2	Di-n-butylphthalate		92.2	185	365	U
120-83-2	2,4-Dichlorophenol		92.2	185	365	U
84-66-2	Diethylphthalate		92.2	185	365	U
105-67-9	2,4-Dimethylphenol		369	738	1440	Q, U
131-11-3	Dimethyl phthalate		92.2	185	365	U
534-52-1	4,6-Dinitro-2-methylphenol		922	1850	3650	U
51-28-5	2,4-Dinitrophenol		922	1850	3650	U
121-14-2	2,4-Dinitrotoluene		92.2	185	365	U
606-20-2	2,6-Dinitrotoluene		92.2	185	365	U
117-84-0	Di-n-octylphthalate		92.2	185	365	S, X, U
117-81-7	Bis(2-ethylhexyl)phthalate		92.2	185	365	S, U
118-74-1	Hexachlorobenzene		92.2	185	365	U
87-68-3	Hexachlorobutadiene		92.2	185	365	Q, X, U
77-47-4	Hexachlorocyclopentadiene		92.2	185	365	U
67-72-1	Hexachloroethane		92.2	185	365	U
78-59-1	Isophorone		92.2	185	365	X, U
95-48-7	2-Methylphenol		92.2	185	365	U
106-44-5	4-Methylphenol		92.2	185	365	U
100-01-6	4-Nitroaniline		369	738	1440	U
99-09-2	3-Nitroaniline		369	738	1440	U
88-74-4	2-Nitroaniline		369	738	1440	X, U
98-95-3	Nitrobenzene		92.2	185	365	X, Q, U

ANALYSIS DATA SHEET

NTC12-SB26-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-08	File ID:	1218508.D
Sampled:	12/20/10 17:35	Prepared:	12/23/10 13:30	Analyzed:	01/10/11 20:44
Solids:	89.73	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A01104	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		369	738	1440	U
88-75-5	2-Nitrophenol		92.2	185	365	U
86-30-6	N-Nitrosodiphenylamine		92.2	185	365	Q, U
621-64-7	N-Nitroso-di-n-propylamine		92.2	185	365	X, U
87-86-5	Pentachlorophenol		369	738	1440	U
108-95-2	Phenol		92.2	185	365	Q, U
88-06-2	2,4,6-Trichlorophenol		92.2	185	365	U
95-95-4	2,4,5-Trichlorophenol		92.2	185	365	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3690	3190	86.4	45 - 105	
2-Fluorophenol	7381	5680	77.0	35 - 105	
Nitrobenzene-d5	3690	4014	109	35 - 100	*X
Phenol-d6	7381	6278	85.1	40 - 100	
Terphenyl-d14	3690	5910	160	30 - 125	*S, X
2,4,6-Tribromophenol	7381	5045	68.4	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB26-0406

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-09	File ID:	1218509.D
Sampled:	12/20/10 17:40	Prepared:	12/23/10 13:30	Analyzed:	01/06/11 20:39
Solids:	79.89	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00701	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		104	208	410	Y, U
98-86-2	Acetophenone		104	208	410	U
1912-24-9	Atrazine		104	208	410	U
100-52-7	Benzaldehyde		104	208	410	U
92-52-4	1,1-Biphenyl		104	208	410	U
101-55-3	4-Bromophenyl-phenylether		104	208	410	U
85-68-7	Butylbenzylphthalate		104	208	410	U
105-60-2	Caprolactam		104	208	410	U
86-74-8	Carbazole	494	104	208	410	Y
59-50-7	4-Chloro-3-methylphenol		104	208	410	U
106-47-8	4-Chloroaniline		104	208	410	U
111-91-1	Bis(2-chloroethoxy)methane		104	208	410	Q, U
111-44-4	Bis(2-chloroethyl)ether		104	208	410	U
108-60-1	2,2'-Oxybis-1-chloropropane		104	208	410	U
91-58-7	2-Chloronaphthalene		104	208	410	U
95-57-8	2-Chlorophenol		104	208	410	U
7005-72-3	4-Chlorophenyl phenyl ether		104	208	410	U
132-64-9	Dibenzofuran	366	104	208	410	J
84-74-2	Di-n-butylphthalate		104	208	410	U
120-83-2	2,4-Dichlorophenol		104	208	410	U
84-66-2	Diethylphthalate		104	208	410	U
105-67-9	2,4-Dimethylphenol		414	829	1620	Q, U
131-11-3	Dimethyl phthalate		104	208	410	U
534-52-1	4,6-Dinitro-2-methylphenol		1040	2080	4100	U
51-28-5	2,4-Dinitrophenol		1040	2080	4100	U
121-14-2	2,4-Dinitrotoluene		104	208	410	U
606-20-2	2,6-Dinitrotoluene		104	208	410	U
117-84-0	Di-n-octylphthalate		104	208	410	U
117-81-7	Bis(2-ethylhexyl)phthalate	201	104	208	410	J
118-74-1	Hexachlorobenzene		104	208	410	U
87-68-3	Hexachlorobutadiene		104	208	410	Q, X, U
77-47-4	Hexachlorocyclopentadiene		104	208	410	X, U
67-72-1	Hexachloroethane		104	208	410	U
78-59-1	Isophorone		104	208	410	X, U
95-48-7	2-Methylphenol		104	208	410	U
106-44-5	4-Methylphenol	167	104	208	410	J
100-01-6	4-Nitroaniline		414	829	1620	U
99-09-2	3-Nitroaniline		414	829	1620	U
88-74-4	2-Nitroaniline		414	829	1620	X, U
98-95-3	Nitrobenzene		104	208	410	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB26-0406

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-09 File ID: 1218509.D

Sampled: 12/20/10 17:40 Prepared: 12/23/10 13:30 Analyzed: 01/06/11 20:39

Solids: 79.89 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		414	829	1620	U
88-75-5	2-Nitrophenol		104	208	410	U
86-30-6	N-Nitrosodiphenylamine		104	208	410	Q, U
621-64-7	N-Nitroso-di-n-propylamine		104	208	410	X, U
87-86-5	Pentachlorophenol		414	829	1620	U
108-95-2	Phenol		104	208	410	Q, U
88-06-2	2,4,6-Trichlorophenol		104	208	410	U
95-95-4	2,4,5-Trichlorophenol		104	208	410	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	4145	3165	76.4	45 - 105	
2-Fluorophenol	8289	6297	76.0	35 - 105	
Nitrobenzene-d5	4145	3950	95.3	35 - 100	X
Phenol-d6	8289	6644	80.1	40 - 100	
Terphenyl-d14	4145	4216	102	30 - 125	
2,4,6-Tribromophenol	8289	5512	66.5	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB27-0005

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-13 File ID: 1218513is80.D

Sampled: 12/20/10 15:30 Prepared: 12/23/10 13:30 Analyzed: 01/10/11 19:45

Solids: 83.51 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A01104 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		98.4	197	390	Y, U
98-86-2	Acetophenone		98.4	197	390	U
1912-24-9	Atrazine		98.4	197	390	U
100-52-7	Benzaldehyde		98.4	197	390	U
92-52-4	1,1-Biphenyl		98.4	197	390	U
101-55-3	4-Bromophenyl-phenylether		98.4	197	390	U
85-68-7	Butylbenzylphthalate		98.4	197	390	U
105-60-2	Caprolactam		98.4	197	390	X, U
86-74-8	Carbazole	167	98.4	197	390	Y, J
59-50-7	4-Chloro-3-methylphenol		98.4	197	390	U
106-47-8	4-Chloroaniline		98.4	197	390	U
111-91-1	Bis(2-chloroethoxy)methane		98.4	197	390	Q, U
111-44-4	Bis(2-chloroethyl)ether		98.4	197	390	U
108-60-1	2,2'-Oxybis-1-chloropropane		98.4	197	390	U
91-58-7	2-Chloronaphthalene		98.4	197	390	U
95-57-8	2-Chlorophenol		98.4	197	390	U
7005-72-3	4-Chlorophenyl phenyl ether		98.4	197	390	U
132-64-9	Dibenzofuran	144	98.4	197	390	J
84-74-2	Di-n-butylphthalate		98.4	197	390	U
120-83-2	2,4-Dichlorophenol		98.4	197	390	U
84-66-2	Diethylphthalate		98.4	197	390	U
105-67-9	2,4-Dimethylphenol		394	788	1540	Q, U
131-11-3	Dimethyl phthalate		98.4	197	390	U
534-52-1	4,6-Dinitro-2-methylphenol		984	1970	3900	U
51-28-5	2,4-Dinitrophenol		984	1970	3900	U
121-14-2	2,4-Dinitrotoluene		98.4	197	390	U
606-20-2	2,6-Dinitrotoluene		98.4	197	390	U
117-84-0	Di-n-octylphthalate		98.4	197	390	X, U
117-81-7	Bis(2-ethylhexyl)phthalate		98.4	197	390	U
118-74-1	Hexachlorobenzene		98.4	197	390	U
87-68-3	Hexachlorobutadiene		98.4	197	390	X, Q, U
77-47-4	Hexachlorocyclopentadiene		98.4	197	390	U
67-72-1	Hexachloroethane		98.4	197	390	U
78-59-1	Isophorone		98.4	197	390	X, U
95-48-7	2-Methylphenol		98.4	197	390	U
106-44-5	4-Methylphenol		98.4	197	390	U
100-01-6	4-Nitroaniline		394	788	1540	U
99-09-2	3-Nitroaniline		394	788	1540	U
88-74-4	2-Nitroaniline		394	788	1540	X, U
98-95-3	Nitrobenzene		98.4	197	390	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB27-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-13	File ID:	1218513is80.D
Sampled:	12/20/10 15:30	Prepared:	12/23/10 13:30	Analyzed:	01/10/11 19:45
Solids:	83.51	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A01104	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		394	788	1540	U
88-75-5	2-Nitrophenol		98.4	197	390	U
86-30-6	N-Nitrosodiphenylamine		98.4	197	390	Q, U
621-64-7	N-Nitroso-di-n-propylamine		98.4	197	390	X, U
87-86-5	Pentachlorophenol		394	788	1540	U
108-95-2	Phenol		98.4	197	390	Q, U
88-06-2	2,4,6-Trichlorophenol		98.4	197	390	U
95-95-4	2,4,5-Trichlorophenol		98.4	197	390	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3939	3289	83.5	45 - 105	
2-Fluorophenol	7878	6183	78.5	35 - 105	
Nitrobenzene-d5	3939	4394	112	35 - 100	*X
Phenol-d6	7878	6733	85.5	40 - 100	
Terphenyl-d14	3939	4808	122	30 - 125	X
2,4,6-Tribromophenol	7878	5717	72.6	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-14 File ID: 1218514.D

Sampled: 12/20/10 15:35 Prepared: 12/23/10 13:30 Analyzed: 01/10/11 17:46

Solids: 86.58 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A01104 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		94.3	189	374	Y, U
98-86-2	Acetophenone		94.3	189	374	U
1912-24-9	Atrazine		94.3	189	374	U
100-52-7	Benzaldehyde		94.3	189	374	U
92-52-4	1,1-Biphenyl		94.3	189	374	U
101-55-3	4-Bromophenyl-phenylether		94.3	189	374	U
85-68-7	Butylbenzylphthalate		94.3	189	374	U
105-60-2	Caprolactam		94.3	189	374	X, U
86-74-8	Carbazole		94.3	189	374	Y, U
59-50-7	4-Chloro-3-methylphenol		94.3	189	374	U
106-47-8	4-Chloroaniline		94.3	189	374	U
111-91-1	Bis(2-chloroethoxy)methane		94.3	189	374	Q, N, U
111-44-4	Bis(2-chloroethyl)ether		94.3	189	374	U
108-60-1	2,2'-Oxybis-1-chloropropane		94.3	189	374	U
91-58-7	2-Chloronaphthalene		94.3	189	374	U
95-57-8	2-Chlorophenol		94.3	189	374	U
7005-72-3	4-Chlorophenyl phenyl ether		94.3	189	374	U
132-64-9	Dibenzofuran		94.3	189	374	U
84-74-2	Di-n-butylphthalate		94.3	189	374	U
120-83-2	2,4-Dichlorophenol		94.3	189	374	U
84-66-2	Diethylphthalate		94.3	189	374	U
105-67-9	2,4-Dimethylphenol		377	755	1470	Q, U
131-11-3	Dimethyl phthalate		94.3	189	374	U
534-52-1	4,6-Dinitro-2-methylphenol		943	1890	3740	U
51-28-5	2,4-Dinitrophenol		943	1890	3740	U
121-14-2	2,4-Dinitrotoluene		94.3	189	374	U
606-20-2	2,6-Dinitrotoluene		94.3	189	374	U
117-84-0	Di-n-octylphthalate		94.3	189	374	X, N, U
117-81-7	Bis(2-ethylhexyl)phthalate		94.3	189	374	U
118-74-1	Hexachlorobenzene		94.3	189	374	U
87-68-3	Hexachlorobutadiene		94.3	189	374	Q, X, N, U
77-47-4	Hexachlorocyclopentadiene		94.3	189	374	U
67-72-1	Hexachloroethane		94.3	189	374	U
78-59-1	Isophorone		94.3	189	374	X, U
95-48-7	2-Methylphenol		94.3	189	374	U
106-44-5	4-Methylphenol		94.3	189	374	U
100-01-6	4-Nitroaniline		377	755	1470	U
99-09-2	3-Nitroaniline		377	755	1470	U
88-74-4	2-Nitroaniline		377	755	1470	X, U
98-95-3	Nitrobenzene		94.3	189	374	Q, N, X, U

ANALYSIS DATA SHEET

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-14 File ID: 1218514.D

Sampled: 12/20/10 15:35 Prepared: 12/23/10 13:30 Analyzed: 01/10/11 17:46

Solids: 86.58 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A01104 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		377	755	1470	U
88-75-5	2-Nitrophenol		94.3	189	374	U
86-30-6	N-Nitrosodiphenylamine		94.3	189	374	O, N, U
621-64-7	N-Nitroso-di-n-propylamine		94.3	189	374	X, U
87-86-5	Pentachlorophenol		377	755	1470	U
108-95-2	Phenol		94.3	189	374	O, U
88-06-2	2,4,6-Trichlorophenol		94.3	189	374	U
95-95-4	2,4,5-Trichlorophenol		94.3	189	374	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3774	3106	82.3	45 - 105	
2-Fluorophenol	7549	5339	70.7	35 - 105	
Nitrobenzene-d5	3774	4075	108	35 - 100	*X
Phenol-d6	7549	5915	78.4	40 - 100	
Terphenyl-d14	3774	4201	111	30 - 125	X
2,4,6-Tribromophenol	7549	4254	56.3	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB28-0005

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-21 File ID: 1218521.D

Sampled: 12/20/10 17:00 Prepared: 12/23/10 13:30 Analyzed: 01/10/11 19:15

Solids: 87.72 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A01104 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		92.5	185	366	Y, U
98-86-2	Acetophenone		92.5	185	366	U
1912-24-9	Atrazine		92.5	185	366	U
100-52-7	Benzaldehyde		92.5	185	366	U
92-52-4	1,1-Biphenyl		92.5	185	366	U
101-55-3	4-Bromophenyl-phenylether		92.5	185	366	U
85-68-7	Butylbenzylphthalate		92.5	185	366	U
105-60-2	Caprolactam		92.5	185	366	X, U
86-74-8	Carbazole		92.5	185	366	Y, U
59-50-7	4-Chloro-3-methylphenol		92.5	185	366	U
106-47-8	4-Chloroaniline		92.5	185	366	U
111-91-1	Bis(2-chloroethoxy)methane		92.5	185	366	Q, U
111-44-4	Bis(2-chloroethyl)ether		92.5	185	366	U
108-60-1	2,2'-Oxybis-1-chloropropane		92.5	185	366	U
91-58-7	2-Chloronaphthalene		92.5	185	366	U
95-57-8	2-Chlorophenol		92.5	185	366	U
7005-72-3	4-Chlorophenyl phenyl ether		92.5	185	366	U
132-64-9	Dibenzofuran		92.5	185	366	U
84-74-2	Di-n-butylphthalate		92.5	185	366	U
120-83-2	2,4-Dichlorophenol		92.5	185	366	U
84-66-2	Diethylphthalate		92.5	185	366	U
105-67-9	2,4-Dimethylphenol		370	741	1440	Q, U
131-11-3	Dimethyl phthalate		92.5	185	366	U
534-52-1	4,6-Dinitro-2-methylphenol		925	1850	3660	U
51-28-5	2,4-Dinitrophenol		925	1850	3660	U
121-14-2	2,4-Dinitrotoluene		92.5	185	366	U
606-20-2	2,6-Dinitrotoluene		92.5	185	366	U
117-84-0	Di-n-octylphthalate		92.5	185	366	X, U
117-81-7	Bis(2-ethylhexyl)phthalate		92.5	185	366	U
118-74-1	Hexachlorobenzene		92.5	185	366	U
87-68-3	Hexachlorobutadiene		92.5	185	366	Q, X, U
77-47-4	Hexachlorocyclopentadiene		92.5	185	366	U
67-72-1	Hexachloroethane		92.5	185	366	U
78-59-1	Isophorone		92.5	185	366	X, U
95-48-7	2-Methylphenol		92.5	185	366	U
106-44-5	4-Methylphenol		92.5	185	366	U
100-01-6	4-Nitroaniline		370	741	1440	U
99-09-2	3-Nitroaniline		370	741	1440	U
88-74-4	2-Nitroaniline		370	741	1440	X, U
98-95-3	Nitrobenzene		92.5	185	366	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB28-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-21	File ID:	1218521.D
Sampled:	12/20/10 17:00	Prepared:	12/23/10 13:30	Analyzed:	01/10/11 19:15
Solids:	87.72	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A01104	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		370	741	1440	U
88-75-5	2-Nitrophenol		92.5	185	366	U
86-30-6	N-Nitrosodiphenylamine		92.5	185	366	Q, U
621-64-7	N-Nitroso-di-n-propylamine		92.5	185	366	X, U
87-86-5	Pentachlorophenol		370	741	1440	U
108-95-2	Phenol		92.5	185	366	Q, U
88-06-2	2,4,6-Trichlorophenol		92.5	185	366	U
95-95-4	2,4,5-Trichlorophenol		92.5	185	366	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3701	2680	72.4	45 - 105	
2-Fluorophenol	7402	4994	67.5	35 - 105	
Nitrobenzene-d5	3701	3526	95.3	35 - 100	X
Phenol-d6	7402	5536	74.8	40 - 100	
Terphenyl-d14	3701	4009	108	30 - 125	X
2,4,6-Tribromophenol	7402	4351	58.8	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB28-0204

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-22	File ID:	1218522.D
Sampled:	12/20/10 17:05	Prepared:	12/23/10 13:30	Analyzed:	01/06/11 22:11
Solids:	88.95	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00701	Calibration:	0351002
Instrument:	MS-BNA3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		93.0	186	369	Y, U
98-86-2	Acetophenone		93.0	186	369	U
1912-24-9	Atrazine		93.0	186	369	U
100-52-7	Benzaldehyde		93.0	186	369	U
92-52-4	1,1-Biphenyl		93.0	186	369	U
101-55-3	4-Bromophenyl-phenylether		93.0	186	369	U
85-68-7	Butylbenzylphthalate		93.0	186	369	U
105-60-2	Caprolactam		93.0	186	369	U
86-74-8	Carbazole	1080	93.0	186	369	Y
59-50-7	4-Chloro-3-methylphenol		93.0	186	369	U
106-47-8	4-Chloroaniline		93.0	186	369	U
111-91-1	Bis(2-chloroethoxy)methane		93.0	186	369	Q, U
111-44-4	Bis(2-chloroethyl)ether		93.0	186	369	U
108-60-1	2,2'-Oxybis-1-chloropropane		93.0	186	369	U
91-58-7	2-Chloronaphthalene		93.0	186	369	U
95-57-8	2-Chlorophenol		93.0	186	369	U
7005-72-3	4-Chlorophenyl phenyl ether		93.0	186	369	U
132-64-9	Dibenzofuran	1140	93.0	186	369	
84-74-2	Di-n-butylphthalate		93.0	186	369	U
120-83-2	2,4-Dichlorophenol		93.0	186	369	U
84-66-2	Diethylphthalate		93.0	186	369	U
105-67-9	2,4-Dimethylphenol		372	745	1450	Q, U
131-11-3	Dimethyl phthalate		93.0	186	369	U
534-52-1	4,6-Dinitro-2-methylphenol		930	1860	3690	U
51-28-5	2,4-Dinitrophenol		930	1860	3690	U
121-14-2	2,4-Dinitrotoluene		93.0	186	369	U
606-20-2	2,6-Dinitrotoluene		93.0	186	369	U
117-84-0	Di-n-octylphthalate		93.0	186	369	U
117-81-7	Bis(2-ethylhexyl)phthalate		93.0	186	369	U
118-74-1	Hexachlorobenzene		93.0	186	369	U
87-68-3	Hexachlorobutadiene		93.0	186	369	Q, X, U
77-47-4	Hexachlorocyclopentadiene		93.0	186	369	X, U
67-72-1	Hexachloroethane		93.0	186	369	U
78-59-1	Isophorone		93.0	186	369	X, U
95-48-7	2-Methylphenol		93.0	186	369	U
106-44-5	4-Methylphenol		93.0	186	369	U
100-01-6	4-Nitroaniline		372	745	1450	U
99-09-2	3-Nitroaniline		372	745	1450	U
88-74-4	2-Nitroaniline		372	745	1450	X, U
98-95-3	Nitrobenzene		93.0	186	369	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB28-0204

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-22 File ID: 1218522.D

Sampled: 12/20/10 17:05 Prepared: 12/23/10 13:30 Analyzed: 01/06/11 22:11

Solids: 88.95 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		372	745	1450	U
88-75-5	2-Nitrophenol		93.0	186	369	U
86-30-6	N-Nitrosodiphenylamine		93.0	186	369	Q, U
621-64-7	N-Nitroso-di-n-propylamine		93.0	186	369	X, U
87-86-5	Pentachlorophenol		372	745	1450	U
108-95-2	Phenol		93.0	186	369	Q, U
88-06-2	2,4,6-Trichlorophenol		93.0	186	369	U
95-95-4	2,4,5-Trichlorophenol		93.0	186	369	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3723	2828	76.0	45 - 105	
2-Fluorophenol	7445	5441	73.1	35 - 105	
Nitrobenzene-d5	3723	3501	94.1	35 - 100	X
Phenol-d6	7445	5587	75.0	40 - 100	
Terphenyl-d14	3723	3940	106	30 - 125	
2,4,6-Tribromophenol	7445	4733	63.6	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB29-0005

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-23 File ID: 1218523.D

Sampled: 12/20/10 17:20 Prepared: 12/28/10 09:56 Analyzed: 01/05/11 22:58

Solids: 86.52 Preparation: EXT_3546 Dilution: 1

Batch: 0L27012 Sequence: 1A00601 Calibration: 0362004 Instrument: MS-BNA1

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		96.3	193	381	N, U
98-86-2	Acetophenone		96.3	193	381	U
1912-24-9	Atrazine		96.3	193	381	U
100-52-7	Benzaldehyde		96.3	193	381	U
92-52-4	1,1-Biphenyl		96.3	193	381	U
101-55-3	4-Bromophenyl-phenylether		96.3	193	381	U
85-68-7	Butylbenzylphthalate		96.3	193	381	Q, N, X, U
105-60-2	Caprolactam		96.3	193	381	U
86-74-8	Carbazole		96.3	193	381	U
59-50-7	4-Chloro-3-methylphenol		96.3	193	381	Q, U
106-47-8	4-Chloroaniline		96.3	193	381	U
111-91-1	Bis(2-chloroethoxy)methane		96.3	193	381	Q, U
111-44-4	Bis(2-chloroethyl)ether		96.3	193	381	U
108-60-1	2,2'-Oxybis-1-chloropropane		96.3	193	381	Q, X, U
91-58-7	2-Chloronaphthalene		96.3	193	381	U
95-57-8	2-Chlorophenol		96.3	193	381	U
7005-72-3	4-Chlorophenyl phenyl ether		96.3	193	381	U
132-64-9	Dibenzofuran		96.3	193	381	U
84-74-2	Di-n-butylphthalate		96.3	193	381	Q, N, U
120-83-2	2,4-Dichlorophenol		96.3	193	381	U
84-66-2	Diethylphthalate		96.3	193	381	U
105-67-9	2,4-Dimethylphenol		385	771	1500	Q, U
131-11-3	Dimethyl phthalate		96.3	193	381	U
534-52-1	4,6-Dinitro-2-methylphenol		963	1930	3810	U
51-28-5	2,4-Dinitrophenol		963	1930	3810	Q, X, U
121-14-2	2,4-Dinitrotoluene		96.3	193	381	Q, U
606-20-2	2,6-Dinitrotoluene		96.3	193	381	U
117-84-0	Di-n-octylphthalate		96.3	193	381	Q, X, N, U
117-81-7	Bis(2-ethylhexyl)phthalate		96.3	193	381	Q, N, X, U
118-74-1	Hexachlorobenzene		96.3	193	381	U
87-68-3	Hexachlorobutadiene		96.3	193	381	U
77-47-4	Hexachlorocyclopentadiene		96.3	193	381	N, U
67-72-1	Hexachloroethane		96.3	193	381	U
78-59-1	Isophorone		96.3	193	381	U
95-48-7	2-Methylphenol		96.3	193	381	U
106-44-5	4-Methylphenol		96.3	193	381	U
100-01-6	4-Nitroaniline		385	771	1500	Q, X, U
99-09-2	3-Nitroaniline		385	771	1500	U
88-74-4	2-Nitroaniline		385	771	1500	Q, X, N, U
98-95-3	Nitrobenzene		96.3	193	381	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB29-0005

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-23 File ID: 1218523.D

Sampled: 12/20/10 17:20 Prepared: 12/28/10 09:56 Analyzed: 01/05/11 22:58

Solids: 86.52 Preparation: EXT_3546 Dilution: 1

Batch: 0L27012 Sequence: 1A00601 Calibration: 0362004 Instrument: MS-BNA1

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		385	771	1500	X, U
88-75-5	2-Nitrophenol		96.3	193	381	Q, U
86-30-6	N-Nitrosodiphenylamine		96.3	193	381	U
621-64-7	N-Nitroso-di-n-propylamine		96.3	193	381	Q, X, U
87-86-5	Pentachlorophenol		385	771	1500	Q, U
108-95-2	Phenol		96.3	193	381	U
88-06-2	2,4,6-Trichlorophenol		96.3	193	381	U
95-95-4	2,4,5-Trichlorophenol		96.3	193	381	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3853	3288	85.3	45 - 105	
2-Fluorophenol	7705	5324	69.1	35 - 105	
Nitrobenzene-d5	3853	3902	101	35 - 100	*X
Phenol-d6	7705	6556	85.1	40 - 100	
Terphenyl-d14	3853	3803	98.7	30 - 125	
2,4,6-Tribromophenol	7705	6180	80.2	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB29-0204

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-24 File ID: 1218524.D

Sampled: 12/20/10 17:25 Prepared: 12/28/10 09:56 Analyzed: 01/05/11 23:26

Solids: 83.01 Preparation: EXT_3546 Dilution: 1

Batch: 0L27012 Sequence: 1A00601 Calibration: 0362004 Instrument: MS-BNA1

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		100	201	398	U
98-86-2	Acetophenone		100	201	398	U
1912-24-9	Atrazine		100	201	398	U
100-52-7	Benzaldehyde		100	201	398	U
92-52-4	1,1-Biphenyl		100	201	398	U
101-55-3	4-Bromophenyl-phenylether		100	201	398	U
85-68-7	Butylbenzylphthalate		100	201	398	Q, X, U
105-60-2	Caprolactam		100	201	398	U
86-74-8	Carbazole		100	201	398	U
59-50-7	4-Chloro-3-methylphenol		100	201	398	Q, U
106-47-8	4-Chloroaniline		100	201	398	U
111-91-1	Bis(2-chloroethoxy)methane		100	201	398	Q, U
111-44-4	Bis(2-chloroethyl)ether		100	201	398	U
108-60-1	2,2'-Oxybis-1-chloropropane		100	201	398	Q, X, U
91-58-7	2-Chloronaphthalene		100	201	398	U
95-57-8	2-Chlorophenol		100	201	398	U
7005-72-3	4-Chlorophenyl phenyl ether		100	201	398	U
132-64-9	Dibenzofuran		100	201	398	U
84-74-2	Di-n-butylphthalate		100	201	398	Q, U
120-83-2	2,4-Dichlorophenol		100	201	398	U
84-66-2	Diethylphthalate		100	201	398	U
105-67-9	2,4-Dimethylphenol		401	804	1570	Q, U
131-11-3	Dimethyl phthalate		100	201	398	U
534-52-1	4,6-Dinitro-2-methylphenol		1000	2010	3980	U
51-28-5	2,4-Dinitrophenol		1000	2010	3980	Q, X, U
121-14-2	2,4-Dinitrotoluene		100	201	398	Q, U
606-20-2	2,6-Dinitrotoluene		100	201	398	U
117-84-0	Di-n-octylphthalate		100	201	398	Q, X, U
117-81-7	Bis(2-ethylhexyl)phthalate		100	201	398	Q, X, U
118-74-1	Hexachlorobenzene		100	201	398	U
87-68-3	Hexachlorobutadiene		100	201	398	U
77-47-4	Hexachlorocyclopentadiene		100	201	398	U
67-72-1	Hexachloroethane		100	201	398	U
78-59-1	Isophorone		100	201	398	U
95-48-7	2-Methylphenol		100	201	398	U
106-44-5	4-Methylphenol		100	201	398	U
100-01-6	4-Nitroaniline		401	804	1570	Q, X, U
99-09-2	3-Nitroaniline		401	804	1570	U
88-74-4	2-Nitroaniline		401	804	1570	Q, X, U
98-95-3	Nitrobenzene		100	201	398	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB29-0204

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-24	File ID:	1218524.D
Sampled:	12/20/10 17:25	Prepared:	12/28/10 09:56	Analyzed:	01/05/11 23:26
Solids:	83.01	Preparation:	EXT_3546	Dilution:	1
Batch:	0L27012	Sequence:	1A00601	Calibration:	0362004
Instrument:	MS-BNA1				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		401	804	1570	X, U
88-75-5	2-Nitrophenol		100	201	398	Q, U
86-30-6	N-Nitrosodiphenylamine		100	201	398	U
621-64-7	N-Nitroso-di-n-propylamine		100	201	398	Q, X, U
87-86-5	Pentachlorophenol		401	804	1570	Q, U
108-95-2	Phenol		100	201	398	U
88-06-2	2,4,6-Trichlorophenol		100	201	398	U
95-95-4	2,4,5-Trichlorophenol		100	201	398	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	4016	3116	77.6	45 - 105	
2-Fluorophenol	8032	5776	71.9	35 - 105	
Nitrobenzene-d5	4016	4189	104	35 - 100	*X
Phenol-d6	8032	6823	85.0	40 - 100	
Terphenyl-d14	4016	3701	92.2	30 - 125	
2,4,6-Tribromophenol	8032	6007	74.8	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB30-0005

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-06 File ID: 1218506.D

Sampled: 12/20/10 14:20 Prepared: 12/23/10 13:30 Analyzed: 01/06/11 18:04

Solids: 91.08 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		90.3	181	358	Y, U
98-86-2	Acetophenone		90.3	181	358	U
1912-24-9	Atrazine		90.3	181	358	U
100-52-7	Benzaldehyde		90.3	181	358	U
92-52-4	1,1-Biphenyl		90.3	181	358	U
101-55-3	4-Bromophenyl-phenylether		90.3	181	358	U
85-68-7	Butylbenzylphthalate		90.3	181	358	U
105-60-2	Caprolactam		90.3	181	358	U
86-74-8	Carbazole		90.3	181	358	U
59-50-7	4-Chloro-3-methylphenol		90.3	181	358	Y, U
106-47-8	4-Chloroaniline		90.3	181	358	U
111-91-1	Bis(2-chloroethoxy)methane		90.3	181	358	U
111-44-4	Bis(2-chloroethyl)ether		90.3	181	358	Q, U
108-60-1	2,2'-Oxybis-1-chloropropane		90.3	181	358	U
91-58-7	2-Chloronaphthalene		90.3	181	358	U
95-57-8	2-Chlorophenol		90.3	181	358	U
7005-72-3	4-Chlorophenyl phenyl ether		90.3	181	358	U
132-64-9	Dibenzofuran		90.3	181	358	U
84-74-2	Di-n-butylphthalate		90.3	181	358	U
120-83-2	2,4-Dichlorophenol		90.3	181	358	U
84-66-2	Diethylphthalate		90.3	181	358	U
105-67-9	2,4-Dimethylphenol		361	723	1410	Q, U
131-11-3	Dimethyl phthalate		90.3	181	358	U
534-52-1	4,6-Dinitro-2-methylphenol		903	1810	3580	U
51-28-5	2,4-Dinitrophenol		903	1810	3580	U
121-14-2	2,4-Dinitrotoluene		90.3	181	358	U
606-20-2	2,6-Dinitrotoluene		90.3	181	358	U
117-84-0	Di-n-octylphthalate		90.3	181	358	U
117-81-7	Bis(2-ethylhexyl)phthalate		90.3	181	358	U
118-74-1	Hexachlorobenzene		90.3	181	358	U
87-68-3	Hexachlorobutadiene		90.3	181	358	X, Q, U
77-47-4	Hexachlorocyclopentadiene		90.3	181	358	X, U
67-72-1	Hexachloroethane		90.3	181	358	U
78-59-1	Isophorone		90.3	181	358	X, U
95-48-7	2-Methylphenol		90.3	181	358	U
106-44-5	4-Methylphenol		90.3	181	358	U
100-01-6	4-Nitroaniline		361	723	1410	U
99-09-2	3-Nitroaniline		361	723	1410	U
88-74-4	2-Nitroaniline		361	723	1410	X, U
98-95-3	Nitrobenzene		90.3	181	358	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB30-0005

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-06 File ID: 1218506.D

Sampled: 12/20/10 14:20 Prepared: 12/23/10 13:30 Analyzed: 01/06/11 18:04

Solids: 91.08 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		361	723	1410	U
88-75-5	2-Nitrophenol		90.3	181	358	U
86-30-6	N-Nitrosodiphenylamine		90.3	181	358	Q, U
621-64-7	N-Nitroso-di-n-propylamine		90.3	181	358	X, U
87-86-5	Pentachlorophenol		361	723	1410	U
108-95-2	Phenol		90.3	181	358	Q, U
88-06-2	2,4,6-Trichlorophenol		90.3	181	358	U
95-95-4	2,4,5-Trichlorophenol		90.3	181	358	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3612	2630	72.8	45 - 105	
2-Fluorophenol	7224	5200	72.0	35 - 105	
Nitrobenzene-d5	3612	3376	93.5	35 - 100	X
Phenol-d6	7224	5443	75.4	40 - 100	
Terphenyl-d14	3612	3417	94.6	30 - 125	
2,4,6-Tribromophenol	7224	4871	67.4	35 - 125	

ANALYSIS DATA SHEET

NTC12-SB30-00502

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-07 File ID: 1218507.D

Sampled: 12/20/10 14:25 Prepared: 12/23/10 13:30 Analyzed: 01/06/11 18:35

Solids: 87.53 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		93.9	188	372	Y, U
98-86-2	Acetophenone		93.9	188	372	U
1912-24-9	Atrazine		93.9	188	372	U
100-52-7	Benzaldehyde		93.9	188	372	U
92-52-4	1,1-Biphenyl		93.9	188	372	U
101-55-3	4-Bromophenyl-phenylether		93.9	188	372	U
85-68-7	Butylbenzylphthalate		93.9	188	372	U
105-60-2	Caprolactam		93.9	188	372	U
86-74-8	Carbazole		93.9	188	372	Y, U
59-50-7	4-Chloro-3-methylphenol		93.9	188	372	U
106-47-8	4-Chloroaniline		93.9	188	372	U
111-91-1	Bis(2-chloroethoxy)methane		93.9	188	372	Q, U
111-44-4	Bis(2-chloroethyl)ether		93.9	188	372	U
108-60-1	2,2'-Oxybis-1-chloropropane		93.9	188	372	U
91-58-7	2-Chloronaphthalene		93.9	188	372	U
95-57-8	2-Chlorophenol		93.9	188	372	U
7005-72-3	4-Chlorophenyl phenyl ether		93.9	188	372	U
132-64-9	Dibenzofuran		93.9	188	372	U
84-74-2	Di-n-butylphthalate		93.9	188	372	U
120-83-2	2,4-Dichlorophenol		93.9	188	372	U
84-66-2	Diethylphthalate		93.9	188	372	U
105-67-9	2,4-Dimethylphenol		375	752	1470	Q, U
131-11-3	Dimethyl phthalate		93.9	188	372	U
534-52-1	4,6-Dinitro-2-methylphenol		939	1880	3720	U
51-28-5	2,4-Dinitrophenol		939	1880	3720	U
121-14-2	2,4-Dinitrotoluene		93.9	188	372	U
606-20-2	2,6-Dinitrotoluene		93.9	188	372	U
117-84-0	Di-n-octylphthalate		93.9	188	372	U
117-81-7	Bis(2-ethylhexyl)phthalate		93.9	188	372	U
118-74-1	Hexachlorobenzene		93.9	188	372	U
87-68-3	Hexachlorobutadiene		93.9	188	372	Q, X, U
77-47-4	Hexachlorocyclopentadiene		93.9	188	372	X, U
67-72-1	Hexachloroethane		93.9	188	372	U
78-59-1	Isophorone		93.9	188	372	X, U
95-48-7	2-Methylphenol		93.9	188	372	U
106-44-5	4-Methylphenol		93.9	188	372	U
100-01-6	4-Nitroaniline		375	752	1470	U
99-09-2	3-Nitroaniline		375	752	1470	U
88-74-4	2-Nitroaniline		375	752	1470	X, U
98-95-3	Nitrobenzene		93.9	188	372	Q, X, U

ANALYSIS DATA SHEET

NTC12-SB30-00502

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-07 File ID: 1218507.D

Sampled: 12/20/10 14:25 Prepared: 12/23/10 13:30 Analyzed: 01/06/11 18:35

Solids: 87.53 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
100-02-7	4-Nitrophenol		375	752	1470	U
88-75-5	2-Nitrophenol		93.9	188	372	U
86-30-6	N-Nitrosodiphenylamine		93.9	188	372	Q, U
621-64-7	N-Nitroso-di-n-propylamine		93.9	188	372	X, U
87-86-5	Pentachlorophenol		375	752	1470	U
108-95-2	Phenol		93.9	188	372	Q, U
88-06-2	2,4,6-Trichlorophenol		93.9	188	372	U
95-95-4	2,4,5-Trichlorophenol		93.9	188	372	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3758	2984	79.4	45 - 105	
2-Fluorophenol	7516	6184	82.3	35 - 105	
Nitrobenzene-d5	3758	4004	107	35 - 100	*X
Phenol-d6	7516	6568	87.4	40 - 100	
Terphenyl-d14	3758	3769	100	30 - 125	
2,4,6-Tribromophenol	7516	5651	75.2	35 - 125	

ANALYSIS DATA SHEET

NTC12-DUP01

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-10	File ID:	1218510.D
Sampled:	12/20/10 00:00	Prepared:	12/23/10 13:30	Analyzed:	01/07/11 18:00
Solids:	89.40	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00708	Calibration:	0327001
Instrument:	MS-BNA4				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	5.33	1.87	3.72	7.46	J
208-96-8	Acenaphthylene	6.46	1.87	3.72	7.46	J
120-12-7	Anthracene	14.1	1.87	3.72	7.46	
56-55-3	Benzo(a)anthracene	65.1	1.87	3.72	7.46	
50-32-8	Benzo(a)pyrene	74.2	1.87	3.72	7.46	
205-99-2	Benzo(b)fluoranthene	106	1.87	3.72	7.46	
191-24-2	Benzo(g,h,i)perylene	44.0	1.87	3.72	7.46	
207-08-9	Benzo(k)fluoranthene	37.5	1.87	3.72	7.46	Q
218-01-9	Chrysene	63.7	1.87	3.72	7.46	
53-70-3	Dibenz(a,h)anthracene	11.8	1.87	3.72	7.46	
206-44-0	Fluoranthene	110	1.87	3.72	7.46	
86-73-7	Fluorene	4.42	1.87	3.72	7.46	J
193-39-5	Indeno(1,2,3-cd)pyrene	38.1	1.87	3.72	7.46	
91-57-6	2-Methylnaphthalene	180	1.87	3.72	7.46	
91-20-3	Naphthalene	82.9	1.87	3.72	7.46	
85-01-8	Phenanthrene	71.0	1.87	3.72	7.46	
129-00-0	Pyrene	103	1.87	3.72	7.46	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3729	3316	88.9	14 - 129	
Terphenyl-d14	3729	3506	94.0	14 - 129	

ANALYSIS DATA SHEET

NTC12-DUP02

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-11	File ID:	1218511.D
Sampled:	12/20/10 00:00	Prepared:	12/23/10 13:30	Analyzed:	01/04/11 19:04
Solids:	82.90	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00413	Calibration:	0327001
Instrument:	MS-BNA4				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	222	2.01	4.02	8.05	
208-96-8	Acenaphthylene	82.9	2.01	4.02	8.05	
120-12-7	Anthracene	734	2.01	4.02	8.05	
56-55-3	Benzo(a)anthracene	2790	2.01	4.02	8.05	
50-32-8	Benzo(a)pyrene	1700	2.01	4.02	8.05	
205-99-2	Benzo(b)fluoranthene	2580	2.01	4.02	8.05	
191-24-2	Benzo(g,h,i)perylene	757	2.01	4.02	8.05	
207-08-9	Benzo(k)fluoranthene	746	2.01	4.02	8.05	Q
218-01-9	Chrysene	1950	2.01	4.02	8.05	
53-70-3	Dibenz(a,h)anthracene	320	2.01	4.02	8.05	
206-44-0	Fluoranthene	5850	2.01	4.02	8.05	E
86-73-7	Fluorene	303	2.01	4.02	8.05	
193-39-5	Indeno(1,2,3-cd)pyrene	804	2.01	4.02	8.05	
91-57-6	2-Methylnaphthalene	682	2.01	4.02	8.05	
91-20-3	Naphthalene	472	2.01	4.02	8.05	
85-01-8	Phenanthrene	2840	2.01	4.02	8.05	
129-00-0	Pyrene	4980	2.01	4.02	8.05	E

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	4021	3162	78.7	14 - 129	
Terphenyl-d14	4021	4236	105	14 - 129	

ANALYSIS DATA SHEET

NTC12-DUP02

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-11RE1	File ID:	1218511D.D
Sampled:	12/20/10 00:00	Prepared:	12/23/10 13:30	Analyzed:	01/07/11 16:29
Solids:	82.90	Preparation:	EXT_3546	Dilution:	5
Batch:	0L22011	Sequence:	1A00708	Calibration:	0327001
Instrument:	MS-BNA4				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	400	10.1	20.1	40.2	D
208-96-8	Acenaphthylene	128	10.1	20.1	40.2	D
120-12-7	Anthracene	1140	10.1	20.1	40.2	D
56-55-3	Benzo(a)anthracene	2610	10.1	20.1	40.2	D
50-32-8	Benzo(a)pyrene	2230	10.1	20.1	40.2	D
205-99-2	Benzo(b)fluoranthene	3460	10.1	20.1	40.2	D
191-24-2	Benzo(g,h,i)perylene	1000	10.1	20.1	40.2	D
207-08-9	Benzo(k)fluoranthene	1130	10.1	20.1	40.2	Q, D
218-01-9	Chrysene	2710	10.1	20.1	40.2	D
53-70-3	Dibenz(a,h)anthracene	318	10.1	20.1	40.2	D
206-44-0	Fluoranthene	6030	10.1	20.1	40.2	D
86-73-7	Fluorene	652	10.1	20.1	40.2	D
193-39-5	Indeno(1,2,3-cd)pyrene	918	10.1	20.1	40.2	D
91-57-6	2-Methylnaphthalene	929	10.1	20.1	40.2	D
91-20-3	Naphthalene	698	10.1	20.1	40.2	D
85-01-8	Phenanthrene	4300	10.1	20.1	40.2	D
129-00-0	Pyrene	5340	10.1	20.1	40.2	D

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	4021	3924	97.6	14 - 129	
Terphenyl-d14	4021	4360	108	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB21-0005

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-17 File ID: 1218517.D

Sampled: 12/20/10 16:20 Prepared: 12/23/10 13:30 Analyzed: 01/04/11 21:34

Solids: 85.01 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00413 Calibration: 0327001 Instrument: MS-BNA4

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	141	1.95	3.89	7.79	
208-96-8	Acenaphthylene	98.1	1.95	3.89	7.79	
120-12-7	Anthracene	581	1.95	3.89	7.79	
56-55-3	Benzo(a)anthracene	1830	1.95	3.89	7.79	
50-32-8	Benzo(a)pyrene	1430	1.95	3.89	7.79	
205-99-2	Benzo(b)fluoranthene	919	1.95	3.89	7.79	
191-24-2	Benzo(g,h,i)perylene	711	1.95	3.89	7.79	
207-08-9	Benzo(k)fluoranthene	2280	1.95	3.89	7.79	Q
218-01-9	Chrysene	1530	1.95	3.89	7.79	
53-70-3	Dibenz(a,h)anthracene	287	1.95	3.89	7.79	
206-44-0	Fluoranthene	4090	1.95	3.89	7.79	E
86-73-7	Fluorene	179	1.95	3.89	7.79	
193-39-5	Indeno(1,2,3-cd)pyrene	674	1.95	3.89	7.79	
91-57-6	2-Methylnaphthalene	28.8	1.95	3.89	7.79	
91-20-3	Naphthalene	24.5	1.95	3.89	7.79	
85-01-8	Phenanthrene	2370	1.95	3.89	7.79	
129-00-0	Pyrene	3190	1.95	3.89	7.79	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3895	2542	65.3	14 - 129	
Terphenyl-d14	3895	3244	83.3	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB21-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-17RE1	File ID:	1218517D.D
Sampled:	12/20/10 16:20	Prepared:	12/23/10 13:30	Analyzed:	01/07/11 17:00
Solids:	85.01	Preparation:	EXT_3546	Dilution:	5
Batch:	0L22011	Sequence:	1A00708	Calibration:	0327001
Instrument:	MS-BNA4				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	192	9.76	19.5	39.0	D
208-96-8	Acenaphthylene	105	9.76	19.5	39.0	D
120-12-7	Anthracene	564	9.76	19.5	39.0	D
56-55-3	Benzo(a)anthracene	1950	9.76	19.5	39.0	D
50-32-8	Benzo(a)pyrene	1780	9.76	19.5	39.0	D
205-99-2	Benzo(b)fluoranthene	2650	9.76	19.5	39.0	D
191-24-2	Benzo(g,h,i)perylene	798	9.76	19.5	39.0	D
207-08-9	Benzo(k)fluoranthene	1010	9.76	19.5	39.0	Q, D
218-01-9	Chrysene	1980	9.76	19.5	39.0	D
53-70-3	Dibenz(a,h)anthracene	258	9.76	19.5	39.0	D
206-44-0	Fluoranthene	4290	9.76	19.5	39.0	D
86-73-7	Fluorene	206	9.76	19.5	39.0	D
193-39-5	Indeno(1,2,3-cd)pyrene	775	9.76	19.5	39.0	D
91-57-6	2-Methylnaphthalene	40.7	9.76	19.5	39.0	D
91-20-3	Naphthalene	38.5	9.76	19.5	39.0	J, D
85-01-8	Phenanthrene	2550	9.76	19.5	39.0	D
129-00-0	Pyrene	3280	9.76	19.5	39.0	D

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3895	3412	87.6	14 - 129	
Terphenyl-d14	3895	3144	80.7	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB21-0507

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-18	File ID:	1218518.D
Sampled:	12/20/10 16:25	Prepared:	12/23/10 13:30	Analyzed:	01/04/11 22:04
Solids:	85.25	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00413	Calibration:	0327001
Instrument:	MS-BNA4				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	275	1.93	3.85	7.72	
208-96-8	Acenaphthylene	75.3	1.93	3.85	7.72	
120-12-7	Anthracene	481	1.93	3.85	7.72	
56-55-3	Benzo(a)anthracene	1290	1.93	3.85	7.72	
50-32-8	Benzo(a)pyrene	1350	1.93	3.85	7.72	
205-99-2	Benzo(b)fluoranthene	830	1.93	3.85	7.72	
191-24-2	Benzo(g,h,i)perylene	620	1.93	3.85	7.72	
207-08-9	Benzo(k)fluoranthene	1450	1.93	3.85	7.72	Q
218-01-9	Chrysene	1120	1.93	3.85	7.72	
53-70-3	Dibenz(a,h)anthracene	336	1.93	3.85	7.72	
206-44-0	Fluoranthene	2790	1.93	3.85	7.72	
86-73-7	Fluorene	282	1.93	3.85	7.72	
193-39-5	Indeno(1,2,3-cd)pyrene	639	1.93	3.85	7.72	
91-57-6	2-Methylnaphthalene	431	1.93	3.85	7.72	
91-20-3	Naphthalene	255	1.93	3.85	7.72	
85-01-8	Phenanthrene	2140	1.93	3.85	7.72	
129-00-0	Pyrene	2500	1.93	3.85	7.72	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3859	2247	58.2	14 - 129	
Terphenyl-d14	3859	2748	71.2	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB22-0005

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-15 File ID: 1218515.D

Sampled: 12/20/10 15:55 Prepared: 12/23/10 13:30 Analyzed: 01/04/11 20:34

Solids: 87.11 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00413 Calibration: 0327001 Instrument: MS-BNA4

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	22.4	1.90	3.80	7.61	
208-96-8	Acenaphthylene	56.2	1.90	3.80	7.61	
120-12-7	Anthracene	209	1.90	3.80	7.61	
56-55-3	Benzo(a)anthracene	1080	1.90	3.80	7.61	
50-32-8	Benzo(a)pyrene	1040	1.90	3.80	7.61	
205-99-2	Benzo(b)fluoranthene	1490	1.90	3.80	7.61	
191-24-2	Benzo(g,h,i)perylene	531	1.90	3.80	7.61	
207-08-9	Benzo(k)fluoranthene	621	1.90	3.80	7.61	Q
218-01-9	Chrysene	953	1.90	3.80	7.61	
53-70-3	Dibenz(a,h)anthracene	183	1.90	3.80	7.61	
206-44-0	Fluoranthene	2250	1.90	3.80	7.61	
86-73-7	Fluorene	24.7	1.90	3.80	7.61	
193-39-5	Indeno(1,2,3-cd)pyrene	490	1.90	3.80	7.61	
91-57-6	2-Methylnaphthalene	28.4	1.90	3.80	7.61	
91-20-3	Naphthalene	28.5	1.90	3.80	7.61	
85-01-8	Phenanthrene	529	1.90	3.80	7.61	
129-00-0	Pyrene	1880	1.90	3.80	7.61	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3801	2998	78.9	14 - 129	
Terphenyl-d14	3801	3281	86.3	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB22-00502

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-16 File ID: 1218516.D

Sampled: 12/20/10 16:00 Prepared: 12/23/10 13:30 Analyzed: 01/04/11 21:04

Solids: 85.85 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00413 Calibration: 0327001 Instrument: MS-BNA4

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	26.6	1.95	3.88	7.77	
208-96-8	Acenaphthylene	39.7	1.95	3.88	7.77	
120-12-7	Anthracene	115	1.95	3.88	7.77	
56-55-3	Benzo(a)anthracene	475	1.95	3.88	7.77	
50-32-8	Benzo(a)pyrene	632	1.95	3.88	7.77	
205-99-2	Benzo(b)fluoranthene	801	1.95	3.88	7.77	
191-24-2	Benzo(g,h,i)perylene	417	1.95	3.88	7.77	
207-08-9	Benzo(k)fluoranthene	515	1.95	3.88	7.77	Q
218-01-9	Chrysene	518	1.95	3.88	7.77	
53-70-3	Dibenz(a,h)anthracene	106	1.95	3.88	7.77	
206-44-0	Fluoranthene	1400	1.95	3.88	7.77	
86-73-7	Fluorene	41.7	1.95	3.88	7.77	
193-39-5	Indeno(1,2,3-cd)pyrene	366	1.95	3.88	7.77	
91-57-6	2-Methylnaphthalene	26.5	1.95	3.88	7.77	
91-20-3	Naphthalene	18.2	1.95	3.88	7.77	
85-01-8	Phenanthrene	775	1.95	3.88	7.77	
129-00-0	Pyrene	1150	1.95	3.88	7.77	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3883	3125	80.5	14 - 129	
Terphenyl-d14	3883	3665	94.4	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB23-0005

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-01 File ID: 1218501.D

Sampled: 12/20/10 13:00 Prepared: 12/23/10 13:30 Analyzed: 01/03/11 23:56

Solids: 94.21 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00409 Calibration: 0327001 Instrument: MS-BNA4

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	5.48	1.73	3.44	6.90	J
208-96-8	Acenaphthylene	4.21	1.73	3.44	6.90	J
120-12-7	Anthracene	24.7	1.73	3.44	6.90	
56-55-3	Benzo(a)anthracene	90.3	1.73	3.44	6.90	
50-32-8	Benzo(a)pyrene	111	1.73	3.44	6.90	
205-99-2	Benzo(b)fluoranthene	149	1.73	3.44	6.90	
191-24-2	Benzo(g,h,i)perylene	61.2	1.73	3.44	6.90	
207-08-9	Benzo(k)fluoranthene	67.0	1.73	3.44	6.90	Q
218-01-9	Chrysene	122	1.73	3.44	6.90	
53-70-3	Dibenz(a,h)anthracene	17.8	1.73	3.44	6.90	
206-44-0	Fluoranthene	204	1.73	3.44	6.90	
86-73-7	Fluorene	5.63	1.73	3.44	6.90	J
193-39-5	Indeno(1,2,3-cd)pyrene	58.2	1.73	3.44	6.90	
91-57-6	2-Methylnaphthalene	10.8	1.73	3.44	6.90	
91-20-3	Naphthalene	10.3	1.73	3.44	6.90	
85-01-8	Phenanthrene	108	1.73	3.44	6.90	
129-00-0	Pyrene	180	1.73	3.44	6.90	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3446	2590	75.2	14 - 129	
Terphenyl-d14	3446	3299	95.7	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB23-0810

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-02 File ID: 1218502.D

Sampled: 12/20/10 13:20 Prepared: 12/23/10 13:30 Analyzed: 01/04/11 00:26

Solids: 84.20 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00409 Calibration: 0327001 Instrument: MS-BNA4

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	72.9	1.94	3.88	7.77	
208-96-8	Acenaphthylene	25.8	1.94	3.88	7.77	
120-12-7	Anthracene	199	1.94	3.88	7.77	
56-55-3	Benzo(a)anthracene	204	1.94	3.88	7.77	
50-32-8	Benzo(a)pyrene	149	1.94	3.88	7.77	
205-99-2	Benzo(b)fluoranthene	179	1.94	3.88	7.77	
191-24-2	Benzo(g,h,i)perylene	52.4	1.94	3.88	7.77	
207-08-9	Benzo(k)fluoranthene	87.7	1.94	3.88	7.77	Q
218-01-9	Chrysene	223	1.94	3.88	7.77	
53-70-3	Dibenz(a,h)anthracene	17.4	1.94	3.88	7.77	
206-44-0	Fluoranthene	500	1.94	3.88	7.77	
86-73-7	Fluorene	73.7	1.94	3.88	7.77	
193-39-5	Indeno(1,2,3-cd)pyrene	50.4	1.94	3.88	7.77	
91-57-6	2-Methylnaphthalene	49.4	1.94	3.88	7.77	
91-20-3	Naphthalene	61.3	1.94	3.88	7.77	
85-01-8	Phenanthrene	415	1.94	3.88	7.77	
129-00-0	Pyrene	478	1.94	3.88	7.77	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3881	3061	78.9	14 - 129	
Terphenyl-d14	3881	3602	92.8	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB24-0005

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-03 File ID: 1218503.D

Sampled: 12/20/10 14:00 Prepared: 12/23/10 13:30 Analyzed: 01/04/11 15:33

Solids: 83.57 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00413 Calibration: 0327001 Instrument: MS-BNA4

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	12.3	1.99	3.96	7.93	
208-96-8	Acenaphthylene		1.99	3.96	7.93	U
120-12-7	Anthracene	43.1	1.99	3.96	7.93	
56-55-3	Benzo(a)anthracene	86.5	1.99	3.96	7.93	
50-32-8	Benzo(a)pyrene	76.8	1.99	3.96	7.93	
205-99-2	Benzo(b)fluoranthene	98.3	1.99	3.96	7.93	
191-24-2	Benzo(g,h,i)perylene	44.4	1.99	3.96	7.93	
207-08-9	Benzo(k)fluoranthene	42.6	1.99	3.96	7.93	Q
218-01-9	Chrysene	98.6	1.99	3.96	7.93	
53-70-3	Dibenz(a,h)anthracene	14.0	1.99	3.96	7.93	
206-44-0	Fluoranthene	213	1.99	3.96	7.93	
86-73-7	Fluorene	22.1	1.99	3.96	7.93	
193-39-5	Indeno(1,2,3-cd)pyrene	40.1	1.99	3.96	7.93	
91-57-6	2-Methylnaphthalene	11.2	1.99	3.96	7.93	
91-20-3	Naphthalene	17.6	1.99	3.96	7.93	
85-01-8	Phenanthrene	214	1.99	3.96	7.93	
129-00-0	Pyrene	170	1.99	3.96	7.93	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3962	3243	81.8	14 - 129	
Terphenyl-d14	3962	3668	92.6	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB24-00502

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-04 File ID: 1218504.D

Sampled: 12/20/10 14:05 Prepared: 12/23/10 13:30 Analyzed: 01/04/11 16:03

Solids: 89.56 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00413 Calibration: 0327001 Instrument: MS-BNA4

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	7.48	1.82	3.62	7.25	
208-96-8	Acenaphthylene		1.82	3.62	7.25	U
120-12-7	Anthracene	19.0	1.82	3.62	7.25	
56-55-3	Benzo(a)anthracene	41.3	1.82	3.62	7.25	
50-32-8	Benzo(a)pyrene	40.1	1.82	3.62	7.25	
205-99-2	Benzo(b)fluoranthene	53.7	1.82	3.62	7.25	
191-24-2	Benzo(g,h,i)perylene	26.9	1.82	3.62	7.25	
207-08-9	Benzo(k)fluoranthene	27.6	1.82	3.62	7.25	Q
218-01-9	Chrysene	63.0	1.82	3.62	7.25	
53-70-3	Dibenz(a,h)anthracene		1.82	3.62	7.25	U
206-44-0	Fluoranthene	118	1.82	3.62	7.25	
86-73-7	Fluorene	10.0	1.82	3.62	7.25	
193-39-5	Indeno(1,2,3-cd)pyrene	19.9	1.82	3.62	7.25	
91-57-6	2-Methylnaphthalene	8.50	1.82	3.62	7.25	
91-20-3	Naphthalene	8.38	1.82	3.62	7.25	
85-01-8	Phenanthrene	92.6	1.82	3.62	7.25	
129-00-0	Pyrene	104	1.82	3.62	7.25	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3625	2412	66.5	14 - 129	
Terphenyl-d14	3625	3353	92.5	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB25-0005

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-19 File ID: 1218519.D

Sampled: 12/20/10 16:35 Prepared: 12/23/10 13:30 Analyzed: 01/04/11 22:34

Solids: 87.55 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00413 Calibration: 0327001 Instrument: MS-BNA4

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	42.2	1.91	3.80	7.62	
208-96-8	Acenaphthylene	95.3	1.91	3.80	7.62	
120-12-7	Anthracene	370	1.91	3.80	7.62	
56-55-3	Benzo(a)anthracene	832	1.91	3.80	7.62	
50-32-8	Benzo(a)pyrene	988	1.91	3.80	7.62	
205-99-2	Benzo(b)fluoranthene	927	1.91	3.80	7.62	
191-24-2	Benzo(g,h,i)perylene	437	1.91	3.80	7.62	
207-08-9	Benzo(k)fluoranthene	1080	1.91	3.80	7.62	Q
218-01-9	Chrysene	943	1.91	3.80	7.62	
53-70-3	Dibenz(a,h)anthracene	258	1.91	3.80	7.62	
206-44-0	Fluoranthene	2110	1.91	3.80	7.62	
86-73-7	Fluorene	63.1	1.91	3.80	7.62	
193-39-5	Indeno(1,2,3-cd)pyrene	430	1.91	3.80	7.62	
91-57-6	2-Methylnaphthalene	35.6	1.91	3.80	7.62	
91-20-3	Naphthalene	31.1	1.91	3.80	7.62	
85-01-8	Phenanthrene	970	1.91	3.80	7.62	
129-00-0	Pyrene	1860	1.91	3.80	7.62	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3807	2477	65.1	14 - 129	
Terphenyl-d14	3807	3031	79.6	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB25-0204

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-20	File ID:	1218520.D
Sampled:	12/20/10 16:40	Prepared:	12/23/10 13:30	Analyzed:	01/07/11 21:02
Solids:	83.03	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00708	Calibration:	0327001
Instrument:	MS-BNA4				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	76.8	1.97	3.93	7.88	
208-96-8	Acenaphthylene	20.8	1.97	3.93	7.88	
120-12-7	Anthracene	216	1.97	3.93	7.88	
56-55-3	Benzo(a)anthracene	493	1.97	3.93	7.88	
50-32-8	Benzo(a)pyrene	770	1.97	3.93	7.88	
205-99-2	Benzo(b)fluoranthene	1080	1.97	3.93	7.88	
191-24-2	Benzo(g,h,i)perylene	314	1.97	3.93	7.88	
207-08-9	Benzo(k)fluoranthene	486	1.97	3.93	7.88	O
218-01-9	Chrysene	478	1.97	3.93	7.88	
53-70-3	Dibenz(a,h)anthracene	109	1.97	3.93	7.88	
206-44-0	Fluoranthene	1360	1.97	3.93	7.88	
86-73-7	Fluorene	77.4	1.97	3.93	7.88	
193-39-5	Indeno(1,2,3-cd)pyrene	309	1.97	3.93	7.88	
91-57-6	2-Methylnaphthalene	69.7	1.97	3.93	7.88	
91-20-3	Naphthalene	122	1.97	3.93	7.88	
85-01-8	Phenanthrene	881	1.97	3.93	7.88	
129-00-0	Pyrene	1120	1.97	3.93	7.88	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3936	2743	69.7	14 - 129	
Terphenyl-d14	3936	2583	65.6	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB26-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-08	File ID:	1218508.D
Sampled:	12/20/10 17:35	Prepared:	12/23/10 13:30	Analyzed:	01/07/11 21:32
Solids:	89.73	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00708	Calibration:	0327001
Instrument:	MS-BNA4				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	30.3	1.85	3.69	7.38	
208-96-8	Acenaphthylene	31.0	1.85	3.69	7.38	
120-12-7	Anthracene	109	1.85	3.69	7.38	
56-55-3	Benzo(a)anthracene	252	1.85	3.69	7.38	
50-32-8	Benzo(a)pyrene	546	1.85	3.69	7.38	S
205-99-2	Benzo(b)fluoranthene	853	1.85	3.69	7.38	S
191-24-2	Benzo(g,h,i)perylene	247	1.85	3.69	7.38	S
207-08-9	Benzo(k)fluoranthene	288	1.85	3.69	7.38	O, S
218-01-9	Chrysene	267	1.85	3.69	7.38	
53-70-3	Dibenz(a,h)anthracene	87.4	1.85	3.69	7.38	S
206-44-0	Fluoranthene	644	1.85	3.69	7.38	
86-73-7	Fluorene	34.5	1.85	3.69	7.38	
193-39-5	Indeno(1,2,3-cd)pyrene	243	1.85	3.69	7.38	S
91-57-6	2-Methylnaphthalene	49.2	1.85	3.69	7.38	
91-20-3	Naphthalene	38.2	1.85	3.69	7.38	
85-01-8	Phenanthrene	428	1.85	3.69	7.38	
129-00-0	Pyrene	553	1.85	3.69	7.38	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3690	3185	86.3	14 - 129	
Terphenyl-d14	3690	2821	76.5	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB26-0406

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix: Soil
Laboratory ID: 1012185-09
File ID: 1218509.D
Sampled: 12/20/10 17:40
Prepared: 12/23/10 13:30
Analyzed: 01/04/11 18:04
Solids: 79.89
Preparation: EXT_3546
Dilution: 1
Batch: 0L22011
Sequence: 1A00413
Calibration: 0327001
Instrument: MS-BNA4

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	403	2.08	4.14	8.29	
208-96-8	Acenaphthylene	73.1	2.08	4.14	8.29	
120-12-7	Anthracene	887	2.08	4.14	8.29	
56-55-3	Benzo(a)anthracene	2580	2.08	4.14	8.29	
50-32-8	Benzo(a)pyrene	1840	2.08	4.14	8.29	
205-99-2	Benzo(b)fluoranthene	1380	2.08	4.14	8.29	
191-24-2	Benzo(g,h,i)perylene	841	2.08	4.14	8.29	
207-08-9	Benzo(k)fluoranthene	2570	2.08	4.14	8.29	Q
218-01-9	Chrysene	2090	2.08	4.14	8.29	
53-70-3	Dibenz(a,h)anthracene	283	2.08	4.14	8.29	
206-44-0	Fluoranthene	5310	2.08	4.14	8.29	E
86-73-7	Fluorene	608	2.08	4.14	8.29	
193-39-5	Indeno(1,2,3-cd)pyrene	848	2.08	4.14	8.29	
91-57-6	2-Methylnaphthalene	545	2.08	4.14	8.29	
91-20-3	Naphthalene	439	2.08	4.14	8.29	
85-01-8	Phenanthrene	4750	2.08	4.14	8.29	E
129-00-0	Pyrene	4480	2.08	4.14	8.29	E

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	4145	1216	29.3	14 - 129	
Terphenyl-d14	4145	3385	81.7	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB26-0406

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-09RE1	File ID:	1218509D.D
Sampled:	12/20/10 17:40	Prepared:	12/23/10 13:30	Analyzed:	01/07/11 15:59
Solids:	79.89	Preparation:	EXT_3546	Dilution:	5
Batch:	0L22011	Sequence:	1A00708	Calibration:	0327001
Instrument:	MS-BNA4				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	528	10.4	20.7	41.5	D
208-96-8	Acenaphthylene	80.4	10.4	20.7	41.5	D
120-12-7	Anthracene	1370	10.4	20.7	41.5	D
56-55-3	Benzo(a)anthracene	2920	10.4	20.7	41.5	D
50-32-8	Benzo(a)pyrene	2230	10.4	20.7	41.5	D
205-99-2	Benzo(b)fluoranthene	3350	10.4	20.7	41.5	D
191-24-2	Benzo(g,h,i)perylene	993	10.4	20.7	41.5	D
207-08-9	Benzo(k)fluoranthene	1050	10.4	20.7	41.5	Q, D
218-01-9	Chrysene	3120	10.4	20.7	41.5	D
53-70-3	Dibenz(a,h)anthracene	287	10.4	20.7	41.5	D
206-44-0	Fluoranthene	6480	10.4	20.7	41.5	D
86-73-7	Fluorene	756	10.4	20.7	41.5	D
193-39-5	Indeno(1,2,3-cd)pyrene	906	10.4	20.7	41.5	D
91-57-6	2-Methylnaphthalene	860	10.4	20.7	41.5	D
91-20-3	Naphthalene	711	10.4	20.7	41.5	D
85-01-8	Phenanthrene	5520	10.4	20.7	41.5	D
129-00-0	Pyrene	5890	10.4	20.7	41.5	D

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	4145	4224	102	14 - 129	
Terphenyl-d14	4145	4033	97.3	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB27-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-13	File ID:	1218513.D
Sampled:	12/20/10 15:30	Prepared:	12/23/10 13:30	Analyzed:	01/07/11 20:31
Solids:	83.51	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00708	Calibration:	0327001
Instrument:	MS-BNA4				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	205	1.97	3.94	7.88	
208-96-8	Acenaphthylene	75.3	1.97	3.94	7.88	
120-12-7	Anthracene	606	1.97	3.94	7.88	
56-55-3	Benzo(a)anthracene	1070	1.97	3.94	7.88	
50-32-8	Benzo(a)pyrene	1460	1.97	3.94	7.88	
205-99-2	Benzo(b)fluoranthene	2260	1.97	3.94	7.88	
191-24-2	Benzo(g,h,i)perylene	594	1.97	3.94	7.88	
207-08-9	Benzo(k)fluoranthene	800	1.97	3.94	7.88	Q
218-01-9	Chrysene	886	1.97	3.94	7.88	
53-70-3	Dibenz(a,h)anthracene	204	1.97	3.94	7.88	
206-44-0	Fluoranthene	2630	1.97	3.94	7.88	
86-73-7	Fluorene	254	1.97	3.94	7.88	
193-39-5	Indeno(1,2,3-cd)pyrene	579	1.97	3.94	7.88	
91-57-6	2-Methylnaphthalene	72.7	1.97	3.94	7.88	
91-20-3	Naphthalene	91.5	1.97	3.94	7.88	
85-01-8	Phenanthrene	2130	1.97	3.94	7.88	
129-00-0	Pyrene	2260	1.97	3.94	7.88	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3939	3111	79.0	14 - 129	
Terphenyl-d14	3939	3235	82.1	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix: Soil
Laboratory ID: 1012185-14
File ID: 1218514.D
Sampled: 12/20/10 15:35
Prepared: 12/23/10 13:30
Analyzed: 01/07/11 18:31
Solids: 86.58
Preparation: EXT_3546
Dilution: 1
Batch: 0L22011
Sequence: 1A00708
Calibration: 0327001
Instrument: MS-BNA4

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	9.79	1.89	3.77	7.55	
208-96-8	Acenaphthylene	3.70	1.89	3.77	7.55	J
120-12-7	Anthracene	22.3	1.89	3.77	7.55	
56-55-3	Benzo(a)anthracene	75.6	1.89	3.77	7.55	
50-32-8	Benzo(a)pyrene	87.8	1.89	3.77	7.55	
205-99-2	Benzo(b)fluoranthene	129	1.89	3.77	7.55	
191-24-2	Benzo(g,h,i)perylene	43.2	1.89	3.77	7.55	
207-08-9	Benzo(k)fluoranthene	47.4	1.89	3.77	7.55	Q
218-01-9	Chrysene	83.4	1.89	3.77	7.55	
53-70-3	Dibenz(a,h)anthracene	12.0	1.89	3.77	7.55	
206-44-0	Fluoranthene	169	1.89	3.77	7.55	
86-73-7	Fluorene	10.3	1.89	3.77	7.55	
193-39-5	Indeno(1,2,3-cd)pyrene	38.0	1.89	3.77	7.55	
91-57-6	2-Methylnaphthalene	15.0	1.89	3.77	7.55	
91-20-3	Naphthalene	7.68	1.89	3.77	7.55	
85-01-8	Phenanthrene	121	1.89	3.77	7.55	
129-00-0	Pyrene	143	1.89	3.77	7.55	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3774	3552	94.1	14 - 129	
Terphenyl-d14	3774	3391	89.8	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB28-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-21	File ID:	1218521.D
Sampled:	12/20/10 17:00	Prepared:	12/23/10 13:30	Analyzed:	01/07/11 20:01
Solids:	87.72	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00708	Calibration:	0327001
Instrument:	MS-BNA4				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	4.96	1.85	3.70	7.41	J
208-96-8	Acenaphthylene	37.6	1.85	3.70	7.41	
120-12-7	Anthracene	31.4	1.85	3.70	7.41	
56-55-3	Benzo(a)anthracene	158	1.85	3.70	7.41	
50-32-8	Benzo(a)pyrene	211	1.85	3.70	7.41	
205-99-2	Benzo(b)fluoranthene	273	1.85	3.70	7.41	
191-24-2	Benzo(g,h,i)perylene	101	1.85	3.70	7.41	
207-08-9	Benzo(k)fluoranthene	97.5	1.85	3.70	7.41	Q
218-01-9	Chrysene	151	1.85	3.70	7.41	
53-70-3	Dibenz(a,h)anthracene	29.1	1.85	3.70	7.41	
206-44-0	Fluoranthene	318	1.85	3.70	7.41	
86-73-7	Fluorene	6.02	1.85	3.70	7.41	J
193-39-5	Indeno(1,2,3-cd)pyrene	91.2	1.85	3.70	7.41	
91-57-6	2-Methylnaphthalene	8.03	1.85	3.70	7.41	
91-20-3	Naphthalene	11.2	1.85	3.70	7.41	
85-01-8	Phenanthrene	92.4	1.85	3.70	7.41	
129-00-0	Pyrene	323	1.85	3.70	7.41	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3701	2760	74.6	14 - 129	
Terphenyl-d14	3701	2859	77.2	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB28-0204

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-22 File ID: 1218522.D

Sampled: 12/20/10 17:05 Prepared: 12/23/10 13:30 Analyzed: 01/05/11 00:04

Solids: 88.95 Preparation: EXT_3546 Dilution: 1

Batch: 0L22011 Sequence: 1A00413 Calibration: 0327001 Instrument: MS-BNA4

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	1120	1.86	3.72	7.45	
208-96-8	Acenaphthylene	253	1.86	3.72	7.45	
120-12-7	Anthracene	4330	1.86	3.72	7.45	E
56-55-3	Benzo(a)anthracene	7930	1.86	3.72	7.45	E
50-32-8	Benzo(a)pyrene	4200	1.86	3.72	7.45	E
205-99-2	Benzo(b)fluoranthene	4040	1.86	3.72	7.45	E
191-24-2	Benzo(g,h,i)perylene	1110	1.86	3.72	7.45	
207-08-9	Benzo(k)fluoranthene	1500	1.86	3.72	7.45	O
218-01-9	Chrysene	5050	1.86	3.72	7.45	E
53-70-3	Dibenz(a,h)anthracene	705	1.86	3.72	7.45	
206-44-0	Fluoranthene	14400	1.86	3.72	7.45	E
86-73-7	Fluorene	2510	1.86	3.72	7.45	
193-39-5	Indeno(1,2,3-cd)pyrene	1330	1.86	3.72	7.45	
91-57-6	2-Methylnaphthalene	266	1.86	3.72	7.45	
91-20-3	Naphthalene	323	1.86	3.72	7.45	
85-01-8	Phenanthrene	15100	1.86	3.72	7.45	E
129-00-0	Pyrene	11500	1.86	3.72	7.45	E

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3723	2716	72.9	14 - 129	
Terphenyl-d14	3723	3030	81.4	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB28-0204

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-22RE1 File ID: 1218522D.D

Sampled: 12/20/10 17:05 Prepared: 12/23/10 13:30 Analyzed: 01/07/11 17:30

Solids: 88.95 Preparation: EXT_3546 Dilution: 10

Batch: 0L22011 Sequence: 1A00708 Calibration: 0327001 Instrument: MS-BNA4

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	1560	18.6	37.2	74.5	D
208-96-8	Acenaphthylene	286	18.6	37.2	74.5	D
120-12-7	Anthracene	5280	18.6	37.2	74.5	D
56-55-3	Benzo(a)anthracene	9780	18.6	37.2	74.5	D
50-32-8	Benzo(a)pyrene	7740	18.6	37.2	74.5	D
205-99-2	Benzo(b)fluoranthene	10300	18.6	37.2	74.5	D
191-24-2	Benzo(g,h,i)perylene	2660	18.6	37.2	74.5	D
207-08-9	Benzo(k)fluoranthene	5150	18.6	37.2	74.5	Q, D
218-01-9	Chrysene	7940	18.6	37.2	74.5	D
53-70-3	Dibenz(a,h)anthracene	945	18.6	37.2	74.5	D
206-44-0	Fluoranthene	21100	18.6	37.2	74.5	D
86-73-7	Fluorene	3010	18.6	37.2	74.5	D
193-39-5	Indeno(1,2,3-cd)pyrene	2710	18.6	37.2	74.5	D
91-57-6	2-Methylnaphthalene	396	18.6	37.2	74.5	D
91-20-3	Naphthalene	484	18.6	37.2	74.5	D
85-01-8	Phenanthrene	20200	18.6	37.2	74.5	D
129-00-0	Pyrene	16800	18.6	37.2	74.5	D

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3723	3699	99.4	14 - 129	
Terphenyl-d14	3723	3479	93.5	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB29-0005

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-23	File ID:	1218523.D
Sampled:	12/20/10 17:20	Prepared:	12/28/10 09:56	Analyzed:	12/30/10 22:25
Solids:	86.52	Preparation:	EXT_3546	Dilution:	1
Batch:	0L27012	Sequence:	1A00308	Calibration:	0327001
Instrument:	MS-BNA4				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	28.5	1.93	3.85	7.71	
208-96-8	Acenaphthylene	17.3	1.93	3.85	7.71	
120-12-7	Anthracene	80.7	1.93	3.85	7.71	
56-55-3	Benzo(a)anthracene	298	1.93	3.85	7.71	
50-32-8	Benzo(a)pyrene	296	1.93	3.85	7.71	
205-99-2	Benzo(b)fluoranthene	475	1.93	3.85	7.71	N
191-24-2	Benzo(g,h,i)perylene	158	1.93	3.85	7.71	
207-08-9	Benzo(k)fluoranthene	135	1.93	3.85	7.71	
218-01-9	Chrysene	305	1.93	3.85	7.71	
53-70-3	Dibenz(a,h)anthracene	44.5	1.93	3.85	7.71	
206-44-0	Fluoranthene	597	1.93	3.85	7.71	
86-73-7	Fluorene	36.4	1.93	3.85	7.71	
193-39-5	Indeno(1,2,3-cd)pyrene	139	1.93	3.85	7.71	
91-57-6	2-Methylnaphthalene	87.9	1.93	3.85	7.71	N
91-20-3	Naphthalene	45.0	1.93	3.85	7.71	
85-01-8	Phenanthrene	418	1.93	3.85	7.71	
129-00-0	Pyrene	495	1.93	3.85	7.71	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3853	2576	66.9	14 - 129	
Terphenyl-d14	3853	3119	81.0	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB29-0204

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-24	File ID:	1218524.D
Sampled:	12/20/10 17:25	Prepared:	12/28/10 09:56	Analyzed:	12/30/10 22:55
Solids:	83.01	Preparation:	EXT_3546	Dilution:	1
Batch:	0L27012	Sequence:	1A00308	Calibration:	0327001
Instrument:	MS-BNA4				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	6.64	2.01	4.01	8.04	J
208-96-8	Acenaphthylene		2.01	4.01	8.04	U
120-12-7	Anthracene	23.8	2.01	4.01	8.04	
56-55-3	Benzo(a)anthracene	76.8	2.01	4.01	8.04	
50-32-8	Benzo(a)pyrene	75.7	2.01	4.01	8.04	
205-99-2	Benzo(b)fluoranthene	123	2.01	4.01	8.04	
191-24-2	Benzo(g,h,i)perylene	49.3	2.01	4.01	8.04	
207-08-9	Benzo(k)fluoranthene	47.6	2.01	4.01	8.04	
218-01-9	Chrysene	86.6	2.01	4.01	8.04	
53-70-3	Dibenz(a,h)anthracene		2.01	4.01	8.04	U
206-44-0	Fluoranthene	158	2.01	4.01	8.04	
86-73-7	Fluorene	10.2	2.01	4.01	8.04	
193-39-5	Indeno(1,2,3-cd)pyrene	36.3	2.01	4.01	8.04	
91-57-6	2-Methylnaphthalene	22.7	2.01	4.01	8.04	
91-20-3	Naphthalene	43.2	2.01	4.01	8.04	
85-01-8	Phenanthrene	120	2.01	4.01	8.04	
129-00-0	Pyrene	129	2.01	4.01	8.04	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	4016	3078	76.6	14 - 129	
Terphenyl-d14	4016	3358	83.6	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB30-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-06	File ID:	1218506.D
Sampled:	12/20/10 14:20	Prepared:	12/23/10 13:30	Analyzed:	01/04/11 16:34
Solids:	91.08	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00413	Calibration:	0327001
Instrument:	MS-BNA4				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	2.96	1.81	3.61	7.23	J
208-96-8	Acenaphthylene		1.81	3.61	7.23	U
120-12-7	Anthracene	8.45	1.81	3.61	7.23	
56-55-3	Benzo(a)anthracene	29.3	1.81	3.61	7.23	
50-32-8	Benzo(a)pyrene	21.8	1.81	3.61	7.23	
205-99-2	Benzo(b)fluoranthene	31.8	1.81	3.61	7.23	
191-24-2	Benzo(g,h,i)perylene	13.5	1.81	3.61	7.23	
207-08-9	Benzo(k)fluoranthene	14.1	1.81	3.61	7.23	Q
218-01-9	Chrysene	38.5	1.81	3.61	7.23	
53-70-3	Dibenz(a,h)anthracene		1.81	3.61	7.23	U
206-44-0	Fluoranthene	74.3	1.81	3.61	7.23	
86-73-7	Fluorene		1.81	3.61	7.23	U
193-39-5	Indeno(1,2,3-cd)pyrene	12.8	1.81	3.61	7.23	
91-57-6	2-Methylnaphthalene	4.77	1.81	3.61	7.23	J
91-20-3	Naphthalene	4.25	1.81	3.61	7.23	J
85-01-8	Phenanthrene	56.4	1.81	3.61	7.23	
129-00-0	Pyrene	66.0	1.81	3.61	7.23	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3612	2630	72.8	14 - 129	
Terphenyl-d14	3612	2979	82.5	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB30-00502

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-07	File ID:	1218507.D
Sampled:	12/20/10 14:25	Prepared:	12/23/10 13:30	Analyzed:	01/04/11 17:04
Solids:	87.53	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22011	Sequence:	1A00413	Calibration:	0327001
Instrument:	MS-BNA4				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
83-32-9	Acenaphthene	5.87	1.88	3.75	7.52	J
208-96-8	Acenaphthylene	3.67	1.88	3.75	7.52	J
120-12-7	Anthracene	20.3	1.88	3.75	7.52	
56-55-3	Benzo(a)anthracene	46.2	1.88	3.75	7.52	
50-32-8	Benzo(a)pyrene	53.5	1.88	3.75	7.52	
205-99-2	Benzo(b)fluoranthene	69.9	1.88	3.75	7.52	
191-24-2	Benzo(g,h,i)perylene	34.8	1.88	3.75	7.52	
207-08-9	Benzo(k)fluoranthene	25.7	1.88	3.75	7.52	Q
218-01-9	Chrysene	65.7	1.88	3.75	7.52	
53-70-3	Dibenz(a,h)anthracene		1.88	3.75	7.52	U
206-44-0	Fluoranthene	123	1.88	3.75	7.52	
86-73-7	Fluorene		1.88	3.75	7.52	U
193-39-5	Indeno(1,2,3-cd)pyrene	29.8	1.88	3.75	7.52	
91-57-6	2-Methylnaphthalene	3.31	1.88	3.75	7.52	J
91-20-3	Naphthalene	4.00	1.88	3.75	7.52	J
85-01-8	Phenanthrene	75.4	1.88	3.75	7.52	
129-00-0	Pyrene	105	1.88	3.75	7.52	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3758	2966	78.9	14 - 129	
Terphenyl-d14	3758	3398	90.4	14 - 129	

ANALYSIS DATA SHEET

NTC12-SB21-0507

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix: Soil
Laboratory ID: 1012185-18
File ID: 025F2701.D
Sampled: 12/20/10 16:25
Prepared: 12/27/10 11:48
Analyzed: 01/06/11 01:25
Solids: 85.25
Preparation: EXT_3546
Dilution: 1
Batch: 0L22010
Sequence: 1A00705
Calibration: 1005002
Instrument: GL-ECD3

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
12674-11-2	Aroclor-1016		80.0	80.0	80.0	UZ-01
11104-28-2	Aroclor-1221		80.0	80.0	80.0	UZ-01
11141-16-5	Aroclor-1232		80.0	80.0	80.0	UZ-01
53469-21-9	Aroclor-1242		80.0	80.0	80.0	UZ-01
12672-29-6	Aroclor-1248		80.0	80.0	80.0	UZ-01
11096-82-5	Aroclor-1260		80.0	80.0	80.0	UX, Z-01

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.04	12.03	63.2	70 - 125	*
Tetrachloro-m-xylene [2C]	19.04	10.75	56.5	70 - 125	*
Decachlorobiphenyl	19.04	11.39	59.8	60 - 125	*
Decachlorobiphenyl [2C]	19.04	8.334	43.8	60 - 125	*Y

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB21-0507

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-18RE1	File ID:	003F0301.D
Sampled:	12/20/10 16:25	Prepared:	12/27/10 11:48	Analyzed:	01/06/11 17:01
Solids:	85.25	Preparation:	EXT_3546	Dilution:	2
Batch:	0L22010	Sequence:	1A01007	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
11097-69-1	Aroclor-1254	799	9.60	19.0	38.8	D

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.04	10.99	57.7	70 - 125	*
Tetrachloro-m-xylene [2C]	19.04	11.28	59.2	70 - 125	*
Decachlorobiphenyl	19.04	9.076	47.7	60 - 125	*Y
Decachlorobiphenyl [2C]	19.04	8.320	43.7	60 - 125	*Y

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB25-0204

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-20	File ID:	029F3101.D
Sampled:	12/20/10 16:40	Prepared:	12/27/10 11:48	Analyzed:	01/06/11 02:39
Solids:	83.03	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22010	Sequence:	1A00705	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
12674-11-2	Aroclor-1016		4.96	9.84	20.1	U
11104-28-2	Aroclor-1221		11.8	11.8	20.1	UZ-01
11141-16-5	Aroclor-1232		4.96	9.84	20.1	U
53469-21-9	Aroclor-1242		17.7	17.7	20.1	UZ-01
12672-29-6	Aroclor-1248		23.6	23.6	23.6	UZ-01
11096-82-5	Aroclor-1260		59.0	59.0	59.0	UXZ-01,

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.68	15.94	81.0	70 - 125	
Tetrachloro-m-xylene [2C]	19.68	12.84	65.3	70 - 125	*
Decachlorobiphenyl	19.68	12.85	65.3	60 - 125	
Decachlorobiphenyl [2C]	19.68	8.685	44.1	60 - 125	*Y

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB25-0204

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-20RE1	File ID:	004F0401.D
Sampled:	12/20/10 16:40	Prepared:	12/27/10 11:48	Analyzed:	01/06/11 17:19
Solids:	83.03	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22010	Sequence:	1A01007	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
11097-69-1	Aroclor-1254	105	4.96	9.84	20.1	

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.68	15.98	81.2	70 - 125	
Tetrachloro-m-xylene [2C]	19.68	14.48	73.6	70 - 125	
Decachlorobiphenyl	19.68	13.53	68.8	60 - 125	Y
Decachlorobiphenyl [2C]	19.68	9.936	50.5	60 - 125	*Y

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-14 File ID: 015F1701.D

Sampled: 12/20/10 15:35 Prepared: 12/22/10 14:30 Analyzed: 01/05/11 22:19

Solids: 86.58 Preparation: EXT_3546 Dilution: 1

Batch: 0L21019 Sequence: 1A00705 Calibration: 1005002 Instrument: GL-ECD3

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
12674-11-2	Aroclor-1016		4.76	9.43	19.2	U
11104-28-2	Aroclor-1221		4.76	9.43	19.2	U
11141-16-5	Aroclor-1232		4.76	9.43	19.2	U
53469-21-9	Aroclor-1242		4.76	9.43	19.2	U
12672-29-6	Aroclor-1248		4.76	9.43	19.2	U
11097-69-1	Aroclor-1254		4.76	9.43	19.2	U
11096-82-5	Aroclor-1260		4.76	9.43	19.2	UX

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.87	14.70	77.9	70 - 125	
Tetrachloro-m-xylene [2C]	18.87	14.80	78.4	70 - 125	
Decachlorobiphenyl	18.87	14.07	74.6	60 - 125	
Decachlorobiphenyl [2C]	18.87	12.14	64.3	60 - 125	

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB28-0204

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-22	File ID:	012F1401.D
Sampled:	12/20/10 17:05	Prepared:	12/27/10 11:48	Analyzed:	01/05/11 21:24
Solids:	88.95	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22010	Sequence:	1A00705	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
12674-11-2	Aroclor-1016		22.0	22.0	22.0	UZ-01
11104-28-2	Aroclor-1221		22.0	22.0	22.0	UZ-01
11141-16-5	Aroclor-1232		22.0	22.0	22.0	UZ-01
53469-21-9	Aroclor-1242		22.0	22.0	22.0	UZ-01
12672-29-6	Aroclor-1248		22.0	22.0	22.0	UZ-01
11096-82-5	Aroclor-1260		22.0	22.0	22.0	UX, Z-01

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.37	13.88	75.6	70 - 125	
Tetrachloro-m-xylene [2C]	18.37	13.11	71.4	70 - 125	
Decachlorobiphenyl	18.37	26.34	143	60 - 125	*
Decachlorobiphenyl [2C]	18.37	14.03	76.4	60 - 125	

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB28-0204

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-22RE1	File ID:	005F0501.D
Sampled:	12/20/10 17:05	Prepared:	12/27/10 11:48	Analyzed:	01/06/11 17:38
Solids:	88.95	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22010	Sequence:	1A01007	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
11097-69-1	Aroclor-1254	48.1	4.63	9.18	18.7	P

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.37	13.55	73.8	70 - 125	
Tetrachloro-m-xylene [2C]	18.37	12.46	67.9	70 - 125	*
Decachlorobiphenyl	18.37	21.90	119	60 - 125	Y
Decachlorobiphenyl [2C]	18.37	12.37	67.3	60 - 125	Y

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB29-0204

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-24	File ID:	014F1601.D
Sampled:	12/20/10 17:25	Prepared:	12/27/10 11:48	Analyzed:	01/05/11 22:01
Solids:	83.01	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22010	Sequence:	1A00705	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
12674-11-2	Aroclor-1016		11.6	11.6	19.7	UZ-01
11104-28-2	Aroclor-1221		11.6	11.6	19.7	UZ-01
11141-16-5	Aroclor-1232		11.6	11.6	19.7	UZ-01
53469-21-9	Aroclor-1242		11.6	11.6	19.7	UZ-01
12672-29-6	Aroclor-1248		11.6	11.6	19.7	UZ-01
11096-82-5	Aroclor-1260		11.6	11.6	19.7	UX, Z-01

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.31	15.14	78.4	70 - 125	
Tetrachloro-m-xylene [2C]	19.31	13.17	68.2	70 - 125	*
Decachlorobiphenyl	19.31	13.67	70.8	60 - 125	
Decachlorobiphenyl [2C]	19.31	9.966	51.6	60 - 125	*

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB29-0204

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-24RE1	File ID:	006F0601.D
Sampled:	12/20/10 17:25	Prepared:	12/27/10 11:48	Analyzed:	01/06/11 17:57
Solids:	83.01	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22010	Sequence:	1A01007	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
11097-69-1	Aroclor-1254	29.8	4.87	9.65	19.7	P

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.31	15.19	78.7	70 - 125	
Tetrachloro-m-xylene [2C]	19.31	12.74	66.0	70 - 125	*
Decachlorobiphenyl	19.31	13.77	71.3	60 - 125	Y
Decachlorobiphenyl [2C]	19.31	9.801	50.8	60 - 125	*Y

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-DUP01

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-10	File ID:	018F1801.D
Sampled:	12/20/10 00:00	Prepared:	12/22/10 14:30	Analyzed:	01/03/11 17:49
Solids:	89.40	Preparation:	EXT_3546	Dilution:	1
Batch:	0L21019	Sequence:	1A00502	Calibration:	0362003
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	12.1	0.186	0.373	0.735	
72-54-8	4,4'-DDD	2.86	0.186	0.373	0.735	
50-29-3	4,4'-DDT	6.29	0.186	0.373	0.735	
309-00-2	Aldrin		0.121	0.373	0.735	U
319-84-6	alpha-BHC [2C]		0.121	0.373	0.735	U
5103-71-9	alpha-Chlordane [2C]		0.121	0.373	0.735	U
319-85-7	beta-BHC		0.121	0.373	0.735	U
319-86-8	delta-BHC		0.121	0.373	0.735	U
60-57-1	Dieldrin		0.186	0.373	0.735	U
959-98-8	Endosulfan I		0.121	0.373	0.735	U
33213-65-9	Endosulfan II [2C]		0.186	0.373	0.735	U
1031-07-8	Endosulfan sulfate		0.186	0.373	0.735	U
72-20-8	Endrin		0.186	0.373	0.735	U
7421-93-4	Endrin aldehyde		0.186	0.373	0.735	U
53494-70-5	Endrin ketone		0.186	0.373	0.735	U
58-89-9	gamma-BHC (Lindane)		0.121	0.373	0.735	U
5103-74-2	gamma-Chlordane	0.206	0.121	0.373	0.735	JPM
76-44-8	Heptachlor		0.121	0.373	0.735	U
1024-57-3	Heptachlor epoxide [2C]		0.121	0.373	0.735	U
72-43-5	Methoxychlor [2C]		0.121	0.373	0.735	UZ
8001-35-2	Toxaphene		12.1	24.1	36.2	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.28	11.03	60.3	70 - 125	*
Tetrachloro-m-xylene [2C]	18.28	10.56	57.8	70 - 125	*
Decachlorobiphenyl	18.28	10.37	56.7	60 - 125	*
Decachlorobiphenyl [2C]	18.28	8.548	46.8	60 - 125	*Y

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-DUP02

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-11 File ID: 029F2901.D

Sampled: 12/20/10 00:00 Prepared: 12/22/10 14:30 Analyzed: 01/04/11 19:58

Solids: 82.90 Preparation: EXT_3546 Dilution: 1

Batch: 0L21019 Sequence: 1A00604 Calibration: 1005002 Instrument: GL-ECD3

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	77.0	0.202	0.405	0.798	PZ-01
72-54-8	4,4'-DDD	534	0.202	0.405	0.798	PEZ-01
50-29-3	4,4'-DDT	138	0.202	0.405	0.798	EZ-01
309-00-2	Aldrin [2C]	8.74	0.131	0.405	0.798	PZ-01
319-84-6	alpha-BHC	1.03	0.131	0.405	0.798	PM
5103-71-9	alpha-Chlordane	42.1	0.131	0.405	0.798	PZ-01
319-85-7	beta-BHC	1.43	0.131	0.405	0.798	PM
319-86-8	delta-BHC [2C]	7.68	0.131	0.405	0.798	P
60-57-1	Dieldrin	5.98	0.202	0.405	0.798	PZ-01, M
959-98-8	Endosulfan I [2C]		0.131	0.405	0.798	U
33213-65-9	Endosulfan II	0.493	0.202	0.405	0.798	JPM, Z-01
1031-07-8	Endosulfan sulfate	3.17	0.202	0.405	0.798	PZ-01, M
72-20-8	Endrin [2C]	5.50	0.202	0.405	0.798	PZ-01, M
7421-93-4	Endrin aldehyde	3.55	0.202	0.405	0.798	Z-01
53494-70-5	Endrin ketone		0.202	0.405	0.798	U
58-89-9	gamma-BHC (Lindane)	0.998	0.131	0.405	0.798	P
5103-74-2	gamma-Chlordane	36.2	0.131	0.405	0.798	Z-01
76-44-8	Heptachlor [2C]	1.43	0.131	0.405	0.798	
1024-57-3	Heptachlor epoxide [2C]	2.47	0.131	0.405	0.798	PZ-01, M
72-43-5	Methoxychlor		0.131	0.405	0.798	U
8001-35-2	Toxaphene		13.1	26.2	39.3	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.84	12.97	65.4	70 - 125	*
Tetrachloro-m-xylene [2C]	19.84	11.57	58.3	70 - 125	*
Decachlorobiphenyl	19.84	13.61	68.6	60 - 125	
Decachlorobiphenyl [2C]	19.84	8.859	44.7	60 - 125	*

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-DUP02

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-11RE1	File ID:	028F2801.D
Sampled:	12/20/10 00:00	Prepared:	12/22/10 14:30	Analyzed:	01/04/11 19:40
Solids:	82.90	Preparation:	EXT_3546	Dilution:	10
Batch:	0L21019	Sequence:	1A00604	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	71.9	2.02	4.05	7.98	DPZ-01
72-54-8	4,4'-DDD	434	2.02	4.05	7.98	DPZ-01
50-29-3	4,4'-DDT [2C]	168	2.02	4.05	7.98	D
309-00-2	Aldrin [2C]	12.6	1.31	4.05	7.98	DP
319-84-6	alpha-BHC		1.31	4.05	7.98	U
5103-71-9	alpha-Chlordane	38.7	1.31	4.05	7.98	DZ-01
319-85-7	beta-BHC		1.31	4.05	7.98	U
319-86-8	delta-BHC	14.6	1.31	4.05	7.98	D
60-57-1	Dieldrin	7.25	2.02	4.05	7.98	JDPM, Z-01
959-98-8	Endosulfan I	2.90	1.31	4.05	7.98	JDPZ-01
33213-65-9	Endosulfan II		2.02	4.05	7.98	U
1031-07-8	Endosulfan sulfate		2.02	4.05	7.98	UM
72-20-8	Endrin [2C]	11.0	2.02	4.05	7.98	DPM, Z-01
7421-93-4	Endrin aldehyde [2C]	6.58	2.02	4.05	7.98	JDPZ-01
53494-70-5	Endrin ketone		2.02	4.05	7.98	U
58-89-9	gamma-BHC (Lindane)		1.31	4.05	7.98	U
5103-74-2	gamma-Chlordane [2C]	38.7	1.31	4.05	7.98	DZ-01
76-44-8	Heptachlor [2C]	2.43	1.31	4.05	7.98	JDPM
1024-57-3	Heptachlor epoxide [2C]	4.45	1.31	4.05	7.98	JDPM, Z-01
72-43-5	Methoxychlor		1.31	4.05	7.98	U
8001-35-2	Toxaphene		131	262	393	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.84	12.60	63.5	70 - 125	*
Tetrachloro-m-xylene [2C]	19.84	15.96	80.5	70 - 125	
Decachlorobiphenyl	19.84	15.67	79.0	60 - 125	
Decachlorobiphenyl [2C]	19.84	15.97	80.5	60 - 125	

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB21-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-17	File ID:	023F2501.D
Sampled:	12/20/10 16:20	Prepared:	12/27/10 11:48	Analyzed:	01/06/11 00:48
Solids:	85.01	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22010	Sequence:	1A00705	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	130	0.191	0.382	0.753	E
72-54-8	4,4'-DDD	15.2	0.191	0.382	0.753	X
50-29-3	4,4'-DDT	89.7	0.191	0.382	0.753	EY
309-00-2	Aldrin [2C]	0.374	0.124	0.382	0.753	JPM
319-84-6	alpha-BHC [2C]		0.124	0.382	0.753	U
5103-71-9	alpha-Chlordane	54.8	0.124	0.382	0.753	P
319-85-7	beta-BHC		0.124	0.382	0.753	U
319-86-8	delta-BHC	1.62	0.124	0.382	0.753	P
60-57-1	Dieldrin [2C]	1.77	0.191	0.382	0.753	P
959-98-8	Endosulfan I	1.17	0.124	0.382	0.753	
33213-65-9	Endosulfan II	0.504	0.191	0.382	0.753	JPM
1031-07-8	Endosulfan sulfate [2C]	2.59	0.191	0.382	0.753	P
72-20-8	Endrin	0.740	0.191	0.382	0.753	JPM
7421-93-4	Endrin aldehyde	0.894	0.191	0.382	0.753	PM
53494-70-5	Endrin ketone		0.191	0.382	0.753	U
58-89-9	gamma-BHC (Lindane) [2C]		0.124	0.382	0.753	U
5103-74-2	gamma-Chlordane	30.6	0.124	0.382	0.753	P
76-44-8	Heptachlor	1.36	0.124	0.382	0.753	P
1024-57-3	Heptachlor epoxide	5.22	0.124	0.382	0.753	P
72-43-5	Methoxychlor [2C]	0.595	0.124	0.382	0.753	JPY, M
8001-35-2	Toxaphene		12.4	24.7	37.1	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.73	12.70	67.8	70 - 125	*
Tetrachloro-m-xylene [2C]	18.73	13.44	71.8	70 - 125	
Decachlorobiphenyl	18.73	12.34	65.9	60 - 125	
Decachlorobiphenyl [2C]	18.73	12.06	64.4	60 - 125	Y

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB21-0005

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-17RE1	File ID:	006F0801.D
Sampled:	12/20/10 16:20	Prepared:	12/27/10 11:48	Analyzed:	01/05/11 19:32
Solids:	85.01	Preparation:	EXT_3546	Dilution:	2
Batch:	0L22010	Sequence:	1A00705	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	119	0.382	0.764	1.51	D
72-54-8	4,4'-DDD	10.8	0.382	0.764	1.51	D
50-29-3	4,4'-DDT [2C]	83.5	0.382	0.764	1.51	D
309-00-2	Aldrin [2C]		0.247	0.764	1.51	U
319-84-6	alpha-BHC [2C]		0.247	0.764	1.51	U
5103-71-9	alpha-Chlordane	51.8	0.247	0.764	1.51	DP
319-85-7	beta-BHC		0.247	0.764	1.51	U
319-86-8	delta-BHC	2.54	0.247	0.764	1.51	DP
60-57-1	Dieldrin [2C]	1.97	0.382	0.764	1.51	DP
959-98-8	Endosulfan I [2C]	1.56	0.247	0.764	1.51	DP
33213-65-9	Endosulfan II		0.382	0.764	1.51	U
1031-07-8	Endosulfan sulfate [2C]	2.54	0.382	0.764	1.51	DP
72-20-8	Endrin		0.382	0.764	1.51	U
7421-93-4	Endrin aldehyde		0.382	0.764	1.51	U
53494-70-5	Endrin ketone		0.382	0.764	1.51	U
58-89-9	gamma-BHC (Lindane)		0.247	0.764	1.51	U
5103-74-2	gamma-Chlordane	28.9	0.247	0.764	1.51	DP
76-44-8	Heptachlor		0.247	0.764	1.51	U
1024-57-3	Heptachlor epoxide	4.88	0.247	0.764	1.51	D
72-43-5	Methoxychlor		0.247	0.764	1.51	U
8001-35-2	Toxaphene		24.7	49.4	74.2	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.73	12.05	64.3	70 - 125	*
Tetrachloro-m-xylene [2C]	18.73	13.16	70.3	70 - 125	
Decachlorobiphenyl	18.73	11.97	63.9	60 - 125	
Decachlorobiphenyl [2C]	18.73	13.53	72.2	60 - 125	

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB21-0507

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-18 File ID: 025F2701.D

Sampled: 12/20/10 16:25 Prepared: 12/27/10 11:48 Analyzed: 01/06/11 01:25

Solids: 85.25 Preparation: EXT_3546 Dilution: 1

Batch: 0L22010 Sequence: 1A00705 Calibration: 1005002 Instrument: GL-ECD3

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	112	0.194	0.388	0.766	PEZ-01
72-54-8	4,4'-DDD	872	0.194	0.388	0.766	PEX, Z-01
50-29-3	4,4'-DDT	1000	0.194	0.388	0.766	PEY, Z-01
309-00-2	Aldrin	17.0	0.126	0.388	0.766	PZ-01
319-84-6	alpha-BHC	1.02	0.126	0.388	0.766	PM, Z-01
5103-71-9	alpha-Chlordane	152	0.126	0.388	0.766	PEZ-01
319-85-7	beta-BHC	1.12	0.126	0.388	0.766	PM, Z-01
319-86-8	delta-BHC [2C]	6.05	0.126	0.388	0.766	PZ-01
60-57-1	Dieldrin	5.47	0.194	0.388	0.766	PM, Z-01
959-98-8	Endosulfan I [2C]	4.35	0.126	0.388	0.766	Z-01
33213-65-9	Endosulfan II [2C]	5.63	0.194	0.388	0.766	PZ-01
1031-07-8	Endosulfan sulfate	2.62	0.194	0.388	0.766	PM, Z-01
72-20-8	Endrin [2C]	7.40	0.194	0.388	0.766	PM, Z-01
7421-93-4	Endrin aldehyde	5.64	0.194	0.388	0.766	PZ-01
53494-70-5	Endrin ketone		0.194	0.388	0.766	U
58-89-9	gamma-BHC (Lindane) [2C]	0.346	0.126	0.388	0.766	JPM, Z-01
5103-74-2	gamma-Chlordane	129	0.126	0.388	0.766	PEZ-01
76-44-8	Heptachlor [2C]	1.83	0.126	0.388	0.766	Z-01
1024-57-3	Heptachlor epoxide [2C]	2.36	0.126	0.388	0.766	PM, Z-01
72-43-5	Methoxychlor		0.126	0.388	0.766	U
8001-35-2	Toxaphene		12.6	25.1	37.7	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.04	12.03	63.2	70 - 125	*
Tetrachloro-m-xylene [2C]	19.04	10.75	56.5	70 - 125	*
Decachlorobiphenyl	19.04	11.39	59.8	60 - 125	*
Decachlorobiphenyl [2C]	19.04	8.334	43.8	60 - 125	*Y

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB21-0507

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-18RE1	File ID:	007F0901.D
Sampled:	12/20/10 16:25	Prepared:	12/27/10 11:48	Analyzed:	01/05/11 19:51
Solids:	85.25	Preparation:	EXT_3546	Dilution:	25
Batch:	0L22010	Sequence:	1A00705	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	107	4.86	9.71	19.1	DPZ-01
72-54-8	4,4'-DDD	696	4.86	9.71	19.1	DZ-01
50-29-3	4,4'-DDT [2C]	823	4.86	9.71	19.1	D
309-00-2	Aldrin	17.8	3.14	9.71	19.1	JDZ-01
319-84-6	alpha-BHC		3.14	9.71	19.1	U
5103-71-9	alpha-Chlordane	141	3.14	9.71	19.1	DPZ-01
319-85-7	beta-BHC		3.14	9.71	19.1	U
319-86-8	delta-BHC		3.14	9.71	19.1	U
60-57-1	Dieldrin	5.55	4.86	9.71	19.1	JDPM, Z-01
959-98-8	Endosulfan I		3.14	9.71	19.1	U
33213-65-9	Endosulfan II		4.86	9.71	19.1	U
1031-07-8	Endosulfan sulfate		4.86	9.71	19.1	U
72-20-8	Endrin [2C]	10.0	4.86	9.71	19.1	JDPM, Z-01
7421-93-4	Endrin aldehyde		4.86	9.71	19.1	U
53494-70-5	Endrin ketone		4.86	9.71	19.1	U
58-89-9	gamma-BHC (Lindane)		3.14	9.71	19.1	U
5103-74-2	gamma-Chlordane	119	3.14	9.71	19.1	DZ-01
76-44-8	Heptachlor		3.14	9.71	19.1	U
1024-57-3	Heptachlor epoxide [2C]		3.14	9.71	19.1	U
72-43-5	Methoxychlor		3.14	9.71	19.1	U
8001-35-2	Toxaphene		314	628	943	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.04	12.16	63.9	70 - 125	D
Tetrachloro-m-xylene [2C]	19.04	16.48	86.6	70 - 125	D
Decachlorobiphenyl	19.04	14.79	77.7	60 - 125	D
Decachlorobiphenyl [2C]	19.04	20.46	107	60 - 125	D

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB22-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-15	File ID:	035F3501.D
Sampled:	12/20/10 15:55	Prepared:	12/27/10 11:48	Analyzed:	01/04/11 21:50
Solids:	87.11	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22010	Sequence:	1A00604	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	188	0.189	0.378	0.744	EZ-01
72-54-8	4,4'-DDD	42.2	0.189	0.378	0.744	PZ-01
50-29-3	4,4'-DDT	161	0.189	0.378	0.744	E
309-00-2	Aldrin [2C]	1.87	0.122	0.378	0.744	PM
319-84-6	alpha-BHC	0.641	0.122	0.378	0.744	JP
5103-71-9	alpha-Chlordane	243	0.122	0.378	0.744	PEZ-01
319-85-7	beta-BHC	0.702	0.122	0.378	0.744	JP
319-86-8	delta-BHC [2C]	2.09	0.122	0.378	0.744	
60-57-1	Dieldrin	1.63	0.189	0.378	0.744	PM, Z-01
959-98-8	Endosulfan I	2.63	0.122	0.378	0.744	PM, Z-01
33213-65-9	Endosulfan II	2.07	0.189	0.378	0.744	PM, Z-01
1031-07-8	Endosulfan sulfate [2C]	3.70	0.189	0.378	0.744	P
72-20-8	Endrin	2.52	0.189	0.378	0.744	PM, Z-01
7421-93-4	Endrin aldehyde	4.32	0.189	0.378	0.744	PZ-01
53494-70-5	Endrin ketone		0.189	0.378	0.744	U
58-89-9	gamma-BHC (Lindane) [2C]	0.268	0.122	0.378	0.744	JPM
5103-74-2	gamma-Chlordane	171	0.122	0.378	0.744	PEZ-01
76-44-8	Heptachlor	4.70	0.122	0.378	0.744	
1024-57-3	Heptachlor epoxide [2C]	10.1	0.122	0.378	0.744	PM
72-43-5	Methoxychlor		0.122	0.378	0.744	U
8001-35-2	Toxaphene		12.2	24.4	36.7	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.52	14.67	79.2	70 - 125	
Tetrachloro-m-xylene [2C]	18.52	15.64	84.5	70 - 125	
Decachlorobiphenyl	18.52	17.21	93.0	60 - 125	
Decachlorobiphenyl [2C]	18.52	14.19	76.6	60 - 125	

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB22-0005

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-15RE1	File ID:	034F3401.D
Sampled:	12/20/10 15:55	Prepared:	12/27/10 11:48	Analyzed:	01/04/11 21:31
Solids:	87.11	Preparation:	EXT_3546	Dilution:	5
Batch:	0L22010	Sequence:	1A00604	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	168	0.944	1.89	3.72	DZ-01
72-54-8	4,4'-DDD	42.2	0.944	1.89	3.72	DZ-01
50-29-3	4,4'-DDT [2C]	147	0.944	1.89	3.72	D
309-00-2	Aldrin [2C]	2.13	0.611	1.89	3.72	JDP
319-84-6	alpha-BHC [2C]		0.611	1.89	3.72	U
5103-71-9	alpha-Chlordane	225	0.611	1.89	3.72	DPZ-01
319-85-7	beta-BHC		0.611	1.89	3.72	U
319-86-8	delta-BHC	5.67	0.611	1.89	3.72	DP
60-57-1	Dieldrin	1.29	0.944	1.89	3.72	JDPZ-01, M
959-98-8	Endosulfan I [2C]	9.52	0.611	1.89	3.72	DPZ-01
33213-65-9	Endosulfan II	1.85	0.944	1.89	3.72	JDPZ-01, M
1031-07-8	Endosulfan sulfate		0.944	1.89	3.72	U
72-20-8	Endrin	2.63	0.944	1.89	3.72	JDPZ-01, M
7421-93-4	Endrin aldehyde	3.76	0.944	1.89	3.72	DPZ-01
53494-70-5	Endrin ketone		0.944	1.89	3.72	U
58-89-9	gamma-BHC (Lindane) [2C]		0.611	1.89	3.72	U
5103-74-2	gamma-Chlordane	160	0.611	1.89	3.72	DPZ-01
76-44-8	Heptachlor	8.08	0.611	1.89	3.72	DP
1024-57-3	Heptachlor epoxide	32.6	0.611	1.89	3.72	DPZ-01
72-43-5	Methoxychlor		0.611	1.89	3.72	U
8001-35-2	Toxaphene		61.1	122	183	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.52	14.56	78.6	70 - 125	
Tetrachloro-m-xylene [2C]	18.52	18.35	99.1	70 - 125	
Decachlorobiphenyl	18.52	16.06	86.7	60 - 125	
Decachlorobiphenyl [2C]	18.52	18.86	102	60 - 125	

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB22-00502

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-16	File ID:	038F3801.D
Sampled:	12/20/10 16:00	Prepared:	12/27/10 11:48	Analyzed:	01/04/11 22:45
Solids:	85.85	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22010	Sequence:	1A00604	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	70.3	0.195	0.391	0.770	Z-01
72-54-8	4,4'-DDD	15.8	0.195	0.391	0.770	Z-01
50-29-3	4,4'-DDT	64.4	0.195	0.391	0.770	
309-00-2	Aldrin [2C]	0.463	0.126	0.391	0.770	JPM
319-84-6	alpha-BHC [2C]		0.126	0.391	0.770	U
5103-71-9	alpha-Chlordane	51.3	0.126	0.391	0.770	PZ-01
319-85-7	beta-BHC		0.126	0.391	0.770	U
319-86-8	delta-BHC [2C]	0.389	0.126	0.391	0.770	JPM
60-57-1	Dieldrin [2C]	4.32	0.195	0.391	0.770	PZ-01
959-98-8	Endosulfan I	0.506	0.126	0.391	0.770	JPM, Z-01
33213-65-9	Endosulfan II	0.322	0.195	0.391	0.770	JPZ-01, M
1031-07-8	Endosulfan sulfate		0.195	0.391	0.770	U
72-20-8	Endrin [2C]	6.75	0.195	0.391	0.770	PZ-01
7421-93-4	Endrin aldehyde [2C]	1.50	0.195	0.391	0.770	Z-01
53494-70-5	Endrin ketone		0.195	0.391	0.770	U
58-89-9	gamma-BHC (Lindane) [2C]		0.126	0.391	0.770	U
5103-74-2	gamma-Chlordane	29.2	0.126	0.391	0.770	PZ-01
76-44-8	Heptachlor	1.45	0.126	0.391	0.770	P
1024-57-3	Heptachlor epoxide	7.00	0.126	0.391	0.770	PZ-01
72-43-5	Methoxychlor		0.126	0.391	0.770	U
8001-35-2	Toxaphene		12.6	25.3	37.9	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.16	13.97	72.9	70 - 125	
Tetrachloro-m-xylene [2C]	19.16	14.30	74.7	70 - 125	
Decachlorobiphenyl	19.16	11.97	62.5	60 - 125	
Decachlorobiphenyl [2C]	19.16	11.92	62.2	60 - 125	

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB23-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-01	File ID:	017F2701.D
Sampled:	12/20/10 13:00	Prepared:	12/22/10 14:30	Analyzed:	12/29/10 23:23
Solids:	94.21	Preparation:	EXT_3546	Dilution:	1
Batch:	0L21019	Sequence:	0L36408	Calibration:	0362003
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	4.16	0.174	0.347	0.684	
72-54-8	4,4'-DDD	5.82	0.174	0.347	0.684	
50-29-3	4,4'-DDT [2C]	8.12	0.174	0.347	0.684	
309-00-2	Aldrin		0.112	0.347	0.684	U
319-84-6	alpha-BHC [2C]		0.112	0.347	0.684	U
5103-71-9	alpha-Chlordane	0.512	0.112	0.347	0.684	JPM
319-85-7	beta-BHC		0.112	0.347	0.684	U
319-86-8	delta-BHC [2C]	0.151	0.112	0.347	0.684	J
60-57-1	Dieldrin	0.271	0.174	0.347	0.684	JPM
959-98-8	Endosulfan I		0.112	0.347	0.684	U
33213-65-9	Endosulfan II [2C]	0.478	0.174	0.347	0.684	JP
1031-07-8	Endosulfan sulfate		0.174	0.347	0.684	U
72-20-8	Endrin [2C]	1.18	0.174	0.347	0.684	P
7421-93-4	Endrin aldehyde		0.174	0.347	0.684	U
53494-70-5	Endrin ketone		0.174	0.347	0.684	U
58-89-9	gamma-BHC (Lindane)		0.112	0.347	0.684	U
5103-74-2	gamma-Chlordane [2C]	0.848	0.112	0.347	0.684	
76-44-8	Heptachlor		0.112	0.347	0.684	U
1024-57-3	Heptachlor epoxide [2C]		0.112	0.347	0.684	U
72-43-5	Methoxychlor		0.112	0.347	0.684	U
8001-35-2	Toxaphene		11.2	22.5	33.7	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	17.01	12.63	74.2	70 - 125	
Tetrachloro-m-xylene [2C]	17.01	12.58	74.0	70 - 125	
Decachlorobiphenyl	17.01	14.41	84.7	60 - 125	
Decachlorobiphenyl [2C]	17.01	13.25	77.9	60 - 125	

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB23-0810

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-02	File ID:	018F2801.D
Sampled:	12/20/10 13:20	Prepared:	12/22/10 14:30	Analyzed:	12/29/10 23:41
Solids:	84.20	Preparation:	EXT_3546	Dilution:	1
Batch:	0L21019	Sequence:	0L36408	Calibration:	0362003
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	0.692	0.195	0.391	0.770	J
72-54-8	4,4'-DDD	2.37	0.195	0.391	0.770	P
50-29-3	4,4'-DDT [2C]	0.900	0.195	0.391	0.770	P
309-00-2	Aldrin		0.126	0.391	0.770	U
319-84-6	alpha-BHC [2C]		0.126	0.391	0.770	U
5103-71-9	alpha-Chlordane		0.126	0.391	0.770	U
319-85-7	beta-BHC [2C]		0.126	0.391	0.770	U
319-86-8	delta-BHC [2C]	0.217	0.126	0.391	0.770	J
60-57-1	Dieldrin		0.195	0.391	0.770	U
959-98-8	Endosulfan I		0.126	0.391	0.770	U
33213-65-9	Endosulfan II		0.195	0.391	0.770	U
1031-07-8	Endosulfan sulfate		0.195	0.391	0.770	U
72-20-8	Endrin [2C]		0.195	0.391	0.770	U
7421-93-4	Endrin aldehyde		0.195	0.391	0.770	U
53494-70-5	Endrin ketone		0.195	0.391	0.770	U
58-89-9	gamma-BHC (Lindane)		0.126	0.391	0.770	U
5103-74-2	gamma-Chlordane	0.308	0.126	0.391	0.770	JP
76-44-8	Heptachlor		0.126	0.391	0.770	U
1024-57-3	Heptachlor epoxide [2C]		0.126	0.391	0.770	U
72-43-5	Methoxychlor [2C]		0.126	0.391	0.770	U
8001-35-2	Toxaphene		12.6	25.3	37.9	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.16	12.52	65.4	70 - 125	*
Tetrachloro-m-xylene [2C]	19.16	11.16	58.3	70 - 125	*
Decachlorobiphenyl	19.16	13.92	72.7	60 - 125	
Decachlorobiphenyl [2C]	19.16	10.72	56.0	60 - 125	*

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB24-0005

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix: Soil
Laboratory ID: 1012185-03
File ID: 019F2901.D
Sampled: 12/20/10 14:00
Prepared: 12/22/10 14:30
Analyzed: 12/30/10 00:00
Solids: 83.57
Preparation: EXT_3546
Dilution: 1
Batch: 0L21019
Sequence: 0L36408
Calibration: 0362003
Instrument: GL-ECD3

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	1.29	0.196	0.391	0.771	
72-54-8	4,4'-DDD	3.01	0.196	0.391	0.771	
50-29-3	4,4'-DDT		0.196	0.391	0.771	U
309-00-2	Aldrin		0.127	0.391	0.771	U
319-84-6	alpha-BHC		0.127	0.391	0.771	U
5103-71-9	alpha-Chlordane	0.140	0.127	0.391	0.771	JPM
319-85-7	beta-BHC		0.127	0.391	0.771	U
319-86-8	delta-BHC	0.722	0.127	0.391	0.771	JPX
60-57-1	Dieldrin		0.196	0.391	0.771	U
959-98-8	Endosulfan I		0.127	0.391	0.771	U
33213-65-9	Endosulfan II	0.394	0.196	0.391	0.771	JP
1031-07-8	Endosulfan sulfate		0.196	0.391	0.771	U
72-20-8	Endrin [2C]		0.196	0.391	0.771	U
7421-93-4	Endrin aldehyde		0.196	0.391	0.771	U
53494-70-5	Endrin ketone		0.196	0.391	0.771	U
58-89-9	gamma-BHC (Lindane) [2C]		0.127	0.391	0.771	U
5103-74-2	gamma-Chlordane [2C]	0.309	0.127	0.391	0.771	J
76-44-8	Heptachlor		0.127	0.391	0.771	U
1024-57-3	Heptachlor epoxide [2C]		0.127	0.391	0.771	U
72-43-5	Methoxychlor [2C]	0.383	0.127	0.391	0.771	JPM
8001-35-2	Toxaphene		12.7	25.3	38.0	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.18	10.60	55.3	70 - 125	*
Tetrachloro-m-xylene [2C]	19.18	10.35	54.0	70 - 125	*
Decachlorobiphenyl	19.18	12.32	64.2	60 - 125	
Decachlorobiphenyl [2C]	19.18	11.58	60.4	60 - 125	

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB24-00502

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-04 File ID: 013F1301.D

Sampled: 12/20/10 14:05 Prepared: 12/22/10 14:30 Analyzed: 01/03/11 16:17

Solids: 89.56 Preparation: EXT_3546 Dilution: 1

Batch: 0L21019 Sequence: 1A00502 Calibration: 0362003 Instrument: GL-ECD3

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	1.78	0.183	0.365	0.719	PZ-01
72-54-8	4,4'-DDD	4.31	0.183	0.365	0.719	PZ-01
50-29-3	4,4'-DDT	0.362	0.183	0.365	0.719	JPM, Z-01
309-00-2	Aldrin		0.118	0.365	0.719	U
319-84-6	alpha-BHC [2C]		0.118	0.365	0.719	U
5103-71-9	alpha-Chlordane	0.250	0.118	0.365	0.719	JPM, Z-01
319-85-7	beta-BHC		0.118	0.365	0.719	U
319-86-8	delta-BHC	2.43	0.118	0.365	0.719	PX, Z-01
60-57-1	Dieldrin	0.321	0.183	0.365	0.719	JPM, Z-01
959-98-8	Endosulfan I		0.118	0.365	0.719	U
33213-65-9	Endosulfan II		0.183	0.365	0.719	U
1031-07-8	Endosulfan sulfate		0.183	0.365	0.719	U
72-20-8	Endrin [2C]	0.235	0.183	0.365	0.719	JPM, Z-01
7421-93-4	Endrin aldehyde		0.183	0.365	0.719	U
53494-70-5	Endrin ketone		0.183	0.365	0.719	U
58-89-9	gamma-BHC (Lindane) [2C]		0.118	0.365	0.719	U
5103-74-2	gamma-Chlordane	0.578	0.118	0.365	0.719	JPZ-01
76-44-8	Heptachlor		0.118	0.365	0.719	U
1024-57-3	Heptachlor epoxide	1.61	0.118	0.365	0.719	PZ-01
72-43-5	Methoxychlor	0.954	0.118	0.365	0.719	PM
8001-35-2	Toxaphene		11.8	23.6	35.4	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	17.89	12.68	70.9	70 - 125	
Tetrachloro-m-xylene [2C]	17.89	11.25	62.9	70 - 125	*
Decachlorobiphenyl	17.89	14.28	79.8	60 - 125	
Decachlorobiphenyl [2C]	17.89	12.20	68.2	60 - 125	Y

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB25-0005

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix: Soil
Laboratory ID: 1012185-19
File ID: 027F2901.D
Sampled: 12/20/10 16:35
Prepared: 12/27/10 11:48
Analyzed: 01/06/11 02:02
Solids: 87.55
Preparation: EXT_3546
Dilution: 1
Batch: 0L22010
Sequence: 1A00705
Calibration: 1005002
Instrument: GL-ECD3

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	243	0.190	0.381	0.750	PEZ-01
72-54-8	4,4'-DDD	271	0.190	0.381	0.750	PEX, Z-01
50-29-3	4,4'-DDT	228	0.190	0.381	0.750	EY, Z-01
309-00-2	Aldrin [2C]	20.8	0.123	0.381	0.750	PM, Z-01
319-84-6	alpha-BHC [2C]	1.10	0.123	0.381	0.750	PM, Z-01
5103-71-9	alpha-Chlordane	1880	0.123	0.381	0.750	PEZ-01
319-85-7	beta-BHC	6.55	0.123	0.381	0.750	PZ-01
319-86-8	delta-BHC	4.65	0.123	0.381	0.750	PM, Z-01
60-57-1	Dieldrin	16.6	0.190	0.381	0.750	PZ-01
959-98-8	Endosulfan I	36.8	0.123	0.381	0.750	PM, Z-01
33213-65-9	Endosulfan II	53.5	0.190	0.381	0.750	PM, Z-01
1031-07-8	Endosulfan sulfate [2C]	12.1	0.190	0.381	0.750	Z-01
72-20-8	Endrin	12.2	0.190	0.381	0.750	PM, Z-01
7421-93-4	Endrin aldehyde	19.5	0.190	0.381	0.750	PZ-01
53494-70-5	Endrin ketone [2C]	1.14	0.190	0.381	0.750	PZ-01
58-89-9	gamma-BHC (Lindane) [2C]	0.538	0.123	0.381	0.750	JPZ-01, M
5103-74-2	gamma-Chlordane	1610	0.123	0.381	0.750	EZ-01
76-44-8	Heptachlor	260	0.123	0.381	0.750	PEZ-01
1024-57-3	Heptachlor epoxide [2C]	64.0	0.123	0.381	0.750	PM, Z-01
72-43-5	Methoxychlor		0.123	0.381	0.750	U
8001-35-2	Toxaphene		12.3	24.6	37.0	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.66	13.74	73.6	70 - 125	
Tetrachloro-m-xylene [2C]	18.66	11.60	62.2	70 - 125	*
Decachlorobiphenyl	18.66	11.56	61.9	60 - 125	
Decachlorobiphenyl [2C]	18.66	13.45	72.0	60 - 125	Y

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB25-0005

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-19RE1	File ID:	008F1001.D
Sampled:	12/20/10 16:35	Prepared:	12/27/10 11:48	Analyzed:	01/05/11 20:09
Solids:	87.55	Preparation:	EXT_3546	Dilution:	50
Batch:	0L22010	Sequence:	1A00705	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	220	9.52	19.0	37.5	DZ-01
72-54-8	4,4'-DDD	237	9.52	19.0	37.5	DPZ-01
50-29-3	4,4'-DDT [2C]	463	9.52	19.0	37.5	DZ-01
309-00-2	Aldrin [2C]	39.2	6.16	19.0	37.5	DPZ-01, M
319-84-6	alpha-BHC [2C]		6.16	19.0	37.5	U
5103-71-9	alpha-Chlordane	3220	6.16	19.0	37.5	DPZ-01
319-85-7	beta-BHC		6.16	19.0	37.5	U
319-86-8	delta-BHC [2C]	15.3	6.16	19.0	37.5	JDPM
60-57-1	Dieldrin		9.52	19.0	37.5	U
959-98-8	Endosulfan I		6.16	19.0	37.5	U
33213-65-9	Endosulfan II	32.2	9.52	19.0	37.5	JDPM, Z-01
1031-07-8	Endosulfan sulfate		9.52	19.0	37.5	U
72-20-8	Endrin		9.52	19.0	37.5	U
7421-93-4	Endrin aldehyde	50.9	9.52	19.0	37.5	DPZ-01
53494-70-5	Endrin ketone		9.52	19.0	37.5	U
58-89-9	gamma-BHC (Lindane)		6.16	19.0	37.5	U
5103-74-2	gamma-Chlordane	2600	6.16	19.0	37.5	DPZ-01
76-44-8	Heptachlor [2C]	299	6.16	19.0	37.5	D
1024-57-3	Heptachlor epoxide [2C]	97.2	6.16	19.0	37.5	DPM, Z-01
72-43-5	Methoxychlor		6.16	19.0	37.5	U
8001-35-2	Toxaphene		616	1230	1850	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.66	15.04	80.6	70 - 125	D
Tetrachloro-m-xylene [2C]	18.66	21.33	114	70 - 125	D
Decachlorobiphenyl	18.66	17.94	96.1	60 - 125	D
Decachlorobiphenyl [2C]	18.66	43.89	235	60 - 125	D

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB25-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-19RE2	File ID:	009F1101.D
Sampled:	12/20/10 16:35	Prepared:	12/27/10 11:48	Analyzed:	01/05/11 20:28
Solids:	87.55	Preparation:	EXT_3546	Dilution:	5
Batch:	0L22010	Sequence:	1A00705	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	197	0.952	1.90	3.75	DZ-01
72-54-8	4,4'-DDD	195	0.952	1.90	3.75	DPZ-01
50-29-3	4,4'-DDT [2C]	282	0.952	1.90	3.75	D
309-00-2	Aldrin [2C]	25.6	0.616	1.90	3.75	DPM, Z-01
319-84-6	alpha-BHC [2C]	1.21	0.616	1.90	3.75	JDPM, Z-01
5103-71-9	alpha-Chlordane	3200	0.616	1.90	3.75	DPEZ-01
319-85-7	beta-BHC [2C]		0.616	1.90	3.75	U
319-86-8	delta-BHC [2C]	22.9	0.616	1.90	3.75	DPZ-01
60-57-1	Dieldrin [2C]	8.85	0.952	1.90	3.75	DZ-01
959-98-8	Endosulfan I	19.1	0.616	1.90	3.75	DPM, Z-01
33213-65-9	Endosulfan II	35.2	0.952	1.90	3.75	DPM, Z-01
1031-07-8	Endosulfan sulfate [2C]	15.2	0.952	1.90	3.75	DPZ-01
72-20-8	Endrin	6.87	0.952	1.90	3.75	DPM, Z-01
7421-93-4	Endrin aldehyde [2C]	14.9	0.952	1.90	3.75	DPM, Z-01
53494-70-5	Endrin ketone [2C]	2.59	0.952	1.90	3.75	JDPZ-01
58-89-9	gamma-BHC (Lindane) [2C]		0.616	1.90	3.75	U
5103-74-2	gamma-Chlordane	2590	0.616	1.90	3.75	DPEZ-01
76-44-8	Heptachlor	236	0.616	1.90	3.75	DZ-01
1024-57-3	Heptachlor epoxide [2C]	72.6	0.616	1.90	3.75	DPM, Z-01
72-43-5	Methoxychlor		0.616	1.90	3.75	U
8001-35-2	Toxaphene		61.6	123	185	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.66	12.66	67.8	70 - 125	*
Tetrachloro-m-xylene [2C]	18.66	14.07	75.4	70 - 125	
Decachlorobiphenyl	18.66	11.77	63.1	60 - 125	
Decachlorobiphenyl [2C]	18.66	20.58	110	60 - 125	

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB25-0204

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-20	File ID:	029F3101.D
Sampled:	12/20/10 16:40	Prepared:	12/27/10 11:48	Analyzed:	01/06/11 02:39
Solids:	83.03	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22010	Sequence:	1A00705	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	1090	0.201	0.401	0.791	PEZ-01
72-54-8	4,4'-DDD	631	0.201	0.401	0.791	PEX, Z-01
50-29-3	4,4'-DDT	77.2	0.201	0.401	0.791	Y, Z-01
309-00-2	Aldrin [2C]	0.626	0.130	0.401	0.791	JZ-01
319-84-6	alpha-BHC [2C]		0.130	0.401	0.791	U
5103-71-9	alpha-Chlordane [2C]	1.68	0.130	0.401	0.791	PM, Z-01
319-85-7	beta-BHC		0.130	0.401	0.791	U
319-86-8	delta-BHC		0.130	0.401	0.791	U
60-57-1	Dieldrin [2C]	4.79	0.201	0.401	0.791	Z-01
959-98-8	Endosulfan I	0.194	0.130	0.401	0.791	JPM, Z-01
33213-65-9	Endosulfan II	0.280	0.201	0.401	0.791	JPM, Z-01
1031-07-8	Endosulfan sulfate	0.204	0.201	0.401	0.791	JPM, Z-01
72-20-8	Endrin [2C]	9.89	0.201	0.401	0.791	PZ-01
7421-93-4	Endrin aldehyde [2C]	0.953	0.201	0.401	0.791	PZ-01
53494-70-5	Endrin ketone		0.201	0.401	0.791	U
58-89-9	gamma-BHC (Lindane) [2C]		0.130	0.401	0.791	U
5103-74-2	gamma-Chlordane	1.16	0.130	0.401	0.791	PM, Z-01
76-44-8	Heptachlor		0.130	0.401	0.791	U
1024-57-3	Heptachlor epoxide	1.77	0.130	0.401	0.791	PZ-01
72-43-5	Methoxychlor [2C]	0.528	0.130	0.401	0.791	JPY, Z-01
8001-35-2	Toxaphene		13.0	26.0	39.0	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.68	15.94	81.0	70 - 125	
Tetrachloro-m-xylene [2C]	19.68	12.84	65.3	70 - 125	*
Decachlorobiphenyl	19.68	12.85	65.3	60 - 125	
Decachlorobiphenyl [2C]	19.68	8.685	44.1	60 - 125	*Y

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB25-0204

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-20RE1	File ID:	010F1201.D
Sampled:	12/20/10 16:40	Prepared:	12/27/10 11:48	Analyzed:	01/05/11 20:46
Solids:	83.03	Preparation:	EXT_3546	Dilution:	25
Batch:	0L22010	Sequence:	1A00705	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	986	5.02	10.0	19.8	D
72-54-8	4,4'-DDD	545	5.02	10.0	19.8	D
50-29-3	4,4'-DDT [2C]	120	5.02	10.0	19.8	D
309-00-2	Aldrin		3.25	10.0	19.8	U
319-84-6	alpha-BHC		3.25	10.0	19.8	U
5103-71-9	alpha-Chlordane	8.24	3.25	10.0	19.8	JD
319-85-7	beta-BHC		3.25	10.0	19.8	U
319-86-8	delta-BHC		3.25	10.0	19.8	U
60-57-1	Dieldrin		5.02	10.0	19.8	U
959-98-8	Endosulfan I		3.25	10.0	19.8	U
33213-65-9	Endosulfan II		5.02	10.0	19.8	U
1031-07-8	Endosulfan sulfate		5.02	10.0	19.8	U
72-20-8	Endrin	6.54	5.02	10.0	19.8	JDPM
7421-93-4	Endrin aldehyde		5.02	10.0	19.8	U
53494-70-5	Endrin ketone		5.02	10.0	19.8	U
58-89-9	gamma-BHC (Lindane)		3.25	10.0	19.8	U
5103-74-2	gamma-Chlordane		3.25	10.0	19.8	U
76-44-8	Heptachlor		3.25	10.0	19.8	U
1024-57-3	Heptachlor epoxide		3.25	10.0	19.8	U
72-43-5	Methoxychlor		3.25	10.0	19.8	U
8001-35-2	Toxaphene		325	649	974	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.68	15.95	81.0	70 - 125	D
Tetrachloro-m-xylene [2C]	19.68	22.17	113	70 - 125	D
Decachlorobiphenyl	19.68	18.56	94.3	60 - 125	D
Decachlorobiphenyl [2C]	19.68	22.92	116	60 - 125	D

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB26-0005

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-08	File ID:	016F1601.D
Sampled:	12/20/10 17:35	Prepared:	12/22/10 14:30	Analyzed:	01/03/11 17:12
Solids:	89.73	Preparation:	EXT_3546	Dilution:	1
Batch:	0L21019	Sequence:	1A00502	Calibration:	0362003
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	103	0.188	0.376	0.742	PEZ-01
72-54-8	4,4'-DDD	68.8	0.188	0.376	0.742	PZ-01
50-29-3	4,4'-DDT	66.7	0.188	0.376	0.742	
309-00-2	Aldrin [2C]	0.440	0.122	0.376	0.742	JZ-01
319-84-6	alpha-BHC [2C]		0.122	0.376	0.742	U
5103-71-9	alpha-Chlordane	1.88	0.122	0.376	0.742	Z-01
319-85-7	beta-BHC		0.122	0.376	0.742	U
319-86-8	delta-BHC [2C]	0.325	0.122	0.376	0.742	JP
60-57-1	Dieldrin	1.54	0.188	0.376	0.742	PM, Z-01
959-98-8	Endosulfan I [2C]		0.122	0.376	0.742	U
33213-65-9	Endosulfan II [2C]		0.188	0.376	0.742	U
1031-07-8	Endosulfan sulfate	0.691	0.188	0.376	0.742	JPM
72-20-8	Endrin	13.7	0.188	0.376	0.742	PZ-01
7421-93-4	Endrin aldehyde	1.24	0.188	0.376	0.742	Z-01
53494-70-5	Endrin ketone		0.188	0.376	0.742	U
58-89-9	gamma-BHC (Lindane) [2C]		0.122	0.376	0.742	U
5103-74-2	gamma-Chlordane [2C]	4.35	0.122	0.376	0.742	Z-01
76-44-8	Heptachlor		0.122	0.376	0.742	U
1024-57-3	Heptachlor epoxide [2C]	0.122	0.122	0.376	0.742	JPM, Z-01
72-43-5	Methoxychlor [2C]	3.04	0.122	0.376	0.742	PY
8001-35-2	Toxaphene		12.2	24.4	36.5	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.45	12.41	67.3	70 - 125	*
Tetrachloro-m-xylene [2C]	18.45	11.27	61.1	70 - 125	*
Decachlorobiphenyl	18.45	13.75	74.5	60 - 125	
Decachlorobiphenyl [2C]	18.45	9.503	51.5	60 - 125	*Y

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB26-0005

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-08RE1	File ID:	017F1701.D
Sampled:	12/20/10 17:35	Prepared:	12/22/10 14:30	Analyzed:	01/03/11 17:31
Solids:	89.73	Preparation:	EXT_3546	Dilution:	2
Batch:	0L21019	Sequence:	1A00502	Calibration:	0362003
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	95.4	0.376	0.753	1.48	DZ-01
72-54-8	4,4'-DDD	63.8	0.376	0.753	1.48	DPZ-01
50-29-3	4,4'-DDT	62.1	0.376	0.753	1.48	D
309-00-2	Aldrin		0.244	0.753	1.48	U
319-84-6	alpha-BHC [2C]		0.244	0.753	1.48	U
5103-71-9	alpha-Chlordane	1.66	0.244	0.753	1.48	DZ-01
319-85-7	beta-BHC		0.244	0.753	1.48	U
319-86-8	delta-BHC		0.244	0.753	1.48	U
60-57-1	Dieldrin	1.48	0.376	0.753	1.48	DPZ-01, M
959-98-8	Endosulfan I		0.244	0.753	1.48	U
33213-65-9	Endosulfan II	0.469	0.376	0.753	1.48	JDPM, Z-01
1031-07-8	Endosulfan sulfate	0.717	0.376	0.753	1.48	JDPM
72-20-8	Endrin	13.2	0.376	0.753	1.48	DPZ-01
7421-93-4	Endrin aldehyde	1.20	0.376	0.753	1.48	JDZ-01
53494-70-5	Endrin ketone		0.376	0.753	1.48	U
58-89-9	gamma-BHC (Lindane) [2C]		0.244	0.753	1.48	U
5103-74-2	gamma-Chlordane	1.04	0.244	0.753	1.48	JDPM, Z-01
76-44-8	Heptachlor		0.244	0.753	1.48	U
1024-57-3	Heptachlor epoxide [2C]		0.244	0.753	1.48	U
72-43-5	Methoxychlor [2C]	2.94	0.244	0.753	1.48	DPY
8001-35-2	Toxaphene		24.4	48.7	73.1	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.45	12.13	65.8	70 - 125	*
Tetrachloro-m-xylene [2C]	18.45	11.58	62.8	70 - 125	*
Decachlorobiphenyl	18.45	13.38	72.5	60 - 125	
Decachlorobiphenyl [2C]	18.45	9.467	51.3	60 - 125	*Y

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB26-0406

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-09	File ID:	020F2001.D
Sampled:	12/20/10 17:40	Prepared:	12/22/10 14:30	Analyzed:	01/03/11 18:26
Solids:	79.89	Preparation:	EXT_3546	Dilution:	1
Batch:	0L21019	Sequence:	1A00502	Calibration:	0362003
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	215	0.207	0.415	0.817	PEZ-01
72-54-8	4,4'-DDD	1410	0.207	0.415	0.817	PEZ-01
50-29-3	4,4'-DDT [2C]	120	0.207	0.415	0.817	PE
309-00-2	Aldrin	2.48	0.134	0.415	0.817	PM
319-84-6	alpha-BHC	1.05	0.134	0.415	0.817	PM
5103-71-9	alpha-Chlordane [2C]	19.3	0.134	0.415	0.817	Z-01
319-85-7	beta-BHC	0.919	0.134	0.415	0.817	PM
319-86-8	delta-BHC	1.53	0.134	0.415	0.817	PXM,
60-57-1	Dieldrin	13.4	0.207	0.415	0.817	PM, Z-01
959-98-8	Endosulfan I	4.51	0.134	0.415	0.817	PZ-01
33213-65-9	Endosulfan II	4.04	0.207	0.415	0.817	PM, Z-01
1031-07-8	Endosulfan sulfate	2.17	0.207	0.415	0.817	PM
72-20-8	Endrin [2C]	12.9	0.207	0.415	0.817	PM, Z-01
7421-93-4	Endrin aldehyde [2C]	10.9	0.207	0.415	0.817	PZ-01
53494-70-5	Endrin ketone		0.207	0.415	0.817	U
58-89-9	gamma-BHC (Lindane)	0.581	0.134	0.415	0.817	JPM
5103-74-2	gamma-Chlordane [2C]	47.1	0.134	0.415	0.817	Z-01
76-44-8	Heptachlor [2C]	1.19	0.134	0.415	0.817	P
1024-57-3	Heptachlor epoxide [2C]	1.90	0.134	0.415	0.817	PZ-01
72-43-5	Methoxychlor		0.134	0.415	0.817	U
8001-35-2	Toxaphene		13.4	26.8	40.2	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	20.32	12.94	63.7	70 - 125	*
Tetrachloro-m-xylene [2C]	20.32	9.940	48.9	70 - 125	*
Decachlorobiphenyl	20.32	14.30	70.4	60 - 125	
Decachlorobiphenyl [2C]	20.32	8.358	41.1	60 - 125	*Y

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB26-0406

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-09RE1	File ID:	019F1901.D
Sampled:	12/20/10 17:40	Prepared:	12/22/10 14:30	Analyzed:	01/03/11 18:08
Solids:	79.89	Preparation:	EXT_3546	Dilution:	25
Batch:	0L21019	Sequence:	1A00502	Calibration:	0362003
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	196	5.18	10.4	20.4	DPZ-01
72-54-8	4,4'-DDD	1090	5.18	10.4	20.4	DPZ-01
50-29-3	4,4'-DDT	55.8	5.18	10.4	20.4	DPM
309-00-2	Aldrin	3.37	3.35	10.4	20.4	JDPM
319-84-6	alpha-BHC		3.35	10.4	20.4	U
5103-71-9	alpha-Chlordane [2C]	33.5	3.35	10.4	20.4	DPZ-01
319-85-7	beta-BHC		3.35	10.4	20.4	U
319-86-8	delta-BHC [2C]	14.6	3.35	10.4	20.4	JDP
60-57-1	Dieldrin	16.9	5.18	10.4	20.4	JDPM, Z-01
959-98-8	Endosulfan I	6.00	3.35	10.4	20.4	JDZ-01
33213-65-9	Endosulfan II		5.18	10.4	20.4	U
1031-07-8	Endosulfan sulfate		5.18	10.4	20.4	U
72-20-8	Endrin [2C]	24.1	5.18	10.4	20.4	DPM, Z-01
7421-93-4	Endrin aldehyde [2C]	19.8	5.18	10.4	20.4	JDPZ-01
53494-70-5	Endrin ketone		5.18	10.4	20.4	U
58-89-9	gamma-BHC (Lindane)		3.35	10.4	20.4	U
5103-74-2	gamma-Chlordane [2C]	68.3	3.35	10.4	20.4	DPZ-01
76-44-8	Heptachlor		3.35	10.4	20.4	U
1024-57-3	Heptachlor epoxide [2C]	4.48	3.35	10.4	20.4	JDPM, Z-01
72-43-5	Methoxychlor		3.35	10.4	20.4	U
8001-35-2	Toxaphene		335	671	1010	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	20.32	13.26	65.2	70 - 125	D
Tetrachloro-m-xylene [2C]	20.32	15.23	75.0	70 - 125	D
Decachlorobiphenyl	20.32	23.35	115	60 - 125	D
Decachlorobiphenyl [2C]	20.32	15.66	77.1	60 - 125	DY

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB27-0005

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-13	File ID:	032F3201.D
Sampled:	12/20/10 15:30	Prepared:	12/22/10 14:30	Analyzed:	01/04/11 20:54
Solids:	83.51	Preparation:	EXT_3546	Dilution:	1
Batch:	0L21019	Sequence:	1A00604	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	162	0.200	0.399	0.787	EZ-01
72-54-8	4,4'-DDD	28.8	0.200	0.399	0.787	PZ-01
50-29-3	4,4'-DDT	171	0.200	0.399	0.787	E
309-00-2	Aldrin [2C]	1.29	0.129	0.399	0.787	Z-01
319-84-6	alpha-BHC [2C]	0.509	0.129	0.399	0.787	JP
5103-71-9	alpha-Chlordane	4.74	0.129	0.399	0.787	Z-01
319-85-7	beta-BHC		0.129	0.399	0.787	U
319-86-8	delta-BHC [2C]	3.55	0.129	0.399	0.787	P
60-57-1	Dieldrin	1.81	0.200	0.399	0.787	PM, Z-01
959-98-8	Endosulfan I [2C]		0.129	0.399	0.787	U
33213-65-9	Endosulfan II	0.855	0.200	0.399	0.787	PZ-01
1031-07-8	Endosulfan sulfate	0.772	0.200	0.399	0.787	JPM
72-20-8	Endrin [2C]	22.6	0.200	0.399	0.787	PZ-01
7421-93-4	Endrin aldehyde	0.769	0.200	0.399	0.787	JZ-01
53494-70-5	Endrin ketone		0.200	0.399	0.787	U
58-89-9	gamma-BHC (Lindane) [2C]	0.144	0.129	0.399	0.787	JPM
5103-74-2	gamma-Chlordane [2C]	4.31	0.129	0.399	0.787	PZ-01
76-44-8	Heptachlor		0.129	0.399	0.787	U
1024-57-3	Heptachlor epoxide	4.18	0.129	0.399	0.787	Z-01
72-43-5	Methoxychlor		0.129	0.399	0.787	U
8001-35-2	Toxaphene		12.9	25.8	38.7	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.57	15.34	78.4	70 - 125	
Tetrachloro-m-xylene [2C]	19.57	15.92	81.3	70 - 125	
Decachlorobiphenyl	19.57	15.84	80.9	60 - 125	
Decachlorobiphenyl [2C]	19.57	13.01	66.5	60 - 125	

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB27-0005

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-13RE1 File ID: 031F3101.D

Sampled: 12/20/10 15:30 Prepared: 12/22/10 14:30 Analyzed: 01/04/11 20:35

Solids: 83.51 Preparation: EXT_3546 Dilution: 4

Batch: 0L21019 Sequence: 1A00604 Calibration: 1005002 Instrument: GL-ECD3

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	143	0.798	1.60	3.15	DZ-01
72-54-8	4,4'-DDD	28.3	0.798	1.60	3.15	DPZ-01
50-29-3	4,4'-DDT [2C]	160	0.798	1.60	3.15	D
309-00-2	Aldrin [2C]	1.76	0.517	1.60	3.15	JDPZ-01
319-84-6	alpha-BHC		0.517	1.60	3.15	U
5103-71-9	alpha-Chlordane [2C]	4.48	0.517	1.60	3.15	DZ-01
319-85-7	beta-BHC		0.517	1.60	3.15	U
319-86-8	delta-BHC	4.53	0.517	1.60	3.15	D
60-57-1	Dieldrin	1.21	0.798	1.60	3.15	JDPZ-01, M
959-98-8	Endosulfan I		0.517	1.60	3.15	U
33213-65-9	Endosulfan II		0.798	1.60	3.15	U
1031-07-8	Endosulfan sulfate		0.798	1.60	3.15	U
72-20-8	Endrin [2C]	25.8	0.798	1.60	3.15	DPZ-01
7421-93-4	Endrin aldehyde		0.798	1.60	3.15	U
53494-70-5	Endrin ketone		0.798	1.60	3.15	U
58-89-9	gamma-BHC (Lindane)		0.517	1.60	3.15	U
5103-74-2	gamma-Chlordane	1.48	0.517	1.60	3.15	JDPZ-01, M
76-44-8	Heptachlor		0.517	1.60	3.15	U
1024-57-3	Heptachlor epoxide [2C]	4.45	0.517	1.60	3.15	DZ-01
72-43-5	Methoxychlor		0.517	1.60	3.15	U
8001-35-2	Toxaphene		51.7	103	155	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.57	14.57	74.5	70 - 125	
Tetrachloro-m-xylene [2C]	19.57	17.48	89.3	70 - 125	
Decachlorobiphenyl	19.57	16.14	82.5	60 - 125	
Decachlorobiphenyl [2C]	19.57	16.29	83.3	60 - 125	

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-14 File ID: 015F1701.D

Sampled: 12/20/10 15:35 Prepared: 12/22/10 14:30 Analyzed: 01/05/11 22:19

Solids: 86.58 Preparation: EXT_3546 Dilution: 1

Batch: 0L21019 Sequence: 1A00705 Calibration: 1005002 Instrument: GL-ECD3

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	12.9	0.192	0.385	0.759	
72-54-8	4,4'-DDD	5.41	0.192	0.385	0.759	
50-29-3	4,4'-DDT [2C]	9.10	0.192	0.385	0.759	
309-00-2	Aldrin		0.125	0.385	0.759	U
319-84-6	alpha-BHC [2C]		0.125	0.385	0.759	U
5103-71-9	alpha-Chlordane [2C]	0.466	0.125	0.385	0.759	J
319-85-7	beta-BHC		0.125	0.385	0.759	U
319-86-8	delta-BHC		0.125	0.385	0.759	U
60-57-1	Dieldrin		0.192	0.385	0.759	U
959-98-8	Endosulfan I		0.125	0.385	0.759	U
33213-65-9	Endosulfan II		0.192	0.385	0.759	U
1031-07-8	Endosulfan sulfate		0.192	0.385	0.759	U
72-20-8	Endrin		0.192	0.385	0.759	U
7421-93-4	Endrin aldehyde		0.192	0.385	0.759	U
53494-70-5	Endrin ketone		0.192	0.385	0.759	U
58-89-9	gamma-BHC (Lindane)		0.125	0.385	0.759	U
5103-74-2	gamma-Chlordane	0.301	0.125	0.385	0.759	JPM
76-44-8	Heptachlor		0.125	0.385	0.759	U
1024-57-3	Heptachlor epoxide		0.125	0.385	0.759	U
72-43-5	Methoxychlor		0.125	0.385	0.759	U
8001-35-2	Toxaphene		12.5	24.9	37.4	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.87	14.70	77.9	70 - 125	
Tetrachloro-m-xylene [2C]	18.87	14.80	78.4	70 - 125	
Decachlorobiphenyl	18.87	14.07	74.6	60 - 125	
Decachlorobiphenyl [2C]	18.87	12.14	64.3	60 - 125	

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB28-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-21	File ID:	011R1301.D
Sampled:	12/20/10 17:00	Prepared:	12/27/10 11:48	Analyzed:	01/05/11 21:05
Solids:	87.72	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22010	Sequence:	1A00705	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE [2C]	6.92	0.189	0.378	0.744	
72-54-8	4,4'-DDD	2.92	0.189	0.378	0.744	
50-29-3	4,4'-DDT [2C]	5.44	0.189	0.378	0.744	
309-00-2	Aldrin		0.122	0.378	0.744	U
319-84-6	alpha-BHC [2C]		0.122	0.378	0.744	U
5103-71-9	alpha-Chlordane [2C]	0.203	0.122	0.378	0.744	J
319-85-7	beta-BHC		0.122	0.378	0.744	U
319-86-8	delta-BHC		0.122	0.378	0.744	U
60-57-1	Dieldrin		0.189	0.378	0.744	U
959-98-8	Endosulfan I		0.122	0.378	0.744	U
33213-65-9	Endosulfan II		0.189	0.378	0.744	U
1031-07-8	Endosulfan sulfate		0.189	0.378	0.744	U
72-20-8	Endrin		0.189	0.378	0.744	U
7421-93-4	Endrin aldehyde		0.189	0.378	0.744	U
53494-70-5	Endrin ketone		0.189	0.378	0.744	U
58-89-9	gamma-BHC (Lindane)		0.122	0.378	0.744	U
5103-74-2	gamma-Chlordane [2C]	0.326	0.122	0.378	0.744	JP
76-44-8	Heptachlor		0.122	0.378	0.744	U
1024-57-3	Heptachlor epoxide [2C]		0.122	0.378	0.744	U
72-43-5	Methoxychlor		0.122	0.378	0.744	U
8001-35-2	Toxaphene		12.2	24.4	36.6	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.51	13.88	75.0	70 - 125	
Tetrachloro-m-xylene [2C]	18.51	14.82	80.1	70 - 125	
Decachlorobiphenyl	18.51	13.03	70.4	60 - 125	
Decachlorobiphenyl [2C]	18.51	11.51	62.2	60 - 125	

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB28-0204

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-22	File ID:	012F1401.D
Sampled:	12/20/10 17:05	Prepared:	12/27/10 11:48	Analyzed:	01/05/11 21:24
Solids:	88.95	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22010	Sequence:	1A00705	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	29.4	0.187	0.375	0.738	PZ-01
72-54-8	4,4'-DDD	55.1	0.187	0.375	0.738	PZ-01
50-29-3	4,4'-DDT	16.7	0.187	0.375	0.738	Z-01
309-00-2	Aldrin		0.121	0.375	0.738	U
319-84-6	alpha-BHC [2C]	0.172	0.121	0.375	0.738	JPZ-01, M
5103-71-9	alpha-Chlordane [2C]	0.610	0.121	0.375	0.738	JPZ-01, M
319-85-7	beta-BHC [2C]		0.121	0.375	0.738	U
319-86-8	delta-BHC [2C]	0.164	0.121	0.375	0.738	JPM, Z-01
60-57-1	Dieldrin [2C]	1.05	0.187	0.375	0.738	PZ-01
959-98-8	Endosulfan I	1.68	0.121	0.375	0.738	PZ-01
33213-65-9	Endosulfan II	1.13	0.187	0.375	0.738	PM, Z-01
1031-07-8	Endosulfan sulfate [2C]	3.95	0.187	0.375	0.738	PZ-01
72-20-8	Endrin	2.95	0.187	0.375	0.738	Z-01
7421-93-4	Endrin aldehyde [2C]	1.13	0.187	0.375	0.738	Z-01
53494-70-5	Endrin ketone	0.715	0.187	0.375	0.738	JPM, Z-01
58-89-9	gamma-BHC (Lindane) [2C]	3.61	0.121	0.375	0.738	PM, Z-01
5103-74-2	gamma-Chlordane [2C]	3.57	0.121	0.375	0.738	PM, Z-01
76-44-8	Heptachlor [2C]	0.182	0.121	0.375	0.738	JPZ-01, M
1024-57-3	Heptachlor epoxide [2C]		0.121	0.375	0.738	U
72-43-5	Methoxychlor	1.33	0.121	0.375	0.738	PM, Z-01
8001-35-2	Toxaphene		12.1	24.2	36.4	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.37	13.88	75.6	70 - 125	
Tetrachloro-m-xylene [2C]	18.37	13.11	71.4	70 - 125	
Decachlorobiphenyl	18.37	26.34	143	60 - 125	*
Decachlorobiphenyl [2C]	18.37	14.03	76.4	60 - 125	

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB29-0005

Laboratory:	Empirical Laboratories, LLC		SDG:	CTOF27AGL_001	
Client:	Tetra Tech NUS, Inc. (T010)		Project:	Great Lakes CTO F27A	
Matrix:	Soil	Laboratory ID:	1012185-23	File ID:	013F1501.D
Sampled:	12/20/10 17:20	Prepared:	12/27/10 11:48	Analyzed:	01/05/11 21:42
Solids:	86.52	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22010	Sequence:	1A00705	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	41.7	0.189	0.378	0.745	Z-01
72-54-8	4,4'-DDD	26.0	0.189	0.378	0.745	PZ-01
50-29-3	4,4'-DDT	47.4	0.189	0.378	0.745	Z-01
309-00-2	Aldrin		0.122	0.378	0.745	U
319-84-6	alpha-BHC [2C]		0.122	0.378	0.745	U
5103-71-9	alpha-Chlordane	1.74	0.122	0.378	0.745	Z-01
319-85-7	beta-BHC		0.122	0.378	0.745	U
319-86-8	delta-BHC	1.06	0.122	0.378	0.745	PZ-01
60-57-1	Dieldrin	0.893	0.189	0.378	0.745	PZ-01, M
959-98-8	Endosulfan I [2C]		0.122	0.378	0.745	U
33213-65-9	Endosulfan II	0.240	0.189	0.378	0.745	JPM, Z-01
1031-07-8	Endosulfan sulfate		0.189	0.378	0.745	U
72-20-8	Endrin [2C]	5.65	0.189	0.378	0.745	PZ-01
7421-93-4	Endrin aldehyde [2C]	0.660	0.189	0.378	0.745	JPZ-01
53494-70-5	Endrin ketone		0.189	0.378	0.745	U
58-89-9	gamma-BHC (Lindane) [2C]	0.600	0.122	0.378	0.745	JPZ-01
5103-74-2	gamma-Chlordane [2C]	2.20	0.122	0.378	0.745	Z-01
76-44-8	Heptachlor [2C]	0.180	0.122	0.378	0.745	JPM, Z-01
1024-57-3	Heptachlor epoxide [2C]	0.288	0.122	0.378	0.745	JPM, Z-01
72-43-5	Methoxychlor		0.122	0.378	0.745	U
8001-35-2	Toxaphene		12.2	24.4	36.7	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.52	12.38	66.8	70 - 125	*
Tetrachloro-m-xylene [2C]	18.52	12.35	66.7	70 - 125	*
Decachlorobiphenyl	18.52	15.22	82.2	60 - 125	
Decachlorobiphenyl [2C]	18.52	11.26	60.8	60 - 125	

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB29-0204

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-24	File ID:	014F1601.D
Sampled:	12/20/10 17:25	Prepared:	12/27/10 11:48	Analyzed:	01/05/11 22:01
Solids:	83.01	Preparation:	EXT_3546	Dilution:	1
Batch:	0L22010	Sequence:	1A00705	Calibration:	1005002
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	10.5	0.197	0.394	0.776	Z-01
72-54-8	4,4'-DDD	19.7	0.197	0.394	0.776	PZ-01
50-29-3	4,4'-DDT	4.07	0.197	0.394	0.776	Z-01
309-00-2	Aldrin [2C]	0.557	0.127	0.394	0.776	JPZ-01
319-84-6	alpha-BHC [2C]		0.127	0.394	0.776	U
5103-71-9	alpha-Chlordane	1.88	0.127	0.394	0.776	Z-01
319-85-7	beta-BHC [2C]	0.722	0.127	0.394	0.776	JPZ-01
319-86-8	delta-BHC [2C]	0.282	0.127	0.394	0.776	JPM, Z-01
60-57-1	Dieldrin [2C]	0.919	0.197	0.394	0.776	PZ-01
959-98-8	Endosulfan I		0.127	0.394	0.776	U
33213-65-9	Endosulfan II [2C]	0.540	0.197	0.394	0.776	JPM, Z-01
1031-07-8	Endosulfan sulfate		0.197	0.394	0.776	U
72-20-8	Endrin [2C]	0.371	0.197	0.394	0.776	JPM, Z-01
7421-93-4	Endrin aldehyde		0.197	0.394	0.776	U
53494-70-5	Endrin ketone		0.197	0.394	0.776	U
58-89-9	gamma-BHC (Lindane)		0.127	0.394	0.776	U
5103-74-2	gamma-Chlordane	2.36	0.127	0.394	0.776	Z-01
76-44-8	Heptachlor		0.127	0.394	0.776	U
1024-57-3	Heptachlor epoxide [2C]	0.213	0.127	0.394	0.776	JPZ-01, M
72-43-5	Methoxychlor		0.127	0.394	0.776	U
8001-35-2	Toxaphene		12.7	25.5	38.2	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	19.31	15.14	78.4	70 - 125	
Tetrachloro-m-xylene [2C]	19.31	13.17	68.2	70 - 125	*
Decachlorobiphenyl	19.31	13.67	70.8	60 - 125	
Decachlorobiphenyl [2C]	19.31	9.966	51.6	60 - 125	*

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB30-0005

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Great Lakes CTO F27A
Matrix:	Soil	Laboratory ID:	1012185-06	File ID:	014F1401.D
Sampled:	12/20/10 14:20	Prepared:	12/22/10 14:30	Analyzed:	01/03/11 16:35
Solids:	91.08	Preparation:	EXT_3546	Dilution:	1
Batch:	0L21019	Sequence:	1A00502	Calibration:	0362003
Instrument:	GL-ECD3				

CAS NO.	COMPOUND	CONC. (ug/Kg dry)	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	1.91	0.182	0.364	0.717	PZ-01
72-54-8	4,4'-DDD	5.19	0.182	0.364	0.717	Z-01
50-29-3	4,4'-DDT [2C]	1.28	0.182	0.364	0.717	P
309-00-2	Aldrin		0.118	0.364	0.717	U
319-84-6	alpha-BHC		0.118	0.364	0.717	U
5103-71-9	alpha-Chlordane [2C]	0.628	0.118	0.364	0.717	JPZ-01
319-85-7	beta-BHC		0.118	0.364	0.717	U
319-86-8	delta-BHC	1.16	0.118	0.364	0.717	PX
60-57-1	Dieldrin	0.246	0.182	0.364	0.717	JPM, Z-01
959-98-8	Endosulfan I		0.118	0.364	0.717	U
33213-65-9	Endosulfan II		0.182	0.364	0.717	U
1031-07-8	Endosulfan sulfate		0.182	0.364	0.717	U
72-20-8	Endrin [2C]		0.182	0.364	0.717	U
7421-93-4	Endrin aldehyde		0.182	0.364	0.717	U
53494-70-5	Endrin ketone		0.182	0.364	0.717	U
58-89-9	gamma-BHC (Lindane) [2C]		0.118	0.364	0.717	U
5103-74-2	gamma-Chlordane	0.512	0.118	0.364	0.717	JZ-01
76-44-8	Heptachlor		0.118	0.364	0.717	U
1024-57-3	Heptachlor epoxide	1.13	0.118	0.364	0.717	PZ-01
72-43-5	Methoxychlor [2C]		0.118	0.364	0.717	UZ
8001-35-2	Toxaphene		11.8	23.5	35.3	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	17.82	11.77	66.0	70 - 125	*
Tetrachloro-m-xylene [2C]	17.82	10.64	59.7	70 - 125	*
Decachlorobiphenyl	17.82	13.54	76.0	60 - 125	
Decachlorobiphenyl [2C]	17.82	11.83	66.4	60 - 125	Y

* Values outside of QC limits

ANALYSIS DATA SHEET

NTC12-SB30-00502

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1012185-07 File ID: 015F1501.D

Sampled: 12/20/10 14:25 Prepared: 12/22/10 14:30 Analyzed: 01/03/11 16:54

Solids: 87.53 Preparation: EXT_3546 Dilution: 1

Batch: 0L21019 Sequence: 1A00502 Calibration: 0362003 Instrument: GL-ECD3

CAS NO.	COMPOUND	CONC. (ug/Kg dry	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE	0.989	0.192	0.383	0.755	Z-01
72-54-8	4,4'-DDD	2.96	0.192	0.383	0.755	Z-01
50-29-3	4,4'-DDT [2C]	0.872	0.192	0.383	0.755	P
309-00-2	Aldrin		0.124	0.383	0.755	U
319-84-6	alpha-BHC		0.124	0.383	0.755	U
5103-71-9	alpha-Chlordane [2C]	0.202	0.124	0.383	0.755	JPZ-01
319-85-7	beta-BHC [2C]		0.124	0.383	0.755	U
319-86-8	delta-BHC	0.310	0.124	0.383	0.755	JX
60-57-1	Dieldrin		0.192	0.383	0.755	U
959-98-8	Endosulfan I		0.124	0.383	0.755	U
33213-65-9	Endosulfan II		0.192	0.383	0.755	U
1031-07-8	Endosulfan sulfate		0.192	0.383	0.755	U
72-20-8	Endrin [2C]		0.192	0.383	0.755	U
7421-93-4	Endrin aldehyde		0.192	0.383	0.755	U
53494-70-5	Endrin ketone		0.192	0.383	0.755	U
58-89-9	gamma-BHC (Lindane)		0.124	0.383	0.755	U
5103-74-2	gamma-Chlordane		0.124	0.383	0.755	U
76-44-8	Heptachlor		0.124	0.383	0.755	U
1024-57-3	Heptachlor epoxide	0.435	0.124	0.383	0.755	JPZ-01
72-43-5	Methoxychlor [2C]		0.124	0.383	0.755	UZ
8001-35-2	Toxaphene		12.4	24.8	37.2	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg dry)	CONC (ug/Kg dry)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	18.79	11.92	63.4	70 - 125	*
Tetrachloro-m-xylene [2C]	18.79	11.41	60.7	70 - 125	*
Decachlorobiphenyl	18.79	12.46	66.3	60 - 125	
Decachlorobiphenyl [2C]	18.79	12.20	64.9	60 - 125	Y

* Values outside of QC limits

APPENDIX C

SUPPORT DOCUMENTATION

HOLDTIME

SDG CTOF27AGL0

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
HG	MG/KG	NTC12-SB30-0005	1012185-06	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB30-00502	1012185-07	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB29-0204	1012185-24	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB29-0005	1012185-23	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB28-0204	1012185-22	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB28-0005	1012185-21	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB27-0204	1012185-14	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB27-0005	1012185-13	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB26-0406	1012185-09	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB26-0005	1012185-08	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB25-0204	1012185-20	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB25-0005	1012185-19	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-DUP02	1012185-11	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB24-00502	1012185-04	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-DUP01	1012185-10	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
HG	MG/KG	NTC12-SB21-0005	1012185-17	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB21-0507	1012185-18	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB22-0005	1012185-15	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB22-00502	1012185-16	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB23-0005	1012185-01	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB23-0810	1012185-02	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB24-0005	1012185-03	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB26-0005	1012185-08RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB27-0204	1012185-14	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB27-0005	1012185-13RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB27-0005	1012185-13	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB26-0406	1012185-09RE2	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB26-0406	1012185-09RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB26-0005	1012185-08	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB26-0005	1012185-08RE2	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB25-0204	1012185-20RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB27-0204	1012185-14RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB29-0005	1012185-23	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	NTC12-SB25-0204	1012185-20	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB26-0406	1012185-09	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB28-0005	1012185-21	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB28-0005	1012185-21RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB28-0204	1012185-22	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB29-0204	1012185-24RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB28-0204	1012185-22RE2	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB29-0005	1012185-23RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB29-0005	1012185-23RE2	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB29-0204	1012185-24	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB25-0005	1012185-19RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB23-0810	1012185-02	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB30-00502	1012185-07	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB30-0005	1012185-06	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB28-0204	1012185-22RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-DUP02	1012185-11RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-DUP01	1012185-10	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB24-0005	1012185-03	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	NTC12-DUP02	1012185-11	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB25-0005	1012185-19	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB21-0005	1012185-17	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB21-0005	1012185-17RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB21-0507	1012185-18	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB21-0507	1012185-18RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB22-0005	1012185-15	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB22-0005	1012185-15RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB22-00502	1012185-16	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB22-00502	1012185-16RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB23-0005	1012185-01	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB23-0005	1012185-01RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB23-0005	1012185-01RE2	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-DUP01	1012185-10RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB23-0810	1012185-02RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB24-00502	1012185-04	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB24-00502	1012185-04RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB22-0005	1012185-15RE2	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/L	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	01/03/2011	01/05/2011	14	2	16
CN	MG/KG	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	12/28/2010	12/29/2010	8	1	9
IGN	MG/KG	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	01/05/2011	01/05/2011	16	0	16
PH	S.U.	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	12/29/2010	12/29/2010	9	0	9
RSUL	MG/KG	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	01/03/2011	01/03/2011	14	0	14
OS	UG/KG	NTC12-SB27-0005	1012185-13	NM	12/20/2010	12/23/2010	01/10/2011	3	18	21
OS	UG/KG	NTC12-DUP02	1012185-11	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB21-0005	1012185-17	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB21-0507	1012185-18	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB22-0005	1012185-15	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB22-00502	1012185-16	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB23-0005	1012185-01	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB23-0810	1012185-02	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB24-0005	1012185-03	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB24-00502	1012185-04	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB25-0005	1012185-19	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB25-0204	1012185-20	NM	12/20/2010	12/23/2010	01/10/2011	3	18	21
OS	UG/KG	NTC12-DUP01	1012185-10	NM	12/20/2010	12/23/2010	01/10/2011	3	18	21

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
OS	UG/KG	NTC12-SB30-0005	1012185-06	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB26-0406	1012185-09	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB30-00502	1012185-07	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB29-0204	1012185-24	NM	12/20/2010	12/28/2010	01/05/2011	8	8	16
OS	UG/KG	NTC12-SB29-0005	1012185-23	NM	12/20/2010	12/28/2010	01/05/2011	8	8	16
OS	UG/KG	NTC12-SB28-0204	1012185-22	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB28-0005	1012185-21	NM	12/20/2010	12/23/2010	01/10/2011	3	18	21
OS	UG/KG	NTC12-SB27-0204	1012185-14	NM	12/20/2010	12/23/2010	01/10/2011	3	18	21
OS	UG/KG	NTC12-SB26-0005	1012185-08	NM	12/20/2010	12/23/2010	01/10/2011	3	18	21
OS	UG/KG	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	12/28/2010	01/06/2011	8	9	17
PAH	UG/KG	NTC12-SB30-00502	1012185-07	NM	12/20/2010	12/23/2010	01/04/2011	3	12	15
PAH	UG/KG	NTC12-SB28-0005	1012185-21	NM	12/20/2010	12/23/2010	01/07/2011	3	15	18
PAH	UG/KG	NTC12-SB26-0406	1012185-09	NM	12/20/2010	12/23/2010	01/04/2011	3	12	15
PAH	UG/KG	NTC12-SB26-0406	1012185-09RE1	NM	12/20/2010	12/23/2010	01/07/2011	3	15	18
PAH	UG/KG	NTC12-SB27-0005	1012185-13	NM	12/20/2010	12/23/2010	01/07/2011	3	15	18
PAH	UG/KG	NTC12-SB27-0204	1012185-14	NM	12/20/2010	12/23/2010	01/07/2011	3	15	18
PAH	UG/KG	NTC12-SB28-0204	1012185-22	NM	12/20/2010	12/23/2010	01/05/2011	3	13	16
PAH	UG/KG	NTC12-SB28-0204	1012185-22RE1	NM	12/20/2010	12/23/2010	01/07/2011	3	15	18

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
PAH	UG/KG	NTC12-SB29-0005	1012185-23	NM	12/20/2010	12/28/2010	12/30/2010	8	2	10
PAH	UG/KG	NTC12-SB26-0005	1012185-08	NM	12/20/2010	12/23/2010	01/07/2011	3	15	18
PAH	UG/KG	NTC12-SB30-0005	1012185-06	NM	12/20/2010	12/23/2010	01/04/2011	3	12	15
PAH	UG/KG	NTC12-SB23-0810	1012185-02	NM	12/20/2010	12/23/2010	01/04/2011	3	12	15
PAH	UG/KG	NTC12-SB29-0204	1012185-24	NM	12/20/2010	12/28/2010	12/30/2010	8	2	10
PAH	UG/KG	NTC12-SB21-0507	1012185-18	NM	12/20/2010	12/23/2010	01/04/2011	3	12	15
PAH	UG/KG	NTC12-DUP01	1012185-10	NM	12/20/2010	12/23/2010	01/07/2011	3	15	18
PAH	UG/KG	NTC12-DUP02	1012185-11	NM	12/20/2010	12/23/2010	01/04/2011	3	12	15
PAH	UG/KG	NTC12-DUP02	1012185-11RE1	NM	12/20/2010	12/23/2010	01/07/2011	3	15	18
PAH	UG/KG	NTC12-SB24-00502	1012185-04	NM	12/20/2010	12/23/2010	01/04/2011	3	12	15
PAH	UG/KG	NTC12-SB21-0005	1012185-17RE1	NM	12/20/2010	12/23/2010	01/07/2011	3	15	18
PAH	UG/KG	NTC12-SB25-0204	1012185-20	NM	12/20/2010	12/23/2010	01/07/2011	3	15	18
PAH	UG/KG	NTC12-SB22-0005	1012185-15	NM	12/20/2010	12/23/2010	01/04/2011	3	12	15
PAH	UG/KG	NTC12-SB22-00502	1012185-16	NM	12/20/2010	12/23/2010	01/04/2011	3	12	15
PAH	UG/KG	NTC12-SB23-0005	1012185-01	NM	12/20/2010	12/23/2010	01/03/2011	3	11	14
PAH	UG/KG	NTC12-SB24-0005	1012185-03	NM	12/20/2010	12/23/2010	01/04/2011	3	12	15
PAH	UG/KG	NTC12-SB25-0005	1012185-19	NM	12/20/2010	12/23/2010	01/04/2011	3	12	15
PAH	UG/KG	NTC12-SB21-0005	1012185-17	NM	12/20/2010	12/23/2010	01/04/2011	3	12	15

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
PCB	UG/KG	NTC12-SB28-0204	1012185-22	NM	12/20/2010	12/27/2010	01/05/2011	7	9	16
PCB	UG/KG	NTC12-SB29-0204	1012185-24RE1	NM	12/20/2010	12/27/2010	01/06/2011	7	10	17
PCB	UG/KG	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	12/22/2010	01/04/2011	2	13	15
PCB	UG/KG	NTC12-SB28-0204	1012185-22RE1	NM	12/20/2010	12/27/2010	01/06/2011	7	10	17
PCB	UG/KG	NTC12-SB25-0204	1012185-20RE1	NM	12/20/2010	12/27/2010	01/06/2011	7	10	17
PCB	UG/KG	NTC12-SB25-0204	1012185-20	NM	12/20/2010	12/27/2010	01/06/2011	7	10	17
PCB	UG/KG	NTC12-SB21-0507	1012185-18RE1	NM	12/20/2010	12/27/2010	01/06/2011	7	10	17
PCB	UG/KG	NTC12-SB21-0507	1012185-18	NM	12/20/2010	12/27/2010	01/06/2011	7	10	17
PCB	UG/KG	NTC12-SB29-0204	1012185-24	NM	12/20/2010	12/27/2010	01/05/2011	7	9	16
PCB	UG/KG	NTC12-SB27-0204	1012185-14	NM	12/20/2010	12/22/2010	01/05/2011	2	14	16
PEST	UG/KG	NTC12-SB28-0005	1012185-21	NM	12/20/2010	12/27/2010	01/05/2011	7	9	16
PEST	UG/KG	NTC12-SB25-0005	1012185-19RE2	NM	12/20/2010	12/27/2010	01/05/2011	7	9	16
PEST	UG/KG	NTC12-SB25-0204	1012185-20RE1	NM	12/20/2010	12/27/2010	01/05/2011	7	9	16
PEST	UG/KG	NTC12-SB26-0005	1012185-08	NM	12/20/2010	12/22/2010	01/03/2011	2	12	14
PEST	UG/KG	NTC12-SB26-0005	1012185-08RE1	NM	12/20/2010	12/22/2010	01/03/2011	2	12	14
PEST	UG/KG	NTC12-SB26-0406	1012185-09	NM	12/20/2010	12/22/2010	01/03/2011	2	12	14
PEST	UG/KG	NTC12-SB26-0406	1012185-09RE1	NM	12/20/2010	12/22/2010	01/03/2011	2	12	14
PEST	UG/KG	NTC12-SB27-0005	1012185-13	NM	12/20/2010	12/22/2010	01/04/2011	2	13	15

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
PEST	UG/KG	NTC12-SB27-0204	1012185-14	NM	12/20/2010	12/22/2010	01/05/2011	2	14	16
PEST	UG/KG	NTC12-SB25-0005	1012185-19RE1	NM	12/20/2010	12/27/2010	01/05/2011	7	9	16
PEST	UG/KG	NTC12-SB28-0204	1012185-22	NM	12/20/2010	12/27/2010	01/05/2011	7	9	16
PEST	UG/KG	NTC12-SB29-0005	1012185-23	NM	12/20/2010	12/27/2010	01/05/2011	7	9	16
PEST	UG/KG	NTC12-SB29-0204	1012185-24	NM	12/20/2010	12/27/2010	01/05/2011	7	9	16
PEST	UG/KG	NTC12-SB30-0005	1012185-06	NM	12/20/2010	12/22/2010	01/03/2011	2	12	14
PEST	UG/KG	NTC12-SB30-00502	1012185-07	NM	12/20/2010	12/22/2010	01/03/2011	2	12	14
PEST	UG/KG	NTC12-SB27-0005	1012185-13RE1	NM	12/20/2010	12/22/2010	01/04/2011	2	13	15
PEST	UG/KG	NTC12-SB21-0005	1012185-17RE1	NM	12/20/2010	12/27/2010	01/05/2011	7	9	16
PEST	UG/KG	NTC12-DUP01	1012185-10	NM	12/20/2010	12/22/2010	01/03/2011	2	12	14
PEST	UG/KG	NTC12-DUP02	1012185-11	NM	12/20/2010	12/22/2010	01/04/2011	2	13	15
PEST	UG/KG	NTC12-SB25-0204	1012185-20	NM	12/20/2010	12/27/2010	01/06/2011	7	10	17
PEST	UG/KG	NTC12-SB21-0005	1012185-17	NM	12/20/2010	12/27/2010	01/06/2011	7	10	17
PEST	UG/KG	NTC12-SB25-0005	1012185-19	NM	12/20/2010	12/27/2010	01/06/2011	7	10	17
PEST	UG/KG	NTC12-SB21-0507	1012185-18	NM	12/20/2010	12/27/2010	01/06/2011	7	10	17
PEST	UG/KG	NTC12-SB21-0507	1012185-18RE1	NM	12/20/2010	12/27/2010	01/05/2011	7	9	16
PEST	UG/KG	NTC12-SB22-0005	1012185-15	NM	12/20/2010	12/27/2010	01/04/2011	7	8	15
PEST	UG/KG	NTC12-SB22-0005	1012185-15RE1	NM	12/20/2010	12/27/2010	01/04/2011	7	8	15

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
PEST	UG/KG	NTC12-SB22-00502	1012185-16	NM	12/20/2010	12/27/2010	01/04/2011	7	8	15
PEST	UG/KG	NTC12-SB23-0005	1012185-01	NM	12/20/2010	12/22/2010	12/29/2010	2	7	9
PEST	UG/KG	NTC12-SB23-0810	1012185-02	NM	12/20/2010	12/22/2010	12/29/2010	2	7	9
PEST	UG/KG	NTC12-SB24-0005	1012185-03	NM	12/20/2010	12/22/2010	12/30/2010	2	8	10
PEST	UG/KG	NTC12-SB24-00502	1012185-04	NM	12/20/2010	12/22/2010	01/03/2011	2	12	14
PEST	UG/KG	NTC12-DUP02	1012185-11RE1	NM	12/20/2010	12/22/2010	01/04/2011	2	13	15
TCLPH	MG/L	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	12/29/2010	12/30/2010	9	1	10
TCLPM	MG/L	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	12/29/2010	12/29/2010	9	0	9
TCLPP	MG/L	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	12/29/2010	01/03/2011	9	5	14
TCLPS	MG/L	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	12/29/2010	01/04/2011	9	6	15
TCLPV	%	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	01/05/2011	01/05/2011	16	0	16
TCLPV	MG/L	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	12/29/2010	12/29/2010	9	0	9

NTC GREAT LAKES
SOIL DATA
CTOF27AGL001

FRACTION	CHEMICAL	NTC12-SB27-0204	UNITS	NTC12-DUP01	RPD	D	
PAH	2-METHYLNAPHTHALENE	15	UG/KG	180	169.23	165.00	J
PAH	ACENAPHTHENE	9.79	UG/KG	5.33 J	58.99	4.46	<2x RL
PAH	ACENAPHTHYLENE	3.7 J	UG/KG	6.46 J	54.33	2.76	<2x RL
PAH	ANTHRACENE	22.3	UG/KG	14.1	45.05	8.20	
PAH	BENZO(A)ANTHRACENE	75.6	UG/KG	65.1	14.93	10.50	
PAH	BENZO(A)PYRENE	87.8	UG/KG	74.2	16.79	13.60	
PAH	BENZO(B)FLUORANTHENE	129	UG/KG	106	19.57	23.00	
PAH	BENZO(G,H,I)PERYLENE	43.2	UG/KG	44	1.83	0.80	
PAH	BENZO(K)FLUORANTHENE	47.4	UG/KG	37.5	23.32	9.90	
PAH	CHRYSENE	83.4	UG/KG	63.7	26.78	19.70	
PAH	DIBENZO(A,H)ANTHRACENE	12	UG/KG	11.8	1.68	0.20	
PAH	FLUORANTHENE	169	UG/KG	110	42.29	59.00	
PAH	FLUORENE	10.3	UG/KG	4.42 J	79.89	5.88	<2x RL
PAH	INDENO(1,2,3-CD)PYRENE	38	UG/KG	38.1	0.26	0.10	
PAH	NAPHTHALENE	7.68	UG/KG	82.9	166.09	75.22	J
PAH	PHENANTHRENE	121	UG/KG	71	52.08	50.00	J
PAH	PYRENE	143	UG/KG	103	32.52	40.00	
PEST	4,4'-DDD	5.41	UG/KG	2.86	61.67	2.55	J
PEST	4,4'-DDE	12.9	UG/KG	12.1	6.40	0.80	
PEST	4,4'-DDT	9.1	UG/KG	6.29	36.52	2.81	
PEST	ALPHA-CHLORDANE	0.466 J	UG/KG	ND	200.00	0.47	<2 xRL
PEST	GAMMA-CHLORDANE	0.301 JPM	UG/KG	0.206 JPM	37.48	0.10	

Current RPD Quality Control Limit: 50 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

NTC GREAT LAKES
SOIL DATA
CTOF27AGL001

FRACTION	CHEMICAL	NTC12-SB25-0204	UNITS	NTC12-DUP02	RPD	D
OS	4-METHYLPHENOL	375 J	UG/KG	348 J	7.47	27.00
OS	DIBENZOFURAN	ND	UG/KG	371 J	200.00	371.00
OS	PHENOL	99.7 J	UG/KG	ND	200.00	99.70
PAH	2-METHYLNAPHTHALENE	69.7	UG/KG	682	162.91	612.30
PAH	ACENAPHTHENE	76.8	UG/KG	222	97.19	145.20
PAH	ACENAPHTHYLENE	20.8	UG/KG	82.9	119.77	62.10
PAH	ANTHRACENE	216	UG/KG	734	109.05	518.00
PAH	BENZO(A)ANTHRACENE	493	UG/KG	2790	139.93	2297.00
PAH	BENZO(A)PYRENE	770	UG/KG	1700	75.30	930.00
PAH	BENZO(B)FLUORANTHENE	1080	UG/KG	2580	81.97	1500.00
PAH	BENZO(G,H,I)PERYLENE	314	UG/KG	757	82.73	443.00
PAH	BENZO(K)FLUORANTHENE	486	UG/KG	746	42.21	260.00
PAH	CHRYSENE	478	UG/KG	1950	121.25	1472.00
PAH	DIBENZO(A,H)ANTHRACENE	109	UG/KG	320 1254 J	98.37	211.00
PAH	FLUORANTHENE	1360	UG/KG	~~5850 E~~ 6030	~~124.55~~	~~4490.00~~ 4620
PAH	FLUORENE	77.4	UG/KG	303	118.61	225.60
PAH	INDENO(1,2,3-CD)PYRENE	309	UG/KG	804	88.95	495.00
PAH	NAPHTHALENE	122	UG/KG	472	117.85	350.00
PAH	PHENANTHRENE	881	UG/KG	2840	105.29	1959.00
PAH	PYRENE	1120	UG/KG	5340 ~~4080 E~~ 1307	~~120.56~~	4025 ~~3860.00~~
~~PCB~~	~~AROCLOR-1254~~	105	UG/KG	~~ND~~	200.00	105.00
PEST	4,4'-DDD	545 ~~631~~ PEXZ-01	UG/KG	434 ~~584~~ PEZ-01	22.6 ~~16.65~~	111 ~~97.00~~
PEST	4,4'-DDE	986 ~~1090~~ PEZ-01	UG/KG	77 PZ-01 171	~~173.61~~	98 ~~1013.00~~
PEST	4,4'-DDT	282 ~~77.2 YZ-01~~	UG/KG	168 ~~138 EZ-01~~ 506	~~56.51~~	114 ~~60.80~~
PEST	ALDRIN	0.626 JZ-01	UG/KG	8.74 PZ-01	173.27	8.11
PEST	ALPHA-BHC	ND	UG/KG	1.03 PM	200.00	1.03
PEST	ALPHA-CHLORDANE	1.68 PMZ-01	UG/KG	42.1 PZ-01	184.65	40.42
PEST	BETA-BHC	ND	UG/KG	1.43 PM	200.00	1.43
PEST	DELTA-BHC	ND	UG/KG	7.68 P	200.00	7.68
PEST	DIELDRIN	4.79 Z-01	UG/KG	5.98 PZ-01M	22.10	1.19

Current RPD Quality Control Limit: 50 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

NTC GREAT LAKES
SOIL DATA
CTOF27AGL001

FRACTION	CHEMICAL	NTC12-SB25-0204	UNITS	NTC12-DUP02	RPD	D	
PEST	ENDOSULFAN I	0.194 JPMZ-01	UG/KG	ND	**200.00**	0.19	<2xRL
PEST	ENDOSULFAN II	0.28 JPMZ-01	UG/KG	0.493 JPMZ-01	**55.11**	0.21	<2xRL
PEST	ENDOSULFAN SULFATE	0.204 JPMZ-01	UG/KG	3.17 PZ-01M	**175.82**	2.97	J
PEST	ENDRIN	9.89 PZ-01	UG/KG	5.5 PZ-01M	**57.05**	4.39	J
PEST	ENDRIN ALDEHYDE	0.953 PZ-01	UG/KG	3.55 Z-01	**115.35**	2.60	J
PEST	GAMMA-BHC (LINDANE)	ND	UG/KG	0.998 P	**200.00**	1.00	<2xRL
PEST	GAMMA-CHLORDANE	1.16 PMZ-01	UG/KG	36.2 Z-01	**187.58**	35.04	J
PEST	HEPTACHLOR	ND	UG/KG	1.43	**200.00**	1.43	<2xRL
PEST	HEPTACHLOR EPOXIDE	1.77 PZ-01	UG/KG	2.47 PZ-01M	33.02	0.70	
PEST	METHOXYCHLOR	0.528 JPYZ-01	UG/KG	ND	**200.00**	0.53	<2xRL

Current RPD Quality Control Limit: 50 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

ANALYTICAL SUMMARY DATA PACKAGE
SDG # CTOF27AGL_001

PROJECT NAME: GREAT LAKES CTO F27A
PROJECT LOCATION: GREAT LAKES, IL
CONTRACT #: N62470-08-D-1001

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THIS DOCUMENT MEETS DoD QSM 4.1 STANDARDS

The results relate to only the samples associated with the referenced SDG and the submitted data has been produced in accordance with laboratory procedures. The Laboratory's Technical Lab Director, Mr. Rick Davis, is responsible for the final data produced and reported. His signature is listed at the end of the Case Narrative within the Analytical Data Package. If applicable to this report package, details on report revisions and the information on subcontracted analysis are listed in the package Case Narrative. This report shall not be reproduced, except in full, without the written approval of Empirical Laboratories, LLC.

Sample Delivery Group Case Narrative

Receipt Information
The samples were received within the preservation guidelines for the associated methods. The information associated with sample receipt and the Sample Delivery Group (SDG) are included within section 4 of this package, which also provides information on the link between the client sample ID listed on the COC and laboratory's assigned unique sample ID or WorkOrder #. The sample is tracked through the laboratory for all analysis via the assigned WorkOrder #.

All samples that were received were analyzed and none of the samples were placed on hold without analyses. Samples were subcontracted to Test America for BTU Content by ASTM D240.

A trip blank was not received in the shipment.

Changes to the Revision
This is an original submittal of the final report package.

Analytical Information
All samples were prepped (where applicable) and analyzed within the standard allowed holding times, unless noted within the exceptions listed below. The laboratory analyzed all samples within the program and method guidelines. The following information is provided specific to individual methods:

Chromatographic Flags for Manual Integration:
The following letters are used to denote manual integrations on the laboratory's raw data in association with chromatographic integrations:

A: The peak was manually integrated as it was not integrated in the original chromatogram.
B: The peak was manually integrated due to resolution or coelution issues in the original chromatogram.
C: The peak was manually integrated to correct the baseline from the original chromatogram.
D: The peak was manually integrated to identify the correct peak as the wrong peak was identified in the original chromatogram.
E: The peak was manually integrated to include the entire peak as the original chromatogram only integrated part of the peak.

SW8260B TCLP:
The matrix spike associated to sample 1012185-12 exceeded criteria with a positive bias for Vinyl Chloride.

The continuing calibration verification 0L36401-CCV1 exceeded criteria with a positive bias for 2-Butanone.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW8270C TCLP:
The batch spike associated to batch 0L29008 exceeded criteria with a positive bias for Pentachlorophenol and with a negative bias for Hexachlorobutadiene and Hexachloroethane. The adjusted LOD for Hexachlorobutadiene and Hexachloroethane remains below the regulatory limit.

The matrix spikes associated to sample 1012185-12 exceeded recovery criteria with a positive bias for 2,4-Dinitrotoluene and Pentachlorophenol, exceeded recovery criteria with a negative bias for Hexachlorobutadiene and Hexachloroethane and exceeded the relative percent difference criteria for Hexachlorobutadiene and Hexachloroethane.

The continuing calibration verification 1A00501-CCV1 exceeded criteria with a positive bias for Nitrobenzene-d5 and Terphenyld-14.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW8270C BNA:
The surrogate Nitrobenzene-d5 exceeded criteria with a positive bias for 0L27012-BS1, -BLK1, 0L22011-BLK1, -BS1, -MSD1 and samples 1012185-23, -24, -03, -07, -01, -11, -15, -16, -10, -14, -13 and -08. The surrogate Terphenyld-14 exceeded criteria with a positive bias in sample 1012185-08.

The batch spike associated to batch 0L22011 exceeded criteria with a positive bias for Bis(2-chloroethyoxy)methane, 2,4-Dimethylphenol, Hexachlorobutadiene, Nitrobenzene and Phenol and with a negative bias for N-nitroso-di-n-propylamine. The batch spike associated to batch 0L27012 exceeded criteria with a positive bias for Butylbenzylphthalate, 4-Chloro-3-methylphenol, Bis(2-chloroethoxy)methane, 2,2'-Oxybis-1-chloropropane, Dib-n-butylphthalate, 2,4-Dimethylphenol, 2,4-Dinitrophenol, Di-n-octylphthalate, Bis(2-ethylhexyl)phthalate, 4-Nitroaniline, 2-Nitroaniline, Nitrobenzene, 2-Nitrophenol, N-nitroso-di-n-propylamine and Pentachlorophenol.

The matrix spikes associated to sample 1012185-14 exceeded criteria with a positive bias for Di-n-ocytlphthalate, Hexachlorobutadiene, Bis(2-chloroethoxy)methane and Nitrobenzene and with a negative bias for N-nitrosodiphenylamine. The matrix spikes associated to sample 1012185-23 exceeded criteria with a positive bias for Butylbenzylphthalate, Di-n-octylphthalate, Bis(2-ethylhexyl)phthalate, Di-n-butylphthalate, and 2-Nitroaniline and with a negative bias for Hexachlorocyclopentadiene, 2,3,4,6-Tetrachlorophenol and 3,3'-Dichlorobenzidine and exceeded the relative percent difference criteria for Hexachlorocyclopentadiene.

The internal standards Chrysene-d12 and Perylene-d12 exceeded criteria with a negative bias in sample 1012185-08. Compounds associated to these iinternal

standards are qualified.

The continuing calibration verifications exceeded criteria in 1A00601-CCV1 with a positive bias for Butylbenzylphthalate, 2,2'-Oxybis-1-chloropropane, 2,4-Dinitrophenol, Di-n-octylphthalate, Bis(2-ethylhexyl)phthalate, 4-Nitroaniline 2-Nitroaniline, Nitrobenzene, 4-Nitrophenol, N-noitroso-di-n-propylamine and Nitrobenzene-d5, in 1A00701-CCV1 with a negative bias for 3,3'-Dichlorobenzidine and Carbazole and with a positive bias for Hexachlorobutadiene, Hexachlorocyclopentadiene, Isophorone, 2-Nitroaniline, Nitrobenzene, N-nitroso-di-n-propylamine and Nitrobenzene-d5 and in 1A01104-CCV1 with a negative bias for 3,3'-Dichlorobenzidine and Carbazole and with a positive bias for Caprolactam, Di-n-octylphthalate, Hexachlorobutadiene, Isophorone, 2-Nitroaniline, Nitrobenzene, N-nitroso-di-n-propylamine, Nitrobenzene-d5 and Terphenyl-d14.

The method blank 0L27012-BLK1 has a positive result for Diethylphthalate.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW8270C PAH:
The batch spike associated to batch 0L22011-BS2 exceeded criteria with a positive bias for Benzo(k)fluoranthene.

The matrix spikes associated to sample 1012185-23 exceeded recovery criteria with a positive bias for Benzo(b)fluoranthene and exceeded relative percent difference criteria for 2-Methylnaphthalene.

The internal standard Perylene-d12 exceeded criteria in sample 1012185-08. Compounds associated to Perleyene-d12 in sample 1012185-08 are qualified.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW8082A:
Samples 1012185-12, -18, -20, -22 and -24 are qualified with a Z-01 to indicate that the DL, LOD and/or LOQ have been elevated due to interference.

The surrogate Tetrachloro-m-xylene exceeded criteria with a negative bias on both columns in sample 1012185-12 and on column 2 in sample 1012185-22RE1. The surrogate Decachlorobiphenyl exceeded criteria with a negative bias on column 2 in samples 1012185-20RE1 and 0L2109-MSD2 and on column 1 in sample 1012185-22. The surrogates Tetrachloro-m-xylene and Decachlorobiphenyl exceeded criteria with a negative bias on both columns in samples 1012185-18, -18RE1 and 0L2109-MS2 and exceeded criteria with a negative bias on column 2 iin samples 1012185-20, -24 and -24RE1.

The continuing calibration verifications exceeded criteria in 0L36408-CCV6 with a

positive bias on column 2 for Aroclor-1016 and 1260, in 1A00604-CCV3 and 1A00705-CCV3 with a positive bias on column 2 for Aroclor-1260, in 1A00604-CCV7 on column 2 for Aroclor-1016 and 1260, in 1A00604-CCV8 and 1A02007-CCV2 with a positive bias on column 2 for Aroclor-1254, in 1A00705-CCV6 with a positive bias on column 2 for Aroclor-1016 and on both columns for Aroclor-1260, in 1A00705-CCV7 and 1A01007-CCV3 with a negative bias on column 2 for Decachlorobiphenyl and in 1A01007-CCV1 with a negative bias on column 1 for Decachlorobiphenyl.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW8081A TCLP:
The continuing calibration verifications exceeded criteria in 1A00502-CCV2 with a positive bias for Chlordane on column 2, in 1A00502-CCV4 with a positive bias on column 1 for Heptachlor and with a negative bias on column 2 for Methoxychlor and Decachlorobiphenyl and in 1A00502-CCV6 with a negative bias on column 2 for Toxaphene.

The surrogate Decachlorobiphenyl exceeded criteria with a negative bias in OL29007-BS1 on column 1.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW8081B:
Some analytes in samples 1012185-04, -06, -07,-08, -0RE1, -09, -09RE, -11, -11RE1, -13, -13RE1, -15, -15RE1, -16, -16RE1, -18, -18RE1, -19, -19RE1, -19RE2, -20, -22, -23 and -24 are qualified with a Z-01 to indicate that due to interference, the result for this analyte may be biased high.

The continuing calibration verifications exceeded criteria in 0L36408-CCV4 with a positive bias for Delta-BHC on column 1, in 1A00502-CCV4 on column 1 with a positive bias for Delta-BHC and Heptachlor and on column 2 with a negative bias for Methoxychlor and Decachlorobiphenyl, in 1A00502-CCV6 and 1A00705-CCV8 with a negative bias for Toxaphene on column 2, in 1A00604-CCV5 with a positive bias for Beta-BHC on column 2 and in 1A00705-CCV7 with a positive bias for 4,4'-DDD on column 1, with a negative bias on both columns for 4,4'-DDT and with a negative bias on column 2 for Methoxychlor and Decachlorobiphenyl.

The surrogate Tetrachloro-m-xylene and Decachlorobiphenyl exceeded criteria with a negative bias on one or both columns in samples 1012185-02, -08, -08RE1, -09, -11, -10, -18, 16RE1, -20 and -24. The surrogate Tetrachloro-m-xylene exceeded criteria with a negative bias on one or both columns in samples 1012185-03, -06, -07, -23, -04, -19, -18RE1, -17RE1, -09RE1, -11RE1 and -19RE2. The surrogate Decachlorobiphenyl exceeded criteria with a negative bias on one or both columns in samples 1012185-19RE1, -22 and 0L21019-MS1.

The matrix spike associated to sample 1012185-14 exceeded criteria with a negative bias on column 2 for 4,4'-DDE.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW8151A TCLP:
The surrogate 2,4-Dichlorophenylacetic Acid exceeded criteria with a negative bias on both columns in sample 1012185-12 and on column 2 with a negative bias for 1012185-12MS and -12MSD.

The matrix spike duplicate associated to sample 1012185-12 exceeded criteria with a negative bias on both columns for 2,4,5-TP(Silvex) and exceeded the relative percent difference criteria for 2,4,5-TP(Silvex) on column 1.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW6010B/SW7471A/SW7470A:
The following samples are qualified with an M, for the compound indicated, to indicate that the LOD and/or DL were raised due to interference: 1012185-01, -03, -06, -13 and -15 (Thallium), 1012185-10 (Silver) and 1012185-11 and -18 (Beryllium).

The digestion blank 1A04001-BLK has positive results for Chromium and Zinc. The continuing calibration blanks 1A00702-CCB3 and –CCB4 have positive results for Iron. The digestion blank 1A04002-BLK1 has positive results for Chromium, Iron, Thallium and Zinc. The continuing calibration blank 1A00702-CCB5 has a positive result for Lead.

The matrix spikes associated to sample 1012185-14 exceeded criteria with a negative bias for Antimony and Chromium, with a positive bias for Cadmium, Arsenic, Barium and Sodium and exceeded the relative percent difference for Copper. Copper, Magnesium, Manganese and Potassium also exceeded criteria but the concentrations in the parent sample are greater then 4 times that amount spiked. The post spike associated to sample 1012185-14 exceeded criteria with a positive bias for Antimony, Arsenic, Cadmium, Magnesium, Manganese and Selenium and with a negative bias for Iron.

The serial dilution associated to sample 1012185-14 exceeded criteria for Iron and Manganese.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

Wet Chemistry:
Sample 1012185-12 was received after the EPA recommended holding time for pH.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

Data Qualifiers
As applicable and where required, the following general qualifiers are associated with the sample results. Additional qualifiers will be specified within the reporting sections of the data package or within the body of the Case Narrative.

Analytical Report Terms and Qualifiers

MDL: The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The MDL is determined from analysis of a sample containing the analyte in a given matrix. For DoD QSM 4.1 reporting purposes, this definition is also applied to the reported Detection Limit (DL).

LOD: The Limit of Detection is an estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte- and matrix-specific and may be laboratory-dependent. This definition is further clarified in the DoD QSM 4.1 revisions as the smallest amount or concentration of a substance that must be present in a sample in order to be detected at a high level of confidence (99%). At the LOD, the false negative rate (Type II error) is 1%.

LOQ: The Limit of Quantitation is the minimum level, concentration, or quantity of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. This term is further clarified within the DoD QSM 4.1 as the lowest concentration that produces a quantitative result within specified limits of precision and bias.

***:** An exceeding quality control criteria is associated with the reported result.

B: The presence of a "B" to the right of an analytical value indicates that this compound was also detected in the method blank and the data should be interpreted with caution. One should consider the possibility that the correct sample result might be less than the reported result and, perhaps, zero.

D: When a sample (or sample extract) is rerun diluted because one of the compound concentrations exceeded the highest concentration range for the standard curve, all of the values obtained in the dilution run will be flagged with a "D".

E: The concentration for any compound found which exceeds the highest concentration level on the standard curve for that compound will be flagged with an "E". Usually the sample will be rerun at a dilution to quantitate the flagged compound.

H1: The result was analyzed outside of the EPA recommended holding time.

H2: The result was extracted outside of the EPA recommended holding time.

H3: The sample for this analyte was received outside of the EPA recommended holding time.

J: The presence of a "J" to the right of an analytical result indicates that the reported result is estimated. The mass spectral data pass the identification criteria showing that the compound is present, but the calculated result is less than the EQL. One should feel confident that the result is greater than zero and less than the EQL.

M: Indicates that the sample matrix interfered with the quantitation of the analyte. In dual column analysis the result is reported from the column with the lower concentration. In inorganics, it indicates that the parameters MDL/RL has been raised.

N: The MS/MSD accuracy and/or precision are outside criteria. The predigested spike recovery is not within control limits for the associated parameter.

P: The associated numerical value is an estimated quantity. There is greater than a 40% difference between the two GC columns for the detected concentrations. The higher of the two values is reported unless matrix interference is obvious or for HPLC analysis where the primary column is reported.

Q: The RPD and/or percent recovery exceeded limits in the associated Blank Spike and/or Blank Spike Duplicate.

S: The associated internal standard failed criteria.

U: The presence of a "U" indicates that the analyte was analyzed for but was not detected or the concentration of the analyte quantitated below the DL.

X: The parameter shows a potential positive bias on a reported concentration due to an ICV or CCV exceeding the upper control limit on the high side.

Y: The parameter shows a potential negative bias on a reported concentration due to an ICV or CCV exceeding the lower control limit on the low side.

Z: The parameter shows lack of confirmation/detection, which may be due to a negative bias in the ICV or CCV which exceeds the lower control limit.

LIMS Definitions / Naming Conventions:

The following are general naming conventions that are used throughout the laboratory; however, on a method by method basis, there are additional QAQC items that are named in a consistent format.

BLK: LIMS assigns a unique identifier to the Method Blank by naming it as the letters BLK appended to the Batch ID. A Method Blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The Method Blank is used to assess for possible contamination during preparation and/or analysis steps. Method Blanks within a Batch or Analytical sequence will be appended with a numerical value beginning with 1 that will increase incrementally.

BS: LIMS assigns a unique identifier to the Blank Spike by naming it as the letters BS appended to the Batch ID. The Blank Spike or Lab Control Sample is a controlled analyte-free matrix, which is spiked with known and verified concentrations of target analytes. Spiking concentrations can be referenced in the method SOP. The BS is used to evaluate the viability of analytes taken through the entire prep (when applicable) and analytical process. Blank Spikes within a Batch or Analytical sequence will be appended with a numerical value beginning with 1 that will increase incrementally. A duplicate Blank Spike will be designated as a BSD.

MS: The LIMS assigns each Client sample with a unique identifier. The Matrix Spike is designated with a MS at the end of the sample's unique identifier. The Matrix Spike sample is used to assess the effect of the sample matrix on the precision and accuracy of the results generated using the selected method. A duplicate Matrix Spike will be designated as a MSD.

IDs: The LIMS assigns each Client sample with a unique identifier. The letter "RE" may potentially be appended to the end of the LIMS Sample ID. And **"RE"** implies that the sample was either re-prepped, re-analyzed straight, or re-analyzed at a dilution. Subsequent re-analysis for the sample will be appended with a numerical value beginning with 1 that will increase incrementally. Eg: RE1, RE2, RE3, etc.

Statement of Data Authenticity:
I certify that, based upon my inquiry of those individuals immediately responsible for obtaining the information and to the best of my knowledge, the data package is in compliance with the terms and conditions of the contract, both technically and for completeness, with the exception of the conditions detailed in this Case Narrative, as verified by my signature below. During absences, Ms. Marcia K. McGinnity is authorized to sign this Statement of Data Authenticity.

Mr. Rick D. Davis
Laboratory Technical Director / VP Operations

EMPIRICAL LABORATORIES, LLC - CHAIN OF CUSTODY RECORD

SHIP TO: 621 Mainstream Drive, Suite 270 ♦ Nashville, TN 37228 ♦ 615-345-1115 ♦ (fax) 615-846-5426

12-39

Send Results to:	Send Invoice to:
Name Bob Davis	Name Accounting
Company Tetra Tech	Company Tetra tech
Address 661 Andersen Dr. #7	Address
City Pittsburgh ~~PA 15220~~	City
State, Zip PA 15220	~~State, Zip~~ SAMO
Phone 412-921-7251	Phone
Fax 412-921-4090	Fax
E-mail Robert.Davis@TetraTech.com	E-mail
Project No./Name: #TET10CTOF27A CTO F27A	Sampler's (Signature): [signature]

Analysis Requirements: SVOCs+PAHs (8270C); ~~PCBs (8082A)~~; Pesticides (8081B); TAL Metals (6010C); VOCs (8260B); * Multiple IDW parameters

Lab Use Only:

VOA Headspace	Y	N	NA
Field Filtered	Y	N	NA
Correct Containers	Y	N	NA
Discrepancies	Y	N	NA
Cust. Seals Intact	Y	N	NA
Containers Intact	Y	N	NA

Airbill #: 6349

CAR #:

Lab Use Only Lab #	Date/Time Sampled	Sample Description	Sample Matrix	SVOCs+PAHs (8270C)	~~PCBs (8082A)~~	Pesticides (8081B)	TAL Metals (6010C)	VOCs (8260B)	* Multiple IDW parameters	Comments	No. of Bottles	Lab Use Only Containers/Pres.
1012185 -01	12-20-10/1300	NTC12-SB23-0005	SO	✓	[illegible]	✓	✓			[illegible]	2	2 4oz
-02	/1320	NTC12-SB23-0810	SO	✓		✓	✓				2	
-03	/1400	NTC12-SB24-0005	SO	✓		✓	✓				2	
-04	/1405	NTC12-SB24-00502		✓		✓	✓				2	
-05	—	TB01 #9060						✓			2	* WS 12/21/10
-06	/1420	NTC12-SB30-0005		✓		✓	✓				2	
-07	/1425	NTC12-SB30-00502		✓		✓	✓				2	
-08	1735	NTC12-SB26-0005		✓	[illegible]	✓	✓				2	
-09	1740/[illegible]	NTC12-SB26-0406		✓	[illegible]	✓	✓			[illegible]	2	
-10	/0000	NTC12-DUP01		✓		✓	✓				2	
-11	/0000	NTC12-DUP02		✓		✓	✓				2	
-12	1800	NTC12-Soil-IDW									8	

Sample Kit Prep'd by: (Signature)	Date/Time	Received By: (Signature)
	12/17/10/1000	[signature]
Relinquished by: (Signature) [signature]	Date/Time 12/20/10/1700	Received By: (Signature)
Relinquished by: (Signature)	Date/Time	Received By: (Signature)
Received for Laboratory by: (Signature) [signature]	Date/Time 12-21-10 09:15	Temperature 4.4°C

REMARKS:

* See PO# for CTO F27A for full suite of parameters.

not rec'd in shipment WS 12/21/10

Details:

Page 1 of 2

Cooler No. 2 of 2

Date Shipped 12-20-10

Shipped By Fed Ex

Turnaround

Distribution: Original and yellow copies accompany sample shipment to laboratory; Pink retained by samplers.

EMPIRICAL LABORATORIES, LLC - CHAIN OF CUSTODY RECORD

SHIP TO: 621 Mainstream Drive, Suite 270 ♦ Nashville, TN 37228 ♦ 615-345-1115 ♦ (fax) 615-846-5426 12440

Send Results to:
Name Bob Davis
Company Tetra Tech NUS Inc
Address 661 Andersen Dr. #7
City Pittsburgh
State, Zip PA, 15220
Phone 412-921-7251
Fax
E-mail Robert.Davis@TetraTech.com

Send Invoice to:
Name
Company
Address
City SAME
State, Zip
Phone
Fax
E-mail

Project No./Name: #TET10CTOF27A

Sampler's (Signature):

Analysis Requirements: SVOCs, PAHs (8270C); PCBs (8082A); Pesticides (8081B); TAL Metals (6010C)

Lab Use Only:
VOA Headspace Y N (NA)
Field Filtered Y (N) NA
Correct Containers (Y) N NA
Discrepancies Y (N) NA
Cust. Seals Intact Y N (NA)
Containers Intact (Y) N NA
Airbill #: 6349
CAR #: —

Lab Use Only Lab #	Date/Time Sampled	Sample Description	Sample Matrix	SVOCs, PAHs (8270C)	PCBs (8082A)	Pesticides (8081B)	TAL Metals (6010C)	Comments	No. of Bottles	Lab Use Only Containers/Pres.
10C185 -13	1530	NTC12-SB27-0005	SO	✓	[redacted]	✓	✓		2	2 4oz
-14	1535	-SB27-0204		✓	✓	✓	✓	MS/MSD, pcbs	6	6 4oz
-15	1555	-SB22-0005		✓		✓	✓		2	2 4oz
-16	1600	-SB22-0005D		✓		✓	✓		2	
-17	1620	-SB21-0005		✓		✓	✓		2	
-18	1625	-SB21-0507		✓	✓	✓	✓	PCB analysis	2	
-19	1635	-SB25-0005		✓		✓	✓		2	
-20	1640	-SB25-0204		✓	✓	✓	✓	pcb analysis	2	
-21	1700	-SB28-0005		✓		✓	✓		2	
-22	1705	-SB28-0204		✓	✓	✓	✓	pcb analysis	2	
-23	1720	-SB29-0005		✓	[redacted]	✓	✓		2	
-24	1725	-SB29-0204		✓	✓	✓	✓	pcb analysis	2	

	Date/Time		
Sample Kit Prep'd by: (Signature)	12/17/10/1000	Received By: (Signature)	
Relinquished by: (Signature)	12-20-10/1700	Received By: (Signature)	
Relinquished by: (Signature)	Date/Time	Received By: (Signature)	
Received for Laboratory by: (Signature)	Date/Time 12-21-10 09:15	Temperature 4.4°C	

REMARKS:

Details:
Page 1 of 2
Cooler No. 2 of 2
Date Shipped 12-20-10
Shipped By Fed Ex
Turnaround

Distribution: Original and yellow copies accompany sample shipment to laboratory; Pink retained by samplers.

14

CTOF27AGL_001 Summ Package

EMPIRICAL LABORATORIES
COOLER RECEIPT FORM

LIMS Number: 10RIF5 Number of Coolers: 1 of 2

Client: TTNUS Project: CTO F27A

Date/Time Received: **12/21/10** **09:15** Date cooler(s) opened: **12/21/10**

Opened By (print): Will Schwab (signature): [signature]

Circle response below as appropriate

1. How did the samples arrive? FedEx UPS DHL Hand Delivered
EL Courier Other: _____

If applicable, enter airbill number here: 6349

2. Were custody seals on outside of cooler(s)? ..... Yes (No)

How many: — Seal date: — Seal Initials: —

3. Were custody seals unbroken and intact at the date and time of arrival?	Yes	No	(N/A)
4. Were custody papers sealed in a plastic bag included in the sample cooler?	(Yes)	No	N/A
5. Were custody papers filled out properly (ink, signed, etc.)?	(Yes)	No	N/A
6. Did you sign custody papers in the appropriate place for acceptance?	(Yes)	No	N/A
7. Was project identifiable from custody papers?	(Yes)	No	N/A
8. If required, was enough ice present in the cooler(s)?	(Yes)	No	N/A

Type of Coolant: (WET) DRY BLUE NONE

Temperature of Samples upon Receipt: Initial Value: 4.7 °C Correction Factor: -0.3 °C Final Value: 4.4 °C

Dates samples were logged-in: **12/21/10**

9. Initial this form to acknowledge login of sample(s): (Name): Chris Powell (Initial): CP

10. Were all bottle lids intact and sealed tightly?	(Yes)	No	N/A
11. Did all bottles arrive unbroken?	(Yes)	No	N/A
12. Was all required bottle label information complete?	(Yes)	No	N/A
13. Did all bottle labels agree with custody papers?	(Yes)	No	N/A
14. Were correct containers used for the analyses indicated?	(Yes)	No	N/A
15. Were preservative levels correct in all applicable sample containers?	Yes	No	(N/A)
16. Was residual chlorine present in any applicable sample containers?	Yes	No	(N/A)
17. Was sufficient amount of sample sent for the analyses required?	(Yes)	No	N/A
18. Was headspace present in any included VOA vials?	Yes	No	(N/A)

Trip Blank missing in Shipment!

If Non-Conformance issues were present, list by sample ID: _____

EMPIRICAL LABORATORIES
COOLER RECEIPT FORM

LIMS Number: 10/2185 Number of Coolers: 2 of 2

Client: TTNUS Project: CTO F27A

Date/Time Received: **12/21/10** **09:15** Date cooler(s) opened: **12/21/10**

Opened By (print): Will Schwab (signature): [signature]

Circle response below as appropriate

1. How did the samples arrive? FedEx UPS DHL Hand Delivered
EL Courier Other: _____

If applicable, enter airbill number here: 3803

2. Were custody seals on outside of cooler(s)? ..... Yes (No)

How many: — Seal date: — Seal Initials: —

3. Were custody seals unbroken and intact at the date and time of arrival?	Yes	No	(N/A)
4. Were custody papers sealed in a plastic bag included in the sample cooler?	(Yes)	No	N/A
5. Were custody papers filled out properly (ink, signed, etc.)?	(Yes)	No	N/A
6. Did you sign custody papers in the appropriate place for acceptance?	(Yes)	No	N/A
7. Was project identifiable from custody papers?	(Yes)	No	N/A
8. If required, was enough ice present in the cooler(s)?	(Yes)	No	N/A

Type of Coolant: (WET) DRY BLUE NONE

Temperature of Samples upon Receipt: Initial Value: 3.8 °C Correction Factor: -0.3 °C Final Value: 3.5 °C

Dates samples were logged-in: **12/21/10**

9. Initial this form to acknowledge login of sample(s): (Name): _____ (Initial): _____

10. Were all bottle lids intact and sealed tightly?	Yes	No	N/A
11. Did all bottles arrive unbroken?	Yes	No	N/A
12. Was all required bottle label information complete?	Yes	No	N/A
13. Did all bottle labels agree with custody papers?	Yes	No	N/A
14. Were correct containers used for the analyses indicated?	Yes	No	N/A
15. Were preservative levels correct in all applicable sample containers?	Yes	No	N/A
16. Was residual chlorine present in any applicable sample containers?	Yes	No	N/A
17. Was sufficient amount of sample sent for the analyses required?	Yes	No	N/A
18. Was headspace present in any included VOA vials?	Yes	No	N/A

If Non-Conformance issues were present, list by sample ID: _____

HOLDING TIME SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NTC12-SB23-0005	12/20/10 13:00	12/21/10 09:15	12/23/10 13:30	3.06	14.00	01/06/11 19:07	14.23	40.00	
NTC12-SB23-0810	12/20/10 13:20	12/21/10 09:15	12/23/10 13:30	3.05	14.00	01/06/11 19:37	14.25	40.00	
NTC12-SB24-0005	12/20/10 14:00	12/21/10 09:15	12/23/10 13:30	3.02	14.00	01/06/11 17:03	14.15	40.00	
NTC12-SB24-00502	12/20/10 14:05	12/21/10 09:15	12/23/10 13:30	3.02	14.00	01/06/11 17:33	14.17	40.00	
NTC12-SB30-0005	12/20/10 14:20	12/21/10 09:15	12/23/10 13:30	3.01	14.00	01/06/11 18:04	14.19	40.00	
NTC12-SB30-00502	12/20/10 14:25	12/21/10 09:15	12/23/10 13:30	3.00	14.00	01/06/11 18:35	14.21	40.00	
NTC12-SB26-0005	12/20/10 17:35	12/21/10 09:15	12/23/10 13:30	2.87	14.00	01/10/11 20:44	18.30	40.00	
NTC12-SB26-0406	12/20/10 17:40	12/21/10 09:15	12/23/10 13:30	2.87	14.00	01/06/11 20:39	14.30	40.00	
NTC12-DUP01	12/20/10 00:00	12/21/10 09:15	12/23/10 13:30	3.60	14.00	01/10/11 17:17	18.16	40.00	
NTC12-DUP02	12/20/10 00:00	12/21/10 09:15	12/23/10 13:30	3.60	14.00	01/06/11 21:09	14.32	40.00	
NTC12-SOIL-IDW	12/20/10 18:00	12/21/10 09:15	12/28/10 09:56	7.71	14.00	01/06/11 00:49	8.62	40.00	
NTC12-SB27-0005	12/20/10 15:30	12/21/10 09:15	12/23/10 13:30	2.96	14.00	01/10/11 19:45	18.26	40.00	
NTC12-SB27-0204	12/20/10 15:35	12/21/10 09:15	12/23/10 13:30	2.95	14.00	01/10/11 17:46	18.18	40.00	
NTC12-SB22-0005	12/20/10 15:55	12/21/10 09:15	12/23/10 13:30	2.94	14.00	01/06/11 21:40	14.34	40.00	
NTC12-SB22-00502	12/20/10 16:00	12/21/10 09:15	12/23/10 13:30	2.94	14.00	01/06/11 22:42	14.38	40.00	
NTC12-SB21-0005	12/20/10 16:20	12/21/10 09:15	12/23/10 13:30	2.92	14.00	01/06/11 20:09	14.28	40.00	
NTC12-SB21-0507	12/20/10 16:25	12/21/10 09:15	12/23/10 13:30	2.92	14.00	01/06/11 23:13	14.40	40.00	
NTC12-SB25-0005	12/20/10 16:35	12/21/10 09:15	12/23/10 13:30	2.91	14.00	01/06/11 23:44	14.43	40.00	
NTC12-SB25-0204	12/20/10 16:40	12/21/10 09:15	12/23/10 13:30	2.91	14.00	01/10/11 20:14	18.28	40.00	
NTC12-SB28-0005	12/20/10 17:00	12/21/10 09:15	12/23/10 13:30	2.90	14.00	01/10/11 19:15	18.24	40.00	
NTC12-SB28-0204	12/20/10 17:05	12/21/10 09:15	12/23/10 13:30	2.89	14.00	01/06/11 22:11	14.36	40.00	
NTC12-SB29-0005	12/20/10 17:20	12/21/10 09:15	12/28/10 09:56	7.73	14.00	01/05/11 22:58	8.54	40.00	
NTC12-SB29-0204	12/20/10 17:25	12/21/10 09:15	12/28/10 09:56	7.73	14.00	01/05/11 23:26	8.56	40.00	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 1A00601
Instrument: MS-BNA1
Calibration: 0362004

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Calibration Check (1A00601-CCV1) ug/mL				Lab File ID: SEQ-CCV1s.D		Analyzed: 01/05/11 15:05		
2-Fluorobiphenyl	50.00	93.0	80 - 120	8.033	8.033	0.0000	+/-0.500	
2-Fluorophenol	100.0	110	80 - 120	3.775	3.775	0.0000	+/-0.500	
Nitrobenzene-d5	50.00	133	80 - 120	5.883	5.883	0.0000	+/-0.500	*
Phenol-d6	100.0	105	80 - 120	4.891	4.891	0.0000	+/-0.500	
Terphenyl-d14	50.00	103	80 - 120	12.541	12.541	0.0000	+/-0.500	
2,4,6-Tribromophenol	100.0	104	80 - 120	9.764	9.764	0.0000	+/-0.500	
LCS (0L27012-BS1) ug/Kg wet				Lab File ID: L27012L1.D		Analyzed: 01/05/11 15:36		
2-Fluorobiphenyl	3333	79.2	45 - 105	8.034	8.033	0.0010	+/-0.500	
2-Fluorophenol	6667	84.7	35 - 105	3.787	3.775	0.0120	+/-0.500	
Nitrobenzene-d5	3333	116	35 - 100	5.877	5.883	-0.0060	+/-0.500	*
Phenol-d6	6667	91.9	40 - 100	4.894	4.891	0.0030	+/-0.500	
Terphenyl-d14	3333	87.3	30 - 125	12.543	12.541	0.0020	+/-0.500	
2,4,6-Tribromophenol	6667	87.3	35 - 125	9.764	9.764	0.0000	+/-0.500	
Blank (0L27012-BLK1) ug/Kg wet				Lab File ID: L27012B1.D		Analyzed: 01/05/11 16:31		
2-Fluorobiphenyl	3333	82.1	45 - 105	8.027	8.033	-0.0060	+/-0.500	
2-Fluorophenol	6667	84.7	35 - 105	3.782	3.775	0.0070	+/-0.500	
Nitrobenzene-d5	3333	117	35 - 100	5.873	5.883	-0.0100	+/-0.500	*
Phenol-d6	6667	93.3	40 - 100	4.885	4.891	-0.0060	+/-0.500	
Terphenyl-d14	3333	93.8	30 - 125	12.545	12.541	0.0040	+/-0.500	
2,4,6-Tribromophenol	6667	79.3	35 - 125	9.757	9.764	-0.0070	+/-0.500	
NTC12-SB29-0005 (1012185-23) ug/Kg dry				Lab File ID: 1218523.D		Analyzed: 01/05/11 22:58		
2-Fluorobiphenyl	3853	85.3	45 - 105	8.025	8.033	-0.0080	+/-0.500	
2-Fluorophenol	7705	69.1	35 - 105	3.783	3.775	0.0080	+/-0.500	
Nitrobenzene-d5	3853	101	35 - 100	5.873	5.883	-0.0100	+/-0.500	*
Phenol-d6	7705	85.1	40 - 100	4.889	4.891	-0.0020	+/-0.500	
Terphenyl-d14	3853	98.7	30 - 125	12.541	12.541	0.0000	+/-0.500	
2,4,6-Tribromophenol	7705	80.2	35 - 125	9.755	9.764	-0.0090	+/-0.500	
NTC12-SB29-0204 (1012185-24) ug/Kg dry				Lab File ID: 1218524.D		Analyzed: 01/05/11 23:26		
2-Fluorobiphenyl	4016	77.6	45 - 105	8.025	8.033	-0.0080	+/-0.500	
2-Fluorophenol	8032	71.9	35 - 105	3.784	3.775	0.0090	+/-0.500	
Nitrobenzene-d5	4016	104	35 - 100	5.871	5.883	-0.0120	+/-0.500	*
Phenol-d6	8032	85.0	40 - 100	4.889	4.891	-0.0020	+/-0.500	
Terphenyl-d14	4016	92.2	30 - 125	12.542	12.541	0.0010	+/-0.500	
2,4,6-Tribromophenol	8032	74.8	35 - 125	9.754	9.764	-0.0100	+/-0.500	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00601

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA1
Calibration: 0362004

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Matrix Spike (0L27012-MS1) ug/Kg dry				Lab File ID: 1218523M.D		Analyzed: 01/05/11 23:54		
2-Fluorobiphenyl	3853	72.0	45 - 105	8.029	8.033	-0.0040	+/-0.500	
2-Fluorophenol	7705	62.8	35 - 105	3.785	3.775	0.0100	+/-0.500	
Nitrobenzene-d5	3853	86.1	35 - 100	5.884	5.883	0.0010	+/-0.500	
Phenol-d6	7705	76.1	40 - 100	4.897	4.891	0.0060	+/-0.500	
Terphenyl-d14	3853	85.2	30 - 125	12.544	12.541	0.0030	+/-0.500	
2,4,6-Tribromophenol	7705	67.4	35 - 125	9.765	9.764	0.0010	+/-0.500	
Matrix Spike Dup (0L27012-MSD1) ug/Kg dry				Lab File ID: 1218523S.D		Analyzed: 01/06/11 00:21		
2-Fluorobiphenyl	3853	69.3	45 - 105	8.034	8.033	0.0010	+/-0.500	
2-Fluorophenol	7705	71.9	35 - 105	3.793	3.775	0.0180	+/-0.500	
Nitrobenzene-d5	3853	93.0	35 - 100	5.878	5.883	-0.0050	+/-0.500	
Phenol-d6	7705	83.5	40 - 100	4.899	4.891	0.0080	+/-0.500	
Terphenyl-d14	3853	91.8	30 - 125	12.544	12.541	0.0030	+/-0.500	
2,4,6-Tribromophenol	7705	77.7	35 - 125	9.763	9.764	-0.0010	+/-0.500	
NTC12-SOIL-IDW (1012185-12) ug/Kg dry				Lab File ID: 1218512D.D		Analyzed: 01/06/11 00:49		
2-Fluorophenol	7514	67.7	35 - 105	3.777	3.775	0.0020	+/-0.500	
Phenol-d6	7514	80.0	40 - 100	4.881	4.891	-0.0100	+/-0.500	
2,4,6-Tribromophenol	7514	74.2	35 - 125	9.759	9.764	-0.0050	+/-0.500	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00701

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA3
Calibration: 0351002

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Calibration Check (1A00701-CCV1) ug/mL				Lab File ID: SEQ-CCV1s.D		Analyzed: 01/06/11 13:23		
2-Fluorobiphenyl	50.00	96.8	80 - 120	9.573	9.573	0.0000	+/-0.500	
2-Fluorophenol	100.0	112	80 - 120	5.35	5.35	0.0000	+/-0.500	
Nitrobenzene-d5	50.00	130	80 - 120	7.404	7.404	0.0000	+/-0.500	*
Phenol-d6	100.0	111	80 - 120	6.341	6.341	0.0000	+/-0.500	
Terphenyl-d14	50.00	116	80 - 120	14.213	14.213	0.0000	+/-0.500	
2,4,6-Tribromophenol	100.0	88.8	80 - 120	11.376	11.376	0.0000	+/-0.500	
Blank (0L22011-BLK1) ug/Kg wet				Lab File ID: L22011B1.D		Analyzed: 01/06/11 16:00		
2-Fluorobiphenyl	3333	85.7	45 - 105	9.566	9.573	-0.0070	+/-0.500	
2-Fluorophenol	6667	90.8	35 - 105	5.353	5.35	0.0030	+/-0.500	
Nitrobenzene-d5	3333	110	35 - 100	7.402	7.404	-0.0020	+/-0.500	*
Phenol-d6	6667	93.1	40 - 100	6.334	6.341	-0.0070	+/-0.500	
Terphenyl-d14	3333	96.7	30 - 125	14.211	14.213	-0.0020	+/-0.500	
2,4,6-Tribromophenol	6667	74.3	35 - 125	11.369	11.376	-0.0070	+/-0.500	
LCS (0L22011-BS1) ug/Kg wet				Lab File ID: L22011L1.D		Analyzed: 01/06/11 16:32		
2-Fluorobiphenyl	3333	81.8	45 - 105	9.567	9.573	-0.0060	+/-0.500	
2-Fluorophenol	6667	86.3	35 - 105	5.36	5.35	0.0100	+/-0.500	
Nitrobenzene-d5	3333	109	35 - 100	7.403	7.404	-0.0010	+/-0.500	*
Phenol-d6	6667	88.8	40 - 100	6.345	6.341	0.0040	+/-0.500	
Terphenyl-d14	3333	88.4	30 - 125	14.208	14.213	-0.0050	+/-0.500	
2,4,6-Tribromophenol	6667	73.5	35 - 125	11.375	11.376	-0.0010	+/-0.500	
NTC12-SB24-0005 (1012185-03) ug/Kg dry				Lab File ID: 1218503.D		Analyzed: 01/06/11 17:03		
2-Fluorobiphenyl	3962	84.1	45 - 105	9.568	9.573	-0.0050	+/-0.500	
2-Fluorophenol	7925	85.6	35 - 105	5.355	5.35	0.0050	+/-0.500	
Nitrobenzene-d5	3962	111	35 - 100	7.399	7.404	-0.0050	+/-0.500	*
Phenol-d6	7925	90.4	40 - 100	6.336	6.341	-0.0050	+/-0.500	
Terphenyl-d14	3962	106	30 - 125	14.208	14.213	-0.0050	+/-0.500	
2,4,6-Tribromophenol	7925	72.1	35 - 125	11.371	11.376	-0.0050	+/-0.500	
NTC12-SB24-00502 (1012185-04) ug/Kg dry				Lab File ID: 1218504.D		Analyzed: 01/06/11 17:33		
2-Fluorobiphenyl	3625	75.0	45 - 105	9.569	9.573	-0.0040	+/-0.500	
2-Fluorophenol	7250	73.5	35 - 105	5.357	5.35	0.0070	+/-0.500	
Nitrobenzene-d5	3625	94.4	35 - 100	7.401	7.404	-0.0030	+/-0.500	
Phenol-d6	7250	77.8	40 - 100	6.338	6.341	-0.0030	+/-0.500	
Terphenyl-d14	3625	87.7	30 - 125	14.21	14.213	-0.0030	+/-0.500	
2,4,6-Tribromophenol	7250	67.1	35 - 125	11.373	11.376	-0.0030	+/-0.500	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00701

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA3
Calibration: 0351002

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
NTC12-SB30-0005 (1012185-06) ug/Kg dry				Lab File ID: 1218506.D		Analyzed: 01/06/11 18:04		
2-Fluorobiphenyl	3612	72.8	45 - 105	9.566	9.573	-0.0070	+/-0.500	
2-Fluorophenol	7224	72.0	35 - 105	5.354	5.35	0.0040	+/-0.500	
Nitrobenzene-d5	3612	93.5	35 - 100	7.402	7.404	-0.0020	+/-0.500	
Phenol-d6	7224	75.4	40 - 100	6.335	6.341	-0.0060	+/-0.500	
Terphenyl-d14	3612	94.6	30 - 125	14.212	14.213	-0.0010	+/-0.500	
2,4,6-Tribromophenol	7224	67.4	35 - 125	11.37	11.376	-0.0060	+/-0.500	
NTC12-SB30-00502 (1012185-07) ug/Kg dry				Lab File ID: 1218507.D		Analyzed: 01/06/11 18:35		
2-Fluorobiphenyl	3758	79.4	45 - 105	9.568	9.573	-0.0050	+/-0.500	
2-Fluorophenol	7516	82.3	35 - 105	5.355	5.35	0.0050	+/-0.500	
Nitrobenzene-d5	3758	107	35 - 100	7.404	7.404	0.0000	+/-0.500	*
Phenol-d6	7516	87.4	40 - 100	6.336	6.341	-0.0050	+/-0.500	
Terphenyl-d14	3758	100	30 - 125	14.208	14.213	-0.0050	+/-0.500	
2,4,6-Tribromophenol	7516	75.2	35 - 125	11.371	11.376	-0.0050	+/-0.500	
NTC12-SB23-0005 (1012185-01) ug/Kg dry				Lab File ID: 1218501.D		Analyzed: 01/06/11 19:07		
2-Fluorobiphenyl	3446	80.8	45 - 105	9.566	9.573	-0.0070	+/-0.500	
2-Fluorophenol	6893	85.3	35 - 105	5.359	5.35	0.0090	+/-0.500	
Nitrobenzene-d5	3446	108	35 - 100	7.402	7.404	-0.0020	+/-0.500	*
Phenol-d6	6893	91.4	40 - 100	6.34	6.341	-0.0010	+/-0.500	
Terphenyl-d14	3446	104	30 - 125	14.212	14.213	-0.0010	+/-0.500	
2,4,6-Tribromophenol	6893	77.7	35 - 125	11.374	11.376	-0.0020	+/-0.500	
NTC12-SB23-0810 (1012185-02) ug/Kg dry				Lab File ID: 1218502.D		Analyzed: 01/06/11 19:37		
2-Fluorobiphenyl	3881	79.7	45 - 105	9.567	9.573	-0.0060	+/-0.500	
2-Fluorophenol	7763	83.4	35 - 105	5.36	5.35	0.0100	+/-0.500	
Nitrobenzene-d5	3881	97.4	35 - 100	7.403	7.404	-0.0010	+/-0.500	
Phenol-d6	7763	88.1	40 - 100	6.341	6.341	0.0000	+/-0.500	
Terphenyl-d14	3881	103	30 - 125	14.213	14.213	0.0000	+/-0.500	
2,4,6-Tribromophenol	7763	68.5	35 - 125	11.375	11.376	-0.0010	+/-0.500	
NTC12-SB21-0005 (1012185-17) ug/Kg dry				Lab File ID: 1218517.D		Analyzed: 01/06/11 20:09		
2-Fluorobiphenyl	3895	66.2	45 - 105	9.566	9.573	-0.0070	+/-0.500	
2-Fluorophenol	7790	58.3	35 - 105	5.354	5.35	0.0040	+/-0.500	
Nitrobenzene-d5	3895	87.9	35 - 100	7.402	7.404	-0.0020	+/-0.500	
Phenol-d6	7790	64.8	40 - 100	6.335	6.341	-0.0060	+/-0.500	
Terphenyl-d14	3895	87.8	30 - 125	14.212	14.213	-0.0010	+/-0.500	
2,4,6-Tribromophenol	7790	52.2	35 - 125	11.374	11.376	-0.0020	+/-0.500	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00701

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA3
Calibration: 0351002

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
NTC12-SB26-0406 (1012185-09) ug/Kg dry				Lab File ID: 1218509.D		Analyzed: 01/06/11 20:39		
2-Fluorobiphenyl	4145	76.4	45 - 105	9.568	9.573	-0.0050	+/-0.500	
2-Fluorophenol	8289	76.0	35 - 105	5.356	5.35	0.0060	+/-0.500	
Nitrobenzene-d5	4145	95.3	35 - 100	7.399	7.404	-0.0050	+/-0.500	
Phenol-d6	8289	80.1	40 - 100	6.337	6.341	-0.0040	+/-0.500	
Terphenyl-d14	4145	102	30 - 125	14.218	14.213	0.0050	+/-0.500	
2,4,6-Tribromophenol	8289	66.5	35 - 125	11.381	11.376	0.0050	+/-0.500	
NTC12-DUP02 (1012185-11) ug/Kg dry				Lab File ID: 1218511.D		Analyzed: 01/06/11 21:09		
2-Fluorobiphenyl	4021	77.2	45 - 105	9.575	9.573	0.0020	+/-0.500	
2-Fluorophenol	8042	75.0	35 - 105	5.357	5.35	0.0070	+/-0.500	
Nitrobenzene-d5	4021	101	35 - 100	7.401	7.404	-0.0030	+/-0.500	*
Phenol-d6	8042	82.4	40 - 100	6.338	6.341	-0.0030	+/-0.500	
Terphenyl-d14	4021	101	30 - 125	14.225	14.213	0.0120	+/-0.500	
2,4,6-Tribromophenol	8042	70.4	35 - 125	11.392	11.376	0.0160	+/-0.500	
NTC12-SB22-0005 (1012185-15) ug/Kg dry				Lab File ID: 1218515.D		Analyzed: 01/06/11 21:40		
2-Fluorobiphenyl	3801	78.9	45 - 105	9.57	9.573	-0.0030	+/-0.500	
2-Fluorophenol	7602	73.1	35 - 105	5.358	5.35	0.0080	+/-0.500	
Nitrobenzene-d5	3801	102	35 - 100	7.401	7.404	-0.0030	+/-0.500	*
Phenol-d6	7602	79.1	40 - 100	6.339	6.341	-0.0020	+/-0.500	
Terphenyl-d14	3801	116	30 - 125	14.216	14.213	0.0030	+/-0.500	
2,4,6-Tribromophenol	7602	66.3	35 - 125	11.378	11.376	0.0020	+/-0.500	
NTC12-SB28-0204 (1012185-22) ug/Kg dry				Lab File ID: 1218522.D		Analyzed: 01/06/11 22:11		
2-Fluorobiphenyl	3723	76.0	45 - 105	9.569	9.573	-0.0040	+/-0.500	
2-Fluorophenol	7445	73.1	35 - 105	5.357	5.35	0.0070	+/-0.500	
Nitrobenzene-d5	3723	94.1	35 - 100	7.405	7.404	0.0010	+/-0.500	
Phenol-d6	7445	75.0	40 - 100	6.338	6.341	-0.0030	+/-0.500	
Terphenyl-d14	3723	106	30 - 125	14.219	14.213	0.0060	+/-0.500	
2,4,6-Tribromophenol	7445	63.6	35 - 125	11.387	11.376	0.0110	+/-0.500	
NTC12-SB22-00502 (1012185-16) ug/Kg dry				Lab File ID: 1218516.D		Analyzed: 01/06/11 22:42		
2-Fluorobiphenyl	3883	82.2	45 - 105	9.573	9.573	0.0000	+/-0.500	
2-Fluorophenol	7766	73.6	35 - 105	5.361	5.35	0.0110	+/-0.500	
Nitrobenzene-d5	3883	102	35 - 100	7.404	7.404	0.0000	+/-0.500	*
Phenol-d6	7766	78.1	40 - 100	6.342	6.341	0.0010	+/-0.500	
Terphenyl-d14	3883	121	30 - 125	14.218	14.213	0.0050	+/-0.500	
2,4,6-Tribromophenol	7766	70.6	35 - 125	11.386	11.376	0.0100	+/-0.500	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Sequence: 1A00701

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA3

Calibration: 0351002

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
NTC12-SB21-0507 (1012185-18) ug/Kg dry				Lab File ID: 1218518.D		Analyzed: 01/06/11 23:13		
2-Fluorobiphenyl	3859	64.0	45 - 105	9.575	9.573	0.0020	+/-0.500	
2-Fluorophenol	7717	66.5	35 - 105	5.357	5.35	0.0070	+/-0.500	
Nitrobenzene-d5	3859	82.6	35 - 100	7.406	7.404	0.0020	+/-0.500	
Phenol-d6	7717	69.6	40 - 100	6.343	6.341	0.0020	+/-0.500	
Terphenyl-d14	3859	92.8	30 - 125	14.235	14.213	0.0220	+/-0.500	
2,4,6-Tribromophenol	7717	58.7	35 - 125	11.397	11.376	0.0210	+/-0.500	
NTC12-SB25-0005 (1012185-19) ug/Kg dry				Lab File ID: 1218519.D		Analyzed: 01/06/11 23:44		
2-Fluorobiphenyl	3807	69.1	45 - 105	9.578	9.573	0.0050	+/-0.500	
2-Fluorophenol	7615	52.0	35 - 105	5.36	5.35	0.0100	+/-0.500	
Nitrobenzene-d5	3807	77.3	35 - 100	7.409	7.404	0.0050	+/-0.500	
Phenol-d6	7615	46.5	40 - 100	6.346	6.341	0.0050	+/-0.500	
Terphenyl-d14	3807	112	30 - 125	14.228	14.213	0.0150	+/-0.500	
2,4,6-Tribromophenol	7615	55.4	35 - 125	11.4	11.376	0.0240	+/-0.500	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 1A01104
Instrument: MS-BNA3
Calibration: 0351002

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Calibration Check (1A01104-CCV1) ug/mL				Lab File ID: SEQ-CCV1s.D		Analyzed: 01/10/11 16:38		
2-Fluorobiphenyl	50.00	96.7	80 - 120	9.578	9.578	0.0000	+/-0.500	
2-Fluorophenol	100.0	110	80 - 120	5.342	5.342	0.0000	+/-0.500	
Nitrobenzene-d5	50.00	130	80 - 120	7.409	7.409	0.0000	+/-0.500	*
Phenol-d6	100.0	114	80 - 120	6.347	6.347	0.0000	+/-0.500	
Terphenyl-d14	50.00	123	80 - 120	14.214	14.214	0.0000	+/-0.500	*
2,4,6-Tribromophenol	100.0	91.2	80 - 120	11.386	11.386	0.0000	+/-0.500	
NTC12-DUP01 (1012185-10) ug/Kg dry				Lab File ID: 1218510.D		Analyzed: 01/10/11 17:17		
2-Fluorobiphenyl	3729	80.5	45 - 105	9.57	9.578	-0.0080	+/-0.500	
2-Fluorophenol	7457	72.9	35 - 105	5.343	5.342	0.0010	+/-0.500	
Nitrobenzene-d5	3729	103	35 - 100	7.406	7.409	-0.0030	+/-0.500	*
Phenol-d6	7457	80.6	40 - 100	6.338	6.347	-0.0090	+/-0.500	
Terphenyl-d14	3729	108	30 - 125	14.21	14.214	-0.0040	+/-0.500	
2,4,6-Tribromophenol	7457	63.6	35 - 125	11.378	11.386	-0.0080	+/-0.500	
NTC12-SB27-0204 (1012185-14) ug/Kg dry				Lab File ID: 1218514.D		Analyzed: 01/10/11 17:46		
2-Fluorobiphenyl	3774	82.3	45 - 105	9.571	9.578	-0.0070	+/-0.500	
2-Fluorophenol	7549	70.7	35 - 105	5.349	5.342	0.0070	+/-0.500	
Nitrobenzene-d5	3774	108	35 - 100	7.402	7.409	-0.0070	+/-0.500	*
Phenol-d6	7549	78.4	40 - 100	6.339	6.347	-0.0080	+/-0.500	
Terphenyl-d14	3774	111	30 - 125	14.211	14.214	-0.0030	+/-0.500	
2,4,6-Tribromophenol	7549	56.3	35 - 125	11.374	11.386	-0.0120	+/-0.500	
Matrix Spike (0L22011-MS1) ug/Kg dry				Lab File ID: 1218514M.D		Analyzed: 01/10/11 18:16		
2-Fluorobiphenyl	3824	75.1	45 - 105	9.574	9.578	-0.0040	+/-0.500	
2-Fluorophenol	7649	73.8	35 - 105	5.352	5.342	0.0100	+/-0.500	
Nitrobenzene-d5	3824	99.4	35 - 100	7.41	7.409	0.0010	+/-0.500	
Phenol-d6	7649	79.3	40 - 100	6.348	6.347	0.0010	+/-0.500	
Terphenyl-d14	3824	104	30 - 125	14.21	14.214	-0.0040	+/-0.500	
2,4,6-Tribromophenol	7649	66.1	35 - 125	11.382	11.386	-0.0040	+/-0.500	
Matrix Spike Dup (0L22011-MSD1) ug/Kg dry				Lab File ID: 1218514S.D		Analyzed: 01/10/11 18:46		
2-Fluorobiphenyl	3774	80.4	45 - 105	9.574	9.578	-0.0040	+/-0.500	
2-Fluorophenol	7549	77.9	35 - 105	5.356	5.342	0.0140	+/-0.500	
Nitrobenzene-d5	3774	109	35 - 100	7.415	7.409	0.0060	+/-0.500	*
Phenol-d6	7549	83.8	40 - 100	6.352	6.347	0.0050	+/-0.500	
Terphenyl-d14	3774	115	30 - 125	14.209	14.214	-0.0050	+/-0.500	
2,4,6-Tribromophenol	7549	68.5	35 - 125	11.382	11.386	-0.0040	+/-0.500	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 1A01104
Instrument: MS-BNA3
Calibration: 0351002

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
NTC12-SB28-0005 (1012185-21) ug/Kg dry				Lab File ID: 1218521.D		Analyzed: 01/10/11 19:15		
2-Fluorobiphenyl	3701	72.4	45 - 105	9.568	9.578	-0.0100	+/-0.500	
2-Fluorophenol	7402	67.5	35 - 105	5.346	5.342	0.0040	+/-0.500	
Nitrobenzene-d5	3701	95.3	35 - 100	7.404	7.409	-0.0050	+/-0.500	
Phenol-d6	7402	74.8	40 - 100	6.337	6.347	-0.0100	+/-0.500	
Terphenyl-d14	3701	108	30 - 125	14.209	14.214	-0.0050	+/-0.500	
2,4,6-Tribromophenol	7402	58.8	35 - 125	11.372	11.386	-0.0140	+/-0.500	
NTC12-SB27-0005 (1012185-13) ug/Kg dry				Lab File ID: 1218513is80.D		Analyzed: 01/10/11 19:45		
2-Fluorobiphenyl	3939	83.5	45 - 105	9.572	9.578	-0.0060	+/-0.500	
2-Fluorophenol	7878	78.5	35 - 105	5.345	5.342	0.0030	+/-0.500	
Nitrobenzene-d5	3939	112	35 - 100	7.403	7.409	-0.0060	+/-0.500	*
Phenol-d6	7878	85.5	40 - 100	6.34	6.347	-0.0070	+/-0.500	
Terphenyl-d14	3939	122	30 - 125	14.212	14.214	-0.0020	+/-0.500	
2,4,6-Tribromophenol	7878	72.6	35 - 125	11.375	11.386	-0.0110	+/-0.500	
NTC12-SB25-0204 (1012185-20) ug/Kg dry				Lab File ID: 1218520.D		Analyzed: 01/10/11 20:14		
2-Fluorobiphenyl	3936	71.7	45 - 105	9.569	9.578	-0.0090	+/-0.500	
2-Fluorophenol	7872	70.8	35 - 105	5.347	5.342	0.0050	+/-0.500	
Nitrobenzene-d5	3936	86.0	35 - 100	7.4	7.409	-0.0090	+/-0.500	
Phenol-d6	7872	76.8	40 - 100	6.337	6.347	-0.0100	+/-0.500	
Terphenyl-d14	3936	122	30 - 125	14.209	14.214	-0.0050	+/-0.500	
2,4,6-Tribromophenol	7872	64.2	35 - 125	11.377	11.386	-0.0090	+/-0.500	
NTC12-SB26-0005 (1012185-08) ug/Kg dry				Lab File ID: 1218508.D		Analyzed: 01/10/11 20:44		
2-Fluorobiphenyl	3690	86.4	45 - 105	9.573	9.578	-0.0050	+/-0.500	
2-Fluorophenol	7381	77.0	35 - 105	5.346	5.342	0.0040	+/-0.500	
Nitrobenzene-d5	3690	109	35 - 100	7.405	7.409	-0.0040	+/-0.500	*
Phenol-d6	7381	85.1	40 - 100	6.342	6.347	-0.0050	+/-0.500	
Terphenyl-d14	3690	160	30 - 125	14.209	14.214	-0.0050	+/-0.500	*
2,4,6-Tribromophenol	7381	68.4	35 - 125	11.381	11.386	-0.0050	+/-0.500	

ANALYSIS SEQUENCE SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 0L35109
Instrument: MS-BNA3
Calibration: 0351002

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	0L35109-TUN1	SEQ-TUN1.D	12/07/10 17:31
Cal Standard	0L35109-CAL1	SEQ-CAL1.D	12/07/10 17:58
Cal Standard	0L35109-CAL2	SEQ-CAL2.D	12/07/10 18:29
Cal Standard	0L35109-CAL3	SEQ-CAL3.D	12/07/10 18:59
Cal Standard	0L35109-CAL4	SEQ-CAL4.D	12/07/10 19:29
Cal Standard	0L35109-CAL5	SEQ-CAL5.D	12/07/10 19:59
Cal Standard	0L35109-CAL6	SEQ-CAL6.D	12/07/10 20:29
Cal Standard	0L35109-CAL7	SEQ-CAL7.D	12/07/10 20:59
Cal Standard	0L35109-CAL9	SEQ-CAL9.D	12/07/10 21:58
Cal Standard	0L35109-CALA	SEQ-CALA.D	12/07/10 22:28
Cal Standard	0L35109-CALB	SEQ-CALB.D	12/07/10 22:57
Cal Standard	0L35109-CALC	SEQ-CALC.D	12/07/10 23:27
Cal Standard	0L35109-CALD	SEQ-CALD.D	12/07/10 23:56
Cal Standard	0L35109-CALE	SEQ-CALE.D	12/08/10 00:25
Cal Standard	0L35109-CALF	SEQ-CALF.D	12/08/10 00:54
Cal Standard	0L35109-CALG	SEQ-CALG.D	12/08/10 01:23
Cal Standard	0L35109-CALH	SEQ-CALH.D	12/08/10 01:52
Cal Standard	0L35109-CALJ	SEQ-CALJ.D	12/08/10 02:51
Cal Standard	0L35109-CALK	SEQ-CALK.D	12/08/10 03:20
MS Tune	0L35109-TUN2	SEQ-TUN2.D	12/08/10 03:49
Initial Cal Check	0L35109-ICV3	SEQ-ICV3.D	12/08/10 10:01
Initial Cal Check	0L35109-ICV4	SEQ-ICV4.D	12/08/10 10:31
Initial Cal Check	0L35109-ICV5	SEQ-ICV5.D	12/08/10 11:04
Initial Cal Check	0L35109-ICV7	SEQ-ICV7.D	12/08/10 12:04
Initial Cal Check	0L35109-ICVA	SEQ-ICVA.D	12/08/10 14:09

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Lab File ID:	SEQ-TUN1.D	Injection Date:	12/07/10
Instrument ID:	MS-BNA3	Injection Time:	17:31
Sequence:	0L35109	Lab Sample ID:	0L35109-TUN1

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
51	30 - 60% of 198	44.4	PASS
68	Less than 2% of 69	0	PASS
69	Less than 200% of 198	47.6	PASS
70	Less than 2% of 69	0.454	PASS
127	40 - 60% of 198	57.6	PASS
197	Less than 1% of 198	0.468	PASS
198	Base peak, 100% relative abundance	100	PASS
199	5 - 9% of 198	6.79	PASS
275	10 - 30% of 198	25.5	PASS
365	1 - 200% of 198	3.23	PASS
441	0.001 - 100% of 443	77	PASS
442	40 - 200% of 198	77	PASS
443	17 - 23% of 442	20.1	PASS

INITIAL CALIBRATION DATA

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0351002
Instrument: MS-BNA3
Matrix: Water
Calibration Date: 12/7/2010 5:31:41PM

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
3,3'-Dichlorobenzidine												
Acenaphthene	1	1.374103	2	1.315472	5	1.294825	10	1.297991	20	1.275653	40	1.264744
Acenaphthylene	1	1.977639	2	1.856101	5	2.054718	10	2.034701	20	2.004486	40	2.016175
Acetophenone												
Aniline	1	1.893837	2	1.776582	5	1.860449	10	1.905373	20	1.96982	40	1.974599
Anthracene	1	1.152616	2	1.06955	5	1.199769	10	1.197299	20	1.226635	40	1.202224
Atrazine												
Benzaldehyde												
Benzidine												
Benzo(a)anthracene	1	1.176974	2	1.111061	5	1.144412	10	1.151915	20	1.206273	40	1.273851
Benzo(a)pyrene	1	0.8141702	2	0.8979174	5	1.012763	10	1.07342	20	1.117703	40	1.177321
Benzo(b)fluoranthene	1	1.125665	2	0.9776505	5	1.090132	10	1.171102	20	1.29305	40	1.2449
Benzo(g,h,i)perylene	1	0.8361077	2	0.7984972	5	0.8140256	10	0.9111468	20	0.7364742	40	0.9464765
Benzoic acid	1		2		5	~~4.781063E-02~~	10	0.0826069	20	0.1115828	40	0.1730795
Benzo(k)fluoranthene	1	1.14576	2	1.154252	5	1.251529	10	1.234315	20	1.330375	40	1.295232
Benzyl alcohol	1	0.6727378	2	0.6959354	5	0.772278	10	0.795494	20	0.8202954	40	0.8572062
1,1-Biphenyl												
4-Bromophenyl-phenylether	1	0.2518511	2	0.2324228	5	0.2437731	10	0.256832	20	0.2460901	40	0.2374707
Butylbenzylphthalate	1	~~0.4212315~~	2	~~0.4213914~~	5	0.5348313	10	0.6014097	20	0.6750239	40	0.7266313
Caprolactam												
Carbazole	1	1.01038	2	0.9970601	5	1.12402	10	1.080297	20	1.103171	40	1.03857
4-Chloro-3-methylphenol	1	~~0.2181994~~	2	0.1973558	5	0.2555061	10	0.2703475	20	0.2869397	40	0.3103583
4-Chloroaniline	1	0.4024068	2	0.3901094	5	0.4361041	10	0.428376	20	0.4378298	40	0.4407009
Bis(2-chloroethoxy)methane	1	0.4428005	2	0.3937843	5	0.4134067	10	0.4132365	20	0.4016128	40	0.4006352
Bis(2-chloroethyl)ether	1	1.305395	2	1.271392	5	1.279374	10	1.244134	20	1.24794	40	1.248168
2,2'-Oxybis-1-chloropropane	1	1.965289	2	1.793817	5	1.845471	10	1.811628	20	1.795887	40	1.79747
2-Chloronaphthalene	1	1.301941	2	1.234577	5	1.261078	10	1.265583	20	1.232031	40	1.224941
2-Chlorophenol	1	1.214973	2	1.209461	5	1.305111	10	1.33217	20	1.378026	40	1.389739
4-Chlorophenyl phenyl ether	1	0.7071653	2	0.6593299	5	0.6773879	10	0.6525344	20	0.636283	40	0.641452
Chrysene	1	1.306708	2	1.164201	5	1.238881	10	1.248779	20	1.219789	40	1.261333
Dibenz(a,h)anthracene	1	0.7512715	2	0.654872	5	0.7969043	10	0.8919851	20	0.7541061	40	0.941626

INITIAL CALIBRATION DATA

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0351002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA3

Calibration Date: 12/7/2010 5:31:41PM

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
Dibenzofuran	1	1.871373	2	1.740989	5	1.77835	10	1.705143	20	1.70834	40	1.703961
Di-n-butylphthalate	1	1.082426	2	1.046644	5	1.297638	10	1.304534	20	1.412773	40	1.396991
1,4-Dichlorobenzene	1	1.763261	2	1.615997	5	1.634718	10	1.593686	20	1.585729	40	1.569702
1,3-Dichlorobenzene	1	1.712108	2	1.509974	5	1.605202	10	1.591847	20	1.585144	40	1.527454
1,2-Dichlorobenzene	1	1.614674	2	1.490364	5	1.546689	10	1.516537	20	1.510281	40	1.482237
2,6-Dichlorophenol												
2,4-Dichlorophenol	1	0.2193633	2	0.2189929	5	0.2564872	10	0.2777847	20	0.2877571	40	0.2934208
Diethylphthalate	1	1.305598	2	1.272227	5	1.418943	10	1.386613	20	1.419902	40	1.434097
2,4-Dimethylphenol	1	0.3408463	2	0.315261	5	0.3594693	10	0.3685544	20	0.370695	40	0.3730775
Dimethyl phthalate	1		2	1.3603	5	1.387939	10	1.399916	20	1.384977	40	1.382422
4,6-Dinitro-2-methylphenol	1		2		5	5.314518E-02	10	8.603549E-02	20	0.1020477	40	0.1278111
2,4-Dinitrophenol	1		2		5	~~4.447398E-02~~	10	6.358993E-02	20	8.773021E-02	40	0.1367475
2,4-Dinitrotoluene	1		2	0.2696124	5	0.3483922	10	0.3796104	20	0.3959347	40	0.432168
2,6-Dinitrotoluene	1		2	0.2748954	5	0.2969673	10	0.3157389	20	0.320917	40	0.3377335
Di-n-octylphthalate	1	~~0.777665~~	2	~~0.7972759~~	5	~~1.157303~~	10	1.226168	20	1.667762	40	1.640777
1,4-Dioxane												
1,2-Diphenylhydrazine	1	0.8633715	2	0.7922832	5	0.851889	10	0.902869	20	0.8523618	40	0.8367419
Bis(2-ethylhexyl)phthalate	1	~~0.5629525~~	2	0.623236	5	0.7692422	10	0.8261352	20	0.9295948	40	0.9699243
Fluoranthene	1	1.010262	2	1.050371	5	1.174781	10	1.087186	20	1.202634	40	1.216382
Fluorene	1	1.417605	2	1.334531	5	1.437789	10	1.382289	20	1.384069	40	1.391212
2-Fluorobiphenyl	1	1.529612	2	1.450802	5	1.515443	10	1.491745	20	1.421812	40	1.419088
2-Fluorophenol	2	1.169393	4	1.036011	10	1.183087	20	1.188432	40	1.218105	80	1.194993
Hexachlorobenzene	1	0.2870931	2	0.2718521	5	0.2738817	10	0.2758146	20	0.2709715	40	0.2670496
Hexachlorobutadiene	1	0.1996622	2	0.1865372	5	0.1967719	10	0.1932208	20	0.1899233	40	0.1887931
Hexachlorocyclopentadiene	1	~~0.166607~~	2	~~0.1547457~~	5	~~0.2130315~~	10	0.2250949	20	0.2330708	40	0.2880169
Hexachloroethane	1	0.6451315	2	0.5286661	5	0.5787438	10	0.5669407	20	0.5836949	40	0.5978446
Indeno(1,2,3-cd)pyrene	1	0.9439524	2	0.8985737	5	0.9919689	10	1.096168	20	0.9191515	40	1.154267
Isophorone	1	0.6213175	2	0.5968757	5	0.655194	10	0.6761772	20	0.6705981	40	0.6772569
1-Methylnaphthalene	1	0.6465797	2	0.6184212	5	0.6369707	10	0.6319121	20	0.6193783	40	0.6184568
2-Methylnaphthalene	1	0.6007326	2	0.5838361	5	0.6129738	10	0.6049021	20	0.6013921	40	0.6039252
2-Methylphenol	1	1.026084	2	1.011589	5	1.14484	10	1.136228	20	1.174352	40	1.20347

INITIAL CALIBRATION DATA

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0351002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA3

Calibration Date: 12/7/2010 5:31:41PM

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
3-Methylphenol	1	1.025789	2	1.061762	5	1.129465	10	1.179577	20	1.199753	40	1.223609
4-Methylphenol	1	1.025789	2	1.061762	5	1.129465	10	1.179577	20	1.199753	40	1.223609
Naphthalene	1	1.247118	2	1.106848	5	1.148925	10	1.133299	20	1.11088	40	1.079891
4-Nitroaniline	1	~~0.1637579~~	2	0.2187884	5	0.2653623	10	0.2143523	20	0.2396615	40	0.2459712
3-Nitroaniline	1	0.2521217	2	0.2314275	5	0.3066698	10	0.2972167	20	0.3176403	40	0.3340046
2-Nitroaniline	1	~~0.2346445~~	2	0.2444902	5	0.300972	10	0.329205	20	0.3393918	40	0.3674347
Nitrobenzene	1	0.3854216	2	0.3471099	5	0.3691849	10	0.3758157	20	0.3757619	40	0.3756076
Nitrobenzene-d5	1	0.352723	2	0.3219239	5	0.3538833	10	0.3730289	20	0.3752849	40	0.3765852
4-Nitrophenol	1		2		5	0.1331172	10	0.1539397	20	0.1740912	40	0.215041
2-Nitrophenol	1	~~0.129178~~	2	~~0.1163139~~	5	0.1485732	10	0.17082	20	0.1803181	40	0.1943955
N-Nitrosodimethylamine	1	0.7647097	2	0.661789	5	0.6967903	10	0.688223	20	0.7105897	40	0.7218412
N-Nitrosodiphenylamine	1	0.7364883	2	0.7242688	5	0.7675569	10	0.8277756	20	0.7829048	40	0.7552249
N-Nitroso-di-n-propylamine	1	0.8476763	2	0.7771541	5	0.853617	10	0.8701614	20	0.8776069	40	0.8946144
Pentachlorophenol	1		2		5	5.778394E-02	10	8.270825E-02	20	0.1099003	40	0.1367365
Phenanthrene	1	1.342498	2	1.263175	5	1.243815	10	1.236225	20	1.217743	40	1.191144
Phenol	1	1.490667	2	1.31629	5	1.525052	10	1.523419	20	1.537998	40	1.5435
Phenol-d6	2	1.404785	4	1.320014	10	1.47159	20	1.488608	40	1.497926	80	1.486483
Pyrene	1	1.333765	2	1.276026	5	1.300614	10	1.457668	20	1.450879	40	1.446398
Pyridine	1	1.454129	2	1.255486	5	1.344622	10	1.386362	20	1.421998	40	1.414011
Terphenyl-d14	1	0.8692116	2	0.8169587	5	0.8477459	10	0.9168767	20	0.9257567	40	0.924241
1,2,4,5-Tetrachlorobenzene												
2,3,4,6-Tetrachlorophenol	1		2		5	0.225384	10	0.248152	20	0.2704891	40	0.311669
2,4,6-Tribromophenol	2		4	~~7.386201E-02~~	10	0.0957204	20	0.1146915	40	0.1142205	80	0.1204485
1,2,4-Trichlorobenzene	1	0.3839343	2	0.374162	5	0.3658839	10	0.3641081	20	0.3579797	40	0.3484484
2,4,6-Trichlorophenol	1	~~0.2252043~~	2	0.2345706	5	0.3036388	10	0.3406874	20	0.3510972	40	0.380565
2,4,5-Trichlorophenol	1	0.2421286	2	0.2367774	5	0.2965186	10	0.340473	20	0.3434994	40	0.3869717

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0351002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA3

Calibration Date: 12/7/2010 5:31:41PM

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
3,3'-Dichlorobenzidine							1	~~0.2115697~~	2	~~0.2588051~~	5	0.3243157
Acenaphthene	50	1.238488	80	1.19577	100	1.16933						
Acenaphthylene	50	1.97121	80	1.884909	100	1.831805						
Acetophenone							1	1.733387	2	1.611126	5	1.755035
Aniline	50	1.948951	80	1.907822	100	1.862631						
Anthracene	50	1.178258	80	1.127398	100	1.098018						
Atrazine							1	0.1680055	2	0.213903	5	0.2370567
Benzaldehyde							1	1.068138	2	1.056947	5	1.110207
Benzidine							1		2	~~0.3685161~~	5	0.5108731
Benzo(a)anthracene	50	1.249589	80	1.222044	100	1.204762						
Benzo(a)pyrene	50	1.167092	80	1.14047	100	1.155787						
Benzo(b)fluoranthene	50	1.275165	80	1.224665	100	1.333177						
Benzo(g,h,i)perylene	50	0.9771522	80	0.9672074	100	0.8194906						
Benzoic acid	50	0.1965843	80	0.2128701	100	0.2236522						
Benzo(k)fluoranthene	50	1.252373	80	1.210115	100	~~1.293734~~						
Benzyl alcohol	50	0.8433992	80	0.8408955	100	0.828434						
1,1-Biphenyl							1	1.729905	2	1.761782	5	1.778887
4-Bromophenyl-phenylether	50	0.236109	80	0.2297848	100	0.222073						
Butylbenzylphthalate	50	0.7153074	80	0.6926723	100	0.7158573						
Caprolactam							1	~~6.332556E-02~~	2	~~6.355097E-02~~	5	8.324675E-02
Carbazole	50	1.01202	80	0.9766254	100	0.9601454						
4-Chloro-3-methylphenol	50	0.3070247	80	0.3059882	100	0.2999465						
4-Chloroaniline	50	0.4323715	80	0.4259841	100	0.4193021						
Bis(2-chloroethoxy)methane	50	0.3916945	80	0.3836585	100	0.3728562						
Bis(2-chloroethyl)ether	50	1.226619	80	1.198521	100	1.165071						
2,2'-Oxybis-1-chloropropane	50	1.757395	80	1.690954	100	1.662549						
2-Chloronaphthalene	50	1.199244	80	1.160444	100	1.130907						
2-Chlorophenol	50	1.373857	80	1.348389	100	1.332618						
4-Chlorophenyl phenyl ether	50	0.6356375	80	0.6158727	100	0.608712						
Chrysene	50	1.226559	80	1.182619	100	1.165941						
Dibenz(a,h)anthracene	50	0.969048	80	0.9854922	100	0.8468877						

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0351002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA3

Calibration Date: 12/7/2010 5:31:41PM

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
Dibenzofuran	50	1.658712	80	1.596439	100	1.558825						
Di-n-butylphthalate	50	1.391006	80	1.287289	100	1.247621						
1,4-Dichlorobenzene	50	1.556736	80	1.509165	100	1.484188						
1,3-Dichlorobenzene	50	1.520602	80	1.482944	100	1.474431						
1,2-Dichlorobenzene	50	1.473125	80	1.433567	100	1.416697						
2,6-Dichlorophenol							1	0.2370254	2	0.2189698	5	0.2517737
2,4-Dichlorophenol	50	0.2969539	80	0.2962102	100	0.2908114						
Diethylphthalate	50	1.416848	80	1.369631	100	1.357585						
2,4-Dimethylphenol	50	0.3684433	80	0.3608579	100	0.3537564						
Dimethyl phthalate	50	1.359098	80	1.310816	100	1.297145						
4,6-Dinitro-2-methylphenol	50	0.1401067	80	0.1437955	100	0.1460562						
2,4-Dinitrophenol	50	0.159813	80	0.1664924	100	0.1758471						
2,4-Dinitrotoluene	50	0.4298704	80	0.422104	100	0.421059						
2,6-Dinitrotoluene	50	0.330395	80	0.3281434	100	0.3247883						
Di-n-octylphthalate	50	1.621448	80	1.518511	100	1.815061						
1,4-Dioxane							1	0.5750144	2	0.6155307	5	0.5975798
1,2-Diphenylhydrazine	50	0.8174537	80	0.7756974	100	0.7472643						
Bis(2-ethylhexyl)phthalate	50	0.9644317	80	0.9327127	100	0.9433765						
Fluoranthene	50	1.200663	80	1.145228	100	1.117971						
Fluorene	50	1.371696	80	1.3477	100	1.331747						
2-Fluorobiphenyl	50	1.380741	80	1.342227	100	1.31122						
2-Fluorophenol	100	1.184307	160	1.150476	200	1.143049						
Hexachlorobenzene	50	0.2611324	80	0.2528165	100	0.2469684						
Hexachlorobutadiene	50	0.1898094	80	0.1823152	100	0.1809221						
Hexachlorocyclopentadiene	50	0.3205142	80	0.2672985	100	0.2978232						
Hexachloroethane	50	0.5928387	80	0.5834398	100	0.5785441						
Indeno(1,2,3-cd)pyrene	50	1.184644	80	1.201734	100	1.031961						
Isophorone	50	0.6693467	80	0.6606669	100	0.651883						
1-Methylnaphthalene	50	0.6110108	80	0.5887133	100	0.578354						
2-Methylnaphthalene	50	0.5899842	80	0.5725228	100	0.5640864						
2-Methylphenol	50	1.174288	80	1.161528	100	1.130825						

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0351002
Instrument: MS-BNA3
Matrix: Water
Calibration Date: 12/7/2010 5:31:41PM

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
3-Methylphenol	50	1.180593	80	1.174014	100	1.145808						
4-Methylphenol	50	1.180593	80	1.174014	100	1.145808						
Naphthalene	50	1.062289	80	1.009165	100	0.9853361						
4-Nitroaniline	50	0.245583	80	0.2713623	100	0.2926737						
3-Nitroaniline	50	0.3328151	80	0.3335098	100	0.3302451						
2-Nitroaniline	50	0.3604391	80	0.3575911	100	0.3502726						
Nitrobenzene	50	0.3742193	80	0.3632219	100	0.3548228						
Nitrobenzene-d5	50	0.3716804	80	0.3677033	100	0.3602605						
4-Nitrophenol	50	0.2302537	80	0.2312482	100	0.237925						
2-Nitrophenol	50	0.1987571	80	0.1969275	100	0.1952942						
N-Nitrosodimethylamine	50	0.7179275	80	0.699562	100	0.6988776						
N-Nitrosodiphenylamine	50	0.734013	80	0.7049383	100	0.6836085						
N-Nitroso-di-n-propylamine	50	0.8590022	80	0.8618547	100	0.8482223						
Pentachlorophenol	50	0.1477524	80	0.152323	100	0.1493187						
Phenanthrene	50	1.165403	80	1.107075	100	1.089032						
Phenol	50	1.515388	80	1.487162	100	1.485453						
Phenol-d6	100	1.444334	160	1.417009	200	1.38417						
Pyrene	50	1.376348	80	1.350116	100	1.429147						
Pyridine	50	1.386096	80	1.382983	100	1.355936						
Terphenyl-d14	50	0.8866	80	0.8605814	100	0.9157647						
1,2,4,5-Tetrachlorobenzene							1	0.3530087	2	0.3195873	5	0.3252684
2,3,4,6-Tetrachlorophenol	50	0.3149583	80	0.3195705	100	0.3193177						
2,4,6-Tribromophenol	100	0.1236089	160	0.1225882	200	0.120418						
1,2,4-Trichlorobenzene	50	0.3509992	80	0.3419386	100	0.3363453						
2,4,6-Trichlorophenol	50	0.3746937	80	0.3778514	100	0.3769771						
2,4,5-Trichlorophenol	50	0.3892628	80	0.399019	100	0.3860452						

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0351002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA3

Calibration Date: 12/7/2010 5:31:41PM

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
3,3'-Dichlorobenzidine	10	0.3330745	20	0.3900825	40	0.4220677	50	0.4388195	80	0.42004	100	0.4023442
Acenaphthene												
Acenaphthylene												
Acetophenone	10	1.704303	20	1.801178	40	1.795701	50	1.710426	80	1.718945	100	1.59967
Aniline												
Anthracene												
Atrazine	10	0.2348484	20	0.2490883	40	0.2501657	50	0.2413828	80	0.2398009	100	0.2294713
Benzaldehyde	10	1.071349	20	1.114882	40	1.084654	50	1.035449	80	1.026022	100	0.9476697
Benzidine	10	0.5256135	20	0.6359201	40	0.7009071	50	0.7077408	80	0.7108148	100	0.6669063
Benzo(a)anthracene												
Benzo(a)pyrene												
Benzo(b)fluoranthene												
Benzo(g,h,i)perylene												
Benzoic acid												
Benzo(k)fluoranthene												
Benzyl alcohol												
1,1-Biphenyl	10	1.698813	20	1.690111	40	1.617949	50	1.584418	80	1.52658	100	1.43873
4-Bromophenyl-phenylether												
Butylbenzylphthalate												
Caprolactam	10	7.727893E-02	20	9.873525E-02	40	0.1074636	50	0.1070435	80	0.1101464	100	0.1047554
Carbazole												
4-Chloro-3-methylphenol												
4-Chloroaniline												
Bis(2-chloroethoxy)methane												
Bis(2-chloroethyl)ether												
2,2'-Oxybis-1-chloropropane												
2-Chloronaphthalene												
2-Chlorophenol												
4-Chlorophenyl phenyl ether												
Chrysene												
Dibenz(a,h)anthracene												

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0351002
Instrument: MS-BNA3
Matrix: Water
Calibration Date: 12/7/2010 5:31:41PM

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
Dibenzofuran												
Di-n-butylphthalate												
1,4-Dichlorobenzene												
1,3-Dichlorobenzene												
1,2-Dichlorobenzene												
2,6-Dichlorophenol	10	0.2406157	20	0.2739896	40	0.2837769	50	0.2807297	80	0.2789585	100	0.2685961
2,4-Dichlorophenol												
Diethylphthalate												
2,4-Dimethylphenol												
Dimethyl phthalate												
4,6-Dinitro-2-methylphenol												
2,4-Dinitrophenol												
2,4-Dinitrotoluene												
2,6-Dinitrotoluene												
Di-n-octylphthalate												
1,4-Dioxane	10	0.6181946	20	0.5750216	40	0.597864	50	0.5649718	80	0.5618798	100	0.5357223
1,2-Diphenylhydrazine												
Bis(2-ethylhexyl)phthalate												
Fluoranthene												
Fluorene												
2-Fluorobiphenyl												
2-Fluorophenol												
Hexachlorobenzene												
Hexachlorobutadiene												
Hexachlorocyclopentadiene												
Hexachloroethane												
Indeno(1,2,3-cd)pyrene												
Isophorone												
1-Methylnaphthalene												
2-Methylnaphthalene												
2-Methylphenol												

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0351002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA3

Calibration Date: 12/7/2010 5:31:41PM

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
3-Methylphenol												
4-Methylphenol												
Naphthalene												
4-Nitroaniline												
3-Nitroaniline												
2-Nitroaniline												
Nitrobenzene												
Nitrobenzene-d5												
4-Nitrophenol												
2-Nitrophenol												
N-Nitrosodimethylamine												
N-Nitrosodiphenylamine												
N-Nitroso-di-n-propylamine												
Pentachlorophenol												
Phenanthrene												
Phenol												
Phenol-d6												
Pyrene												
Pyridine												
Terphenyl-d14												
1,2,4,5-Tetrachlorobenzene	10	0.3142966	20	0.3196447	40	0.3170485	50	0.3100616	80	0.3033013	100	0.2910487
2,3,4,6-Tetrachlorophenol												
2,4,6-Tribromophenol												
1,2,4-Trichlorobenzene												
2,4,6-Trichlorophenol												
2,4,5-Trichlorophenol												

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0351002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA3

Calibration Date: 12/7/2010 5:31:41PM

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
3,3'-Dichlorobenzidine	0.3901063	11.47408	15.49443	2.260094E-02			15	
Acenaphthene	1.269597	4.903152	10.465	4.763744E-02			CCC (30)	
Acenaphthylene	1.959083	4.154041	10.24944	4.133794E-02			15	
Acetophenone	1.714419	4.130585	7.227222	3.094706E-02			15	
Aniline	1.900007	3.284542	6.390556	8.799762E-02			15	
Anthracene	1.161307	4.582293	12.34144	4.433106E-02			15	
Atrazine	0.2293025	11.08458	11.88522	5.410601E-02			15	
Benzaldehyde	1.057258	4.80575	6.264667	2.697619E-02			15	
Benzidine	0.6369679	13.40551	13.89371	2.662737E-02			15	
Benzo(a)anthracene	1.193431	4.385626	15.53889	2.902238E-02			15	
Benzo(a)pyrene	1.061849	12.15633	17.34322	4.821226E-02			CCC (30)	
Benzo(b)fluoranthene	1.192834	9.469779	16.90622	0.0364467			15	
Benzo(g,h,i)perylene	0.8673976	9.832135	19.57289	8.613339E-02			15	
Benzoic acid	0.1667293	34.36929	7.9865	0.5465472	0.9972413		0.995	
Benzo(k)fluoranthene	1.234244	5.160575	16.9405	4.784776E-02			15	
Benzyl alcohol	0.7918529	8.384648	6.922	7.858658E-02			15	
1,1-Biphenyl	1.647464	6.941428	9.711111	3.672288E-02			15	
4-Bromophenyl-phenylether	0.2396007	4.615409	11.69178	3.160712E-02			15	
Butylbenzylphthalate	0.6659619	10.75201	14.81629	1.927271E-02			15	
Caprolactam	0.0983814	13.1947	8.739	0.1800642			15	
Carbazole	1.033588	5.537093	12.53067	4.187015E-02			15	
4-Chloro-3-methylphenol	0.2791833	13.73393	8.943625	3.777953E-02			CCC (30)	
4-Chloroaniline	0.4236872	4.041706	8.357222	5.579471E-02			15	
Bis(2-chloroethoxy)methane	0.4015206	5.043312	7.969778	4.750625E-02			15	
Bis(2-chloroethyl)ether	1.242957	3.412662	6.456667	9.612344E-02			15	
2,2'-Oxybis-1-chloropropane	1.791162	4.894321	7.083555	4.525434E-02			15	
2-Chloronaphthalene	1.223416	4.351312	9.738445	4.355056E-02			15	
2-Chlorophenol	1.320483	5.059863	6.533111	6.571699E-02			15	
4-Chlorophenyl phenyl ether	0.6482639	4.698305	11.09078	0.034051			15	
Chrysene	1.223868	3.849079	15.58856	3.824456E-02			15	
Dibenz(a,h)anthracene	0.843577	13.39613	19.10544	0.064455			15	
Dibenzofuran	1.702459	5.478968	10.67456	4.805089E-02			15	

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0351002
Instrument: MS-BNA3
Matrix: Water
Calibration Date: 12/7/2010 5:31:41PM

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Di-n-butylphthalate	1.274102	10.33933	12.96089	3.198878E-02			15	
1,4-Dichlorobenzene	1.590354	5.068212	6.791	3.285709E-02			CCC (30)	
1,3-Dichlorobenzene	1.556634	4.82334	6.712111	3.840334E-02			15	
1,2-Dichlorobenzene	1.498241	3.960279	6.972778	3.854247E-02			15	
2,6-Dichlorophenol	0.2593817	8.91257	8.374111	1.822758E-02			15	
2,4-Dichlorophenol	0.2708646	11.75671	8.104445	7.489039E-02			CCC (30)	
Diethylphthalate	1.375716	4.066081	10.94922	7.018966E-02			15	
2,4-Dimethylphenol	0.3567735	5.191635	7.862444	7.425377E-02			15	
Dimethyl phthalate	1.360327	2.760394	10.08487	0.1018539			15	
4,6-Dinitro-2-methylphenol	0.1141426	30.80017	11.15414	8.948876E-02	0.9987724		0.995	
2,4-Dinitrophenol	0.1317034	34.87347	10.48617	6.439793E-02	0.9970944		SPCC (0.05)	
2,4-Dinitrotoluene	0.3873439	14.36567	10.647	8.872293E-02			15	
2,6-Dinitrotoluene	0.3161974	6.525335	10.15025	8.086076E-02			15	
Di-n-octylphthalate	1.581621	12.56055	16.37467	1.584676E-02			CCC (30)	
1,4-Dioxane	0.5824199	4.647384	3.461222	6.378529E-02			15	
1,2-Diphenylhydrazine	0.8266591	5.85195	11.28589	4.479164E-02			15	
Bis(2-ethylhexyl)phthalate	0.8698317	14.06275	15.55788	2.160886E-02			15	
Fluoranthene	1.133942	6.426527	13.74544	3.010434E-02			CCC (30)	
Fluorene	1.377626	2.611998	11.09611	4.668763E-02			15	
2-Fluorobiphenyl	1.429188	5.299247	9.590445	4.316615E-02			15	
2-Fluorophenol	1.163095	4.537913	5.309444	4.883207E-02			15	
Hexachlorobenzene	0.2675089	4.583392	11.79278	3.935515E-02			15	
Hexachlorobutadiene	0.1897728	3.248719	8.468444	2.541857E-02			CCC (30)	
Hexachlorocyclopentadiene	0.2719697	13.77204	9.354667	0.0244126			SPCC (0.05)	
Hexachloroethane	0.5839827	5.21415	7.374556	2.041353E-02			15	
Indeno(1,2,3-cd)pyrene	1.046936	11.15244	19.08733	6.484222E-02			15	
Isophorone	0.6532573	4.164348	7.718667	0.1211494			15	
1-Methylnaphthalene	0.6166441	3.550294	9.265111	3.593918E-02			15	
2-Methylnaphthalene	0.5927061	2.758044	9.143334	3.771168E-02			15	
2-Methylphenol	1.129245	5.890276	7.051444	5.962201E-02			15	
3-Methylphenol	1.146708	5.671519	7.231	8.935357E-02			15	
4-Methylphenol	1.146708	5.671519	7.231	8.935357E-02			15	

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0351002
Instrument: MS-BNA3
Matrix: Water
Calibration Date: 12/7/2010 5:31:41PM

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Naphthalene	1.098195	7.090559	8.304222	3.938283E-02			15	
4-Nitroaniline	0.2492193	10.6119	11.10488	0.1012271			15	
3-Nitroaniline	0.3039612	12.46666	10.355	8.761057E-02			15	
2-Nitroaniline	0.3312246	12.35964	9.851625	5.605301E-02			15	
Nitrobenzene	0.3690184	3.243848	7.433	8.670105E-02			15	
Nitrobenzene-d5	0.3614526	4.787386	7.410333	7.322044E-02			15	
4-Nitrophenol	0.1965166	21.52661	10.55771	9.363783E-02	0.9988059		SPCC (0.05)	
2-Nitrophenol	0.1835837	10.09707	7.816143	0.0460575			CCC (30)	
N-Nitrosodimethylamine	0.7067011	3.972251	3.796889	0.112963			15	
N-Nitrosodiphenylamine	0.7463088	5.779425	11.23333	6.231948E-02			CCC (30)	
N-Nitroso-di-n-propylamine	0.8544344	3.82209	7.235111	0.132911			SPCC (0.05)	
Pentachlorophenol	0.1195033	31.15399	12.02443	2.565489E-02	0.9986727		CCC (30)	*
Phenanthrene	1.206234	6.535522	12.27844	3.596534E-02			15	
Phenol	1.491659	4.640746	6.357889	0.1599589			CCC (30)	
Phenol-d6	1.434991	4.1192	6.341889	0.1499449			15	
Pyrene	1.380107	4.996263	14.02522	3.880092E-02			15	
Pyridine	1.377958	4.121152	3.838111	8.916254E-02			15	
Terphenyl-d14	0.8848596	4.382233	14.21	0.0194432			15	
1,2,4,5-Tetrachlorobenzene	0.3170295	5.342813	9.355222	3.483054E-02			15	
2,3,4,6-Tetrachlorophenol	0.2870772	13.54627	10.82871	2.564344E-02			15	
2,4,6-Tribromophenol	0.1159566	8.307173	11.39514	4.977028E-02			15	
1,2,4-Trichlorobenzene	0.3581999	4.302402	8.212111	0.0416875			15	
2,4,6-Trichlorophenol	0.3425101	14.8708	9.487875	3.202461E-02			CCC (30)	
2,4,5-Trichlorophenol	0.3356329	18.90298	9.529444	3.382823E-02	0.9992251		0.995	

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Lab File ID:	SEQ-TUN2.D	Injection Date:	12/08/10
Instrument ID:	MS-BNA3	Injection Time:	03:49
Sequence:	0L35109	Lab Sample ID:	0L35109-TUN2

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
51	30 - 60% of 198	46.1	PASS
68	Less than 2% of 69	0.759	PASS
69	Less than 200% of 198	46.1	PASS
70	Less than 2% of 69	0.512	PASS
127	40 - 60% of 198	57.3	PASS
197	Less than 1% of 198	0.26	PASS
198	Base peak, 100% relative abundance	100	PASS
199	5 - 9% of 198	7.25	PASS
275	10 - 30% of 198	24.8	PASS
365	1 - 200% of 198	3.45	PASS
441	0.001 - 100% of 443	73.2	PASS
442	40 - 200% of 198	81	PASS
443	17 - 23% of 442	19.4	PASS

INITIAL CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA3	Calibration:	0351002
Lab File ID:	SEQ-ICV3.D	Calibration Date:	12/07/10 17:31
Sequence:	0L35109	Injection Date:	12/08/10
Lab Sample ID:	0L35109-ICV3	Injection Time:	10:01

		CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
Benzaldehyde	A	50.00	47.93	1.057258	1.013398		-4.1	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

INITIAL CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA3	Calibration:	0351002
Lab File ID:	SEQ-ICV4.D	Calibration Date:	12/07/10 17:31
Sequence:	0L35109	Injection Date:	12/08/10
Lab Sample ID:	0L35109-ICV4	Injection Time:	10:31

		CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
3,3'-Dichlorobenzidine	A	50.00	47.61	0.3901063	0.3714708		-4.8	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

INITIAL CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA3	Calibration:	0351002
Lab File ID:	SEQ-ICV5.D	Calibration Date:	12/07/10 17:31
Sequence:	0L35109	Injection Date:	12/08/10
Lab Sample ID:	0L35109-ICV5	Injection Time:	11:04

		CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
Acetophenone	A	50.00	48.49	1.714419	1.662733		-3.0	20
Atrazine	A	50.00	49.51	0.2293025	0.2270669		-1.0	20
1,1-Biphenyl	A	50.00	46.63	1.647464	1.536423		-6.7	20
Caprolactam	A	50.00	52.93	0.0983814	0.1041517		5.9	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

INITIAL CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA3	Calibration:	0351002
Lab File ID:	SEQ-ICV7.D	Calibration Date:	12/07/10 17:31
Sequence:	0L35109	Injection Date:	12/08/10
Lab Sample ID:	0L35109-ICV7	Injection Time:	12:04

		CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
N-Nitrosodiphenylamine	A	50.00	51.34	0.7463088	0.7662808		2.7	20
2,3,4,6-Tetrachlorophenol	A	50.00	43.50	0.2870772	0.249777		-13.0	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

INITIAL CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA3	Calibration:	0351002
Lab File ID:	SEQ-ICVA.D	Calibration Date:	12/07/10 17:31
Sequence:	0L35109	Injection Date:	12/08/10
Lab Sample ID:	0L35109-ICVA	Injection Time:	14:09

		CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
4-Bromophenyl-phenylether	A	50.00	51.04	0.2396007	0.2446022		2.1	20
Butylbenzylphthalate	A	50.00	54.90	0.6659619	0.731176		9.8	20
Carbazole	A	50.00	44.33	1.033588	0.9164384		-11.3	20
4-Chloro-3-methylphenol	A	50.00	51.74	0.2791833	0.2888752		3.5	20
4-Chloroaniline	A	50.00	50.74	0.4236872	0.4299877		1.5	20
Bis(2-chloroethoxy)methane	A	50.00	49.55	0.4015206	0.397907		-0.9	20
Bis(2-chloroethyl)ether	A	50.00	49.26	1.242957	1.224652		-1.5	20
2,2'-Oxybis-1-chloropropane	A	50.00	49.35	1.791162	1.767772		-1.3	20
2-Chloronaphthalene	A	50.00	49.94	1.223416	1.222017		-0.1	20
2-Chlorophenol	A	50.00	50.72	1.320483	1.339391		1.4	20
4-Chlorophenyl phenyl ether	A	50.00	48.94	0.6482639	0.6345678		-2.1	20
Dibenzofuran	A	50.00	52.29	1.702459	1.780513		4.6	20
Di-n-butylphthalate	A	50.00	53.56	1.274102	1.364881		7.1	20
2,4-Dichlorophenol	A	50.00	53.23	0.2708646	0.2883479		6.5	20
Diethylphthalate	A	50.00	50.07	1.375716	1.37777		0.1	20
2,4-Dimethylphenol	A	50.00	45.98	0.3567735	0.3280623		-8.0	20
Dimethyl phthalate	A	50.00	50.41	1.360327	1.371495		0.8	20
4,6-Dinitro-2-methylphenol	L	50.00	43.80	0.1141426	0.118963		-12.4	20
2,4-Dinitrophenol	L	50.00	41.03	0.1317034	0.1214933	0.05	-17.9	20
2,4-Dinitrotoluene	A	50.00	54.89	0.3873439	0.4252053		9.8	20
2,6-Dinitrotoluene	A	50.00	50.97	0.3161974	0.3223188		1.9	20
Di-n-octylphthalate	A	50.00	52.54	1.581621	1.662112		5.1	20
Bis(2-ethylhexyl)phthalate	A	50.00	54.27	0.8698317	0.944141		8.5	20
Hexachlorobenzene	A	50.00	48.64	0.2675089	0.2602515		-2.7	20
Hexachlorobutadiene	A	50.00	50.27	0.1897728	0.1907933		0.5	20
Hexachlorocyclopentadiene	A	50.00	47.27	0.2719697	0.2571016	0.05	-5.5	20
Hexachloroethane	A	50.00	51.17	0.5839827	0.5976224		2.3	20
Isophorone	A	50.00	49.58	0.6532573	0.6477211		-0.8	20
2-Methylphenol	A	50.00	50.79	1.129245	1.147068		1.6	20

INITIAL CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA3	Calibration:	0351002
Lab File ID:	SEQ-ICVA.D	Calibration Date:	12/07/10 17:31
Sequence:	0L35109	Injection Date:	12/08/10
Lab Sample ID:	0L35109-ICVA	Injection Time:	14:09

		CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
3-Methylphenol	A	50.00	46.61	1.146708	1.068856		-6.8	20
4-Methylphenol	A	50.00	46.61	1.146708	1.068856		-6.8	20
4-Nitroaniline	A	50.00	48.63	0.2492193	0.2423702		-2.7	20
3-Nitroaniline	A	50.00	54.97	0.3039612	0.3341951		9.9	20
2-Nitroaniline	A	50.00	58.93	0.3312246	0.3904014		17.9	20
Nitrobenzene	A	50.00	50.66	0.3690184	0.3738603		1.3	20
4-Nitrophenol	L	50.00	45.62	0.1965166	0.2046322	0.05	-8.8	20
2-Nitrophenol	A	50.00	50.69	0.1835837	0.1861302		1.4	20
N-Nitroso-di-n-propylamine	A	50.00	51.06	0.8544344	0.872589	0.05	2.1	20
Pentachlorophenol	L	50.00	47.55	0.1195033	0.1362715		-4.9	20
Phenol	A	50.00	49.32	1.491659	1.471449		-1.4	20
2,4,6-Trichlorophenol	A	50.00	52.15	0.3425101	0.3572326		4.3	20
2,4,5-Trichlorophenol	L	50.00	48.75	0.3356329	0.3771646		-2.5	20
2-Fluorobiphenyl	A	50.00	48.29	1.429188	1.380386		-3.4	20
2-Fluorophenol	A	100.0	101.4	1.163095	1.179091		1.4	20
Nitrobenzene-d5	A	50.00	50.95	0.3614526	0.3682965		1.9	20
Phenol-d6	A	100.0	97.70	1.434991	1.402014		-2.3	20
Terphenyl-d14	A	50.00	52.29	0.8848596	0.925348		4.6	20
2,4,6-Tribromophenol	A	100.0	97.03	0.1159566	0.1125125		-3.0	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

PREPARATION BATCH SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Batch: 0L22011 Batch Matrix: Solid Preparation: EXT_3546

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL./WEIGHT	FINAL VOL.
Blank	0L22011-BLK1	12/23/10 13:30	15.00	1.00
LCS	0L22011-BS1	12/23/10 13:30	15.00	1.00
NTC12-SB27-0204	0L22011-MS1	12/23/10 13:30	15.10	1.00
NTC12-SB27-0204	0L22011-MSD1	12/23/10 13:30	15.30	1.00
NTC12-SB23-0005	1012185-01	12/23/10 13:30	15.40	1.00
NTC12-SB23-0810	1012185-02	12/23/10 13:30	15.30	1.00
NTC12-SB24-0005	1012185-03	12/23/10 13:30	15.10	1.00
NTC12-SB24-00502	1012185-04	12/23/10 13:30	15.40	1.00
NTC12-SB30-0005	1012185-06	12/23/10 13:30	15.20	1.00
NTC12-SB30-00502	1012185-07	12/23/10 13:30	15.20	1.00
NTC12-SB26-0005	1012185-08	12/23/10 13:30	15.10	1.00
NTC12-SB26-0406	1012185-09	12/23/10 13:30	15.10	1.00
NTC12-DUP01	1012185-10	12/23/10 13:30	15.00	1.00
NTC12-DUP02	1012185-11	12/23/10 13:30	15.00	1.00
NTC12-SB27-0005	1012185-13	12/23/10 13:30	15.20	1.00
NTC12-SB27-0204	1012185-14	12/23/10 13:30	15.30	1.00
NTC12-SB22-0005	1012185-15	12/23/10 13:30	15.10	1.00
NTC12-SB22-00502	1012185-16	12/23/10 13:30	15.00	1.00
NTC12-SB21-0005	1012185-17	12/23/10 13:30	15.10	1.00
NTC12-SB21-0507	1012185-18	12/23/10 13:30	15.20	1.00
NTC12-SB25-0005	1012185-19	12/23/10 13:30	15.00	1.00
NTC12-SB25-0204	1012185-20	12/23/10 13:30	15.30	1.00
NTC12-SB28-0005	1012185-21	12/23/10 13:30	15.40	1.00
NTC12-SB28-0204	1012185-22	12/23/10 13:30	15.10	1.00

ANALYSIS DATA SHEET

Blank

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Laboratory ID: 0L22011-BLK1 File ID: L22011B1.D

Sampled: Prepared: Analyzed: 01/06/11 16:00

Solids: Preparation: EXT_3546 Dilution:

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	ONC. (ug/Kg we	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		83.3	167	330	Y, U
98-86-2	Acetophenone		83.3	167	330	U
1912-24-9	Atrazine		83.3	167	330	U
100-52-7	Benzaldehyde		83.3	167	330	U
92-52-4	1,1-Biphenyl		83.3	167	330	U
101-55-3	4-Bromophenyl-phenylether		83.3	167	330	U
85-68-7	Butylbenzylphthalate		83.3	167	330	U
105-60-2	Caprolactam		83.3	167	330	U
86-74-8	Carbazole		83.3	167	330	Y, U
59-50-7	4-Chloro-3-methylphenol		83.3	167	330	U
106-47-8	4-Chloroaniline		83.3	167	330	U
111-91-1	Bis(2-chloroethoxy)methane		83.3	167	330	Q, U
111-44-4	Bis(2-chloroethyl)ether		83.3	167	330	U
108-60-1	2,2'-Oxybis-1-chloropropane		83.3	167	330	U
91-58-7	2-Chloronaphthalene		83.3	167	330	U
95-57-8	2-Chlorophenol		83.3	167	330	U
7005-72-3	4-Chlorophenyl phenyl ether		83.3	167	330	U
132-64-9	Dibenzofuran		83.3	167	330	U
84-74-2	Di-n-butylphthalate		83.3	167	330	U
87-65-0	2,6-Dichlorophenol		83.3	167	330	U
120-83-2	2,4-Dichlorophenol		83.3	167	330	U
84-66-2	Diethylphthalate		83.3	167	330	U
105-67-9	2,4-Dimethylphenol		333	667	1300	Q, U
131-11-3	Dimethyl phthalate		83.3	167	330	U
534-52-1	4,6-Dinitro-2-methylphenol		833	1670	3300	U
51-28-5	2,4-Dinitrophenol		833	1670	3300	U
121-14-2	2,4-Dinitrotoluene		83.3	167	330	U
606-20-2	2,6-Dinitrotoluene		83.3	167	330	U
117-84-0	Di-n-octylphthalate		83.3	167	330	U
117-81-7	Bis(2-ethylhexyl)phthalate		83.3	167	330	U
118-74-1	Hexachlorobenzene		83.3	167	330	U
87-68-3	Hexachlorobutadiene		83.3	167	330	Q, X, U
77-47-4	Hexachlorocyclopentadiene		83.3	167	330	X, U
67-72-1	Hexachloroethane		83.3	167	330	U
78-59-1	Isophorone		83.3	167	330	X, U
95-48-7	2-Methylphenol		83.3	167	330	U
108-39-4	3-Methylphenol		83.3	167	330	U
106-44-5	4-Methylphenol		83.3	167	330	U
100-01-6	4-Nitroaniline		333	667	1300	U
99-09-2	3-Nitroaniline		333	667	1300	U

ANALYSIS DATA SHEET

Blank

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Matrix: Laboratory ID: 0L22011-BLK1 File ID: L22011B1.D

Sampled: Prepared: Analyzed: 01/06/11 16:00

Solids: Preparation: EXT_3546 Dilution:

Batch: 0L22011 Sequence: 1A00701 Calibration: 0351002 Instrument: MS-BNA3

CAS NO.	COMPOUND	ONC. (ug/Kg we	DL	LOD	LOQ	Q
88-74-4	2-Nitroaniline		333	667	1300	X, U
98-95-3	Nitrobenzene		83.3	167	330	Q, X, U
100-02-7	4-Nitrophenol		333	667	1300	U
88-75-5	2-Nitrophenol		83.3	167	330	U
86-30-6	N-Nitrosodiphenylamine		83.3	167	330	Q, U
621-64-7	N-Nitroso-di-n-propylamine		83.3	167	330	X, U
87-86-5	Pentachlorophenol		333	667	1300	U
108-95-2	Phenol		83.3	167	330	Q, U
58-90-2	2,3,4,6-Tetrachlorophenol		83.3	167	330	U
88-06-2	2,4,6-Trichlorophenol		83.3	167	330	U
95-95-4	2,4,5-Trichlorophenol		83.3	167	330	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg wet)	CONC (ug/Kg wet)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3333	2855	85.7	45 - 105	
2-Fluorophenol	6667	6052	90.8	35 - 105	
Nitrobenzene-d5	3333	3682	110	35 - 100	X
Phenol-d6	6667	6209	93.1	40 - 100	
Terphenyl-d14	3333	3223	96.7	30 - 125	
2,4,6-Tribromophenol	6667	4952	74.3	35 - 125	

LCS / LCS DUPLICATE RECOVERY

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix: Solid
Batch: 0L22011
Laboratory ID: 0L22011-BS1
Preparation: EXT_3546
Initial/Final: 15 g / 1 mL

ANALYTE	SPIKE ADDED (ug/Kg wet)	LCS CONCENTRATION (ug/Kg wet)	LCS % REC.	QC LIMITS REC.
3,3'-Dichlorobenzidine	3333	2095	62.9	19 - 130
Acetophenone	3333	2803	84.1	35 - 110
Atrazine	3333	2815	84.5	55 - 105
Benzaldehyde	3333	2286	68.6	10 - 160
1,1-Biphenyl	3333	2684	80.5	45 - 110
4-Bromophenyl-phenylether	3333	3461	104	45 - 115
Butylbenzylphthalate	3333	3235	97.1	50 - 125
Caprolactam	3333	2518	75.5	50 - 110
Carbazole	3333	2510	75.3	45 - 115
4-Chloro-3-methylphenol	3333	3616	108	45 - 115
4-Chloroaniline	3333	2003	60.1	10 - 95
Bis(2-chloroethoxy)methane	**3333**	**3758**	**113**	**45 - 110**
Bis(2-chloroethyl)ether	3333	3392	102	40 - 105
2,2'-Oxybis-1-chloropropane	3333	2650	79.5	20 - 115
2-Chloronaphthalene	3333	3103	93.1	45 - 105
2-Chlorophenol	3333	2807	84.2	45 - 105
4-Chlorophenyl phenyl ether	3333	3479	104	45 - 110
Dibenzofuran	3333	2932	88.0	50 - 105
Di-n-butylphthalate	3333	2997	89.9	55 - 110
2,6-Dichlorophenol	3333	3107	93.2	45 - 110
2,4-Dichlorophenol	3333	3478	104	45 - 110
Diethylphthalate	3333	3072	92.2	50 - 115
2,4-Dimethylphenol	**3333**	**3654**	**110**	**30 - 105**
Dimethyl phthalate	3333	3263	97.9	50 - 110
4,6-Dinitro-2-methylphenol	3333	3186	95.6	30 - 135
2,4-Dinitrophenol	3333	3152	94.6	15 - 130
2,4-Dinitrotoluene	3333	3258	97.7	50 - 115
2,6-Dinitrotoluene	3333	3121	93.6	50 - 110
Di-n-octylphthalate	3333	3684	111	40 - 130
Bis(2-ethylhexyl)phthalate	3333	3163	94.9	45 - 125

LCS / LCS DUPLICATE RECOVERY

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Matrix:	Solid		
Batch:	0L22011	Laboratory ID:	0L22011-BS1
Preparation:	EXT_3546	Initial/Final:	15 g / 1 mL

ANALYTE	SPIKE ADDED (ug/Kg wet)	LCS CONCENTRATION (ug/Kg wet)	LCS % REC.	QC LIMITS REC.
Hexachlorobenzene	3333	2861	85.8	45 - 120
Hexachlorobutadiene	**3333**	**4322**	**130**	**30 - 110**
Hexachlorocyclopentadiene	3333	2422	72.7	10 - 110
Hexachloroethane	3333	3214	96.4	35 - 110
Isophorone	3333	3273	98.2	45 - 110
2-Methylphenol	3333	3094	92.8	40 - 105
4-Methylphenol	3333	3129	93.9	40 - 105
4-Nitroaniline	3333	2979	89.4	35 - 115
3-Nitroaniline	3333	1991	59.7	25 - 110
2-Nitroaniline	3333	3656	110	45 - 120
Nitrobenzene	**3333**	**4053**	**122**	**40 - 115**
4-Nitrophenol	3333	3410	102	15 - 140
2-Nitrophenol	3333	2980	89.4	40 - 110
N-Nitrosodiphenylamine	**3333**	**1570**	**47.1**	**50 - 115**
N-Nitroso-di-n-propylamine	3333	3807	114	40 - 115
Pentachlorophenol	3333	3686	111	25 - 120
Phenol	**3333**	**3351**	**101**	**40 - 100**
2,3,4,6-Tetrachlorophenol	3333	2834	85.0	50 - 125
2,4,6-Trichlorophenol	3333	3607	108	45 - 110
2,4,5-Trichlorophenol	3333	3574	107	50 - 110

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8270C

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Matrix: Solid

Batch: 0L22011

% Solids: 86.58

Source Sample Name: **1012185-14**

ANALYTE	SPIKE ADDED (ug/Kg dry)	SAMPLE CONCENTRATION (ug/Kg dry)	MS CONCENTRATION (ug/Kg dry)	MS % REC.	Q	QC LIMITS REC.
3,3'-Dichlorobenzidine	3824	ND	1723	45.1		19 - 130
Acetophenone	3824	ND	2982	78.0		35 - 110
Atrazine	3824	ND	3102	81.1		55 - 105
Benzaldehyde	3824	ND	2523	66.0		10 - 160
1,1-Biphenyl	3824	ND	2765	72.3		45 - 110
4-Bromophenyl-phenylether	3824	ND	3711	97.0		45 - 115
Butylbenzylphthalate	3824	ND	4392	115		50 - 125
Caprolactam	3824	ND	3115	81.5		50 - 110
Carbazole	3824	ND	2812	73.5		45 - 115
4-Chloro-3-methylphenol	3824	ND	3472	90.8		45 - 115
4-Chloroaniline	3824	ND	1672	43.7		10 - 95
Bis(2-chloroethoxy)methane	3824	ND	3939	103		45 - 110
Bis(2-chloroethyl)ether	3824	ND	3657	95.6		40 - 105
2,2'-Oxybis-1-chloropropane	3824	ND	2903	75.9		20 - 115
2-Chloronaphthalene	3824	ND	3255	85.1		45 - 105
2-Chlorophenol	3824	ND	2916	76.3		45 - 105
4-Chlorophenyl phenyl ether	3824	ND	3696	96.6		45 - 110
Dibenzofuran	3824	ND	3066	80.2		50 - 105
Di-n-butylphthalate	3824	ND	3409	89.1		55 - 110
2,6-Dichlorophenol	3824	ND	3031	79.3		45 - 110
2,4-Dichlorophenol	3824	ND	3436	89.8		45 - 110
Diethylphthalate	3824	ND	3326	87.0		50 - 115
2,4-Dimethylphenol	3824	ND	2424	63.4		30 - 105
Dimethyl phthalate	3824	ND	3507	91.7		50 - 110
4,6-Dinitro-2-methylphenol	3824	ND	2209	57.8		30 - 135
2,4-Dinitrophenol	3824	ND	1137	29.7		15 - 130
2,4-Dinitrotoluene	3824	ND	3589	93.8		50 - 115
2,6-Dinitrotoluene	3824	ND	3428	89.6		50 - 110
Di-n-octylphthalate	3824	ND	5189	136	*	40 - 130
Bis(2-ethylhexyl)phthalate	3824	ND	4147	108		45 - 125
Hexachlorobenzene	3824	ND	3023	79.1		45 - 120
Hexachlorobutadiene	3824	ND	4342	114	*	30 - 110

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8270C

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Matrix: Solid

Batch: 0L22011

% Solids: 86.58

Source Sample Name: **1012185-14**

ANALYTE	SPIKE ADDED (ug/Kg dry)	SAMPLE CONCENTRATION (ug/Kg dry)	MS CONCENTRATION (ug/Kg dry)	MS % REC.	Q	QC LIMITS REC.
Hexachlorocyclopentadiene	3824	ND	1289	33.7		10 - 110
Hexachloroethane	3824	ND	3242	84.8		35 - 110
Isophorone	3824	ND	3411	89.2		45 - 110
2-Methylphenol	3824	ND	2760	72.2		40 - 105
4-Methylphenol	3824	ND	2842	74.3		40 - 105
4-Nitroaniline	3824	ND	3019	78.9		35 - 115
3-Nitroaniline	3824	ND	2489	65.1		25 - 110
2-Nitroaniline	3824	ND	4032	105		45 - 120
Nitrobenzene	3824	ND	4201	110		40 - 115
4-Nitrophenol	3824	ND	3598	94.1		15 - 140
2-Nitrophenol	3824	ND	3473	90.8		40 - 110
N-Nitrosodiphenylamine	3824	ND	1718	44.9	*	50 - 115
N-Nitroso-di-n-propylamine	3824	ND	4038	106		40 - 115
Pentachlorophenol	3824	ND	2586	67.6		25 - 120
Phenol	3824	ND	3447	90.1		40 - 100
2,3,4,6-Tetrachlorophenol	3824	ND	2626	68.7		50 - 125
2,4,6-Trichlorophenol	3824	ND	3608	94.3		45 - 110
2,4,5-Trichlorophenol	3824	ND	3550	92.8		50 - 110

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Matrix: Solid

Batch: 0L22011

% Solids: 86.58

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Source Sample Name: **1012185-14**

ANALYTE	SPIKE ADDED (ug/Kg dry)	MSD CONCENTRATION (ug/Kg dry)	MSD % REC. #	% RPD	Q	QC LIMITS RPD	QC LIMITS REC.
3,3'-Dichlorobenzidine	3774	1819	48.2	5.43		30	19 - 130
Acetophenone	3774	3136	83.1	5.02		30	35 - 110
Atrazine	3774	3282	86.9	5.63		30	55 - 105
Benzaldehyde	3774	2641	70.0	4.58		30	10 - 160
1,1-Biphenyl	3774	2900	76.8	4.79		30	45 - 110
4-Bromophenyl-phenylether	3774	3881	103	4.48		30	45 - 115
Butylbenzylphthalate	3774	4715	125	7.08		30	50 - 125
Caprolactam	3774	3024	80.1	2.97		30	50 - 110
Carbazole	3774	3000	79.5	6.47		30	45 - 115
4-Chloro-3-methylphenol	3774	3759	99.6	7.93		30	45 - 115
4-Chloroaniline	3774	1983	52.5	17.0		30	10 - 95
Bis(2-chloroethoxy)methane	3774	4235	112	7.24	*	30	45 - 110
Bis(2-chloroethyl)ether	3774	3918	104	6.89		30	40 - 105
2,2'-Oxybis-1-chloropropane	3774	3089	81.8	6.21		30	20 - 115
2-Chloronaphthalene	3774	3420	90.6	4.95		30	45 - 105
2-Chlorophenol	3774	3018	80.0	3.43		30	45 - 105
4-Chlorophenyl phenyl ether	3774	3906	103	5.53		30	45 - 110
Dibenzofuran	3774	3238	85.8	5.45		30	50 - 105
Di-n-butylphthalate	3774	3475	92.1	1.93		30	55 - 110
2,6-Dichlorophenol	3774	3244	86.0	6.78		30	45 - 110
2,4-Dichlorophenol	3774	3680	97.5	6.88		30	45 - 110
Diethylphthalate	3774	3495	92.6	4.94		30	50 - 115
2,4-Dimethylphenol	3774	2529	67.0	4.23		30	30 - 105
Dimethyl phthalate	3774	3635	96.3	3.58		30	50 - 110
4,6-Dinitro-2-methylphenol	3774	2383	63.1	7.59		30	30 - 135
2,4-Dinitrophenol	3774	1190	31.5	4.58		30	15 - 130
2,4-Dinitrotoluene	3774	3874	103	7.65		30	50 - 115
2,6-Dinitrotoluene	3774	3705	98.2	7.76		30	50 - 110
Di-n-octylphthalate	3774	6136	163	16.7	*	30	40 - 130
Bis(2-ethylhexyl)phthalate	3774	4415	117	6.25		30	45 - 125
Hexachlorobenzene	3774	3238	85.8	6.85		30	45 - 120
Hexachlorobutadiene	3774	4654	123	6.95	*	30	30 - 110
Hexachlorocyclopentadiene	3774	1319	34.9	2.33		30	10 - 110

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8270C

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Batch: 0L22011

% Solids: 86.58

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Source Sample Name: **1012185-14**

ANALYTE	SPIKE ADDED (ug/Kg dry)	MSD CONCENTRATION (ug/Kg dry)	MSD % REC. #	% RPD	Q	QC LIMITS RPD	QC LIMITS REC.
Hexachloroethane	3774	3402	90.1	4.83		30	35 - 110
Isophorone	3774	3634	96.3	6.32		30	45 - 110
2-Methylphenol	3774	2829	75.0	2.47		30	40 - 105
4-Methylphenol	3774	2921	77.4	2.74		30	40 - 105
4-Nitroaniline	3774	3065	81.2	1.50		30	35 - 115
3-Nitroaniline	3774	2669	70.7	7.00		30	25 - 110
2-Nitroaniline	3774	4408	117	8.92		30	45 - 120
Nitrobenzene	3774	4574	121	8.50	*	30	40 - 115
4-Nitrophenol	3774	3923	104	8.66		30	15 - 140
2-Nitrophenol	3774	3765	99.8	8.07		30	40 - 110
N-Nitrosodiphenylamine	3774	1804	47.8	4.86	*	30	50 - 115
N-Nitroso-di-n-propylamine	3774	4335	115	7.10		30	40 - 115
Pentachlorophenol	3774	2572	68.1	0.522		30	25 - 120
Phenol	3774	3596	95.3	4.23		30	40 - 100
2,3,4,6-Tetrachlorophenol	3774	2770	73.4	5.35		30	50 - 125
2,4,6-Trichlorophenol	3774	3817	101	5.65		30	45 - 110
2,4,5-Trichlorophenol	3774	3785	100	6.39		30	50 - 110

ANALYSIS SEQUENCE SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 1A00701
Instrument: MS-BNA3
Calibration: 0351002

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	1A00701-TUN1	SEQ-TUN1.D	01/06/11 12:54
Calibration Check	1A00701-CCV1	SEQ-CCV1s.D	01/06/11 13:23
Blank	0L22011-BLK1	L22011B1.D	01/06/11 16:00
LCS	0L22011-BS1	L22011L1.D	01/06/11 16:32
NTC12-SB24-0005	1012185-03	1218503.D	01/06/11 17:03
NTC12-SB24-00502	1012185-04	1218504.D	01/06/11 17:33
NTC12-SB30-0005	1012185-06	1218506.D	01/06/11 18:04
NTC12-SB30-00502	1012185-07	1218507.D	01/06/11 18:35
NTC12-SB23-0005	1012185-01	1218501.D	01/06/11 19:07
NTC12-SB23-0810	1012185-02	1218502.D	01/06/11 19:37
NTC12-SB21-0005	1012185-17	1218517.D	01/06/11 20:09
NTC12-SB26-0406	1012185-09	1218509.D	01/06/11 20:39
NTC12-DUP02	1012185-11	1218511.D	01/06/11 21:09
NTC12-SB22-0005	1012185-15	1218515.D	01/06/11 21:40
NTC12-SB28-0204	1012185-22	1218522.D	01/06/11 22:11
NTC12-SB22-00502	1012185-16	1218516.D	01/06/11 22:42
NTC12-SB21-0507	1012185-18	1218518.D	01/06/11 23:13
NTC12-SB25-0005	1012185-19	1218519.D	01/06/11 23:44

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Lab File ID:	SEQ-TUN1.D	Injection Date:	01/06/11
Instrument ID:	MS-BNA3	Injection Time:	12:54
Sequence:	1A00701	Lab Sample ID:	1A00701-TUN1

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
51	30 - 60% of 198	35.4	PASS
68	Less than 2% of 69	0.576	PASS
69	Less than 200% of 198	45.1	PASS
70	Less than 2% of 69	0.334	PASS
127	40 - 60% of 198	48.5	PASS
197	Less than 1% of 198	0.31	PASS
198	Base peak, 100% relative abundance	100	PASS
199	5 - 9% of 198	7	PASS
275	10 - 30% of 198	23.9	PASS
365	1 - 200% of 198	3.41	PASS
441	0.001 - 100% of 443	81.3	PASS
442	40 - 200% of 198	60.6	PASS
443	17 - 23% of 442	18.3	PASS

CONTINUING CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA3	Calibration:	0351002
Lab File ID:	SEQ-CCV1s.D	Calibration Date:	12/07/10 17:31
Sequence:	1A00701	Injection Date:	01/06/11
Lab Sample ID:	1A00701-CCV1	Injection Time:	13:23

		CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
3,3'-Dichlorobenzidine	A	50.00	30.87	0.3901063	0.2408342		-38.3	20 *
Acetophenone	A	50.00	56.03	1.714419	1.921263		12.1	20
Atrazine	A	50.00	46.62	0.2293025	0.2137892		-6.8	20
Benzaldehyde	A	50.00	40.13	1.057258	0.8484962		-19.7	20
1,1-Biphenyl	A	50.00	48.56	1.647464	1.600008		-2.9	20
4-Bromophenyl-phenylether	A	50.00	49.92	0.2396007	0.2392245		-0.2	20
Butylbenzylphthalate	A	50.00	49.24	0.6659619	0.6558736		-1.5	20
Caprolactam	A	50.00	57.21	0.0983814	0.1125722		14.4	20
Carbazole	A	50.00	36.16	1.033588	0.7474901		-27.7	20 *
4-Chloro-3-methylphenol	A	50.00	56.45	0.2791833	0.3151966		12.9	20
4-Chloroaniline	A	50.00	46.47	0.4236872	0.3937464		-7.1	20
Bis(2-chloroethoxy)methane	A	50.00	56.58	0.4015206	0.454404		13.2	20
Bis(2-chloroethyl)ether	A	50.00	56.82	1.242957	1.412455		13.6	20
2,2'-Oxybis-1-chloropropane	A	50.00	43.32	1.791162	1.551714		-13.4	20
2-Chloronaphthalene	A	50.00	48.77	1.223416	1.193367		-2.5	20
2-Chlorophenol	A	50.00	48.64	1.320483	1.284611		-2.7	20
4-Chlorophenyl phenyl ether	A	50.00	54.33	0.6482639	0.7043617		8.7	20
Dibenzofuran	A	50.00	45.88	1.702459	1.562163		-8.2	20
Di-n-butylphthalate	A	50.00	46.89	1.274102	1.194881		-6.2	20
2,4-Dichlorophenol	A	50.00	56.70	0.2708646	0.3071776		13.4	20
Diethylphthalate	A	50.00	45.44	1.375716	1.250131		-9.1	20
2,4-Dimethylphenol	A	50.00	55.79	0.3567735	0.3980972		11.6	20
Dimethyl phthalate	A	50.00	48.09	1.360327	1.30829		-3.8	20
4,6-Dinitro-2-methylphenol	L	50.00	48.04	0.1141426	0.1319455		-3.9	20
2,4-Dinitrophenol	L	50.00	44.96	0.1317034	0.1365472	0.05	-10.1	20
2,4-Dinitrotoluene	A	50.00	52.22	0.3873439	0.4045037		4.4	20
2,6-Dinitrotoluene	A	50.00	50.92	0.3161974	0.3220396		1.8	20
Di-n-octylphthalate	A	50.00	49.46	1.581621	1.564532		-1.1	20
Bis(2-ethylhexyl)phthalate	A	50.00	47.46	0.8698317	0.8256388		-5.1	20

CONTINUING CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA3	Calibration:	0351002
Lab File ID:	SEQ-CCV1s.D	Calibration Date:	12/07/10 17:31
Sequence:	1A00701	Injection Date:	01/06/11
Lab Sample ID:	1A00701-CCV1	Injection Time:	13:23

		CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Hexachlorobenzene	A	50.00	45.10	0.2675089	0.2412928		-9.8	20
Hexachlorobutadiene	A	50.00	62.40	0.1897728	0.2368498		24.8	20 *
Hexachlorocyclopentadiene	A	50.00	75.37	0.2719697	0.4099903	0.05	50.7	20 *
Hexachloroethane	A	50.00	52.82	0.5839827	0.6169393		5.6	20
Isophorone	A	50.00	62.43	0.6532573	0.8156181		24.9	20 *
2-Methylphenol	A	50.00	52.77	1.129245	1.191898		5.5	20
3-Methylphenol	A	50.00	52.97	1.146708	1.214748		5.9	20
4-Methylphenol	A	50.00	52.97	1.146708	1.214748		5.9	20
4-Nitroaniline	A	50.00	47.55	0.2492193	0.2370208		-4.9	20
3-Nitroaniline	A	50.00	40.60	0.3039612	0.2468168		-18.8	20
2-Nitroaniline	A	50.00	73.42	0.3312246	0.4863734		46.8	20 *
Nitrobenzene	A	50.00	65.08	0.3690184	0.4803076		30.2	20 *
4-Nitrophenol	L	50.00	51.71	0.1965166	0.2346072	0.05	3.4	20
2-Nitrophenol	A	50.00	51.72	0.1835837	0.1898979		3.4	20
N-Nitrosodiphenylamine	A	50.00	45.08	0.7463088	0.6729137		-9.8	20
N-Nitroso-di-n-propylamine	A	50.00	64.54	0.8544344	1.102878	0.05	29.1	20 *
Pentachlorophenol	L	50.00	50.97	0.1195033	0.1471253		1.9	20
Phenol	A	50.00	57.90	1.491659	1.727331		15.8	20
2,3,4,6-Tetrachlorophenol	A	50.00	54.49	0.2870772	0.3128811		9.0	20
2,4,6-Trichlorophenol	A	50.00	57.21	0.3425101	0.3918824		14.4	20
2,4,5-Trichlorophenol	L	50.00	54.31	0.3356329	0.421165		8.6	20
2-Fluorobiphenyl	A	50.00	48.39	1.429188	1.383085		-3.2	20
2-Fluorophenol	A	100.0	111.8	1.163095	1.299775		11.8	20
Nitrobenzene-d5	A	50.00	64.89	0.3614526	0.4690707		29.8	20 *
Phenol-d6	A	100.0	111.4	1.434991	1.598805		11.4	20
Terphenyl-d14	A	50.00	58.04	0.8848596	1.027088		16.1	20
2,4,6-Tribromophenol	A	100.0	88.76	0.1159566	0.1029185		-11.2	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

ANALYSIS SEQUENCE SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Sequence: 1A01104

Calibration: 0351002

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA3

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	1A01104-TUN1	SEQ-TUN1.D	01/10/11 16:11
Calibration Check	1A01104-CCV1	SEQ-CCV1s.D	01/10/11 16:38
NTC12-DUP01	1012185-10	1218510.D	01/10/11 17:17
NTC12-SB27-0204	1012185-14	1218514.D	01/10/11 17:46
NTC12-SB27-0204	0L22011-MS1	1218514M.D	01/10/11 18:16
NTC12-SB27-0204	0L22011-MSD1	1218514S.D	01/10/11 18:46
NTC12-SB28-0005	1012185-21	1218521.D	01/10/11 19:15
NTC12-SB27-0005	1012185-13	1218513is80.D	01/10/11 19:45
NTC12-SB25-0204	1012185-20	1218520.D	01/10/11 20:14
NTC12-SB26-0005	1012185-08	1218508.D	01/10/11 20:44

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Lab File ID:	SEQ-TUN1.D	Injection Date:	01/10/11
Instrument ID:	MS-BNA3	Injection Time:	16:11
Sequence:	1A01104	Lab Sample ID:	1A01104-TUN1

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
51	30 - 60% of 198	39.4	PASS
68	Less than 2% of 69	0	PASS
69	Less than 200% of 198	49.2	PASS
70	Less than 2% of 69	0.427	PASS
127	40 - 60% of 198	52.6	PASS
197	Less than 1% of 198	0	PASS
198	Base peak, 100% relative abundance	100	PASS
199	5 - 9% of 198	7.41	PASS
275	10 - 30% of 198	22.6	PASS
365	1 - 200% of 198	2.26	PASS
441	0.001 - 100% of 443	77.7	PASS
442	40 - 200% of 198	47.2	PASS
443	17 - 23% of 442	20.5	PASS

CONTINUING CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA3	Calibration:	0351002
Lab File ID:	SEQ-CCV1s.D	Calibration Date:	12/07/10 17:31
Sequence:	1A01104	Injection Date:	01/10/11
Lab Sample ID:	1A01104-CCV1	Injection Time:	16:38

		CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
3,3'-Dichlorobenzidine	A	50.00	32.47	0.3901063	0.2533077		-35.1	20 *
Acetophenone	A	50.00	56.68	1.714419	1.943385		13.4	20
Atrazine	A	50.00	46.41	0.2293025	0.2128566		-7.2	20
Benzaldehyde	A	50.00	42.55	1.057258	0.8996506		-14.9	20
1,1-Biphenyl	A	50.00	48.07	1.647464	1.583799		-3.9	20
4-Bromophenyl-phenylether	A	50.00	50.37	0.2396007	0.2413787		0.7	20
Butylbenzylphthalate	A	50.00	57.73	0.6659619	0.7689192		15.5	20
Caprolactam	A	50.00	63.55	0.0983814	0.125041		27.1	20 *
Carbazole	A	50.00	38.01	1.033588	0.7856996		-24.0	20 *
4-Chloro-3-methylphenol	A	50.00	59.07	0.2791833	0.3298019		18.1	20
4-Chloroaniline	A	50.00	49.58	0.4236872	0.4201039		-0.8	20
Bis(2-chloroethoxy)methane	A	50.00	58.50	0.4015206	0.4697618		17.0	20
Bis(2-chloroethyl)ether	A	50.00	57.26	1.242957	1.423368		14.5	20
2,2'-Oxybis-1-chloropropane	A	50.00	44.45	1.791162	1.592354		-11.1	20
2-Chloronaphthalene	A	50.00	49.87	1.223416	1.220226		-0.3	20
2-Chlorophenol	A	50.00	50.09	1.320483	1.322843		0.2	20
4-Chlorophenyl phenyl ether	A	50.00	54.40	0.6482639	0.7052661		8.8	20
Dibenzofuran	A	50.00	45.76	1.702459	1.558161		-8.5	20
Di-n-butylphthalate	A	50.00	47.82	1.274102	1.21867		-4.4	20
2,4-Dichlorophenol	A	50.00	58.25	0.2708646	0.3155692		16.5	20
Diethylphthalate	A	50.00	47.10	1.375716	1.295885		-5.8	20
2,4-Dimethylphenol	A	50.00	57.08	0.3567735	0.4073274		14.2	20
Dimethyl phthalate	A	50.00	49.16	1.360327	1.337543		-1.7	20
4,6-Dinitro-2-methylphenol	L	50.00	45.42	0.1141426	0.1239181		-9.2	20
2,4-Dinitrophenol	L	50.00	41.53	0.1317034	0.1234159	0.05	-16.9	20
2,4-Dinitrotoluene	A	50.00	53.09	0.3873439	0.4112914		6.2	20
2,6-Dinitrotoluene	A	50.00	51.44	0.3161974	0.3253336		2.9	20
Di-n-octylphthalate	A	50.00	78.18	1.581621	2.472907		56.4	20 *
Bis(2-ethylhexyl)phthalate	A	50.00	56.55	0.8698317	0.9837307		13.1	20

CONTINUING CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA3	Calibration:	0351002
Lab File ID:	SEQ-CCV1s.D	Calibration Date:	12/07/10 17:31
Sequence:	1A01104	Injection Date:	01/10/11
Lab Sample ID:	1A01104-CCV1	Injection Time:	16:38

COMPOUND	TYPE	CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Hexachlorobenzene	A	50.00	45.13	0.2675089	0.24148		-9.7	20
Hexachlorobutadiene	A	50.00	61.34	0.1897728	0.2328143		22.7	20 *
Hexachlorocyclopentadiene	A	50.00	55.12	0.2719697	0.2998434	0.05	10.2	20
Hexachloroethane	A	50.00	53.71	0.5839827	0.6273434		7.4	20
Isophorone	A	50.00	63.24	0.6532573	0.8262617		26.5	20 *
2-Methylphenol	A	50.00	54.60	1.129245	1.233157		9.2	20
3-Methylphenol	A	50.00	54.87	1.146708	1.258316		9.7	20
4-Methylphenol	A	50.00	54.87	1.146708	1.258316		9.7	20
4-Nitroaniline	A	50.00	52.63	0.2492193	0.2623262		5.3	20
3-Nitroaniline	A	50.00	46.76	0.3039612	0.2842638		-6.5	20
2-Nitroaniline	A	50.00	75.37	0.3312246	0.4992615		50.7	20 *
Nitrobenzene	A	50.00	66.21	0.3690184	0.4886263		32.4	20 *
4-Nitrophenol	L	50.00	55.38	0.1965166	0.2526461	0.05	10.8	20
2-Nitrophenol	A	50.00	56.44	0.1835837	0.2072347		12.9	20
N-Nitrosodiphenylamine	A	50.00	46.61	0.7463088	0.6956417		-6.8	20
N-Nitroso-di-n-propylamine	A	50.00	65.14	0.8544344	1.113193	0.05	30.3	20 *
Pentachlorophenol	L	50.00	50.43	0.1195033	0.1454089		0.9	20
Phenol	A	50.00	58.73	1.491659	1.752193		17.5	20
2,3,4,6-Tetrachlorophenol	A	50.00	56.87	0.2870772	0.3265403		13.7	20
2,4,6-Trichlorophenol	A	50.00	59.03	0.3425101	0.4044001		18.1	20
2,4,5-Trichlorophenol	L	50.00	54.96	0.3356329	0.4263346		9.9	20
2-Fluorobiphenyl	A	50.00	48.36	1.429188	1.382447		-3.3	20
2-Fluorophenol	A	100.0	110.3	1.163095	1.283103		10.3	20
Nitrobenzene-d5	A	50.00	65.05	0.3614526	0.4702161		30.1	20 *
Phenol-d6	A	100.0	114.0	1.434991	1.635433		14.0	20
Terphenyl-d14	A	50.00	61.68	0.8848596	1.091553		23.4	20 *
2,4,6-Tribromophenol	A	100.0	91.24	0.1159566	0.1057942		-8.8	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

ANALYSIS SEQUENCE SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 0L35702
Instrument: MS-BNA1
Calibration: 0362004

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	0L35702-TUN1	SEQ-TUN1.D	12/18/10 18:01
Cal Standard	0L35702-CAL1	SEQ-CAL1.D	12/18/10 18:25
Cal Standard	0L35702-CAL2	SEQ-CAL2.D	12/18/10 18:53
Cal Standard	0L35702-CAL3	SEQ-CAL3.D	12/18/10 19:21
Cal Standard	0L35702-CAL4	SEQ-CAL4.D	12/18/10 19:49
Cal Standard	0L35702-CAL5	SEQ-CAL5.D	12/18/10 20:17
Cal Standard	0L35702-CAL6	SEQ-CAL6.D	12/18/10 20:45
Cal Standard	0L35702-CAL7	SEQ-CAL7.D	12/18/10 21:12
Cal Standard	0L35702-CAL8	SEQ-CAL8.D	12/18/10 21:40
Cal Standard	0L35702-CAL9	SEQ-CAL9.D	12/18/10 22:08
Cal Standard	0L35702-CALA	SEQ-CALA.D	12/18/10 22:36
Cal Standard	0L35702-CALB	SEQ-CALB.D	12/18/10 23:03
Cal Standard	0L35702-CALC	SEQ-CALC.D	12/18/10 23:31
Cal Standard	0L35702-CALD	SEQ-CALD.D	12/18/10 23:59
Cal Standard	0L35702-CALE	SEQ-CALE.D	12/19/10 00:26
Cal Standard	0L35702-CALF	SEQ-CALF.D	12/19/10 00:54
Cal Standard	0L35702-CALG	SEQ-CALG.D	12/19/10 01:21
Cal Standard	0L35702-CALH	SEQ-CALH.D	12/19/10 01:49
Cal Standard	0L35702-CALI	SEQ-CALI.D	12/19/10 02:16
Cal Standard	0L35702-CALJ	SEQ-CALJ.D	12/19/10 02:43
Cal Standard	0L35702-CALK	SEQ-CALK.D	12/19/10 03:11
Initial Cal Check	0L35702-ICV1	SEQ-ICV1.D	12/19/10 03:38
Initial Cal Check	0L35702-ICV2	SEQ-ICV2.D	12/19/10 04:05
MS Tune	0L35702-TUN2	SEQ-TUN1.D	12/22/10 15:21
Initial Cal Check	0L35702-ICV3	SEQ-ICV3.D	12/22/10 17:47

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Lab File ID:	SEQ-TUN1.D	Injection Date:	12/18/10
Instrument ID:	MS-BNA1	Injection Time:	18:01
Sequence:	0L35702	Lab Sample ID:	0L35702-TUN1

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
51	30 - 60% of 198	32.2	PASS
68	Less than 2% of 69	0	PASS
69	Less than 200% of 198	53.3	PASS
70	Less than 2% of 69	0.467	PASS
127	40 - 60% of 198	41.1	PASS
197	Less than 1% of 198	0	PASS
198	Base peak, 100% relative abundance	100	PASS
199	5 - 9% of 198	7.15	PASS
275	10 - 30% of 198	17.1	PASS
365	1 - 200% of 198	2.04	PASS
441	0.001 - 100% of 443	73	PASS
442	40 - 200% of 198	48.8	PASS
443	17 - 23% of 442	19.6	PASS

INITIAL CALIBRATION DATA

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362004

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA1

Calibration Date: 12/18/2010 6:01:14PM

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
3,3'-Dichlorobenzidine												
Acenaphthene	1	1.348352	2	1.278572	5	1.325648	10	1.218787	20	1.309364	40	1.037386
Acenaphthylene	1	2.084407	2	1.896779	5	2.164744	10	2.096397	20	2.064472	40	1.738933
Acetophenone												
Aniline	1	2.003892	2	1.817257	5	2.026887	10	1.954085	20	1.862817	40	1.859482
Anthracene	1	1.215691	2	1.093456	5	1.113755	10	1.149589	20	1.200713	40	1.031995
Atrazine												
Benzaldehyde												
Benzidine												
Benzo(a)anthracene	1	1.164115	2	1.11246	5	1.117687	10	1.126547	20	1.135109	40	1.200297
Benzo(a)pyrene	1		2	0.7021988	5	0.9191536	10	0.9886951	20	1.07144	40	1.135962
Benzo(b)fluoranthene	1		2	~~0.6957154~~	5	0.9015172	10	1.090521	20	1.166049	40	1.172349
Benzo(g,h,i)perylene	1		2		5	0.6781382	10	0.6642757	20	0.7367676	40	0.8096809
Benzoic acid	1		2		5		10	0.0220009	20	6.734805E-02	40	0.1336541
Benzo(k)fluoranthene	1		2	1.056983	5	1.295804	10	1.307639	20	1.37504	40	1.450473
Benzyl alcohol	1	0.6760083	2	0.6701804	5	0.7929572	10	0.8711333	20	0.7749117	40	0.8334584
1,1-Biphenyl												
4-Bromophenyl-phenylether	1	0.2498662	2	0.2395219	5	0.2538038	10	0.2383013	20	0.2784548	40	0.2560569
Butylbenzylphthalate	1		2		5	0.541403	10	0.5535127	20	0.648904	40	0.6493197
Caprolactam												
Carbazole	1	1.01065	2	0.9897868	5	0.9695613	10	1.008382	20	1.160686	40	1.015274
4-Chloro-3-methylphenol	1		2	0.2013224	5	0.2372614	10	0.2400649	20	0.2492694	40	0.2568644
4-Chloroaniline	1	0.4592105	2	0.4379076	5	0.4922755	10	0.4438585	20	0.4767213	40	0.4675983
Bis(2-chloroethoxy)methane	1	0.5377867	2	0.4242009	5	0.484007	10	0.4752992	20	0.4670363	40	0.4748303
Bis(2-chloroethyl)ether	1	1.287631	2	1.304333	5	1.419682	10	1.373404	20	1.326029	40	1.362495
2,2'-Oxybis-1-chloropropane	1	2.263278	2	1.874187	5	2.223492	10	2.292625	20	2.160516	40	2.104419
2-Chloronaphthalene	1	1.512543	2	1.237375	5	1.201385	10	1.248322	20	1.265424	40	1.212097
2-Chlorophenol	1	1.288644	2	1.474949	5	1.460751	10	1.438017	20	1.37213	40	1.470887
4-Chlorophenyl phenyl ether	1	0.6324514	2	0.6734852	5	0.7014361	10	0.6716002	20	0.6949916	40	0.6270622
Chrysene	1	1.338237	2	1.256028	5	1.339678	10	1.174719	20	1.1989	40	1.183559
Dibenz(a,h)anthracene	1		2		5	0.4306483	10	0.5702998	20	0.6423417	40	0.7365787

INITIAL CALIBRATION DATA

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362004

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA1

Calibration Date: 12/18/2010 6:01:14PM

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
Dibenzofuran	1	1.778321	2	1.621031	5	1.808038	10	1.54438	20	1.785169	40	1.647363
Di-n-butylphthalate	1		2		5	1.313671	10	1.347141	20	1.575356	40	1.442941
1,4-Dichlorobenzene	1	1.508515	2	1.533946	5	1.579763	10	1.561973	20	1.518416	40	1.56203
1,3-Dichlorobenzene	1	1.649814	2	1.460253	5	1.509212	10	1.613835	20	1.573804	40	1.605841
1,2-Dichlorobenzene	1	1.658933	2	1.358461	5	1.543028	10	1.643251	20	1.445176	40	1.457855
2,6-Dichlorophenol												
2,4-Dichlorophenol	1	0.2919269	2	0.2892728	5	0.2883292	10	0.311626	20	0.3123392	40	0.3386215
Diethylphthalate	1	~~7.604847~~	2	~~3.139478~~	5	~~2.033841~~	10	1.535279	20	1.487179	40	1.306715
2,4-Dimethylphenol	1		2	0.2816744	5	0.3077065	10	0.3204136	20	0.3180764	40	0.3129629
Dimethyl phthalate	1		2		5	1.373339	10	1.451541	20	1.464771	40	1.251226
4,6-Dinitro-2-methylphenol	1		2		5		10	4.623276E-02	20	0.1021571	40	0.1584873
2,4-Dinitrophenol	1		2		5		10	3.150776E-02	20	7.604986E-02	40	0.1213198
2,4-Dinitrotoluene	1		2	~~0.1892532~~	5	0.2793378	10	0.2949146	20	0.4159376	40	0.4264008
2,6-Dinitrotoluene	1		2		5	0.2703892	10	0.3000696	20	0.3704238	40	0.3662189
Di-n-octylphthalate	1		2		5		10	0.6764134	20	1.201144	40	1.418852
1,4-Dioxane												
1,2-Diphenylhydrazine	1	0.934472	2	0.8831663	5	0.8397747	10	0.8843139	20	0.9054345	40	0.7777648
Bis(2-ethylhexyl)phthalate	1		2		5	~~0.4928173~~	10	0.5896658	20	0.8263999	40	0.8567532
Fluoranthene	1	1.286962	2	1.093112	5	1.026261	10	1.106917	20	1.278596	40	1.129386
Fluorene	1	1.353391	2	1.292246	5	1.433684	10	1.300167	20	1.394333	40	1.237472
2-Fluorobiphenyl	1	1.494908	2	1.299839	5	1.531088	10	1.46727	20	1.450253	40	1.312977
2-Fluorophenol	2	1.403783	4	1.251217	10	1.316233	20	1.318509	40	1.245709	80	1.36044
Hexachlorobenzene	1	0.3133619	2	0.319558	5	0.2989487	10	0.3012556	20	0.3164629	40	0.2916296
Hexachlorobutadiene	1		2	0.2108537	5	0.207582	10	0.220536	20	0.1896914	40	0.2054117
Hexachlorocyclopentadiene	1		2	~~0.1800305~~	5	0.2807988	10	0.3047435	20	0.3705689	40	0.3940059
Hexachloroethane	1	0.620557	2	0.519949	5	0.6351487	10	0.6292412	20	0.5945677	40	0.6182107
Indeno(1,2,3-cd)pyrene	1		2		5	0.6227788	10	0.7298104	20	0.8294008	40	0.9570625
Isophorone	1		2		5	0.7330214	10	0.6770081	20	0.7298945	40	0.7268007
1-Methylnaphthalene	1	0.6114761	2	0.5246924	5	0.5607095	10	0.5868964	20	0.5646677	40	0.5583462
2-Methylnaphthalene	1	0.5593303	2	0.5696783	5	0.5185937	10	0.5799724	20	0.5507446	40	0.5600772
2-Methylphenol	1	1.139238	2	0.9843908	5	1.11518	10	1.269866	20	1.162056	40	1.158099

INITIAL CALIBRATION DATA

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362004

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA1

Calibration Date: 12/18/2010 6:01:14PM

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
3-Methylphenol	1	1.063246	2	0.9727118	5	1.179754	10	1.19176	20	1.086049	40	1.260436
4-Methylphenol	1	1.063246	2	0.9727118	5	1.179754	10	1.19176	20	1.086049	40	1.260436
Naphthalene	1		2	1.050624	5	1.076788	10	1.075639	20	1.032028	40	0.9848447
4-Nitroaniline	1		2	~~0.1628363~~	5	0.2377384	10	0.2422332	20	0.2768117	40	0.2859787
3-Nitroaniline	1	~~0.2245889~~	2	~~0.2521242~~	5	0.3164237	10	0.326308	20	0.3984439	40	0.3980206
2-Nitroaniline	1		2	~~0.1455256~~	5	0.2193977	10	0.243328	20	0.3243926	40	0.3165097
Nitrobenzene	1		2		5	0.3592281	10	0.3476294	20	0.3487276	40	0.3566873
Nitrobenzene-d5	1	0.299704	2	0.3041156	5	0.3259186	10	0.3387894	20	0.3522363	40	0.3441448
4-Nitrophenol	1		2		5		10	9.855349E-02	20	0.1595435	40	0.1791884
2-Nitrophenol	1		2		5	0.1554442	10	0.1711476	20	0.2132723	40	0.2168272
N-Nitrosodimethylamine	1		2	0.4815077	5	0.4528387	10	0.5510334	20	0.5538626	40	0.6063606
N-Nitrosodiphenylamine	1	0.7377892	2	0.641178	5	0.6769072	10	0.7288941	20	0.7504604	40	0.6917409
N-Nitroso-di-n-propylamine	1		2	0.696598	5	0.8522184	10	0.9005872	20	0.8573433	40	0.9409251
Pentachlorophenol	1		2		5	~~4.610648E-02~~	10	7.210099E-02	20	0.1405664	40	0.1822092
Phenanthrene	1	1.280185	2	1.196134	5	1.196579	10	1.155489	20	1.138632	40	1.081193
Phenol	1	1.852644	2	1.758561	5	1.865164	10	1.833856	20	1.773614	40	1.743435
Phenol-d6	2	1.56719	4	1.525349	10	1.650296	20	1.601461	40	1.550825	80	1.500835
Pyrene	1	1.342952	2	1.410732	5	1.722922	10	1.421124	20	1.353002	40	1.385476
Pyridine	1		2	1.079029	5	1.494812	10	1.431858	20	1.554576	40	1.711064
Terphenyl-d14	1		2	0.8930057	5	0.9941025	10	0.8812743	20	0.8498471	40	0.8061945
1,2,4,5-Tetrachlorobenzene												
2,3,4,6-Tetrachlorophenol	1		2		5	0.2709762	10	0.3101752	20	0.3611376	40	0.3931623
2,4,6-Tribromophenol	2		4		10	0.1237667	20	0.1451633	40	0.1743561	80	0.1679238
1,2,4-Trichlorobenzene	1	0.4614751	2	0.3719559	5	0.3902296	10	0.4020289	20	0.3784318	40	0.3948766
2,4,6-Trichlorophenol	1		2	0.2670491	5	0.3867995	10	0.4050053	20	0.4133697	40	0.4068492
2,4,5-Trichlorophenol	1		2		5	0.3838905	10	0.4176613	20	0.444445	40	0.4315143

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0362004
Instrument: MS-BNA1
Matrix: Water
Calibration Date: 12/18/2010 6:01:14PM

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
3,3'-Dichlorobenzidine									1		2	
Acenaphthene	50	1.157337	60	1.07347	80	0.9563539	100	0.876854				
Acenaphthylene	50	1.909995	60	1.782575	80	1.568012	100	1.604714				
Acetophenone									1	1.664252	2	1.635957
Aniline	50	1.686277	60	1.694008	80	1.702525	100	1.537717				
Anthracene	50	1.075541	60	1.002611	80	0.862955	100	0.8725606				
Atrazine									1		2	0.2169208
Benzaldehyde									1	1.16207	2	1.159626
Benzidine									1		2	
Benzo(a)anthracene	50	1.103269	60	1.10339	80	1.07776	100	1.048295				
Benzo(a)pyrene	50	1.115838	60	1.052982	80	1.03274	100	1.02538				
Benzo(b)fluoranthene	50	1.178673	60	1.061235	80	1.124596	100	1.072386				
Benzo(g,h,i)perylene	50	0.7362696	60	0.8142672	80	0.7925369	100	0.8119577				
Benzoic acid	50	0.152768	60	0.167593	80	0.2222591	100	0.2230798				
Benzo(k)fluoranthene	50	1.283033	60	1.247808	80	1.157802	100	1.146402				
Benzyl alcohol	50	0.6901262	60	0.7609605	80	0.6920564	100	0.653107				
1,1-Biphenyl									1	~~1.930316~~	2	~~1.856173~~
4-Bromophenyl-phenylether	50	0.2543035	60	0.2412717	80	0.2375402	100	0.234117				
Butylbenzylphthalate	50	0.6875222	60	0.649047	80	0.6469656	100	0.6228524				
Caprolactam									1		2	~~7.464428E-02~~
Carbazole	50	0.9035019	60	0.9848856	80	0.8426092	100	0.8387098				
4-Chloro-3-methylphenol	50	0.2537659	60	0.2477758	80	0.2765246	100	0.2484046				
4-Chloroaniline	50	0.4750815	60	0.4300455	80	0.481565	100	0.4372817				
Bis(2-chloroethoxy)methane	50	0.463065	60	0.4360773	80	0.4487949	100	0.4085092				
Bis(2-chloroethyl)ether	50	1.25271	60	1.181188	80	1.206165	100	1.157768				
2,2'-Oxybis-1-chloropropane	50	1.925327	60	1.990244	80	1.921907	100	1.669166				
2-Chloronaphthalene	50	1.300071	60	1.105832	80	1.028633	100	1.043736				
2-Chlorophenol	50	1.36429	60	1.349684	80	1.246584	100	1.281325				
4-Chlorophenyl phenyl ether	50	0.7090751	60	0.6019215	80	0.5798786	100	0.5258909				
Chrysene	50	1.146423	60	1.10029	80	1.025912	100	0.9541531				
Dibenz(a,h)anthracene	50	0.6838794	60	0.7394652	80	0.7308747	100	0.7776032				

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0362004
Instrument: MS-BNA1
Matrix: Water
Calibration Date: 12/18/2010 6:01:14PM

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
Dibenzofuran	50	1.622645	60	1.389883	80	1.351636	100	1.349081				
Di-n-butylphthalate	50	1.489128	60	1.309696	80	1.279657	100	1.147867				
1,4-Dichlorobenzene	50	1.455151	60	1.438712	80	1.355478	100	1.279162				
1,3-Dichlorobenzene	50	1.453221	60	1.487939	80	1.422499	100	1.269031				
1,2-Dichlorobenzene	50	1.295582	60	1.372017	80	1.252802	100	1.100628				
2,6-Dichlorophenol									1		2	0.2764339
2,4-Dichlorophenol	50	0.3093473	60	0.3049251	80	0.3202377	100	0.3120303				
Diethylphthalate	50	1.408167	60	1.325167	80	1.222743	100	1.104301				
2,4-Dimethylphenol	50	0.3261859	60	0.2956195	80	0.3205089	100	0.308093				
Dimethyl phthalate	50	1.252524	60	1.263922	80	1.077461	100	1.163947				
4,6-Dinitro-2-methylphenol	50	0.1534864	60	0.159578	80	0.178445	100	0.1795628				
2,4-Dinitrophenol	50	0.1514503	60	0.1663726	80	0.1816319	100	0.1961529				
2,4-Dinitrotoluene	50	0.4238763	60	0.3821128	80	0.3921351	100	0.4067588				
2,6-Dinitrotoluene	50	0.3656241	60	0.3696685	80	0.3346456	100	0.3629225				
Di-n-octylphthalate	50	1.45699	60	1.462162	80	1.432999	100	1.414418				
1,4-Dioxane									1	0.539418	2	0.5129063
1,2-Diphenylhydrazine	50	0.7930407	60	0.7531774	80	0.7317764	100	0.7049986				
Bis(2-ethylhexyl)phthalate	50	0.845221	60	0.7951258	80	0.8232879	100	0.7467134				
Fluoranthene	50	1.149035	60	1.043634	80	0.9411585	100	0.96472				
Fluorene	50	1.364597	60	1.18745	80	1.096831	100	1.033826				
2-Fluorobiphenyl	50	1.408474	60	1.22082	80	1.0449	100	1.128293				
2-Fluorophenol	100	1.155713	120	1.283948	160	1.222573	200	1.123623				
Hexachlorobenzene	50	0.2945907	60	0.2755779	80	0.2599553	100	0.2623003				
Hexachlorobutadiene	50	0.205004	60	0.1884661	80	0.1862815	100	0.1910898				
Hexachlorocyclopentadiene	50	0.4057775	60	0.3569486	80	0.3942583	100	0.3679152				
Hexachloroethane	50	0.5452072	60	0.5604655	80	0.5306652	100	0.4934562				
Indeno(1,2,3-cd)pyrene	50	0.8597233	60	0.878046	80	0.9106019	100	0.9521201				
Isophorone	50	0.6811175	60	0.6720164	80	0.7341954	100	0.6693151				
1-Methylnaphthalene	50	0.5604303	60	0.4683669	80	0.5152476	100	0.4701138				
2-Methylnaphthalene	50	0.5204943	60	0.448567	80	0.5262981	100	0.4577817				
2-Methylphenol	50	1.035035	60	1.080094	80	1.048395	100	0.9185301				

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362004

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA1

Calibration Date: 12/18/2010 6:01:14PM

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
3-Methylphenol	50	0.9491418	60	1.116248	80	1.085917	100	0.9420685				
4-Methylphenol	50	0.9491418	60	1.116248	80	1.085917	100	0.9420685				
Naphthalene	50	0.9545722	60	0.9490683	80	0.7972511	100	0.7969216				
4-Nitroaniline	50	0.2694671	60	0.2795864	80	0.3209442	100	0.2843044				
3-Nitroaniline	50	0.4226482	60	0.3903727	80	0.3967867	100	0.3841121				
2-Nitroaniline	50	0.3123446	60	0.320402	80	0.319308	100	0.3307581				
Nitrobenzene	50	0.354891	60	0.327837	80	0.3554849	100	0.3278463				
Nitrobenzene-d5	50	0.3599085	60	0.3453101	80	0.3596853	100	0.3487001				
4-Nitrophenol	50	0.1882538	60	0.1786304	80	0.1817791	100	0.1948128				
2-Nitrophenol	50	0.2083326	60	0.224648	80	0.2451794	100	0.2315352				
N-Nitrosodimethylamine	50	0.5282803	60	0.5897694	80	0.5686201	100	0.531806				
N-Nitrosodiphenylamine	50	0.6175854	60	0.6414693	80	0.6185743	100	0.5786553				
N-Nitroso-di-n-propylamine	50	0.6849062	60	0.8706108	80	0.8673492	100	0.7239541				
Pentachlorophenol	50	0.1703219	60	0.1698432	80	0.1837787	100	0.1847835				
Phenanthrene	50	1.032581	60	1.01939	80	0.896821	100	0.7990773				
Phenol	50	1.589201	60	1.563636	80	1.551373	100	1.44682				
Phenol-d6	100	1.369831	120	1.37085	160	1.348401	200	1.212943				
Pyrene	50	1.297955	60	1.217787	80	1.179459	100	1.128589				
Pyridine	50	1.456262	60	1.617267	80	1.630525	100	1.49529				
Terphenyl-d14	50	0.8777599	60	0.8875144	80	0.8196086	100	0.7892714				
1,2,4,5-Tetrachlorobenzene									1		2	
2,3,4,6-Tetrachlorophenol	50	0.4294384	60	0.3476694	80	0.3691118	100	0.3524071				
2,4,6-Tribromophenol	100	0.1609448	120	0.1677941	160	0.1400498	200	0.1485775				
1,2,4-Trichlorobenzene	50	0.3518812	60	0.3491734	80	0.3616659	100	0.3262202				
2,4,6-Trichlorophenol	50	0.4649362	60	0.4129211	80	0.3903364	100	0.3945285				
2,4,5-Trichlorophenol	50	0.4973001	60	0.4563307	80	0.4053369	100	0.3878787				

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362004

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA1

Calibration Date: 12/18/2010 6:01:14PM

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
3,3'-Dichlorobenzidine	5	0.2892264	10	0.2707547	20	0.3677178	40	0.3948175	50	0.3975328	60	0.3798616
Acenaphthene												
Acenaphthylene												
Acetophenone	5	1.656271	10	1.588346	20	1.461199	40	1.431312	50	1.400799	60	1.374353
Aniline												
Anthracene												
Atrazine	5	0.2055336	10	0.2449893	20	0.2372857	40	0.2168858	50	0.2261804	60	0.1965325
Benzaldehyde	5	1.167151	10	1.099565	20	1.143829	40	0.9612038	50	0.919317	60	0.9676847
Benzidine	5	~~0.3303748~~	10	0.3156317	20	0.524796	40	0.612317	50	0.5542858	60	0.5595175
Benzo(a)anthracene												
Benzo(a)pyrene												
Benzo(b)fluoranthene												
Benzo(g,h,i)perylene												
Benzoic acid												
Benzo(k)fluoranthene												
Benzyl alcohol												
1,1-Biphenyl	5	1.73065	10	1.828596	20	1.547061	40	1.389215	50	1.460006	60	1.349549
4-Bromophenyl-phenylether												
Butylbenzylphthalate												
Caprolactam	5	9.469835E-02	10	0.109958	20	0.1157518	40	0.1285406	50	0.1032598	60	0.1285285
Carbazole												
4-Chloro-3-methylphenol												
4-Chloroaniline												
Bis(2-chloroethoxy)methane												
Bis(2-chloroethyl)ether												
2,2'-Oxybis-1-chloropropane												
2-Chloronaphthalene												
2-Chlorophenol												
4-Chlorophenyl phenyl ether												
Chrysene												
Dibenz(a,h)anthracene												

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0362004
Instrument: MS-BNA1
Matrix: Water
Calibration Date: 12/18/2010 6:01:14PM

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
Dibenzofuran												
Di-n-butylphthalate												
1,4-Dichlorobenzene												
1,3-Dichlorobenzene												
1,2-Dichlorobenzene												
2,6-Dichlorophenol	5	0.3228983	10	0.3456558	20	0.3418019	40	0.3188803	50	0.308649	60	0.3279657
2,4-Dichlorophenol												
Diethylphthalate												
2,4-Dimethylphenol												
Dimethyl phthalate												
4,6-Dinitro-2-methylphenol												
2,4-Dinitrophenol												
2,4-Dinitrotoluene												
2,6-Dinitrotoluene												
Di-n-octylphthalate												
1,4-Dioxane	5	0.5534197	10	0.6029229	20	0.6000105	40	0.5934343	50	0.5954454	60	0.5872776
1,2-Diphenylhydrazine												
Bis(2-ethylhexyl)phthalate												
Fluoranthene												
Fluorene												
2-Fluorobiphenyl												
2-Fluorophenol												
Hexachlorobenzene												
Hexachlorobutadiene												
Hexachlorocyclopentadiene												
Hexachloroethane												
Indeno(1,2,3-cd)pyrene												
Isophorone												
1-Methylnaphthalene												
2-Methylnaphthalene												
2-Methylphenol												

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0362004
Instrument: MS-BNA1
Matrix: Water
Calibration Date: 12/18/2010 6:01:14PM

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
3-Methylphenol												
4-Methylphenol												
Naphthalene												
4-Nitroaniline												
3-Nitroaniline												
2-Nitroaniline												
Nitrobenzene												
Nitrobenzene-d5												
4-Nitrophenol												
2-Nitrophenol												
N-Nitrosodimethylamine												
N-Nitrosodiphenylamine												
N-Nitroso-di-n-propylamine												
Pentachlorophenol												
Phenanthrene												
Phenol												
Phenol-d6												
Pyrene												
Pyridine												
Terphenyl-d14												
1,2,4,5-Tetrachlorobenzene	5	0.3792186	10	0.3961495	20	0.3861099	40	0.3604219	50	0.3322253	60	0.3180726
2,3,4,6-Tetrachlorophenol												
2,4,6-Tribromophenol												
1,2,4-Trichlorobenzene												
2,4,6-Trichlorophenol												
2,4,5-Trichlorophenol												

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0362004
Instrument: MS-BNA1
Matrix: Water
Calibration Date: 12/18/2010 6:01:14PM

Compound	Level 19		Level 20		Level 21		Level 22		Level 23		Level 24	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
3,3'-Dichlorobenzidine	80	0.3891003	100	0.360098								
Acenaphthene												
Acenaphthylene												
Acetophenone	80	1.509867	100	1.191472								
Aniline												
Anthracene												
Atrazine	80	0.2124015	100	0.2054991								
Benzaldehyde	80	0.9814419	100	0.7416367								
Benzidine	80	0.5839142	100	0.5260856								
Benzo(a)anthracene												
Benzo(a)pyrene												
Benzo(b)fluoranthene												
Benzo(g,h,i)perylene												
Benzoic acid												
Benzo(k)fluoranthene												
Benzyl alcohol												
1,1-Biphenyl	80	1.310838	100	1.176319								
4-Bromophenyl-phenylether												
Butylbenzylphthalate												
Caprolactam	80	0.1340829	100	0.1205364								
Carbazole												
4-Chloro-3-methylphenol												
4-Chloroaniline												
Bis(2-chloroethoxy)methane												
Bis(2-chloroethyl)ether												
2,2'-Oxybis-1-chloropropane												
2-Chloronaphthalene												
2-Chlorophenol												
4-Chlorophenyl phenyl ether												
Chrysene												
Dibenz(a,h)anthracene												

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0362004
Instrument: MS-BNA1
Matrix: Water
Calibration Date: 12/18/2010 6:01:14PM

Compound	Level 19		Level 20		Level 21		Level 22		Level 23		Level 24	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
Dibenzofuran												
Di-n-butylphthalate												
1,4-Dichlorobenzene												
1,3-Dichlorobenzene												
1,2-Dichlorobenzene												
2,6-Dichlorophenol	80	0.2876442	100	0.2843447								
2,4-Dichlorophenol												
Diethylphthalate												
2,4-Dimethylphenol												
Dimethyl phthalate												
4,6-Dinitro-2-methylphenol												
2,4-Dinitrophenol												
2,4-Dinitrotoluene												
2,6-Dinitrotoluene												
Di-n-octylphthalate												
1,4-Dioxane	80	0.6215314	100	0.5272245								
1,2-Diphenylhydrazine												
Bis(2-ethylhexyl)phthalate												
Fluoranthene												
Fluorene												
2-Fluorobiphenyl												
2-Fluorophenol												
Hexachlorobenzene												
Hexachlorobutadiene												
Hexachlorocyclopentadiene												
Hexachloroethane												
Indeno(1,2,3-cd)pyrene												
Isophorone												
1-Methylnaphthalene												
2-Methylnaphthalene												
2-Methylphenol												

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0362004
Instrument: MS-BNA1
Matrix: Water
Calibration Date: 12/18/2010 6:01:14PM

Compound	Level 19		Level 20		Level 21		Level 22		Level 23		Level 24	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
3-Methylphenol												
4-Methylphenol												
Naphthalene												
4-Nitroaniline												
3-Nitroaniline												
2-Nitroaniline												
Nitrobenzene												
Nitrobenzene-d5												
4-Nitrophenol												
2-Nitrophenol												
N-Nitrosodimethylamine												
N-Nitrosodiphenylamine												
N-Nitroso-di-n-propylamine												
Pentachlorophenol												
Phenanthrene												
Phenol												
Phenol-d6												
Pyrene												
Pyridine												
Terphenyl-d14												
1,2,4,5-Tetrachlorobenzene	80	0.2946534	100	0.276244								
2,3,4,6-Tetrachlorophenol												
2,4,6-Tribromophenol												
1,2,4-Trichlorobenzene												
2,4,6-Trichlorophenol												
2,4,5-Trichlorophenol												

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0362004
Instrument: MS-BNA1
Matrix: Water
Calibration Date: 12/18/2010 6:01:14PM

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
3,3'-Dichlorobenzidine	0.3561386	13.74607	14.00913	1.853712E-02			15	
Acenaphthene	1.158212	14.29994	9.0893	6.863698E-02			CCC (30)	
Acenaphthylene	1.891103	11.23367	8.8751	5.824126E-02			15	
Acetophenone	1.491383	10.09705	5.9345	3.533817E-02			15	
Aniline	1.814495	8.712649	5.0947	0.1061016			15	
Anthracene	1.061887	11.50453	10.9213	4.956257E-02			15	
Atrazine	0.2180254	7.203989	10.55367	8.976036E-02			15	
Benzaldehyde	1.030353	13.61947	4.9567	3.368076E-02			15	
Benzidine	0.5252211	18.55429	12.485	2.056556E-02		0.9933875	0.99	
Benzo(a)anthracene	1.118893	3.791406	14.0132	2.141849E-02			15	
Benzo(a)pyrene	1.004932	13.00593	15.629	4.329081E-02			CCC (30)	
Benzo(b)fluoranthene	1.095916	8.306519	15.26688	3.715737E-02			15	
Benzo(g,h,i)perylene	0.7554867	8.063221	17.10713	0.0522402			15	
Benzoic acid	0.1412433	53.15864	6.784714	0.7332219		0.9914056	0.99	
Benzo(k)fluoranthene	1.257887	9.666064	15.29933	5.295254E-02			15	
Benzyl alcohol	0.7414899	10.21932	5.6468	0.1073651			15	
1,1-Biphenyl	1.474029	14.84233	8.37475	5.904494E-02			15	
4-Bromophenyl-phenylether	0.2483237	5.338416	10.3185	3.246559E-02			15	
Butylbenzylphthalate	0.6249408	8.167292	13.416	1.919134E-02			15	
Caprolactam	0.1169195	11.68998	7.443	0.305151			15	
Carbazole	0.9724047	9.694398	11.1316	0.0413017			15	
4-Chloro-3-methylphenol	0.2456948	8.186533	7.667444	6.040722E-02			CCC (30)	
4-Chloroaniline	0.4601545	4.713541	7.0595	5.065824E-02			15	
Bis(2-chloroethoxy)methane	0.4619607	7.81565	6.7025	0.1092234			15	
Bis(2-chloroethyl)ether	1.28714	6.76312	5.1907	0.1134156			15	
2,2'-Oxybis-1-chloropropane	2.042516	9.79913	5.8131	7.244105E-02			15	
2-Chloronaphthalene	1.215542	11.50754	8.3821	6.350785E-02			15	
2-Chlorophenol	1.374726	6.133877	5.2255	4.223994E-02			15	
4-Chlorophenyl phenyl ether	0.6417793	9.286445	9.7325	3.644994E-02			15	
Chrysene	1.17179	10.57778	14.054	5.595642E-02			15	
Dibenz(a,h)anthracene	0.6639614	17.30742	16.8445	4.159269E-02	0.9971858		0.995	
Dibenzofuran	1.589755	11.16221	9.2984	5.427527E-02			15	

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0362004
Instrument: MS-BNA1
Matrix: Water
Calibration Date: 12/18/2010 6:01:14PM

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Di-n-butylphthalate	1.363182	9.847762	11.615	3.805597E-02			15	
1,4-Dichlorobenzene	1.479315	6.637054	5.482	5.867455E-02			CCC (30)	
1,3-Dichlorobenzene	1.504545	7.519585	5.3966	3.201965E-02			15	
1,2-Dichlorobenzene	1.412773	12.37593	5.6559	2.437379E-02			15	
2,6-Dichlorophenol	0.3126971	8.052077	7.060778	3.303276E-02			15	
2,4-Dichlorophenol	0.3078656	5.011903	6.8009	7.686769E-02			CCC (30)	
Diethylphthalate	1.341364	11.18514	9.635286	5.717583E-02			15	
2,4-Dimethylphenol	0.3101379	4.520934	6.601222	0.1065945			15	
Dimethyl phthalate	1.287341	10.51153	8.78025	0.1342213			15	
4,6-Dinitro-2-methylphenol	0.1397071	34.78978	9.802286	0.1288307	0.9974412		0.995	
2,4-Dinitrophenol	0.1320693	45.30627	9.150857	8.498765E-02		0.9967507	SPCC (0.05)	
2,4-Dinitrotoluene	0.3776842	15.36291	9.312125	0.1020181	0.9956458		0.995	
2,6-Dinitrotoluene	0.3424953	11.08749	8.831625	0.1060668			15	
Di-n-octylphthalate	1.294711	22.16871	14.90171	1.483539E-02	0.9968773		CCC (30)	
1,4-Dioxane	0.5733591	6.453446	2.0327	0.2131685			15	
1,2-Diphenylhydrazine	0.8207919	9.68715	9.922	5.045649E-02			15	
Bis(2-ethylhexyl)phthalate	0.7833096	11.84578	14.13843	2.094629E-02			15	
Fluoranthene	1.101978	10.57929	12.2919	4.765323E-02			CCC (30)	
Fluorene	1.2694	10.2778	9.71	4.731986E-02			15	
2-Fluorobiphenyl	1.335882	12.27071	8.2631	3.988867E-02			15	
2-Fluorophenol	1.268175	6.87474	4.0035	8.664369E-02			15	
Hexachlorobenzene	0.2933641	7.288823	10.3804	0.0528239			15	
Hexachlorobutadiene	0.2005462	5.992858	7.151111	4.343702E-02			CCC (30)	
Hexachlorocyclopentadiene	0.3593771	12.41399	8.011125	1.441213E-02			SPCC (0.05)	
Hexachloroethane	0.5747469	8.915124	6.0437	3.935189E-02			15	
Indeno(1,2,3-cd)pyrene	0.842443	13.64429	16.82237	3.707439E-02			15	
Isophorone	0.7029211	4.306087	6.425375	0.119834			15	
1-Methylnaphthalene	0.5420947	8.67814	7.9182	5.411778E-02			15	
2-Methylnaphthalene	0.5291538	8.531085	7.8047	0.0352344			15	
2-Methylphenol	1.091088	9.197364	5.7956	0.0658841			15	
3-Methylphenol	1.084733	9.91475	5.9863	0.1342931			15	
4-Methylphenol	1.084733	9.91475	5.9863	0.1342931			15	

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0362004
Instrument: MS-BNA1
Matrix: Water
Calibration Date: 12/18/2010 6:01:14PM

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Naphthalene	0.9686374	11.16622	6.971667	6.066103E-02			15	
4-Nitroaniline	0.274633	9.568577	9.758375	0.1446812			15	
3-Nitroaniline	0.3791395	9.873316	9.024375	0.1126044			15	
2-Nitroaniline	0.2983051	14.13219	8.5225	7.053652E-02			15	
Nitrobenzene	0.3472915	3.633122	6.13175	9.818485E-02			15	
Nitrobenzene-d5	0.3378513	6.332655	6.1091	7.110683E-02			15	
4-Nitrophenol	0.1686802	19.4349	9.266571	0.1040449	0.9970496		SPCC (0.05)	
2-Nitrophenol	0.2082983	14.5601	6.50725	0.0466271			CCC (30)	
N-Nitrosodimethylamine	0.5404532	9.072787	2.409222	0.188559			15	
N-Nitrosodiphenylamine	0.6683254	8.697682	9.8824	8.152393E-02			CCC (30)	
N-Nitroso-di-n-propylamine	0.8216103	11.46883	5.965444	0.1554278			SPCC (0.05)	
Pentachlorophenol	0.1576577	25.81916	10.62586	3.551647E-02	0.9974932		CCC (30)	
Phenanthrene	1.079608	13.62309	10.8597	5.063865E-02			15	
Phenol	1.69783	8.697325	5.1152	0.2175782			CCC (30)	
Phenol-d6	1.469798	9.364761	5.1008	0.2206916			15	
Pyrene	1.346	12.31461	12.5586	4.906139E-02			15	
Pyridine	1.496743	12.09185	2.411	0.3967962			15	
Terphenyl-d14	0.8665087	7.049283	12.79067	3.376688E-02			15	
1,2,4,5-Tetrachlorobenzene	0.3428869	12.96305	8.011125	2.979072E-02			15	
2,3,4,6-Tetrachlorophenol	0.3542598	13.64632	9.464375	4.771478E-02			15	
2,4,6-Tribromophenol	0.153572	11.17439	10.00625	0.0738055			15	
1,2,4-Trichlorobenzene	0.3787939	9.82728	6.8905	5.750424E-02			15	
2,4,6-Trichlorophenol	0.3935328	13.39547	8.159555	4.247603E-02			CCC (30)	
2,4,5-Trichlorophenol	0.4280447	8.85813	8.197625	5.860378E-02			15	

INITIAL CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA1	Calibration:	0362004
Lab File ID:	SEQ-ICV1.D	Calibration Date:	12/18/10 18:01
Sequence:	0L35702	Injection Date:	12/19/10
Lab Sample ID:	0L35702-ICV1	Injection Time:	03:38

		CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
Acetophenone	A	50.00	48.29	1.491383	1.440482		-3.4	20
Atrazine	A	50.00	43.66	0.2180254	0.1903756		-12.7	20
Benzaldehyde	A	50.00	43.80	1.030353	0.9025793		-12.4	20
1,1-Biphenyl	A	50.00	41.87	1.474029	1.234423		-16.3	20
4-Bromophenyl-phenylether	A	50.00	52.00	0.2483237	0.2582525		4.0	20
Butylbenzylphthalate	A	50.00	55.16	0.6249408	0.6894927		10.3	20
Carbazole	A	50.00	50.47	0.9724047	0.9816045		0.9	20
4-Chloro-3-methylphenol	A	50.00	55.48	0.2456948	0.2726439		11.0	20
4-Chloroaniline	A	50.00	48.94	0.4601545	0.4504155		-2.1	20
Bis(2-chloroethoxy)methane	A	50.00	47.74	0.4619607	0.441091		-4.5	20
Bis(2-chloroethyl)ether	A	50.00	51.32	1.28714	1.321147		2.6	20
2,2'-Oxybis-1-chloropropane	A	50.00	47.57	2.042516	1.94344		-4.9	20
2-Chloronaphthalene	A	50.00	54.25	1.215542	1.318904		8.5	20
2-Chlorophenol	A	50.00	49.73	1.374726	1.3673		-0.5	20
4-Chlorophenyl phenyl ether	A	50.00	46.50	0.6417793	0.5968565		-7.0	20
Dibenzofuran	A	50.00	47.75	1.589755	1.518321		-4.5	20
Di-n-butylphthalate	A	50.00	54.83	1.363182	1.494901		9.7	20
2,4-Dichlorophenol	A	50.00	54.75	0.3078656	0.3371061		9.5	20
Diethylphthalate	A	50.00	49.32	1.341364	1.323204		-1.4	20
2,4-Dimethylphenol	A	50.00	49.35	0.3101379	0.3060793		-1.3	20
Dimethyl phthalate	A	50.00	52.04	1.287341	1.339882		4.1	20
4,6-Dinitro-2-methylphenol	L	50.00	51.10	0.1397071	0.165349		2.2	20
2,4-Dinitrophenol	Q	50.00	54.92	0.1320693	0.1707222	0.05	9.8	20
2,4-Dinitrotoluene	L	50.00	51.53	0.3776842	0.4129243		3.1	20
2,6-Dinitrotoluene	A	50.00	52.01	0.3424953	0.3562346		4.0	20
Di-n-octylphthalate	L	50.00	57.02	1.294711	1.608453		14.0	20
Bis(2-ethylhexyl)phthalate	A	50.00	57.09	0.7833096	0.8943582		14.2	20
Hexachlorobenzene	A	50.00	48.70	0.2933641	0.2857311		-2.6	20
Hexachlorobutadiene	A	50.00	51.47	0.2005462	0.2064304		2.9	20

INITIAL CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA1	Calibration:	0362004
Lab File ID:	SEQ-ICV1.D	Calibration Date:	12/18/10 18:01
Sequence:	0L35702	Injection Date:	12/19/10
Lab Sample ID:	0L35702-ICV1	Injection Time:	03:38

		CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
Hexachlorocyclopentadiene	A	50.00	54.18	0.3593771	0.389443	0.05	8.4	20
Hexachloroethane	A	50.00	51.46	0.5747469	0.5915205		2.9	20
Isophorone	A	50.00	53.56	0.7029211	0.7529099		7.1	20
2-Methylphenol	A	50.00	49.81	1.091088	1.086859		-0.4	20
3-Methylphenol	A	50.00	53.59	1.084733	1.162538		7.2	20
4-Methylphenol	A	50.00	53.59	1.084733	1.162538		7.2	20
4-Nitroaniline	A	50.00	41.61	0.274633	0.2285265		-16.8	20
3-Nitroaniline	A	50.00	45.94	0.3791395	0.3483779		-8.1	20
Nitrobenzene	A	50.00	53.85	0.3472915	0.3740237		7.7	20
4-Nitrophenol	L	50.00	50.26	0.1686802	0.1824608	0.05	0.5	20
N-Nitrosodiphenylamine	A	50.00	47.07	0.6683254	0.6291773		-5.9	20
N-Nitroso-di-n-propylamine	A	50.00	53.45	0.8216103	0.8782842	0.05	6.9	20
Pentachlorophenol	L	50.00	51.10	0.1576577	0.1778665		2.2	20
Phenol	A	50.00	48.02	1.69783	1.630678		-4.0	20
2,3,4,6-Tetrachlorophenol	A	50.00	51.52	0.3542598	0.3650355		3.0	20
2,4,6-Trichlorophenol	A	50.00	56.73	0.3935328	0.4465026		13.5	20
2,4,5-Trichlorophenol	A	50.00	54.52	0.4280447	0.4667338		9.0	20
2-Fluorobiphenyl	A	50.00	45.32	1.335882	1.21073		-9.4	20
2-Fluorophenol	A	100.0	95.12	1.268175	1.206292		-4.9	20
Nitrobenzene-d5	A	50.00	54.60	0.3378513	0.3689055		9.2	20
Phenol-d6	A	100.0	92.37	1.469798	1.357598		-7.6	20
Terphenyl-d14	A	50.00	48.13	0.8665087	0.8340641		-3.7	20
2,4,6-Tribromophenol	A	100.0	103.4	0.153572	0.1587617		3.4	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

INITIAL CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA1	Calibration:	0362004
Lab File ID:	SEQ-ICV2.D	Calibration Date:	12/18/10 18:01
Sequence:	0L35702	Injection Date:	12/19/10
Lab Sample ID:	0L35702-ICV2	Injection Time:	04:05

		CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
3,3'-Dichlorobenzidine	A	50.00	52.75	0.3561386	0.3757319		5.5	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Lab File ID:	SEQ-TUN1.D	Injection Date:	12/22/10
Instrument ID:	MS-BNA1	Injection Time:	15:21
Sequence:	0L35702	Lab Sample ID:	0L35702-TUN2

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
51	30 - 60% of 198	35.4	PASS
68	Less than 2% of 69	0	PASS
69	Less than 200% of 198	58.2	PASS
70	Less than 2% of 69	0.498	PASS
127	40 - 60% of 198	42.2	PASS
197	Less than 1% of 198	0	PASS
198	Base peak, 100% relative abundance	100	PASS
199	5 - 9% of 198	6.78	PASS
275	10 - 30% of 198	17.9	PASS
365	1 - 200% of 198	1.91	PASS
441	0.001 - 100% of 443	72.5	PASS
442	40 - 200% of 198	51.3	PASS
443	17 - 23% of 442	21.8	PASS

INITIAL CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA1	Calibration:	0362004
Lab File ID:	SEQ-ICV3.D	Calibration Date:	12/18/10 18:01
Sequence:	0L35702	Injection Date:	12/22/10
Lab Sample ID:	0L35702-ICV3	Injection Time:	17:47

		CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
Caprolactam	A	50.00	58.27	0.1169195	0.1362487		16.5	20
2-Nitroaniline	A	50.00	52.06	0.2983051	0.3106067		4.1	20
2-Nitrophenol	A	50.00	53.21	0.2082983	0.22166		6.4	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

PREPARATION BATCH SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Batch: 0L27012 Batch Matrix: Solid

Preparation: EXT_3546

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL./WEIGHT	FINAL VOL.
Blank	0L27012-BLK1	12/28/10 09:56	15.00	1.00
LCS	0L27012-BS1	12/28/10 09:56	15.00	1.00
NTC12-SB29-0005	0L27012-MS1	12/28/10 09:56	15.00	1.00
NTC12-SB29-0005	0L27012-MSD1	12/28/10 09:56	15.00	1.00
NTC12-SOIL-IDW	1012185-12	12/28/10 09:56	15.00	1.00
NTC12-SB29-0005	1012185-23	12/28/10 09:56	15.00	1.00
NTC12-SB29-0204	1012185-24	12/28/10 09:56	15.00	1.00

ANALYSIS DATA SHEET

Blank

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix:
Laboratory ID: 0L27012-BLK1
File ID: L27012B1.D
Sampled:
Prepared:
Analyzed: 01/05/11 16:31
Solids:
Preparation: EXT_3546
Dilution:
Batch: 0L27012
Sequence: 1A00601
Calibration: 0362004
Instrument: MS-BNA1

CAS NO.	COMPOUND	ONC. (ug/Kg we	DL	LOD	LOQ	Q
91-94-1	3,3'-Dichlorobenzidine		83.3	167	330	U
98-86-2	Acetophenone		83.3	167	330	U
1912-24-9	Atrazine		83.3	167	330	U
100-52-7	Benzaldehyde		83.3	167	330	U
92-52-4	1,1-Biphenyl		83.3	167	330	U
101-55-3	4-Bromophenyl-phenylether		83.3	167	330	U
85-68-7	Butylbenzylphthalate		83.3	167	330	Q, X, U
105-60-2	Caprolactam		83.3	167	330	U
86-74-8	Carbazole		83.3	167	330	U
59-50-7	4-Chloro-3-methylphenol		83.3	167	330	Q, U
106-47-8	4-Chloroaniline		83.3	167	330	U
111-91-1	Bis(2-chloroethoxy)methane		83.3	167	330	Q, U
111-44-4	Bis(2-chloroethyl)ether		83.3	167	330	U
108-60-1	2,2'-Oxybis-1-chloropropane		83.3	167	330	Q, X, U
91-58-7	2-Chloronaphthalene		83.3	167	330	U
95-57-8	2-Chlorophenol		83.3	167	330	U
7005-72-3	4-Chlorophenyl phenyl ether		83.3	167	330	U
132-64-9	Dibenzofuran		83.3	167	330	U
84-74-2	Di-n-butylphthalate		83.3	167	330	Q, U
87-65-0	2,6-Dichlorophenol		83.3	167	330	U
120-83-2	2,4-Dichlorophenol		83.3	167	330	U
84-66-2	Diethylphthalate	145	83.3	167	330	J
105-67-9	2,4-Dimethylphenol		333	667	1300	Q, U
131-11-3	Dimethyl phthalate		83.3	167	330	U
534-52-1	4,6-Dinitro-2-methylphenol		833	1670	3300	U
51-28-5	2,4-Dinitrophenol		833	1670	3300	Q, X, U
121-14-2	2,4-Dinitrotoluene		83.3	167	330	Q, U
606-20-2	2,6-Dinitrotoluene		83.3	167	330	U
117-84-0	Di-n-octylphthalate		83.3	167	330	Q, X, U
117-81-7	Bis(2-ethylhexyl)phthalate		83.3	167	330	Q, X, U
118-74-1	Hexachlorobenzene		83.3	167	330	U
87-68-3	Hexachlorobutadiene		83.3	167	330	U
77-47-4	Hexachlorocyclopentadiene		83.3	167	330	U
67-72-1	Hexachloroethane		83.3	167	330	U
78-59-1	Isophorone		83.3	167	330	U
95-48-7	2-Methylphenol		83.3	167	330	U
108-39-4	3-Methylphenol		83.3	167	330	U
106-44-5	4-Methylphenol		83.3	167	330	U
100-01-6	4-Nitroaniline		333	667	1300	Q, X, U
99-09-2	3-Nitroaniline		333	667	1300	U

ANALYSIS DATA SHEET

Blank

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix:
Laboratory ID: 0L27012-BLK1
File ID: L27012B1.D
Sampled:
Prepared:
Analyzed: 01/05/11 16:31
Solids:
Preparation: EXT_3546
Dilution:
Batch: 0L27012
Sequence: 1A00601
Calibration: 0362004
Instrument: MS-BNA1

CAS NO.	COMPOUND	ONC. (ug/Kg we	DL	LOD	LOQ	Q
88-74-4	2-Nitroaniline		333	667	1300	Q, X, U
98-95-3	Nitrobenzene		83.3	167	330	Q, X, U
100-02-7	4-Nitrophenol		333	667	1300	X, U
88-75-5	2-Nitrophenol		83.3	167	330	Q, U
86-30-6	N-Nitrosodiphenylamine		83.3	167	330	U
621-64-7	N-Nitroso-di-n-propylamine		83.3	167	330	Q, X, U
87-86-5	Pentachlorophenol		333	667	1300	Q, U
108-95-2	Phenol		83.3	167	330	U
58-90-2	2,3,4,6-Tetrachlorophenol		83.3	167	330	U
88-06-2	2,4,6-Trichlorophenol		83.3	167	330	U
95-95-4	2,4,5-Trichlorophenol		83.3	167	330	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg wet)	CONC (ug/Kg wet)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3333	2738	82.1	45 - 105	
2-Fluorophenol	6667	5646	84.7	35 - 105	
Nitrobenzene-d5	3333	3901	117	35 - 100	X
Phenol-d6	6667	6217	93.3	40 - 100	
Terphenyl-d14	3333	3126	93.8	30 - 125	
2,4,6-Tribromophenol	6667	5290	79.3	35 - 125	

LCS / LCS DUPLICATE RECOVERY

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Batch: 0L27012

Preparation: EXT_3546

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Laboratory ID: 0L27012-BS1

Initial/Final: 15 g / 1 mL

ANALYTE	SPIKE ADDED (ug/Kg wet)	LCS CONCENTRATION (ug/Kg wet)	LCS % REC.	QC LIMITS REC.
3,3'-Dichlorobenzidine	3333	3157	94.7	19 - 130
Acetophenone	3333	2798	83.9	35 - 110
Atrazine	3333	2912	87.4	55 - 105
Benzaldehyde	3333	2566	77.0	10 - 160
1,1-Biphenyl	3333	2654	79.6	45 - 110
4-Bromophenyl-phenylether	3333	3761	113	45 - 115
Butylbenzylphthalate	**3333**	**4798**	**144**	**50 - 125**
Caprolactam	3333	3054	91.6	50 - 110
Carbazole	3333	3666	110	45 - 115
4-Chloro-3-methylphenol	**3333**	**3921**	**118**	**45 - 115**
4-Chloroaniline	3333	2423	72.7	10 - 95
Bis(2-chloroethoxy)methane	**3333**	**3750**	**113**	**45 - 110**
Bis(2-chloroethyl)ether	3333	3484	105	40 - 105
2,2'-Oxybis-1-chloropropane	**3333**	**4023**	**121**	**20 - 115**
2-Chloronaphthalene	3333	2921	87.6	45 - 105
2-Chlorophenol	3333	3070	92.1	45 - 105
4-Chlorophenyl phenyl ether	3333	2736	82.1	45 - 110
Dibenzofuran	3333	3057	91.7	50 - 105
Di-n-butylphthalate	**3333**	**4177**	**125**	**55 - 110**
2,6-Dichlorophenol	3333	2535	76.1	45 - 110
2,4-Dichlorophenol	3333	3354	101	45 - 110
Diethylphthalate	3333	3685	111	50 - 115
2,4-Dimethylphenol	**3333**	**3970**	**119**	**30 - 105**
Dimethyl phthalate	3333	3506	105	50 - 110
4,6-Dinitro-2-methylphenol	3333	3969	119	30 - 135
2,4-Dinitrophenol	**3333**	**4374**	**131**	**15 - 130**
2,4-Dinitrotoluene	3333	3597	108	50 - 115
2,6-Dinitrotoluene	3333	3336	100	50 - 110
Di-n-octylphthalate	**3333**	**4995**	**150**	**40 - 130**
Bis(2-ethylhexyl)phthalate	**3333**	**4931**	**148**	**45 - 125**

LCS / LCS DUPLICATE RECOVERY

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Batch: 0L27012

Preparation: EXT_3546

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Laboratory ID: 0L27012-BS1

Initial/Final: 15 g / 1 mL

ANALYTE	SPIKE ADDED (ug/Kg wet)	LCS CONCENTRATION (ug/Kg wet)	LCS % REC.	QC LIMITS REC.
Hexachlorobenzene	3333	3165	94.9	45 - 120
Hexachlorobutadiene	3333	2744	82.3	30 - 110
Hexachlorocyclopentadiene	3333	1780	53.4	10 - 110
Hexachloroethane	3333	3257	97.7	35 - 110
Isophorone	3333	3378	101	45 - 110
2-Methylphenol	3333	3286	98.6	40 - 105
4-Methylphenol	3333	3357	101	40 - 105
4-Nitroaniline	**3333**	**4045**	**121**	**35 - 115**
3-Nitroaniline	3333	2612	78.4	25 - 110
2-Nitroaniline	**3333**	**4683**	**140**	**45 - 120**
Nitrobenzene	**3333**	**4242**	**127**	**40 - 115**
4-Nitrophenol	3333	4648	139	15 - 140
2-Nitrophenol	**3333**	**3837**	**115**	**40 - 110**
N-Nitrosodiphenylamine	3333	2075	62.2	50 - 115
N-Nitroso-di-n-propylamine	**3333**	**4023**	**121**	**40 - 115**
Pentachlorophenol	**3333**	**4294**	**129**	**25 - 120**
Phenol	3333	3121	93.6	40 - 100
2,3,4,6-Tetrachlorophenol	3333	2358	70.8	50 - 125
2,4,6-Trichlorophenol	3333	2883	86.5	45 - 110
2,4,5-Trichlorophenol	3333	2983	89.5	50 - 110

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8270C

NTC12-SB29-0005

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Batch: 0L27012

% Solids: 86.52

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Source Sample Name: **1012185-23**

ANALYTE	SPIKE ADDED (ug/Kg dry)	SAMPLE CONCENTRATION (ug/Kg dry)	MS CONCENTRATION (ug/Kg dry)	MS % REC.	Q	QC LIMITS REC.
3,3'-Dichlorobenzidine	3853	ND	1319	34.2		19 - 130
Acetophenone	3853	ND	2688	69.8		35 - 110
Atrazine	3853	ND	2756	71.5		55 - 105
Benzaldehyde	3853	ND	2562	66.5		10 - 160
1,1-Biphenyl	3853	ND	2614	67.9		45 - 110
4-Bromophenyl-phenylether	3853	ND	3600	93.4		45 - 115
Butylbenzylphthalate	3853	ND	5352	139	*	50 - 125
Caprolactam	3853	ND	2789	72.4		50 - 110
Carbazole	3853	ND	3570	92.7		45 - 115
4-Chloro-3-methylphenol	3853	ND	3538	91.8		45 - 115
4-Chloroaniline	3853	ND	1742	45.2		10 - 95
Bis(2-chloroethoxy)methane	3853	ND	3417	88.7		45 - 110
Bis(2-chloroethyl)ether	3853	ND	3514	91.2		40 - 105
2,2'-Oxybis-1-chloropropane	3853	ND	4097	106		20 - 115
2-Chloronaphthalene	3853	ND	2823	73.3		45 - 105
2-Chlorophenol	3853	ND	2972	77.1		45 - 105
4-Chlorophenyl phenyl ether	3853	ND	2695	70.0		45 - 110
Dibenzofuran	3853	ND	3113	80.8		50 - 105
Di-n-butylphthalate	3853	ND	4164	108		55 - 110
2,6-Dichlorophenol	3853	ND	2422	62.9		45 - 110
2,4-Dichlorophenol	3853	ND	3088	80.2		45 - 110
Diethylphthalate	3853	ND	3395	88.1		50 - 115
2,4-Dimethylphenol	3853	ND	3088	80.2		30 - 105
Dimethyl phthalate	3853	ND	3535	91.7		50 - 110
4,6-Dinitro-2-methylphenol	3853	ND	2213	57.4		30 - 135
2,4-Dinitrophenol	3853	ND	1150	29.9		15 - 130
2,4-Dinitrotoluene	3853	ND	3628	94.2		50 - 115
2,6-Dinitrotoluene	3853	ND	3542	91.9		50 - 110
Di-n-octylphthalate	3853	ND	6765	176	*	40 - 130
Bis(2-ethylhexyl)phthalate	3853	ND	5543	144	*	45 - 125
Hexachlorobenzene	3853	ND	3111	80.7		45 - 120
Hexachlorobutadiene	3853	ND	2613	67.8		30 - 110

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8270C

NTC12-SB29-0005

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Batch: 0L27012

% Solids: 86.52

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Source Sample Name: **1012185-23**

ANALYTE	SPIKE ADDED (ug/Kg dry)	SAMPLE CONCENTRATION (ug/Kg dry)	MS CONCENTRATION (ug/Kg dry)	MS % REC.	Q	QC LIMITS REC.
Hexachlorocyclopentadiene	3853	ND	331.4	8.60	*	10 - 110
Hexachloroethane	3853	ND	2841	73.7		35 - 110
Isophorone	3853	ND	3146	81.7		45 - 110
2-Methylphenol	3853	ND	3049	79.1		40 - 105
4-Methylphenol	3853	ND	3139	81.5		40 - 105
4-Nitroaniline	3853	ND	3128	81.2		35 - 115
3-Nitroaniline	3853	ND	2232	57.9		25 - 110
2-Nitroaniline	3853	ND	4308	112		45 - 120
Nitrobenzene	3853	ND	3488	90.5		40 - 115
4-Nitrophenol	3853	ND	4445	115		15 - 140
2-Nitrophenol	3853	ND	3448	89.5		40 - 110
N-Nitrosodiphenylamine	3853	ND	1953	50.7		50 - 115
N-Nitroso-di-n-propylamine	3853	ND	3524	91.5		40 - 115
Pentachlorophenol	3853	ND	2283	59.3		25 - 120
Phenol	3853	ND	2937	76.2		40 - 100
2,3,4,6-Tetrachlorophenol	3853	ND	1877	48.7	*	50 - 125
2,4,6-Trichlorophenol	3853	ND	2885	74.9		45 - 110
2,4,5-Trichlorophenol	3853	ND	2844	73.8		50 - 110

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8270C

NTC12-SB29-0005

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Batch: 0L27012

% Solids: 86.52

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Source Sample Name: **1012185-23**

ANALYTE	SPIKE ADDED (ug/Kg dry)	MSD CONCENTRATION (ug/Kg dry)	MSD % REC. #	% RPD	Q	QC LIMITS RPD	QC LIMITS REC.
3,3'-Dichlorobenzidine	3853	2033	52.8	42.6	*	30	19 - 130
Acetophenone	3853	3065	79.6	13.1		30	35 - 110
Atrazine	3853	2724	70.7	1.16		30	55 - 105
Benzaldehyde	3853	2755	71.5	7.28		30	10 - 160
1,1-Biphenyl	3853	2647	68.7	1.26		30	45 - 110
4-Bromophenyl-phenylether	3853	4109	107	13.2		30	45 - 115
Butylbenzylphthalate	3853	5733	149	6.87	*	30	50 - 125
Caprolactam	3853	3218	83.5	14.3		30	50 - 110
Carbazole	3853	4010	104	11.6		30	45 - 115
4-Chloro-3-methylphenol	3853	4276	111	18.9		30	45 - 115
4-Chloroaniline	3853	1999	51.9	13.7		30	10 - 95
Bis(2-chloroethoxy)methane	3853	3763	97.7	9.63		30	45 - 110
Bis(2-chloroethyl)ether	3853	3678	95.5	4.58		30	40 - 105
2,2'-Oxybis-1-chloropropane	3853	4232	110	3.24		30	20 - 115
2-Chloronaphthalene	3853	2818	73.1	0.179		30	45 - 105
2-Chlorophenol	3853	3078	79.9	3.50		30	45 - 105
4-Chlorophenyl phenyl ether	3853	2512	65.2	7.04		30	45 - 110
Dibenzofuran	3853	3305	85.8	5.98		30	50 - 105
Di-n-butylphthalate	3853	4371	113	4.84	*	30	55 - 110
2,6-Dichlorophenol	3853	2697	70.0	10.7		30	45 - 110
2,4-Dichlorophenol	3853	3368	87.4	8.66		30	45 - 110
Diethylphthalate	3853	3329	86.4	1.95		30	50 - 115
2,4-Dimethylphenol	3853	3610	93.7	15.6		30	30 - 105
Dimethyl phthalate	3853	3497	90.8	1.07		30	50 - 110
4,6-Dinitro-2-methylphenol	3853	2509	65.1	12.5		30	30 - 135
2,4-Dinitrophenol	3853	1203	31.2	4.48		30	15 - 130
2,4-Dinitrotoluene	3853	3436	89.2	5.44		30	50 - 115
2,6-Dinitrotoluene	3853	3356	87.1	5.39		30	50 - 110
Di-n-octylphthalate	3853	7850	204	14.9	*	30	40 - 130
Bis(2-ethylhexyl)phthalate	3853	5947	154	7.04	*	30	45 - 125
Hexachlorobenzene	3853	3389	88.0	8.57		30	45 - 120
Hexachlorobutadiene	3853	2922	75.8	11.2		30	30 - 110
Hexachlorocyclopentadiene	3853	586.2	15.2	55.5	*	30	10 - 110

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8270C

NTC12-SB29-0005

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Batch: 0L27012

% Solids: 86.52

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Source Sample Name: **1012185-23**

ANALYTE	SPIKE ADDED (ug/Kg dry)	MSD CONCENTRATION (ug/Kg dry)	MSD % REC. #	% RPD	Q	QC LIMITS RPD	QC LIMITS REC.
Hexachloroethane	3853	3142	81.6	10.1		30	35 - 110
Isophorone	3853	3276	85.0	4.03		30	45 - 110
2-Methylphenol	3853	3225	83.7	5.61		30	40 - 105
4-Methylphenol	3853	3439	89.3	9.12		30	40 - 105
4-Nitroaniline	3853	3373	87.5	7.52		30	35 - 115
3-Nitroaniline	3853	2484	64.5	10.7		30	25 - 110
2-Nitroaniline	3853	4744	123	9.65	*	30	45 - 120
Nitrobenzene	3853	4022	104	14.2		30	40 - 115
4-Nitrophenol	3853	4433	115	0.282		30	15 - 140
2-Nitrophenol	3853	3851	100	11.1		30	40 - 110
N-Nitrosodiphenylamine	3853	2249	58.4	14.1		30	50 - 115
N-Nitroso-di-n-propylamine	3853	4281	111	19.4		30	40 - 115
Pentachlorophenol	3853	2718	70.6	17.4		30	25 - 120
Phenol	3853	3323	86.3	12.3		30	40 - 100
2,3,4,6-Tetrachlorophenol	3853	1959	50.8	4.25		30	50 - 125
2,4,6-Trichlorophenol	3853	2690	69.8	7.00		30	45 - 110
2,4,5-Trichlorophenol	3853	2869	74.5	0.895		30	50 - 110

ANALYSIS SEQUENCE SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Sequence: 1A00601

Calibration: 0362004

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA1

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	1A00601-TUN1	SEQ-TUN1.D	01/05/11 14:42
Calibration Check	1A00601-CCV1	SEQ-CCV1s.D	01/05/11 15:05
LCS	0L27012-BS1	L27012L1.D	01/05/11 15:36
Blank	0L27012-BLK1	L27012B1.D	01/05/11 16:31
NTC12-SB29-0005	1012185-23	1218523.D	01/05/11 22:58
NTC12-SB29-0204	1012185-24	1218524.D	01/05/11 23:26
NTC12-SB29-0005	0L27012-MS1	1218523M.D	01/05/11 23:54
NTC12-SB29-0005	0L27012-MSD1	1218523S.D	01/06/11 00:21
NTC12-SOIL-IDW	1012185-12	1218512D.D	01/06/11 00:49

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Lab File ID: SEQ-TUN1.D

Instrument ID: MS-BNA1

Sequence: 1A00601

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Injection Date: 01/05/11

Injection Time: 14:42

Lab Sample ID: 1A00601-TUN1

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
51	30 - 60% of 198	55.5	PASS
68	Less than 2% of 69	0	PASS
69	Less than 200% of 198	82.9	PASS
70	Less than 2% of 69	0.18	PASS
127	40 - 60% of 198	52.2	PASS
197	Less than 1% of 198	0	PASS
198	Base peak, 100% relative abundance	100	PASS
199	5 - 9% of 198	6.72	PASS
275	10 - 30% of 198	18.7	PASS
365	1 - 200% of 198	1.77	PASS
441	0.001 - 100% of 443	81.3	PASS
442	40 - 200% of 198	42.1	PASS
443	17 - 23% of 442	19.7	PASS

CONTINUING CALIBRATION CHECK

SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: MS-BNA1
Lab File ID: SEQ-CCV1s.D
Sequence: 1A00601
Lab Sample ID: 1A00601-CCV1

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Calibration: 0362004
Calibration Date: 12/18/10 18:01
Injection Date: 01/05/11
Injection Time: 15:05

COMPOUND	TYPE	CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
3,3'-Dichlorobenzidine	A	50.00	48.39	0.3561386	0.3446922		-3.2	20
Acetophenone	A	50.00	56.15	1.491383	1.674931		12.3	20
Atrazine	A	50.00	46.68	0.2180254	0.2035592		-6.6	20
Benzaldehyde	A	50.00	41.73	1.030353	0.8600188		-16.5	20
1,1-Biphenyl	A	50.00	47.75	1.474029	1.407691		-4.5	20
4-Bromophenyl-phenylether	A	50.00	43.21	0.2483237	0.2146164		-13.6	20
Butylbenzylphthalate	A	50.00	63.75	0.6249408	0.7968613		27.5	20 *
Caprolactam	A	50.00	55.61	0.1169195	0.1300299		11.2	20
Carbazole	A	50.00	57.76	0.9724047	1.123279		15.5	20
4-Chloro-3-methylphenol	A	50.00	56.67	0.2456948	0.2784757		13.3	20
4-Chloroaniline	A	50.00	45.58	0.4601545	0.4194847		-8.8	20
Bis(2-chloroethoxy)methane	A	50.00	53.25	0.4619607	0.4920279		6.5	20
Bis(2-chloroethyl)ether	A	50.00	58.57	1.28714	1.507883		17.1	20
2,2'-Oxybis-1-chloropropane	A	50.00	66.28	2.042516	2.707467		32.6	20 *
2-Chloronaphthalene	A	50.00	55.17	1.215542	1.341202		10.3	20
2-Chlorophenol	A	50.00	50.46	1.374726	1.387329		0.9	20
4-Chlorophenyl phenyl ether	A	50.00	41.83	0.6417793	0.5368997		-16.3	20
Dibenzofuran	A	50.00	46.20	1.589755	1.469066		-7.6	20
Di-n-butylphthalate	A	50.00	53.33	1.363182	1.454013		6.7	20
2,6-Dichlorophenol	A	50.00	46.37	0.3126971	0.2899889		-7.3	20
2,4-Dichlorophenol	A	50.00	50.73	0.3078656	0.3123429		1.5	20
Diethylphthalate	A	50.00	52.47	1.341364	1.407537		4.9	20
2,4-Dimethylphenol	A	50.00	56.61	0.3101379	0.3511202		13.2	20
Dimethyl phthalate	A	50.00	50.27	1.287341	1.29433		0.5	20
4,6-Dinitro-2-methylphenol	L	50.00	54.53	0.1397071	0.1788575		9.1	20
2,4-Dinitrophenol	Q	50.00	63.57	0.1320693	0.2085448	0.05	27.1	20 *
2,4-Dinitrotoluene	L	50.00	54.44	0.3776842	0.4367093		8.9	20
2,6-Dinitrotoluene	A	50.00	52.70	0.3424953	0.3609671		5.4	20
Di-n-octylphthalate	L	50.00	70.08	1.294711	2.000835		40.2	20 *

CONTINUING CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA1	Calibration:	0362004
Lab File ID:	SEQ-CCV1s.D	Calibration Date:	12/18/10 18:01
Sequence:	1A00601	Injection Date:	01/05/11
Lab Sample ID:	1A00601-CCV1	Injection Time:	15:05

COMPOUND	TYPE	CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Bis(2-ethylhexyl)phthalate	A	50.00	64.73	0.7833096	1.014089		29.5	20 *
Hexachlorobenzene	A	50.00	45.61	0.2933641	0.267632		-8.8	20
Hexachlorobutadiene	A	50.00	40.90	0.2005462	0.1640592		-18.2	20
Hexachlorocyclopentadiene	A	50.00	52.86	0.3593771	0.3799102	0.05	5.7	20
Hexachloroethane	A	50.00	54.67	0.5747469	0.6283867		9.3	20
Isophorone	A	50.00	59.50	0.7029211	0.836435		19.0	20
2-Methylphenol	A	50.00	56.62	1.091088	1.235584		13.2	20
3-Methylphenol	A	50.00	58.33	1.084733	1.265389		16.7	20
4-Methylphenol	A	50.00	58.33	1.084733	1.265389		16.7	20
4-Nitroaniline	A	50.00	63.57	0.274633	0.3491466		27.1	20 *
3-Nitroaniline	A	50.00	54.26	0.3791395	0.4114574		8.5	20
2-Nitroaniline	A	50.00	82.38	0.2983051	0.4914652		64.8	20 *
Nitrobenzene	A	50.00	63.50	0.3472915	0.4410284		27.0	20 *
4-Nitrophenol	L	50.00	73.90	0.1686802	0.2772972	0.05	47.8	20 *
2-Nitrophenol	A	50.00	58.52	0.2082983	0.2438075		17.0	20
N-Nitrosodiphenylamine	A	50.00	54.09	0.6683254	0.7230344		8.2	20
N-Nitroso-di-n-propylamine	A	50.00	67.06	0.8216103	1.101874	0.05	34.1	20 *
Pentachlorophenol	L	50.00	55.28	0.1576577	0.1943004		10.6	20
Phenol	A	50.00	49.97	1.69783	1.696856		-0.06	20
2,3,4,6-Tetrachlorophenol	A	50.00	48.41	0.3542598	0.3430112		-3.2	20
2,4,6-Trichlorophenol	A	50.00	47.80	0.3935328	0.3762313		-4.4	20
2,4,5-Trichlorophenol	A	50.00	44.49	0.4280447	0.3809065		-11.0	20
2-Fluorobiphenyl	A	50.00	46.51	1.335882	1.24266		-7.0	20
2-Fluorophenol	A	100.0	109.5	1.268175	1.389048		9.5	20
Nitrobenzene-d5	A	50.00	66.39	0.3378513	0.4485878		32.8	20 *
Phenol-d6	A	100.0	105.2	1.469798	1.546804		5.2	20
Terphenyl-d14	A	50.00	51.72	0.8665087	0.8962424		3.4	20
2,4,6-Tribromophenol	A	100.0	104.4	0.153572	0.1603004		4.4	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

INTERNAL STANDARD AREA AND RT SUMMARY
SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00601

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA1
Calibration: 0362004

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Calibration Check (1A00601-CCV1)			Lab File ID: SEQ-CCV1s.D			Analyzed: 01/05/11 15:05			
1,4-Dichlorobenzene-d4	483142	5.226	539748	5.459	90	50 - 200	-0.2330	+/-0.50	
Naphthalene-d8	1540015	6.71	1580681	6.95	97	50 - 200	-0.2400	+/-0.50	
Acenaphthene-d10	710631	8.809	788597	9.058	90	50 - 200	-0.2490	+/-0.50	
Phenanthrene-d10	989762	10.585	1206887	10.832	82	50 - 200	-0.2470	+/-0.50	
Chrysene-d12	807719	13.769	1017059	14.03	79	50 - 200	-0.2610	+/-0.50	
Perylene-d12	690061	15.409	849426	15.698	81	50 - 200	-0.2890	+/-0.50	
LCS (0L27012-BS1)			Lab File ID: L27012L1.D			Analyzed: 01/05/11 15:36			
1,4-Dichlorobenzene-d4	511377	5.234	483142	5.226	106	50 - 200	0.0080	+/-0.50	
Naphthalene-d8	1513643	6.711	1540015	6.71	98	50 - 200	0.0010	+/-0.50	
Acenaphthene-d10	760229	8.811	710631	8.809	107	50 - 200	0.0020	+/-0.50	
Phenanthrene-d10	978491	10.586	989762	10.585	99	50 - 200	0.0010	+/-0.50	
Chrysene-d12	904513	13.771	807719	13.769	112	50 - 200	0.0020	+/-0.50	
Perylene-d12	771793	15.41	690061	15.409	112	50 - 200	0.0010	+/-0.50	
Blank (0L27012-BLK1)			Lab File ID: L27012B1.D			Analyzed: 01/05/11 16:31			
1,4-Dichlorobenzene-d4	554986	5.232	483142	5.226	115	50 - 200	0.0060	+/-0.50	
Naphthalene-d8	1581776	6.707	1540015	6.71	103	50 - 200	-0.0030	+/-0.50	
Acenaphthene-d10	840612	8.803	710631	8.809	118	50 - 200	-0.0060	+/-0.50	
Phenanthrene-d10	1157292	10.577	989762	10.585	117	50 - 200	-0.0080	+/-0.50	
Chrysene-d12	1012265	13.764	807719	13.769	125	50 - 200	-0.0050	+/-0.50	
Perylene-d12	894512	15.408	690061	15.409	130	50 - 200	-0.0010	+/-0.50	
NTC12-SB29-0005 (1012185-23)			Lab File ID: 1218523.D			Analyzed: 01/05/11 22:58			
1,4-Dichlorobenzene-d4	599581	5.231	483142	5.226	124	50 - 200	0.0050	+/-0.50	
Naphthalene-d8	1833366	6.709	1540015	6.71	119	50 - 200	-0.0010	+/-0.50	
Acenaphthene-d10	801554	8.808	710631	8.809	113	50 - 200	-0.0010	+/-0.50	
Phenanthrene-d10	1142256	10.579	989762	10.585	115	50 - 200	-0.0060	+/-0.50	
Chrysene-d12	750521	13.767	807719	13.769	93	50 - 200	-0.0020	+/-0.50	
Perylene-d12	500727	15.411	690061	15.409	73	50 - 200	0.0020	+/-0.50	
NTC12-SB29-0204 (1012185-24)			Lab File ID: 1218524.D			Analyzed: 01/05/11 23:26			
1,4-Dichlorobenzene-d4	498014	5.23	483142	5.226	103	50 - 200	0.0040	+/-0.50	
Naphthalene-d8	1532485	6.712	1540015	6.71	100	50 - 200	0.0020	+/-0.50	
Acenaphthene-d10	780182	8.809	710631	8.809	110	50 - 200	0.0000	+/-0.50	
Phenanthrene-d10	1004925	10.585	989762	10.585	102	50 - 200	0.0000	+/-0.50	
Chrysene-d12	768439	13.765	807719	13.769	95	50 - 200	-0.0040	+/-0.50	
Perylene-d12	522331	15.412	690061	15.409	76	50 - 200	0.0030	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00601

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA1
Calibration: 0362004

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Matrix Spike (0L27012-MS1)			Lab File ID: 1218523M.D			Analyzed: 01/05/11 23:54			
1,4-Dichlorobenzene-d4	570760	5.233	483142	5.226	118	50 - 200	0.0070	+/-0.50	
Naphthalene-d8	1829691	6.714	1540015	6.71	119	50 - 200	0.0040	+/-0.50	
Acenaphthene-d10	883914	8.811	710631	8.809	124	50 - 200	0.0020	+/-0.50	
Phenanthrene-d10	1185245	10.589	989762	10.585	120	50 - 200	0.0040	+/-0.50	
Chrysene-d12	807168	13.775	807719	13.769	100	50 - 200	0.0060	+/-0.50	
Perylene-d12	559742	15.415	690061	15.409	81	50 - 200	0.0060	+/-0.50	
Matrix Spike Dup (0L27012-MSD1)			Lab File ID: 1218523S.D			Analyzed: 01/06/11 00:21			
1,4-Dichlorobenzene-d4	545097	5.234	483142	5.226	113	50 - 200	0.0080	+/-0.50	
Naphthalene-d8	1748777	6.713	1540015	6.71	114	50 - 200	0.0030	+/-0.50	
Acenaphthene-d10	895121	8.81	710631	8.809	126	50 - 200	0.0010	+/-0.50	
Phenanthrene-d10	1048434	10.584	989762	10.585	106	50 - 200	-0.0010	+/-0.50	
Chrysene-d12	704217	13.773	807719	13.769	87	50 - 200	0.0040	+/-0.50	
Perylene-d12	434855	15.417	690061	15.409	63	50 - 200	0.0080	+/-0.50	
NTC12-SOIL-IDW (1012185-12)			Lab File ID: 1218512D.D			Analyzed: 01/06/11 00:49			
1,4-Dichlorobenzene-d4	496163	5.228	483142	5.226	103	50 - 200	0.0020	+/-0.50	
Naphthalene-d8	1604925	6.709	1540015	6.71	104	50 - 200	-0.0010	+/-0.50	
Acenaphthene-d10	796999	8.807	710631	8.809	112	50 - 200	-0.0020	+/-0.50	
Phenanthrene-d10	1012547	10.581	989762	10.585	102	50 - 200	-0.0040	+/-0.50	
Chrysene-d12	731197	13.766	807719	13.769	91	50 - 200	-0.0030	+/-0.50	
Perylene-d12	410665	15.412	690061	15.409	60	50 - 200	0.0030	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00701

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA3
Calibration: 0351002

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Calibration Check (1A00701-CCV1)			Lab File ID: SEQ-CCV1s.D			Analyzed: 01/06/11 13:23			
1,4-Dichlorobenzene-d4	717681	6.774	520490	6.774	138	50 - 200	0.0000	+/-0.50	
Naphthalene-d8	2399016	8.26	1864250	8.284	129	50 - 200	-0.0240	+/-0.50	
Acenaphthene-d10	1282399	10.405	1011290	10.429	127	50 - 200	-0.0240	+/-0.50	
Phenanthrene-d10	2012831	12.242	1690574	12.256	119	50 - 200	-0.0140	+/-0.50	
Chrysene-d12	1470087	15.56	1331643	15.56	110	50 - 200	0.0000	+/-0.50	
Perylene-d12	1074175	17.445	1068595	17.426	101	50 - 200	0.0190	+/-0.50	
Blank (0L22011-BLK1)			Lab File ID: L22011B1.D			Analyzed: 01/06/11 16:00			
1,4-Dichlorobenzene-d4	910823	6.772	717681	6.774	127	50 - 200	-0.0020	+/-0.50	
Naphthalene-d8	3086938	8.253	2399016	8.26	129	50 - 200	-0.0070	+/-0.50	
Acenaphthene-d10	1681532	10.397	1282399	10.405	131	50 - 200	-0.0080	+/-0.50	
Phenanthrene-d10	2667429	12.234	2012831	12.242	133	50 - 200	-0.0080	+/-0.50	
Chrysene-d12	2166730	15.552	1470087	15.56	147	50 - 200	-0.0080	+/-0.50	
Perylene-d12	1816950	17.442	1074175	17.445	169	50 - 200	-0.0030	+/-0.50	
LCS (0L22011-BS1)			Lab File ID: L22011L1.D			Analyzed: 01/06/11 16:32			
1,4-Dichlorobenzene-d4	766310	6.773	717681	6.774	107	50 - 200	-0.0010	+/-0.50	
Naphthalene-d8	2500404	8.259	2399016	8.26	104	50 - 200	-0.0010	+/-0.50	
Acenaphthene-d10	1366391	10.399	1282399	10.405	107	50 - 200	-0.0060	+/-0.50	
Phenanthrene-d10	2177632	12.236	2012831	12.242	108	50 - 200	-0.0060	+/-0.50	
Chrysene-d12	1731452	15.554	1470087	15.56	118	50 - 200	-0.0060	+/-0.50	
Perylene-d12	1144235	17.444	1074175	17.445	107	50 - 200	-0.0010	+/-0.50	
NTC12-SB24-0005 (1012185-03)			Lab File ID: 1218503.D			Analyzed: 01/06/11 17:03			
1,4-Dichlorobenzene-d4	735295	6.769	717681	6.774	102	50 - 200	-0.0050	+/-0.50	
Naphthalene-d8	2477816	8.255	2399016	8.26	103	50 - 200	-0.0050	+/-0.50	
Acenaphthene-d10	1362645	10.4	1282399	10.405	106	50 - 200	-0.0050	+/-0.50	
Phenanthrene-d10	2222865	12.237	2012831	12.242	110	50 - 200	-0.0050	+/-0.50	
Chrysene-d12	1645278	15.55	1470087	15.56	112	50 - 200	-0.0100	+/-0.50	
Perylene-d12	1151698	17.44	1074175	17.445	107	50 - 200	-0.0050	+/-0.50	
NTC12-SB24-00502 (1012185-04)			Lab File ID: 1218504.D			Analyzed: 01/06/11 17:33			
1,4-Dichlorobenzene-d4	855207	6.771	717681	6.774	119	50 - 200	-0.0030	+/-0.50	
Naphthalene-d8	2828865	8.257	2399016	8.26	118	50 - 200	-0.0030	+/-0.50	
Acenaphthene-d10	1451419	10.401	1282399	10.405	113	50 - 200	-0.0040	+/-0.50	
Phenanthrene-d10	2221721	12.233	2012831	12.242	110	50 - 200	-0.0090	+/-0.50	
Chrysene-d12	1712319	15.552	1470087	15.56	116	50 - 200	-0.0080	+/-0.50	
Perylene-d12	1269918	17.441	1074175	17.445	118	50 - 200	-0.0040	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00701

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA3
Calibration: 0351002

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
NTC12-SB30-0005 (1012185-06)			Lab File ID: 1218506.D			Analyzed: 01/06/11 18:04			
1,4-Dichlorobenzene-d4	893999	6.772	717681	6.774	125	50 - 200	-0.0020	+/-0.50	
Naphthalene-d8	2971497	8.258	2399016	8.26	124	50 - 200	-0.0020	+/-0.50	
Acenaphthene-d10	1617571	10.398	1282399	10.405	126	50 - 200	-0.0070	+/-0.50	
Phenanthrene-d10	2621139	12.235	2012831	12.242	130	50 - 200	-0.0070	+/-0.50	
Chrysene-d12	1826944	15.553	1470087	15.56	124	50 - 200	-0.0070	+/-0.50	
Perylene-d12	1268131	17.438	1074175	17.445	118	50 - 200	-0.0070	+/-0.50	
NTC12-SB30-00502 (1012185-07)			Lab File ID: 1218507.D			Analyzed: 01/06/11 18:35			
1,4-Dichlorobenzene-d4	901492	6.774	717681	6.774	126	50 - 200	0.0000	+/-0.50	
Naphthalene-d8	2979440	8.255	2399016	8.26	124	50 - 200	-0.0050	+/-0.50	
Acenaphthene-d10	1640480	10.4	1282399	10.405	128	50 - 200	-0.0050	+/-0.50	
Phenanthrene-d10	2616320	12.237	2012831	12.242	130	50 - 200	-0.0050	+/-0.50	
Chrysene-d12	1930601	15.55	1470087	15.56	131	50 - 200	-0.0100	+/-0.50	
Perylene-d12	1283573	17.44	1074175	17.445	119	50 - 200	-0.0050	+/-0.50	
NTC12-SB23-0005 (1012185-01)			Lab File ID: 1218501.D			Analyzed: 01/06/11 19:07			
1,4-Dichlorobenzene-d4	941947	6.772	717681	6.774	131	50 - 200	-0.0020	+/-0.50	
Naphthalene-d8	3236681	8.258	2399016	8.26	135	50 - 200	-0.0020	+/-0.50	
Acenaphthene-d10	1831744	10.398	1282399	10.405	143	50 - 200	-0.0070	+/-0.50	
Phenanthrene-d10	3014351	12.235	2012831	12.242	150	50 - 200	-0.0070	+/-0.50	
Chrysene-d12	2172735	15.553	1470087	15.56	148	50 - 200	-0.0070	+/-0.50	
Perylene-d12	1501518	17.443	1074175	17.445	140	50 - 200	-0.0020	+/-0.50	
NTC12-SB23-0810 (1012185-02)			Lab File ID: 1218502.D			Analyzed: 01/06/11 19:37			
1,4-Dichlorobenzene-d4	930331	6.773	717681	6.774	130	50 - 200	-0.0010	+/-0.50	
Naphthalene-d8	3124963	8.255	2399016	8.26	130	50 - 200	-0.0050	+/-0.50	
Acenaphthene-d10	1731214	10.399	1282399	10.405	135	50 - 200	-0.0060	+/-0.50	
Phenanthrene-d10	2743270	12.236	2012831	12.242	136	50 - 200	-0.0060	+/-0.50	
Chrysene-d12	1777518	15.554	1470087	15.56	121	50 - 200	-0.0060	+/-0.50	
Perylene-d12	1166326	17.439	1074175	17.445	109	50 - 200	-0.0060	+/-0.50	
NTC12-SB21-0005 (1012185-17)			Lab File ID: 1218517.D			Analyzed: 01/06/11 20:09			
1,4-Dichlorobenzene-d4	865628	6.772	717681	6.774	121	50 - 200	-0.0020	+/-0.50	
Naphthalene-d8	2939313	8.254	2399016	8.26	123	50 - 200	-0.0060	+/-0.50	
Acenaphthene-d10	1698015	10.398	1282399	10.405	132	50 - 200	-0.0070	+/-0.50	
Phenanthrene-d10	2717759	12.235	2012831	12.242	135	50 - 200	-0.0070	+/-0.50	
Chrysene-d12	1834599	15.558	1470087	15.56	125	50 - 200	-0.0020	+/-0.50	
Perylene-d12	1249612	17.443	1074175	17.445	116	50 - 200	-0.0020	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00701

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA3
Calibration: 0351002

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
NTC12-SB26-0406 (1012185-09)			Lab File ID: 1218509.D			Analyzed: 01/06/11 20:39			
1,4-Dichlorobenzene-d4	887537	6.769	717681	6.774	124	50 - 200	-0.0050	+/-0.50	
Naphthalene-d8	3100862	8.255	2399016	8.26	129	50 - 200	-0.0050	+/-0.50	
Acenaphthene-d10	1655378	10.405	1282399	10.405	129	50 - 200	0.0000	+/-0.50	
Phenanthrene-d10	2457611	12.242	2012831	12.242	122	50 - 200	0.0000	+/-0.50	
Chrysene-d12	1310140	15.565	1470087	15.56	89	50 - 200	0.0050	+/-0.50	
Perylene-d12	793635	17.455	1074175	17.445	74	50 - 200	0.0100	+/-0.50	
NTC12-DUP02 (1012185-11)			Lab File ID: 1218511.D			Analyzed: 01/06/11 21:09			
1,4-Dichlorobenzene-d4	802279	6.771	717681	6.774	112	50 - 200	-0.0030	+/-0.50	
Naphthalene-d8	2760794	8.257	2399016	8.26	115	50 - 200	-0.0030	+/-0.50	
Acenaphthene-d10	1524952	10.411	1282399	10.405	119	50 - 200	0.0060	+/-0.50	
Phenanthrene-d10	2297162	12.253	2012831	12.242	114	50 - 200	0.0110	+/-0.50	
Chrysene-d12	1404405	15.576	1470087	15.56	96	50 - 200	0.0160	+/-0.50	
Perylene-d12	911743	17.475	1074175	17.445	85	50 - 200	0.0300	+/-0.50	
NTC12-SB22-0005 (1012185-15)			Lab File ID: 1218515.D			Analyzed: 01/06/11 21:40			
1,4-Dichlorobenzene-d4	798401	6.772	717681	6.774	111	50 - 200	-0.0020	+/-0.50	
Naphthalene-d8	2845510	8.257	2399016	8.26	119	50 - 200	-0.0030	+/-0.50	
Acenaphthene-d10	1630344	10.402	1282399	10.405	127	50 - 200	-0.0030	+/-0.50	
Phenanthrene-d10	2527531	12.239	2012831	12.242	126	50 - 200	-0.0030	+/-0.50	
Chrysene-d12	1348481	15.562	1470087	15.56	92	50 - 200	0.0020	+/-0.50	
Perylene-d12	700080	17.452	1074175	17.445	65	50 - 200	0.0070	+/-0.50	
NTC12-SB28-0204 (1012185-22)			Lab File ID: 1218522.D			Analyzed: 01/06/11 22:11			
1,4-Dichlorobenzene-d4	837987	6.77	717681	6.774	117	50 - 200	-0.0040	+/-0.50	
Naphthalene-d8	2867436	8.256	2399016	8.26	120	50 - 200	-0.0040	+/-0.50	
Acenaphthene-d10	1535554	10.406	1282399	10.405	120	50 - 200	0.0010	+/-0.50	
Phenanthrene-d10	2222536	12.248	2012831	12.242	110	50 - 200	0.0060	+/-0.50	
Chrysene-d12	1108147	15.57	1470087	15.56	75	50 - 200	0.0100	+/-0.50	
Perylene-d12	674875	17.46	1074175	17.445	63	50 - 200	0.0150	+/-0.50	
NTC12-SB22-00502 (1012185-16)			Lab File ID: 1218516.D			Analyzed: 01/06/11 22:42			
1,4-Dichlorobenzene-d4	907701	6.774	717681	6.774	126	50 - 200	0.0000	+/-0.50	
Naphthalene-d8	3209905	8.26	2399016	8.26	134	50 - 200	0.0000	+/-0.50	
Acenaphthene-d10	1819215	10.405	1282399	10.405	142	50 - 200	0.0000	+/-0.50	
Phenanthrene-d10	2827352	12.242	2012831	12.242	140	50 - 200	0.0000	+/-0.50	
Chrysene-d12	1543974	15.565	1470087	15.56	105	50 - 200	0.0050	+/-0.50	
Perylene-d12	811224	17.459	1074175	17.445	76	50 - 200	0.0140	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00701

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA3
Calibration: 0351002

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
NTC12-SB21-0507 (1012185-18)			Lab File ID: 1218518.D			Analyzed: 01/06/11 23:13			
1,4-Dichlorobenzene-d4	798580	6.776	717681	6.774	111	50 - 200	0.0020	+/-0.50	
Naphthalene-d8	2788349	8.262	2399016	8.26	116	50 - 200	0.0020	+/-0.50	
Acenaphthene-d10	1571565	10.412	1282399	10.405	123	50 - 200	0.0070	+/-0.50	
Phenanthrene-d10	2449193	12.258	2012831	12.242	122	50 - 200	0.0160	+/-0.50	
Chrysene-d12	1303503	15.581	1470087	15.56	89	50 - 200	0.0210	+/-0.50	
Perylene-d12	799383	17.48	1074175	17.445	74	50 - 200	0.0350	+/-0.50	
NTC12-SB25-0005 (1012185-19)			Lab File ID: 1218519.D			Analyzed: 01/06/11 23:44			
1,4-Dichlorobenzene-d4	809887	6.774	717681	6.774	113	50 - 200	0.0000	+/-0.50	
Naphthalene-d8	3011420	8.265	2399016	8.26	126	50 - 200	0.0050	+/-0.50	
Acenaphthene-d10	1760542	10.41	1282399	10.405	137	50 - 200	0.0050	+/-0.50	
Phenanthrene-d10	2773192	12.251	2012831	12.242	138	50 - 200	0.0090	+/-0.50	
Chrysene-d12	1309551	15.579	1470087	15.56	89	50 - 200	0.0190	+/-0.50	
Perylene-d12	815315	17.478	1074175	17.445	76	50 - 200	0.0330	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A01104

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA3
Calibration: 0351002

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Calibration Check (1A01104-CCV1)			Lab File ID: SEQ-CCV1s.D			Analyzed: 01/10/11 16:38			
1,4-Dichlorobenzene-d4	825653	6.77	520490	6.774	159	50 - 200	-0.0040	+/-0.50	
Naphthalene-d8	2812525	8.265	1864250	8.284	151	50 - 200	-0.0190	+/-0.50	
Acenaphthene-d10	1530156	10.41	1011290	10.429	151	50 - 200	-0.0190	+/-0.50	
Phenanthrene-d10	2447030	12.247	1690574	12.256	145	50 - 200	-0.0090	+/-0.50	
Chrysene-d12	1592779	15.56	1331643	15.56	120	50 - 200	0.0000	+/-0.50	
Perylene-d12	837941	17.445	1068595	17.426	78	50 - 200	0.0190	+/-0.50	
NTC12-DUP01 (1012185-10)			Lab File ID: 1218510.D			Analyzed: 01/10/11 17:17			
1,4-Dichlorobenzene-d4	881955	6.771	825653	6.77	107	50 - 200	0.0010	+/-0.50	
Naphthalene-d8	3059488	8.262	2812525	8.265	109	50 - 200	-0.0030	+/-0.50	
Acenaphthene-d10	1644540	10.406	1530156	10.41	107	50 - 200	-0.0040	+/-0.50	
Phenanthrene-d10	2624523	12.238	2447030	12.247	107	50 - 200	-0.0090	+/-0.50	
Chrysene-d12	1769073	15.552	1592779	15.56	111	50 - 200	-0.0080	+/-0.50	
Perylene-d12	1040710	17.437	837941	17.445	124	50 - 200	-0.0080	+/-0.50	
NTC12-SB27-0204 (1012185-14)			Lab File ID: 1218514.D			Analyzed: 01/10/11 17:46			
1,4-Dichlorobenzene-d4	957813	6.772	825653	6.77	116	50 - 200	0.0020	+/-0.50	
Naphthalene-d8	3216071	8.258	2812525	8.265	114	50 - 200	-0.0070	+/-0.50	
Acenaphthene-d10	1697612	10.403	1530156	10.41	111	50 - 200	-0.0070	+/-0.50	
Phenanthrene-d10	2644502	12.235	2447030	12.247	108	50 - 200	-0.0120	+/-0.50	
Chrysene-d12	1675596	15.553	1592779	15.56	105	50 - 200	-0.0070	+/-0.50	
Perylene-d12	841588	17.433	837941	17.445	100	50 - 200	-0.0120	+/-0.50	
Matrix Spike (0L22011-MS1)			Lab File ID: 1218514M.D			Analyzed: 01/10/11 18:16			
1,4-Dichlorobenzene-d4	915436	6.771	825653	6.77	111	50 - 200	0.0010	+/-0.50	
Naphthalene-d8	3048358	8.261	2812525	8.265	108	50 - 200	-0.0040	+/-0.50	
Acenaphthene-d10	1611339	10.406	1530156	10.41	105	50 - 200	-0.0040	+/-0.50	
Phenanthrene-d10	2481928	12.243	2447030	12.247	101	50 - 200	-0.0040	+/-0.50	
Chrysene-d12	1512192	15.556	1592779	15.56	95	50 - 200	-0.0040	+/-0.50	
Perylene-d12	852236	17.437	837941	17.445	102	50 - 200	-0.0080	+/-0.50	
Matrix Spike Dup (0L22011-MSD1)			Lab File ID: 1218514S.D			Analyzed: 01/10/11 18:46			
1,4-Dichlorobenzene-d4	1183425	6.78	825653	6.77	143	50 - 200	0.0100	+/-0.50	
Naphthalene-d8	3891923	8.266	2812525	8.265	138	50 - 200	0.0010	+/-0.50	
Acenaphthene-d10	2103573	10.406	1530156	10.41	137	50 - 200	-0.0040	+/-0.50	
Phenanthrene-d10	3245256	12.243	2447030	12.247	133	50 - 200	-0.0040	+/-0.50	
Chrysene-d12	1848213	15.561	1592779	15.56	116	50 - 200	0.0010	+/-0.50	
Perylene-d12	929968	17.436	837941	17.445	111	50 - 200	-0.0090	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A01104

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA3
Calibration: 0351002

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
NTC12-SB28-0005 (1012185-21)			Lab File ID: 1218521.D			Analyzed: 01/10/11 19:15			
1,4-Dichlorobenzene-d4	806403	6.77	825653	6.77	98	50 - 200	0.0000	+/-0.50	
Naphthalene-d8	2851641	8.26	2812525	8.265	101	50 - 200	-0.0050	+/-0.50	
Acenaphthene-d10	1556009	10.4	1530156	10.41	102	50 - 200	-0.0100	+/-0.50	
Phenanthrene-d10	2344920	12.237	2447030	12.247	96	50 - 200	-0.0100	+/-0.50	
Chrysene-d12	1270086	15.551	1592779	15.56	80	50 - 200	-0.0090	+/-0.50	
Perylene-d12	712647	17.436	837941	17.445	85	50 - 200	-0.0090	+/-0.50	
NTC12-SB27-0005 (1012185-13)			Lab File ID: 1218513is80.D			Analyzed: 01/10/11 19:45			
1,4-Dichlorobenzene-d4	840584	6.773	825653	6.77	102	50 - 200	0.0030	+/-0.50	
Naphthalene-d8	2743112	8.259	2812525	8.265	98	50 - 200	-0.0060	+/-0.50	
Acenaphthene-d10	1515506	10.404	1530156	10.41	99	50 - 200	-0.0060	+/-0.50	
Phenanthrene-d10	2292297	12.241	2447030	12.247	94	50 - 200	-0.0060	+/-0.50	
Chrysene-d12	1316256	15.559	1592779	15.56	83	50 - 200	-0.0010	+/-0.50	
Perylene-d12	803184	17.444	837941	17.445	96	50 - 200	-0.0010	+/-0.50	
NTC12-SB25-0204 (1012185-20)			Lab File ID: 1218520.D			Analyzed: 01/10/11 20:14			
1,4-Dichlorobenzene-d4	832465	6.77	825653	6.77	101	50 - 200	0.0000	+/-0.50	
Naphthalene-d8	2885315	8.261	2812525	8.265	103	50 - 200	-0.0040	+/-0.50	
Acenaphthene-d10	1519209	10.401	1530156	10.41	99	50 - 200	-0.0090	+/-0.50	
Phenanthrene-d10	2214701	12.238	2447030	12.247	91	50 - 200	-0.0090	+/-0.50	
Chrysene-d12	882144	15.551	1592779	15.56	55	50 - 200	-0.0090	+/-0.50	
Perylene-d12	488515	17.441	837941	17.445	58	50 - 200	-0.0040	+/-0.50	
NTC12-SB26-0005 (1012185-08)			Lab File ID: 1218508.D			Analyzed: 01/10/11 20:44			
1,4-Dichlorobenzene-d4	884241	6.77	825653	6.77	107	50 - 200	0.0000	+/-0.50	
Naphthalene-d8	3027736	8.261	2812525	8.265	108	50 - 200	-0.0040	+/-0.50	
Acenaphthene-d10	1586501	10.405	1530156	10.41	104	50 - 200	-0.0050	+/-0.50	
Phenanthrene-d10	2199807	12.237	2447030	12.247	90	50 - 200	-0.0100	+/-0.50	
Chrysene-d12	732075	15.555	1592779	15.56	46	50 - 200	-0.0050	+/-0.50	*
Perylene-d12	366039	17.44	837941	17.445	44	50 - 200	-0.0050	+/-0.50	*

SAMPLE ID NTC12-DUP02

SAMPLE CALC IS AREA	DILUTION	COMPOUND OF INTEREST	IS AMOUNT (NG)	Final Extract Volume (UL)	AVE RRF	CONCENTRATION PPB
1524952	1	299333	20	1000	1.7025	370.88
		% Solids	**Amt. Inj. (UL)**	**Sample Volume (Grams)**		
		0.829	0.5	15		

Dibenzofuran = 371 ug/kg

Data File: \\ELABNSH05\TARGET\chem\bna3.i\010611b3.b\1218511.D
Report Date: 07-Jan-2011 05:45

Laboratory Name

Data file : \\ELABNSH05\TARGET\chem\bna3.i\010611b3.b\1218511.D
Lab Smp Id: 1012185-11 Client Smp ID: NTC12-DUP02
Inj Date : 06-JAN-2011 21:09 MS Autotune Date: 07-SEP-2010 04:33
Operator : MEC Inst ID: bna3.i
Smp Info : 1012185-11;1;15;1000;;UG/KG;23-DEC-2010
Misc Info : ;0;;;;0L22011;ppbnax.sub;
Comment :
Method : \\ELABNSH05\TARGET\chem\bna3.i\010611b3.b\IXSOX3.m
Meth Date : 07-Jan-2011 05:43 amonteiro Quant Type: ISTD
Cal Date : 07-DEC-2010 22:57 Cal File: SEQ-CALB.D
Als bottle: 13
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: ppbnax.sub
Target Version: 4.04
Processing Host: TARGET02_VM

Concentration Formula: Amt * DF * Uf * Vt*Vi/(Amt * Vi * (Solids/100))

Name	Value	Description
DF	1.000	Dilution Factor
Uf	1.000	ng unit correction factor
Vt	1000.000	Volume of final extract (uL)(1000 low, 2
Amt	15.000	Mass of initial extraction
Vi	0.500	Volume injected (uL)
Solids	100.000	Percent Solids

M1/7/11

1/7/11

		Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/ul)	CONCENTRATIONS FINAL (UG/KG)
*	1	1,4-Dichlorobenzene-d4	152	6.771	6.774	(1.000)	802279	40.0000	
$	2	2-Fluorophenol	112	5.357	5.350	(0.791)	1749926	75.0135	5001
$	3	Phenol-d6	99	6.338	6.341	(0.936)	2372129	82.4183	5494
	19	3-Methylphenol	108	7.209	7.216	(1.065)	99669	4.33353	288.9(a)
	20	4-Methylphenol	108	7.209	7.216	(1.065)	99669	4.33353	288.9(a)
*	33	Naphthalene-d8	136	8.257	8.260	(1.000)	2760794	40.0000	
$	34	Nitrobenzene-d5	82	7.401	7.404	(0.896)	1259895	50.5020	3367(R)
	51	Naphthalene	128	8.286	8.284	(1.003)	469207	6.19029	412.7
	55	2-Methylnaphthalene	141	9.123	9.121	(1.105)	359042	8.77671	585.1
	56	1-Methylnaphthalene	141	9.243	9.241	(1.119)	196734	4.62244	308.2(a)
*	69	Acenaphthene-d10	164	10.411	10.405	(1.000)	1524952	40.0000	
$	74	2-Fluorobiphenyl	172	9.575	9.573	(0.920)	2102461	38.5871	2572
	80	Acenaphthene	153	10.450	10.443	(1.004)	189027	3.90537	260.4(a)

Data File: \\ELABNSH05\TARGET\chem\bna3.i\010611b3.b\1218511.D
Report Date: 07-Jan-2011 05:45

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/ul)	CONCENTRATIONS FINAL (UG/KG)
84 Dibenzofuran	168	10.661	10.655	(1.024)	299333	4.61192	307.5(a)
88 Fluorene	166	11.085	11.078	(1.065)	316867	6.03322	402.2
* 102 Phenanthrene-d10	188	12.253	12.242	(1.000)	2297162	40.0000	
$ 107 2,4,6-Tribromophenol	330	11.392	11.376	(0.930)	468660	70.3770	4692
111 Phenanthrene	178	12.282	12.270	(1.002)	2921752	42.1774	2812
112 Anthracene	178	12.344	12.333	(1.007)	735642	11.0303	735.4
116 Fluoranthene	202	13.763	13.737	(1.123)	3855963	59.2121	3947
* 132 Chrysene-d12	240	15.576	15.560	(1.000)	1404405	40.0000	
134 Pyrene	202	14.037	14.021	(0.901)	3223869	66.5323	4435
$ 135 Terphenyl-d14	244	14.225	14.213	(0.913)	1576622	50.7482	3383
138 Benzo(a)anthracene	228	15.562	15.540	(0.999)	1202707	28.7032	1914
139 Chrysene	228	15.605	15.588	(1.002)	1220146	28.3952	1893
* 154 Perylene-d12	264	17.475	17.445	(1.000)	911743	40.0000	
156 Benzo(b)fluoranthene	252	16.946	16.920	(0.970)	754239	27.7406	1849(M)
157 Benzo(k)fluoranthene	252	16.961	16.959	(0.971)	656803	23.3465	1556(M)
158 Benzo(a)pyrene	252	17.389	17.363	(0.995)	664514	27.4555	1830
159 Indeno(1,2,3-cd)pyrene	276	19.183	19.147	(1.098)	302746	12.6866	845.8
161 Benzo(g,h,i)perylene	276	19.673	19.642	(1.126)	282899	14.3087	953.9(M)

QC Flag Legend

a - Target compound detected but, quantitated amount
Below Limit Of Quantitation(BLOQ).
R - Spike/Surrogate failed recovery limits.
M - Compound response manually integrated.

Data for SW8270C (PAH) Forms

HOLDING TIME SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NTC12-SB23-0005	12/20/10 13:00	12/21/10 09:15	12/23/10 13:30	3.06	14.00	01/03/11 23:56	11.43	40.00	
NTC12-SB23-0810	12/20/10 13:20	12/21/10 09:15	12/23/10 13:30	3.05	14.00	01/04/11 00:26	11.46	40.00	
NTC12-SB24-0005	12/20/10 14:00	12/21/10 09:15	12/23/10 13:30	3.02	14.00	01/04/11 15:33	12.09	40.00	
NTC12-SB24-00502	12/20/10 14:05	12/21/10 09:15	12/23/10 13:30	3.02	14.00	01/04/11 16:03	12.11	40.00	
NTC12-SB30-0005	12/20/10 14:20	12/21/10 09:15	12/23/10 13:30	3.01	14.00	01/04/11 16:34	12.13	40.00	
NTC12-SB30-00502	12/20/10 14:25	12/21/10 09:15	12/23/10 13:30	3.00	14.00	01/04/11 17:04	12.15	40.00	
NTC12-SB26-0005	12/20/10 17:35	12/21/10 09:15	12/23/10 13:30	2.87	14.00	01/07/11 21:32	15.33	40.00	
NTC12-SB26-0406	12/20/10 17:40	12/21/10 09:15	12/23/10 13:30	2.87	14.00	01/04/11 18:04	12.19	40.00	
NTC12-SB26-0406	12/20/10 17:40	12/21/10 09:15	12/23/10 13:30	2.87	14.00	01/07/11 15:59	15.10	40.00	
NTC12-DUP01	12/20/10 00:00	12/21/10 09:15	12/23/10 13:30	3.60	14.00	01/07/11 18:00	15.19	40.00	
NTC12-DUP02	12/20/10 00:00	12/21/10 09:15	12/23/10 13:30	3.60	14.00	01/04/11 19:04	12.23	40.00	
NTC12-DUP02	12/20/10 00:00	12/21/10 09:15	12/23/10 13:30	3.60	14.00	01/07/11 16:29	15.12	40.00	
NTC12-SB27-0005	12/20/10 15:30	12/21/10 09:15	12/23/10 13:30	2.96	14.00	01/07/11 20:31	15.29	40.00	
NTC12-SB27-0204	12/20/10 15:35	12/21/10 09:15	12/23/10 13:30	2.95	14.00	01/07/11 18:31	15.21	40.00	
NTC12-SB22-0005	12/20/10 15:55	12/21/10 09:15	12/23/10 13:30	2.94	14.00	01/04/11 20:34	12.29	40.00	
NTC12-SB22-00502	12/20/10 16:00	12/21/10 09:15	12/23/10 13:30	2.94	14.00	01/04/11 21:04	12.32	40.00	
NTC12-SB21-0005	12/20/10 16:20	12/21/10 09:15	12/23/10 13:30	2.92	14.00	01/04/11 21:34	12.34	40.00	
NTC12-SB21-0005	12/20/10 16:20	12/21/10 09:15	12/23/10 13:30	2.92	14.00	01/07/11 17:00	15.15	40.00	
NTC12-SB21-0507	12/20/10 16:25	12/21/10 09:15	12/23/10 13:30	2.92	14.00	01/04/11 22:04	12.36	40.00	
NTC12-SB25-0005	12/20/10 16:35	12/21/10 09:15	12/23/10 13:30	2.91	14.00	01/04/11 22:34	12.38	40.00	
NTC12-SB25-0204	12/20/10 16:40	12/21/10 09:15	12/23/10 13:30	2.91	14.00	01/07/11 21:02	15.31	40.00	
NTC12-SB28-0005	12/20/10 17:00	12/21/10 09:15	12/23/10 13:30	2.90	14.00	01/07/11 20:01	15.27	40.00	
NTC12-SB28-0204	12/20/10 17:05	12/21/10 09:15	12/23/10 13:30	2.89	14.00	01/05/11 00:04	12.44	40.00	
NTC12-SB28-0204	12/20/10 17:05	12/21/10 09:15	12/23/10 13:30	2.89	14.00	01/07/11 17:30	15.17	40.00	

HOLDING TIME SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NTC12-SB29-0005	12/20/10 17:20	12/21/10 09:15	12/28/10 09:56	7.73	14.00	12/30/10 22:25	2.52	40.00	
NTC12-SB29-0204	12/20/10 17:25	12/21/10 09:15	12/28/10 09:56	7.73	14.00	12/30/10 22:55	2.54	40.00	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00308

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA4
Calibration: 0327001

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Calibration Check (1A00308-CCV1) ug/mL				Lab File ID: SEQ-CCV1.D		Analyzed: 12/30/10 17:27		
2-Fluorobiphenyl	5.000	90.1	80 - 120	9.739	9.739	0.0000	+/-0.500	
Terphenyl-d14	5.000	105	80 - 120	14.425	14.425	0.0000	+/-0.500	
Blank (0L27012-BLK2) ug/Kg wet				Lab File ID: L27012B1.D		Analyzed: 12/30/10 21:27		
2-Fluorobiphenyl	3333	75.9	14 - 129	9.74	9.739	0.0010	+/-0.500	
Terphenyl-d14	3333	92.6	14 - 129	14.434	14.425	0.0090	+/-0.500	
LCS (0L27012-BS2) ug/Kg wet				Lab File ID: L27012L1.D		Analyzed: 12/30/10 21:56		
2-Fluorobiphenyl	3333	70.2	14 - 129	9.739	9.739	0.0000	+/-0.500	
Terphenyl-d14	3333	88.6	14 - 129	14.434	14.425	0.0090	+/-0.500	
NTC12-SB29-0005 (1012185-23) ug/Kg dry				Lab File ID: 1218523.D		Analyzed: 12/30/10 22:25		
2-Fluorobiphenyl	3853	66.9	14 - 129	9.749	9.739	0.0100	+/-0.500	
Terphenyl-d14	3853	81.0	14 - 129	14.453	14.425	0.0280	+/-0.500	
NTC12-SB29-0204 (1012185-24) ug/Kg dry				Lab File ID: 1218524.D		Analyzed: 12/30/10 22:55		
2-Fluorobiphenyl	4016	76.6	14 - 129	9.749	9.739	0.0100	+/-0.500	
Terphenyl-d14	4016	83.6	14 - 129	14.462	14.425	0.0370	+/-0.500	
Matrix Spike (0L27012-MS2) ug/Kg dry				Lab File ID: 1218523M.D		Analyzed: 12/30/10 23:24		
2-Fluorobiphenyl	3853	64.9	14 - 129	9.768	9.739	0.0290	+/-0.500	
Terphenyl-d14	3853	77.8	14 - 129	14.481	14.425	0.0560	+/-0.500	
Matrix Spike Dup (0L27012-MSD2) ug/Kg dry				Lab File ID: 1218523S.D		Analyzed: 12/30/10 23:53		
2-Fluorobiphenyl	3853	66.6	14 - 129	9.786	9.739	0.0470	+/-0.500	
Terphenyl-d14	3853	78.9	14 - 129	14.49	14.425	0.0650	+/-0.500	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Sequence: 1A00409

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA4

Calibration: 0327001

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Calibration Check (1A00409-CCV1) ug/mL				Lab File ID: SEQ-CCV1.D		Analyzed: 01/03/11 13:46		
2-Fluorobiphenyl	5.000	102	80 - 120	9.738	9.738	0.0000	+/-0.500	
Terphenyl-d14	5.000	111	80 - 120	14.423	14.423	0.0000	+/-0.500	
Blank (0L22011-BLK2) ug/Kg wet				Lab File ID: L22011B2.D		Analyzed: 01/03/11 22:56		
2-Fluorobiphenyl	3333	76.7	14 - 129	9.738	9.738	0.0000	+/-0.500	
Terphenyl-d14	3333	108	14 - 129	14.442	14.423	0.0190	+/-0.500	
LCS (0L22011-BS2) ug/Kg wet				Lab File ID: L22011L2.D		Analyzed: 01/03/11 23:26		
2-Fluorobiphenyl	3333	75.4	14 - 129	9.738	9.738	0.0000	+/-0.500	
Terphenyl-d14	3333	98.1	14 - 129	14.442	14.423	0.0190	+/-0.500	
NTC12-SB23-0005 (1012185-01) ug/Kg dry				Lab File ID: 1218501.D		Analyzed: 01/03/11 23:56		
2-Fluorobiphenyl	3446	75.2	14 - 129	9.738	9.738	0.0000	+/-0.500	
Terphenyl-d14	3446	95.7	14 - 129	14.442	14.423	0.0190	+/-0.500	
NTC12-SB23-0810 (1012185-02) ug/Kg dry				Lab File ID: 1218502.D		Analyzed: 01/04/11 00:26		
2-Fluorobiphenyl	3881	78.9	14 - 129	9.747	9.738	0.0090	+/-0.500	
Terphenyl-d14	3881	92.8	14 - 129	14.451	14.423	0.0280	+/-0.500	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00413

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA4
Calibration: 0327001

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Calibration Check (1A00413-CCV1) ug/mL				Lab File ID: SEQ-CCV1.D		Analyzed: 01/04/11 13:27		
2-Fluorobiphenyl	5.000	88.7	80 - 120	9.735	9.735	0.0000	+/-0.500	
Terphenyl-d14	5.000	114	80 - 120	14.42	14.42	0.0000	+/-0.500	
NTC12-SB24-0005 (1012185-03) ug/Kg dry				Lab File ID: 1218503.D		Analyzed: 01/04/11 15:33		
2-Fluorobiphenyl	3962	81.8	14 - 129	9.744	9.735	0.0090	+/-0.500	
Terphenyl-d14	3962	92.6	14 - 129	14.438	14.42	0.0180	+/-0.500	
NTC12-SB24-00502 (1012185-04) ug/Kg dry				Lab File ID: 1218504.D		Analyzed: 01/04/11 16:03		
2-Fluorobiphenyl	3625	66.5	14 - 129	9.735	9.735	0.0000	+/-0.500	
Terphenyl-d14	3625	92.5	14 - 129	14.438	14.42	0.0180	+/-0.500	
NTC12-SB30-0005 (1012185-06) ug/Kg dry				Lab File ID: 1218506.D		Analyzed: 01/04/11 16:34		
2-Fluorobiphenyl	3612	72.8	14 - 129	9.744	9.735	0.0090	+/-0.500	
Terphenyl-d14	3612	82.5	14 - 129	14.438	14.42	0.0180	+/-0.500	
NTC12-SB30-00502 (1012185-07) ug/Kg dry				Lab File ID: 1218507.D		Analyzed: 01/04/11 17:04		
2-Fluorobiphenyl	3758	78.9	14 - 129	9.744	9.735	0.0090	+/-0.500	
Terphenyl-d14	3758	90.4	14 - 129	14.438	14.42	0.0180	+/-0.500	
NTC12-SB26-0406 (1012185-09) ug/Kg dry				Lab File ID: 1218509.D		Analyzed: 01/04/11 18:04		
2-Fluorobiphenyl	4145	29.3	14 - 129	9.744	9.735	0.0090	+/-0.500	
Terphenyl-d14	4145	81.7	14 - 129	14.531	14.42	0.1110	+/-0.500	
NTC12-DUP02 (1012185-11) ug/Kg dry				Lab File ID: 1218511.D		Analyzed: 01/04/11 19:04		
2-Fluorobiphenyl	4021	78.7	14 - 129	9.818	9.735	0.0830	+/-0.500	
Terphenyl-d14	4021	105	14 - 129	14.559	14.42	0.1390	+/-0.500	
NTC12-SB22-0005 (1012185-15) ug/Kg dry				Lab File ID: 1218515.D		Analyzed: 01/04/11 20:34		
2-Fluorobiphenyl	3801	78.9	14 - 129	9.762	9.735	0.0270	+/-0.500	
Terphenyl-d14	3801	86.3	14 - 129	14.494	14.42	0.0740	+/-0.500	
NTC12-SB22-00502 (1012185-16) ug/Kg dry				Lab File ID: 1218516.D		Analyzed: 01/04/11 21:04		
2-Fluorobiphenyl	3883	80.5	14 - 129	9.781	9.735	0.0460	+/-0.500	
Terphenyl-d14	3883	94.4	14 - 129	14.513	14.42	0.0930	+/-0.500	
NTC12-SB21-0005 (1012185-17) ug/Kg dry				Lab File ID: 1218517.D		Analyzed: 01/04/11 21:34		
2-Fluorobiphenyl	3895	65.3	14 - 129	9.781	9.735	0.0460	+/-0.500	
Terphenyl-d14	3895	83.3	14 - 129	14.513	14.42	0.0930	+/-0.500	
NTC12-SB21-0507 (1012185-18) ug/Kg dry				Lab File ID: 1218518.D		Analyzed: 01/04/11 22:04		
2-Fluorobiphenyl	3859	58.2	14 - 129	9.837	9.735	0.1020	+/-0.500	
Terphenyl-d14	3859	71.2	14 - 129	14.624	14.42	0.2040	+/-0.500	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Sequence: 1A00413

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA4

Calibration: 0327001

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
NTC12-SB25-0005 (1012185-19) ug/Kg dry				Lab File ID: 1218519.D		Analyzed: 01/04/11 22:34		
2-Fluorobiphenyl	3807	65.1	14 - 129	9.8	9.735	0.0650	+/-0.500	
Terphenyl-d14	3807	79.6	14 - 129	14.55	14.42	0.1300	+/-0.500	
NTC12-SB28-0204 (1012185-22) ug/Kg dry				Lab File ID: 1218522.D		Analyzed: 01/05/11 00:04		
2-Fluorobiphenyl	3723	72.9	14 - 129	9.828	9.735	0.0930	+/-0.500	
Terphenyl-d14	3723	81.4	14 - 129	14.615	14.42	0.1950	+/-0.500	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00708

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA4
Calibration: 0327001

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Calibration Check (1A00708-CCV1) ug/mL				Lab File ID: SEQ-CCV1.D		Analyzed: 01/07/11 12:22		
2-Fluorobiphenyl	5.000	94.1	80 - 120	9.67	9.67	0.0000	+/-0.500	
Terphenyl-d14	5.000	102	80 - 120	14.356	14.356	0.0000	+/-0.500	
NTC12-SB26-0406 (1012185-09RE1) ug/Kg dry				Lab File ID: 1218509D.D		Analyzed: 01/07/11 15:59		
2-Fluorobiphenyl	4145	102	14 - 129	9.67	9.67	0.0000	+/-0.500	
Terphenyl-d14	4145	97.3	14 - 129	14.365	14.356	0.0090	+/-0.500	
NTC12-DUP02 (1012185-11RE1) ug/Kg dry				Lab File ID: 1218511D.D		Analyzed: 01/07/11 16:29		
2-Fluorobiphenyl	4021	97.6	14 - 129	9.679	9.67	0.0090	+/-0.500	
Terphenyl-d14	4021	108	14 - 129	14.365	14.356	0.0090	+/-0.500	
NTC12-SB21-0005 (1012185-17RE1) ug/Kg dry				Lab File ID: 1218517D.D		Analyzed: 01/07/11 17:00		
2-Fluorobiphenyl	3895	87.6	14 - 129	9.67	9.67	0.0000	+/-0.500	
Terphenyl-d14	3895	80.7	14 - 129	14.356	14.356	0.0000	+/-0.500	
NTC12-SB28-0204 (1012185-22RE1) ug/Kg dry				Lab File ID: 1218522D.D		Analyzed: 01/07/11 17:30		
2-Fluorobiphenyl	3723	99.4	14 - 129	9.67	9.67	0.0000	+/-0.500	
Terphenyl-d14	3723	93.5	14 - 129	14.356	14.356	0.0000	+/-0.500	
NTC12-DUP01 (1012185-10) ug/Kg dry				Lab File ID: 1218510.D		Analyzed: 01/07/11 18:00		
2-Fluorobiphenyl	3729	88.9	14 - 129	9.68	9.67	0.0100	+/-0.500	
Terphenyl-d14	3729	94.0	14 - 129	14.365	14.356	0.0090	+/-0.500	
NTC12-SB27-0204 (1012185-14) ug/Kg dry				Lab File ID: 1218514.D		Analyzed: 01/07/11 18:31		
2-Fluorobiphenyl	3774	94.1	14 - 129	9.679	9.67	0.0090	+/-0.500	
Terphenyl-d14	3774	89.8	14 - 129	14.365	14.356	0.0090	+/-0.500	
Matrix Spike (0L22011-MS2) ug/Kg dry				Lab File ID: 1218514M.D		Analyzed: 01/07/11 19:01		
2-Fluorobiphenyl	3824	83.6	14 - 129	9.689	9.67	0.0190	+/-0.500	
Terphenyl-d14	3824	85.1	14 - 129	14.365	14.356	0.0090	+/-0.500	
Matrix Spike Dup (0L22011-MSD2) ug/Kg dry				Lab File ID: 1218514S.D		Analyzed: 01/07/11 19:31		
2-Fluorobiphenyl	3774	84.7	14 - 129	9.689	9.67	0.0190	+/-0.500	
Terphenyl-d14	3774	90.1	14 - 129	14.374	14.356	0.0180	+/-0.500	
NTC12-SB28-0005 (1012185-21) ug/Kg dry				Lab File ID: 1218521.D		Analyzed: 01/07/11 20:01		
2-Fluorobiphenyl	3701	74.6	14 - 129	9.679	9.67	0.0090	+/-0.500	
Terphenyl-d14	3701	77.2	14 - 129	14.374	14.356	0.0180	+/-0.500	
NTC12-SB27-0005 (1012185-13) ug/Kg dry				Lab File ID: 1218513.D		Analyzed: 01/07/11 20:31		
2-Fluorobiphenyl	3939	79.0	14 - 129	9.679	9.67	0.0090	+/-0.500	
Terphenyl-d14	3939	82.1	14 - 129	14.374	14.356	0.0180	+/-0.500	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00708

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA4
Calibration: 0327001

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
NTC12-SB25-0204 (1012185-20) ug/Kg dry				Lab File ID: 1218520.D		Analyzed: 01/07/11 21:02		
2-Fluorobiphenyl	3936	69.7	14 - 129	9.679	9.67	0.0090	+/-0.500	
Terphenyl-d14	3936	65.6	14 - 129	14.374	14.356	0.0180	+/-0.500	
NTC12-SB26-0005 (1012185-08) ug/Kg dry				Lab File ID: 1218508.D		Analyzed: 01/07/11 21:32		
2-Fluorobiphenyl	3690	86.3	14 - 129	9.679	9.67	0.0090	+/-0.500	
Terphenyl-d14	3690	76.5	14 - 129	14.374	14.356	0.0180	+/-0.500	

PREPARATION BATCH SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Batch: 0L22011 Batch Matrix: Solid

Preparation: EXT_3546

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL./WEIGHT	FINAL VOL.
Blank	0L22011-BLK2	12/23/10 13:30	15.00	1.00
LCS	0L22011-BS2	12/23/10 13:30	15.00	1.00
NTC12-SB27-0204	0L22011-MS2	12/23/10 13:30	15.10	1.00
NTC12-SB27-0204	0L22011-MSD2	12/23/10 13:30	15.30	1.00
NTC12-SB23-0005	1012185-01	12/23/10 13:30	15.40	1.00
NTC12-SB23-0810	1012185-02	12/23/10 13:30	15.30	1.00
NTC12-SB24-0005	1012185-03	12/23/10 13:30	15.10	1.00
NTC12-SB24-00502	1012185-04	12/23/10 13:30	15.40	1.00
NTC12-SB30-0005	1012185-06	12/23/10 13:30	15.20	1.00
NTC12-SB30-00502	1012185-07	12/23/10 13:30	15.20	1.00
NTC12-SB26-0005	1012185-08	12/23/10 13:30	15.10	1.00
NTC12-SB26-0406	1012185-09	12/23/10 13:30	15.10	1.00
NTC12-SB26-0406	1012185-09RE1	12/23/10 13:30	15.10	1.00
NTC12-DUP01	1012185-10	12/23/10 13:30	15.00	1.00
NTC12-DUP02	1012185-11	12/23/10 13:30	15.00	1.00
NTC12-DUP02	1012185-11RE1	12/23/10 13:30	15.00	1.00
NTC12-SB27-0005	1012185-13	12/23/10 13:30	15.20	1.00
NTC12-SB27-0204	1012185-14	12/23/10 13:30	15.30	1.00
NTC12-SB22-0005	1012185-15	12/23/10 13:30	15.10	1.00
NTC12-SB22-00502	1012185-16	12/23/10 13:30	15.00	1.00
NTC12-SB21-0005	1012185-17	12/23/10 13:30	15.10	1.00
NTC12-SB21-0005	1012185-17RE1	12/23/10 13:30	15.10	1.00
NTC12-SB21-0507	1012185-18	12/23/10 13:30	15.20	1.00
NTC12-SB25-0005	1012185-19	12/23/10 13:30	15.00	1.00
NTC12-SB25-0204	1012185-20	12/23/10 13:30	15.30	1.00
NTC12-SB28-0005	1012185-21	12/23/10 13:30	15.40	1.00
NTC12-SB28-0204	1012185-22	12/23/10 13:30	15.10	1.00
NTC12-SB28-0204	1012185-22RE1	12/23/10 13:30	15.10	1.00

ANALYSIS DATA SHEET

Blank

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix:
Laboratory ID: 0L22011-BLK2
File ID: L22011B2.D
Sampled:
Prepared:
Analyzed: 01/03/11 22:56
Solids:
Preparation: EXT_3546
Dilution:
Batch: 0L22011
Sequence: 1A00409
Calibration: 0327001
Instrument: MS-BNA4

CAS NO.	COMPOUND	ONC. (ug/Kg we	DL	LOD	LOQ	Q
83-32-9	Acenaphthene		1.67	3.33	6.67	U
208-96-8	Acenaphthylene		1.67	3.33	6.67	U
120-12-7	Anthracene		1.67	3.33	6.67	U
56-55-3	Benzo(a)anthracene		1.67	3.33	6.67	U
50-32-8	Benzo(a)pyrene		1.67	3.33	6.67	U
205-99-2	Benzo(b)fluoranthene		1.67	3.33	6.67	U
191-24-2	Benzo(g,h,i)perylene		1.67	3.33	6.67	U
207-08-9	Benzo(k)fluoranthene		1.67	3.33	6.67	Q, U
218-01-9	Chrysene		1.67	3.33	6.67	U
53-70-3	Dibenz(a,h)anthracene		1.67	3.33	6.67	U
206-44-0	Fluoranthene		1.67	3.33	6.67	U
86-73-7	Fluorene		1.67	3.33	6.67	U
193-39-5	Indeno(1,2,3-cd)pyrene		1.67	3.33	6.67	U
91-57-6	2-Methylnaphthalene		1.67	3.33	6.67	U
91-20-3	Naphthalene		1.67	3.33	6.67	U
85-01-8	Phenanthrene		1.67	3.33	6.67	U
129-00-0	Pyrene		1.67	3.33	6.67	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg wet)	CONC (ug/Kg wet)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3333	2557	76.7	14 - 129	
Terphenyl-d14	3333	3604	108	14 - 129	

LCS / LCS DUPLICATE RECOVERY

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix: Solid
Batch: 0L22011
Laboratory ID: 0L22011-BS2
Preparation: EXT_3546
Initial/Final: 15 g / 1 mL

ANALYTE	SPIKE ADDED (ug/Kg wet)	LCS CONCENTRATION (ug/Kg wet)	LCS % REC.	QC LIMITS REC.
Acenaphthene	66.67	61.38	92.1	28 - 110
Acenaphthylene	66.67	55.52	83.3	23 - 126
Anthracene	66.67	71.87	108	28 - 136
Benzo(a)anthracene	66.67	47.26	70.9	31 - 146
Benzo(a)pyrene	66.67	56.92	85.4	28 - 128
Benzo(b)fluoranthene	66.67	50.47	75.7	30 - 139
Benzo(g,h,i)perylene	66.67	63.78	95.7	21 - 149
Benzo(k)fluoranthene	**66.67**	**89.50**	**134**	**42 - 129**
Chrysene	66.67	86.55	130	39 - 134
Dibenz(a,h)anthracene	66.67	48.05	72.1	30 - 138
Fluoranthene	66.67	62.03	93.0	30 - 142
Fluorene	66.67	69.59	104	27 - 116
Indeno(1,2,3-cd)pyrene	66.67	55.62	83.4	17 - 164
2-Methylnaphthalene	66.67	59.03	88.5	30 - 111
Naphthalene	66.67	54.24	81.4	29 - 106
Phenanthrene	66.67	59.98	90.0	32 - 127
Pyrene	66.67	66.44	99.7	28 - 130

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8270C

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Matrix: Solid

Batch: 0L22011

% Solids: 86.58

Source Sample Name: **1012185-14**

ANALYTE	SPIKE ADDED (ug/Kg dry)	SAMPLE CONCENTRATION (ug/Kg dry)	MS CONCENTRATION (ug/Kg dry)	MS % REC.	Q	QC LIMITS REC.
Acenaphthene	3824	9.794	3547	92.5		28 - 110
Acenaphthylene	3824	3.698	3343	87.3		23 - 126
Anthracene	3824	22.28	3265	84.8		28 - 136
Benzo(a)anthracene	3824	75.64	3453	88.3		31 - 146
Benzo(a)pyrene	3824	87.79	3093	78.6		28 - 128
Benzo(b)fluoranthene	3824	128.7	4080	103		30 - 139
Benzo(g,h,i)perylene	3824	43.22	2647	68.1		21 - 149
Benzo(k)fluoranthene	3824	47.43	4113	106		42 - 129
Chrysene	3824	83.43	3429	87.5		39 - 134
Dibenz(a,h)anthracene	3824	12.04	2966	77.2		30 - 138
Fluoranthene	3824	169.0	3397	84.4		30 - 142
Fluorene	3824	10.27	3758	98.0		27 - 116
Indeno(1,2,3-cd)pyrene	3824	38.00	2833	73.1		17 - 164
2-Methylnaphthalene	3824	14.98	3815	99.4		30 - 111
Naphthalene	3824	7.682	3400	88.7		29 - 106
Phenanthrene	3824	121.2	3892	98.6		32 - 127
Pyrene	3824	142.5	3398	85.1		28 - 130

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8270C

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Batch: 0L22011

% Solids: 86.58

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Source Sample Name: **1012185-14**

ANALYTE	SPIKE ADDED (ug/Kg dry)	MSD CONCENTRATION (ug/Kg dry)	MSD % REC. #	% RPD	Q	QC LIMITS RPD	QC LIMITS REC.
Acenaphthene	3774	3560	94.0	0.347		30	28 - 110
Acenaphthylene	3774	3455	91.4	3.31		30	23 - 126
Anthracene	3774	3492	91.9	6.75		30	28 - 136
Benzo(a)anthracene	3774	3590	93.1	3.89		30	31 - 146
Benzo(a)pyrene	3774	3440	88.8	10.6		30	28 - 128
Benzo(b)fluoranthene	3774	4442	114	8.48		30	30 - 139
Benzo(g,h,i)perylene	3774	2355	61.2	11.7		30	21 - 149
Benzo(k)fluoranthene	3774	4220	111	2.57		30	42 - 129
Chrysene	3774	3023	77.9	12.6		30	39 - 134
Dibenz(a,h)anthracene	3774	2746	72.4	7.71		30	30 - 138
Fluoranthene	3774	3668	92.7	7.65		30	30 - 142
Fluorene	3774	3869	102	2.90		30	27 - 116
Indeno(1,2,3-cd)pyrene	3774	2595	67.7	8.77		30	17 - 164
2-Methylnaphthalene	3774	3765	99.3	1.33		30	30 - 111
Naphthalene	3774	3398	89.8	0.0449		30	29 - 106
Phenanthrene	3774	4060	104	4.22		30	32 - 127
Pyrene	3774	3532	89.8	3.86		30	28 - 130

PREPARATION BATCH SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Batch: 0L27012 Batch Matrix: Solid

Preparation: EXT_3546

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL./WEIGHT	FINAL VOL.
Blank	0L27012-BLK2	12/28/10 09:56	15.00	1.00
LCS	0L27012-BS2	12/28/10 09:56	15.00	1.00
NTC12-SB29-0005	0L27012-MS2	12/28/10 09:56	15.00	1.00
NTC12-SB29-0005	0L27012-MSD2	12/28/10 09:56	15.00	1.00
NTC12-SB29-0005	1012185-23	12/28/10 09:56	15.00	1.00
NTC12-SB29-0204	1012185-24	12/28/10 09:56	15.00	1.00

ANALYSIS DATA SHEET

Blank

Laboratory: Empirical Laboratories, LLC | SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) | Project: Great Lakes CTO F27A

Matrix: | Laboratory ID: 0L27012-BLK2 | File ID: L27012B1.D

Sampled: | Prepared: | Analyzed: 12/30/10 21:27

Solids: | Preparation: EXT_3546 | Dilution:

Batch: 0L27012 | Sequence: 1A00308 | Calibration: 0327001 | Instrument: MS-BNA4

CAS NO.	COMPOUND	ONC. (ug/Kg we	DL	LOD	LOQ	Q
83-32-9	Acenaphthene		1.67	3.33	6.67	U
208-96-8	Acenaphthylene		1.67	3.33	6.67	U
120-12-7	Anthracene		1.67	3.33	6.67	U
56-55-3	Benzo(a)anthracene		1.67	3.33	6.67	U
50-32-8	Benzo(a)pyrene		1.67	3.33	6.67	U
205-99-2	Benzo(b)fluoranthene		1.67	3.33	6.67	U
191-24-2	Benzo(g,h,i)perylene		1.67	3.33	6.67	U
207-08-9	Benzo(k)fluoranthene		1.67	3.33	6.67	U
218-01-9	Chrysene		1.67	3.33	6.67	U
53-70-3	Dibenz(a,h)anthracene		1.67	3.33	6.67	U
206-44-0	Fluoranthene		1.67	3.33	6.67	U
86-73-7	Fluorene		1.67	3.33	6.67	U
193-39-5	Indeno(1,2,3-cd)pyrene		1.67	3.33	6.67	U
91-57-6	2-Methylnaphthalene		1.67	3.33	6.67	U
91-20-3	Naphthalene		1.67	3.33	6.67	U
85-01-8	Phenanthrene		1.67	3.33	6.67	U
129-00-0	Pyrene		1.67	3.33	6.67	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg wet)	CONC (ug/Kg wet)	% REC	QC LIMITS	Q
2-Fluorobiphenyl	3333	2530	75.9	14 - 129	
Terphenyl-d14	3333	3086	92.6	14 - 129	

LCS / LCS DUPLICATE RECOVERY

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix: Solid
Batch: 0L27012
Laboratory ID: 0L27012-BS2
Preparation: EXT_3546
Initial/Final: 15 g / 1 mL

ANALYTE	SPIKE ADDED (ug/Kg wet)	LCS CONCENTRATION (ug/Kg wet)	LCS % REC.	QC LIMITS REC.
Acenaphthene	66.67	52.37	78.6	28 - 110
Acenaphthylene	66.67	50.32	75.5	23 - 126
Anthracene	66.67	59.99	90.0	28 - 136
Benzo(a)anthracene	66.67	54.60	81.9	31 - 146
Benzo(a)pyrene	66.67	48.39	72.6	28 - 128
Benzo(b)fluoranthene	66.67	44.05	66.1	30 - 139
Benzo(g,h,i)perylene	66.67	55.04	82.6	21 - 149
Benzo(k)fluoranthene	66.67	68.78	103	42 - 129
Chrysene	66.67	64.18	96.3	39 - 134
Dibenz(a,h)anthracene	66.67	48.67	73.0	30 - 138
Fluoranthene	66.67	56.41	84.6	30 - 142
Fluorene	66.67	57.89	86.8	27 - 116
Indeno(1,2,3-cd)pyrene	66.67	46.81	70.2	17 - 164
2-Methylnaphthalene	66.67	56.26	84.4	30 - 111
Naphthalene	66.67	51.48	77.2	29 - 106
Phenanthrene	66.67	57.30	85.9	32 - 127
Pyrene	66.67	60.75	91.1	28 - 130

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8270C

NTC12-SB29-0005

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Matrix: Solid

Batch: 0L27012

% Solids: 86.52

Source Sample Name: **1012185-23**

ANALYTE	SPIKE ADDED (ug/Kg dry)	SAMPLE CONCENTRATION (ug/Kg dry)	MS CONCENTRATION (ug/Kg dry)	MS % REC.	Q	QC LIMITS REC.
Acenaphthene	3853	28.51	2789	71.7		28 - 110
Acenaphthylene	3853	17.27	2739	70.6		23 - 126
Anthracene	3853	80.74	3959	101		28 - 136
Benzo(a)anthracene	3853	297.7	4030	96.9		31 - 146
Benzo(a)pyrene	3853	295.5	3047	71.4		28 - 128
Benzo(b)fluoranthene	3853	475.3	5112	120		30 - 139
Benzo(g,h,i)perylene	3853	157.5	2270	54.8		21 - 149
Benzo(k)fluoranthene	3853	135.2	3325	82.8		42 - 129
Chrysene	3853	305.4	2927	68.1		39 - 134
Dibenz(a,h)anthracene	3853	44.49	2962	75.7		30 - 138
Fluoranthene	3853	597.0	3646	79.1		30 - 142
Fluorene	3853	36.36	3178	81.5		27 - 116
Indeno(1,2,3-cd)pyrene	3853	138.6	2909	71.9		17 - 164
2-Methylnaphthalene	3853	87.94	2926	73.7		30 - 111
Naphthalene	3853	44.98	2627	67.0		29 - 106
Phenanthrene	3853	418.3	3945	91.5		32 - 127
Pyrene	3853	495.5	3663	82.2		28 - 130

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8270C

NTC12-SB29-0005

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Matrix: Solid

Batch: 0L27012

% Solids: 86.52

Source Sample Name: **1012185-23**

ANALYTE	SPIKE ADDED (ug/Kg dry)	MSD CONCENTRATION (ug/Kg dry)	MSD % REC. #	% RPD	Q	QC LIMITS RPD	QC LIMITS REC.
Acenaphthene	3853	2937	75.5	5.16		30	28 - 110
Acenaphthylene	3853	2834	73.1	3.39		30	23 - 126
Anthracene	3853	3115	78.8	23.9		30	28 - 136
Benzo(a)anthracene	3853	4235	102	4.98		30	31 - 146
Benzo(a)pyrene	3853	3232	76.2	5.87		30	28 - 128
Benzo(b)fluoranthene	3853	5988	143	15.8	*	30	30 - 139
Benzo(g,h,i)perylene	3853	2679	65.5	16.6		30	21 - 149
Benzo(k)fluoranthene	3853	3213	79.9	3.41		30	42 - 129
Chrysene	3853	2786	64.4	4.95		30	39 - 134
Dibenz(a,h)anthracene	3853	2944	75.2	0.615		30	30 - 138
Fluoranthene	3853	4440	99.8	19.6		30	30 - 142
Fluorene	3853	3400	87.3	6.74		30	27 - 116
Indeno(1,2,3-cd)pyrene	3853	2967	73.4	1.99		30	17 - 164
2-Methylnaphthalene	3853	4112	104	33.7	*	30	30 - 111
Naphthalene	3853	2664	68.0	1.39		30	29 - 106
Phenanthrene	3853	4848	115	20.5		30	32 - 127
Pyrene	3853	4122	94.1	11.8		30	28 - 130

ANALYSIS SEQUENCE SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 0K32711
Instrument: MS-BNA4
Calibration: 0327001

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	0K32711-TUN1	SEQ-TUN1.D	11/18/10 16:21
Cal Standard	0K32711-CAL1	SEQ-CAL1.D	11/18/10 16:40
Cal Standard	0K32711-CAL2	SEQ-CAL2.D	11/18/10 17:09
Cal Standard	0K32711-CAL3	SEQ-CAL3.D	11/18/10 17:38
Cal Standard	0K32711-CAL4	SEQ-CAL4.D	11/18/10 18:07
Cal Standard	0K32711-CAL5	SEQ-CAL5.D	11/18/10 18:36
Cal Standard	0K32711-CAL6	SEQ-CAL6.D	11/18/10 19:05
Cal Standard	0K32711-CAL7	SEQ-CAL7.D	11/18/10 19:34
Cal Standard	0K32711-CAL8	SEQ-CAL8.D	11/18/10 20:03
Cal Standard	0K32711-CAL9	SEQ-CAL9.D	11/18/10 20:32
Cal Standard	0K32711-CALA	SEQ-CALA.D	11/18/10 21:01
Cal Standard	0K32711-CALB	SEQ-CALB.D	11/18/10 21:30
MS Tune	0K32711-TUN2	SEQ-TUN1.D	11/23/10 08:42
Initial Cal Check	0K32711-ICV2	SEQ-ICV2.D	11/23/10 09:01

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Lab File ID:	SEQ-TUN1.D	Injection Date:	11/18/10
Instrument ID:	MS-BNA4	Injection Time:	16:21
Sequence:	0K32711	Lab Sample ID:	0K32711-TUN1

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
51	30 - 60% of 198	55.6	PASS
68	Less than 2% of 69	1.48	PASS
69	Less than 200% of 198	52.5	PASS
70	Less than 2% of 69	0.446	PASS
127	40 - 60% of 198	57.9	PASS
197	Less than 1% of 198	0.7	PASS
198	Base peak, 100% relative abundance	100	PASS
199	5 - 9% of 198	6.77	PASS
275	10 - 30% of 198	27.8	PASS
365	1 - 200% of 198	4.46	PASS
441	0.001 - 100% of 443	81.7	PASS
442	40 - 200% of 198	193	PASS
443	17 - 23% of 442	19.1	PASS

INITIAL CALIBRATION DATA

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0327001

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA4

Calibration Date: 11/18/2010 11:42:47AM

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
Acenaphthene	0.05	0.8828982	0.1	0.845877	0.25	0.9076022	0.5	0.8389518	1	0.8430033	2	0.848162
Acenaphthylene	0.05	1.173325	0.1	1.306329	0.25	1.290652	0.5	1.28229	1	1.284667	2	1.333458
Anthracene	0.05	1.125266	0.1	1.280229	0.25	1.193354	0.5	1.179251	1	1.10984	2	1.165325
Benzo(a)anthracene	0.05	0.9105883	0.1	0.9347731	0.25	1.00169	0.5	1.03581	1	1.048297	2	1.06883
Benzo(a)pyrene	0.05	0.8227443	0.1	0.9457683	0.25	1.082034	0.5	1.066643	1	1.049498	2	1.051584
Benzo(b)fluoranthene	0.05	1.026855	0.1	1.221442	0.25	1.172668	0.5	1.197067	1	1.141033	2	1.211929
Benzo(g,h,i)perylene	0.05	~~0.4857418~~	0.1	0.7885725	0.25	1.049614	0.5	0.9401314	1	0.9657843	2	0.9740693
Benzo(k)fluoranthene	0.05	1.209008	0.1	1.354585	0.25	1.27837	0.5	1.303001	1	1.281622	2	1.207003
Chrysene	0.05	0.8916508	0.1	1.07696	0.25	1.185853	0.5	1.19915	1	1.076729	2	1.055647
Dibenz(a,h)anthracene	0.05	~~0.6785875~~	0.1	0.7341172	0.25	0.8564726	0.5	0.8071165	1	0.8904278	2	0.9060637
Fluoranthene	0.05	1.002729	0.1	1.30594	0.25	1.246294	0.5	1.292046	1	1.236251	2	1.258244
Fluorene	0.05	0.7345815	0.1	0.7766922	0.25	0.8231454	0.5	0.8124029	1	0.841879	2	0.8397599
2-Fluorobiphenyl	0.05	0.8919691	0.1	0.8503179	0.25	0.9758529	0.5	0.8719322	1	0.9275229	2	0.9640577
2-Fluorophenol	0.1		0.2		0.5		1		2		4	
Indeno(1,2,3-cd)pyrene	0.05	~~0.7036001~~	0.1	0.8374838	0.25	1.040197	0.5	1.081496	1	1.10222	2	1.1186
1-Methylnaphthalene	0.05	0.7390374	0.1	0.9116336	0.25	0.8691706	0.5	0.7708751	1	0.8454656	2	0.8828832
2-Methylnaphthalene	0.05	0.7391965	0.1	0.8359044	0.25	0.8325295	0.5	0.7578106	1	0.8468512	2	0.8514712
Naphthalene	0.05	1.308593	0.1	1.314043	0.25	1.570848	0.5	1.29255	1	1.443398	2	1.487226
Nitrobenzene-d5	0.05		0.1		0.25		0.5		1		2	
Phenanthrene	0.05	1.079911	0.1	1.173024	0.25	1.231816	0.5	1.135557	1	1.145318	2	1.1668
Phenol-d6	0.1		0.2		0.5		1		2		4	
Pyrene	0.05	0.9481448	0.1	1.280151	0.25	1.30763	0.5	1.339267	1	1.290621	2	1.327657
Terphenyl-d14	0.05	0.5467985	0.1	0.7443593	0.25	0.7393059	0.5	0.771614	1	0.7358474	2	0.7699508
2,4,6-Tribromophenol	0.1	~~8.935605E-02~~	0.2	~~0.1151131~~	0.5	0.1357298	1	0.1441382	2	0.1672935	4	0.1728286
Acenaphthene-d10	1		1		1		1		1		1	
Chrysene-d12	1		1		1		1		1		1	

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0327001

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA4

Calibration Date: 11/18/2010 11:42:47AM

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF	ug/mL	RF
Acenaphthene	5	0.8656438	10	0.8974366	20	0.8329345	40	0.98012	50	0.8335643		
Acenaphthylene	5	1.323876	10	1.09471	20	0.8522199	40	~~0.7949507~~	50	~~0.8697711~~		
Anthracene	5	1.204749	10	1.178069	20	1.19873	40	1.247767	50	1.075385		
Benzo(a)anthracene	5	1.05975	10	0.9874522	20	1.071663	40	1.232727	50	1.023792		
Benzo(a)pyrene	5	1.132164	10	1.096037	20	1.11975	40	1.169449	50	1.076462		
Benzo(b)fluoranthene	5	1.340105	10	1.229151	20	1.425716	40	1.37139	50	1.330905		
Benzo(g,h,i)perylene	5	1.077065	10	1.116672	20	1.082621	40	0.9152272	50	0.8950882		
Benzo(k)fluoranthene	5	1.25324	10	1.234739	20	1.149729	40	1.080846	50	1.20625		
Chrysene	5	1.072869	10	0.9529287	20	0.9861661	40	1.04259	50	0.9202987		
Dibenz(a,h)anthracene	5	1.055326	10	1.074195	20	1.105403	40	1.151031	50	0.9598194		
Fluoranthene	5	1.279326	10	1.250434	20	1.231731	40	1.355104	50	1.183941		
Fluorene	5	0.8613002	10	0.8960006	20	0.8440762	40	0.9849279	50	0.8393634		
2-Fluorobiphenyl	5	0.9909831	10	1.038779	20	0.9298057	40	1.116559	50	0.9654803		
2-Fluorophenol	10		20		40		80		100			
Indeno(1,2,3-cd)pyrene	5	1.283955	10	1.343725	20	1.342124	40	1.395259	50	1.181023		
1-Methylnaphthalene	5	0.8675747	10	0.9123542	20	0.8229998	40	0.9752804	50	0.8529112		
2-Methylnaphthalene	5	0.8463611	10	0.9080878	20	0.807106	40	0.9533266	50	0.8106066		
Naphthalene	5	1.504908	10	1.643582	20	1.396208	40	1.694936	50	1.416328		
Nitrobenzene-d5	5		10		20		40		50			
Phenanthrene	5	1.160149	10	1.173967	20	1.160456	40	1.430026	50	1.148747		
Phenol-d6	10		20		40		80		100			
Pyrene	5	1.304686	10	1.260748	20	1.255199	40	1.378798	50	1.188894		
Terphenyl-d14	5	0.7669142	10	0.7619086	20	0.7458555	40	0.8211461	50	0.6880347		
2,4,6-Tribromophenol	10	0.1838046	20	0.1952478	40	0.1887652	80	0.1773852	100	0.1695174		
Acenaphthene-d10	1		1		1		1		1			
Chrysene-d12	1		1		1		1		1			

INITIAL CALIBRATION DATA (Continued)

SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Calibration: 0327001
Matrix: Water

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA4
Calibration Date: 11/18/2010 11:42:47AM

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Acenaphthene	0.8705631	5.127806	10.74564	0.127357			CCC (30)	
Acenaphthylene	1.215725	12.91251	10.52611	5.874362E-02			15	
Anthracene	1.177997	5.009078	12.65818	0.1671803			15	
Benzo(a)anthracene	1.034125	8.17021	15.98718	0.1330578			15	
Benzo(a)pyrene	1.055649	9.094329	18.21409	0.1648445			CCC (30)	
Benzo(b)fluoranthene	1.242569	9.274872	17.68582	0.1846034			15	
Benzo(g,h,i)perylene	0.9804845	10.38726	20.7744	0.2869294			15	
Benzo(k)fluoranthene	1.232581	6.101985	17.73054	0.1719389			15	
Chrysene	1.041895	9.473503	16.04382	0.1411001			15	
Dibenz(a,h)anthracene	0.9539972	14.50211	20.2462	0.2314109			15	
Fluoranthene	1.240185	7.295212	14.07445	9.593676E-02			CCC (30)	
Fluorene	0.8412845	7.589083	11.39291	0.1647586			15	
2-Fluorobiphenyl	0.95666	7.976747	9.860727	7.446044E-02			15	
2-Fluorophenol							15	
Indeno(1,2,3-cd)pyrene	1.172608	14.66311	20.2147	0.2717944			15	
1-Methylnaphthalene	0.8591078	7.682268	9.537182	8.424879E-02			15	
2-Methylnaphthalene	0.8353865	7.221973	9.415546	7.643274E-02			15	
Naphthalene	1.461147	9.244318	8.576909	5.753598E-02			15	
Nitrobenzene-d5							15	
Phenanthrene	1.182343	7.581185	12.59573	0.1932382			15	
Phenol-d6							15	
Pyrene	1.261981	9.134096	14.35845	0.1435666			15	
Terphenyl-d14	0.7356123	9.57126	14.53855	7.964107E-02			15	
2,4,6-Tribromophenol	0.1705234	11.52724	11.70989	0.2567149			15	
Acenaphthene-d10							15	
Chrysene-d12							15	

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Lab File ID:	SEQ-TUN1.D	Injection Date:	11/23/10
Instrument ID:	MS-BNA4	Injection Time:	08:42
Sequence:	0K32711	Lab Sample ID:	0K32711-TUN2

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
51	30 - 60% of 198	54.9	PASS
68	Less than 2% of 69	1.55	PASS
69	Less than 200% of 198	48.1	PASS
70	Less than 2% of 69	0.375	PASS
127	40 - 60% of 198	55.9	PASS
197	Less than 1% of 198	0	PASS
198	Base peak, 100% relative abundance	100	PASS
199	5 - 9% of 198	6.64	PASS
275	10 - 30% of 198	24.1	PASS
365	1 - 200% of 198	3.21	PASS
441	0.001 - 100% of 443	78.7	PASS
442	40 - 200% of 198	110	PASS
443	17 - 23% of 442	20	PASS

INITIAL CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA4	Calibration:	0327001
Lab File ID:	SEQ-ICV2.D	Calibration Date:	11/18/10 11:42
Sequence:	0K32711	Injection Date:	11/23/10
Lab Sample ID:	0K32711-ICV2	Injection Time:	09:01

COMPOUND	TYPE	CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
Acenaphthene	A	5.000	4.788	0.8705631	0.8335651		-4.2	20
Acenaphthylene	A	5.000	5.132	1.215725	1.247859		2.6	20
Anthracene	A	5.000	5.317	1.177997	1.252672		6.3	20
Benzo(a)anthracene	A	5.000	5.309	1.034125	1.09807		6.2	20
Benzo(a)pyrene	A	5.000	5.169	1.055649	1.091232		3.4	20
Benzo(b)fluoranthene	A	5.000	4.723	1.242569	1.173824		-5.5	20
Benzo(g,h,i)perylene	A	5.000	4.583	0.9804845	0.898746		-8.3	20
Benzo(k)fluoranthene	A	5.000	5.230	1.232581	1.289191		4.6	20
Chrysene	A	5.000	5.301	1.041895	1.104529		6.0	20
Dibenz(a,h)anthracene	A	5.000	4.792	0.9539972	0.9142389		-4.2	20
Fluoranthene	A	5.000	5.078	1.240185	1.259462		1.6	20
Fluorene	A	5.000	5.137	0.8412845	0.8642614		2.7	20
Indeno(1,2,3-cd)pyrene	A	5.000	4.739	1.172608	1.111297		-5.2	20
1-Methylnaphthalene	A	5.000	4.464	0.8591078	0.7669843		-10.7	20
2-Methylnaphthalene	A	5.000	5.352	0.8353865	0.8942804		7.0	20
Naphthalene	A	5.000	4.781	1.461147	1.397099		-4.4	20
Phenanthrene	A	5.000	5.215	1.182343	1.233121		4.3	20
Pyrene	A	5.000	5.105	1.261981	1.288415		2.1	20
2-Fluorobiphenyl	A	5.000	4.627	0.95666	0.8852986		-7.5	20
Terphenyl-d14	A	5.000	5.305	0.7356123	0.7805239		6.1	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

ANALYSIS SEQUENCE SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Sequence: 1A00308

Calibration: 0327001

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: MS-BNA4

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	1A00308-TUN1	SEQ-TUN1.D	12/30/10 17:08
Calibration Check	1A00308-CCV1	SEQ-CCV1.D	12/30/10 17:27
Blank	0L27012-BLK2	L27012B1.D	12/30/10 21:27
LCS	0L27012-BS2	L27012L1.D	12/30/10 21:56
NTC12-SB29-0005	1012185-23	1218523.D	12/30/10 22:25
NTC12-SB29-0204	1012185-24	1218524.D	12/30/10 22:55
NTC12-SB29-0005	0L27012-MS2	1218523M.D	12/30/10 23:24
NTC12-SB29-0005	0L27012-MSD2	1218523S.D	12/30/10 23:53

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Lab File ID:	SEQ-TUN1.D	Injection Date:	12/30/10
Instrument ID:	MS-BNA4	Injection Time:	17:08
Sequence:	1A00308	Lab Sample ID:	1A00308-TUN1

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
51	30 - 60% of 198	43.9	PASS
68	Less than 2% of 69	1.3	PASS
69	Less than 200% of 198	42	PASS
70	Less than 2% of 69	0.431	PASS
127	40 - 60% of 198	51.9	PASS
197	Less than 1% of 198	0.758	PASS
198	Base peak, 100% relative abundance	100	PASS
199	5 - 9% of 198	6.77	PASS
275	10 - 30% of 198	26.6	PASS
365	1 - 200% of 198	3.6	PASS
441	0.001 - 100% of 443	78.6	PASS
442	40 - 200% of 198	132	PASS
443	17 - 23% of 442	20	PASS

CONTINUING CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA4	Calibration:	0327001
Lab File ID:	SEQ-CCV1.D	Calibration Date:	11/18/10 11:42
Sequence:	1A00308	Injection Date:	12/30/10
Lab Sample ID:	1A00308-CCV1	Injection Time:	17:27

COMPOUND	TYPE	CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acenaphthene	A	5.000	4.629	0.8705631	0.8059422		-7.4	20
Acenaphthylene	A	5.000	5.013	1.215725	1.218961		0.3	20
Anthracene	A	5.000	5.285	1.177997	1.245103		5.7	20
Benzo(a)anthracene	A	5.000	5.168	1.034125	1.068979		3.4	20
Benzo(a)pyrene	A	5.000	5.386	1.055649	1.137169		7.7	20
Benzo(b)fluoranthene	A	5.000	5.249	1.242569	1.304563		5.0	20
Benzo(g,h,i)perylene	A	5.000	4.894	0.9804845	0.9597514		-2.1	20
Benzo(k)fluoranthene	A	5.000	5.521	1.232581	1.361097		10.4	20
Chrysene	A	5.000	5.135	1.041895	1.070095		2.7	20
Dibenz(a,h)anthracene	A	5.000	4.864	0.9539972	0.9280597		-2.7	20
Fluoranthene	A	5.000	4.792	1.240185	1.188622		-4.2	20
Fluorene	A	5.000	4.994	0.8412845	0.840252		-0.1	20
Indeno(1,2,3-cd)pyrene	A	5.000	4.941	1.172608	1.158855		-1.2	20
1-Methylnaphthalene	A	5.000	4.617	0.8591078	0.7932641		-7.7	20
2-Methylnaphthalene	A	5.000	4.622	0.8353865	0.7723198		-7.5	20
Naphthalene	A	5.000	4.496	1.461147	1.313819		-10.1	20
Phenanthrene	A	5.000	4.930	1.182343	1.165927		-1.4	20
Pyrene	A	5.000	4.876	1.261981	1.23071		-2.5	20
2-Fluorobiphenyl	A	5.000	4.504	0.95666	0.8616737		-9.9	20
Terphenyl-d14	A	5.000	5.270	0.7356123	0.7753459		5.4	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

ANALYSIS SEQUENCE SUMMARY

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Sequence:	1A00409	Instrument:	MS-BNA4
Calibration:	0327001		

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	1A00409-TUN1	SEQ-TUN1.D	01/03/11 13:19
Calibration Check	1A00409-CCV1	SEQ-CCV1.D	01/03/11 13:46
Blank	0L22011-BLK2	L22011B2.D	01/03/11 22:56
LCS	0L22011-BS2	L22011L2.D	01/03/11 23:26
NTC12-SB23-0005	1012185-01	1218501.D	01/03/11 23:56
NTC12-SB23-0810	1012185-02	1218502.D	01/04/11 00:26

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Lab File ID:	SEQ-TUN1.D	Injection Date:	01/03/11
Instrument ID:	MS-BNA4	Injection Time:	13:19
Sequence:	1A00409	Lab Sample ID:	1A00409-TUN1

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
51	30 - 60% of 198	53.2	PASS
68	Less than 2% of 69	1.47	PASS
69	Less than 200% of 198	48.9	PASS
70	Less than 2% of 69	0.435	PASS
127	40 - 60% of 198	54.5	PASS
197	Less than 1% of 198	0.83	PASS
198	Base peak, 100% relative abundance	100	PASS
199	5 - 9% of 198	6.76	PASS
275	10 - 30% of 198	26.9	PASS
365	1 - 200% of 198	3.99	PASS
441	0.001 - 100% of 443	81.2	PASS
442	40 - 200% of 198	186	PASS
443	17 - 23% of 442	19.2	PASS

CONTINUING CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA4	Calibration:	0327001
Lab File ID:	SEQ-CCV1.D	Calibration Date:	11/18/10 11:42
Sequence:	1A00409	Injection Date:	01/03/11
Lab Sample ID:	1A00409-CCV1	Injection Time:	13:46

COMPOUND	TYPE	CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acenaphthene	A	5.000	5.162	0.8705631	0.8988308		3.2	20
Acenaphthylene	A	5.000	5.648	1.215725	1.373377		13.0	20
Anthracene	A	5.000	5.761	1.177997	1.357375		15.2	20
Benzo(a)anthracene	A	5.000	5.295	1.034125	1.095211		5.9	20
Benzo(a)pyrene	A	5.000	5.364	1.055649	1.132581		7.3	20
Benzo(b)fluoranthene	A	5.000	4.759	1.242569	1.182591		-4.8	20
Benzo(g,h,i)perylene	A	5.000	5.414	0.9804845	1.061636		8.3	20
Benzo(k)fluoranthene	A	5.000	5.778	1.232581	1.424282		15.6	20
Chrysene	A	5.000	5.783	1.041895	1.205155		15.7	20
Dibenz(a,h)anthracene	A	5.000	5.164	0.9539972	0.9853274		3.3	20
Fluoranthene	A	5.000	5.287	1.240185	1.311381		5.7	20
Fluorene	A	5.000	5.476	0.8412845	0.921459		9.5	20
Indeno(1,2,3-cd)pyrene	A	5.000	5.263	1.172608	1.234265		5.3	20
1-Methylnaphthalene	A	5.000	5.185	0.8591078	0.8909659		3.7	20
2-Methylnaphthalene	A	5.000	5.111	0.8353865	0.8538588		2.2	20
Naphthalene	A	5.000	5.047	1.461147	1.474913		0.9	20
Phenanthrene	A	5.000	5.423	1.182343	1.282388		8.5	20
Pyrene	A	5.000	5.399	1.261981	1.362702		8.0	20
2-Fluorobiphenyl	A	5.000	5.082	0.95666	0.9723628		1.6	20
Terphenyl-d14	A	5.000	5.543	0.7356123	0.8155067		10.9	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

ANALYSIS SEQUENCE SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 1A00413
Instrument: MS-BNA4
Calibration: 0327001

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	1A00413-TUN1	SEQ-TUN1.D	01/04/11 13:08
Calibration Check	1A00413-CCV1	SEQ-CCV1.D	01/04/11 13:27
NTC12-SB24-0005	1012185-03	1218503.D	01/04/11 15:33
NTC12-SB24-00502	1012185-04	1218504.D	01/04/11 16:03
NTC12-SB30-0005	1012185-06	1218506.D	01/04/11 16:34
NTC12-SB30-00502	1012185-07	1218507.D	01/04/11 17:04
NTC12-SB26-0406	1012185-09	1218509.D	01/04/11 18:04
NTC12-DUP02	1012185-11	1218511.D	01/04/11 19:04
NTC12-SB22-0005	1012185-15	1218515.D	01/04/11 20:34
NTC12-SB22-00502	1012185-16	1218516.D	01/04/11 21:04
NTC12-SB21-0005	1012185-17	1218517.D	01/04/11 21:34
NTC12-SB21-0507	1012185-18	1218518.D	01/04/11 22:04
NTC12-SB25-0005	1012185-19	1218519.D	01/04/11 22:34
NTC12-SB28-0204	1012185-22	1218522.D	01/05/11 00:04

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Lab File ID:	SEQ-TUN1.D	Injection Date:	01/04/11
Instrument ID:	MS-BNA4	Injection Time:	13:08
Sequence:	1A00413	Lab Sample ID:	1A00413-TUN1

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
51	30 - 60% of 198	59.1	PASS
68	Less than 2% of 69	1.62	PASS
69	Less than 200% of 198	56	PASS
70	Less than 2% of 69	0.328	PASS
127	40 - 60% of 198	58.9	PASS
197	Less than 1% of 198	0	PASS
198	Base peak, 100% relative abundance	100	PASS
199	5 - 9% of 198	7.18	PASS
275	10 - 30% of 198	23.9	PASS
365	1 - 200% of 198	2.62	PASS
441	0.001 - 100% of 443	77.3	PASS
442	40 - 200% of 198	88.3	PASS
443	17 - 23% of 442	20.8	PASS

CONTINUING CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA4	Calibration:	0327001
Lab File ID:	SEQ-CCV1.D	Calibration Date:	11/18/10 11:42
Sequence:	1A00413	Injection Date:	01/04/11
Lab Sample ID:	1A00413-CCV1	Injection Time:	13:27

		CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acenaphthene	A	5.000	4.586	0.8705631	0.7984156		-8.3	20
Acenaphthylene	A	5.000	5.114	1.215725	1.24347		2.3	20
Anthracene	A	5.000	5.610	1.177997	1.321727		12.2	20
Benzo(a)anthracene	A	5.000	5.619	1.034125	1.162052		12.4	20
Benzo(a)pyrene	A	5.000	5.318	1.055649	1.122815		6.4	20
Benzo(b)fluoranthene	A	5.000	4.879	1.242569	1.212583		-2.4	20
Benzo(g,h,i)perylene	A	5.000	5.673	0.9804845	1.112447		13.5	20
Benzo(k)fluoranthene	A	5.000	5.431	1.232581	1.3389		8.6	20
Chrysene	A	5.000	5.787	1.041895	1.205897		15.7	20
Dibenz(a,h)anthracene	A	5.000	5.455	0.9539972	1.040802		9.1	20
Fluoranthene	A	5.000	5.137	1.240185	1.274171		2.7	20
Fluorene	A	5.000	5.001	0.8412845	0.8414732		0.02	20
Indeno(1,2,3-cd)pyrene	A	5.000	5.547	1.172608	1.300825		10.9	20
1-Methylnaphthalene	A	5.000	4.631	0.8591078	0.7956699		-7.4	20
2-Methylnaphthalene	A	5.000	4.603	0.8353865	0.7691393		-7.9	20
Naphthalene	A	5.000	4.433	1.461147	1.295323		-11.3	20
Phenanthrene	A	5.000	5.228	1.182343	1.236199		4.6	20
Pyrene	A	5.000	5.298	1.261981	1.337242		6.0	20
2,4,6-Tribromophenol	A	10.00	9.991	0.1705234	0.1703775		-0.09	20
2-Fluorobiphenyl	A	5.000	4.435	0.95666	0.8485537		-11.3	20
Terphenyl-d14	A	5.000	5.705	0.7356123	0.8394057		14.1	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

ANALYSIS SEQUENCE SUMMARY

SW8270C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 1A00708
Instrument: MS-BNA4
Calibration: 0327001

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	1A00708-TUN1	SEQ-TUN1.D	01/07/11 12:04
Calibration Check	1A00708-CCV1	SEQ-CCV1.D	01/07/11 12:22
NTC12-SB26-0406	1012185-09RE1	1218509D.D	01/07/11 15:59
NTC12-DUP02	1012185-11RE1	1218511D.D	01/07/11 16:29
NTC12-SB21-0005	1012185-17RE1	1218517D.D	01/07/11 17:00
NTC12-SB28-0204	1012185-22RE1	1218522D.D	01/07/11 17:30
NTC12-DUP01	1012185-10	1218510.D	01/07/11 18:00
NTC12-SB27-0204	1012185-14	1218514.D	01/07/11 18:31
NTC12-SB27-0204	0L22011-MS2	1218514M.D	01/07/11 19:01
NTC12-SB27-0204	0L22011-MSD2	1218514S.D	01/07/11 19:31
NTC12-SB28-0005	1012185-21	1218521.D	01/07/11 20:01
NTC12-SB27-0005	1012185-13	1218513.D	01/07/11 20:31
NTC12-SB25-0204	1012185-20	1218520.D	01/07/11 21:02
NTC12-SB26-0005	1012185-08	1218508.D	01/07/11 21:32

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Lab File ID:	SEQ-TUN1.D	Injection Date:	01/07/11
Instrument ID:	MS-BNA4	Injection Time:	12:04
Sequence:	1A00708	Lab Sample ID:	1A00708-TUN1

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
51	30 - 60% of 198	50.3	PASS
68	Less than 2% of 69	1.38	PASS
69	Less than 200% of 198	47.6	PASS
70	Less than 2% of 69	0.416	PASS
127	40 - 60% of 198	54.7	PASS
197	Less than 1% of 198	0.0102	PASS
198	Base peak, 100% relative abundance	100	PASS
199	5 - 9% of 198	6.89	PASS
275	10 - 30% of 198	28.5	PASS
365	1 - 200% of 198	3.96	PASS
441	0.001 - 100% of 443	77	PASS
442	40 - 200% of 198	178	PASS
443	17 - 23% of 442	19.6	PASS

CONTINUING CALIBRATION CHECK

SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	MS-BNA4	Calibration:	0327001
Lab File ID:	SEQ-CCV1.D	Calibration Date:	11/18/10 11:42
Sequence:	1A00708	Injection Date:	01/07/11
Lab Sample ID:	1A00708-CCV1	Injection Time:	12:22

COMPOUND	TYPE	CONC. (ug/mL)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acenaphthene	A	5.000	4.759	0.8705631	0.8286849		-4.8	20
Acenaphthylene	A	5.000	5.484	1.215725	1.333447		9.7	20
Anthracene	A	5.000	5.308	1.177997	1.250473		6.2	20
Benzo(a)anthracene	A	5.000	4.663	1.034125	0.9643916		-6.7	20
Benzo(a)pyrene	A	5.000	5.351	1.055649	1.129748		7.0	20
Benzo(b)fluoranthene	A	5.000	5.699	1.242569	1.416384		14.0	20
Benzo(g,h,i)perylene	A	5.000	5.437	0.9804845	1.066151		8.7	20
Benzo(k)fluoranthene	A	5.000	5.173	1.232581	1.275328		3.5	20
Chrysene	A	5.000	4.296	1.041895	0.8951615		-14.1	20
Dibenz(a,h)anthracene	A	5.000	5.197	0.9539972	0.9916571		3.9	20
Fluoranthene	A	5.000	4.884	1.240185	1.211499		-2.3	20
Fluorene	A	5.000	5.166	0.8412845	0.8692789		3.3	20
Indeno(1,2,3-cd)pyrene	A	5.000	5.221	1.172608	1.224407		4.4	20
1-Methylnaphthalene	A	5.000	5.127	0.8591078	0.8808897		2.5	20
2-Methylnaphthalene	A	5.000	5.049	0.8353865	0.8435099		1.0	20
Naphthalene	A	5.000	5.121	1.461147	1.496616		2.4	20
Phenanthrene	A	5.000	4.959	1.182343	1.172589		-0.8	20
Pyrene	A	5.000	4.863	1.261981	1.227344		-2.7	20
2-Fluorobiphenyl	A	5.000	4.704	0.95666	0.8999399		-5.9	20
Terphenyl-d14	A	5.000	5.108	0.7356123	0.7514662		2.2	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

INTERNAL STANDARD AREA AND RT SUMMARY
SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00308

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA4
Calibration: 0327001

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Calibration Check (1A00308-CCV1)			Lab File ID: SEQ-CCV1.D			Analyzed: 12/30/10 17:27			
Phenanthrene-d10	163778	12.445	126302	12.551	130	50 - 200	-0.1060	+/-0.50	
Perylene-d12	140775	18.143	119419	18.277	118	50 - 200	-0.1340	+/-0.50	
Blank (0L27012-BLK2)			Lab File ID: L27012B1.D			Analyzed: 12/30/10 21:27			
Phenanthrene-d10	135523	12.445	163778	12.445	83	50 - 200	0.0000	+/-0.50	
Perylene-d12	99941	18.143	140775	18.143	71	50 - 200	0.0000	+/-0.50	
LCS (0L27012-BS2)			Lab File ID: L27012L1.D			Analyzed: 12/30/10 21:56			
Phenanthrene-d10	150624	12.445	163778	12.445	92	50 - 200	0.0000	+/-0.50	
Perylene-d12	130094	18.143	140775	18.143	92	50 - 200	0.0000	+/-0.50	
NTC12-SB29-0005 (1012185-23)			Lab File ID: 1218523.D			Analyzed: 12/30/10 22:25			
Phenanthrene-d10	173807	12.463	163778	12.445	106	50 - 200	0.0180	+/-0.50	
Perylene-d12	113917	18.209	140775	18.143	81	50 - 200	0.0660	+/-0.50	
NTC12-SB29-0204 (1012185-24)			Lab File ID: 1218524.D			Analyzed: 12/30/10 22:55			
Phenanthrene-d10	138474	12.473	163778	12.445	85	50 - 200	0.0280	+/-0.50	
Perylene-d12	94644	18.218	140775	18.143	67	50 - 200	0.0750	+/-0.50	
Matrix Spike (0L27012-MS2)			Lab File ID: 1218523M.D			Analyzed: 12/30/10 23:24			
Phenanthrene-d10	161910	12.501	163778	12.445	99	50 - 200	0.0560	+/-0.50	
Perylene-d12	93996	18.264	140775	18.143	67	50 - 200	0.1210	+/-0.50	
Matrix Spike Dup (0L27012-MSD2)			Lab File ID: 1218523S.D			Analyzed: 12/30/10 23:53			
Phenanthrene-d10	170974	12.51	163778	12.445	104	50 - 200	0.0650	+/-0.50	
Perylene-d12	81838	18.292	140775	18.143	58	50 - 200	0.1490	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SW8270C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Sequence:	1A00409	Instrument:	MS-BNA4
		Calibration:	0327001

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Calibration Check (1A00409-CCV1)			Lab File ID: SEQ-CCV1.D			Analyzed: 01/03/11 13:46			
Phenanthrene-d10	137192	12.443	126302	12.551	109	50 - 200	-0.1080	+/-0.50	
Perylene-d12	128062	18.151	119419	18.277	107	50 - 200	-0.1260	+/-0.50	
Blank (0L22011-BLK2)			Lab File ID: L22011B2.D			Analyzed: 01/03/11 22:56			
Phenanthrene-d10	164548	12.443	137192	12.443	120	50 - 200	0.0000	+/-0.50	
Perylene-d12	123396	18.16	128062	18.151	96	50 - 200	0.0090	+/-0.50	
LCS (0L22011-BS2)			Lab File ID: L22011L2.D			Analyzed: 01/03/11 23:26			
Phenanthrene-d10	162002	12.443	137192	12.443	118	50 - 200	0.0000	+/-0.50	
Perylene-d12	128790	18.161	128062	18.151	101	50 - 200	0.0100	+/-0.50	
NTC12-SB23-0005 (1012185-01)			Lab File ID: 1218501.D			Analyzed: 01/03/11 23:56			
Phenanthrene-d10	182732	12.443	137192	12.443	133	50 - 200	0.0000	+/-0.50	
Perylene-d12	151203	18.17	128062	18.151	118	50 - 200	0.0190	+/-0.50	
NTC12-SB23-0810 (1012185-02)			Lab File ID: 1218502.D			Analyzed: 01/04/11 00:26			
Phenanthrene-d10	163781	12.462	137192	12.443	119	50 - 200	0.0190	+/-0.50	
Perylene-d12	120876	18.188	128062	18.151	94	50 - 200	0.0370	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00413

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA4
Calibration: 0327001

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Calibration Check (1A00413-CCV1)			Lab File ID: SEQ-CCV1.D			Analyzed: 01/04/11 13:27			
Phenanthrene-d10	170158	12.44	126302	12.551	135	50 - 200	-0.1110	+/-0.50	
Perylene-d12	177579	18.139	119419	18.277	149	50 - 200	-0.1380	+/-0.50	
NTC12-SB24-0005 (1012185-03)			Lab File ID: 1218503.D			Analyzed: 01/04/11 15:33			
Phenanthrene-d10	177059	12.449	170158	12.44	104	50 - 200	0.0090	+/-0.50	
Perylene-d12	139856	18.166	177579	18.139	79	50 - 200	0.0270	+/-0.50	
NTC12-SB24-00502 (1012185-04)			Lab File ID: 1218504.D			Analyzed: 01/04/11 16:03			
Phenanthrene-d10	162304	12.44	170158	12.44	95	50 - 200	0.0000	+/-0.50	
Perylene-d12	141511	18.157	177579	18.139	80	50 - 200	0.0180	+/-0.50	
NTC12-SB30-0005 (1012185-06)			Lab File ID: 1218506.D			Analyzed: 01/04/11 16:34			
Phenanthrene-d10	170459	12.449	170158	12.44	100	50 - 200	0.0090	+/-0.50	
Perylene-d12	144610	18.166	177579	18.139	81	50 - 200	0.0270	+/-0.50	
NTC12-SB30-00502 (1012185-07)			Lab File ID: 1218507.D			Analyzed: 01/04/11 17:04			
Phenanthrene-d10	165860	12.44	170158	12.44	97	50 - 200	0.0000	+/-0.50	
Perylene-d12	137087	18.166	177579	18.139	77	50 - 200	0.0270	+/-0.50	
NTC12-SB26-0406 (1012185-09)			Lab File ID: 1218509.D			Analyzed: 01/04/11 18:04			
Phenanthrene-d10	194376	12.533	170158	12.44	114	50 - 200	0.0930	+/-0.50	
Perylene-d12	126759	18.361	177579	18.139	71	50 - 200	0.2220	+/-0.50	
NTC12-DUP02 (1012185-11)			Lab File ID: 1218511.D			Analyzed: 01/04/11 19:04			
Phenanthrene-d10	121290	12.57	170158	12.44	71	50 - 200	0.1300	+/-0.50	
Perylene-d12	95495	18.417	177579	18.139	54	50 - 200	0.2780	+/-0.50	
NTC12-SB22-0005 (1012185-15)			Lab File ID: 1218515.D			Analyzed: 01/04/11 20:34			
Phenanthrene-d10	145301	12.505	170158	12.44	85	50 - 200	0.0650	+/-0.50	
Perylene-d12	88963	18.324	177579	18.139	50	50 - 200	0.1850	+/-0.50	
NTC12-SB22-00502 (1012185-16)			Lab File ID: 1218516.D			Analyzed: 01/04/11 21:04			
Phenanthrene-d10	171502	12.523	170158	12.44	101	50 - 200	0.0830	+/-0.50	
Perylene-d12	106595	18.38	177579	18.139	60	50 - 200	0.2410	+/-0.50	
NTC12-SB21-0005 (1012185-17)			Lab File ID: 1218517.D			Analyzed: 01/04/11 21:34			
Phenanthrene-d10	179529	12.523	170158	12.44	106	50 - 200	0.0830	+/-0.50	
Perylene-d12	115208	18.38	177579	18.139	65	50 - 200	0.2410	+/-0.50	
NTC12-SB21-0507 (1012185-18)			Lab File ID: 1218518.D			Analyzed: 01/04/11 22:04			
Phenanthrene-d10	183147	12.626	170158	12.44	108	50 - 200	0.1860	+/-0.50	
Perylene-d12	106845	18.52	177579	18.139	60	50 - 200	0.3810	+/-0.50	
NTC12-SB25-0005 (1012185-19)			Lab File ID: 1218519.D			Analyzed: 01/04/11 22:34			
Phenanthrene-d10	190016	12.561	170158	12.44	112	50 - 200	0.1210	+/-0.50	
Perylene-d12	96969	18.464	177579	18.139	55	50 - 200	0.3250	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00413

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA4
Calibration: 0327001

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
NTC12-SB28-0204 (1012185-22)			Lab File ID: 1218522.D			Analyzed: 01/05/11 00:04			
Phenanthrene-d10	182273	12.635	170158	12.44	107	50 - 200	0.1950	+/-0.50	
Perylene-d12	169787	18.585	177579	18.139	96	50 - 200	0.4460	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00708

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA4
Calibration: 0327001

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Calibration Check (1A00708-CCV1)			Lab File ID: SEQ-CCV1.D			Analyzed: 01/07/11 12:22			
Phenanthrene-d10	151515	12.375	126302	12.551	120	50 - 200	-0.1760	+/-0.50	
Perylene-d12	102554	18.055	119419	18.277	86	50 - 200	-0.2220	+/-0.50	
NTC12-SB26-0406 (1012185-09RE1)			Lab File ID: 1218509D.D			Analyzed: 01/07/11 15:59			
Phenanthrene-d10	128012	12.375	151515	12.375	84	50 - 200	0.0000	+/-0.50	
Perylene-d12	105518	18.074	102554	18.055	103	50 - 200	0.0190	+/-0.50	
NTC12-DUP02 (1012185-11RE1)			Lab File ID: 1218511D.D			Analyzed: 01/07/11 16:29			
Phenanthrene-d10	119191	12.375	151515	12.375	79	50 - 200	0.0000	+/-0.50	
Perylene-d12	74656	18.074	102554	18.055	73	50 - 200	0.0190	+/-0.50	
NTC12-SB21-0005 (1012185-17RE1)			Lab File ID: 1218517D.D			Analyzed: 01/07/11 17:00			
Phenanthrene-d10	127119	12.375	151515	12.375	84	50 - 200	0.0000	+/-0.50	
Perylene-d12	87716	18.056	102554	18.055	86	50 - 200	0.0010	+/-0.50	
NTC12-SB28-0204 (1012185-22RE1)			Lab File ID: 1218522D.D			Analyzed: 01/07/11 17:30			
Phenanthrene-d10	122513	12.376	151515	12.375	81	50 - 200	0.0010	+/-0.50	
Perylene-d12	76111	18.056	102554	18.055	74	50 - 200	0.0010	+/-0.50	
NTC12-DUP01 (1012185-10)			Lab File ID: 1218510.D			Analyzed: 01/07/11 18:00			
Phenanthrene-d10	148282	12.366	151515	12.375	98	50 - 200	-0.0090	+/-0.50	
Perylene-d12	99117	18.056	102554	18.055	97	50 - 200	0.0010	+/-0.50	
NTC12-SB27-0204 (1012185-14)			Lab File ID: 1218514.D			Analyzed: 01/07/11 18:31			
Phenanthrene-d10	140927	12.375	151515	12.375	93	50 - 200	0.0000	+/-0.50	
Perylene-d12	82407	18.056	102554	18.055	80	50 - 200	0.0010	+/-0.50	
Matrix Spike (0L22011-MS2)			Lab File ID: 1218514M.D			Analyzed: 01/07/11 19:01			
Phenanthrene-d10	153432	12.385	151515	12.375	101	50 - 200	0.0100	+/-0.50	
Perylene-d12	111137	18.074	102554	18.055	108	50 - 200	0.0190	+/-0.50	
Matrix Spike Dup (0L22011-MSD2)			Lab File ID: 1218514S.D			Analyzed: 01/07/11 19:31			
Phenanthrene-d10	175821	12.385	151515	12.375	116	50 - 200	0.0100	+/-0.50	
Perylene-d12	89288	18.074	102554	18.055	87	50 - 200	0.0190	+/-0.50	
NTC12-SB28-0005 (1012185-21)			Lab File ID: 1218521.D			Analyzed: 01/07/11 20:01			
Phenanthrene-d10	174637	12.375	151515	12.375	115	50 - 200	0.0000	+/-0.50	
Perylene-d12	86089	18.065	102554	18.055	84	50 - 200	0.0100	+/-0.50	
NTC12-SB27-0005 (1012185-13)			Lab File ID: 1218513.D			Analyzed: 01/07/11 20:31			
Phenanthrene-d10	184599	12.375	151515	12.375	122	50 - 200	0.0000	+/-0.50	
Perylene-d12	60774	18.074	102554	18.055	59	50 - 200	0.0190	+/-0.50	
NTC12-SB25-0204 (1012185-20)			Lab File ID: 1218520.D			Analyzed: 01/07/11 21:02			
Phenanthrene-d10	191519	12.375	151515	12.375	126	50 - 200	0.0000	+/-0.50	
Perylene-d12	56687	18.083	102554	18.055	55	50 - 200	0.0280	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SW8270C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00708

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: MS-BNA4
Calibration: 0327001

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
NTC12-SB26-0005 (1012185-08)			Lab File ID: 1218508.D			Analyzed: 01/07/11 21:32			
Phenanthrene-d10	175972	12.375	151515	12.375	116	50 - 200	0.0000	+/-0.50	
Perylene-d12	43817	18.074	102554	18.055	43	50 - 200	0.0190	+/-0.50	*

SAMPLE ID NTC12-DUP02

SAMPLE CALC IS AREA	DILUTION	COMPOUND OF INTEREST	IS AMOUNT (NG)	Final Extract Volume (UL)	AVE RRF	CONCENTRATION PPB
95495	1	3809711	1	1000	1.2426	2581.93
		% Solids	**Amt. Inj. (UL)**	**Sample Volume (Grams)**		
		0.829	1	15		

benzo(b)fluoranthere = 2,580 ug/kg

Data File: \\ELABNSH05\TARGET\chem\bna4.i\010411B4.b\1218511.D
Report Date: 10-Jan-2011 16:56

Laboratory Name

Data file : \\ELABNSH05\TARGET\chem\bna4.i\010411B4.b\1218511.D
Lab Smp Id: 1012185-11 Client Smp ID: NTC12-DUP02
Inj Date : 04-JAN-2011 19:04 MS Autotune Date: 08-MAY-2010 12:24
Operator : MEC Inst ID: bna4.i
Smp Info : 1012185-11;1;15;1000;1;UG/KG;23-DEC-2010
Misc Info : ;0;;;;0L22011;pahsurmis.sub;
Comment :
Method : \\ELABNSH05\TARGET\chem\bna4.i\010411B4.b\IXBN4LOW.m
Meth Date : 04-Jan-2011 16:02 gquick Quant Type: ISTD
Cal Date : 18-NOV-2010 21:30 Cal File: SEQ-CALB.D
Als bottle: 12
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: pahsurmis.sub
Target Version: 4.04
Processing Host: TARGET17_VM

Concentration Formula: Amt * DF * Uf * Vt*Vi/(Amt * Vi * (Solids/100))

Name	Value	Description
DF	1.000	Dilution Factor
Uf	1.000	ng unit correction factor
Vt	1000.000	Volume of final extract (uL)(1000 low, 2
Amt	15.000	Mass of initial extraction
Vi	1.000	Volume injected (uL)
Solids	100.000	Percent Solids

GVQ 1/10/11

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/ul)	FINAL (UG/KG)
* 102 Phenanthrene-d10	188	12.570	12.440	(1.000)	121290	1.00000	(M)
51 Naphthalene	128	8.470	8.442	(0.674)	1041201	5.87511	391.7
55 2-Methylnaphthalene	142	9.316	9.288	(0.741)	859808	8.48573	565.7 (M)
56 1-Methylnaphthalene	142	9.428	9.409	(0.750)	481319	4.61913	307.9 (M)
$ 74 2-Fluorobiphenyl	172	9.818	9.735	(0.781)	4563082	39.3256	2622 (M)
77 Acenaphthylene	152	10.525	10.404	(0.837)	152081	1.03137	68.76
80 Acenaphthene	153	10.739	10.618	(0.854)	290879	2.75478	183.6 (M)
88 Fluorene	166	11.389	11.259	(0.906)	385059	3.77363	251.6 (QM)
$ 107 2,4,6-Tribromophenol	330	11.677	11.575	(0.929)	988296	47.7835	3186 (M)
111 Phenanthrene	178	12.607	12.468	(1.003)	5056112	35.2572	2350
112 Anthracene	178	12.672	12.533	(1.008)	1304522	9.13024	608.7 (H)
116 Fluoranthene	202	14.113	13.955	(1.123)	10933812	72.6875	4846 (AMH)
134 Pyrene	202	14.411	14.234	(1.146)	9485853	61.9724	4131 (AMH)

1/11/11

Data File: \\ELABNSH05\TARGET\chem\bna4.i\010411B4.b\1218511.D
Report Date: 10-Jan-2011 16:56

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/ul)	CONCENTRATIONS FINAL (UG/KG)
* 154 Perylene-d12	264	18.417	18.139	(1.000)	95495	1.00000	(QM)
$ 135 Terphenyl-d14	244	14.559	14.420	(1.158)	4699673	52.6737	3512 (AM)
138 Benzo(a)anthracene	228	16.056	15.852	(1.277)	4356762	34.7349	2316 (M)
139 Chrysene	228	16.112	15.907	(1.282)	3062317	24.2327	1616 (M)
156 Benzo(b)fluoranthene	252	17.804	17.534	(0.967)	3809711	32.1063	2140 (M)
157 Benzo(k)fluoranthene	252	17.832	17.581	(0.968)	1091426	9.27253	618.2 (M)
158 Benzo(a)pyrene	252	18.334	18.055	(0.995)	2128941	21.1185	1408 (M)
159 Indeno(1,2,3-cd)pyrene	276	20.407	20.007	(1.108)	1120174	10.0035	666.9 (M)
160 Dibenz(a,h)anthracene	278	20.397	20.035	(1.108)	362132	3.97502	265.0 (M)
161 Benzo(g,h,i)perylene	276	21.011	20.556	(1.141)	881656	9.41625	627.7 (M)

QC Flag Legend

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.

Data for SW8082A Forms

HOLDING TIME SUMMARY

SW8082A

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NTC12-SOIL-IDW	12/20/10 18:00	12/21/10 09:15	12/22/10 14:30	1.90	14.00	01/04/11 16:34	13.09	40.00	
NTC12-SB27-0204	12/20/10 15:35	12/21/10 09:15	12/22/10 14:30	2.00	14.00	01/05/11 22:19	14.33	40.00	
NTC12-SB21-0507	12/20/10 16:25	12/21/10 09:15	12/27/10 11:48	6.85	14.00	01/06/11 01:25	9.57	40.00	
NTC12-SB21-0507	12/20/10 16:25	12/21/10 09:15	12/27/10 11:48	6.85	14.00	01/06/11 17:01	10.22	40.00	
NTC12-SB25-0204	12/20/10 16:40	12/21/10 09:15	12/27/10 11:48	6.84	14.00	01/06/11 02:39	9.62	40.00	
NTC12-SB25-0204	12/20/10 16:40	12/21/10 09:15	12/27/10 11:48	6.84	14.00	01/06/11 17:19	10.23	40.00	
NTC12-SB28-0204	12/20/10 17:05	12/21/10 09:15	12/27/10 11:48	6.82	14.00	01/05/11 21:24	9.40	40.00	
NTC12-SB28-0204	12/20/10 17:05	12/21/10 09:15	12/27/10 11:48	6.82	14.00	01/06/11 17:38	10.24	40.00	
NTC12-SB29-0204	12/20/10 17:25	12/21/10 09:15	12/27/10 11:48	6.81	14.00	01/05/11 22:01	9.43	40.00	
NTC12-SB29-0204	12/20/10 17:25	12/21/10 09:15	12/27/10 11:48	6.81	14.00	01/06/11 17:57	10.26	40.00	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8082A

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 0L36408

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: GL-ECD3
Calibration: 0362003

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Calibration Check (0L36408-CCV1) ug/L				Lab File ID: 003F1301.D		Analyzed: 12/29/10 19:03		
Tetrachloro-m-xylene	100.0	92.6	80 - 120	5.473	5.473	0.0000	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	86.0	80 - 120	4.606	4.606	0.0000	+/-0.030	
Decachlorobiphenyl	100.0	96.8	80 - 120	11.738	11.738	0.0000	+/-0.030	
Decachlorobiphenyl [2C]	100.0	90.0	80 - 120	10.12	10.12	0.0000	+/-0.030	
Blank (0L21019-BLK1) ug/Kg wet				Lab File ID: 007F1701.D		Analyzed: 12/29/10 20:17		
Tetrachloro-m-xylene	33.33	75.3	70 - 125	5.472	5.473	-0.0010	+/-0.030	
Tetrachloro-m-xylene [2C]	33.33	72.1	70 - 125	4.606	4.606	0.0000	+/-0.030	
Decachlorobiphenyl	33.33	82.7	60 - 125	11.739	11.738	0.0010	+/-0.030	
Decachlorobiphenyl [2C]	33.33	79.6	60 - 125	10.117	10.12	-0.0030	+/-0.030	
LCS (0L21019-BS2) ug/Kg wet				Lab File ID: 009F1901.D		Analyzed: 12/29/10 20:54		
Tetrachloro-m-xylene	33.33	76.8	70 - 125	5.472	5.473	-0.0010	+/-0.030	
Tetrachloro-m-xylene [2C]	33.33	71.2	70 - 125	4.606	4.606	0.0000	+/-0.030	
Decachlorobiphenyl	33.33	86.2	60 - 125	11.739	11.738	0.0010	+/-0.030	
Decachlorobiphenyl [2C]	33.33	83.3	60 - 125	10.119	10.12	-0.0010	+/-0.030	
Calibration Check (0L36408-CCV4) ug/L				Lab File ID: 020F3001.D		Analyzed: 12/30/10 00:18		
Tetrachloro-m-xylene	100.0	94.6	80 - 120	5.471	5.473	-0.0020	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	93.3	80 - 120	4.605	4.606	-0.0010	+/-0.030	
Decachlorobiphenyl	100.0	99.2	80 - 120	11.74	11.738	0.0020	+/-0.030	
Decachlorobiphenyl [2C]	100.0	96.5	80 - 120	10.118	10.12	-0.0020	+/-0.030	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8082A

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00604

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: GL-ECD3
Calibration: 1005002

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Calibration Check (1A00604-CCV1) ug/L				Lab File ID: 014F1401.D		Analyzed: 01/04/11 15:20		
Tetrachloro-m-xylene	100.0	106	80 - 120	5.322	5.322	0.0000	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	106	80 - 120	4.487	4.487	0.0000	+/-0.030	
Decachlorobiphenyl	100.0	99.0	80 - 120	11.52	11.52	0.0000	+/-0.030	
Decachlorobiphenyl [2C]	100.0	96.5	80 - 120	9.923	9.923	0.0000	+/-0.030	
NTC12-SOIL-IDW (1012185-12) ug/Kg dry				Lab File ID: 018F1801.D		Analyzed: 01/04/11 16:34		
Tetrachloro-m-xylene	18.18	57.0	70 - 125	5.319	5.322	-0.0030	+/-0.030	*
Tetrachloro-m-xylene [2C]	18.18	55.8	70 - 125	4.479	4.487	-0.0080	+/-0.030	*
Decachlorobiphenyl	18.18	62.6	60 - 125	11.519	11.52	-0.0010	+/-0.030	
Decachlorobiphenyl [2C]	18.18	73.8	60 - 125	9.922	9.923	-0.0010	+/-0.030	
Blank (0L22010-BLK1) ug/Kg wet				Lab File ID: 019F1901.D		Analyzed: 01/04/11 16:52		
Tetrachloro-m-xylene	16.67	74.9	70 - 125	5.321	5.322	-0.0010	+/-0.030	
Tetrachloro-m-xylene [2C]	16.67	82.7	70 - 125	4.484	4.487	-0.0030	+/-0.030	
Decachlorobiphenyl	16.67	70.7	60 - 125	11.519	11.52	-0.0010	+/-0.030	
Decachlorobiphenyl [2C]	16.67	67.6	60 - 125	9.922	9.923	-0.0010	+/-0.030	
LCS (0L22010-BS2) ug/Kg wet				Lab File ID: 022F2201.D		Analyzed: 01/04/11 17:48		
Tetrachloro-m-xylene	16.67	80.7	70 - 125	5.32	5.322	-0.0020	+/-0.030	
Tetrachloro-m-xylene [2C]	16.67	85.3	70 - 125	4.485	4.487	-0.0020	+/-0.030	
Decachlorobiphenyl	16.67	75.3	60 - 125	11.52	11.52	0.0000	+/-0.030	
Decachlorobiphenyl [2C]	16.67	82.1	60 - 125	9.921	9.923	-0.0020	+/-0.030	
LCS Dup (0L22010-BSD2) ug/Kg wet				Lab File ID: 023F2301.D		Analyzed: 01/04/11 18:07		
Tetrachloro-m-xylene	16.67	76.8	70 - 125	5.319	5.322	-0.0030	+/-0.030	
Tetrachloro-m-xylene [2C]	16.67	83.9	70 - 125	4.484	4.487	-0.0030	+/-0.030	
Decachlorobiphenyl	16.67	71.4	60 - 125	11.518	11.52	-0.0020	+/-0.030	
Decachlorobiphenyl [2C]	16.67	79.0	60 - 125	9.923	9.923	0.0000	+/-0.030	
Calibration Check (1A00604-CCV5) ug/L				Lab File ID: 024F2401.D		Analyzed: 01/04/11 18:25		
Tetrachloro-m-xylene	100.0	106	80 - 120	5.319	5.322	-0.0030	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	105	80 - 120	4.484	4.487	-0.0030	+/-0.030	
Decachlorobiphenyl	100.0	93.4	80 - 120	11.517	11.52	-0.0030	+/-0.030	
Decachlorobiphenyl [2C]	100.0	95.6	80 - 120	9.922	9.923	-0.0010	+/-0.030	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8082A

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00705

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: GL-ECD3
Calibration: 1005002

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Calibration Check (1A00705-CCV1) ug/L				Lab File ID: 003F0501.D		Analyzed: 01/05/11 18:36		
Tetrachloro-m-xylene	100.0	103	80 - 120	5.274	5.274	0.0000	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	94.4	80 - 120	4.45	4.45	0.0000	+/-0.030	
Decachlorobiphenyl	100.0	93.6	80 - 120	11.45	11.45	0.0000	+/-0.030	
Decachlorobiphenyl [2C]	100.0	90.3	80 - 120	9.864	9.864	0.0000	+/-0.030	
NTC12-SB28-0204 (1012185-22) ug/Kg dry				Lab File ID: 012F1401.D		Analyzed: 01/05/11 21:24		
Tetrachloro-m-xylene	18.37	75.6	70 - 125	5.275	5.274	0.0010	+/-0.030	
Tetrachloro-m-xylene [2C]	18.37	71.4	70 - 125	4.445	4.45	-0.0050	+/-0.030	
Decachlorobiphenyl	18.37	143	60 - 125	11.458	11.45	0.0080	+/-0.030	*
Decachlorobiphenyl [2C]	18.37	76.4	60 - 125	9.867	9.864	0.0030	+/-0.030	
NTC12-SB29-0204 (1012185-24) ug/Kg dry				Lab File ID: 014F1601.D		Analyzed: 01/05/11 22:01		
Tetrachloro-m-xylene	19.31	78.4	70 - 125	5.275	5.274	0.0010	+/-0.030	
Tetrachloro-m-xylene [2C]	19.31	68.2	70 - 125	4.445	4.45	-0.0050	+/-0.030	*
Decachlorobiphenyl	19.31	70.8	60 - 125	11.455	11.45	0.0050	+/-0.030	
Decachlorobiphenyl [2C]	19.31	51.6	60 - 125	9.865	9.864	0.0010	+/-0.030	*
NTC12-SB27-0204 (1012185-14) ug/Kg dry				Lab File ID: 015F1701.D		Analyzed: 01/05/11 22:19		
Tetrachloro-m-xylene	18.87	77.9	70 - 125	5.276	5.274	0.0020	+/-0.030	
Tetrachloro-m-xylene [2C]	18.87	78.4	70 - 125	4.449	4.45	-0.0010	+/-0.030	
Decachlorobiphenyl	18.87	74.6	60 - 125	11.456	11.45	0.0060	+/-0.030	
Decachlorobiphenyl [2C]	18.87	64.3	60 - 125	9.864	9.864	0.0000	+/-0.030	
Matrix Spike (0L21019-MS2) ug/Kg dry				Lab File ID: 018F2001.D		Analyzed: 01/05/11 23:15		
Tetrachloro-m-xylene	37.99	64.2	70 - 125	5.275	5.274	0.0010	+/-0.030	*
Tetrachloro-m-xylene [2C]	37.99	62.2	70 - 125	4.449	4.45	-0.0010	+/-0.030	*
Decachlorobiphenyl	37.99	59.6	60 - 125	11.454	11.45	0.0040	+/-0.030	*
Decachlorobiphenyl [2C]	37.99	51.2	60 - 125	9.865	9.864	0.0010	+/-0.030	*
Matrix Spike Dup (0L21019-MSD2) ug/Kg dry				Lab File ID: 019F2101.D		Analyzed: 01/05/11 23:34		
Tetrachloro-m-xylene	37.26	75.5	70 - 125	5.277	5.274	0.0030	+/-0.030	
Tetrachloro-m-xylene [2C]	37.26	72.3	70 - 125	4.448	4.45	-0.0020	+/-0.030	
Decachlorobiphenyl	37.26	67.9	60 - 125	11.453	11.45	0.0030	+/-0.030	
Decachlorobiphenyl [2C]	37.26	57.2	60 - 125	9.865	9.864	0.0010	+/-0.030	*
Calibration Check (1A00705-CCV4) ug/L				Lab File ID: 020F2201.D		Analyzed: 01/05/11 23:52		
Tetrachloro-m-xylene	100.0	103	80 - 120	5.277	5.274	0.0030	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	102	80 - 120	4.452	4.45	0.0020	+/-0.030	
Decachlorobiphenyl	100.0	91.0	80 - 120	11.453	11.45	0.0030	+/-0.030	
Decachlorobiphenyl [2C]	100.0	85.8	80 - 120	9.865	9.864	0.0010	+/-0.030	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8082A

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00705

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: GL-ECD3
Calibration: 1005002

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
NTC12-SB21-0507 (1012185-18) ug/Kg dry				Lab File ID: 025F2701.D		Analyzed: 01/06/11 01:25		
Tetrachloro-m-xylene	19.04	63.2	70 - 125	5.275	5.274	0.0010	+/-0.030	*
Tetrachloro-m-xylene [2C]	19.04	56.5	70 - 125	4.444	4.45	-0.0060	+/-0.030	*
Decachlorobiphenyl	19.04	59.8	60 - 125	11.455	11.45	0.0050	+/-0.030	*
Decachlorobiphenyl [2C]	19.04	43.8	60 - 125	9.867	9.864	0.0030	+/-0.030	*
NTC12-SB25-0204 (1012185-20) ug/Kg dry				Lab File ID: 029F3101.D		Analyzed: 01/06/11 02:39		
Tetrachloro-m-xylene	19.68	81.0	70 - 125	5.275	5.274	0.0010	+/-0.030	
Tetrachloro-m-xylene [2C]	19.68	65.3	70 - 125	4.445	4.45	-0.0050	+/-0.030	*
Decachlorobiphenyl	19.68	65.3	60 - 125	11.456	11.45	0.0060	+/-0.030	
Decachlorobiphenyl [2C]	19.68	44.1	60 - 125	9.865	9.864	0.0010	+/-0.030	*
Calibration Check (1A00705-CCV7) ug/L				Lab File ID: 031F3301.D		Analyzed: 01/06/11 03:16		
Tetrachloro-m-xylene	100.0	108	80 - 120	5.276	5.274	0.0020	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	92.5	80 - 120	4.449	4.45	-0.0010	+/-0.030	
Decachlorobiphenyl	100.0	82.9	80 - 120	11.454	11.45	0.0040	+/-0.030	
Decachlorobiphenyl [2C]	100.0	68.8	80 - 120	9.866	9.864	0.0020	+/-0.030	*

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8082A

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A01007

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: GL-ECD3
Calibration: 1005002

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Calibration Check (1A01007-CCV1) ug/L				Lab File ID: 001F0101.D		Analyzed: 01/06/11 16:24		
Tetrachloro-m-xylene	100.0	97.6	80 - 120	5.282	5.282	0.0000	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	108	80 - 120	4.448	4.448	0.0000	+/-0.030	
Decachlorobiphenyl	100.0	78.2	80 - 120	11.463	11.463	0.0000	+/-0.030	*
Decachlorobiphenyl [2C]	100.0	82.8	80 - 120	9.868	9.868	0.0000	+/-0.030	
NTC12-SB21-0507 (1012185-18RE1) ug/Kg dry				Lab File ID: 003F0301.D		Analyzed: 01/06/11 17:01		
Tetrachloro-m-xylene	19.04	57.7	70 - 125	5.273	5.282	-0.0090	+/-0.030	*
Tetrachloro-m-xylene [2C]	19.04	59.2	70 - 125	4.443	4.448	-0.0050	+/-0.030	*
Decachlorobiphenyl	19.04	47.7	60 - 125	11.455	11.463	-0.0080	+/-0.030	*
Decachlorobiphenyl [2C]	19.04	43.7	60 - 125	9.865	9.868	-0.0030	+/-0.030	*
NTC12-SB25-0204 (1012185-20RE1) ug/Kg dry				Lab File ID: 004F0401.D		Analyzed: 01/06/11 17:19		
Tetrachloro-m-xylene	19.68	81.2	70 - 125	5.274	5.282	-0.0080	+/-0.030	
Tetrachloro-m-xylene [2C]	19.68	73.6	70 - 125	4.442	4.448	-0.0060	+/-0.030	
Decachlorobiphenyl	19.68	68.8	60 - 125	11.454	11.463	-0.0090	+/-0.030	
Decachlorobiphenyl [2C]	19.68	50.5	60 - 125	9.866	9.868	-0.0020	+/-0.030	*
NTC12-SB28-0204 (1012185-22RE1) ug/Kg dry				Lab File ID: 005F0501.D		Analyzed: 01/06/11 17:38		
Tetrachloro-m-xylene	18.37	73.8	70 - 125	5.274	5.282	-0.0080	+/-0.030	
Tetrachloro-m-xylene [2C]	18.37	67.9	70 - 125	4.444	4.448	-0.0040	+/-0.030	*
Decachlorobiphenyl	18.37	119	60 - 125	11.457	11.463	-0.0060	+/-0.030	
Decachlorobiphenyl [2C]	18.37	67.3	60 - 125	9.867	9.868	-0.0010	+/-0.030	
NTC12-SB29-0204 (1012185-24RE1) ug/Kg dry				Lab File ID: 006F0601.D		Analyzed: 01/06/11 17:57		
Tetrachloro-m-xylene	19.31	78.7	70 - 125	5.274	5.282	-0.0080	+/-0.030	
Tetrachloro-m-xylene [2C]	19.31	66.0	70 - 125	4.444	4.448	-0.0040	+/-0.030	*
Decachlorobiphenyl	19.31	71.3	60 - 125	11.454	11.463	-0.0090	+/-0.030	
Decachlorobiphenyl [2C]	19.31	50.8	60 - 125	9.866	9.868	-0.0020	+/-0.030	*
Calibration Check (1A01007-CCV3) ug/L				Lab File ID: 007F0701.D		Analyzed: 01/06/11 18:15		
Tetrachloro-m-xylene	100.0	101	80 - 120	5.275	5.282	-0.0070	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	93.6	80 - 120	4.45	4.448	0.0020	+/-0.030	
Decachlorobiphenyl	100.0	82.8	80 - 120	11.454	11.463	-0.0090	+/-0.030	
Decachlorobiphenyl [2C]	100.0	68.4	80 - 120	9.865	9.868	-0.0030	+/-0.030	*

PREPARATION BATCH SUMMARY

SW8082A

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Batch: 0L21019 Batch Matrix: Solid Preparation: EXT_3546

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL./WEIGHT	FINAL VOL.
Blank	0L21019-BLK1	12/22/10 14:30	15.00	5.00
LCS	0L21019-BS2	12/22/10 14:30	15.00	5.00
NTC12-SB27-0204	0L21019-MS2	12/22/10 14:30	15.20	5.00
NTC12-SB27-0204	0L21019-MSD2	12/22/10 14:30	15.50	5.00
NTC12-SOIL-IDW	1012185-12	12/22/10 14:30	15.50	5.00
NTC12-SB27-0204	1012185-14	12/22/10 14:30	15.30	5.00

ANALYSIS DATA SHEET

Blank

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix:
Laboratory ID: 0L21019-BLK1
File ID: 007F1701.D
Sampled:
Prepared: 12/22/10 14:30
Analyzed: 12/29/10 20:17
Solids:
Preparation: EXT_3546
Dilution:
Batch: 0L21019
Sequence: 0L36408
Calibration: 0362003
Instrument: GL-ECD3

CAS NO.	COMPOUND	CONC. (ug/Kg wet	DL	LOD	LOQ	Q
12674-11-2	Aroclor-1016		4.20	8.33	17.0	U
11104-28-2	Aroclor-1221		4.20	8.33	17.0	U
11141-16-5	Aroclor-1232		4.20	8.33	17.0	U
53469-21-9	Aroclor-1242		4.20	8.33	17.0	U
12672-29-6	Aroclor-1248		4.20	8.33	17.0	U
11097-69-1	Aroclor-1254		4.20	8.33	17.0	U
11096-82-5	Aroclor-1260		4.20	8.33	17.0	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg wet)	CONC (ug/Kg wet)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	33.33	25.10	75.3	70 - 125	
Tetrachloro-m-xylene [2C]	33.33	24.02	72.1	70 - 125	
Decachlorobiphenyl	33.33	27.57	82.7	60 - 125	
Decachlorobiphenyl [2C]	33.33	26.55	79.6	60 - 125	

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Matrix:	Solid		
Batch:	0L21019	Laboratory ID:	0L21019-BS2
Preparation:	EXT_3546	Initial/Final:	15 g / 5 mL

ANALYTE	SPIKE ADDED (ug/Kg wet)	LCS CONCENTRATION (ug/Kg wet)	LCS % REC.	QC LIMITS REC.
Aroclor-1016	166.7	160.3	96.2	40 - 140
Aroclor-1016 [2C]	166.7	193.2	116	40 - 140
Aroclor-1260	166.7	153.5	92.1	60 - 130
Aroclor-1260 [2C]	166.7	210.7	126	60 - 130

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8082A

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Batch: 0L21019

% Solids: 86.58

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Source Sample Name: **1012185-14**

ANALYTE	SPIKE ADDED (ug/Kg dry)	SAMPLE CONCENTRATION (ug/Kg dry)	MS CONCENTRATION (ug/Kg dry)	MS % REC.	Q	QC LIMITS REC.
Aroclor-1016	190.0	ND	145.8	76.8		40 - 140
Aroclor-1016 [2C]	190.0	ND	168.1	88.5		40 - 140
Aroclor-1260	190.0	ND	139.1	73.2		60 - 130
Aroclor-1260 [2C]	190.0	ND	135.7	71.4		60 - 130

ANALYTE	SPIKE ADDED (ug/Kg dry)	MSD CONCENTRATION (ug/Kg dry)	MSD % REC. #	% RPD	Q	QC LIMITS RPD	QC LIMITS REC.
Aroclor-1016	186.3	164.5	88.3	12.0		30	40 - 140
Aroclor-1016 [2C]	186.3	184.3	98.9	9.19		30	40 - 140
Aroclor-1260	186.3	158.0	84.8	12.7		30	60 - 130
Aroclor-1260 [2C]	186.3	154.0	82.7	12.7		30	60 - 130

PREPARATION BATCH SUMMARY

SW8082A

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Batch: 0L22010 Batch Matrix: Solid
Preparation: EXT_3546

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL./WEIGHT	FINAL VOL.
Blank	0L22010-BLK1	12/27/10 11:48	15.00	5.00
LCS	0L22010-BS2	12/27/10 11:48	15.00	5.00
LCS Dup	0L22010-BSD2	12/27/10 11:48	15.00	5.00
NTC12-SB21-0507	1012185-18	12/27/10 11:48	15.40	5.00
NTC12-SB21-0507	1012185-18RE1	12/27/10 11:48	15.40	5.00
NTC12-SB25-0204	1012185-20	12/27/10 11:48	15.30	5.00
NTC12-SB25-0204	1012185-20RE1	12/27/10 11:48	15.30	5.00
NTC12-SB28-0204	1012185-22	12/27/10 11:48	15.30	5.00
NTC12-SB28-0204	1012185-22RE1	12/27/10 11:48	15.30	5.00
NTC12-SB29-0204	1012185-24	12/27/10 11:48	15.60	5.00
NTC12-SB29-0204	1012185-24RE1	12/27/10 11:48	15.60	5.00

ANALYSIS DATA SHEET

Blank

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix:
Laboratory ID: 0L22010-BLK1
File ID: 019F1901.D
Sampled:
Prepared: 12/27/10 11:48
Analyzed: 01/04/11 16:52
Solids:
Preparation: EXT_3546
Dilution:
Batch: 0L22010
Sequence: 1A00604
Calibration: 1005002
Instrument: GL-ECD3

CAS NO.	COMPOUND	CONC. (ug/Kg wet	DL	LOD	LOQ	Q
12674-11-2	Aroclor-1016		4.20	8.33	17.0	U
11104-28-2	Aroclor-1221		4.20	8.33	17.0	U
11141-16-5	Aroclor-1232		4.20	8.33	17.0	U
53469-21-9	Aroclor-1242		4.20	8.33	17.0	U
12672-29-6	Aroclor-1248		4.20	8.33	17.0	U
11097-69-1	Aroclor-1254		4.20	8.33	17.0	U
11096-82-5	Aroclor-1260		4.20	8.33	17.0	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg wet)	CONC (ug/Kg wet)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	16.67	12.48	74.9	70 - 125	
Tetrachloro-m-xylene [2C]	16.67	13.78	82.7	70 - 125	
Decachlorobiphenyl	16.67	11.78	70.7	60 - 125	
Decachlorobiphenyl [2C]	16.67	11.27	67.6	60 - 125	

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Matrix:	Solid		
Batch:	0L22010	Laboratory ID:	0L22010-BS2
Preparation:	EXT_3546	Initial/Final:	15 g / 5 mL

ANALYTE	SPIKE ADDED (ug/Kg wet)	LCS CONCENTRATION (ug/Kg wet)	LCS % REC.	QC LIMITS REC.
Aroclor-1016	166.7	158.9	95.3	40 - 140
Aroclor-1016 [2C]	166.7	195.2	117	40 - 140
Aroclor-1260	166.7	149.8	89.9	60 - 130
Aroclor-1260 [2C]	166.7	198.4	119	60 - 130

ANALYTE	SPIKE ADDED (ug/Kg wet)	LCSD CONCENTRATION (ug/Kg wet)	LCSD % REC. #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Aroclor-1016	166.7	150.7	90.4	5.27	30	40 - 140
Aroclor-1016 [2C]	166.7	188.6	113	3.47	30	40 - 140
Aroclor-1260	166.7	143.1	85.9	4.60	30	60 - 130
Aroclor-1260 [2C]	166.7	192.3	115	3.12	30	60 - 130

ANALYSIS SEQUENCE SUMMARY

SW8082A

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Sequence: 0L36212

Calibration: 0362003

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	0L36212-CAL1	003R0301.D	12/23/10 11:01
Cal Standard	0L36212-CAL1	003F0301.D	12/23/10 11:01
Cal Standard	0L36212-CAL2	004R0401.D	12/23/10 11:20
Cal Standard	0L36212-CAL2	004F0401.D	12/23/10 11:20
Cal Standard	0L36212-CAL3	005R0501.D	12/23/10 11:39
Cal Standard	0L36212-CAL3	005F0501.D	12/23/10 11:39
Cal Standard	0L36212-CAL4	006R0601.D	12/23/10 11:58
Cal Standard	0L36212-CAL4	006F0601.D	12/23/10 11:58
Cal Standard	0L36212-CAL5	007R0701.D	12/23/10 12:16
Cal Standard	0L36212-CAL5	007F0701.D	12/23/10 12:16
Cal Standard	0L36212-CAL6	008R0801.D	12/23/10 12:35
Cal Standard	0L36212-CAL6	008F0801.D	12/23/10 12:35
Cal Standard	0L36212-CAL7	009R0901.D	12/23/10 12:54
Cal Standard	0L36212-CAL7	009F0901.D	12/23/10 12:54

INITIAL CALIBRATION STANDARDS

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Sequence:	0L36212	Instrument:	GL-ECD3
Calibration:	0362003		

Standard ID	Description	Lab Sample ID	Lab File ID	Analysis Date/Time
10I0162	Pest_ICAL7@1ppb	0L36212-CAL1	003R0301.D	12/23/10 11:01
10I0162	Pest_ICAL7@1ppb	0L36212-CAL1	003F0301.D	12/23/10 11:01
10I0161	Pest_ICAL6@5ppb	0L36212-CAL2	004F0401.D	12/23/10 11:20
10I0161	Pest_ICAL6@5ppb	0L36212-CAL2	004R0401.D	12/23/10 11:20
10I0160	Pest_ICAL5@10ppb	0L36212-CAL3	005F0501.D	12/23/10 11:39
10I0160	Pest_ICAL5@10ppb	0L36212-CAL3	005R0501.D	12/23/10 11:39
10I0159	Pest_ICAL4@25ppb	0L36212-CAL4	006F0601.D	12/23/10 11:58
10I0159	Pest_ICAL4@25ppb	0L36212-CAL4	006R0601.D	12/23/10 11:58
10I0158	Pest_ICAL3@50ppb	0L36212-CAL5	007F0701.D	12/23/10 12:16
10I0158	Pest_ICAL3@50ppb	0L36212-CAL5	007R0701.D	12/23/10 12:16
10I0157	Pest. AB/Sur CCV @ 100ppb	0L36212-CAL6	008F0801.D	12/23/10 12:35
10I0157	Pest. AB/Sur CCV @ 100ppb	0L36212-CAL6	008R0801.D	12/23/10 12:35
10I0155	Pest_ICAL1@200ppb	0L36212-CAL7	009R0901.D	12/23/10 12:54
10I0155	Pest_ICAL1@200ppb	0L36212-CAL7	009F0901.D	12/23/10 12:54

INITIAL CALIBRATION DATA

SW8082A

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362003

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 12/23/2010 3:56:36PM

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Aroclor-1016 (1)												
Aroclor-1016 (2)												
Aroclor-1016 (3)												
Aroclor-1016 (4)												
Aroclor-1016 (5)												
Aroclor-1016 (1) [2C]												
Aroclor-1016 (2) [2C]												
Aroclor-1016 (3) [2C]												
Aroclor-1016 (4) [2C]												
Aroclor-1016 (5) [2C]												
Aroclor-1260 (1)												
Aroclor-1260 (2)												
Aroclor-1260 (3)												
Aroclor-1260 (4)												
Aroclor-1260 (5)												
Aroclor-1260 (1) [2C]												
Aroclor-1260 (2) [2C]												
Aroclor-1260 (3) [2C]												
Aroclor-1260 (4) [2C]												
Aroclor-1260 (5) [2C]												
Tetrachloro-m-xylene	1	~~49217~~	5	32312	10	29237.7	25	27400.72	50	27811.26	100	27807.08
Tetrachloro-m-xylene [2C]	1	34643	5	30368	10	28593.4	25	27127.16	50	26246.82	100	25403.79
Decachlorobiphenyl	1	31531	5	30931.4	10	30103.4	25	27976.6	50	26528.56	100	25640.52
Decachlorobiphenyl [2C]	1	27471	5	24142	10	22490.1	25	19467.6	50	17915.74	100	16960.33

INITIAL CALIBRATION DATA (Continued)

SW8082A

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362003

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 12/23/2010 3:56:36PM

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Aroclor-1016 (1)												
Aroclor-1016 (2)												
Aroclor-1016 (3)												
Aroclor-1016 (4)												
Aroclor-1016 (5)												
Aroclor-1016 (1) [2C]												
Aroclor-1016 (2) [2C]												
Aroclor-1016 (3) [2C]												
Aroclor-1016 (4) [2C]												
Aroclor-1016 (5) [2C]												
Aroclor-1260 (1)												
Aroclor-1260 (2)												
Aroclor-1260 (3)												
Aroclor-1260 (4)												
Aroclor-1260 (5)												
Aroclor-1260 (1) [2C]												
Aroclor-1260 (2) [2C]												
Aroclor-1260 (3) [2C]												
Aroclor-1260 (4) [2C]												
Aroclor-1260 (5) [2C]												
Tetrachloro-m-xylene	200	27967.75										
Tetrachloro-m-xylene [2C]	200	24190.38										
Decachlorobiphenyl	200	27878.14										
Decachlorobiphenyl [2C]	200	17528.91										

INITIAL CALIBRATION DATA (Continued)

SW8082A

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362003

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 12/23/2010 3:56:36PM

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Aroclor-1016 (1)												
Aroclor-1016 (2)												
Aroclor-1016 (3)												
Aroclor-1016 (4)												
Aroclor-1016 (5)												
Aroclor-1016 (1) [2C]												
Aroclor-1016 (2) [2C]												
Aroclor-1016 (3) [2C]												
Aroclor-1016 (4) [2C]												
Aroclor-1016 (5) [2C]												
Aroclor-1260 (1)												
Aroclor-1260 (2)												
Aroclor-1260 (3)												
Aroclor-1260 (4)												
Aroclor-1260 (5)												
Aroclor-1260 (1) [2C]												
Aroclor-1260 (2) [2C]												
Aroclor-1260 (3) [2C]												
Aroclor-1260 (4) [2C]												
Aroclor-1260 (5) [2C]												
Tetrachloro-m-xylene												
Tetrachloro-m-xylene [2C]												
Decachlorobiphenyl												
Decachlorobiphenyl [2C]												

INITIAL CALIBRATION DATA (Continued)

SW8082A

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362003

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 12/23/2010 3:56:36PM

Compound	Level 19		Level 20		Level 21		Level 22		Level 23		Level 24	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Aroclor-1016 (1)			2500	1312.518	1000	1371.552	750	1351.843	500	1353.35	100	1379.86
Aroclor-1016 (2)			2500	423.7828	1000	440.106	750	431.7173	500	435.762	100	454.64
Aroclor-1016 (3)			2500	625.39	1000	640.493	750	627.5187	500	637.41	100	664.9
Aroclor-1016 (4)			2500	633.0916	1000	641.782	750	632.4706	500	633.068	100	654.92
Aroclor-1016 (5)			2500	492.0124	1000	509.949	750	503.0813	500	501.912	100	530.08
Aroclor-1016 (1) [2C]			2500	838.1828	1000	986.116	750	1001.393	500	1062.188	100	1291.13
Aroclor-1016 (2) [2C]			2500	396.0692	1000	434.192	750	455.7093	500	472.152	100	526.06
Aroclor-1016 (3) [2C]			2500	427.5912	1000	474.112	750	484.9987	500	514.674	100	628.97
Aroclor-1016 (4) [2C]			2500	516.644	1000	585.566	750	600.444	500	641.51	100	818.8
Aroclor-1016 (5) [2C]			2500	422.3588	1000	463.649	750	469.5453	500	486.382	100	594.08
Aroclor-1260 (1)			2500	3529.898	1000	3698.998	750	3447.547	500	3690.114	100	3838.16
Aroclor-1260 (2)			2500	1905.044	1000	1991.364	750	1901.885	500	1934.762	100	2008.25
Aroclor-1260 (3)			2500	2008.79	1000	2115.154	750	2005.591	500	2062.272	100	2297.87
Aroclor-1260 (4)			2500	1525.826	1000	1611.527	750	1534.256	500	1591.534	100	1617.43
Aroclor-1260 (5)			2500	814.3084	1000	916.282	750	841.22	500	906.088	100	944.94
Aroclor-1260 (1) [2C]			2500	1612.419	1000	1882.631	750	1833.392	500	1975.376	100	2234.09
Aroclor-1260 (2) [2C]			2500	799.6348	1000	915.273	750	918.148	500	974.864	100	1199
Aroclor-1260 (3) [2C]			2500	967.158	1000	1104.948	750	1105.324	500	1174.532	100	1405.76
Aroclor-1260 (4) [2C]			2500	931.636	1000	1064.022	750	1050.079	500	1115.872	100	1340.42
Aroclor-1260 (5) [2C]			2500	735.7716	1000	844.715	750	825.8493	500	889.262	100	1040.37
Tetrachloro-m-xylene			125		50		37.5		25		5	
Tetrachloro-m-xylene [2C]			125		50		37.5		25		5	
Decachlorobiphenyl			125		50		37.5		25		5	
Decachlorobiphenyl [2C]			125		50		37.5		25		5	

INITIAL CALIBRATION DATA (Continued)

SW8082A

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0362003
Instrument: GL-ECD3
Matrix: Water
Calibration Date: 12/23/2010 3:56:36PM

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Aroclor-1016 (1)	1377.504	4.536308	6.700333	3.426844E-02			20	
Aroclor-1016 (2)	444.0847	4.44248	5.826833	3.181603E-02			20	
Aroclor-1016 (3)	649.9719	4.621188	6.179167	3.737598E-02			20	
Aroclor-1016 (4)	648.8554	3.928386	6.382333	4.135933E-02			20	
Aroclor-1016 (5)	518.3258	5.712167	6.986333	4.281168E-02			20	
Aroclor-1016 (1) [2C]	1116.305	22.05288	5.6205	8.742721E-02			20	*
Aroclor-1016 (2) [2C]	482.1738	15.65584	5.207667	6.233316E-02			20	
Aroclor-1016 (3) [2C]	538.2843	19.29511	5.3845	6.561467E-02			20	
Aroclor-1016 (4) [2C]	685.3173	23.96236	5.673333	7.372141E-02			20	*
Aroclor-1016 (5) [2C]	518.0925	18.33539	6.050167	3.093481E-02			20	
Aroclor-1260 (1)	3707.263	5.739381	9.985833	4.225337E-02			20	
Aroclor-1260 (2)	1987.077	5.271371	8.871167	0.0462616			20	
Aroclor-1260 (3)	2134.259	6.546249	9.215667	0.0358565			20	
Aroclor-1260 (4)	1615.479	6.430938	9.3155	3.563058E-02			20	
Aroclor-1260 (5)	907.6331	8.228581	11.0785	2.856956E-02			20	
Aroclor-1260 (1) [2C]	2013.278	16.31731	8.419	8.340063E-03			20	
Aroclor-1260 (2) [2C]	1028.947	20.55875	7.164667	1.777219E-02			20	*
Aroclor-1260 (3) [2C]	1227.66	19.18172	7.3915	0.0314888			20	
Aroclor-1260 (4) [2C]	1169.368	18.45489	7.554333	1.416947E-02			20	
Aroclor-1260 (5) [2C]	921.5547	18.06768	8.109833	0.0215561			20	
Tetrachloro-m-xylene	28756.09	6.436385	5.549333	1.124923E-02			20	
Tetrachloro-m-xylene [2C]	28081.79	12.60113	4.667286	3.784695E-02			20	
Decachlorobiphenyl	28655.66	7.832286	11.845	9.537063E-03			20	
Decachlorobiphenyl [2C]	20853.67	18.98494	10.21386	3.150825E-03			20	

ANALYSIS SEQUENCE SUMMARY

SW8082A

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Sequence: 1A00510

Calibration: 1005002

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	1A00510-CAL1	006R0601.D	01/04/11 12:51
Cal Standard	1A00510-CAL1	006F0601.D	01/04/11 12:51
Cal Standard	1A00510-CAL2	007R0701.D	01/04/11 13:09
Cal Standard	1A00510-CAL2	007F0701.D	01/04/11 13:09
Cal Standard	1A00510-CAL3	008R0801.D	01/04/11 13:28
Cal Standard	1A00510-CAL3	008F0801.D	01/04/11 13:28
Cal Standard	1A00510-CAL4	009R0901.D	01/04/11 13:47
Cal Standard	1A00510-CAL4	009F0901.D	01/04/11 13:47
Cal Standard	1A00510-CAL5	010R1001.D	01/04/11 14:05
Cal Standard	1A00510-CAL5	010F1001.D	01/04/11 14:05
Cal Standard	1A00510-CAL6	011R1101.D	01/04/11 14:24
Cal Standard	1A00510-CAL6	011F1101.D	01/04/11 14:24
Cal Standard	1A00510-CAL7	012R1201.D	01/04/11 14:42
Cal Standard	1A00510-CAL7	012F1201.D	01/04/11 14:42

ANALYSIS SEQUENCE SUMMARY

SW8082A

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Sequence: 0L36408

Calibration: 0362003

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Calibration Check	0L36408-CCV1	003R1301.D	12/29/10 19:03
Calibration Check	0L36408-CCV1	003F1301.D	12/29/10 19:03
Calibration Check	0L36408-CCV3	006R1601.D	12/29/10 19:58
Calibration Check	0L36408-CCV3	006F1601.D	12/29/10 19:58
Blank	0L21019-BLK1	007R1701.D	12/29/10 20:17
Blank	0L21019-BLK1	007F1701.D	12/29/10 20:17
LCS	0L21019-BS2	009R1901.D	12/29/10 20:54
LCS	0L21019-BS2	009F1901.D	12/29/10 20:54
Calibration Check	0L36408-CCV4	020R3001.D	12/30/10 00:18
Calibration Check	0L36408-CCV4	020F3001.D	12/30/10 00:18
Calibration Check	0L36408-CCV6	023R3301.D	12/30/10 01:14
Calibration Check	0L36408-CCV6	023F3301.D	12/30/10 01:14

CONTINUING CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	006F1601.D	Calibration Date:	12/23/10 15:56
Sequence:	0L36408	Injection Date:	12/29/10
Lab Sample ID:	0L36408-CCV3	Injection Time:	19:58

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Aroclor-1016 (1)	A	1000	883.1	1377.504	1216.471		-11.7	20
Aroclor-1016 (2)	A	1000	910.5	444.0847	404.345		-8.9	20
Aroclor-1016 (3)	A	1000	918.3	649.9719	596.88		-8.2	20
Aroclor-1016 (4)	A	1000	910.0	648.8554	590.48		-9.0	20
Aroclor-1016 (5)	A	1000	922.6	518.3258	478.202		-7.7	20
Aroclor-1016 (1) [2C]	A	1000	1032	1116.305	1152.125		3.2	20
Aroclor-1016 (2) [2C]	A	1000	1150	482.1738	554.476		15.0	20
Aroclor-1016 (3) [2C]	A	1000	1086	538.2843	584.567		8.6	20
Aroclor-1016 (4) [2C]	A	1000	1021	685.3173	700.043		2.1	20
Aroclor-1016 (5) [2C]	A	1000	1167	518.0925	604.755		16.7	20
Aroclor-1260 (1)	A	1000	998.6	3707.263	3702.19		-0.1	20
Aroclor-1260 (2)	A	1000	984.1	1987.077	1955.435		-1.6	20
Aroclor-1260 (3)	A	1000	965.5	2134.259	2060.652		-3.4	20
Aroclor-1260 (4)	A	1000	993.0	1615.479	1604.267		-0.7	20
Aroclor-1260 (5)	A	1000	1005	907.6331	912.475		0.5	20
Aroclor-1260 (1) [2C]	A	1000	1228	2013.278	2472.964		22.8	20 *
Aroclor-1260 (2) [2C]	A	1000	1164	1028.947	1198.152		16.4	20
Aroclor-1260 (3) [2C]	A	1000	1185	1227.66	1455.223		18.5	20
Aroclor-1260 (4) [2C]	A	1000	1177	1169.368	1375.981		17.7	20
Aroclor-1260 (5) [2C]	A	1000	1210	921.5547	1115.494		21.0	20 *

19.3

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	020F3001.D	Calibration Date:	12/23/10 15:56
Sequence:	0L36408	Injection Date:	12/30/10
Lab Sample ID:	0L36408-CCV4	Injection Time:	00:18

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Tetrachloro-m-xylene	A	100.0	94.64	28756.09	27215.86		-5.4	20
Tetrachloro-m-xylene [2C]	A	100.0	93.28	28081.79	26194.05		-6.7	20
Decachlorobiphenyl	A	100.0	99.24	28655.66	28437.12		-0.8	20
Decachlorobiphenyl [2C]	A	100.0	96.50	20853.67	20123.71		-3.5	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	023F3301.D	Calibration Date:	12/23/10 15:56
Sequence:	0L36408	Injection Date:	12/30/10
Lab Sample ID:	0L36408-CCV6	Injection Time:	01:14

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT		
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)	
Aroclor-1016 (1)	A	1000	1022	1377.504	1408.478		2.2	20	
Aroclor-1016 (2)	A	1000	1001	444.0847	444.478		0.09	20	
Aroclor-1016 (3)	A	1000	1009	649.9719	655.888		0.9	20	
Aroclor-1016 (4)	A	1000	997.2	648.8554	647.046		-0.3	20	
Aroclor-1016 (5)	A	1000	1012	518.3258	524.809		1.3	20	
Aroclor-1016 (1) [2C]	A	1000	1111	1116.305	1240.091		11.1	20	
Aroclor-1016 (2) [2C]	A	1000	1341	482.1738	646.761		34.1	20	*
Aroclor-1016 (3) [2C]	A	1000	1183	538.2843	637.033		18.3	20	
Aroclor-1016 (4) [2C]	A	1000	1159	685.3173	794.512		15.9	20	
Aroclor-1016 (5) [2C]	A	1000	1329	518.0925	688.426		32.9	20	*
Aroclor-1260 (1)	A	1000	1112	3707.263	4123.247		11.2	20	
Aroclor-1260 (2)	A	1000	1094	1987.077	2174.101		9.4	20	
Aroclor-1260 (3)	A	1000	1070	2134.259	2284.284		7.0	20	
Aroclor-1260 (4)	A	1000	1094	1615.479	1767.536		9.4	20	
Aroclor-1260 (5)	A	1000	1116	907.6331	1012.876		11.6	20	
Aroclor-1260 (1) [2C]	A	1000	1396	2013.278	2810.017		39.6	20	*
Aroclor-1260 (2) [2C]	A	1000	1320	1028.947	1358.592		32.0	20	*
Aroclor-1260 (3) [2C]	A	1000	1337	1227.66	1641.648		33.7	20	*
Aroclor-1260 (4) [2C]	A	1000	1354	1169.368	1583.223		35.4	20	*
Aroclor-1260 (5) [2C]	A	1000	1378	921.5547	1269.799		37.8	20	*

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

INITIAL CALIBRATION STANDARDS

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Sequence:	1A00510	Instrument:	GL-ECD3
Calibration:	1005002		

Standard ID	Description	Lab Sample ID	Lab File ID	Analysis Date/Time
10I0162	Pest_ICAL7@1ppb	1A00510-CAL1	006F0601.D	01/04/11 12:51
10I0162	Pest_ICAL7@1ppb	1A00510-CAL1	006R0601.D	01/04/11 12:51
10I0161	Pest_ICAL6@5ppb	1A00510-CAL2	007R0701.D	01/04/11 13:09
10I0161	Pest_ICAL6@5ppb	1A00510-CAL2	007F0701.D	01/04/11 13:09
10I0160	Pest_ICAL5@10ppb	1A00510-CAL3	008F0801.D	01/04/11 13:28
10I0160	Pest_ICAL5@10ppb	1A00510-CAL3	008R0801.D	01/04/11 13:28
10I0159	Pest_ICAL4@25ppb	1A00510-CAL4	009F0901.D	01/04/11 13:47
10I0159	Pest_ICAL4@25ppb	1A00510-CAL4	009R0901.D	01/04/11 13:47
10I0158	Pest_ICAL3@50ppb	1A00510-CAL5	010F1001.D	01/04/11 14:05
10I0158	Pest_ICAL3@50ppb	1A00510-CAL5	010R1001.D	01/04/11 14:05
10I0157	Pest. AB/Sur CCV @ 100ppb	1A00510-CAL6	011F1101.D	01/04/11 14:24
10I0157	Pest. AB/Sur CCV @ 100ppb	1A00510-CAL6	011R1101.D	01/04/11 14:24
10I0155	Pest_ICAL1@200ppb	1A00510-CAL7	012R1201.D	01/04/11 14:42
10I0155	Pest_ICAL1@200ppb	1A00510-CAL7	012F1201.D	01/04/11 14:42

INITIAL CALIBRATION DATA

SW8082A

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 1005002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 1/5/2011 7:19:26PM

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Aroclor-1016 (1)												
Aroclor-1016 (2)												
Aroclor-1016 (3)												
Aroclor-1016 (4)												
Aroclor-1016 (5)												
Aroclor-1016 (1) [2C]												
Aroclor-1016 (2) [2C]												
Aroclor-1016 (3) [2C]												
Aroclor-1016 (4) [2C]												
Aroclor-1016 (5) [2C]												
Aroclor-1254 (1)												
Aroclor-1254 (2)												
Aroclor-1254 (3)												
Aroclor-1254 (4)												
Aroclor-1254 (5)												
Aroclor-1254 (1) [2C]												
Aroclor-1254 (2) [2C]												
Aroclor-1254 (3) [2C]												
Aroclor-1254 (4) [2C]												
Aroclor-1254 (5) [2C]												
Aroclor-1260 (1)												
Aroclor-1260 (2)												
Aroclor-1260 (3)												
Aroclor-1260 (4)												
Aroclor-1260 (5)												
Aroclor-1260 (1) [2C]												
Aroclor-1260 (2) [2C]												
Aroclor-1260 (3) [2C]												
Aroclor-1260 (4) [2C]												
Aroclor-1260 (5) [2C]												
Tetrachloro-m-xylene	1	28300	5	27792.8	10	27862.3	25	28281.32	50	29540.54	100	29547.87

INITIAL CALIBRATION DATA

SW8082A

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 1005002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 1/5/2011 7:19:26PM

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Tetrachloro-m-xylene [2C]	1	28245	5	24812.2	10	24010.4	25	23300.32	50	23098.44	100	22669.18
Decachlorobiphenyl	1	32686	5	33252.4	10	30730	25	28060.88	50	30425.48	100	30434.57
Decachlorobiphenyl [2C]	1	25722	5	22976.2	10	20811.5	25	18504.28	50	19541.74	100	18948.58

INITIAL CALIBRATION DATA (Continued)

SW8082A

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 1005002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 1/5/2011 7:19:26PM

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Aroclor-1016 (1)												
Aroclor-1016 (2)												
Aroclor-1016 (3)												
Aroclor-1016 (4)												
Aroclor-1016 (5)												
Aroclor-1016 (1) [2C]												
Aroclor-1016 (2) [2C]												
Aroclor-1016 (3) [2C]												
Aroclor-1016 (4) [2C]												
Aroclor-1016 (5) [2C]												
Aroclor-1254 (1)												
Aroclor-1254 (2)												
Aroclor-1254 (3)												
Aroclor-1254 (4)												
Aroclor-1254 (5)												
Aroclor-1254 (1) [2C]												
Aroclor-1254 (2) [2C]												
Aroclor-1254 (3) [2C]												
Aroclor-1254 (4) [2C]												
Aroclor-1254 (5) [2C]												
Aroclor-1260 (1)												
Aroclor-1260 (2)												
Aroclor-1260 (3)												
Aroclor-1260 (4)												
Aroclor-1260 (5)												
Aroclor-1260 (1) [2C]												
Aroclor-1260 (2) [2C]												
Aroclor-1260 (3) [2C]												
Aroclor-1260 (4) [2C]												
Aroclor-1260 (5) [2C]												
Tetrachloro-m-xylene	200	30228.13										

INITIAL CALIBRATION DATA (Continued)

SW8082A

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 1005002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 1/5/2011 7:19:26PM

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Tetrachloro-m-xylene [2C]	200	22228.47										
Decachlorobiphenyl	200	30794.04										
Decachlorobiphenyl [2C]	200	18299.89										

INITIAL CALIBRATION DATA (Continued)

SW8082A

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 1005002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 1/5/2011 7:19:26PM

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Aroclor-1016 (1)												
Aroclor-1016 (2)												
Aroclor-1016 (3)												
Aroclor-1016 (4)												
Aroclor-1016 (5)												
Aroclor-1016 (1) [2C]												
Aroclor-1016 (2) [2C]												
Aroclor-1016 (3) [2C]												
Aroclor-1016 (4) [2C]												
Aroclor-1016 (5) [2C]												
Aroclor-1254 (1)												
Aroclor-1254 (2)												
Aroclor-1254 (3)												
Aroclor-1254 (4)												
Aroclor-1254 (5)												
Aroclor-1254 (1) [2C]												
Aroclor-1254 (2) [2C]												
Aroclor-1254 (3) [2C]												
Aroclor-1254 (4) [2C]												
Aroclor-1254 (5) [2C]												
Aroclor-1260 (1)												
Aroclor-1260 (2)												
Aroclor-1260 (3)												
Aroclor-1260 (4)												
Aroclor-1260 (5)												
Aroclor-1260 (1) [2C]												
Aroclor-1260 (2) [2C]												
Aroclor-1260 (3) [2C]												
Aroclor-1260 (4) [2C]												
Aroclor-1260 (5) [2C]												
Tetrachloro-m-xylene												

INITIAL CALIBRATION DATA (Continued)

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Calibration:	1005002	Instrument:	GL-ECD3
Matrix:	Water	Calibration Date:	1/5/2011 7:19:26PM

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Tetrachloro-m-xylene [2C]												
Decachlorobiphenyl												
Decachlorobiphenyl [2C]												

INITIAL CALIBRATION DATA (Continued)

SW8082A

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 1005002
Instrument: GL-ECD3
Matrix: Water
Calibration Date: 1/5/2011 7:19:26PM

Compound	Level 19		Level 20		Level 21		Level 22		Level 23		Level 24	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Aroclor-1016 (1)			2500	1312.518	1000	1371.552	750	1351.843	500	1353.35	100	1379.86
Aroclor-1016 (2)			2500	423.7828	1000	440.106	750	431.7173	500	435.762	100	454.64
Aroclor-1016 (3)			2500	625.39	1000	640.493	750	627.5187	500	637.41	100	664.9
Aroclor-1016 (4)			2500	633.0916	1000	641.782	750	632.4706	500	633.068	100	654.92
Aroclor-1016 (5)			2500	492.0124	1000	509.949	750	503.0813	500	501.912	100	530.08
Aroclor-1016 (1) [2C]			2500	838.1828	1000	986.116	750	1001.393	500	1062.188	100	1291.13
Aroclor-1016 (2) [2C]			2500	396.0692	1000	434.192	750	455.7093	500	472.152	100	526.06
Aroclor-1016 (3) [2C]			2500	427.5912	1000	474.112	750	484.9987	500	514.674	100	628.97
Aroclor-1016 (4) [2C]			2500	516.644	1000	585.566	750	600.444	500	641.51	100	818.8
Aroclor-1016 (5) [2C]			2500	422.3588	1000	463.649	750	469.5453	500	486.382	100	594.08
Aroclor-1254 (1)												
Aroclor-1254 (2)												
Aroclor-1254 (3)												
Aroclor-1254 (4)												
Aroclor-1254 (5)												
Aroclor-1254 (1) [2C]												
Aroclor-1254 (2) [2C]												
Aroclor-1254 (3) [2C]												
Aroclor-1254 (4) [2C]												
Aroclor-1254 (5) [2C]												
Aroclor-1260 (1)			2500	3529.898	1000	3698.998	750	3447.547	500	3690.114	100	3838.16
Aroclor-1260 (2)			2500	1905.044	1000	1991.364	750	1901.885	500	1934.762	100	2008.25
Aroclor-1260 (3)			2500	2008.79	1000	2115.154	750	2005.591	500	2062.272	100	2297.87
Aroclor-1260 (4)			2500	1525.826	1000	1611.527	750	1534.256	500	1591.534	100	1617.43
Aroclor-1260 (5)			2500	814.3084	1000	916.282	750	841.22	500	906.088	100	944.94
Aroclor-1260 (1) [2C]			2500	1612.419	1000	1882.631	750	1833.392	500	1975.376	100	2234.09
Aroclor-1260 (2) [2C]			2500	799.6348	1000	915.273	750	918.148	500	974.864	100	1199
Aroclor-1260 (3) [2C]			2500	967.158	1000	1104.948	750	1105.324	500	1174.532	100	1405.76
Aroclor-1260 (4) [2C]			2500	931.636	1000	1064.022	750	1050.079	500	1115.872	100	1340.42
Aroclor-1260 (5) [2C]			2500	735.7716	1000	844.715	750	825.8493	500	889.262	100	1040.37
Tetrachloro-m-xylene			125		50		37.5		25		5	

INITIAL CALIBRATION DATA (Continued)

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Calibration:	1005002	Instrument:	GL-ECD3
Matrix:	Water	Calibration Date:	1/5/2011 7:19:26PM

Compound	Level 19		Level 20		Level 21		Level 22		Level 23		Level 24	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Tetrachloro-m-xylene [2C]			125		50		37.5		25		5	
Decachlorobiphenyl			125		50		37.5		25		5	
Decachlorobiphenyl [2C]			125		50		37.5		25		5	

INITIAL CALIBRATION DATA (Continued)

SW8082A

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 1005002
Instrument: GL-ECD3
Matrix: Water
Calibration Date: 1/5/2011 7:19:26PM

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Aroclor-1016 (1)	1377.504	4.536308	6.700333	3.426844E-02			20	
Aroclor-1016 (2)	444.0847	4.44248	5.826833	3.181603E-02			20	
Aroclor-1016 (3)	649.9719	4.621188	6.179167	3.737598E-02			20	
Aroclor-1016 (4)	648.8554	3.928386	6.382333	4.135933E-02			20	
Aroclor-1016 (5)	518.3258	5.712167	6.986333	4.281168E-02			20	
Aroclor-1016 (1) [2C]	1116.305	22.05288	5.6205	8.742721E-02			20	*
Aroclor-1016 (2) [2C]	482.1738	15.65584	5.207667	6.233316E-02			20	
Aroclor-1016 (3) [2C]	538.2843	19.29511	5.3845	6.561467E-02			20	
Aroclor-1016 (4) [2C]	685.3173	23.96236	5.673333	7.372141E-02			20	*
Aroclor-1016 (5) [2C]	518.0925	18.33539	6.050167	3.093481E-02			20	
Aroclor-1254 (1)	1803.304	2.178697	8.235666	0.0355389			20	
Aroclor-1254 (2)	1085.454	3.680311	7.543	0.0399491			20	
Aroclor-1254 (3)	1093.427	2.527954	8.131333	4.376735E-02			20	
Aroclor-1254 (4)	1523.147	2.855178	8.584667	4.521186E-02			20	
Aroclor-1254 (5)	1544.674	2.484758	9.099166	3.591379E-02			20	
Aroclor-1254 (1) [2C]	1339.18	8.916472	6.924167	0.0325885			20	
Aroclor-1254 (2) [2C]	1124.057	16.92267	6.330667	1.678979E-02			20	
Aroclor-1254 (3) [2C]	959.0379	15.47823	6.4945	2.867968E-02			20	
Aroclor-1254 (4) [2C]	718.8912	9.684997	6.824833	3.501469E-02			20	
Aroclor-1254 (5) [2C]	933.819	16.10215	7.189167	4.059321E-02			20	
Aroclor-1260 (1)	3707.263	5.739381	9.985833	4.225337E-02			20	
Aroclor-1260 (2)	1987.077	5.271371	8.871167	0.0462616			20	
Aroclor-1260 (3)	2134.259	6.546249	9.215667	0.0358565			20	
Aroclor-1260 (4)	1615.479	6.430938	9.3155	3.563058E-02			20	
Aroclor-1260 (5)	907.6331	8.228581	11.0785	2.856956E-02			20	
Aroclor-1260 (1) [2C]	2013.278	16.31731	8.419	8.340063E-03			20	
Aroclor-1260 (2) [2C]	1028.947	20.55875	7.164667	1.777219E-02			20	*
Aroclor-1260 (3) [2C]	1227.66	19.18172	7.3915	0.0314888			20	
Aroclor-1260 (4) [2C]	1169.368	18.45489	7.554333	1.416947E-02			20	
Aroclor-1260 (5) [2C]	921.5547	18.06768	8.109833	0.0215561			20	
Tetrachloro-m-xylene	28793.28	3.343177	5.320714	7.382119E-03			20	
Tetrachloro-m-xylene [2C]	24052	8.465139	4.487286	3.658425E-02			20	

INITIAL CALIBRATION DATA (Continued)

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Calibration:	1005002	Instrument:	GL-ECD3
Matrix:	Water	Calibration Date:	1/5/2011 7:19:26PM

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Decachlorobiphenyl	30911.91	5.48761	11.51943	7.207403E-03			20	
Decachlorobiphenyl [2C]	20686.31	13.29798	9.923857	2.674018E-03			20	

INITIAL CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	007F0701.D	Calibration Date:	01/05/11 19:19
Sequence:	0K32606	Injection Date:	11/18/10
Lab Sample ID:	0K32606-ICV1	Injection Time:	14:40

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT		
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)	
Aroclor-1016 (1)	A	1000	965.8	1377.504	1330.475		-3.4	20	
Aroclor-1016 (2)	A	1000	954.1	444.0847	423.696		-4.6	20	
Aroclor-1016 (3)	A	1000	990.4	649.9719	643.709		-1.0	20	
Aroclor-1016 (4)	A	1000	1001	648.8554	649.524		0.1	20	
Aroclor-1016 (5)	A	1000	1007	518.3258	521.878		0.7	20	
Aroclor-1016 (1) [2C]	A	1000	770.6	1116.305	860.241		-22.9	20	*
Aroclor-1016 (2) [2C]	A	1000	955.3	482.1738	460.605		-4.5	20	
Aroclor-1016 (3) [2C]	A	1000	884.8	538.2843	476.271		-11.5	20	
Aroclor-1016 (4) [2C]	A	1000	869.8	685.3173	596.06		-13.0	20	
Aroclor-1016 (5) [2C]	A	1000	893.4	518.0925	462.882		-10.7	20	
Aroclor-1260 (1)	A	1000	914.4	3707.263	3390.072		-8.6	20	
Aroclor-1260 (2)	A	1000	999.0	1987.077	1985.004		-0.1	20	
Aroclor-1260 (3)	A	1000	1044	2134.259	2227.99		4.4	20	
Aroclor-1260 (4)	A	1000	845.2	1615.479	1365.422		-15.5	20	
Aroclor-1260 (5)	A	1000	819.7	907.6331	744.024		-18.0	20	
Aroclor-1260 (1) [2C]	A	1000	848.7	2013.278	1708.677		-15.1	20	
Aroclor-1260 (2) [2C]	A	1000	914.8	1028.947	941.29		-8.5	20	
Aroclor-1260 (3) [2C]	A	1000	939.9	1227.66	1153.839		-6.0	20	
Aroclor-1260 (4) [2C]	A	1000	917.8	1169.368	1073.231		-8.2	20	
Aroclor-1260 (5) [2C]	A	1000	816.1	921.5547	752.068		-18.4	20	

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

INITIAL CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	007F0801.D	Calibration Date:	01/05/11 19:19
Sequence:	0K33419	Injection Date:	11/24/10
Lab Sample ID:	0K33419-ICV1	Injection Time:	19:49

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
Aroclor-1254 (1)	A	1000	973.1	1803.304	1754.749		-2.7	20
Aroclor-1254 (2)	A	1000	953.1	1085.454	1034.595		-4.7	20
Aroclor-1254 (3)	A	1000	978.3	1093.427	1069.689		-2.2	20
Aroclor-1254 (4)	A	1000	956.1	1523.147	1456.336		-4.4	20
Aroclor-1254 (5)	A	1000	971.9	1544.674	1501.287		-2.8	20
Aroclor-1254 (1) [2C]	A	1000	945.5	1339.18	1266.188		-5.5	20
Aroclor-1254 (2) [2C]	A	1000	878.8	1124.057	987.794		-12.1	20
Aroclor-1254 (3) [2C]	A	1000	890.6	959.0379	854.17		-10.9	20
Aroclor-1254 (4) [2C]	A	1000	931.2	718.8912	669.47		-6.9	20
Aroclor-1254 (5) [2C]	A	1000	887.5	933.819	828.766		-11.2	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

ANALYSIS SEQUENCE SUMMARY

SW8082A

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Sequence: 1A00604

Calibration: 1005002

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Calibration Check	1A00604-CCV1	014R1401.D	01/04/11 15:20
Calibration Check	1A00604-CCV1	014F1401.D	01/04/11 15:20
Calibration Check	1A00604-CCV3	016R1601.D	01/04/11 15:57
Calibration Check	1A00604-CCV3	016F1601.D	01/04/11 15:57
Calibration Check	1A00604-CCV4	017R1701.D	01/04/11 16:15
Calibration Check	1A00604-CCV4	017F1701.D	01/04/11 16:15
NTC12-SOIL-IDW	1012185-12	018F1801.D	01/04/11 16:34
NTC12-SOIL-IDW	1012185-12	018R1801.D	01/04/11 16:34
Blank	0L22010-BLK1	019F1901.D	01/04/11 16:52
Blank	0L22010-BLK1	019R1901.D	01/04/11 16:52
LCS	0L22010-BS2	022F2201.D	01/04/11 17:48
LCS	0L22010-BS2	022R2201.D	01/04/11 17:48
LCS Dup	0L22010-BSD2	023F2301.D	01/04/11 18:07
LCS Dup	0L22010-BSD2	023R2301.D	01/04/11 18:07
Calibration Check	1A00604-CCV5	024F2401.D	01/04/11 18:25
Calibration Check	1A00604-CCV5	024R2401.D	01/04/11 18:25
Calibration Check	1A00604-CCV7	026R2601.D	01/04/11 19:03
Calibration Check	1A00604-CCV7	026F2601.D	01/04/11 19:03
Calibration Check	1A00604-CCV8	027R2701.D	01/04/11 19:21
Calibration Check	1A00604-CCV8	027F2701.D	01/04/11 19:21

CONTINUING CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	016F1601.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00604	Injection Date:	01/04/11
Lab Sample ID:	1A00604-CCV3	Injection Time:	15:57

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Aroclor-1016 (1)	A	1000	1086	1377.504	1496.377		8.6	20
Aroclor-1016 (2)	A	1000	1088	444.0847	483.005		8.8	20
Aroclor-1016 (3)	A	1000	1074	649.9719	697.796		7.4	20
Aroclor-1016 (4)	A	1000	1081	648.8554	701.359		8.1	20
Aroclor-1016 (5)	A	1000	1084	518.3258	561.663		8.4	20
Aroclor-1016 (1) [2C]	A	1000	1130	1116.305	1261.981		13.0	20
Aroclor-1016 (2) [2C]	A	1000	1207	482.1738	582.069		20.7	20 *
Aroclor-1016 (3) [2C]	A	1000	1185	538.2843	637.652		18.5	20
Aroclor-1016 (4) [2C]	A	1000	1149	685.3173	787.305		14.9	20
Aroclor-1016 (5) [2C]	A	1000	1258	518.0925	651.738		25.8	20 *
Aroclor-1260 (1)	A	1000	1157	3707.263	4288.164		15.7	20
Aroclor-1260 (2)	A	1000	1146	1987.077	2278.093		14.6	20
Aroclor-1260 (3)	A	1000	1137	2134.259	2425.851		13.7	20
Aroclor-1260 (4)	A	1000	1174	1615.479	1896.543		17.4	20
Aroclor-1260 (5)	A	1000	1126	907.6331	1022.3		12.6	20
Aroclor-1260 (1) [2C]	A	1000	1312	2013.278	2641.567		31.2	20 *
Aroclor-1260 (2) [2C]	A	1000	1269	1028.947	1305.366		26.9	20 *
Aroclor-1260 (3) [2C]	A	1000	1279	1227.66	1570.521		27.9	20 *
Aroclor-1260 (4) [2C]	A	1000	1290	1169.368	1508.297		29.0	20 *
Aroclor-1260 (5) [2C]	A	1000	1322	921.5547	1218.079		32.2	20 *

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	017F1701.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00604	Injection Date:	01/04/11
Lab Sample ID:	1A00604-CCV4	Injection Time:	16:15

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Aroclor-1254 (1)	A	1000	1032	1803.304	1861.54		3.2	20
Aroclor-1254 (2)	A	1000	1019	1085.454	1105.711		1.9	20
Aroclor-1254 (3)	A	1000	1057	1093.427	1156.21		5.7	20
Aroclor-1254 (4)	A	1000	990.4	1523.147	1508.573		-1.0	20
Aroclor-1254 (5)	A	1000	1047	1544.674	1617.266		4.7	20
Aroclor-1254 (1) [2C]	A	1000	1203	1339.18	1610.79		20.3	20 *
Aroclor-1254 (2) [2C]	A	1000	1131	1124.057	1270.958		13.1	20
Aroclor-1254 (3) [2C]	A	1000	1168	959.0379	1120.38		16.8	20
Aroclor-1254 (4) [2C]	A	1000	1222	718.8912	878.199		22.2	20 *
Aroclor-1254 (5) [2C]	A	1000	1110	933.819	1036.485		11.0	20

10.3

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	024F2401.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00604	Injection Date:	01/04/11
Lab Sample ID:	1A00604-CCV5	Injection Time:	18:25

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Tetrachloro-m-xylene	A	100.0	105.5	28793.28	30366.94		5.5	20
Tetrachloro-m-xylene [2C]	A	100.0	104.7	24052	25184.67		4.7	20
Decachlorobiphenyl	A	100.0	93.40	30911.91	28873.36		-6.6	20
Decachlorobiphenyl [2C]	A	100.0	95.64	20686.31	19784.83		-4.4	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	026F2601.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00604	Injection Date:	01/04/11
Lab Sample ID:	1A00604-CCV7	Injection Time:	19:03

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Aroclor-1016 (1)	A	1000	1132	1377.504	1559.87		13.2	20
Aroclor-1016 (2)	A	1000	1114	444.0847	494.895		11.4	20
Aroclor-1016 (3)	A	1000	1120	649.9719	727.893		12.0	20
Aroclor-1016 (4)	A	1000	1100	648.8554	713.583		10.0	20
Aroclor-1016 (5)	A	1000	1108	518.3258	574.3		10.8	20
Aroclor-1016 (1) [2C]	A	1000	1213	1116.305	1353.9		21.3	20 *
Aroclor-1016 (2) [2C]	A	1000	1271	482.1738	612.714		27.1	20 *
Aroclor-1016 (3) [2C]	A	1000	1242	538.2843	668.429		24.2	20 *
Aroclor-1016 (4) [2C]	A	1000	1210	685.3173	829.541		21.0	20 *
Aroclor-1016 (5) [2C]	A	1000	1342	518.0925	695.232		34.2	20 *
Aroclor-1260 (1)	A	1000	1179	3707.263	4371.526		17.9	20
Aroclor-1260 (2)	A	1000	1173	1987.077	2331.801		17.3	20
Aroclor-1260 (3)	A	1000	1158	2134.259	2471.077		15.8	20
Aroclor-1260 (4)	A	1000	1184	1615.479	1912.472		18.4	20
Aroclor-1260 (5)	A	1000	1152	907.6331	1045.154		15.2	20
Aroclor-1260 (1) [2C]	A	1000	1385	2013.278	2787.845		38.5	20 *
Aroclor-1260 (2) [2C]	A	1000	1308	1028.947	1345.489		30.8	20 *
Aroclor-1260 (3) [2C]	A	1000	1342	1227.66	1647.155		34.2	20 *
Aroclor-1260 (4) [2C]	A	1000	1347	1169.368	1575.01		34.7	20 *
Aroclor-1260 (5) [2C]	A	1000	1386	921.5547	1277.335		38.6	20 *

25.6

35.4

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	027F2701.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00604	Injection Date:	01/04/11
Lab Sample ID:	1A00604-CCV8	Injection Time:	19:21

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT		
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)	
Aroclor-1254 (1)	A	1000	1069	1803.304	1928.03		6.9	20	
Aroclor-1254 (2)	A	1000	1049	1085.454	1139.126		4.9	20	
Aroclor-1254 (3)	A	1000	1089	1093.427	1190.712		8.9	20	
Aroclor-1254 (4)	A	1000	1053	1523.147	1604.575		5.3	20	
Aroclor-1254 (5)	A	1000	1087	1544.674	1679.745		8.7	20	
Aroclor-1254 (1) [2C]	A	1000	1274	1339.18	1705.985		27.4	20	*
Aroclor-1254 (2) [2C]	A	1000	1191	1124.057	1338.565		19.1	20	
Aroclor-1254 (3) [2C]	A	1000	1234	959.0379	1183.642		23.4	20	*
Aroclor-1254 (4) [2C]	A	1000	1301	718.8912	935.318		30.1	20	*
Aroclor-1254 (5) [2C]	A	1000	1191	933.819	1112.206		19.1	20	

23.8

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

ANALYSIS SEQUENCE SUMMARY

SW8082A

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 1A00705
Instrument: GL-ECD3
Calibration: 1005002

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Calibration Check	1A00705-CCV1	003F0501.D	01/05/11 18:36
Calibration Check	1A00705-CCV1	003R0501.D	01/05/11 18:36
Calibration Check	1A00705-CCV3	005F0701.D	01/05/11 19:13
Calibration Check	1A00705-CCV3	005R0701.D	01/05/11 19:13
NTC12-SB28-0204	1012185-22	012R1401.D	01/05/11 21:24
NTC12-SB28-0204	1012185-22	012F1401.D	01/05/11 21:24
NTC12-SB29-0204	1012185-24	014R1601.D	01/05/11 22:01
NTC12-SB29-0204	1012185-24	014F1601.D	01/05/11 22:01
NTC12-SB27-0204	1012185-14	015F1701.D	01/05/11 22:19
NTC12-SB27-0204	1012185-14	015R1701.D	01/05/11 22:19
NTC12-SB27-0204	0L21019-MS2	018R2001.D	01/05/11 23:15
NTC12-SB27-0204	0L21019-MS2	018F2001.D	01/05/11 23:15
NTC12-SB27-0204	0L21019-MSD2	019F2101.D	01/05/11 23:34
NTC12-SB27-0204	0L21019-MSD2	019R2101.D	01/05/11 23:34
Calibration Check	1A00705-CCV4	020R2201.D	01/05/11 23:52
Calibration Check	1A00705-CCV4	020F2201.D	01/05/11 23:52
Calibration Check	1A00705-CCV6	022F2401.D	01/06/11 00:29
Calibration Check	1A00705-CCV6	022R2401.D	01/06/11 00:29
NTC12-SB21-0507	1012185-18	025R2701.D	01/06/11 01:25
NTC12-SB21-0507	1012185-18	025F2701.D	01/06/11 01:25
NTC12-SB25-0204	1012185-20	029R3101.D	01/06/11 02:39
NTC12-SB25-0204	1012185-20	029F3101.D	01/06/11 02:39
Calibration Check	1A00705-CCV7	031R3301.D	01/06/11 03:16
Calibration Check	1A00705-CCV7	031F3301.D	01/06/11 03:16
Calibration Check	1A00705-CCV9	033R3501.D	01/06/11 03:53
Calibration Check	1A00705-CCV9	033F3501.D	01/06/11 03:53

CONTINUING CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	005F0701.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00705	Injection Date:	01/05/11
Lab Sample ID:	1A00705-CCV3	Injection Time:	19:13

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT		
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)	
Aroclor-1016 (1)	A	1000	1096	1377.504	1509.785		9.6	20	
Aroclor-1016 (2)	A	1000	1056	444.0847	468.879		5.6	20	
Aroclor-1016 (3)	A	1000	1063	649.9719	691.013		6.3	20	
Aroclor-1016 (4)	A	1000	1059	648.8554	687.391		5.9	20	
Aroclor-1016 (5)	A	1000	1059	518.3258	549.152		5.9	20	
Aroclor-1016 (1) [2C]	A	1000	1119	1116.305	1249.359		11.9	20	
Aroclor-1016 (2) [2C]	A	1000	1211	482.1738	583.997		21.1	20	*
Aroclor-1016 (3) [2C]	A	1000	1146	538.2843	617.067		14.6	20	
Aroclor-1016 (4) [2C]	A	1000	1135	685.3173	777.893		13.5	20	
Aroclor-1016 (5) [2C]	A	1000	1216	518.0925	629.835		21.6	20	*
Aroclor-1260 (1)	A	1000	1171	3707.263	4341.021		17.1	20	
Aroclor-1260 (2)	A	1000	1157	1987.077	2298.469		15.7	20	
Aroclor-1260 (3)	A	1000	1137	2134.259	2426.979		13.7	20	
Aroclor-1260 (4)	A	1000	1177	1615.479	1902.053		17.7	20	
Aroclor-1260 (5)	A	1000	1145	907.6331	1039.356		14.5	20	
Aroclor-1260 (1) [2C]	A	1000	1294	2013.278	2605.055		29.4	20	*
Aroclor-1260 (2) [2C]	A	1000	1237	1028.947	1273.288		23.7	20	*
Aroclor-1260 (3) [2C]	A	1000	1251	1227.66	1535.537		25.1	20	*
Aroclor-1260 (4) [2C]	A	1000	1271	1169.368	1486.206		27.1	20	*
Aroclor-1260 (5) [2C]	A	1000	1254	921.5547	1155.531		25.4	20	*

16.5

26.1

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	020F2201.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00705	Injection Date:	01/05/11
Lab Sample ID:	1A00705-CCV4	Injection Time:	23:52

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Tetrachloro-m-xylene	A	100.0	102.6	28793.28	29555.57		2.6	20
Tetrachloro-m-xylene [2C]	A	100.0	102.0	24052	24543.91		2.0	20
Decachlorobiphenyl	A	100.0	91.03	30911.91	28139.1		-9.0	20
Decachlorobiphenyl [2C]	A	100.0	85.85	20686.31	17759		-14.2	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	022F2401.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00705	Injection Date:	01/06/11
Lab Sample ID:	1A00705-CCV6	Injection Time:	00:29

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT		
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)	
Aroclor-1016 (1)	A	1000	1131	1377.504	1557.759		13.1	20	
Aroclor-1016 (2)	A	1000	1128	444.0847	500.737		12.8	20	
Aroclor-1016 (3)	A	1000	1117	649.9719	725.827		11.7	20	
Aroclor-1016 (4)	A	1000	1115	648.8554	723.681		11.5	20	
Aroclor-1016 (5)	A	1000	1116	518.3258	578.553		11.6	20	
Aroclor-1016 (1) [2C]	A	1000	1130	1116.305	1261.774		13.0	20	
Aroclor-1016 (2) [2C]	A	1000	1329	482.1738	640.676		32.9	20	*
Aroclor-1016 (3) [2C]	A	1000	1226	538.2843	659.895		22.6	20	*
Aroclor-1016 (4) [2C]	A	1000	1229	685.3173	842.545		22.9	20	*
Aroclor-1016 (5) [2C]	A	1000	1307	518.0925	676.988		30.7	20	*
Aroclor-1260 (1)	A	1000	1241	3707.263	4599.863		24.1	20	*
Aroclor-1260 (2)	A	1000	1237	1987.077	2457.881		23.7	20	*
Aroclor-1260 (3)	A	1000	1149	2134.259	2452.88		14.9	20	
Aroclor-1260 (4)	A	1000	1183	1615.479	1911.499		18.3	20	
Aroclor-1260 (5)	A	1000	1199	907.6331	1088.415		19.9	20	
Aroclor-1260 (1) [2C]	A	1000	1368	2013.278	2753.707		36.8	20	*
Aroclor-1260 (2) [2C]	A	1000	1315	1028.947	1353.439		31.5	20	*
Aroclor-1260 (3) [2C]	A	1000	1345	1227.66	1651.687		34.5	20	*
Aroclor-1260 (4) [2C]	A	1000	1336	1169.368	1562.783		33.6	20	*
Aroclor-1260 (5) [2C]	A	1000	1366	921.5547	1259.308		36.7	20	*

24.4

20.2

34.1

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	031F3301.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00705	Injection Date:	01/06/11
Lab Sample ID:	1A00705-CCV7	Injection Time:	03:16

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Tetrachloro-m-xylene	A	100.0	108.0	28793.28	31100.11		8.0	20
Tetrachloro-m-xylene [2C]	A	100.0	92.51	24052	22250.08		-7.5	20
Decachlorobiphenyl	A	100.0	82.93	30911.91	25635.89		-17.1	20
Decachlorobiphenyl [2C]	A	100.0	68.75	20686.31	14221.88		-31.2	20 *

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	033F3501.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00705	Injection Date:	01/06/11
Lab Sample ID:	1A00705-CCV9	Injection Time:	03:53

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Aroclor-1016 (1)	A	1000	1103	1377.504	1519.756		10.3	20
Aroclor-1016 (2)	A	1000	1113	444.0847	494.211		11.3	20
Aroclor-1016 (3)	A	1000	1089	649.9719	707.636		8.9	20
Aroclor-1016 (4)	A	1000	1090	648.8554	707.328		9.0	20
Aroclor-1016 (5)	A	1000	1094	518.3258	567.112		9.4	20
Aroclor-1016 (1) [2C]	A	1000	901.9	1116.305	1006.776		-9.8	20
Aroclor-1016 (2) [2C]	A	1000	1055	482.1738	508.83		5.5	20
Aroclor-1016 (3) [2C]	A	1000	979.2	538.2843	527.099		-2.1	20
Aroclor-1016 (4) [2C]	A	1000	975.0	685.3173	668.221		-2.5	20
Aroclor-1016 (5) [2C]	A	1000	1056	518.0925	547.347		5.6	20
Aroclor-1260 (1)	A	1000	1112	3707.263	4123.268		11.2	20
Aroclor-1260 (2)	A	1000	1156	1987.077	2297.803		15.6	20
Aroclor-1260 (3)	A	1000	1117	2134.259	2383.973		11.7	20
Aroclor-1260 (4)	A	1000	1127	1615.479	1820.013		12.7	20
Aroclor-1260 (5)	A	1000	1024	907.6331	929.128		2.4	20
Aroclor-1260 (1) [2C]	A	1000	1060	2013.278	2134.262		6.0	20
Aroclor-1260 (2) [2C]	A	1000	1046	1028.947	1075.897		4.6	20
Aroclor-1260 (3) [2C]	A	1000	1068	1227.66	1311.607		6.8	20
Aroclor-1260 (4) [2C]	A	1000	1063	1169.368	1243.123		6.3	20
Aroclor-1260 (5) [2C]	A	1000	1064	921.5547	980.522		6.4	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

ANALYSIS SEQUENCE SUMMARY

SW8082A

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Sequence: 1A01007

Calibration: 1005002

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Calibration Check	1A01007-CCV1	001F0101.D	01/06/11 16:24
Calibration Check	1A01007-CCV1	001R0101.D	01/06/11 16:24
Calibration Check	1A01007-CCV2	002R0201.D	01/06/11 16:42
Calibration Check	1A01007-CCV2	002F0201.D	01/06/11 16:42
NTC12-SB21-0507	1012185-18RE1	003R0301.D	01/06/11 17:01
NTC12-SB21-0507	1012185-18RE1	003F0301.D	01/06/11 17:01
NTC12-SB25-0204	1012185-20RE1	004F0401.D	01/06/11 17:19
NTC12-SB25-0204	1012185-20RE1	004R0401.D	01/06/11 17:19
NTC12-SB28-0204	1012185-22RE1	005F0501.D	01/06/11 17:38
NTC12-SB28-0204	1012185-22RE1	005R0501.D	01/06/11 17:38
NTC12-SB29-0204	1012185-24RE1	006R0601.D	01/06/11 17:57
NTC12-SB29-0204	1012185-24RE1	006F0601.D	01/06/11 17:57
Calibration Check	1A01007-CCV3	007F0701.D	01/06/11 18:15
Calibration Check	1A01007-CCV3	007R0701.D	01/06/11 18:15
Calibration Check	1A01007-CCV4	008R0801.D	01/06/11 18:34
Calibration Check	1A01007-CCV4	008F0801.D	01/06/11 18:34

CONTINUING CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	001F0101.D	Calibration Date:	01/05/11 19:19
Sequence:	1A01007	Injection Date:	01/06/11
Lab Sample ID:	1A01007-CCV1	Injection Time:	16:24

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT		
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)	
Tetrachloro-m-xylene	A	100.0	97.59	28793.28	28100.15		-2.4	20	
Tetrachloro-m-xylene [2C]	A	100.0	107.5	24052	25855.62		7.5	20	
Decachlorobiphenyl	A	100.0	78.21	30911.91	24175.7		-21.8	20	*
Decachlorobiphenyl [2C]	A	100.0	82.77	20686.31	17123.09		-17.2	20	

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	002F0201.D	Calibration Date:	01/05/11 19:19
Sequence:	1A01007	Injection Date:	01/06/11
Lab Sample ID:	1A01007-CCV2	Injection Time:	16:42

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT		
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)	
Aroclor-1254 (1)	A	1000	1091	1803.304	1967.895		9.1	20	
Aroclor-1254 (2)	A	1000	1049	1085.454	1139.172		4.9	20	
Aroclor-1254 (3)	A	1000	1100	1093.427	1202.634		10.0	20	
Aroclor-1254 (4)	A	1000	1081	1523.147	1646.67		8.1	20	
Aroclor-1254 (5)	A	1000	1092	1544.674	1686.113		9.2	20	
Aroclor-1254 (1) [2C]	A	1000	1272	1339.18	1702.875		27.2	20	*
Aroclor-1254 (2) [2C]	A	1000	1207	1124.057	1356.464		20.7	20	*
Aroclor-1254 (3) [2C]	A	1000	1223	959.0379	1173.376		22.3	20	*
Aroclor-1254 (4) [2C]	A	1000	1297	718.8912	932.431		29.7	20	*
Aroclor-1254 (5) [2C]	A	1000	1172	933.819	1094.118		17.2	20	

23.4

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	007F0701.D	Calibration Date:	01/05/11 19:19
Sequence:	1A01007	Injection Date:	01/06/11
Lab Sample ID:	1A01007-CCV3	Injection Time:	18:15

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT		
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)	
Tetrachloro-m-xylene	A	100.0	101.0	28793.28	29076.17		1.0	20	
Tetrachloro-m-xylene [2C]	A	100.0	93.62	24052	22517.4		-6.4	20	
Decachlorobiphenyl	A	100.0	82.82	30911.91	25599.8		-17.2	20	
Decachlorobiphenyl [2C]	A	100.0	68.45	20686.31	14159.13		-31.6	20	*

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8082A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	008F0801.D	Calibration Date:	01/05/11 19:19
Sequence:	1A01007	Injection Date:	01/06/11
Lab Sample ID:	1A01007-CCV4	Injection Time:	18:34

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Aroclor-1254 (1)	A	1000	1006	1803.304	1813.364		0.6	20
Aroclor-1254 (2)	A	1000	990.8	1085.454	1075.476		-0.9	20
Aroclor-1254 (3)	A	1000	1027	1093.427	1122.553		2.7	20
Aroclor-1254 (4)	A	1000	1002	1523.147	1525.57		0.2	20
Aroclor-1254 (5)	A	1000	1010	1544.674	1559.414		1.0	20
Aroclor-1254 (1) [2C]	A	1000	1106	1339.18	1480.629		10.6	20
Aroclor-1254 (2) [2C]	A	1000	1047	1124.057	1177.275		4.7	20
Aroclor-1254 (3) [2C]	A	1000	1057	959.0379	1013.567		5.7	20
Aroclor-1254 (4) [2C]	A	1000	1110	718.8912	797.618		11.0	20
Aroclor-1254 (5) [2C]	A	1000	1048	933.819	978.853		4.8	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB21-0507

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-18RE1 Date(s) Analyzed: 01/06/2011 01/06/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
Aroclor-1254	1	9.00	-0.03	0.03	799	
	2	7.11	-0.03	0.03	592	30

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB25-0204

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-20RE1 Date(s) Analyzed: 01/06/2011 01/06/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
Aroclor-1254	1	9.00	-0.03	0.03	105	
	2	7.12	-0.03	0.03	88.7	17

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB28-0204

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-22RE1 Date(s) Analyzed: 01/06/2011 01/06/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
Aroclor-1254	1	9.00	-0.03	0.03	48.1	
	2	7.12	-0.03	0.03	19.7	84

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB29-0204

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-24RE1 Date(s) Analyzed: 01/06/2011 01/06/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
Aroclor-1254	1	9.00	-0.03	0.03	29.8	
	2	7.11	-0.03	0.03	19.4	42

METHOD DETECTION AND REPORTING LIMITS

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Analyte	MDL	MRL	Units	Method
Aroclor-1016	4.20	17.0	ug/Kg	SW8082A
Aroclor-1221	4.20	17.0	ug/Kg	SW8082A
Aroclor-1232	4.20	17.0	ug/Kg	SW8082A
Aroclor-1242	4.20	17.0	ug/Kg	SW8082A
Aroclor-1248	4.20	17.0	ug/Kg	SW8082A
Aroclor-1254	4.20	17.0	ug/Kg	SW8082A
Aroclor-1260	4.20	17.0	ug/Kg	SW8082A

Data for SW8081B Forms

HOLDING TIME SUMMARY

SW8081B

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NTC12-SB23-0005	12/20/10 13:00	12/21/10 09:15	12/22/10 14:30	2.10	14.00	12/29/10 23:23	7.37	40.00	
NTC12-SB23-0810	12/20/10 13:20	12/21/10 09:15	12/22/10 14:30	2.09	14.00	12/29/10 23:41	7.38	40.00	
NTC12-SB24-0005	12/20/10 14:00	12/21/10 09:15	12/22/10 14:30	2.06	14.00	12/30/10 00:00	7.40	40.00	
NTC12-SB24-00502	12/20/10 14:05	12/21/10 09:15	12/22/10 14:30	2.06	14.00	01/03/11 16:17	12.07	40.00	
NTC12-SB30-0005	12/20/10 14:20	12/21/10 09:15	12/22/10 14:30	2.05	14.00	01/03/11 16:35	12.09	40.00	
NTC12-SB30-00502	12/20/10 14:25	12/21/10 09:15	12/22/10 14:30	2.05	14.00	01/03/11 16:54	12.10	40.00	
NTC12-SB26-0005	12/20/10 17:35	12/21/10 09:15	12/22/10 14:30	1.91	14.00	01/03/11 17:12	12.11	40.00	
NTC12-SB26-0005	12/20/10 17:35	12/21/10 09:15	12/22/10 14:30	1.91	14.00	01/03/11 17:31	12.13	40.00	
NTC12-SB26-0406	12/20/10 17:40	12/21/10 09:15	12/22/10 14:30	1.91	14.00	01/03/11 18:26	12.16	40.00	
NTC12-SB26-0406	12/20/10 17:40	12/21/10 09:15	12/22/10 14:30	1.91	14.00	01/03/11 18:08	12.15	40.00	
NTC12-DUP01	12/20/10 00:00	12/21/10 09:15	12/22/10 14:30	2.65	14.00	01/03/11 17:49	12.14	40.00	
NTC12-DUP02	12/20/10 00:00	12/21/10 09:15	12/22/10 14:30	2.65	14.00	01/04/11 19:58	13.23	40.00	
NTC12-DUP02	12/20/10 00:00	12/21/10 09:15	12/22/10 14:30	2.65	14.00	01/04/11 19:40	13.22	40.00	
NTC12-SB27-0005	12/20/10 15:30	12/21/10 09:15	12/22/10 14:30	2.00	14.00	01/04/11 20:54	13.27	40.00	
NTC12-SB27-0005	12/20/10 15:30	12/21/10 09:15	12/22/10 14:30	2.00	14.00	01/04/11 20:35	13.25	40.00	
NTC12-SB27-0204	12/20/10 15:35	12/21/10 09:15	12/22/10 14:30	2.00	14.00	01/05/11 22:19	14.33	40.00	
NTC12-SB22-0005	12/20/10 15:55	12/21/10 09:15	12/27/10 11:48	6.87	14.00	01/04/11 21:50	8.42	40.00	
NTC12-SB22-0005	12/20/10 15:55	12/21/10 09:15	12/27/10 11:48	6.87	14.00	01/04/11 21:31	8.40	40.00	
NTC12-SB22-00502	12/20/10 16:00	12/21/10 09:15	12/27/10 11:48	6.87	14.00	01/04/11 22:45	8.46	40.00	
NTC12-SB21-0005	12/20/10 16:20	12/21/10 09:15	12/27/10 11:48	6.85	14.00	01/06/11 00:48	9.54	40.00	
NTC12-SB21-0005	12/20/10 16:20	12/21/10 09:15	12/27/10 11:48	6.85	14.00	01/05/11 19:32	9.32	40.00	
NTC12-SB21-0507	12/20/10 16:25	12/21/10 09:15	12/27/10 11:48	6.85	14.00	01/06/11 01:25	9.57	40.00	
NTC12-SB21-0507	12/20/10 16:25	12/21/10 09:15	12/27/10 11:48	6.85	14.00	01/05/11 19:51	9.34	40.00	
NTC12-SB25-0005	12/20/10 16:35	12/21/10 09:15	12/27/10 11:48	6.84	14.00	01/06/11 02:02	9.59	40.00	

HOLDING TIME SUMMARY

SW8081B

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NTC12-SB25-0005	12/20/10 16:35	12/21/10 09:15	12/27/10 11:48	6.84	14.00	01/05/11 20:09	9.35	40.00	
NTC12-SB25-0005	12/20/10 16:35	12/21/10 09:15	12/27/10 11:48	6.84	14.00	01/05/11 20:28	9.36	40.00	
NTC12-SB25-0204	12/20/10 16:40	12/21/10 09:15	12/27/10 11:48	6.84	14.00	01/06/11 02:39	9.62	40.00	
NTC12-SB25-0204	12/20/10 16:40	12/21/10 09:15	12/27/10 11:48	6.84	14.00	01/05/11 20:46	9.37	40.00	
NTC12-SB28-0005	12/20/10 17:00	12/21/10 09:15	12/27/10 11:48	6.83	14.00	01/05/11 21:05	9.39	40.00	
NTC12-SB28-0204	12/20/10 17:05	12/21/10 09:15	12/27/10 11:48	6.82	14.00	01/05/11 21:24	9.40	40.00	
NTC12-SB29-0005	12/20/10 17:20	12/21/10 09:15	12/27/10 11:48	6.81	14.00	01/05/11 21:42	9.41	40.00	
NTC12-SB29-0204	12/20/10 17:25	12/21/10 09:15	12/27/10 11:48	6.81	14.00	01/05/11 22:01	9.43	40.00	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8081B

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 0L36408

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: GL-ECD3
Calibration: 0362003

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Calibration Check (0L36408-CCV1) ug/L				Lab File ID: 003F1301.D		Analyzed: 12/29/10 19:03		
Tetrachloro-m-xylene	100.0	92.6	80 - 120	5.473	5.473	0.0000	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	86.0	80 - 120	4.606	4.606	0.0000	+/-0.030	
Decachlorobiphenyl	100.0	96.8	80 - 120	11.738	11.738	0.0000	+/-0.030	
Decachlorobiphenyl [2C]	100.0	90.0	80 - 120	10.12	10.12	0.0000	+/-0.030	
Blank (0L21019-BLK1) ug/Kg wet				Lab File ID: 007F1701.D		Analyzed: 12/29/10 20:17		
Tetrachloro-m-xylene	33.33	75.3	70 - 125	5.472	5.473	-0.0010	+/-0.030	
Tetrachloro-m-xylene [2C]	33.33	72.1	70 - 125	4.606	4.606	0.0000	+/-0.030	
Decachlorobiphenyl	33.33	82.7	60 - 125	11.739	11.738	0.0010	+/-0.030	
Decachlorobiphenyl [2C]	33.33	79.6	60 - 125	10.117	10.12	-0.0030	+/-0.030	
LCS (0L21019-BS1) ug/Kg wet				Lab File ID: 008F1801.D		Analyzed: 12/29/10 20:35		
Tetrachloro-m-xylene	33.33	74.3	70 - 125	5.472	5.473	-0.0010	+/-0.030	
Tetrachloro-m-xylene [2C]	33.33	70.5	70 - 125	4.604	4.606	-0.0020	+/-0.030	
Decachlorobiphenyl	33.33	79.4	60 - 125	11.737	11.738	-0.0010	+/-0.030	
Decachlorobiphenyl [2C]	33.33	76.6	60 - 125	10.119	10.12	-0.0010	+/-0.030	
NTC12-SB23-0005 (1012185-01) ug/Kg dry				Lab File ID: 017F2701.D		Analyzed: 12/29/10 23:23		
Tetrachloro-m-xylene	17.01	74.2	70 - 125	5.472	5.473	-0.0010	+/-0.030	
Tetrachloro-m-xylene [2C]	17.01	74.0	70 - 125	4.602	4.606	-0.0040	+/-0.030	
Decachlorobiphenyl	17.01	84.7	60 - 125	11.737	11.738	-0.0010	+/-0.030	
Decachlorobiphenyl [2C]	17.01	77.9	60 - 125	10.117	10.12	-0.0030	+/-0.030	
NTC12-SB23-0810 (1012185-02) ug/Kg dry				Lab File ID: 018F2801.D		Analyzed: 12/29/10 23:41		
Tetrachloro-m-xylene	19.16	65.4	70 - 125	5.472	5.473	-0.0010	+/-0.030	*
Tetrachloro-m-xylene [2C]	19.16	58.3	70 - 125	4.6	4.606	-0.0060	+/-0.030	*
Decachlorobiphenyl	19.16	72.7	60 - 125	11.738	11.738	0.0000	+/-0.030	
Decachlorobiphenyl [2C]	19.16	56.0	60 - 125	10.12	10.12	0.0000	+/-0.030	*
NTC12-SB24-0005 (1012185-03) ug/Kg dry				Lab File ID: 019F2901.D		Analyzed: 12/30/10 00:00		
Tetrachloro-m-xylene	19.18	55.3	70 - 125	5.471	5.473	-0.0020	+/-0.030	*
Tetrachloro-m-xylene [2C]	19.18	54.0	70 - 125	4.601	4.606	-0.0050	+/-0.030	*
Decachlorobiphenyl	19.18	64.2	60 - 125	11.738	11.738	0.0000	+/-0.030	
Decachlorobiphenyl [2C]	19.18	60.4	60 - 125	10.116	10.12	-0.0040	+/-0.030	
Calibration Check (0L36408-CCV4) ug/L				Lab File ID: 020F3001.D		Analyzed: 12/30/10 00:18		
Tetrachloro-m-xylene	100.0	94.6	80 - 120	5.471	5.473	-0.0020	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	93.3	80 - 120	4.605	4.606	-0.0010	+/-0.030	
Decachlorobiphenyl	100.0	99.2	80 - 120	11.74	11.738	0.0020	+/-0.030	
Decachlorobiphenyl [2C]	100.0	96.5	80 - 120	10.118	10.12	-0.0020	+/-0.030	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8081B

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00502

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: GL-ECD3
Calibration: 0362003

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Calibration Check (1A00502-CCV1) ug/L				Lab File ID: 003F0301.D		Analyzed: 01/03/11 13:10		
Tetrachloro-m-xylene	100.0	94.8	80 - 120	5.397	5.397	0.0000	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	89.1	80 - 120	4.545	4.545	0.0000	+/-0.030	
Decachlorobiphenyl	100.0	87.0	80 - 120	11.627	11.627	0.0000	+/-0.030	
Decachlorobiphenyl [2C]	100.0	83.8	80 - 120	10.02	10.02	0.0000	+/-0.030	
NTC12-SB24-00502 (1012185-04) ug/Kg dry				Lab File ID: 013F1301.D		Analyzed: 01/03/11 16:17		
Tetrachloro-m-xylene	17.89	70.9	70 - 125	5.396	5.397	-0.0010	+/-0.030	
Tetrachloro-m-xylene [2C]	17.89	62.9	70 - 125	4.539	4.545	-0.0060	+/-0.030	*
Decachlorobiphenyl	17.89	79.8	60 - 125	11.626	11.627	-0.0010	+/-0.030	
Decachlorobiphenyl [2C]	17.89	68.2	60 - 125	10.018	10.02	-0.0020	+/-0.030	
NTC12-SB30-0005 (1012185-06) ug/Kg dry				Lab File ID: 014F1401.D		Analyzed: 01/03/11 16:35		
Tetrachloro-m-xylene	17.82	66.0	70 - 125	5.394	5.397	-0.0030	+/-0.030	*
Tetrachloro-m-xylene [2C]	17.82	59.7	70 - 125	4.54	4.545	-0.0050	+/-0.030	*
Decachlorobiphenyl	17.82	76.0	60 - 125	11.625	11.627	-0.0020	+/-0.030	
Decachlorobiphenyl [2C]	17.82	66.4	60 - 125	10.019	10.02	-0.0010	+/-0.030	
NTC12-SB30-00502 (1012185-07) ug/Kg dry				Lab File ID: 015F1501.D		Analyzed: 01/03/11 16:54		
Tetrachloro-m-xylene	18.79	63.4	70 - 125	5.395	5.397	-0.0020	+/-0.030	*
Tetrachloro-m-xylene [2C]	18.79	60.7	70 - 125	4.542	4.545	-0.0030	+/-0.030	*
Decachlorobiphenyl	18.79	66.3	60 - 125	11.627	11.627	0.0000	+/-0.030	
Decachlorobiphenyl [2C]	18.79	64.9	60 - 125	10.019	10.02	-0.0010	+/-0.030	
NTC12-SB26-0005 (1012185-08) ug/Kg dry				Lab File ID: 016F1601.D		Analyzed: 01/03/11 17:12		
Tetrachloro-m-xylene	18.45	67.3	70 - 125	5.395	5.397	-0.0020	+/-0.030	*
Tetrachloro-m-xylene [2C]	18.45	61.1	70 - 125	4.54	4.545	-0.0050	+/-0.030	*
Decachlorobiphenyl	18.45	74.5	60 - 125	11.627	11.627	0.0000	+/-0.030	
Decachlorobiphenyl [2C]	18.45	51.5	60 - 125	10.017	10.02	-0.0030	+/-0.030	*
NTC12-SB26-0005 (1012185-08RE1) ug/Kg dry				Lab File ID: 017F1701.D		Analyzed: 01/03/11 17:31		
Tetrachloro-m-xylene	18.45	65.8	70 - 125	5.395	5.397	-0.0020	+/-0.030	*
Tetrachloro-m-xylene [2C]	18.45	62.8	70 - 125	4.541	4.545	-0.0040	+/-0.030	*
Decachlorobiphenyl	18.45	72.5	60 - 125	11.626	11.627	-0.0010	+/-0.030	
Decachlorobiphenyl [2C]	18.45	51.3	60 - 125	10.018	10.02	-0.0020	+/-0.030	*
NTC12-DUP01 (1012185-10) ug/Kg dry				Lab File ID: 018F1801.D		Analyzed: 01/03/11 17:49		
Tetrachloro-m-xylene	18.28	60.3	70 - 125	5.395	5.397	-0.0020	+/-0.030	*
Tetrachloro-m-xylene [2C]	18.28	57.8	70 - 125	4.541	4.545	-0.0040	+/-0.030	*
Decachlorobiphenyl	18.28	56.7	60 - 125	11.628	11.627	0.0010	+/-0.030	*
Decachlorobiphenyl [2C]	18.28	46.8	60 - 125	10.018	10.02	-0.0020	+/-0.030	*

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8081B

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00502

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: GL-ECD3
Calibration: 0362003

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
NTC12-SB26-0406 (1012185-09RE1) ug/Kg dry				Lab File ID: 019F1901.D		Analyzed: 01/03/11 18:08		
Tetrachloro-m-xylene	20.32	65.2	70 - 125	5.394	5.397	-0.0030	+/-0.030	*
Tetrachloro-m-xylene [2C]	20.32	75.0	70 - 125	4.541	4.545	-0.0040	+/-0.030	
Decachlorobiphenyl	20.32	115	60 - 125	11.629	11.627	0.0020	+/-0.030	
Decachlorobiphenyl [2C]	20.32	77.1	60 - 125	10.019	10.02	-0.0010	+/-0.030	
NTC12-SB26-0406 (1012185-09) ug/Kg dry				Lab File ID: 020F2001.D		Analyzed: 01/03/11 18:26		
Tetrachloro-m-xylene	20.32	63.7	70 - 125	5.394	5.397	-0.0030	+/-0.030	*
Tetrachloro-m-xylene [2C]	20.32	48.9	70 - 125	4.537	4.545	-0.0080	+/-0.030	*
Decachlorobiphenyl	20.32	70.4	60 - 125	11.627	11.627	0.0000	+/-0.030	
Decachlorobiphenyl [2C]	20.32	41.1	60 - 125	10.022	10.02	0.0020	+/-0.030	*
Calibration Check (1A00502-CCV4) ug/L				Lab File ID: 022F2201.D		Analyzed: 01/03/11 19:03		
Tetrachloro-m-xylene	100.0	98.0	80 - 120	5.395	5.397	-0.0020	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	85.6	80 - 120	4.542	4.545	-0.0030	+/-0.030	
Decachlorobiphenyl	100.0	92.7	80 - 120	11.625	11.627	-0.0020	+/-0.030	
Decachlorobiphenyl [2C]	100.0	78.8	80 - 120	10.018	10.02	-0.0020	+/-0.030	*

diluted 25x

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8081B

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00604

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: GL-ECD3
Calibration: 1005002

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Calibration Check (1A00604-CCV1) ug/L				Lab File ID: 014F1401.D		Analyzed: 01/04/11 15:20		
Tetrachloro-m-xylene	100.0	106	80 - 120	5.322	5.322	0.0000	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	106	80 - 120	4.487	4.487	0.0000	+/-0.030	
Decachlorobiphenyl	100.0	99.0	80 - 120	11.52	11.52	0.0000	+/-0.030	
Decachlorobiphenyl [2C]	100.0	96.5	80 - 120	9.923	9.923	0.0000	+/-0.030	
Blank (0L22010-BLK1) ug/Kg wet				Lab File ID: 019F1901.D		Analyzed: 01/04/11 16:52		
Tetrachloro-m-xylene	16.67	74.9	70 - 125	5.321	5.322	-0.0010	+/-0.030	
Tetrachloro-m-xylene [2C]	16.67	82.7	70 - 125	4.484	4.487	-0.0030	+/-0.030	
Decachlorobiphenyl	16.67	70.7	60 - 125	11.519	11.52	-0.0010	+/-0.030	
Decachlorobiphenyl [2C]	16.67	67.6	60 - 125	9.922	9.923	-0.0010	+/-0.030	
LCS (0L22010-BS1) ug/Kg wet				Lab File ID: 020F2001.D		Analyzed: 01/04/11 17:11		
Tetrachloro-m-xylene	16.67	81.3	70 - 125	5.32	5.322	-0.0020	+/-0.030	
Tetrachloro-m-xylene [2C]	16.67	88.3	70 - 125	4.485	4.487	-0.0020	+/-0.030	
Decachlorobiphenyl	16.67	74.7	60 - 125	11.519	11.52	-0.0010	+/-0.030	
Decachlorobiphenyl [2C]	16.67	80.2	60 - 125	9.922	9.923	-0.0010	+/-0.030	
LCS Dup (0L22010-BSD1) ug/Kg wet				Lab File ID: 021F2101.D		Analyzed: 01/04/11 17:30		
Tetrachloro-m-xylene	16.67	78.8	70 - 125	5.32	5.322	-0.0020	+/-0.030	
Tetrachloro-m-xylene [2C]	16.67	88.5	70 - 125	4.485	4.487	-0.0020	+/-0.030	
Decachlorobiphenyl	16.67	72.8	60 - 125	11.517	11.52	-0.0030	+/-0.030	
Decachlorobiphenyl [2C]	16.67	76.7	60 - 125	9.922	9.923	-0.0010	+/-0.030	
Calibration Check (1A00604-CCV5) ug/L				Lab File ID: 024F2401.D		Analyzed: 01/04/11 18:25		
Tetrachloro-m-xylene	100.0	106	80 - 120	5.319	5.322	-0.0030	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	105	80 - 120	4.484	4.487	-0.0030	+/-0.030	
Decachlorobiphenyl	100.0	93.4	80 - 120	11.517	11.52	-0.0030	+/-0.030	
Decachlorobiphenyl [2C]	100.0	95.6	80 - 120	9.922	9.923	-0.0010	+/-0.030	
NTC12-DUP02 (1012185-11RE1) ug/Kg dry				Lab File ID: 028F2801.D		Analyzed: 01/04/11 19:40		
Tetrachloro-m-xylene	19.84	63.5	70 - 125	5.319	5.322	-0.0030	+/-0.030	*
Tetrachloro-m-xylene [2C]	19.84	80.5	70 - 125	4.479	4.487	-0.0080	+/-0.030	
Decachlorobiphenyl	19.84	79.0	60 - 125	11.518	11.52	-0.0020	+/-0.030	
Decachlorobiphenyl [2C]	19.84	80.5	60 - 125	9.921	9.923	-0.0020	+/-0.030	
NTC12-DUP02 (1012185-11) ug/Kg dry				Lab File ID: 029F2901.D		Analyzed: 01/04/11 19:58		
Tetrachloro-m-xylene	19.84	65.4	70 - 125	5.32	5.322	-0.0020	+/-0.030	*
Tetrachloro-m-xylene [2C]	19.84	58.3	70 - 125	4.478	4.487	-0.0090	+/-0.030	*
Decachlorobiphenyl	19.84	68.6	60 - 125	11.521	11.52	0.0010	+/-0.030	
Decachlorobiphenyl [2C]	19.84	44.7	60 - 125	9.925	9.923	0.0020	+/-0.030	*

D.1a 1cd 16X

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8081B

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00604

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: GL-ECD3
Calibration: 1005002

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
NTC12-SB27-0005 (1012185-13RE1) ug/Kg dry				Lab File ID: 031F3101.D		Analyzed: 01/04/11 20:35		
Tetrachloro-m-xylene	19.57	74.5	70 - 125	5.319	5.322	-0.0030	+/-0.030	
Tetrachloro-m-xylene [2C]	19.57	89.3	70 - 125	4.484	4.487	-0.0030	+/-0.030	
Decachlorobiphenyl	19.57	82.5	60 - 125	11.517	11.52	-0.0030	+/-0.030	
Decachlorobiphenyl [2C]	19.57	83.3	60 - 125	9.921	9.923	-0.0020	+/-0.030	
NTC12-SB27-0005 (1012185-13) ug/Kg dry				Lab File ID: 032F3201.D		Analyzed: 01/04/11 20:54		
Tetrachloro-m-xylene	19.57	78.4	70 - 125	5.32	5.322	-0.0020	+/-0.030	
Tetrachloro-m-xylene [2C]	19.57	81.3	70 - 125	4.48	4.487	-0.0070	+/-0.030	
Decachlorobiphenyl	19.57	80.9	60 - 125	11.519	11.52	-0.0010	+/-0.030	
Decachlorobiphenyl [2C]	19.57	66.5	60 - 125	9.922	9.923	-0.0010	+/-0.030	
NTC12-SB22-0005 (1012185-15RE1) ug/Kg dry				Lab File ID: 034F3401.D		Analyzed: 01/04/11 21:31		
Tetrachloro-m-xylene	18.52	78.6	70 - 125	5.318	5.322	-0.0040	+/-0.030	
Tetrachloro-m-xylene [2C]	18.52	99.1	70 - 125	4.483	4.487	-0.0040	+/-0.030	
Decachlorobiphenyl	18.52	86.7	60 - 125	11.516	11.52	-0.0040	+/-0.030	
Decachlorobiphenyl [2C]	18.52	102	60 - 125	9.92	9.923	-0.0030	+/-0.030	
NTC12-SB22-0005 (1012185-15) ug/Kg dry				Lab File ID: 035F3501.D		Analyzed: 01/04/11 21:50		
Tetrachloro-m-xylene	18.52	79.2	70 - 125	5.319	5.322	-0.0030	+/-0.030	
Tetrachloro-m-xylene [2C]	18.52	84.5	70 - 125	4.479	4.487	-0.0080	+/-0.030	
Decachlorobiphenyl	18.52	93.0	60 - 125	11.518	11.52	-0.0020	+/-0.030	
Decachlorobiphenyl [2C]	18.52	76.6	60 - 125	9.921	9.923	-0.0020	+/-0.030	
NTC12-SB22-00502 (1012185-16) ug/Kg dry				Lab File ID: 038F3801.D		Analyzed: 01/04/11 22:45		
Tetrachloro-m-xylene	19.16	72.9	70 - 125	5.32	5.322	-0.0020	+/-0.030	
Tetrachloro-m-xylene [2C]	19.16	74.7	70 - 125	4.482	4.487	-0.0050	+/-0.030	
Decachlorobiphenyl	19.16	62.5	60 - 125	11.517	11.52	-0.0030	+/-0.030	
Decachlorobiphenyl [2C]	19.16	62.2	60 - 125	9.922	9.923	-0.0010	+/-0.030	
Calibration Check (1A00604-CCV9) ug/L				Lab File ID: 040F4001.D		Analyzed: 01/04/11 23:22		
Tetrachloro-m-xylene	100.0	106	80 - 120	5.32	5.322	-0.0020	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	110	80 - 120	4.485	4.487	-0.0020	+/-0.030	
Decachlorobiphenyl	100.0	81.1	80 - 120	11.518	11.52	-0.0020	+/-0.030	
Decachlorobiphenyl [2C]	100.0	80.5	80 - 120	9.922	9.923	-0.0010	+/-0.030	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8081B

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00705

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: GL-ECD3
Calibration: 1005002

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q	
Calibration Check (1A00705-CCV1) ug/L				Lab File ID: 003F0501.D		Analyzed: 01/05/11 18:36			
Tetrachloro-m-xylene	100.0	103	80 - 120	5.274	5.274	0.0000	+/-0.030		
Tetrachloro-m-xylene [2C]	100.0	94.4	80 - 120	4.45	4.45	0.0000	+/-0.030		
Decachlorobiphenyl	100.0	93.6	80 - 120	11.45	11.45	0.0000	+/-0.030		
Decachlorobiphenyl [2C]	100.0	90.3	80 - 120	9.864	9.864	0.0000	+/-0.030		
NTC12-SB21-0005 (1012185-17RE1) ug/Kg dry				Lab File ID: 006F0801.D		Analyzed: 01/05/11 19:32			
Tetrachloro-m-xylene	18.73	64.3	70 - 125	5.275	5.274	0.0010	+/-0.030	*	
Tetrachloro-m-xylene [2C]	18.73	70.3	70 - 125	4.45	4.45	0.0000	+/-0.030		
Decachlorobiphenyl	18.73	63.9	60 - 125	11.453	11.45	0.0030	+/-0.030		
Decachlorobiphenyl [2C]	18.73	72.2	60 - 125	9.865	9.864	0.0010	+/-0.030		
NTC12-SB21-0507 (1012185-18RE1) ug/Kg dry				Lab File ID: 007F0901.D		Analyzed: 01/05/11 19:51			Dilutal 25x
Tetrachloro-m-xylene	19.04	63.9	70 - 125	5.275	5.274	0.0010	+/-0.030	*	
Tetrachloro-m-xylene [2C]	19.04	86.6	70 - 125	4.446	4.45	-0.0040	+/-0.030		
Decachlorobiphenyl	19.04	77.7	60 - 125	11.455	11.45	0.0050	+/-0.030		
Decachlorobiphenyl [2C]	19.04	107	60 - 125	9.863	9.864	-0.0010	+/-0.030		
NTC12-SB25-0005 (1012185-19RE1) ug/Kg dry				Lab File ID: 008F1001.D		Analyzed: 01/05/11 20:09			Dilutal 50X
Tetrachloro-m-xylene	18.66	80.6	70 - 125	5.276	5.274	0.0020	+/-0.030		
Tetrachloro-m-xylene [2C]	18.66	114	70 - 125	4.451	4.45	0.0010	+/-0.030		
Decachlorobiphenyl	18.66	96.1	60 - 125	11.454	11.45	0.0040	+/-0.030		
Decachlorobiphenyl [2C]	18.66	235	60 - 125	9.868	9.864	0.0040	+/-0.030	*	
NTC12-SB25-0005 (1012185-19RE2) ug/Kg dry				Lab File ID: 009F1101.D		Analyzed: 01/05/11 20:28			Dilutal 5x
Tetrachloro-m-xylene	18.66	67.8	70 - 125	5.276	5.274	0.0020	+/-0.030	*	
Tetrachloro-m-xylene [2C]	18.66	75.4	70 - 125	4.446	4.45	-0.0040	+/-0.030		
Decachlorobiphenyl	18.66	63.1	60 - 125	11.454	11.45	0.0040	+/-0.030		
Decachlorobiphenyl [2C]	18.66	110	60 - 125	9.869	9.864	0.0050	+/-0.030		
NTC12-SB25-0204 (1012185-20RE1) ug/Kg dry				Lab File ID: 010F1201.D		Analyzed: 01/05/11 20:46			
Tetrachloro-m-xylene	19.68	81.0	70 - 125	5.276	5.274	0.0020	+/-0.030		
Tetrachloro-m-xylene [2C]	19.68	113	70 - 125	4.449	4.45	-0.0010	+/-0.030		
Decachlorobiphenyl	19.68	94.3	60 - 125	11.454	11.45	0.0040	+/-0.030		
Decachlorobiphenyl [2C]	19.68	116	60 - 125	9.862	9.864	-0.0020	+/-0.030		
NTC12-SB28-0005 (1012185-21) ug/Kg dry				Lab File ID: 011F1301.D		Analyzed: 01/05/11 21:05			
Tetrachloro-m-xylene	18.51	75.0	70 - 125	5.276	5.274	0.0020	+/-0.030		
Tetrachloro-m-xylene [2C]	18.51	80.1	70 - 125	4.447	4.45	-0.0030	+/-0.030		
Decachlorobiphenyl	18.51	70.4	60 - 125	11.452	11.45	0.0020	+/-0.030		
Decachlorobiphenyl [2C]	18.51	62.2	60 - 125	9.864	9.864	0.0000	+/-0.030		

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8081B

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 1A00705
Instrument: GL-ECD3
Calibration: 1005002

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
NTC12-SB28-0204 (1012185-22) ug/Kg dry				Lab File ID: 012F1401.D		Analyzed: 01/05/11 21:24		
Tetrachloro-m-xylene	18.37	75.6	70 - 125	5.275	5.274	0.0010	+/-0.030	
Tetrachloro-m-xylene [2C]	18.37	71.4	70 - 125	4.445	4.45	-0.0050	+/-0.030	
Decachlorobiphenyl	18.37	143	60 - 125	11.458	11.45	0.0080	+/-0.030	*
Decachlorobiphenyl [2C]	18.37	76.4	60 - 125	9.867	9.864	0.0030	+/-0.030	
NTC12-SB29-0005 (1012185-23) ug/Kg dry				Lab File ID: 013F1501.D		Analyzed: 01/05/11 21:42		
Tetrachloro-m-xylene	18.52	66.8	70 - 125	5.275	5.274	0.0010	+/-0.030	*
Tetrachloro-m-xylene [2C]	18.52	66.7	70 - 125	4.447	4.45	-0.0030	+/-0.030	*
Decachlorobiphenyl	18.52	82.2	60 - 125	11.457	11.45	0.0070	+/-0.030	
Decachlorobiphenyl [2C]	18.52	60.8	60 - 125	9.865	9.864	0.0010	+/-0.030	
NTC12-SB29-0204 (1012185-24) ug/Kg dry				Lab File ID: 014F1601.D		Analyzed: 01/05/11 22:01		
Tetrachloro-m-xylene	19.31	78.4	70 - 125	5.275	5.274	0.0010	+/-0.030	
Tetrachloro-m-xylene [2C]	19.31	68.2	70 - 125	4.445	4.45	-0.0050	+/-0.030	*
Decachlorobiphenyl	19.31	70.8	60 - 125	11.455	11.45	0.0050	+/-0.030	
Decachlorobiphenyl [2C]	19.31	51.6	60 - 125	9.865	9.864	0.0010	+/-0.030	*
NTC12-SB27-0204 (1012185-14) ug/Kg dry				Lab File ID: 015F1701.D		Analyzed: 01/05/11 22:19		
Tetrachloro-m-xylene	18.87	77.9	70 - 125	5.276	5.274	0.0020	+/-0.030	
Tetrachloro-m-xylene [2C]	18.87	78.4	70 - 125	4.449	4.45	-0.0010	+/-0.030	
Decachlorobiphenyl	18.87	74.6	60 - 125	11.456	11.45	0.0060	+/-0.030	
Decachlorobiphenyl [2C]	18.87	64.3	60 - 125	9.864	9.864	0.0000	+/-0.030	
Matrix Spike (0L21019-MS1) ug/Kg dry				Lab File ID: 016F1801.D		Analyzed: 01/05/11 22:38		
Tetrachloro-m-xylene	37.26	80.5	70 - 125	5.276	5.274	0.0020	+/-0.030	
Tetrachloro-m-xylene [2C]	37.26	75.6	70 - 125	4.448	4.45	-0.0020	+/-0.030	
Decachlorobiphenyl	37.26	71.4	60 - 125	11.453	11.45	0.0030	+/-0.030	
Decachlorobiphenyl [2C]	37.26	59.8	60 - 125	9.866	9.864	0.0020	+/-0.030	*
Matrix Spike Dup (0L21019-MSD1) ug/Kg dry				Lab File ID: 017F1901.D		Analyzed: 01/05/11 22:56		
Tetrachloro-m-xylene	38.50	77.7	70 - 125	5.276	5.274	0.0020	+/-0.030	
Tetrachloro-m-xylene [2C]	38.50	73.8	70 - 125	4.447	4.45	-0.0030	+/-0.030	
Decachlorobiphenyl	38.50	71.7	60 - 125	11.454	11.45	0.0040	+/-0.030	
Decachlorobiphenyl [2C]	38.50	60.1	60 - 125	9.864	9.864	0.0000	+/-0.030	
Calibration Check (1A00705-CCV4) ug/L				Lab File ID: 020F2201.D		Analyzed: 01/05/11 23:52		
Tetrachloro-m-xylene	100.0	103	80 - 120	5.277	5.274	0.0030	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	102	80 - 120	4.452	4.45	0.0020	+/-0.030	
Decachlorobiphenyl	100.0	91.0	80 - 120	11.453	11.45	0.0030	+/-0.030	
Decachlorobiphenyl [2C]	100.0	85.8	80 - 120	9.865	9.864	0.0010	+/-0.030	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8081B

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Sequence: 1A00705

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Instrument: GL-ECD3
Calibration: 1005002

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
NTC12-SB21-0005 (1012185-17) ug/Kg dry				Lab File ID: 023F2501.D		Analyzed: 01/06/11 00:48		
Tetrachloro-m-xylene	18.73	67.8	70 - 125	5.276	5.274	0.0020	+/-0.030	*
Tetrachloro-m-xylene [2C]	18.73	71.8	70 - 125	4.447	4.45	-0.0030	+/-0.030	
Decachlorobiphenyl	18.73	65.9	60 - 125	11.454	11.45	0.0040	+/-0.030	
Decachlorobiphenyl [2C]	18.73	64.4	60 - 125	9.864	9.864	0.0000	+/-0.030	
NTC12-SB21-0507 (1012185-18) ug/Kg dry				Lab File ID: 025F2701.D		Analyzed: 01/06/11 01:25		
Tetrachloro-m-xylene	19.04	63.2	70 - 125	5.275	5.274	0.0010	+/-0.030	*
Tetrachloro-m-xylene [2C]	19.04	56.5	70 - 125	4.444	4.45	-0.0060	+/-0.030	*
Decachlorobiphenyl	19.04	59.8	60 - 125	11.455	11.45	0.0050	+/-0.030	*
Decachlorobiphenyl [2C]	19.04	43.8	60 - 125	9.867	9.864	0.0030	+/-0.030	*
NTC12-SB25-0005 (1012185-19) ug/Kg dry				Lab File ID: 027F2901.D		Analyzed: 01/06/11 02:02		
Tetrachloro-m-xylene	18.66	73.6	70 - 125	5.275	5.274	0.0010	+/-0.030	
Tetrachloro-m-xylene [2C]	18.66	62.2	70 - 125	4.445	4.45	-0.0050	+/-0.030	*
Decachlorobiphenyl	18.66	61.9	60 - 125	11.456	11.45	0.0060	+/-0.030	
Decachlorobiphenyl [2C]	18.66	72.0	60 - 125	9.87	9.864	0.0060	+/-0.030	
NTC12-SB25-0204 (1012185-20) ug/Kg dry				Lab File ID: 029F3101.D		Analyzed: 01/06/11 02:39		
Tetrachloro-m-xylene	19.68	81.0	70 - 125	5.275	5.274	0.0010	+/-0.030	
Tetrachloro-m-xylene [2C]	19.68	65.3	70 - 125	4.445	4.45	-0.0050	+/-0.030	*
Decachlorobiphenyl	19.68	65.3	60 - 125	11.456	11.45	0.0060	+/-0.030	
Decachlorobiphenyl [2C]	19.68	44.1	60 - 125	9.865	9.864	0.0010	+/-0.030	*
Calibration Check (1A00705-CCV7) ug/L				Lab File ID: 031F3301.D		Analyzed: 01/06/11 03:16		
Tetrachloro-m-xylene	100.0	108	80 - 120	5.276	5.274	0.0020	+/-0.030	
Tetrachloro-m-xylene [2C]	100.0	92.5	80 - 120	4.449	4.45	-0.0010	+/-0.030	
Decachlorobiphenyl	100.0	82.9	80 - 120	11.454	11.45	0.0040	+/-0.030	
Decachlorobiphenyl [2C]	100.0	68.8	80 - 120	9.866	9.864	0.0020	+/-0.030	*

PREPARATION BATCH SUMMARY

SW8081B

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Batch: 0L21019 Batch Matrix: Solid Preparation: EXT_3546

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL./WEIGHT	FINAL VOL.
Blank	0L21019-BLK1	12/22/10 14:30	15.00	5.00
LCS	0L21019-BS1	12/22/10 14:30	15.00	5.00
NTC12-SB27-0204	0L21019-MS1	12/22/10 14:30	15.50	5.00
NTC12-SB27-0204	0L21019-MSD1	12/22/10 14:30	15.00	5.00
NTC12-SB23-0005	1012185-01	12/22/10 14:30	15.60	5.00
NTC12-SB23-0810	1012185-02	12/22/10 14:30	15.50	5.00
NTC12-SB24-0005	1012185-03	12/22/10 14:30	15.60	5.00
NTC12-SB24-00502	1012185-04	12/22/10 14:30	15.60	5.00
NTC12-SB30-0005	1012185-06	12/22/10 14:30	15.40	5.00
NTC12-SB30-00502	1012185-07	12/22/10 14:30	15.20	5.00
NTC12-SB26-0005	1012185-08	12/22/10 14:30	15.10	5.00
NTC12-SB26-0005	1012185-08RE1	12/22/10 14:30	15.10	5.00
NTC12-SB26-0406	1012185-09	12/22/10 14:30	15.40	5.00
NTC12-SB26-0406	1012185-09RE1	12/22/10 14:30	15.40	5.00
NTC12-DUP01	1012185-10	12/22/10 14:30	15.30	5.00
NTC12-DUP02	1012185-11	12/22/10 14:30	15.20	5.00
NTC12-DUP02	1012185-11RE1	12/22/10 14:30	15.20	5.00
NTC12-SB27-0005	1012185-13	12/22/10 14:30	15.30	5.00
NTC12-SB27-0005	1012185-13RE1	12/22/10 14:30	15.30	5.00
NTC12-SB27-0204	1012185-14	12/22/10 14:30	15.30	5.00

ANALYSIS DATA SHEET

Blank

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix:
Laboratory ID: 0L21019-BLK1
File ID: 007F1701.D
Sampled:
Prepared: 12/22/10 14:30
Analyzed: 12/29/10 20:17
Solids:
Preparation: EXT_3546
Dilution:
Batch: 0L21019
Sequence: 0L36408
Calibration: 0362003
Instrument: GL-ECD3

CAS NO.	COMPOUND	CONC. (ug/Kg wet	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE		0.170	0.340	0.670	U
72-54-8	4,4'-DDD		0.170	0.340	0.670	U
50-29-3	4,4'-DDT		0.170	0.340	0.670	U
309-00-2	Aldrin		0.110	0.340	0.670	U
319-84-6	alpha-BHC		0.110	0.340	0.670	U
5103-71-9	alpha-Chlordane		0.110	0.340	0.670	U
319-85-7	beta-BHC		0.110	0.340	0.670	U
319-86-8	delta-BHC		0.110	0.340	0.670	U
60-57-1	Dieldrin		0.170	0.340	0.670	U
959-98-8	Endosulfan I		0.110	0.340	0.670	U
33213-65-9	Endosulfan II		0.170	0.340	0.670	U
1031-07-8	Endosulfan sulfate		0.170	0.340	0.670	U
72-20-8	Endrin		0.170	0.340	0.670	U
7421-93-4	Endrin aldehyde		0.170	0.340	0.670	U
53494-70-5	Endrin ketone		0.170	0.340	0.670	U
58-89-9	gamma-BHC (Lindane)		0.110	0.340	0.670	U
5103-74-2	gamma-Chlordane		0.110	0.340	0.670	U
76-44-8	Heptachlor		0.110	0.340	0.670	U
1024-57-3	Heptachlor epoxide		0.110	0.340	0.670	U
72-43-5	Methoxychlor		0.110	0.340	0.670	U
8001-35-2	Toxaphene		11.0	22.0	33.0	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg wet)	CONC (ug/Kg wet)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	33.33	25.10	75.3	70 - 125	
Tetrachloro-m-xylene [2C]	33.33	24.02	72.1	70 - 125	
Decachlorobiphenyl	33.33	27.57	82.7	60 - 125	
Decachlorobiphenyl [2C]	33.33	26.55	79.6	60 - 125	

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

SW8081B

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix: Solid
Batch: 0L21019
Laboratory ID: 0L21019-BS1
Preparation: EXT_3546
Initial/Final: 15 g / 5 mL

ANALYTE	SPIKE ADDED (ug/Kg wet)	LCS CONCENTRATION (ug/Kg wet)	LCS % REC.	QC LIMITS REC.
4,4'-DDE	33.33	30.84	92.5	70 - 125
4,4'-DDE [2C]	33.33	26.83	80.5	70 - 125
4,4'-DDD	33.33	31.14	93.4	30 - 135
4,4'-DDD [2C]	33.33	27.80	83.4	30 - 135
4,4'-DDT	33.33	31.83	95.5	45 - 140
4,4'-DDT [2C]	33.33	28.36	85.1	45 - 140
Aldrin	33.33	30.23	90.7	45 - 140
Aldrin [2C]	33.33	26.26	78.8	45 - 140
alpha-BHC	33.33	31.44	94.3	60 - 125
alpha-BHC [2C]	33.33	28.09	84.3	60 - 125
alpha-Chlordane	33.33	30.55	91.6	65 - 120
alpha-Chlordane [2C]	33.33	27.12	81.4	65 - 120
beta-BHC	33.33	31.00	93.0	60 - 125
beta-BHC [2C]	33.33	28.65	85.9	60 - 125
delta-BHC	33.33	31.87	95.6	55 - 130
delta-BHC [2C]	33.33	29.01	87.0	55 - 130
Dieldrin	33.33	30.15	90.4	65 - 125
Dieldrin [2C]	33.33	26.95	80.8	65 - 125
Endosulfan I	33.33	31.11	93.3	15 - 135
Endosulfan I [2C]	33.33	26.93	80.8	15 - 135
Endosulfan II	33.33	30.23	90.7	35 - 140
Endosulfan II [2C]	33.33	26.94	80.8	35 - 140
Endosulfan sulfate	33.33	30.82	92.5	60 - 135
Endosulfan sulfate [2C]	33.33	27.94	83.8	60 - 135
Endrin	33.33	30.23	90.7	60 - 135
Endrin [2C]	33.33	26.65	79.9	60 - 135
Endrin aldehyde	33.33	26.97	80.9	35 - 145
Endrin aldehyde [2C]	33.33	24.41	73.2	35 - 145
Endrin ketone	33.33	30.88	92.6	65 - 135
Endrin ketone [2C]	33.33	28.48	85.4	65 - 135

LCS / LCS DUPLICATE RECOVERY

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Matrix:	Solid		
Batch:	0L21019	Laboratory ID:	0L21019-BS1
Preparation:	EXT_3546	Initial/Final:	15 g / 5 mL

ANALYTE	SPIKE ADDED (ug/Kg wet)	LCS CONCENTRATION (ug/Kg wet)	LCS % REC.	QC LIMITS REC.
gamma-BHC (Lindane)	33.33	32.22	96.7	60 - 125
gamma-BHC (Lindane) [2C]	33.33	28.37	85.1	60 - 125
gamma-Chlordane	33.33	30.23	90.7	65 - 125
gamma-Chlordane [2C]	33.33	27.46	82.4	65 - 125
Heptachlor	33.33	31.63	94.9	50 - 140
Heptachlor [2C]	33.33	26.57	79.7	50 - 140
Heptachlor epoxide	33.33	30.94	92.8	65 - 130
Heptachlor epoxide [2C]	33.33	26.18	78.6	65 - 130
Methoxychlor	33.33	30.93	92.8	55 - 145
Methoxychlor [2C]	33.33	27.76	83.3	55 - 145

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8081B

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Batch: 0L21019

% Solids: 86.58

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Source Sample Name: **1012185-14**

ANALYTE	SPIKE ADDED (ug/Kg dry)	SAMPLE CONCENTRATION (ug/Kg dry)	MS CONCENTRATION (ug/Kg dry)	MS % REC.	Q	QC LIMITS REC.
4,4'-DDE	37.26	12.93	43.67	82.5		70 - 125
4,4'-DDE [2C]	37.26	12.81	38.86	69.9	*	70 - 125
4,4'-DDD	37.26	5.412	36.24	82.8		30 - 135
4,4'-DDD [2C]	37.26	5.250	31.96	71.7		30 - 135
4,4'-DDT	37.26	8.514	38.32	80.0		45 - 140
4,4'-DDT [2C]	37.26	9.095	36.63	73.9		45 - 140
Aldrin	37.26	ND	33.36	89.5		45 - 140
Aldrin [2C]	37.26	ND	29.14	78.2		45 - 140
alpha-BHC	37.26	0.2397	34.54	92.1		60 - 125
alpha-BHC [2C]	37.26	ND	30.56	82.0		60 - 125
alpha-Chlordane	37.26	0.3826	33.14	87.9		65 - 120
alpha-Chlordane [2C]	37.26	0.4661	28.13	74.3		65 - 120
beta-BHC	37.26	ND	33.03	88.7		60 - 125
beta-BHC [2C]	37.26	ND	36.52	98.0		60 - 125
delta-BHC	37.26	ND	29.34	78.8		55 - 130
delta-BHC [2C]	37.26	ND	30.01	80.6		55 - 130
Dieldrin	37.26	ND	32.77	88.0		65 - 125
Dieldrin [2C]	37.26	0.3510	28.47	75.5		65 - 125
Endosulfan I	37.26	ND	33.12	88.9		15 - 135
Endosulfan I [2C]	37.26	ND	27.63	74.1		15 - 135
Endosulfan II	37.26	ND	31.33	84.1		35 - 140
Endosulfan II [2C]	37.26	ND	27.66	74.2		35 - 140
Endosulfan sulfate	37.26	ND	30.41	81.6		60 - 135
Endosulfan sulfate [2C]	37.26	0.2193	23.62	62.8		60 - 135
Endrin	37.26	ND	38.60	104		60 - 135
Endrin [2C]	37.26	1.297	33.67	86.9		60 - 135
Endrin aldehyde	37.26	ND	21.07	56.6		35 - 145
Endrin aldehyde [2C]	37.26	ND	18.78	50.4		35 - 145
Endrin ketone	37.26	ND	29.38	78.9		65 - 135
Endrin ketone [2C]	37.26	ND	24.59	66.0		65 - 135
gamma-BHC (Lindane)	37.26	ND	34.17	91.7		60 - 125
gamma-BHC (Lindane) [2C]	37.26	ND	30.35	81.5		60 - 125

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MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8081B

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Batch: 0L21019

% Solids: 86.58

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Source Sample Name: **1012185-14**

ANALYTE	SPIKE ADDED (ug/Kg dry)	SAMPLE CONCENTRATION (ug/Kg dry)	MS CONCENTRATION (ug/Kg dry)	MS % REC.	Q	QC LIMITS REC.
gamma-Chlordane	37.26	0.3011	33.49	89.1		65 - 125
gamma-Chlordane [2C]	37.26	1.077	29.24	75.6		65 - 125
Heptachlor	37.26	ND	35.94	96.5		50 - 140
Heptachlor [2C]	37.26	ND	30.28	81.3		50 - 140
Heptachlor epoxide	37.26	ND	32.80	88.0		65 - 130
Heptachlor epoxide [2C]	37.26	ND	28.91	77.6		65 - 130
Methoxychlor	37.26	ND	30.49	81.8		55 - 145
Methoxychlor [2C]	37.26	1.115	28.82	74.4		55 - 145

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8081B

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Batch: 0L21019

% Solids: 86.58

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Source Sample Name: **1012185-14**

ANALYTE	SPIKE ADDED (ug/Kg dry)	MSD CONCENTRATION (ug/Kg dry)	MSD % REC. #	% RPD	Q	QC LIMITS RPD	QC LIMITS REC.
4,4'-DDE	38.50	53.58	106	20.4		30	70 - 125
4,4'-DDE [2C]	38.50	46.41	87.3	17.7		30	70 - 125
4,4'-DDD	38.50	45.31	104	22.2		30	30 - 135
4,4'-DDD [2C]	38.50	38.63	86.7	18.9		30	30 - 135
4,4'-DDT	38.50	44.74	94.1	15.5		30	45 - 140
4,4'-DDT [2C]	38.50	42.09	85.7	13.9		30	45 - 140
Aldrin	38.50	33.82	87.8	1.35		30	45 - 140
Aldrin [2C]	38.50	29.38	76.3	0.828		30	45 - 140
alpha-BHC	38.50	35.06	90.4	1.49		30	60 - 125
alpha-BHC [2C]	38.50	30.97	80.5	1.35		30	60 - 125
alpha-Chlordane	38.50	33.90	87.1	2.26		30	65 - 120
alpha-Chlordane [2C]	38.50	28.76	73.5	2.23		30	65 - 120
beta-BHC	38.50	34.09	88.5	3.15		30	60 - 125
beta-BHC [2C]	38.50	33.09	86.0	9.86		30	60 - 125
delta-BHC	38.50	30.28	78.7	3.17		30	55 - 130
delta-BHC [2C]	38.50	30.72	79.8	2.31		30	55 - 130
Dieldrin	38.50	33.74	87.6	2.91		30	65 - 125
Dieldrin [2C]	38.50	29.05	74.5	2.03		30	65 - 125
Endosulfan I	38.50	33.79	87.8	2.00		30	15 - 135
Endosulfan I [2C]	38.50	27.87	72.4	0.864		30	15 - 135
Endosulfan II	38.50	32.55	84.5	3.79		30	35 - 140
Endosulfan II [2C]	38.50	28.40	73.8	2.64		30	35 - 140
Endosulfan sulfate	38.50	32.60	84.7	6.95		30	60 - 135
Endosulfan sulfate [2C]	38.50	25.18	64.8	6.42		30	60 - 135
Endrin	38.50	39.73	103	2.90		30	60 - 135
Endrin [2C]	38.50	35.00	87.5	3.86		30	60 - 135
Endrin aldehyde	38.50	22.35	58.0	5.87		30	35 - 145
Endrin aldehyde [2C]	38.50	19.81	51.5	5.35		30	35 - 145
Endrin ketone	38.50	31.18	81.0	5.94		30	65 - 135
Endrin ketone [2C]	38.50	25.50	66.2	3.64		30	65 - 135
gamma-BHC (Lindane)	38.50	34.90	90.7	2.12		30	60 - 125
gamma-BHC (Lindane) [2C]	38.50	30.94	80.4	1.94		30	60 - 125
gamma-Chlordane	38.50	34.14	87.9	1.91		30	65 - 125

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8081B

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Batch: 0L21019

% Solids: 86.58

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Source Sample Name: **1012185-14**

ANALYTE	SPIKE ADDED (ug/Kg dry)	MSD CONCENTRATION (ug/Kg dry)	MSD % REC. #	% RPD	Q	QC LIMITS RPD	QC LIMITS REC.
gamma-Chlordane [2C]	38.50	30.47	76.4	4.13		30	65 - 125
Heptachlor	38.50	36.94	95.9	2.75		30	50 - 140
Heptachlor [2C]	38.50	32.17	83.6	6.06		30	50 - 140
Heptachlor epoxide	38.50	33.28	86.4	1.45		30	65 - 130
Heptachlor epoxide [2C]	38.50	29.25	76.0	1.16		30	65 - 130
Methoxychlor	38.50	32.53	84.5	6.48		30	55 - 145
Methoxychlor [2C]	38.50	30.77	77.0	6.52		30	55 - 145

PREPARATION BATCH SUMMARY

SW8081B

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Batch: 0L22010 Batch Matrix: Solid

Preparation: EXT_3546

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL./WEIGHT	FINAL VOL.
Blank	0L22010-BLK1	12/27/10 11:48	15.00	5.00
LCS	0L22010-BS1	12/27/10 11:48	15.00	5.00
LCS Dup	0L22010-BSD1	12/27/10 11:48	15.00	5.00
NTC12-SB22-0005	1012185-15	12/27/10 11:48	15.50	5.00
NTC12-SB22-0005	1012185-15RE1	12/27/10 11:48	15.50	5.00
NTC12-SB22-00502	1012185-16	12/27/10 11:48	15.20	5.00
NTC12-SB21-0005	1012185-17	12/27/10 11:48	15.70	5.00
NTC12-SB21-0005	1012185-17RE1	12/27/10 11:48	15.70	5.00
NTC12-SB21-0507	1012185-18	12/27/10 11:48	15.40	5.00
NTC12-SB21-0507	1012185-18RE1	12/27/10 11:48	15.40	5.00
NTC12-SB25-0005	1012185-19	12/27/10 11:48	15.30	5.00
NTC12-SB25-0005	1012185-19RE1	12/27/10 11:48	15.30	5.00
NTC12-SB25-0005	1012185-19RE2	12/27/10 11:48	15.30	5.00
NTC12-SB25-0204	1012185-20	12/27/10 11:48	15.30	5.00
NTC12-SB25-0204	1012185-20RE1	12/27/10 11:48	15.30	5.00
NTC12-SB28-0005	1012185-21	12/27/10 11:48	15.40	5.00
NTC12-SB28-0204	1012185-22	12/27/10 11:48	15.30	5.00
NTC12-SB29-0005	1012185-23	12/27/10 11:48	15.60	5.00
NTC12-SB29-0204	1012185-24	12/27/10 11:48	15.60	5.00

ANALYSIS DATA SHEET

Blank

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix:
Laboratory ID: 0L22010-BLK1
File ID: 019F1901.D
Sampled:
Prepared: 12/27/10 11:48
Analyzed: 01/04/11 16:52
Solids:
Preparation: EXT_3546
Dilution:
Batch: 0L22010
Sequence: 1A00604
Calibration: 1005002
Instrument: GL-ECD3

CAS NO.	COMPOUND	CONC. (ug/Kg wet	DL	LOD	LOQ	Q
72-55-9	4,4'-DDE		0.170	0.340	0.670	U
72-54-8	4,4'-DDD		0.170	0.340	0.670	U
50-29-3	4,4'-DDT		0.170	0.340	0.670	U
309-00-2	Aldrin		0.110	0.340	0.670	U
319-84-6	alpha-BHC		0.110	0.340	0.670	U
5103-71-9	alpha-Chlordane		0.110	0.340	0.670	U
319-85-7	beta-BHC		0.110	0.340	0.670	U
319-86-8	delta-BHC		0.110	0.340	0.670	U
60-57-1	Dieldrin		0.170	0.340	0.670	U
959-98-8	Endosulfan I		0.110	0.340	0.670	U
33213-65-9	Endosulfan II		0.170	0.340	0.670	U
1031-07-8	Endosulfan sulfate		0.170	0.340	0.670	U
72-20-8	Endrin		0.170	0.340	0.670	U
7421-93-4	Endrin aldehyde		0.170	0.340	0.670	U
53494-70-5	Endrin ketone		0.170	0.340	0.670	U
58-89-9	gamma-BHC (Lindane)		0.110	0.340	0.670	U
5103-74-2	gamma-Chlordane		0.110	0.340	0.670	U
76-44-8	Heptachlor		0.110	0.340	0.670	U
1024-57-3	Heptachlor epoxide		0.110	0.340	0.670	U
72-43-5	Methoxychlor		0.110	0.340	0.670	U
8001-35-2	Toxaphene		11.0	22.0	33.0	U

SYSTEM MONITORING COMPOUND	ADDED (ug/Kg wet)	CONC (ug/Kg wet)	% REC	QC LIMITS	Q
Tetrachloro-m-xylene	16.67	12.48	74.9	70 - 125	
Tetrachloro-m-xylene [2C]	16.67	13.78	82.7	70 - 125	
Decachlorobiphenyl	16.67	11.78	70.7	60 - 125	
Decachlorobiphenyl [2C]	16.67	11.27	67.6	60 - 125	

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Batch: 0L22010

Preparation: EXT_3546

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Laboratory ID: 0L22010-BS1

Initial/Final: 15 g / 5 mL

ANALYTE	SPIKE ADDED (ug/Kg wet)	LCS CONCENTRATION (ug/Kg wet)	LCS % REC.	QC LIMITS REC.
4,4'-DDE	33.33	29.58	88.7	70 - 125
4,4'-DDE [2C]	33.33	29.91	89.7	70 - 125
4,4'-DDD	33.33	31.18	93.5	30 - 135
4,4'-DDD [2C]	33.33	30.73	92.2	30 - 135
4,4'-DDT	33.33	27.22	81.6	45 - 140
4,4'-DDT [2C]	33.33	30.89	92.7	45 - 140
Aldrin	33.33	29.75	89.2	45 - 140
Aldrin [2C]	33.33	29.60	88.8	45 - 140
alpha-BHC	33.33	31.15	93.5	60 - 125
alpha-BHC [2C]	33.33	31.77	95.3	60 - 125
alpha-Chlordane	33.33	29.33	88.0	65 - 120
alpha-Chlordane [2C]	33.33	29.29	87.9	65 - 120
beta-BHC	33.33	30.37	91.1	60 - 125
beta-BHC [2C]	33.33	34.66	104	60 - 125
delta-BHC	33.33	28.27	84.8	55 - 130
delta-BHC [2C]	33.33	32.36	97.1	55 - 130
Dieldrin	33.33	29.66	89.0	65 - 125
Dieldrin [2C]	33.33	29.30	87.9	65 - 125
Endosulfan I	33.33	29.78	89.3	15 - 135
Endosulfan I [2C]	33.33	29.93	89.8	15 - 135
Endosulfan II	33.33	28.82	86.5	35 - 140
Endosulfan II [2C]	33.33	28.90	86.7	35 - 140
Endosulfan sulfate	33.33	30.31	90.9	60 - 135
Endosulfan sulfate [2C]	33.33	30.26	90.8	60 - 135
Endrin	33.33	30.92	92.8	60 - 135
Endrin [2C]	33.33	30.42	91.2	60 - 135
Endrin aldehyde	33.33	24.90	74.7	35 - 145
Endrin aldehyde [2C]	33.33	24.97	74.9	35 - 145
Endrin ketone	33.33	29.36	88.1	65 - 135
Endrin ketone [2C]	33.33	29.11	87.3	65 - 135

LCS / LCS DUPLICATE RECOVERY

SW8081B

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix: Solid
Batch: 0L22010
Laboratory ID: 0L22010-BS1
Preparation: EXT_3546
Initial/Final: 15 g / 5 mL

ANALYTE	SPIKE ADDED (ug/Kg wet)	LCS CONCENTRATION (ug/Kg wet)	LCS % REC.	QC LIMITS REC.
gamma-BHC (Lindane)	33.33	31.28	93.8	60 - 125
gamma-BHC (Lindane) [2C]	33.33	31.62	94.9	60 - 125
gamma-Chlordane	33.33	29.89	89.7	65 - 125
gamma-Chlordane [2C]	33.33	29.38	88.1	65 - 125
Heptachlor	33.33	29.59	88.8	50 - 140
Heptachlor [2C]	33.33	29.77	89.3	50 - 140
Heptachlor epoxide	33.33	29.53	88.6	65 - 130
Heptachlor epoxide [2C]	33.33	28.96	86.9	65 - 130
Methoxychlor	33.33	28.86	86.6	55 - 145
Methoxychlor [2C]	33.33	30.25	90.7	55 - 145

ANALYTE	SPIKE ADDED (ug/Kg wet)	LCSD CONCENTRATION (ug/Kg wet)	LCSD % REC. #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
4,4'-DDE	33.33	29.85	89.6	0.919	30	70 - 125
4,4'-DDE [2C]	33.33	30.12	90.4	0.714	30	70 - 125
4,4'-DDD	33.33	31.27	93.8	0.307	30	30 - 135
4,4'-DDD [2C]	33.33	30.79	92.4	0.206	30	30 - 135
4,4'-DDT	33.33	26.41	79.2	2.99	30	45 - 140
4,4'-DDT [2C]	33.33	30.02	90.1	2.86	30	45 - 140
Aldrin	33.33	29.91	89.7	0.534	30	45 - 140
Aldrin [2C]	33.33	30.03	90.1	1.43	30	45 - 140
alpha-BHC	33.33	31.27	93.8	0.372	30	60 - 125
alpha-BHC [2C]	33.33	32.02	96.0	0.758	30	60 - 125
alpha-Chlordane	33.33	29.52	88.5	0.647	30	65 - 120
alpha-Chlordane [2C]	33.33	29.55	88.6	0.856	30	65 - 120
beta-BHC	33.33	30.24	90.7	0.429	30	60 - 125
beta-BHC [2C]	33.33	33.47	100	3.50	30	60 - 125
delta-BHC	33.33	27.92	83.8	1.24	30	55 - 130
delta-BHC [2C]	33.33	32.23	96.7	0.405	30	55 - 130
Dieldrin	33.33	29.65	89.0	0.00574	30	65 - 125

LCS / LCS DUPLICATE RECOVERY

SW8081B

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix: Solid
Batch: 0L22010
Laboratory ID: 0L22010-BSD1
Preparation: EXT_3546
Initial/Final: 15 g / 5 mL

ANALYTE	SPIKE ADDED (ug/Kg wet)	LCSD CONCENTRATION (ug/Kg wet)	LCSD % REC. #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Dieldrin [2C]	33.33	29.31	87.9	0.0232	30	65 - 125
Endosulfan I	33.33	29.91	89.7	0.416	30	15 - 135
Endosulfan I [2C]	33.33	30.00	90.0	0.242	30	15 - 135
Endosulfan II	33.33	28.85	86.5	0.0737	30	35 - 140
Endosulfan II [2C]	33.33	28.98	86.9	0.278	30	35 - 140
Endosulfan sulfate	33.33	30.25	90.8	0.179	30	60 - 135
Endosulfan sulfate [2C]	33.33	30.13	90.4	0.408	30	60 - 135
Endrin	33.33	30.30	90.9	2.03	30	60 - 135
Endrin [2C]	33.33	29.82	89.5	1.98	30	60 - 135
Endrin aldehyde	33.33	26.03	78.1	4.45	30	35 - 145
Endrin aldehyde [2C]	33.33	26.08	78.3	4.37	30	35 - 145
Endrin ketone	33.33	29.75	89.3	1.31	30	65 - 135
Endrin ketone [2C]	33.33	28.99	87.0	0.380	30	65 - 135
gamma-BHC (Lindane)	33.33	31.27	93.8	0.0284	30	60 - 125
gamma-BHC (Lindane) [2C]	33.33	31.92	95.8	0.963	30	60 - 125
gamma-Chlordane	33.33	30.02	90.0	0.415	30	65 - 125
gamma-Chlordane [2C]	33.33	29.61	88.8	0.790	30	65 - 125
Heptachlor	33.33	29.01	87.0	1.98	30	50 - 140
Heptachlor [2C]	33.33	30.10	90.3	1.12	30	50 - 140
Heptachlor epoxide	33.33	29.51	88.5	0.0743	30	65 - 130
Heptachlor epoxide [2C]	33.33	29.25	87.8	1.01	30	65 - 130
Methoxychlor	33.33	28.03	84.1	2.92	30	55 - 145
Methoxychlor [2C]	33.33	29.03	87.1	4.13	30	55 - 145

INITIAL CALIBRATION DATA

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 1005002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 1/5/2011 7:19:26PM

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
4,4'-DDE	1	33312	5	33302.4	10	33492.7	25	33299.24	50	35952.56	100	36643.49
4,4'-DDE [2C]	1	26886	5	24627.4	10	23971.1	25	22321.72	50	22667.04	100	21718.12
4,4'-DDD	1	25290	5	25992.2	10	26499.8	25	26510.76	50	29411.76	100	30628.18
4,4'-DDD [2C]	1	24557	5	22427.6	10	21654.4	25	20034.2	50	20513.92	100	19488.77
4,4'-DDT	1	22434	5	22604	10	23878.9	25	23766.44	50	26927.2	100	29144.84
4,4'-DDT [2C]	1	20332	5	19039.6	10	19219.8	25	17754.04	50	18745.14	100	18731.06
Aldrin	1	33497	5	35231.6	10	36326	25	36737.12	50	39319.52	100	39738.81
Aldrin [2C]	1	30550	5	27566.8	10	26912	25	25663.84	50	25855.84	100	24800.71
alpha-BHC	1	34684	5	37922.8	10	39485.1	25	41059.64	50	43963.24	100	45216.64
alpha-BHC [2C]	1	31942	5	30731	10	30448.7	25	30117.28	50	30795.12	100	30578.9
alpha-Chlordane	1	33588	5	33459.6	10	33457.3	25	32962.56	50	35503.42	100	35459.84
alpha-Chlordane [2C]	1	29700	5	25923.6	10	25000.5	25	23413.96	50	24027.74	100	23331.85
beta-BHC	1	16039	5	15189.8	10	15093.1	25	15121.08	50	16027.84	100	16221.67
beta-BHC [2C]	1	12578	5	9742.2	10	9336.3	25	9736.36	50	9764.26	100	10399.83
delta-BHC	1	28400	5	30472.4	10	31795.3	25	33392.48	50	36643.82	100	38153.59
delta-BHC [2C]	1	26621	5	26065.2	10	25660.2	25	25166.72	50	26318.02	100	26479.81
Dieldrin	1	32706	5	33557.2	10	33989.3	25	33908.72	50	37161.82	100	37850.26
Dieldrin [2C]	1	29135	5	26983.4	10	26161.1	25	24535.44	50	24585.06	100	24064.3
Endosulfan I	1	31380	5	31085.2	10	31233.1	25	31042.8	50	33588.18	100	34002.2
Endosulfan I [2C]	1	27029	5	24126.6	10	23338.2	25	21632.12	50	21948.72	100	21151.63
Endosulfan II	1	29723	5	29115.6	10	29027	25	28513.4	50	31220.44	100	31919.9
Endosulfan II [2C]	1	25798	5	23325.2	10	22374.2	25	20675.88	50	21232.1	100	20361.81
Endosulfan sulfate	1	24519	5	24361	10	24276.6	25	23814	50	26566.64	100	27717.41
Endosulfan sulfate [2C]	1	21824	5	20391.6	10	19400.8	25	17661.48	50	18530.4	100	18045.75
Endrin	1	23949	5	24467	10	25689.1	25	25260.72	50	27932.86	100	29466.09
Endrin [2C]	1	22810	5	20623.8	10	20699.9	25	19018.96	50	19636.4	100	19387.25
Endrin aldehyde	1	24739	5	24203.6	10	23469.5	25	22498.4	50	24597.2	100	25590.15
Endrin aldehyde [2C]	1	23793	5	20292.2	10	18952.7	25	17081.2	50	17680.32	100	17342.11
Endrin ketone	1	33058	5	33920.2	10	33350.3	25	32184.6	50	35549.58	100	36577.64
Endrin ketone [2C]	1	32483	5	27725	10	26085.4	25	23757.12	50	24446.06	100	23695.92
gamma-BHC (Lindane)	1	31596	5	34038.6	10	35066.5	25	36281.92	50	38833.76	100	39833.41

INITIAL CALIBRATION DATA

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 1005002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 1/5/2011 7:19:26PM

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
gamma-BHC (Lindane) [2C]	1	29897	5	27837.6	10	27412.6	25	27083.52	50	27635.74	100	27435.22
gamma-Chlordane	1	32210	5	33542.4	10	33987.1	25	34005.76	50	36781.56	100	37530.98
gamma-Chlordane [2C]	1	30080	5	26593.8	10	25790	25	24284.16	50	25015.46	100	24157.15
Heptachlor	1	27677	5	27088.6	10	28971.1	25	30123.4	50	32510.6	100	34175.13
Heptachlor [2C]	1	31385	5	27236	10	27007.5	25	25197	50	25051.36	100	24056.63
Heptachlor epoxide	1	33985	5	33700.8	10	33894.3	25	33773.88	50	36156.88	100	36453.89
Heptachlor epoxide [2C]	1	29962	5	26348.2	10	25219.8	25	23494.56	50	23640.56	100	22689.86
Methoxychlor	1	12388	5	12455.4	10	12702.6	25	11977.6	50	13450.94	100	14488.63
Methoxychlor [2C]	1	12843	5	11371.8	10	10850.2	25	9377.2	50	9576.34	100	9574.1
Chlordane (tech)												
Chlordane (1)												
Chlordane (2)												
Chlordane (3)												
Chlordane (4)												
Chlordane (5)												
Chlordane (tech) [2C]												
Chlordane (1) [2C]												
Chlordane (2) [2C]												
Chlordane (3) [2C]												
Chlordane (4) [2C]												
Chlordane (5) [2C]												
Toxaphene (1)												
Toxaphene (2)												
Toxaphene (3)												
Toxaphene (4)												
Toxaphene (5)												
Toxaphene (1) [2C]												
Toxaphene (2) [2C]												
Toxaphene (3) [2C]												
Toxaphene (4) [2C]												
Toxaphene (5) [2C]												

INITIAL CALIBRATION DATA

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Calibration:	1005002	Instrument:	GL-ECD3
Matrix:	Water	Calibration Date:	1/5/2011 7:19:26PM

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Tetrachloro-m-xylene	1	28300	5	27792.8	10	27862.3	25	28281.32	50	29540.54	100	29547.87
Tetrachloro-m-xylene [2C]	1	28245	5	24812.2	10	24010.4	25	23300.32	50	23098.44	100	22669.18
Decachlorobiphenyl	1	32686	5	33252.4	10	30730	25	28060.88	50	30425.48	100	30434.57
Decachlorobiphenyl [2C]	1	25722	5	22976.2	10	20811.5	25	18504.28	50	19541.74	100	18948.58

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 1005002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 1/5/2011 7:19:26PM

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
4,4'-DDE	200	37417.55										
4,4'-DDE [2C]	200	20801.35										
4,4'-DDD	200	31567.94										
4,4'-DDD [2C]	200	18904.32										
4,4'-DDT	200	30653.91										
4,4'-DDT [2C]	200	18116.4										
Aldrin	200	40671.26										
Aldrin [2C]	200	23991.23										
alpha-BHC	200	47529.41										
alpha-BHC [2C]	200	30564.86										
alpha-Chlordane	200	36479.8										
alpha-Chlordane [2C]	200	22610.29										
beta-BHC	200	16577.85										
beta-BHC [2C]	200	11084.09										
delta-BHC	200	39904.44										
delta-BHC [2C]	200	26653.02										
Dieldrin	200	38853.89										
Dieldrin [2C]	200	23097.26										
Endosulfan I	200	34519.7										
Endosulfan I [2C]	200	20359.08										
Endosulfan II	200	32602.48										
Endosulfan II [2C]	200	19513.41										
Endosulfan sulfate	200	28535.13										
Endosulfan sulfate [2C]	200	17307.06										
Endrin	200	30659.13										
Endrin [2C]	200	18437.5										
Endrin aldehyde	200	26174.57										
Endrin aldehyde [2C]	200	16667.65										
Endrin ketone	200	37615.34										
Endrin ketone [2C]	200	22446.67										
gamma-BHC (Lindane)	200	41563.49										

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 1005002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 1/5/2011 7:19:26PM

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
gamma-BHC (Lindane) [2C]	200	27423.14										
gamma-Chlordane	200	38379.5										
gamma-Chlordane [2C]	200	23288.78										
Heptachlor	200	35934.98										
Heptachlor [2C]	200	22705.54										
Heptachlor epoxide	200	37182.35										
Heptachlor epoxide [2C]	200	21660.05										
Methoxychlor	200	14930.47										
Methoxychlor [2C]	200	9104.71										
Chlordane (tech)												
Chlordane (1)												
Chlordane (2)												
Chlordane (3)												
Chlordane (4)												
Chlordane (5)												
Chlordane (tech) [2C]												
Chlordane (1) [2C]												
Chlordane (2) [2C]												
Chlordane (3) [2C]												
Chlordane (4) [2C]												
Chlordane (5) [2C]												
Toxaphene (1)			2000	1277.963	1000	1361.451	750	1279.629	500	1346.182	250	868.724
Toxaphene (2)			2000	528.966	1000	561.51	750	535.3066	500	519.158	250	366.764
Toxaphene (3)			2000	1001.892	1000	1096.932	750	1021.488	500	1042.168	250	824.756
Toxaphene (4)			2000	1214.788	1000	1312.743	750	1242.212	500	1221.034	250	820.448
Toxaphene (5)			2000	649.0015	1000	681.101	750	638.776	500	649.888	250	446.04
Toxaphene (1) [2C]			2000	1649.387	1000	1907.387	750	1840.747	500	2084.008	250	1432.224
Toxaphene (2) [2C]			2000	510.309	1000	601.31	750	566.2267	500	639.256	250	468.456
Toxaphene (3) [2C]			2000	819.114	1000	974.618	750	1188.036	500	1060.016	250	906.596
Toxaphene (4) [2C]			2000	822.9765	1000	956.227	750	914.16	500	1042.234	250	725.956
Toxaphene (5) [2C]			2000	482.1775	1000	552.348	750	512.1973	500	595.036	250	388.12

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 1005002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 1/5/2011 7:19:26PM

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Tetrachloro-m-xylene	200	30228.13										
Tetrachloro-m-xylene [2C]	200	22228.47										
Decachlorobiphenyl	200	30794.04										
Decachlorobiphenyl [2C]	200	18299.89										

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 1005002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 1/5/2011 7:19:26PM

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
4,4'-DDE												
4,4'-DDE [2C]												
4,4'-DDD												
4,4'-DDD [2C]												
4,4'-DDT												
4,4'-DDT [2C]												
Aldrin												
Aldrin [2C]												
alpha-BHC												
alpha-BHC [2C]												
alpha-Chlordane												
alpha-Chlordane [2C]												
beta-BHC												
beta-BHC [2C]												
delta-BHC												
delta-BHC [2C]												
Dieldrin												
Dieldrin [2C]												
Endosulfan I												
Endosulfan I [2C]												
Endosulfan II												
Endosulfan II [2C]												
Endosulfan sulfate												
Endosulfan sulfate [2C]												
Endrin												
Endrin [2C]												
Endrin aldehyde												
Endrin aldehyde [2C]												
Endrin ketone												
Endrin ketone [2C]												
gamma-BHC (Lindane)												

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 1005002
Instrument: GL-ECD3
Matrix: Water
Calibration Date: 1/5/2011 7:19:26PM

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
gamma-BHC (Lindane) [2C]												
gamma-Chlordane												
gamma-Chlordane [2C]												
Heptachlor												
Heptachlor [2C]												
Heptachlor epoxide												
Heptachlor epoxide [2C]												
Methoxychlor												
Methoxychlor [2C]												
Chlordane (tech)			200	2240.281	100	2349.214	50	2214.676	20	2254.73	10	2255.94
Chlordane (1)			200	4489.525	100	4695.65	50	4440.14	20	4586.1	10	4498
Chlordane (2)			200	1052.785	100	1073.7	50	1015.74	20	1010.75	10	953.3
Chlordane (3)			200	962.275	100	1030.14	50	956.96	20	984	10	1165.8
Chlordane (4)			200	3752.235	100	3932.96	50	3693.02	20	3721.45	10	3608.6
Chlordane (5)			200	944.585	100	1013.62	50	967.52	20	971.35	10	1054
Chlordane (tech) [2C]			200	1040.755	100	1163.546	50	1235.78	20	1337.26	10	1413.52
Chlordane (1) [2C]			200	1775.265	100	2006.16	50	2229.98	20	2329.95	10	2727.2
Chlordane (2) [2C]			200	654.565	100	715.14	50	731.02	20	793.6	10	805.6
Chlordane (3) [2C]			200	709.4	100	816.81	50	816.9	20	797.25	10	832.3
Chlordane (4) [2C]			200	1367.205	100	1465.95	50	1608.14	20	1945.95	10	1853.8
Chlordane (5) [2C]			200	697.34	100	813.67	50	792.86	20	819.55	10	848.7
Toxaphene (1)	100	977.84										
Toxaphene (2)	100	393.45										
Toxaphene (3)	100	894.53										
Toxaphene (4)	100	901.29										
Toxaphene (5)	100	495.83										
Toxaphene (1) [2C]	100	1839.76										
Toxaphene (2) [2C]	100	634.14										
Toxaphene (3) [2C]	100	945.87										
Toxaphene (4) [2C]	100	926.54										
Toxaphene (5) [2C]	100	480.56										

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 1005002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 1/5/2011 7:19:26PM

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Tetrachloro-m-xylene												
Tetrachloro-m-xylene [2C]												
Decachlorobiphenyl												
Decachlorobiphenyl [2C]												

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Calibration:	1005002	Instrument:	GL-ECD3
Matrix:	Water	Calibration Date:	1/5/2011 7:19:26PM

Compound	Level 19		Level 20		Level 21		Level 22		Level 23		Level 24	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
4,4'-DDE												
4,4'-DDE [2C]												
4,4'-DDD												
4,4'-DDD [2C]												
4,4'-DDT												
4,4'-DDT [2C]												
Aldrin												
Aldrin [2C]												
alpha-BHC												
alpha-BHC [2C]												
alpha-Chlordane												
alpha-Chlordane [2C]												
beta-BHC												
beta-BHC [2C]												
delta-BHC												
delta-BHC [2C]												
Dieldrin												
Dieldrin [2C]												
Endosulfan I												
Endosulfan I [2C]												
Endosulfan II												
Endosulfan II [2C]												
Endosulfan sulfate												
Endosulfan sulfate [2C]												
Endrin												
Endrin [2C]												
Endrin aldehyde												
Endrin aldehyde [2C]												
Endrin ketone												
Endrin ketone [2C]												
gamma-BHC (Lindane)												

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 1005002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 1/5/2011 7:19:26PM

Compound	Level 19		Level 20		Level 21		Level 22		Level 23		Level 24	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
gamma-BHC (Lindane) [2C]												
gamma-Chlordane												
gamma-Chlordane [2C]												
Heptachlor												
Heptachlor [2C]												
Heptachlor epoxide												
Heptachlor epoxide [2C]												
Methoxychlor												
Methoxychlor [2C]												
Chlordane (tech)	5	2280.04										
Chlordane (1)	5	4651.4										
Chlordane (2)	5	961										
Chlordane (3)	5	924.8										
Chlordane (4)	5	3814.6										
Chlordane (5)	5	1048.4										
Chlordane (tech) [2C]	5	1214.8										
Chlordane (1) [2C]	5	2063.8										
Chlordane (2) [2C]	5	804.6										
Chlordane (3) [2C]	5	810.6										
Chlordane (4) [2C]	5	1539.2										
Chlordane (5) [2C]	5	855.8										
Toxaphene (1)												
Toxaphene (2)												
Toxaphene (3)												
Toxaphene (4)												
Toxaphene (5)												
Toxaphene (1) [2C]												
Toxaphene (2) [2C]												
Toxaphene (3) [2C]												
Toxaphene (4) [2C]												
Toxaphene (5) [2C]												

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 1005002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 1/5/2011 7:19:26PM

Compound	Level 19		Level 20		Level 21		Level 22		Level 23		Level 24	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Tetrachloro-m-xylene			125		50		37.5		25		5	
Tetrachloro-m-xylene [2C]			125		50		37.5		25		5	
Decachlorobiphenyl			125		50		37.5		25		5	
Decachlorobiphenyl [2C]			125		50		37.5		25		5	

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 1005002
Instrument: GL-ECD3
Matrix: Water
Calibration Date: 1/5/2011 7:19:26PM

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
4,4'-DDE	34774.28	5.249225	8.095143	1.074368E-02			20	
4,4'-DDE [2C]	23284.68	8.796808	6.761429	0.0153543			20	
4,4'-DDD	27985.81	8.929875	8.72	1.798193E-02			20	
4,4'-DDD [2C]	21082.89	9.269489	7.373429	5.41304E-03			20	
4,4'-DDT	25629.9	12.86049	9.096714	1.644023E-02	0.9987755		0.995	
4,4'-DDT [2C]	18848.29	4.403606	7.653714	0.0212929			20	
Aldrin	37360.19	7.028671	7.040286	1.076276E-02			20	
Aldrin [2C]	26477.2	8.159228	5.766	1.143311E-02			20	
alpha-BHC	41408.69	10.78578	5.762857	1.490791E-02			20	
alpha-BHC [2C]	30739.69	1.867448	4.929571	1.972384E-02			20	
alpha-Chlordane	34415.79	3.963343	7.893714	1.571323E-02			20	
alpha-Chlordane [2C]	24858.28	9.682163	6.566429	5.367396E-03			20	
beta-BHC	15752.91	3.852075	6.303429	1.200062E-02			20	
beta-BHC [2C]	10377.29	10.85742	5.493857	5.527748E-02			20	
delta-BHC	34108.86	12.44171	6.556714	1.779156E-02	0.9993412		0.995	
delta-BHC [2C]	26137.71	2.109882	5.699286	2.739281E-02			20	
Dieldrin	35432.46	6.903259	8.279429	1.908736E-02			20	
Dieldrin [2C]	25508.79	8.074145	6.906	1.201724E-02			20	
Endosulfan I	32407.31	4.787729	7.956571	1.758908E-02			20	
Endosulfan I [2C]	22797.91	9.921624	6.628571	3.015864E-03			20	
Endosulfan II	30303.12	5.273252	8.83	1.715438E-02			20	
Endosulfan II [2C]	21897.23	9.769224	7.543714	6.290641E-03			20	
Endosulfan sulfate	25684.25	7.39206	9.278429	1.244202E-02			20	
Endosulfan sulfate [2C]	19023.01	8.545927	8.010714	1.158652E-02			20	
Endrin	26774.84	9.697968	8.555143	0.0175379			20	
Endrin [2C]	20087.69	7.223435	7.207	9.937581E-03			20	
Endrin aldehyde	24467.49	5.063104	8.989714	0.0053665			20	
Endrin aldehyde [2C]	18829.88	13.37449	7.750429	9.487843E-03			20	
Endrin ketone	34607.95	5.795901	9.881428	0.0143707			20	
Endrin ketone [2C]	25805.6	13.24816	8.608429	1.609742E-02			20	
gamma-BHC (Lindane)	36744.81	9.556701	6.090429	1.309158E-02			20	
gamma-BHC (Lindane) [2C]	27817.83	3.39835	5.218143	1.373364E-02			20	

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 1005002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 1/5/2011 7:19:26PM

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
gamma-Chlordane	35205.33	6.623955	7.806714	1.579138E-02			20	
gamma-Chlordane [2C]	25601.34	8.819767	6.502857	6.384156E-03			20	
Heptachlor	30925.83	10.87813	6.676714	1.302436E-02	0.9991705		0.995	
Heptachlor [2C]	26091.29	10.80176	5.509571	8.697278E-03			20	
Heptachlor epoxide	35021.01	4.30779	7.516429	0.0117988			20	
Heptachlor epoxide [2C]	24716.43	11.26704	6.253143	7.815555E-03			20	
Methoxychlor	13199.09	8.567955	9.699429	1.343541E-02	0.9991785		0.995	
Methoxychlor [2C]	10385.34	13.15463	8.344571	2.033218E-02			20	
Chlordane (tech)	2265.814	2.036435	9.007667	7.207414E-03			20	
Chlordane (1)	4560.136	2.206321	7.989	1.416297E-02			20	
Chlordane (2)	1011.213	4.748592	6.536	1.188001E-02			20	
Chlordane (3)	1003.996	8.624511	6.760834	8.797502E-03			20	
Chlordane (4)	3753.811	2.957383	7.897833	8.880134E-03			20	
Chlordane (5)	999.9125	4.559042	9.007667	7.207414E-03			20	
Chlordane (tech) [2C]	1234.277	10.59888	7.605	3.28691E-03			20	
Chlordane (1) [2C]	2188.726	14.89601	6.6265	1.838167E-02			20	
Chlordane (2) [2C]	750.7542	8.135717	5.401333	1.394675E-02			20	
Chlordane (3) [2C]	797.21	5.579656	5.56	3.498735E-03			20	
Chlordane (4) [2C]	1630.041	13.84368	6.581167	8.453161E-03			20	
Chlordane (5) [2C]	804.6533	7.142321	7.605	3.28691E-03			20	
Toxaphene (1)	1185.298	17.60246	10.15483	1.163139E-02			20	
Toxaphene (2)	484.1924	16.99113	8.840667	9.882717E-03			20	
Toxaphene (3)	980.2943	10.31703	9.5105	1.633135E-02			20	
Toxaphene (4)	1118.753	18.26761	9.6235	0.0199586			20	
Toxaphene (5)	593.4394	16.38404	10.60983	1.414172E-02			20	
Toxaphene (1) [2C]	1792.252	12.55136	8.7885	1.583008E-02			20	
Toxaphene (2) [2C]	569.9496	12.09974	7.845833	1.217741E-02			20	
Toxaphene (3) [2C]	982.375	13.04506	8.191834	1.640441E-02			20	
Toxaphene (4) [2C]	898.0156	12.24894	9.1715	1.758355E-02			20	
Toxaphene (5) [2C]	501.7398	14.1256	9.3375	1.331971E-02			20	
Tetrachloro-m-xylene	28793.28	3.343177	5.320714	7.382119E-03			20	
Tetrachloro-m-xylene [2C]	24052	8.465139	4.487286	3.658425E-02			20	

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 1005002

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 1/5/2011 7:19:26PM

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Decachlorobiphenyl	30911.91	5.48761	11.51943	7.207403E-03			20	
Decachlorobiphenyl [2C]	20686.31	13.29798	9.923857	2.674018E-03			20	

INITIAL CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	013F1301.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00510	Injection Date:	01/04/11
Lab Sample ID:	1A00510-ICV1	Injection Time:	15:01

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
4,4'-DDE	A	100.0	114.3	34774.28	39735.56		14.3	20
4,4'-DDE [2C]	A	100.0	104.1	23284.68	24243.11		4.1	20
4,4'-DDD	A	100.0	116.8	27985.81	32703.54		16.9	20
4,4'-DDD [2C]	A	100.0	102.9	21082.89	21702.62		2.9	20
4,4'-DDT	L	100.0	104.6	25629.9	31265.65		4.6	20
4,4'-DDT [2C]	A	100.0	108.4	18848.29	20432.21		8.4	20
Aldrin	A	100.0	114.4	37360.19	42752.6		14.4	20
Aldrin [2C]	A	100.0	102.8	26477.2	27207.87		2.8	20
alpha-BHC	A	100.0	119.5	41408.69	49467.04		19.5	20
alpha-BHC [2C]	A	100.0	111.8	30739.69	34358.97		11.8	20
alpha-Chlordane	A	100.0	113.4	34415.79	39032.4		13.4	20
alpha-Chlordane [2C]	A	100.0	104.4	24858.28	25953.87		4.4	20
beta-BHC	A	100.0	114.7	15752.91	18075.94		14.7	20
beta-BHC [2C]	A	100.0	118.7	10377.29	12316.82		18.7	20
delta-BHC	L	100.0	105.9	34108.86	41426.58		5.9	20
delta-BHC [2C]	A	100.0	113.0	26137.71	29537.58		13.0	20
Dieldrin	A	100.0	114.0	35432.46	40397.44		14.0	20
Dieldrin [2C]	A	100.0	102.5	25508.79	26149.2		2.5	20
Endosulfan I	A	100.0	114.3	32407.31	37055.23		14.3	20
Endosulfan I [2C]	A	100.0	103.8	22797.91	23656.54		3.8	20
Endosulfan II	A	100.0	111.7	30303.12	33848.82		11.7	20
Endosulfan II [2C]	A	100.0	101.2	21897.23	22160.33		1.2	20
Endosulfan sulfate	A	100.0	117.6	25684.25	30198.47		17.6	20
Endosulfan sulfate [2C]	A	100.0	104.8	19023.01	19940.59		4.8	20
Endrin	A	100.0	119.4	26774.84	31978.3		19.4	20
Endrin [2C]	A	100.0	105.8	20087.69	21243.85		5.8	20
Endrin aldehyde	A	100.0	107.8	24467.49	26373.5		7.8	20
Endrin aldehyde [2C]	A	100.0	96.98	18829.88	18260.82		-3.0	20
Endrin ketone	A	100.0	113.3	34607.95	39226.97		13.3	20

INITIAL CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	013R1301.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00510	Injection Date:	01/04/11
Lab Sample ID:	1A00510-ICV1	Injection Time:	15:01

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
Endrin ketone [2C]	A	100.0	100.6	25805.6	25972.88		0.6	20
gamma-BHC (Lindane)	A	100.0	118.9	36744.81	43691.79		18.9	20
gamma-BHC (Lindane) [2C]	A	100.0	111.2	27817.83	30937.87		11.2	20
gamma-Chlordane	A	100.0	115.4	35205.33	40638.2		15.4	20
gamma-Chlordane [2C]	A	100.0	105.2	25601.34	26943.79		5.2	20
Heptachlor	L	100.0	107.4	30925.83	37800.11		7.4	20
Heptachlor [2C]	A	100.0	103.2	26091.29	26914.32		3.2	20
Heptachlor epoxide	A	100.0	112.9	35021.01	39539.34		12.9	20
Heptachlor epoxide [2C]	A	100.0	101.6	24716.43	25116.98		1.6	20
Methoxychlor	L	100.0	109.5	13199.09	16072.93		9.5	20
Methoxychlor [2C]	A	100.0	104.7	10385.34	10871.77		4.7	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

ANALYSIS SEQUENCE SUMMARY

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Sequence:	0L36408	Instrument:	GL-ECD3
Calibration:	0362003		

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Performance Mix	0L36408-PEM2	099F1201.D	12/29/10 18:44
Performance Mix	0L36408-PEM2	099R1201.D	12/29/10 18:44
Calibration Check	0L36408-CCV1	003F1301.D	12/29/10 19:03
Calibration Check	0L36408-CCV1	003R1301.D	12/29/10 19:03
Calibration Check	0L36408-CCV2	005R1501.D	12/29/10 19:40
Calibration Check	0L36408-CCV2	005F1501.D	12/29/10 19:40
Blank	0L21019-BLK1	007R1701.D	12/29/10 20:17
Blank	0L21019-BLK1	007F1701.D	12/29/10 20:17
LCS	0L21019-BS1	008F1801.D	12/29/10 20:35
LCS	0L21019-BS1	008R1801.D	12/29/10 20:35
NTC12-SB23-0005	1012185-01	017F2701.D	12/29/10 23:23
NTC12-SB23-0005	1012185-01	017R2701.D	12/29/10 23:23
NTC12-SB23-0810	1012185-02	018R2801.D	12/29/10 23:41
NTC12-SB23-0810	1012185-02	018F2801.D	12/29/10 23:41
NTC12-SB24-0005	1012185-03	019R2901.D	12/30/10 00:00
NTC12-SB24-0005	1012185-03	019F2901.D	12/30/10 00:00
Calibration Check	0L36408-CCV4	020F3001.D	12/30/10 00:18
Calibration Check	0L36408-CCV4	020R3001.D	12/30/10 00:18
Calibration Check	0L36408-CCV5	022F3201.D	12/30/10 00:56
Calibration Check	0L36408-CCV5	022R3201.D	12/30/10 00:56

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	003F1301.D	Calibration Date:	12/23/10 15:56
Sequence:	0L36408	Injection Date:	12/29/10
Lab Sample ID:	0L36408-CCV1	Injection Time:	19:03

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
4,4'-DDE	A	100.0	102.0	32487.67	33128.58		2.0	20
4,4'-DDE [2C]	A	100.0	86.71	26340.12	22840.22		-13.3	20
4,4'-DDD	A	100.0	103.7	27017.65	28027.44		3.7	20
4,4'-DDD [2C]	A	100.0	88.73	23386.3	20750.91		-11.3	20
4,4'-DDT	A	100.0	104.3	22729.73	23716.08		4.3	20
4,4'-DDT [2C]	A	100.0	89.69	19739.9	17705.53		-10.3	20
Aldrin	A	100.0	102.8	35385.12	36372.2		2.8	20
Aldrin [2C]	A	100.0	86.68	29075.31	25201.73		-13.3	20
alpha-BHC	A	100.0	106.7	37461.78	39957.05		6.7	20
alpha-BHC [2C]	A	100.0	91.70	33203.06	30445.93		-8.3	20
alpha-Chlordane	A	100.0	101.9	32028.89	32651.91		1.9	20
alpha-Chlordane [2C]	A	100.0	88.37	27010.77	23870.17		-11.6	20
beta-BHC	A	100.0	99.90	14540.77	14526.41		-0.1	20
beta-BHC [2C]	A	100.0	88.80	13100.81	11633.13		-11.2	20
delta-BHC	A	100.0	111.9	29594.3	33130.1		11.9	20
delta-BHC [2C]	A	100.0	95.35	26517.58	25285.67		-4.6	20
Dieldrin	A	100.0	102.9	33539.54	34504.49		2.9	20
Dieldrin [2C]	A	100.0	88.80	28037.98	24898.57		-11.2	20
Endosulfan I	A	100.0	103.0	30042.71	30929.26		3.0	20
Endosulfan I [2C]	A	100.0	86.76	25435.04	22067.75		-13.2	20
Endosulfan II	A	100.0	102.7	28085.93	28841.54		2.7	20
Endosulfan II [2C]	A	100.0	87.90	23959.83	21059.98		-12.1	20
Endosulfan sulfate	A	100.0	103.4	23222.1	24007.18		3.4	20
Endosulfan sulfate [2C]	A	100.0	89.39	20348.02	18189.49		-10.6	20
Endrin	A	100.0	98.92	25585.52	25309.74		-1.1	20
Endrin [2C]	A	100.0	83.57	22655.16	18933.6		-16.4	20
Endrin aldehyde	A	100.0	101.2	22673.51	22937.8		1.2	20
Endrin aldehyde [2C]	A	100.0	88.27	20614.57	18196.03		-11.7	20
Endrin ketone	A	100.0	103.1	31625.1	32606.87		3.1	20

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	003R1301.D	Calibration Date:	12/23/10 15:56
Sequence:	0L36408	Injection Date:	12/29/10
Lab Sample ID:	0L36408-CCV1	Injection Time:	19:03

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Endrin ketone [2C]	A	100.0	90.66	26909.9	24397.51		-9.3	20
gamma-BHC (Lindane)	A	100.0	106.8	32719.69	34950.27		6.8	20
gamma-BHC (Lindane) [2C]	A	100.0	92.37	29406.27	27163.6		-7.6	20
gamma-Chlordane	A	100.0	100.9	33690.5	34008.47		0.9	20
gamma-Chlordane [2C]	A	100.0	88.44	27718.95	24515.09		-11.6	20
Heptachlor	A	100.0	102.5	28021.52	28730.4		2.5	20
Heptachlor [2C]	A	100.0	83.95	26505.56	22250.59		-16.1	20
Heptachlor epoxide	A	100.0	103.6	32114.34	33287.67		3.7	20
Heptachlor epoxide [2C]	A	100.0	84.73	27492.98	23295.12		-15.3	20
Methoxychlor	A	100.0	95.34	12736.61	12143.08		-4.7	20
Methoxychlor [2C]	A	100.0	82.73	11247.63	9305.37		-17.3	20
Tetrachloro-m-xylene	A	100.0	92.65	28756.09	26642.5		-7.4	20
Tetrachloro-m-xylene [2C]	A	100.0	85.97	28081.79	24141.42		-14.0	20
Decachlorobiphenyl	A	100.0	96.81	28655.66	27742.69		-3.2	20
Decachlorobiphenyl [2C]	A	100.0	90.03	20853.67	18774.13		-10.0	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	005F1501.D	Calibration Date:	12/23/10 15:56
Sequence:	0L36408	Injection Date:	12/29/10
Lab Sample ID:	0L36408-CCV2	Injection Time:	19:40

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Toxaphene (1)	A	1000	1020	1185.298	1208.79		2.0	20
Toxaphene (2)	A	1000	1017	484.1924	492.541		1.7	20
Toxaphene (3)	A	1000	1130	980.2943	1108.079		13.0	20
Toxaphene (4)	A	1000	1029	1118.753	1151.274		2.9	20
Toxaphene (5)	A	1000	989.7	593.4394	587.356		-1.0	20
Toxaphene (1) [2C]	A	1000	894.6	1792.252	1603.324		-10.5	20
Toxaphene (2) [2C]	A	1000	907.7	569.9496	517.365		-9.2	20
Toxaphene (3) [2C]	A	1000	848.8	982.375	833.827		-15.1	20
Toxaphene (4) [2C]	A	1000	886.7	898.0156	796.253		-11.3	20
Toxaphene (5) [2C]	A	1000	856.9	501.7398	429.928		-14.3	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	020F3001.D	Calibration Date:	12/23/10 15:56
Sequence:	0L36408	Injection Date:	12/30/10
Lab Sample ID:	0L36408-CCV4	Injection Time:	00:18

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT		
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)	
4,4'-DDE	A	100.0	106.9	32487.67	34741.12		6.9	20	
4,4'-DDE [2C]	A	100.0	96.62	26340.12	25449.02		-3.4	20	
4,4'-DDD	A	100.0	113.0	27017.65	30541.85		13.0	20	
4,4'-DDD [2C]	A	100.0	100.6	23386.3	23540.63		0.7	20	
4,4'-DDT	A	100.0	108.0	22729.73	24549.21		8.0	20	
4,4'-DDT [2C]	A	100.0	98.96	19739.9	19533.79		-1.0	20	
Aldrin	A	100.0	105.8	35385.12	37431.51		5.8	20	
Aldrin [2C]	A	100.0	95.12	29075.31	27656.43		-4.9	20	
alpha-BHC	A	100.0	112.1	37461.78	41993.43		12.1	20	
alpha-BHC [2C]	A	100.0	103.8	33203.06	34471.37		3.8	20	
alpha-Chlordane	A	100.0	105.0	32028.89	33647.44		5.1	20	
alpha-Chlordane [2C]	A	100.0	96.14	27010.77	25969.55		-3.9	20	
beta-BHC	A	100.0	104.8	14540.77	15246.14		4.9	20	
beta-BHC [2C]	A	100.0	102.4	13100.81	13421.65		2.4	20	
delta-BHC	A	100.0	123.0	29594.3	36392.62		23.0	20	*
delta-BHC [2C]	A	100.0	113.3	26517.58	30039.25		13.3	20	
Dieldrin	A	100.0	106.5	33539.54	35718.99		6.5	20	
Dieldrin [2C]	A	100.0	97.88	28037.98	27442.62		-2.1	20	
Endosulfan I	A	100.0	106.5	30042.71	31984.64		6.5	20	
Endosulfan I [2C]	A	100.0	95.31	25435.04	24243.38		-4.7	20	
Endosulfan II	A	100.0	107.4	28085.93	30150.79		7.4	20	
Endosulfan II [2C]	A	100.0	97.09	23959.83	23262.7		-2.9	20	
Endosulfan sulfate	A	100.0	108.7	23222.1	25250.26		8.7	20	
Endosulfan sulfate [2C]	A	100.0	103.6	20348.02	21086.57		3.6	20	
Endrin	A	100.0	105.4	25585.52	26964.47		5.4	20	
Endrin [2C]	A	100.0	95.52	22655.16	21639.15		-4.5	20	
Endrin aldehyde	A	100.0	106.5	22673.51	24139.26		6.5	20	
Endrin aldehyde [2C]	A	100.0	97.93	20614.57	20187.97		-2.1	20	
Endrin ketone	A	100.0	111.2	31625.1	35161.2		11.2	20	

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	020R3001.D	Calibration Date:	12/23/10 15:56
Sequence:	0L36408	Injection Date:	12/30/10
Lab Sample ID:	0L36408-CCV4	Injection Time:	00:18

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Endrin ketone [2C]	A	100.0	101.8	26909.9	27393.49		1.8	20
gamma-BHC (Lindane)	A	100.0	113.0	32719.69	36963.46		13.0	20
gamma-BHC (Lindane) [2C]	A	100.0	104.0	29406.27	30585.32		4.0	20
gamma-Chlordane	A	100.0	103.6	33690.5	34890.6		3.6	20
gamma-Chlordane [2C]	A	100.0	96.72	27718.95	26810.06		-3.3	20
Heptachlor	A	100.0	111.2	28021.52	31165.58		11.2	20
Heptachlor [2C]	A	100.0	94.53	26505.56	25055.56		-5.5	20
Heptachlor epoxide	A	100.0	106.7	32114.34	34260.23		6.7	20
Heptachlor epoxide [2C]	A	100.0	93.05	27492.98	25582.89		-6.9	20
Methoxychlor	A	100.0	99.36	12736.61	12655.03		-0.6	20
Methoxychlor [2C]	A	100.0	90.61	11247.63	10191.17		-9.4	20
Tetrachloro-m-xylene	A	100.0	94.64	28756.09	27215.86		-5.4	20
Tetrachloro-m-xylene [2C]	A	100.0	93.28	28081.79	26194.05		-6.7	20
Decachlorobiphenyl	A	100.0	99.24	28655.66	28437.12		-0.8	20
Decachlorobiphenyl [2C]	A	100.0	96.50	20853.67	20123.71		-3.5	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	022F3201.D	Calibration Date:	12/23/10 15:56
Sequence:	0L36408	Injection Date:	12/30/10
Lab Sample ID:	0L36408-CCV5	Injection Time:	00:56

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Toxaphene (1)	A	1000	937.4	1185.298	1111.057		-6.3	20
Toxaphene (2)	A	1000	1013	484.1924	490.35		1.3	20
Toxaphene (3)	A	1000	928.7	980.2943	910.435		-7.1	20
Toxaphene (4)	A	1000	956.3	1118.753	1069.864		-4.4	20
Toxaphene (5)	A	1000	848.4	593.4394	503.472		-15.2	20
Toxaphene (1) [2C]	A	1000	984.1	1792.252	1763.805		-1.6	20
Toxaphene (2) [2C]	A	1000	1078	569.9496	614.265		7.8	20
Toxaphene (3) [2C]	A	1000	947.3	982.375	930.628		-5.3	20
Toxaphene (4) [2C]	A	1000	1015	898.0156	911.238		1.5	20
Toxaphene (5) [2C]	A	1000	953.3	501.7398	478.29		-4.7	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

ANALYSIS SEQUENCE SUMMARY

SW8081B

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 1A00502
Instrument: GL-ECD3
Calibration: 0362003

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Performance Mix	1A00502-PEM1	002F0201.D	01/03/11 12:52
Performance Mix	1A00502-PEM1	002R0201.D	01/03/11 12:52
Calibration Check	1A00502-CCV1	003R0301.D	01/03/11 13:10
Calibration Check	1A00502-CCV1	003F0301.D	01/03/11 13:10
Calibration Check	1A00502-CCV3	005R0501.D	01/03/11 13:48
Calibration Check	1A00502-CCV3	005F0501.D	01/03/11 13:48
NTC12-SB24-00502	1012185-04	013F1301.D	01/03/11 16:17
NTC12-SB24-00502	1012185-04	013R1301.D	01/03/11 16:17
NTC12-SB30-0005	1012185-06	014R1401.D	01/03/11 16:35
NTC12-SB30-0005	1012185-06	014F1401.D	01/03/11 16:35
NTC12-SB30-00502	1012185-07	015F1501.D	01/03/11 16:54
NTC12-SB30-00502	1012185-07	015R1501.D	01/03/11 16:54
NTC12-SB26-0005	1012185-08	016F1601.D	01/03/11 17:12
NTC12-SB26-0005	1012185-08	016R1601.D	01/03/11 17:12
NTC12-SB26-0005	1012185-08RE1	017R1701.D	01/03/11 17:31
NTC12-SB26-0005	1012185-08RE1	017F1701.D	01/03/11 17:31
NTC12-DUP01	1012185-10	018F1801.D	01/03/11 17:49
NTC12-DUP01	1012185-10	018R1801.D	01/03/11 17:49
NTC12-SB26-0406	1012185-09RE1	019F1901.D	01/03/11 18:08
NTC12-SB26-0406	1012185-09RE1	019R1901.D	01/03/11 18:08
NTC12-SB26-0406	1012185-09	020R2001.D	01/03/11 18:26
NTC12-SB26-0406	1012185-09	020F2001.D	01/03/11 18:26
Calibration Check	1A00502-CCV4	022R2201.D	01/03/11 19:03
Calibration Check	1A00502-CCV4	022F2201.D	01/03/11 19:03
Calibration Check	1A00502-CCV6	024F2401.D	01/03/11 19:41
Calibration Check	1A00502-CCV6	024R2401.D	01/03/11 19:41

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	003F0301.D	Calibration Date:	12/23/10 15:56
Sequence:	1A00502	Injection Date:	01/03/11
Lab Sample ID:	1A00502-CCV1	Injection Time:	13:10

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
4,4'-DDE	A	100.0	102.3	32487.67	33249.23		2.3	20
4,4'-DDE [2C]	A	100.0	88.76	26340.12	23378.39		-11.2	20
4,4'-DDD	A	100.0	102.7	27017.65	27748.77		2.7	20
4,4'-DDD [2C]	A	100.0	88.00	23386.3	20579.44		-12.0	20
4,4'-DDT	A	100.0	110.4	22729.73	25094.89		10.4	20
4,4'-DDT [2C]	A	100.0	95.00	19739.9	18753.84		-5.0	20
Aldrin	A	100.0	103.9	35385.12	36759.67		3.9	20
Aldrin [2C]	A	100.0	90.57	29075.31	26333.8		-9.4	20
alpha-BHC	A	100.0	109.7	37461.78	41105.2		9.7	20
alpha-BHC [2C]	A	100.0	97.06	33203.06	32225.43		-2.9	20
alpha-Chlordane	A	100.0	102.7	32028.89	32889.08		2.7	20
alpha-Chlordane [2C]	A	100.0	91.16	27010.77	24624.04		-8.8	20
beta-BHC	A	100.0	102.0	14540.77	14837.35		2.0	20
beta-BHC [2C]	A	100.0	93.37	13100.81	12232.53		-6.6	20
delta-BHC	A	100.0	116.2	29594.3	34382.31		16.2	20
delta-BHC [2C]	A	100.0	101.7	26517.58	26966.43		1.7	20
Dieldrin	A	100.0	103.8	33539.54	34814.83		3.8	20
Dieldrin [2C]	A	100.0	90.70	28037.98	25431.19		-9.3	20
Endosulfan I	A	100.0	104.0	30042.71	31234.5		4.0	20
Endosulfan I [2C]	A	100.0	88.38	25435.04	22480.82		-11.6	20
Endosulfan II	A	100.0	103.0	28085.93	28942.31		3.0	20
Endosulfan II [2C]	A	100.0	88.71	23959.83	21254.16		-11.3	20
Endosulfan sulfate	A	100.0	106.0	23222.1	24622.99		6.0	20
Endosulfan sulfate [2C]	A	100.0	91.99	20348.02	18718.8		-8.0	20
Endrin	A	100.0	102.2	25585.52	26151.75		2.2	20
Endrin [2C]	A	100.0	87.69	22655.16	19865.54		-12.3	20
Endrin aldehyde	A	100.0	102.3	22673.51	23194.29		2.3	20
Endrin aldehyde [2C]	A	100.0	89.54	20614.57	18458.29		-10.5	20
Endrin ketone	A	100.0	103.1	31625.1	32618.97		3.1	20

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	003R0301.D	Calibration Date:	12/23/10 15:56
Sequence:	1A00502	Injection Date:	01/03/11
Lab Sample ID:	1A00502-CCV1	Injection Time:	13:10

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Endrin ketone [2C]	A	100.0	91.64	26909.9	24661.59		-8.4	20
gamma-BHC (Lindane)	A	100.0	110.5	32719.69	36152.11		10.5	20
gamma-BHC (Lindane) [2C]	A	100.0	98.20	29406.27	28877.32		-1.8	20
gamma-Chlordane	A	100.0	102.5	33690.5	34525.18		2.5	20
gamma-Chlordane [2C]	A	100.0	91.83	27718.95	25454.87		-8.2	20
Heptachlor	A	100.0	110.1	28021.52	30859.16		10.1	20
Heptachlor [2C]	A	100.0	90.65	26505.56	24027.81		-9.3	20
Heptachlor epoxide	A	100.0	104.8	32114.34	33656.35		4.8	20
Heptachlor epoxide [2C]	A	100.0	87.80	27492.98	24138.98		-12.2	20
Methoxychlor	A	100.0	96.62	12736.61	12305.74		-3.4	20
Methoxychlor [2C]	A	100.0	84.68	11247.63	9524.8		-15.3	20
Tetrachloro-m-xylene	A	100.0	94.84	28756.09	27272.29		-5.2	20
Tetrachloro-m-xylene [2C]	A	100.0	89.14	28081.79	25033.14		-10.9	20
Decachlorobiphenyl	A	100.0	87.02	28655.66	24936.9		-13.0	20
Decachlorobiphenyl [2C]	A	100.0	83.83	20853.67	17482.35		-16.2	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	005F0501.D	Calibration Date:	12/23/10 15:56
Sequence:	1A00502	Injection Date:	01/03/11
Lab Sample ID:	1A00502-CCV3	Injection Time:	13:48

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT		
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)	
Toxaphene (1)	A	1000	1038	1185.298	1230.482		3.8	20	
Toxaphene (2)	A	1000	1116	484.1924	540.275		11.6	20	
Toxaphene (3)	A	1000	1206	980.2943	1182.702		20.6	20	*
Toxaphene (4)	A	1000	1072	1118.753	1199.109		7.2	20	
Toxaphene (5)	A	1000	945.0	593.4394	560.771		-5.5	20	
Toxaphene (1) [2C]	A	1000	988.6	1792.252	1771.851		-1.1	20	
Toxaphene (2) [2C]	A	1000	1083	569.9496	617.176		8.3	20	
Toxaphene (3) [2C]	A	1000	956.6	982.375	939.763		-4.3	20	
Toxaphene (4) [2C]	A	1000	963.1	898.0156	864.867		-3.7	20	
Toxaphene (5) [2C]	A	1000	958.3	501.7398	480.807		-4.2	20	

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	022F2201.D	Calibration Date:	12/23/10 15:56
Sequence:	1A00502	Injection Date:	01/03/11
Lab Sample ID:	1A00502-CCV4	Injection Time:	19:03

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT		
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)	
4,4'-DDE	A	100.0	107.5	32487.67	34915.81		7.5	20	
4,4'-DDE [2C]	A	100.0	87.41	26340.12	23024.68		-12.6	20	
4,4'-DDD	A	100.0	118.6	27017.65	32052.32		18.6	20	
4,4'-DDD [2C]	A	100.0	95.38	23386.3	22307.04		-4.6	20	
4,4'-DDT	A	100.0	103.3	22729.73	23477.55		3.3	20	
4,4'-DDT [2C]	A	100.0	84.37	19739.9	16653.81		-15.6	20	
Aldrin	A	100.0	107.9	35385.12	38169.63		7.9	20	
Aldrin [2C]	A	100.0	86.80	29075.31	25237.29		-13.2	20	
alpha-BHC	A	100.0	116.4	37461.78	43609.81		16.4	20	
alpha-BHC [2C]	A	100.0	96.78	33203.06	32133.63		-3.2	20	
alpha-Chlordane	A	100.0	105.6	32028.89	33830.25		5.6	20	
alpha-Chlordane [2C]	A	100.0	86.75	27010.77	23431.04		-13.3	20	
beta-BHC	A	100.0	107.8	14540.77	15677.57		7.8	20	
beta-BHC [2C]	A	100.0	91.70	13100.81	12013.44		-8.3	20	
delta-BHC	A	100.0	128.7	29594.3	38093.92		28.7	20	*
delta-BHC [2C]	A	100.0	105.8	26517.58	28053.98		5.8	20	
Dieldrin	A	100.0	107.4	33539.54	36031.32		7.4	20	
Dieldrin [2C]	A	100.0	88.53	28037.98	24821.2		-11.5	20	
Endosulfan I	A	100.0	107.0	30042.71	32135.74		7.0	20	
Endosulfan I [2C]	A	100.0	86.92	25435.04	22107.89		-13.1	20	
Endosulfan II	A	100.0	107.1	28085.93	30081.67		7.1	20	
Endosulfan II [2C]	A	100.0	87.05	23959.83	20856.66		-13.0	20	
Endosulfan sulfate	A	100.0	115.4	23222.1	26805.03		15.4	20	
Endosulfan sulfate [2C]	A	100.0	92.91	20348.02	18904.94		-7.1	20	
Endrin	A	100.0	112.3	25585.52	28729.11		12.3	20	
Endrin [2C]	A	100.0	91.52	22655.16	20735.16		-8.5	20	
Endrin aldehyde	A	100.0	106.0	22673.51	24044.93		6.0	20	
Endrin aldehyde [2C]	A	100.0	86.10	20614.57	17749.71		-13.9	20	
Endrin ketone	A	100.0	107.4	31625.1	33972.81		7.4	20	

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	022R2201.D	Calibration Date:	12/23/10 15:56
Sequence:	1A00502	Injection Date:	01/03/11
Lab Sample ID:	1A00502-CCV4	Injection Time:	19:03

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Endrin ketone [2C]	A	100.0	88.33	26909.9	23769.57		-11.7	20
gamma-BHC (Lindane)	A	100.0	117.7	32719.69	38519.68		17.7	20
gamma-BHC (Lindane) [2C]	A	100.0	97.53	29406.27	28680.22		-2.5	20
gamma-Chlordane	A	100.0	104.5	33690.5	35207.68		4.5	20
gamma-Chlordane [2C]	A	100.0	87.48	27718.95	24247.22		-12.5	20
Heptachlor	A	100.0	120.9	28021.52	33886.64		20.9	20 *
Heptachlor [2C]	A	100.0	92.52	26505.56	24523.01		-7.5	20
Heptachlor epoxide	A	100.0	108.6	32114.34	34871.48		8.6	20
Heptachlor epoxide [2C]	A	100.0	85.61	27492.98	23537.78		-14.4	20
Methoxychlor	A	100.0	96.47	12736.61	12287.02		-3.5	20
Methoxychlor [2C]	A	100.0	79.43	11247.63	8933.69		-20.6	20 *
Tetrachloro-m-xylene	A	100.0	98.01	28756.09	28183.42		-2.0	20
Tetrachloro-m-xylene [2C]	A	100.0	85.65	28081.79	24052.6		-14.3	20
Decachlorobiphenyl	A	100.0	92.74	28655.66	26573.92		-7.3	20
Decachlorobiphenyl [2C]	A	100.0	78.78	20853.67	16428.76		-21.2	20 *

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	024F2401.D	Calibration Date:	12/23/10 15:56
Sequence:	1A00502	Injection Date:	01/03/11
Lab Sample ID:	1A00502-CCV6	Injection Time:	19:41

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT		
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)	
Toxaphene (1)	A	1000	814.0	1185.298	964.821		-18.6	20	
Toxaphene (2)	A	1000	1062	484.1924	514.194		6.2	20	
Toxaphene (3)	A	1000	1031	980.2943	1010.46		3.1	20	
Toxaphene (4)	A	1000	917.0	1118.753	1025.876		-8.3	20	
Toxaphene (5)	A	1000	759.2	593.4394	450.521		-24.1	20	*
Toxaphene (1) [2C]	A	1000	697.7	1792.252	1250.46		-30.2	20	*
Toxaphene (2) [2C]	A	1000	865.1	569.9496	493.073		-13.5	20	
Toxaphene (3) [2C]	A	1000	763.8	982.375	750.296		-23.6	20	*
Toxaphene (4) [2C]	A	1000	719.4	898.0156	646.023		-28.1	20	*
Toxaphene (5) [2C]	A	1000	582.2	501.7398	292.088		-41.8	20	*

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

INITIAL CALIBRATION DATA

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362003

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 12/23/2010 3:56:36PM

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
4,4'-DDE	1	32578	5	31139.4	10	31523	25	32367.64	50	32004.8	100	33414.44
4,4'-DDE [2C]	1	31986	5	28609	10	27224.5	25	26200.36	50	24360.56	100	23665.93
4,4'-DDD	1	25536	5	26131	10	26135.4	25	27154.28	50	26607.36	100	28130.77
4,4'-DDD [2C]	1	28313	5	25113.8	10	24014.6	25	23129.36	50	21591.08	100	21017.69
4,4'-DDT	1	20998	5	19989.4	10	21646.4	25	23992.6	50	22308.34	100	24727.19
4,4'-DDT [2C]	1	23378	5	20522.2	10	20178.4	25	20351.64	50	17965.48	100	18418.82
Aldrin	1	34531	5	33783.4	10	34047.2	25	35269.92	50	35731.78	100	36834.37
Aldrin [2C]	1	35198	5	31753.8	10	30112.4	25	28755.28	50	26915.38	100	26058.11
alpha-BHC	1	32652	5	34318	10	35459.1	25	37950.12	50	39141.74	100	40829.32
alpha-BHC [2C]	1	38066	5	34455.6	10	32925.7	25	32780.36	50	31997.96	100	31707.15
alpha-Chlordane	1	32289	5	31594	10	31455.1	25	31816	50	31494.08	100	32375.77
alpha-Chlordane [2C]	1	34321	5	29515.4	10	27787.7	25	25977.28	50	24491.52	100	23939.04
beta-BHC	1	14579	5	14380.4	10	14316	25	14500.56	50	14412.7	100	14810.34
beta-BHC [2C]	1	17781	5	13796	10	12827.9	25	12173.04	50	11665.58	100	12000.75
delta-BHC	1	23096	5	26299.2	10	28384	25	31494.24	50	31076.3	100	33176.64
delta-BHC [2C]	1	30911	5	26905.6	10	26170.6	25	26577.24	50	24892.96	100	25597
Dieldrin	1	34301	5	32021.8	10	32614.2	25	33111.28	50	32912.52	100	34271.3
Dieldrin [2C]	1	34467	5	30290	10	29055.4	25	27479.48	50	25791.12	100	25141.61
Endosulfan I	1	29095	5	29579.8	10	29515.8	25	30078.68	50	29816.86	100	30702.3
Endosulfan I [2C]	1	32569	5	27930.2	10	26375.8	25	24646.68	50	23134.14	100	22307.51
Endosulfan II	1	28126	5	27539.2	10	27876.1	25	27867.2	50	27087.7	100	28530.78
Endosulfan II [2C]	1	31143	5	26352.8	10	24827.8	25	23148.96	50	21222.58	100	20950.02
Endosulfan sulfate	1	25020	5	21784.2	10	22194.6	25	23304.68	50	21999.64	100	23622.34
Endosulfan sulfate [2C]	1	25715	5	21921.6	10	20851.8	25	20186.72	50	18073.78	100	18179.13
Endrin	1	25912	5	24379.8	10	24636.2	25	25633.2	50	24949.58	100	26539.38
Endrin [2C]	1	28408	5	25004.4	10	23607.9	25	22199.64	50	20335.12	100	20112.56
Endrin aldehyde	1	25735	5	21549	10	22411.6	25	21999.44	50	21050.74	100	22503.9
Endrin aldehyde [2C]	1	27960	5	22781.8	10	21386.1	25	19423	50	17763.8	100	17811.53
Endrin ketone	1	33531	5	30848.4	10	30810.6	25	31502.92	50	29792.84	100	31504.62
Endrin ketone [2C]	1	34315	5	29188.8	10	27910.9	25	26423.24	50	23827.02	100	23704.12
gamma-BHC (Lindane)	1	29228	5	30121.6	10	31079.3	25	33152.08	50	33859.9	100	35447.04

INITIAL CALIBRATION DATA

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362003

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 12/23/2010 3:56:36PM

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
gamma-BHC (Lindane) [2C]	1	34053	5	30691.2	10	29398.6	25	29080.28	50	28012.28	100	27853.96
gamma-Chlordane	1	37096	5	32509.4	10	32302.6	25	32831.48	50	32695.36	100	33783.41
gamma-Chlordane [2C]	1	34757	5	30122.4	10	28526.6	25	26671.96	50	25343.8	100	24771.01
Heptachlor	1	23889	5	25250.2	10	26386.3	25	29435.04	50	28928.36	100	30983.23
Heptachlor [2C]	1	33686	5	28615	10	27196.4	25	26489.64	50	24228.76	100	23513.63
Heptachlor epoxide	1	30025	5	31050.6	10	31524.4	25	32288.8	50	32427.9	100	33404.53
Heptachlor epoxide [2C]	1	35309	5	30566.8	10	28573	25	26709.92	50	24791.62	100	23917.19
Methoxychlor	1	13621	5	12303	10	12485.2	25	13306.4	50	11796.3	100	12649.33
Methoxychlor [2C]	1	15055	5	12560.6	10	11797.6	25	11349.92	50	9533.36	100	9431.45
Chlordane (tech)												
Chlordane (1)												
Chlordane (2)												
Chlordane (3)												
Chlordane (4)												
Chlordane (5)												
Chlordane (tech) [2C]												
Chlordane (1) [2C]												
Chlordane (2) [2C]												
Chlordane (3) [2C]												
Chlordane (4) [2C]												
Chlordane (5) [2C]												
Toxaphene (1)												
Toxaphene (2)												
Toxaphene (3)												
Toxaphene (4)												
Toxaphene (5)												
Toxaphene (1) [2C]												
Toxaphene (2) [2C]												
Toxaphene (3) [2C]												
Toxaphene (4) [2C]												
Toxaphene (5) [2C]												

INITIAL CALIBRATION DATA

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362003

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 12/23/2010 3:56:36PM

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Tetrachloro-m-xylene	1	~~49217~~	5	32312	10	29237.7	25	27400.72	50	27811.26	100	27807.08
Tetrachloro-m-xylene [2C]	1	34643	5	30368	10	28593.4	25	27127.16	50	26246.82	100	25403.79
Decachlorobiphenyl	1	31531	5	30931.4	10	30103.4	25	27976.6	50	26528.56	100	25640.52
Decachlorobiphenyl [2C]	1	27471	5	24142	10	22490.1	25	19467.6	50	17915.74	100	16960.33

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362003

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 12/23/2010 3:56:36PM

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
4,4'-DDE	200	34386.39										
4,4'-DDE [2C]	200	22334.48										
4,4'-DDD	200	29428.75										
4,4'-DDD [2C]	200	20524.56										
4,4'-DDT	200	25446.14										
4,4'-DDT [2C]	200	17364.72										
Aldrin	200	37498.15										
Aldrin [2C]	200	24734.18										
alpha-BHC	200	41882.16										
alpha-BHC [2C]	200	30488.68										
alpha-Chlordane	200	33178.25										
alpha-Chlordane [2C]	200	23043.44										
beta-BHC	200	14786.38										
beta-BHC [2C]	200	11461.42										
delta-BHC	200	33633.73										
delta-BHC [2C]	200	24568.64										
Dieldrin	200	35544.69										
Dieldrin [2C]	200	24041.27										
Endosulfan I	200	31510.54										
Endosulfan I [2C]	200	21081.95										
Endosulfan II	200	29574.55										
Endosulfan II [2C]	200	20073.68										
Endosulfan sulfate	200	24629.24										
Endosulfan sulfate [2C]	200	17508.11										
Endrin	200	27048.48										
Endrin [2C]	200	18918.52										
Endrin aldehyde	200	23464.9										
Endrin aldehyde [2C]	200	17175.74										
Endrin ketone	200	33385.31										
Endrin ketone [2C]	200	23000.2										
gamma-BHC (Lindane)	200	36149.89										

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362003

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 12/23/2010 3:56:36PM

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
gamma-BHC (Lindane) [2C]	200	26754.54										
gamma-Chlordane	200	34615.24										
gamma-Chlordane [2C]	200	23839.91										
Heptachlor	200	31278.47										
Heptachlor [2C]	200	21809.47										
Heptachlor epoxide	200	34079.12										
Heptachlor epoxide [2C]	200	22583.34										
Methoxychlor	200	12995										
Methoxychlor [2C]	200	9005.45										
Chlordane (tech)												
Chlordane (1)												
Chlordane (2)												
Chlordane (3)												
Chlordane (4)												
Chlordane (5)												
Chlordane (tech) [2C]												
Chlordane (1) [2C]												
Chlordane (2) [2C]												
Chlordane (3) [2C]												
Chlordane (4) [2C]												
Chlordane (5) [2C]												
Toxaphene (1)			2000	1277.963	1000	1361.451	750	1279.629	500	1346.182	250	868.724
Toxaphene (2)			2000	528.966	1000	561.51	750	535.3066	500	519.158	250	366.764
Toxaphene (3)			2000	1001.892	1000	1096.932	750	1021.488	500	1042.168	250	824.756
Toxaphene (4)			2000	1214.788	1000	1312.743	750	1242.212	500	1221.034	250	820.448
Toxaphene (5)			2000	649.0015	1000	681.101	750	638.776	500	649.888	250	446.04
Toxaphene (1) [2C]			2000	1649.387	1000	1907.387	750	1840.747	500	2084.008	250	1432.224
Toxaphene (2) [2C]			2000	510.309	1000	601.31	750	566.2267	500	639.256	250	468.456
Toxaphene (3) [2C]			2000	819.114	1000	974.618	750	1188.036	500	1060.016	250	906.596
Toxaphene (4) [2C]			2000	822.9765	1000	956.227	750	914.16	500	1042.234	250	725.956
Toxaphene (5) [2C]			2000	482.1775	1000	552.348	750	512.1973	500	595.036	250	388.12

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362003

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 12/23/2010 3:56:36PM

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Tetrachloro-m-xylene	200	27967.75										
Tetrachloro-m-xylene [2C]	200	24190.38										
Decachlorobiphenyl	200	27878.14										
Decachlorobiphenyl [2C]	200	17528.91										

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362003

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 12/23/2010 3:56:36PM

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
4,4'-DDE												
4,4'-DDE [2C]												
4,4'-DDD												
4,4'-DDD [2C]												
4,4'-DDT												
4,4'-DDT [2C]												
Aldrin												
Aldrin [2C]												
alpha-BHC												
alpha-BHC [2C]												
alpha-Chlordane												
alpha-Chlordane [2C]												
beta-BHC												
beta-BHC [2C]												
delta-BHC												
delta-BHC [2C]												
Dieldrin												
Dieldrin [2C]												
Endosulfan I												
Endosulfan I [2C]												
Endosulfan II												
Endosulfan II [2C]												
Endosulfan sulfate												
Endosulfan sulfate [2C]												
Endrin												
Endrin [2C]												
Endrin aldehyde												
Endrin aldehyde [2C]												
Endrin ketone												
Endrin ketone [2C]												
gamma-BHC (Lindane)												

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0362003
Instrument: GL-ECD3
Matrix: Water
Calibration Date: 12/23/2010 3:56:36PM

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
gamma-BHC (Lindane) [2C]												
gamma-Chlordane												
gamma-Chlordane [2C]												
Heptachlor												
Heptachlor [2C]												
Heptachlor epoxide												
Heptachlor epoxide [2C]												
Methoxychlor												
Methoxychlor [2C]												
Chlordane (tech)			200	2240.281	100	2349.214	50	2214.676	20	2254.73	10	2255.94
Chlordane (1)			200	4489.525	100	4695.65	50	4440.14	20	4586.1	10	4498
Chlordane (2)			200	1052.785	100	1073.7	50	1015.74	20	1010.75	10	953.3
Chlordane (3)			200	962.275	100	1030.14	50	956.96	20	984	10	1165.8
Chlordane (4)			200	3752.235	100	3932.96	50	3693.02	20	3721.45	10	3608.6
Chlordane (5)			200	944.585	100	1013.62	50	967.52	20	971.35	10	1054
Chlordane (tech) [2C]			200	1040.755	100	1163.546	50	1235.78	20	1337.26	10	1413.52
Chlordane (1) [2C]			200	1775.265	100	2006.16	50	2229.98	20	2329.95	10	2727.2
Chlordane (2) [2C]			200	654.565	100	715.14	50	731.02	20	793.6	10	805.6
Chlordane (3) [2C]			200	709.4	100	816.81	50	816.9	20	797.25	10	832.3
Chlordane (4) [2C]			200	1367.205	100	1465.95	50	1608.14	20	1945.95	10	1853.8
Chlordane (5) [2C]			200	697.34	100	813.67	50	792.86	20	819.55	10	848.7
Toxaphene (1)	100	977.84										
Toxaphene (2)	100	393.45										
Toxaphene (3)	100	894.53										
Toxaphene (4)	100	901.29										
Toxaphene (5)	100	495.83										
Toxaphene (1) [2C]	100	1839.76										
Toxaphene (2) [2C]	100	634.14										
Toxaphene (3) [2C]	100	945.87										
Toxaphene (4) [2C]	100	926.54										
Toxaphene (5) [2C]	100	480.56										

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Calibration:	0362003	Instrument:	GL-ECD3
Matrix:	Water	Calibration Date:	12/23/2010 3:56:36PM

Compound	Level 13		Level 14		Level 15		Level 16		Level 17		Level 18	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Tetrachloro-m-xylene												
Tetrachloro-m-xylene [2C]												
Decachlorobiphenyl												
Decachlorobiphenyl [2C]												

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362003

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 12/23/2010 3:56:36PM

Compound	Level 19		Level 20		Level 21		Level 22		Level 23		Level 24	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
4,4'-DDE												
4,4'-DDE [2C]												
4,4'-DDD												
4,4'-DDD [2C]												
4,4'-DDT												
4,4'-DDT [2C]												
Aldrin												
Aldrin [2C]												
alpha-BHC												
alpha-BHC [2C]												
alpha-Chlordane												
alpha-Chlordane [2C]												
beta-BHC												
beta-BHC [2C]												
delta-BHC												
delta-BHC [2C]												
Dieldrin												
Dieldrin [2C]												
Endosulfan I												
Endosulfan I [2C]												
Endosulfan II												
Endosulfan II [2C]												
Endosulfan sulfate												
Endosulfan sulfate [2C]												
Endrin												
Endrin [2C]												
Endrin aldehyde												
Endrin aldehyde [2C]												
Endrin ketone												
Endrin ketone [2C]												
gamma-BHC (Lindane)												

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362003

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 12/23/2010 3:56:36PM

Compound	Level 19		Level 20		Level 21		Level 22		Level 23		Level 24	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
gamma-BHC (Lindane) [2C]												
gamma-Chlordane												
gamma-Chlordane [2C]												
Heptachlor												
Heptachlor [2C]												
Heptachlor epoxide												
Heptachlor epoxide [2C]												
Methoxychlor												
Methoxychlor [2C]												
Chlordane (tech)	5	2280.04										
Chlordane (1)	5	4651.4										
Chlordane (2)	5	961										
Chlordane (3)	5	924.8										
Chlordane (4)	5	3814.6										
Chlordane (5)	5	1048.4										
Chlordane (tech) [2C]	5	1214.8										
Chlordane (1) [2C]	5	2063.8										
Chlordane (2) [2C]	5	804.6										
Chlordane (3) [2C]	5	810.6										
Chlordane (4) [2C]	5	1539.2										
Chlordane (5) [2C]	5	855.8										
Toxaphene (1)												
Toxaphene (2)												
Toxaphene (3)												
Toxaphene (4)												
Toxaphene (5)												
Toxaphene (1) [2C]												
Toxaphene (2) [2C]												
Toxaphene (3) [2C]												
Toxaphene (4) [2C]												
Toxaphene (5) [2C]												

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Calibration: 0362003

Matrix: Water

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: GL-ECD3

Calibration Date: 12/23/2010 3:56:36PM

Compound	Level 19		Level 20		Level 21		Level 22		Level 23		Level 24	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Tetrachloro-m-xylene			125		50		37.5		25		5	
Tetrachloro-m-xylene [2C]			125		50		37.5		25		5	
Decachlorobiphenyl			125		50		37.5		25		5	
Decachlorobiphenyl [2C]			125		50		37.5		25		5	

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0362003
Instrument: GL-ECD3
Matrix: Water
Calibration Date: 12/23/2010 3:56:36PM

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
4,4'-DDE	32487.67	3.4341	8.387	2.074454E-02			20	
4,4'-DDE [2C]	26340.12	12.49006	7.008857	2.738972E-02			20	
4,4'-DDD	27017.65	5.01139	9.020857	9.781635E-03			20	
4,4'-DDD [2C]	23386.3	11.67646	7.631571	1.725168E-02			20	
4,4'-DDT	22729.73	8.948656	9.402714	1.156269E-02			20	
4,4'-DDT [2C]	19739.9	10.33025	7.918429	1.767381E-02			20	
Aldrin	35385.12	3.960454	7.323	0.0140873			20	
Aldrin [2C]	29075.31	12.43675	5.993429	1.491937E-02			20	
alpha-BHC	37461.78	9.180577	6.005429	2.456044E-02			20	
alpha-BHC [2C]	33203.06	7.431464	5.124286	1.066946E-02			20	
alpha-Chlordane	32028.89	1.957585	8.191857	2.547424E-02			20	
alpha-Chlordane [2C]	27010.77	14.56833	6.814572	2.367613E-02			20	
beta-BHC	14540.77	1.342717	6.556143	2.689054E-02			20	
beta-BHC [2C]	13100.81	16.8622	5.701	2.629542E-02			20	
delta-BHC	29594.3	13.05101	6.820571	0.028336			20	
delta-BHC [2C]	26517.58	7.979185	5.918714	1.875432E-02			20	
Dieldrin	33539.54	3.62564	8.585571	2.450331E-02			20	
Dieldrin [2C]	28037.98	12.79026	7.164429	1.017671E-02			20	
Endosulfan I	30042.71	2.728627	8.257571	1.945018E-02			20	
Endosulfan I [2C]	25435.04	15.44957	6.880857	2.508662E-03			20	
Endosulfan II	28085.93	2.834552	9.143	1.221745E-02			20	
Endosulfan II [2C]	23959.83	16.19936	7.814286	1.54268E-03			20	
Endosulfan sulfate	23222.1	5.558567	9.594857	0.0127251			20	
Endosulfan sulfate [2C]	20348.02	14.11604	8.286	6.351399E-03			20	
Endrin	25585.52	3.881781	8.866	8.771973E-03			20	
Endrin [2C]	22655.16	14.5884	7.473286	1.710032E-02			20	
Endrin aldehyde	22673.51	6.844148	9.303857	2.943207E-03			20	
Endrin aldehyde [2C]	20614.57	18.62793	8.023429	1.785149E-02			20	
Endrin ketone	31625.1	4.355536	10.20814	1.408748E-02			20	
Endrin ketone [2C]	26909.9	14.8903	8.897286	1.618363E-02			20	
gamma-BHC (Lindane)	32719.69	8.117297	6.343857	4.258502E-03			20	
gamma-BHC (Lindane) [2C]	29406.27	8.18205	5.422571	1.048786E-02			20	

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Calibration: 0362003
Instrument: GL-ECD3
Matrix: Water
Calibration Date: 12/23/2010 3:56:36PM

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
gamma-Chlordane	33690.5	5.070707	8.102286	2.684738E-02			20	
gamma-Chlordane [2C]	27718.95	13.69303	6.749286	1.868481E-02			20	
Heptachlor	28021.52	10.2639	6.949143	1.927336E-02			20	
Heptachlor [2C]	26505.56	14.8275	5.727572	6.113767E-03			20	
Heptachlor epoxide	32114.34	4.310704	7.806857	1.672935E-02			20	
Heptachlor epoxide [2C]	27492.98	16.02793	6.493571	1.584557E-02			20	
Methoxychlor	12736.61	4.878609	10.00386	0.0206292			20	
Methoxychlor [2C]	11247.63	19.13666	8.613143	1.657359E-02			20	
Chlordane (tech)	2265.814	2.036435	9.007667	7.207414E-03			20	
Chlordane (1)	4560.136	2.206321	7.989	1.416297E-02			20	
Chlordane (2)	1011.213	4.748592	6.536	1.188001E-02			20	
Chlordane (3)	1003.996	8.624511	6.760834	8.797502E-03			20	
Chlordane (4)	3753.811	2.957383	7.897833	8.880134E-03			20	
Chlordane (5)	999.9125	4.559042	9.007667	7.207414E-03			20	
Chlordane (tech) [2C]	1234.277	10.59888	7.605	3.28691E-03			20	
Chlordane (1) [2C]	2188.726	14.89601	6.6265	1.838167E-02			20	
Chlordane (2) [2C]	750.7542	8.135717	5.401333	1.394675E-02			20	
Chlordane (3) [2C]	797.21	5.579656	5.56	3.498735E-03			20	
Chlordane (4) [2C]	1630.041	13.84368	6.581167	8.453161E-03			20	
Chlordane (5) [2C]	804.6533	7.142321	7.605	3.28691E-03			20	
Toxaphene (1)	1185.298	17.60246	10.15483	1.163139E-02			20	
Toxaphene (2)	484.1924	16.99113	8.840667	9.882717E-03			20	
Toxaphene (3)	980.2943	10.31703	9.5105	1.633135E-02			20	
Toxaphene (4)	1118.753	18.26761	9.6235	0.0199586			20	
Toxaphene (5)	593.4394	16.38404	10.60983	1.414172E-02			20	
Toxaphene (1) [2C]	1792.252	12.55136	8.7885	1.583008E-02			20	
Toxaphene (2) [2C]	569.9496	12.09974	7.845833	1.217741E-02			20	
Toxaphene (3) [2C]	982.375	13.04506	8.191834	1.640441E-02			20	
Toxaphene (4) [2C]	898.0156	12.24894	9.1715	1.758355E-02			20	
Toxaphene (5) [2C]	501.7398	14.1256	9.3375	1.331971E-02			20	
Tetrachloro-m-xylene	28756.09	6.436385	5.549333	1.124923E-02			20	
Tetrachloro-m-xylene [2C]	28081.79	12.60113	4.667286	3.784695E-02			20	

INITIAL CALIBRATION DATA (Continued)

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Calibration:	0362003	Instrument:	GL-ECD3
Matrix:	Water	Calibration Date:	12/23/2010 3:56:36PM

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Decachlorobiphenyl	28655.66	7.832286	11.845	9.537063E-03			20	
Decachlorobiphenyl [2C]	20853.67	18.98494	10.21386	3.150825E-03			20	

INITIAL CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	016F1501.D	Calibration Date:	12/23/10 15:56
Sequence:	0L35607	Injection Date:	12/21/10
Lab Sample ID:	0L35607-ICV1	Injection Time:	17:50

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
Toxaphene (1)	A	1000	1071	1185.298	1268.998		7.1	20
Toxaphene (2)	A	1000	1050	484.1924	508.485		5.0	20
Toxaphene (3)	A	1000	1039	980.2943	1018.5		3.9	20
Toxaphene (4)	A	1000	1053	1118.753	1177.873		5.3	20
Toxaphene (5)	A	1000	1036	593.4394	614.842		3.6	20
Toxaphene (1) [2C]	A	1000	1058	1792.252	1895.322		5.8	20
Toxaphene (2) [2C]	A	1000	1033	569.9496	588.834		3.3	20
Toxaphene (3) [2C]	A	1000	990.0	982.375	972.543		-1.0	20
Toxaphene (4) [2C]	A	1000	1069	898.0156	960.209		6.9	20
Toxaphene (5) [2C]	A	1000	1089	501.7398	546.571		8.9	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

INITIAL CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	010F1001.D	Calibration Date:	12/23/10 15:56
Sequence:	0L36212	Injection Date:	12/23/10
Lab Sample ID:	0L36212-ICV1	Injection Time:	13:12

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
4,4'-DDE	A	100.0	111.5	32487.67	36236.25		11.5	20
4,4'-DDE [2C]	A	100.0	97.60	26340.12	25707.42		-2.4	20
4,4'-DDD	A	100.0	109.4	27017.65	29549.77		9.4	20
4,4'-DDD [2C]	A	100.0	97.16	23386.3	22721.31		-2.8	20
4,4'-DDT	A	100.0	113.8	22729.73	25868.11		13.8	20
4,4'-DDT [2C]	A	100.0	98.18	19739.9	19380.89		-1.8	20
Aldrin	A	100.0	112.7	35385.12	39869.4		12.7	20
Aldrin [2C]	A	100.0	97.52	29075.31	28353.53		-2.5	20
alpha-BHC	A	100.0	119.2	37461.78	44657.16		19.2	20
alpha-BHC [2C]	A	100.0	104.1	33203.06	34559.06		4.1	20
alpha-Chlordane	A	100.0	111.0	32028.89	35552.09		11.0	20
alpha-Chlordane [2C]	A	100.0	97.58	27010.77	26355.97		-2.4	20
beta-BHC	A	100.0	112.6	14540.77	16376.48		12.6	20
beta-BHC [2C]	A	100.0	99.79	13100.81	13072.9		-0.2	20
delta-BHC	A	100.0	119.2	29594.3	35284.3		19.2	20
delta-BHC [2C]	A	100.0	104.6	26517.58	27734.09		4.6	20
Dieldrin	A	100.0	110.4	33539.54	37043.24		10.4	20
Dieldrin [2C]	A	100.0	96.17	28037.98	26963.3		-3.8	20
Endosulfan I	A	100.0	112.5	30042.71	33798		12.5	20
Endosulfan I [2C]	A	100.0	96.35	25435.04	24507.63		-3.6	20
Endosulfan II	A	100.0	107.9	28085.93	30318.26		7.9	20
Endosulfan II [2C]	A	100.0	92.94	23959.83	22268.47		-7.1	20
Endosulfan sulfate	A	100.0	110.0	23222.1	25544.17		10.0	20
Endosulfan sulfate [2C]	A	100.0	96.56	20348.02	19647.45		-3.4	20
Endrin	A	100.0	112.4	25585.52	28750.05		12.4	20
Endrin [2C]	A	100.0	96.05	22655.16	21760.26		-4.0	20
Endrin aldehyde	A	100.0	99.69	22673.51	22604.24		-0.3	20
Endrin aldehyde [2C]	A	100.0	89.11	20614.57	18370.21		-10.9	20
Endrin ketone	A	100.0	109.2	31625.1	34536.53		9.2	20

INITIAL CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	0362003
Lab File ID:	010R1001.D	Calibration Date:	12/23/10 15:56
Sequence:	0L36212	Injection Date:	12/23/10
Lab Sample ID:	0L36212-ICV1	Injection Time:	13:12

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
Endrin ketone [2C]	A	100.0	95.68	26909.9	25746.32		-4.3	20
gamma-BHC (Lindane)	A	100.0	118.0	32719.69	38595.94		18.0	20
gamma-BHC (Lindane) [2C]	A	100.0	103.2	29406.27	30349.35		3.2	20
gamma-Chlordane	A	100.0	109.1	33690.5	36764.93		9.1	20
gamma-Chlordane [2C]	A	100.0	98.24	27718.95	27229.94		-1.8	20
Heptachlor	A	100.0	117.0	28021.52	32788.96		17.0	20
Heptachlor [2C]	A	100.0	96.85	26505.56	25671.91		-3.1	20
Heptachlor epoxide	A	100.0	113.3	32114.34	36396.72		13.3	20
Heptachlor epoxide [2C]	A	100.0	95.96	27492.98	26383.23		-4.0	20
Methoxychlor	A	100.0	109.2	12736.61	13908.66		9.2	20
Methoxychlor [2C]	A	100.0	94.91	11247.63	10675.47		-5.1	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

ANALYSIS SEQUENCE SUMMARY

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Sequence:	1A00604	Instrument:	GL-ECD3
Calibration:	1005002		

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Performance Mix	1A00604-PEM1	002F0201.D	01/04/11 11:36
Performance Mix	1A00604-PEM1	002R0201.D	01/04/11 11:36
Calibration Check	1A00604-CCV1	014R1401.D	01/04/11 15:20
Calibration Check	1A00604-CCV1	014F1401.D	01/04/11 15:20
Blank	0L22010-BLK1	019R1901.D	01/04/11 16:52
Blank	0L22010-BLK1	019F1901.D	01/04/11 16:52
LCS	0L22010-BS1	020R2001.D	01/04/11 17:11
LCS	0L22010-BS1	020F2001.D	01/04/11 17:11
LCS Dup	0L22010-BSD1	021R2101.D	01/04/11 17:30
LCS Dup	0L22010-BSD1	021F2101.D	01/04/11 17:30
Calibration Check	1A00604-CCV5	024R2401.D	01/04/11 18:25
Calibration Check	1A00604-CCV5	024F2401.D	01/04/11 18:25
Calibration Check	1A00604-CCV6	025F2501.D	01/04/11 18:44
Calibration Check	1A00604-CCV6	025R2501.D	01/04/11 18:44
NTC12-DUP02	1012185-11RE1	028R2801.D	01/04/11 19:40
NTC12-DUP02	1012185-11RE1	028F2801.D	01/04/11 19:40
NTC12-DUP02	1012185-11	029F2901.D	01/04/11 19:58
NTC12-DUP02	1012185-11	029R2901.D	01/04/11 19:58
NTC12-SB27-0005	1012185-13RE1	031R3101.D	01/04/11 20:35
NTC12-SB27-0005	1012185-13RE1	031F3101.D	01/04/11 20:35
NTC12-SB27-0005	1012185-13	032F3201.D	01/04/11 20:54
NTC12-SB27-0005	1012185-13	032R3201.D	01/04/11 20:54
NTC12-SB22-0005	1012185-15RE1	034R3401.D	01/04/11 21:31
NTC12-SB22-0005	1012185-15RE1	034F3401.D	01/04/11 21:31
NTC12-SB22-0005	1012185-15	035R3501.D	01/04/11 21:50
NTC12-SB22-0005	1012185-15	035F3501.D	01/04/11 21:50
NTC12-SB22-00502	1012185-16	038F3801.D	01/04/11 22:45
NTC12-SB22-00502	1012185-16	038R3801.D	01/04/11 22:45
Calibration Check	1A00604-CCV9	040F4001.D	01/04/11 23:22
Calibration Check	1A00604-CCV9	040R4001.D	01/04/11 23:22
Calibration Check	1A00604-CCVA	041F4101.D	01/04/11 23:41
Calibration Check	1A00604-CCVA	041R4101.D	01/04/11 23:41

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	014F1401.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00604	Injection Date:	01/04/11
Lab Sample ID:	1A00604-CCV1	Injection Time:	15:20

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
4,4'-DDE	A	100.0	108.2	34774.28	37633.46		8.2	20
4,4'-DDE [2C]	A	100.0	102.1	23284.68	23768.21		2.1	20
4,4'-DDD	A	100.0	113.0	27985.81	31622.46		13.0	20
4,4'-DDD [2C]	A	100.0	101.6	21082.89	21411.96		1.6	20
4,4'-DDT	L	100.0	100.7	25629.9	30073.44		0.7	20
4,4'-DDT [2C]	A	100.0	106.9	18848.29	20154.7		6.9	20
Aldrin	A	100.0	109.2	37360.19	40807.04		9.2	20
Aldrin [2C]	A	100.0	103.3	26477.2	27352.31		3.3	20
alpha-BHC	A	100.0	112.6	41408.69	46626.71		12.6	20
alpha-BHC [2C]	A	100.0	108.6	30739.69	33377.72		8.6	20
alpha-Chlordane	A	100.0	106.0	34415.79	36468.46		6.0	20
alpha-Chlordane [2C]	A	100.0	101.1	24858.28	25130.7		1.1	20
beta-BHC	A	100.0	104.9	15752.91	16520.33		4.9	20
beta-BHC [2C]	A	100.0	109.6	10377.29	11372.11		9.6	20
delta-BHC	L	100.0	100.8	34108.86	39411.09		0.8	20
delta-BHC [2C]	A	100.0	109.2	26137.71	28544.25		9.2	20
Dieldrin	A	100.0	109.9	35432.46	38936.47		9.9	20
Dieldrin [2C]	A	100.0	100.9	25508.79	25739.61		0.9	20
Endosulfan I	A	100.0	107.9	32407.31	34968.03		7.9	20
Endosulfan I [2C]	A	100.0	101.8	22797.91	23212.66		1.8	20
Endosulfan II	A	100.0	108.3	30303.12	32819.01		8.3	20
Endosulfan II [2C]	A	100.0	100.5	21897.23	22015.14		0.5	20
Endosulfan sulfate	A	100.0	110.9	25684.25	28487.71		10.9	20
Endosulfan sulfate [2C]	A	100.0	103.7	19023.01	19720.36		3.7	20
Endrin	A	100.0	113.9	26774.84	30494.21		13.9	20
Endrin [2C]	A	100.0	104.5	20087.69	20998.68		4.5	20
Endrin aldehyde	A	100.0	107.3	24467.49	26263.72		7.3	20
Endrin aldehyde [2C]	A	100.0	99.94	18829.88	18819.08		-0.06	20
Endrin ketone	A	100.0	108.2	34607.95	37447.16		8.2	20

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	014R1401.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00604	Injection Date:	01/04/11
Lab Sample ID:	1A00604-CCV1	Injection Time:	15:20

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Endrin ketone [2C]	A	100.0	100.7	25805.6	25989.21		0.7	20
gamma-BHC (Lindane)	A	100.0	112.0	36744.81	41141.76		12.0	20
gamma-BHC (Lindane) [2C]	A	100.0	108.0	27817.83	30040.36		8.0	20
gamma-Chlordane	A	100.0	109.7	35205.33	38619.97		9.7	20
gamma-Chlordane [2C]	A	100.0	100.6	25601.34	25762.21		0.6	20
Heptachlor	L	100.0	100.9	30925.83	35457.74		0.9	20
Heptachlor [2C]	A	100.0	101.5	26091.29	26473.04		1.5	20
Heptachlor epoxide	A	100.0	107.1	35021.01	37518.73		7.1	20
Heptachlor epoxide [2C]	A	100.0	98.96	24716.43	24458.41		-1.0	20
Methoxychlor	L	100.0	100.9	13199.09	14776.73		0.9	20
Methoxychlor [2C]	A	100.0	99.85	10385.34	10370.27		-0.1	20
Tetrachloro-m-xylene	A	100.0	105.6	28793.28	30397.85		5.6	20
Tetrachloro-m-xylene [2C]	A	100.0	105.7	24052	25421.44		5.7	20
Decachlorobiphenyl	A	100.0	99.04	30911.91	30616.04		-1.0	20
Decachlorobiphenyl [2C]	A	100.0	96.48	20686.31	19958.23		-3.5	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	024F2401.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00604	Injection Date:	01/04/11
Lab Sample ID:	1A00604-CCV5	Injection Time:	18:25

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT		
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)	
4,4'-DDE	A	100.0	107.0	34774.28	37204.05		7.0	20	
4,4'-DDE [2C]	A	100.0	103.3	23284.68	24052.81		3.3	20	
4,4'-DDD	A	100.0	113.1	27985.81	31648.28		13.1	20	
4,4'-DDD [2C]	A	100.0	103.5	21082.89	21828.27		3.5	20	
4,4'-DDT	L	100.0	98.96	25629.9	29529.48		-1.0	20	
4,4'-DDT [2C]	A	100.0	110.9	18848.29	20899.63		10.9	20	
Aldrin	A	100.0	108.9	37360.19	40676		8.9	20	
Aldrin [2C]	A	100.0	104.0	26477.2	27526.47		4.0	20	
alpha-BHC	A	100.0	112.9	41408.69	46741.53		12.9	20	
alpha-BHC [2C]	A	100.0	112.2	30739.69	34481.69		12.2	20	
alpha-Chlordane	A	100.0	104.4	34415.79	35944.84		4.4	20	
alpha-Chlordane [2C]	A	100.0	103.0	24858.28	25612.28		3.0	20	
beta-BHC	A	100.0	105.9	15752.91	16685.51		5.9	20	
beta-BHC [2C]	A	100.0	122.8	10377.29	12747.48		22.8	20	*
delta-BHC	L	100.0	101.9	34108.86	39836.19		1.9	20	
delta-BHC [2C]	A	100.0	115.7	26137.71	30230.94		15.7	20	
Dieldrin	A	100.0	108.1	35432.46	38312.71		8.1	20	
Dieldrin [2C]	A	100.0	102.7	25508.79	26196.08		2.7	20	
Endosulfan I	A	100.0	106.4	32407.31	34474.92		6.4	20	
Endosulfan I [2C]	A	100.0	102.5	22797.91	23374.94		2.5	20	
Endosulfan II	A	100.0	106.5	30303.12	32285		6.5	20	
Endosulfan II [2C]	A	100.0	103.6	21897.23	22689.08		3.6	20	
Endosulfan sulfate	A	100.0	110.0	25684.25	28262.33		10.0	20	
Endosulfan sulfate [2C]	A	100.0	106.4	19023.01	20246.67		6.4	20	
Endrin	A	100.0	110.6	26774.84	29609.45		10.6	20	
Endrin [2C]	A	100.0	106.1	20087.69	21315.59		6.1	20	
Endrin aldehyde	A	100.0	107.4	24467.49	26285.59		7.4	20	
Endrin aldehyde [2C]	A	100.0	102.8	18829.88	19355.73		2.8	20	
Endrin ketone	A	100.0	106.8	34607.95	36956.47		6.8	20	

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	024R2401.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00604	Injection Date:	01/04/11
Lab Sample ID:	1A00604-CCV5	Injection Time:	18:25

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Endrin ketone [2C]	A	100.0	101.1	25805.6	26081.28		1.1	20
gamma-BHC (Lindane)	A	100.0	112.3	36744.81	41264.7		12.3	20
gamma-BHC (Lindane) [2C]	A	100.0	111.0	27817.83	30891.87		11.1	20
gamma-Chlordane	A	100.0	107.6	35205.33	37889.08		7.6	20
gamma-Chlordane [2C]	A	100.0	103.9	25601.34	26604.02		3.9	20
Heptachlor	L	100.0	105.2	30925.83	37000.18		5.2	20
Heptachlor [2C]	A	100.0	102.8	26091.29	26811.67		2.8	20
Heptachlor epoxide	A	100.0	106.0	35021.01	37111.77		6.0	20
Heptachlor epoxide [2C]	A	100.0	101.4	24716.43	25073.81		1.4	20
Methoxychlor	L	100.0	98.65	13199.09	14442.02		-1.4	20
Methoxychlor [2C]	A	100.0	99.38	10385.34	10320.48		-0.6	20
Tetrachloro-m-xylene	A	100.0	105.5	28793.28	30366.94		5.5	20
Tetrachloro-m-xylene [2C]	A	100.0	104.7	24052	25184.67		4.7	20
Decachlorobiphenyl	A	100.0	93.40	30911.91	28873.36		-6.6	20
Decachlorobiphenyl [2C]	A	100.0	95.64	20686.31	19784.83		-4.4	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	025F2501.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00604	Injection Date:	01/04/11
Lab Sample ID:	1A00604-CCV6	Injection Time:	18:44

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Toxaphene (1)	A	1000	1214	1185.298	1439.375		21.4	20 *
Toxaphene (2)	A	1000	1193	484.1924	577.718		19.3	20
Toxaphene (3)	A	1000	1126	980.2943	1103.576		12.6	20
Toxaphene (4)	A	1000	1134	1118.753	1268.623		13.4	20
Toxaphene (5)	A	1000	1104	593.4394	655.467		10.5	20
Toxaphene (1) [2C]	A	1000	1102	1792.252	1975.069		10.2	20
Toxaphene (2) [2C]	A	1000	1168	569.9496	665.487		16.8	20
Toxaphene (3) [2C]	A	1000	1020	982.375	1002.067		2.0	20
Toxaphene (4) [2C]	A	1000	1097	898.0156	985.568		9.7	20
Toxaphene (5) [2C]	A	1000	1121	501.7398	562.271		12.1	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	040F4001.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00604	Injection Date:	01/04/11
Lab Sample ID:	1A00604-CCV9	Injection Time:	23:22

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
4,4'-DDE	A	100.0	102.3	34774.28	35588.44		2.3	20
4,4'-DDE [2C]	A	100.0	100.8	23284.68	23481.46		0.8	20
4,4'-DDD	A	100.0	112.6	27985.81	31509.27		12.6	20
4,4'-DDD [2C]	A	100.0	104.7	21082.89	22077.96		4.7	20
4,4'-DDT	L	100.0	87.62	25629.9	26032.11		-12.4	20
4,4'-DDT [2C]	A	100.0	98.34	18848.29	18535.23		-1.7	20
Aldrin	A	100.0	104.8	37360.19	39157.19		4.8	20
Aldrin [2C]	A	100.0	101.7	26477.2	26917.99		1.7	20
alpha-BHC	A	100.0	112.2	41408.69	46468.42		12.2	20
alpha-BHC [2C]	A	100.0	112.4	30739.69	34540.71		12.4	20
alpha-Chlordane	A	100.0	99.54	34415.79	34255.83		-0.5	20
alpha-Chlordane [2C]	A	100.0	96.36	24858.28	23954.28		-3.6	20
beta-BHC	A	100.0	103.4	15752.91	16297.63		3.5	20
beta-BHC [2C]	A	100.0	113.8	10377.29	11812.06		13.8	20
delta-BHC	L	100.0	100.4	34108.86	39254.13		0.4	20
delta-BHC [2C]	A	100.0	111.4	26137.71	29113.54		11.4	20
Dieldrin	A	100.0	102.7	35432.46	36389.44		2.7	20
Dieldrin [2C]	A	100.0	99.27	25508.79	25323.37		-0.7	20
Endosulfan I	A	100.0	101.2	32407.31	32800.15		1.2	20
Endosulfan I [2C]	A	100.0	99.44	22797.91	22669.58		-0.6	20
Endosulfan II	A	100.0	100.7	30303.12	30513.56		0.7	20
Endosulfan II [2C]	A	100.0	97.58	21897.23	21366.8		-2.4	20
Endosulfan sulfate	A	100.0	105.2	25684.25	27034.14		5.3	20
Endosulfan sulfate [2C]	A	100.0	102.4	19023.01	19471.37		2.4	20
Endrin	A	100.0	104.6	26774.84	27995.19		4.6	20
Endrin [2C]	A	100.0	101.9	20087.69	20478.57		1.9	20
Endrin aldehyde	A	100.0	102.0	24467.49	24966.93		2.0	20
Endrin aldehyde [2C]	A	100.0	98.30	18829.88	18508.89		-1.7	20
Endrin ketone	A	100.0	100.8	34607.95	34894.7		0.8	20

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	040R4001.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00604	Injection Date:	01/04/11
Lab Sample ID:	1A00604-CCV9	Injection Time:	23:22

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Endrin ketone [2C]	A	100.0	96.38	25805.6	24870.89		-3.6	20
gamma-BHC (Lindane)	A	100.0	110.4	36744.81	40578.2		10.4	20
gamma-BHC (Lindane) [2C]	A	100.0	109.5	27817.83	30460.99		9.5	20
gamma-Chlordane	A	100.0	102.4	35205.33	36038.88		2.4	20
gamma-Chlordane [2C]	A	100.0	96.90	25601.34	24808.32		-3.1	20
Heptachlor	L	100.0	103.2	30925.83	36265.78		3.2	20
Heptachlor [2C]	A	100.0	104.5	26091.29	27257.36		4.5	20
Heptachlor epoxide	A	100.0	101.4	35021.01	35504		1.4	20
Heptachlor epoxide [2C]	A	100.0	97.80	24716.43	24173.75		-2.2	20
Methoxychlor	L	100.0	89.38	13199.09	13049.55		-10.6	20
Methoxychlor [2C]	A	100.0	91.64	10385.34	9517.23		-8.4	20
Tetrachloro-m-xylene	A	100.0	105.8	28793.28	30457.65		5.8	20
Tetrachloro-m-xylene [2C]	A	100.0	109.9	24052	26428.49		9.9	20
Decachlorobiphenyl	A	100.0	81.11	30911.91	25071.98		-18.9	20
Decachlorobiphenyl [2C]	A	100.0	80.52	20686.31	16657.03		-19.5	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	041F4101.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00604	Injection Date:	01/04/11
Lab Sample ID:	1A00604-CCVA	Injection Time:	23:41

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Toxaphene (1)	A	1000	1035	1185.298	1226.609		3.5	20
Toxaphene (2)	A	1000	1112	484.1924	538.373		11.2	20
Toxaphene (3)	A	1000	986.3	980.2943	966.87		-1.4	20
Toxaphene (4)	A	1000	994.4	1118.753	1112.442		-0.6	20
Toxaphene (5)	A	1000	907.0	593.4394	538.233		-9.3	20
Toxaphene (1) [2C]	A	1000	1015	1792.252	1818.426		1.5	20
Toxaphene (2) [2C]	A	1000	970.1	569.9496	552.905		-3.0	20
Toxaphene (3) [2C]	A	1000	876.0	982.375	860.53		-12.4	20
Toxaphene (4) [2C]	A	1000	888.4	898.0156	797.816		-11.2	20
Toxaphene (5) [2C]	A	1000	806.3	501.7398	404.541		-19.4	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

ANALYSIS SEQUENCE SUMMARY

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Sequence:	1A00705	Instrument:	GL-ECD3
Calibration:	1005002		

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Performance Mix	1A00705-PEM1	002F0201.D	01/05/11 15:43
Performance Mix	1A00705-PEM1	002R0201.D	01/05/11 15:43
Calibration Check	1A00705-CCV1	003F0501.D	01/05/11 18:36
Calibration Check	1A00705-CCV1	003R0501.D	01/05/11 18:36
Calibration Check	1A00705-CCV2	004R0601.D	01/05/11 18:55
Calibration Check	1A00705-CCV2	004F0601.D	01/05/11 18:55
NTC12-SB21-0005	1012185-17RE1	006F0801.D	01/05/11 19:32
NTC12-SB21-0005	1012185-17RE1	006R0801.D	01/05/11 19:32
NTC12-SB21-0507	1012185-18RE1	007F0901.D	01/05/11 19:51
NTC12-SB21-0507	1012185-18RE1	007R0901.D	01/05/11 19:51
NTC12-SB25-0005	1012185-19RE1	008R1001.D	01/05/11 20:09
NTC12-SB25-0005	1012185-19RE1	008F1001.D	01/05/11 20:09
NTC12-SB25-0005	1012185-19RE2	009F1101.D	01/05/11 20:28
NTC12-SB25-0005	1012185-19RE2	009R1101.D	01/05/11 20:28
NTC12-SB25-0204	1012185-20RE1	010R1201.D	01/05/11 20:46
NTC12-SB25-0204	1012185-20RE1	010F1201.D	01/05/11 20:46
NTC12-SB28-0005	1012185-21	011R1301.D	01/05/11 21:05
NTC12-SB28-0005	1012185-21	011F1301.D	01/05/11 21:05
NTC12-SB28-0204	1012185-22	012R1401.D	01/05/11 21:24
NTC12-SB28-0204	1012185-22	012F1401.D	01/05/11 21:24
NTC12-SB29-0005	1012185-23	013F1501.D	01/05/11 21:42
NTC12-SB29-0005	1012185-23	013R1501.D	01/05/11 21:42
NTC12-SB29-0204	1012185-24	014F1601.D	01/05/11 22:01
NTC12-SB29-0204	1012185-24	014R1601.D	01/05/11 22:01
NTC12-SB27-0204	1012185-14	015R1701.D	01/05/11 22:19
NTC12-SB27-0204	1012185-14	015F1701.D	01/05/11 22:19
NTC12-SB27-0204	0L21019-MS1	016F1801.D	01/05/11 22:38
NTC12-SB27-0204	0L21019-MS1	016R1801.D	01/05/11 22:38
NTC12-SB27-0204	0L21019-MSD1	017R1901.D	01/05/11 22:56
NTC12-SB27-0204	0L21019-MSD1	017F1901.D	01/05/11 22:56
Calibration Check	1A00705-CCV4	020F2201.D	01/05/11 23:52
Calibration Check	1A00705-CCV4	020R2201.D	01/05/11 23:52

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	003F0501.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00705	Injection Date:	01/05/11
Lab Sample ID:	1A00705-CCV1	Injection Time:	18:36

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
4,4'-DDE	A	100.0	106.2	34774.28	36934.73		6.2	20
4,4'-DDE [2C]	A	100.0	95.36	23284.68	22203.92		-4.6	20
4,4'-DDD	A	100.0	107.5	27985.81	30098.06		7.5	20
4,4'-DDD [2C]	A	100.0	92.71	21082.89	19546.85		-7.3	20
4,4'-DDT	L	100.0	94.19	25629.9	28058.85		-5.8	20
4,4'-DDT [2C]	A	100.0	97.33	18848.29	18344.96		-2.7	20
Aldrin	A	100.0	108.4	37360.19	40502.07		8.4	20
Aldrin [2C]	A	100.0	96.08	26477.2	25440.66		-3.9	20
alpha-BHC	A	100.0	109.1	41408.69	45165.66		9.1	20
alpha-BHC [2C]	A	100.0	100.0	30739.69	30754.46		0.05	20
alpha-Chlordane	A	100.0	104.1	34415.79	35839.15		4.1	20
alpha-Chlordane [2C]	A	100.0	95.61	24858.28	23766.97		-4.4	20
beta-BHC	A	100.0	103.1	15752.91	16242.63		3.1	20
beta-BHC [2C]	A	100.0	95.70	10377.29	9931.42		-4.3	20
delta-BHC	L	100.0	94.67	34108.86	36935.58		-5.3	20
delta-BHC [2C]	A	100.0	97.50	26137.71	25483.32		-2.5	20
Dieldrin	A	100.0	107.9	35432.46	38246.47		7.9	20
Dieldrin [2C]	A	100.0	94.82	25508.79	24187.74		-5.2	20
Endosulfan I	A	100.0	105.6	32407.31	34219.66		5.6	20
Endosulfan I [2C]	A	100.0	94.48	22797.91	21540.83		-5.5	20
Endosulfan II	A	100.0	105.2	30303.12	31884.16		5.2	20
Endosulfan II [2C]	A	100.0	93.71	21897.23	20519.68		-6.3	20
Endosulfan sulfate	A	100.0	102.0	25684.25	26212.52		2.1	20
Endosulfan sulfate [2C]	A	100.0	90.28	19023.01	17174.57		-9.7	20
Endrin	A	100.0	114.7	26774.84	30722.8		14.7	20
Endrin [2C]	A	100.0	99.81	20087.69	20049.82		-0.2	20
Endrin aldehyde	A	100.0	103.0	24467.49	25194.06		3.0	20
Endrin aldehyde [2C]	A	100.0	90.29	18829.88	17000.85		-9.7	20
Endrin ketone	A	100.0	102.0	34607.95	35291.98		2.0	20

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	003R0501.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00705	Injection Date:	01/05/11
Lab Sample ID:	1A00705-CCV1	Injection Time:	18:36

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Endrin ketone [2C]	A	100.0	89.72	25805.6	23153.95		-10.3	20
gamma-BHC (Lindane)	A	100.0	108.7	36744.81	39930.93		8.7	20
gamma-BHC (Lindane) [2C]	A	100.0	99.56	27817.83	27694.84		-0.4	20
gamma-Chlordane	A	100.0	108.7	35205.33	38269.64		8.7	20
gamma-Chlordane [2C]	A	100.0	95.86	25601.34	24542.82		-4.1	20
Heptachlor	L	100.0	96.64	30925.83	33909.59		-3.4	20
Heptachlor [2C]	A	100.0	95.84	26091.29	25007.38		-4.2	20
Heptachlor epoxide	A	100.0	105.8	35021.01	37071.22		5.9	20
Heptachlor epoxide [2C]	A	100.0	93.62	24716.43	23138.58		-6.4	20
Methoxychlor	L	100.0	91.66	13199.09	13392.13		-8.3	20
Methoxychlor [2C]	A	100.0	86.59	10385.34	8993		-13.4	20
Tetrachloro-m-xylene	A	100.0	103.4	28793.28	29760.55		3.4	20
Tetrachloro-m-xylene [2C]	A	100.0	94.44	24052	22715.02		-5.6	20
Decachlorobiphenyl	A	100.0	93.55	30911.91	28917.6		-6.5	20
Decachlorobiphenyl [2C]	A	100.0	90.32	20686.31	18683.55		-9.7	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	004F0601.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00705	Injection Date:	01/05/11
Lab Sample ID:	1A00705-CCV2	Injection Time:	18:55

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Toxaphene (1)	A	1000	1026	1185.298	1216.675		2.6	20
Toxaphene (2)	A	1000	1116	484.1924	540.131		11.6	20
Toxaphene (3)	A	1000	1027	980.2943	1007.189		2.7	20
Toxaphene (4)	A	1000	1058	1118.753	1183.585		5.8	20
Toxaphene (5)	A	1000	908.8	593.4394	539.328		-9.1	20
Toxaphene (1) [2C]	A	1000	1069	1792.252	1916.411		6.9	20
Toxaphene (2) [2C]	A	1000	967.0	569.9496	551.126		-3.3	20
Toxaphene (3) [2C]	A	1000	921.7	982.375	905.498		-7.8	20
Toxaphene (4) [2C]	A	1000	1052	898.0156	944.323		5.2	20
Toxaphene (5) [2C]	A	1000	890.1	501.7398	446.584		-11.0	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	020F2201.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00705	Injection Date:	01/05/11
Lab Sample ID:	1A00705-CCV4	Injection Time:	23:52

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
4,4'-DDE	A	100.0	105.9	34774.28	36842.96		5.9	20
4,4'-DDE [2C]	A	100.0	101.5	23284.68	23634.39		1.5	20
4,4'-DDD	A	100.0	116.5	27985.81	32607.09		16.5	20
4,4'-DDD [2C]	A	100.0	103.3	21082.89	21778.98		3.3	20
4,4'-DDT	L	100.0	93.48	25629.9	27841.04		-6.5	20
4,4'-DDT [2C]	A	100.0	101.0	18848.29	19045.3		1.0	20
Aldrin	A	100.0	107.0	37360.19	39958.73		7.0	20
Aldrin [2C]	A	100.0	99.70	26477.2	26396.67		-0.3	20
alpha-BHC	A	100.0	110.9	41408.69	45940.25		10.9	20
alpha-BHC [2C]	A	100.0	106.2	30739.69	32652.17		6.2	20
alpha-Chlordane	A	100.0	102.5	34415.79	35280.88		2.5	20
alpha-Chlordane [2C]	A	100.0	96.85	24858.28	24074.47		-3.2	20
beta-BHC	A	100.0	104.5	15752.91	16457.8		4.5	20
beta-BHC [2C]	A	100.0	102.1	10377.29	10597.96		2.1	20
delta-BHC	L	100.0	102.1	34108.86	39929.65		2.1	20
delta-BHC [2C]	A	100.0	109.5	26137.71	28619.8		9.5	20
Dieldrin	A	100.0	106.5	35432.46	37751.02		6.5	20
Dieldrin [2C]	A	100.0	99.32	25508.79	25336		-0.7	20
Endosulfan I	A	100.0	104.8	32407.31	33964.02		4.8	20
Endosulfan I [2C]	A	100.0	98.81	22797.91	22526.17		-1.2	20
Endosulfan II	A	100.0	104.7	30303.12	31735.99		4.7	20
Endosulfan II [2C]	A	100.0	98.48	21897.23	21565.36		-1.5	20
Endosulfan sulfate	A	100.0	109.7	25684.25	28175.27		9.7	20
Endosulfan sulfate [2C]	A	100.0	102.6	19023.01	19509.17		2.6	20
Endrin	A	100.0	118.9	26774.84	31834.09		18.9	20
Endrin [2C]	A	100.0	109.4	20087.69	21972.35		9.4	20
Endrin aldehyde	A	100.0	104.5	24467.49	25568.79		4.5	20
Endrin aldehyde [2C]	A	100.0	96.86	18829.88	18238.51		-3.1	20
Endrin ketone	A	100.0	103.2	34607.95	35702.69		3.2	20

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	020R2201.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00705	Injection Date:	01/05/11
Lab Sample ID:	1A00705-CCV4	Injection Time:	23:52

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Endrin ketone [2C]	A	100.0	95.54	25805.6	24653.43		-4.5	20
gamma-BHC (Lindane)	A	100.0	110.5	36744.81	40606.87		10.5	20
gamma-BHC (Lindane) [2C]	A	100.0	105.7	27817.83	29403.69		5.7	20
gamma-Chlordane	A	100.0	105.7	35205.33	37227.96		5.7	20
gamma-Chlordane [2C]	A	100.0	97.06	25601.34	24847.93		-2.9	20
Heptachlor	L	100.0	109.0	30925.83	38386.49		9.0	20
Heptachlor [2C]	A	100.0	104.2	26091.29	27202.14		4.3	20
Heptachlor epoxide	A	100.0	104.5	35021.01	36591.67		4.5	20
Heptachlor epoxide [2C]	A	100.0	96.53	24716.43	23858.85		-3.5	20
Methoxychlor	L	100.0	97.42	13199.09	14257.28		-2.6	20
Methoxychlor [2C]	A	100.0	93.85	10385.34	9746.75		-6.1	20
Tetrachloro-m-xylene	A	100.0	102.6	28793.28	29555.57		2.6	20
Tetrachloro-m-xylene [2C]	A	100.0	102.0	24052	24543.91		2.0	20
Decachlorobiphenyl	A	100.0	91.03	30911.91	28139.1		-9.0	20
Decachlorobiphenyl [2C]	A	100.0	85.85	20686.31	17759		-14.2	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

ANALYSIS SEQUENCE SUMMARY

SW8081B

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 1A00705
Instrument: GL-ECD3
Calibration: 1005002

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Calibration Check	1A00705-CCV5	021R2301.D	01/06/11 00:11
Calibration Check	1A00705-CCV5	021F2301.D	01/06/11 00:11
NTC12-SB21-0005	1012185-17	023R2501.D	01/06/11 00:48
NTC12-SB21-0005	1012185-17	023F2501.D	01/06/11 00:48
NTC12-SB21-0507	1012185-18	025R2701.D	01/06/11 01:25
NTC12-SB21-0507	1012185-18	025F2701.D	01/06/11 01:25
NTC12-SB25-0005	1012185-19	027R2901.D	01/06/11 02:02
NTC12-SB25-0005	1012185-19	027F2901.D	01/06/11 02:02
NTC12-SB25-0204	1012185-20	029R3101.D	01/06/11 02:39
NTC12-SB25-0204	1012185-20	029F3101.D	01/06/11 02:39
Calibration Check	1A00705-CCV7	031R3301.D	01/06/11 03:16
Calibration Check	1A00705-CCV7	031F3301.D	01/06/11 03:16
Calibration Check	1A00705-CCV8	032R3401.D	01/06/11 03:35
Calibration Check	1A00705-CCV8	032F3401.D	01/06/11 03:35

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	021F2301.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00705	Injection Date:	01/06/11
Lab Sample ID:	1A00705-CCV5	Injection Time:	00:11

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT		
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)	
Toxaphene (1)	A	1000	1101	1185.298	1305.488		10.1	20	
Toxaphene (2)	A	1000	1272	484.1924	615.681		27.2	20	*
Toxaphene (3)	A	1000	1122	980.2943	1099.717		12.2	20	
Toxaphene (4)	A	1000	1179	1118.753	1318.582		17.9	20	
Toxaphene (5)	A	1000	1032	593.4394	612.667		3.2	20	
Toxaphene (1) [2C]	A	1000	1015	1792.252	1819.542		1.5	20	
Toxaphene (2) [2C]	A	1000	1005	569.9496	572.662		0.5	20	
Toxaphene (3) [2C]	A	1000	906.9	982.375	890.935		-9.3	20	
Toxaphene (4) [2C]	A	1000	1024	898.0156	919.359		2.4	20	
Toxaphene (5) [2C]	A	1000	775.9	501.7398	389.29		-22.4	20	*

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	031F3301.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00705	Injection Date:	01/06/11
Lab Sample ID:	1A00705-CCV7	Injection Time:	03:16

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
4,4'-DDE	A	100.0	107.9	34774.28	37537.69		7.9	20
4,4'-DDE [2C]	A	100.0	91.13	23284.68	21219.61		-8.9	20
4,4'-DDD	A	100.0	124.9	27985.81	34952.47		24.9	20 *
4,4'-DDD [2C]	A	100.0	99.84	21082.89	21049.77		-0.2	20
4,4'-DDT	L	100.0	79.04	25629.9	23383.71		-21.0	20 *
4,4'-DDT [2C]	A	100.0	77.27	18848.29	14564.21		-22.7	20 *
Aldrin	A	100.0	110.8	37360.19	41379.17		10.8	20
Aldrin [2C]	A	100.0	91.04	26477.2	24104.23		-9.0	20
alpha-BHC	A	100.0	116.4	41408.69	48198.37		16.4	20
alpha-BHC [2C]	A	100.0	97.76	30739.69	30050.31		-2.2	20
alpha-Chlordane	A	100.0	104.8	34415.79	36081.64		4.8	20
alpha-Chlordane [2C]	A	100.0	87.32	24858.28	21706.78		-12.7	20
beta-BHC	A	100.0	108.7	15752.91	17123.21		8.7	20
beta-BHC [2C]	A	100.0	106.0	10377.29	10996.17		6.0	20
delta-BHC	L	100.0	106.8	34108.86	41794.64		6.8	20
delta-BHC [2C]	A	100.0	101.1	26137.71	26435.87		1.1	20
Dieldrin	A	100.0	108.3	35432.46	38364.93		8.3	20
Dieldrin [2C]	A	100.0	89.62	25508.79	22860.49		-10.4	20
Endosulfan I	A	100.0	107.0	32407.31	34669.14		7.0	20
Endosulfan I [2C]	A	100.0	89.30	22797.91	20357.94		-10.7	20
Endosulfan II	A	100.0	105.3	30303.12	31916.05		5.3	20
Endosulfan II [2C]	A	100.0	87.28	21897.23	19112.65		-12.7	20
Endosulfan sulfate	A	100.0	109.9	25684.25	28228.34		9.9	20
Endosulfan sulfate [2C]	A	100.0	91.59	19023.01	17423.66		-8.4	20
Endrin	A	100.0	119.8	26774.84	32082.43		19.8	20
Endrin [2C]	A	100.0	98.27	20087.69	19739.97		-1.7	20
Endrin aldehyde	A	100.0	104.8	24467.49	25653.97		4.8	20
Endrin aldehyde [2C]	A	100.0	86.20	18829.88	16230.9		-13.8	20
Endrin ketone	A	100.0	98.55	34607.95	34106.77		-1.4	20

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	031R3301.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00705	Injection Date:	01/06/11
Lab Sample ID:	1A00705-CCV7	Injection Time:	03:16

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT		
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)	
Endrin ketone [2C]	A	100.0	81.37	25805.6	20997.68		-18.6	20	
gamma-BHC (Lindane)	A	100.0	115.1	36744.81	42286.53		15.1	20	
gamma-BHC (Lindane) [2C]	A	100.0	95.92	27817.83	26681.64		-4.1	20	
gamma-Chlordane	A	100.0	108.6	35205.33	38227.48		8.6	20	
gamma-Chlordane [2C]	A	100.0	88.10	25601.34	22553.93		-11.9	20	
Heptachlor	L	100.0	103.8	30925.83	36513.24		3.8	20	
Heptachlor [2C]	A	100.0	85.89	26091.29	22408.89		-14.1	20	
Heptachlor epoxide	A	100.0	107.7	35021.01	37734.1		7.7	20	
Heptachlor epoxide [2C]	A	100.0	88.28	24716.43	21819.7		-11.7	20	
Methoxychlor	L	100.0	85.28	13199.09	12433.41		-14.7	20	
Methoxychlor [2C]	A	100.0	75.17	10385.34	7806.98		-24.8	20	*
Tetrachloro-m-xylene	A	100.0	108.0	28793.28	31100.11		8.0	20	
Tetrachloro-m-xylene [2C]	A	100.0	92.51	24052	22250.08		-7.5	20	
Decachlorobiphenyl	A	100.0	82.93	30911.91	25635.89		-17.1	20	
Decachlorobiphenyl [2C]	A	100.0	68.75	20686.31	14221.88		-31.2	20	*

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK

SW8081B

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Instrument ID:	GL-ECD3	Calibration:	1005002
Lab File ID:	032F3401.D	Calibration Date:	01/05/11 19:19
Sequence:	1A00705	Injection Date:	01/06/11
Lab Sample ID:	1A00705-CCV8	Injection Time:	03:35

COMPOUND	TYPE	CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Toxaphene (1)	A	1000	800.9	1185.298	949.316		-19.9	20
Toxaphene (2)	A	1000	1084	484.1924	525.085		8.4	20
Toxaphene (3)	A	1000	1062	980.2943	1041.642		6.3	20
Toxaphene (4)	A	1000	927.2	1118.753	1037.357		-7.3	20
Toxaphene (5)	A	1000	744.6	593.4394	441.846		-25.5	20 *
Toxaphene (1) [2C]	A	1000	583.6	1792.252	1045.98		-41.6	20 *
Toxaphene (2) [2C]	A	1000	759.7	569.9496	433.001		-24.0	20 *
Toxaphene (3) [2C]	A	1000	1007	982.375	989.163		0.7	20
Toxaphene (4) [2C]	A	1000	594.9	898.0156	534.22		-40.5	20 *
Toxaphene (5) [2C]	A	1000	408.6	501.7398	205.017		-59.1	20 *

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

BREAKDOWN REPORT

Lab Sample ID: 0L36408-PEM2 **Analyzed:** 12/29/2010

Column Number: 1

Analyte	% Breakdown
4.4'-DDT	7.51
Endrin	11.32

Column Number: 2

Analyte	% Breakdown
4.4'-DDT	9.86
Endrin	12.03

BREAKDOWN REPORT

Lab Sample ID: 1A00502-PEM1 **Analyzed:** 01/03/2011

Column Number: 1

Analyte	% Breakdown
4.4'-DDT	6.01
Endrin	0.01

Column Number: 2

Analyte	% Breakdown
4.4'-DDT	8.48
Endrin	10.91

BREAKDOWN REPORT

Lab Sample ID: 0L36212-PEM1 **Analyzed:** 12/23/2010

Column Number: 1

Analyte	% Breakdown
4.4'-DDT	4.67
Endrin	9.94

Column Number: 2

Analyte	% Breakdown
4.4'-DDT	7.59
Endrin	9.39

BREAKDOWN REPORT

Lab Sample ID: 1A00510-PEM1 **Analyzed:** 01/04/2011

Column Number: 1

Analyte	% Breakdown
4.4'-DDT	0.00
Endrin	10.33

Column Number: 2

Analyte	% Breakdown
4.4'-DDT	6.64
Endrin	11.82

BREAKDOWN REPORT

Lab Sample ID: 1A00604-PEM1 **Analyzed:** 01/04/2011

Column Number: 1

Analyte	% Breakdown
4.4'-DDT	0.00
Endrin	10.33

Column Number: 2

Analyte	% Breakdown
4.4'-DDT	6.64
Endrin	11.82

BREAKDOWN REPORT

Lab Sample ID: 1A00705-PEM1 **Analyzed:** 01/05/2011

Column Number: 1

Analyte	% Breakdown
4.4'-DDT	0.00
Endrin	0.00

Column Number: 2

Analyte	% Breakdown
4.4'-DDT	7.15
Endrin	0.01

METHOD DETECTION AND REPORTING LIMITS

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix: Solid
Instrument: GL-ECD3

Analyte	MDL	MRL	Units	Method
4,4'-DDD	0.170	0.670	ug/Kg	SW8081B
4,4'-DDE	0.170	0.670	ug/Kg	SW8081B
4,4'-DDE [2C]	0.170	0.670	ug/Kg	SW8081B
4,4'-DDT	0.170	0.670	ug/Kg	SW8081B
4,4'-DDT [2C]	0.170	0.670	ug/Kg	SW8081B
Aldrin	0.110	0.670	ug/Kg	SW8081B
Aldrin [2C]	0.110	0.670	ug/Kg	SW8081B
alpha-BHC	0.110	0.670	ug/Kg	SW8081B
alpha-BHC [2C]	0.110	0.670	ug/Kg	SW8081B
alpha-Chlordane	0.110	0.670	ug/Kg	SW8081B
alpha-Chlordane [2C]	0.110	0.670	ug/Kg	SW8081B
beta-BHC	0.110	0.670	ug/Kg	SW8081B
beta-BHC [2C]	0.110	0.670	ug/Kg	SW8081B
delta-BHC	0.110	0.670	ug/Kg	SW8081B
delta-BHC [2C]	0.110	0.670	ug/Kg	SW8081B
Dieldrin	0.170	0.670	ug/Kg	SW8081B
Dieldrin [2C]	0.170	0.670	ug/Kg	SW8081B
Endosulfan I	0.110	0.670	ug/Kg	SW8081B
Endosulfan I [2C]	0.110	0.670	ug/Kg	SW8081B
Endosulfan II	0.170	0.670	ug/Kg	SW8081B
Endosulfan II [2C]	0.170	0.670	ug/Kg	SW8081B
Endosulfan sulfate	0.170	0.670	ug/Kg	SW8081B
Endosulfan sulfate [2C]	0.170	0.670	ug/Kg	SW8081B
Endrin	0.170	0.670	ug/Kg	SW8081B
Endrin [2C]	0.170	0.670	ug/Kg	SW8081B
Endrin aldehyde	0.170	0.670	ug/Kg	SW8081B
Endrin aldehyde [2C]	0.170	0.670	ug/Kg	SW8081B
Endrin ketone	0.170	0.670	ug/Kg	SW8081B
Endrin ketone [2C]	0.170	0.670	ug/Kg	SW8081B
gamma-BHC (Lindane)	0.110	0.670	ug/Kg	SW8081B
gamma-BHC (Lindane) [2C]	0.110	0.670	ug/Kg	SW8081B
gamma-Chlordane	0.110	0.670	ug/Kg	SW8081B
gamma-Chlordane [2C]	0.110	0.670	ug/Kg	SW8081B
Heptachlor	0.110	0.670	ug/Kg	SW8081B
Heptachlor [2C]	0.110	0.670	ug/Kg	SW8081B
Heptachlor epoxide	0.110	0.670	ug/Kg	SW8081B
Heptachlor epoxide [2C]	0.110	0.670	ug/Kg	SW8081B

METHOD DETECTION AND REPORTING LIMITS

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Matrix: Solid

Instrument: GL-ECD3

Analyte	MDL	MRL	Units	Method
Methoxychlor	0.110	0.670	ug/Kg	SW8081B
Methoxychlor [2C]	0.110	0.670	ug/Kg	SW8081B
Toxaphene	11.0	33.0	ug/Kg	SW8081B

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-DUP01

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-10 Date(s) Analyzed: 01/03/2011 01/03/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.82	8.99	9.05	2.86	
	2	7.46	7.60	7.66	2.29	22
4,4'-DDE	1	8.19	8.36	8.42	12.1	
	2	6.84	6.98	7.04	11.0	10
4,4'-DDT	1	9.20	9.37	9.43	6.29	
	2	7.74	7.89	7.95	6.11	3
gamma-Chlordane	1	7.90	8.07	8.13	0.206	
	2	6.59	6.72	6.78	0.862	123

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-DUP02

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-11 Date(s) Analyzed: 01/04/2011 01/04/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.72	8.69	8.75	534	
	2	7.37	7.34	7.40	266	67
4,4'-DDE	1	8.10	8.07	8.13	77.0	
	2	6.76	6.73	6.79	34.1	77
4,4'-DDT	1	9.10	9.07	9.13	138	
	2	7.65	7.62	7.68	138	0
Aldrin	1	7.03	7.01	7.07	4.13	
	2	5.78	5.74	5.80	8.74	72
alpha-BHC	1	5.76	5.73	5.79	1.03	
	2	4.94	4.90	4.96	5.96	141
alpha-Chlordane	1	7.90	7.86	7.92	42.1	
	2	6.56	6.54	6.60	26.0	47
beta-BHC	1	6.31	6.27	6.33	1.43	
	2	5.48	5.46	5.52	6.11	124
delta-BHC	1	6.57	6.53	6.59	3.29	
	2	5.69	5.67	5.73	7.68	80
Dieldrin	1	8.27	8.25	8.31	5.98	
	2	6.90	6.88	6.94	39.3	147
Endosulfan II	1	8.84	8.80	8.86	0.493	
	2	7.52	7.51	7.57	16.8	189
Endosulfan sulfate	1	9.26	9.25	9.31	3.17	
	2	8.03	7.98	8.04	13.2	123
Endrin	1	8.55	8.53	8.59	53.1	
	2	7.21	7.18	7.24	5.50	162
Endrin aldehyde	1	8.98	8.96	9.02	3.55	
	2	7.76	7.72	7.78	3.01	16
gamma-BHC (Lindane)	1	6.11	6.06	6.12	0.998	
	2	5.22	5.19	5.25	0.381	89
gamma-Chlordane	1	7.81	7.78	7.84	36.2	
	2	6.50	6.47	6.53	29.8	19
Heptachlor	1	6.68	6.65	6.71	1.34	
	2	5.51	5.48	5.54	1.43	6
Heptachlor epoxide	1	7.51	7.49	7.55	35.7	
	2	6.26	6.22	6.28	2.47	174

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-DUP02

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-11RE1 Date(s) Analyzed: 01/04/2011 01/04/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.72	8.69	8.75	434	
	2	7.37	7.34	7.40	309	34
4,4'-DDE	1	8.09	8.07	8.13	71.9	
	2	6.75	6.73	6.79	42.7	51
4,4'-DDT	1	9.10	9.07	9.13	128	
	2	7.65	7.62	7.68	168	27
Aldrin	1	7.02	7.01	7.07	4.92	
	2	5.78	5.74	5.80	12.6	88
alpha-Chlordane	1	7.89	7.86	7.92	38.7	
	2	6.56	6.54	6.60	37.9	2
delta-BHC	1	6.53	6.53	6.59	14.6	
	2	5.69	5.67	5.73	11.1	27
Dieldrin	1	8.27	8.25	8.31	7.25	
	2	6.90	6.88	6.94	51.1	150
Endosulfan I	1	7.94	7.93	7.99	2.90	
	2	6.61	6.60	6.66	1.97	38
Endrin	1	8.55	8.53	8.59	51.7	
	2	7.20	7.18	7.24	11.0	130
Endrin aldehyde	1	8.98	8.96	9.02	2.44	
	2	7.75	7.72	7.78	6.58	92
gamma-Chlordane	1	7.81	7.78	7.84	31.7	
	2	6.50	6.47	6.53	38.7	20
Heptachlor	1	6.70	6.65	6.71	12.7	
	2	5.51	5.48	5.54	2.43	136
Heptachlor epoxide	1	7.51	7.49	7.55	36.0	
	2	6.25	6.22	6.28	4.45	156

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB21-0005

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-17 Date(s) Analyzed: 01/06/2011 01/06/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.66	8.69	8.75	15.2	
	2	7.32	7.34	7.40	11.6	27
4,4'-DDE	1	8.04	8.07	8.13	130	
	2	6.71	6.73	6.79	105	22
4,4'-DDT	1	9.04	9.07	9.13	89.7	
	2	7.60	7.62	7.68	79.9	12
Aldrin	1	6.96	7.01	7.07	2.60	
	2	5.71	5.74	5.80	0.374	150
alpha-Chlordane	1	7.84	7.86	7.92	54.8	
	2	6.51	6.54	6.60	28.4	63
delta-BHC	1	6.48	6.53	6.59	1.62	
	2	5.65	5.67	5.73	0.942	53
Dieldrin	1	8.22	8.25	8.31	0.996	
	2	6.85	6.88	6.94	1.77	56
Endosulfan I	1	7.89	7.93	7.99	1.17	
	2	6.56	6.60	6.66	1.13	3
Endosulfan II	1	8.77	8.80	8.86	0.504	
	2	7.48	7.51	7.57	7.07	173
Endosulfan sulfate	1	9.20	9.25	9.31	1.34	
	2	7.97	7.98	8.04	2.59	64
Endrin	1	8.49	8.53	8.59	0.740	
	2	7.16	7.18	7.24	10.4	173
Endrin aldehyde	1	8.91	8.96	9.02	0.894	
	2	7.68	7.72	7.78	3.90	125
gamma-Chlordane	1	7.75	7.78	7.84	30.6	
	2	6.45	6.47	6.53	15.4	66
Heptachlor	1	6.62	6.65	6.71	1.36	
	2	5.47	5.48	5.54	0.593	79
Heptachlor epoxide	1	7.46	7.49	7.55	5.22	
	2	6.20	6.22	6.28	3.58	37
Methoxychlor	1	9.65	9.67	9.73	2.84	
	2	8.29	8.31	8.37	0.595	131

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB21-0005

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-17RE1 Date(s) Analyzed: 01/05/2011 01/05/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.66	8.69	8.75	10.8	
	2	7.32	7.34	7.40	8.80	20
4,4'-DDE	1	8.04	8.07	8.13	119	
	2	6.71	6.73	6.79	106	12
4,4'-DDT	1	9.04	9.07	9.13	80.9	
	2	7.60	7.62	7.68	83.5	3
alpha-Chlordane	1	7.84	7.86	7.92	51.8	
	2	6.52	6.54	6.60	30.9	51
delta-BHC	1	6.48	6.53	6.59	2.54	
	2	5.65	5.67	5.73	0.961	90
Dieldrin	1	8.22	8.25	8.31	1.16	
	2	6.86	6.88	6.94	1.97	52
Endosulfan I	1	7.89	7.93	7.99	0.617	
	2	6.57	6.60	6.66	1.56	87
Endosulfan sulfate	1	9.20	9.25	9.31	1.00	
	2	7.97	7.98	8.04	2.54	87
gamma-Chlordane	1	7.75	7.78	7.84	28.9	
	2	6.45	6.47	6.53	16.5	55
Heptachlor epoxide	1	7.46	7.49	7.55	4.88	
	2	6.21	6.22	6.28	3.74	27

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB21-0507

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-18 Date(s) Analyzed: 01/06/2011 01/06/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.66	8.69	8.75	872	
	2	7.32	7.34	7.40	435	67
4,4'-DDE	1	8.04	8.07	8.13	112	
	2	6.71	6.73	6.79	54.8	69
4,4'-DDT	1	9.04	9.07	9.13	1000	
	2	7.60	7.62	7.68	651	42
Aldrin	1	6.96	7.01	7.07	17.0	
	2	5.74	5.74	5.80	6.98	84
alpha-BHC	1	5.72	5.73	5.79	1.02	
	2	4.90	4.90	4.96	4.88	131
alpha-Chlordane	1	7.84	7.86	7.92	152	
	2	6.52	6.54	6.60	68.1	76
beta-BHC	1	6.26	6.27	6.33	1.12	
	2	5.44	5.46	5.52	4.27	117
delta-BHC	1	6.52	6.53	6.59	2.74	
	2	5.65	5.67	5.73	6.05	75
Dieldrin	1	8.21	8.25	8.31	5.47	
	2	6.85	6.88	6.94	32.5	142
Endosulfan I	1	7.88	7.93	7.99	3.19	
	2	6.57	6.60	6.66	4.35	31
Endosulfan II	1	8.77	8.80	8.86	3.31	
	2	7.48	7.51	7.57	5.63	52
Endosulfan sulfate	1	9.20	9.25	9.31	2.62	
	2	7.97	7.98	8.04	10.7	121
Endrin	1	8.49	8.53	8.59	42.5	
	2	7.16	7.18	7.24	7.40	141
Endrin aldehyde	1	8.92	8.96	9.02	5.64	
	2	7.70	7.72	7.78	3.51	47
gamma-BHC (Lindane)	1	6.02	6.06	6.12	1.19	
	2	5.18	5.19	5.25	0.346	110
gamma-Chlordane	1	7.75	7.78	7.84	129	
	2	6.45	6.47	6.53	82.3	44
Heptachlor	1	6.62	6.65	6.71	1.78	
	2	5.47	5.48	5.54	1.83	3
Heptachlor epoxide	1	7.45	7.49	7.55	41.2	
	2	6.21	6.22	6.28	2.36	178

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB21-0507

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-18RE1 Date(s) Analyzed: 01/05/2011 01/05/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.66	8.69	8.75	696	
	2	7.32	7.34	7.40	550	23
4,4'-DDE	1	8.04	8.07	8.13	107	
	2	6.71	6.73	6.79	72.9	38
4,4'-DDT	1	9.04	9.07	9.13	797	
	2	7.60	7.62	7.68	823	3
Aldrin	1	6.96	7.01	7.07	17.8	
	2	5.74	5.74	5.80	14.3	22
alpha-Chlordane	1	7.84	7.86	7.92	141	
	2	6.51	6.54	6.60	95.3	38
Dieldrin	1	8.21	8.25	8.31	5.55	
	2	6.85	6.88	6.94	48.5	159
Endrin	1	8.49	8.53	8.59	43.8	
	2	7.16	7.18	7.24	10.0	126
gamma-Chlordane	1	7.75	7.78	7.84	119	
	2	6.45	6.47	6.53	115	4

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB22-0005

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-15 Date(s) Analyzed: 01/04/2011 01/04/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.72	8.69	8.75	42.2	
	2	7.37	7.34	7.40	24.3	54
4,4'-DDE	1	8.09	8.07	8.13	188	
	2	6.76	6.73	6.79	142	28
4,4'-DDT	1	9.09	9.07	9.13	161	
	2	7.65	7.62	7.68	135	17
Aldrin	1	7.01	7.01	7.07	20.2	
	2	5.78	5.74	5.80	1.87	166
alpha-BHC	1	5.76	5.73	5.79	0.641	
	2	4.94	4.90	4.96	0.341	61
alpha-Chlordane	1	7.90	7.86	7.92	243	
	2	6.56	6.54	6.60	97.8	85
beta-BHC	1	6.31	6.27	6.33	0.702	
	2	5.48	5.46	5.52	0.390	57
delta-BHC	1	6.53	6.53	6.59	1.93	
	2	5.68	5.67	5.73	2.09	8
Dieldrin	1	8.27	8.25	8.31	1.63	
	2	6.90	6.88	6.94	4.94	101
Endosulfan I	1	7.94	7.93	7.99	2.63	
	2	6.61	6.60	6.66	8.44	105
Endosulfan II	1	8.84	8.80	8.86	2.07	
	2	7.53	7.51	7.57	34.7	177
Endosulfan sulfate	1	9.26	9.25	9.31	1.30	
	2	8.02	7.98	8.04	3.70	96
Endrin	1	8.55	8.53	8.59	2.52	
	2	7.21	7.18	7.24	20.1	155
Endrin aldehyde	1	8.97	8.96	9.02	4.32	
	2	7.76	7.72	7.78	1.51	96
gamma-BHC (Lindane)	1	6.07	6.06	6.12	1.05	
	2	5.22	5.19	5.25	0.268	119
gamma-Chlordane	1	7.81	7.78	7.84	171	
	2	6.50	6.47	6.53	91.9	60
Heptachlor	1	6.67	6.65	6.71	4.70	
	2	5.51	5.48	5.54	4.66	1
Heptachlor epoxide	1	7.51	7.49	7.55	30.7	
	2	6.25	6.22	6.28	10.1	101

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB22-0005

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-15RE1 Date(s) Analyzed: 01/04/2011 01/04/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.72	8.69	8.75	42.2	
	2	7.37	7.34	7.40	30.6	32
4,4'-DDE	1	8.09	8.07	8.13	168	
	2	6.76	6.73	6.79	162	4
4,4'-DDT	1	9.09	9.07	9.13	140	
	2	7.65	7.62	7.68	147	5
Aldrin	1	7.01	7.01	7.07	20.1	
	2	5.78	5.74	5.80	2.13	162
alpha-Chlordane	1	7.90	7.86	7.92	225	
	2	6.56	6.54	6.60	115	65
delta-BHC	1	6.54	6.53	6.59	5.67	
	2	5.68	5.67	5.73	2.53	77
Dieldrin	1	8.27	8.25	8.31	1.29	
	2	6.90	6.88	6.94	5.37	122
Endosulfan I	1	7.94	7.93	7.99	3.32	
	2	6.61	6.60	6.66	9.52	97
Endosulfan II	1	8.84	8.80	8.86	1.85	
	2	7.54	7.51	7.57	41.5	183
Endrin	1	8.55	8.53	8.59	2.63	
	2	7.21	7.18	7.24	23.8	160
Endrin aldehyde	1	8.97	8.96	9.02	3.76	
	2	7.76	7.72	7.78	1.90	66
gamma-Chlordane	1	7.81	7.78	7.84	160	
	2	6.50	6.47	6.53	107	40
Heptachlor	1	6.68	6.65	6.71	8.08	
	2	5.51	5.48	5.54	5.54	37
Heptachlor epoxide	1	7.51	7.49	7.55	32.6	
	2	6.25	6.22	6.28	11.9	93

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB22-00502

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-16 Date(s) Analyzed: 01/04/2011 01/04/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.72	8.69	8.75	15.8	
	2	7.37	7.34	7.40	11.4	32
4,4'-DDE	1	8.09	8.07	8.13	70.3	
	2	6.76	6.73	6.79	59.5	17
4,4'-DDT	1	9.09	9.07	9.13	64.4	
	2	7.65	7.62	7.68	63.2	2
Aldrin	1	7.01	7.01	7.07	2.70	
	2	5.78	5.74	5.80	0.463	142
alpha-Chlordane	1	7.90	7.86	7.92	51.3	
	2	6.56	6.54	6.60	22.3	79
delta-BHC	1	6.54	6.53	6.59	1.85	
	2	5.68	5.67	5.73	0.389	130
Dieldrin	1	8.27	8.25	8.31	1.73	
	2	6.90	6.88	6.94	4.32	85
Endosulfan I	1	7.94	7.93	7.99	0.506	
	2	6.61	6.60	6.66	1.71	109
Endosulfan II	1	8.83	8.80	8.86	0.322	
	2	7.54	7.51	7.57	6.33	181
Endrin	1	8.55	8.53	8.59	3.88	
	2	7.21	7.18	7.24	6.75	54
Endrin aldehyde	1	8.97	8.96	9.02	1.29	
	2	7.76	7.72	7.78	1.50	15
gamma-Chlordane	1	7.80	7.78	7.84	29.2	
	2	6.50	6.47	6.53	14.0	70
Heptachlor	1	6.68	6.65	6.71	1.45	
	2	5.51	5.48	5.54	0.609	82
Heptachlor epoxide	1	7.51	7.49	7.55	7.00	
	2	6.25	6.22	6.28	3.79	60

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB23-0005

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-01 Date(s) Analyzed: 12/29/2010 12/29/2010

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.92	8.99	9.05	5.82	
	2	7.54	7.60	7.66	5.33	9
4,4'-DDE	1	8.29	8.36	8.42	4.16	
	2	6.92	6.98	7.04	3.96	5
4,4'-DDT	1	9.30	9.37	9.43	7.48	
	2	7.83	7.89	7.95	8.12	8
alpha-Chlordane	1	8.09	8.16	8.22	0.512	
	2	6.71	6.78	6.84	3.42	148
delta-BHC	1	6.72	6.79	6.85	0.146	
	2	5.84	5.89	5.95	0.151	4
Dieldrin	1	8.47	8.56	8.62	0.271	
	2	7.07	7.13	7.19	1.17	125
Endosulfan II	1	9.05	9.11	9.17	0.241	
	2	7.74	7.78	7.84	0.478	66
Endrin	1	8.75	8.84	8.90	0.551	
	2	7.38	7.44	7.50	1.18	73
gamma-Chlordane	1	8.00	8.07	8.13	0.711	
	2	6.67	6.72	6.78	0.848	18

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB23-0810

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-02 Date(s) Analyzed: 12/29/2010 12/29/2010

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.92	8.99	9.05	2.37	
	2	7.54	7.60	7.66	1.48	46
4,4'-DDE	1	8.29	8.36	8.42	0.692	
	2	6.92	6.98	7.04	0.608	13
4,4'-DDT	1	9.30	9.37	9.43	0.442	
	2	7.82	7.89	7.95	0.900	68
delta-BHC	1	6.72	6.79	6.85	0.178	
	2	5.84	5.89	5.95	0.217	20
gamma-Chlordane	1	8.00	8.07	8.13	0.308	
	2	6.66	6.72	6.78	0.155	66

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB24-0005

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-03 Date(s) Analyzed: 12/30/2010 12/30/2010

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.92	8.99	9.05	3.01	
	2	7.54	7.60	7.66	2.37	24
4,4'-DDE	1	8.29	8.36	8.42	1.29	
	2	6.92	6.98	7.04	1.12	14
alpha-Chlordane	1	8.09	8.16	8.22	0.140	
	2	6.74	6.78	6.84	0.526	116
delta-BHC	1	6.72	6.79	6.85	0.722	
	2	5.84	5.89	5.95	0.475	41
Endosulfan II	1	9.04	9.11	9.17	0.394	
	2	7.74	7.78	7.84	0.255	43
gamma-Chlordane	1	8.00	8.07	8.13	0.296	
	2	6.67	6.72	6.78	0.309	4
Methoxychlor	1	9.91	9.97	10.03	1.20	
	2	8.52	8.58	8.64	0.383	103

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB24-00502

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-04 Date(s) Analyzed: 01/03/2011 01/03/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.82	8.99	9.05	4.31	
	2	7.45	7.60	7.66	2.89	40
4,4'-DDE	1	8.19	8.36	8.42	1.78	
	2	6.84	6.98	7.04	1.11	47
4,4'-DDT	1	9.20	9.37	9.43	0.362	
	2	7.73	7.89	7.95	1.35	115
alpha-Chlordane	1	7.99	8.16	8.22	0.250	
	2	6.66	6.78	6.84	0.778	103
delta-BHC	1	6.63	6.79	6.85	2.43	
	2	5.76	5.89	5.95	0.950	88
Dieldrin	1	8.37	8.56	8.62	0.321	
	2	6.99	7.13	7.19	1.48	129
Endrin	1	8.65	8.84	8.90	1.16	
	2	7.29	7.44	7.50	0.235	133
gamma-Chlordane	1	7.90	8.07	8.13	0.578	
	2	6.58	6.72	6.78	0.306	62
Heptachlor epoxide	1	7.60	7.78	7.84	1.61	
	2	6.35	6.46	6.52	0.868	60
Methoxychlor	1	9.82	9.97	10.03	0.954	
	2	8.43	8.58	8.64	5.33	139

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB25-0005

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-19 Date(s) Analyzed: 01/06/2011 01/06/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.66	8.69	8.75	271	
	2	7.32	7.34	7.40	109	85
4,4'-DDE	1	8.04	8.07	8.13	243	
	2	6.71	6.73	6.79	152	46
4,4'-DDT	1	9.04	9.07	9.13	228	
	2	7.60	7.62	7.68	170	29
Aldrin	1	6.97	7.01	7.07	508	
	2	5.74	5.74	5.80	20.8	184
alpha-BHC	1	5.72	5.73	5.79	21.7	
	2	4.92	4.90	4.96	1.10	181
alpha-Chlordane	1	7.86	7.86	7.92	1880	
	2	6.52	6.54	6.60	1240	41
beta-BHC	1	6.26	6.27	6.33	6.55	
	2	5.42	5.46	5.52	3.11	71
delta-BHC	1	6.52	6.53	6.59	4.65	
	2	5.64	5.67	5.73	21.2	128
Dieldrin	1	8.25	8.25	8.31	16.6	
	2	6.85	6.88	6.94	7.91	71
Endosulfan I	1	7.89	7.93	7.99	36.8	
	2	6.56	6.60	6.66	113	102
Endosulfan II	1	8.78	8.80	8.86	53.5	
	2	7.48	7.51	7.57	210	119
Endosulfan sulfate	1	9.21	9.25	9.31	11.5	
	2	7.96	7.98	8.04	12.1	5
Endrin	1	8.50	8.53	8.59	12.2	
	2	7.17	7.18	7.24	72.3	142
Endrin aldehyde	1	8.93	8.96	9.02	19.5	
	2	7.70	7.72	7.78	11.1	55
Endrin ketone	1	9.82	9.85	9.91	0.561	
	2	8.57	8.58	8.64	1.14	68
gamma-BHC (Lindane)	1	6.06	6.06	6.12	2.73	
	2	5.19	5.19	5.25	0.538	134
gamma-Chlordane	1	7.77	7.78	7.84	1610	
	2	6.46	6.47	6.53	1180	31
Heptachlor	1	6.63	6.65	6.71	260	
	2	5.47	5.48	5.54	164	45
Heptachlor epoxide	1	7.45	7.49	7.55	594	
	2	6.20	6.22	6.28	64.0	161

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB25-0005

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-19RE1 Date(s) Analyzed: 01/05/2011 01/05/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.66	8.69	8.75	237	
	2	7.32	7.34	7.40	123	63
4,4'-DDE	1	8.03	8.07	8.13	220	
	2	6.71	6.73	6.79	219	0
4,4'-DDT	1	9.03	9.07	9.13	393	
	2	7.60	7.62	7.68	463	17
Aldrin	1	6.96	7.01	7.07	462	
	2	5.74	5.74	5.80	39.2	169
alpha-Chlordane	1	7.84	7.86	7.92	3220	
	2	6.51	6.54	6.60	1990	47
delta-BHC	1	6.49	6.53	6.59	56.0	
	2	5.64	5.67	5.73	15.3	114
Endosulfan II	1	8.77	8.80	8.86	32.2	
	2	7.48	7.51	7.57	452	173
Endrin aldehyde	1	8.91	8.96	9.02	50.9	
	2	7.70	7.72	7.78	32.1	45
gamma-Chlordane	1	7.75	7.78	7.84	2600	
	2	6.45	6.47	6.53	1690	42
Heptachlor	1	6.62	6.65	6.71	287	
	2	5.47	5.48	5.54	299	4
Heptachlor epoxide	1	7.45	7.49	7.55	492	
	2	6.20	6.22	6.28	97.2	134

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB25-0005

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-19RE2 Date(s) Analyzed: 01/05/2011 01/05/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.66	8.69	8.75	195	
	2	7.32	7.34	7.40	97.1	67
4,4'-DDE	1	8.03	8.07	8.13	197	
	2	6.71	6.73	6.79	167	16
4,4'-DDT	1	9.03	9.07	9.13	279	
	2	7.60	7.62	7.68	282	1
Aldrin	1	6.96	7.01	7.07	409	
	2	5.74	5.74	5.80	25.6	176
alpha-BHC	1	5.71	5.73	5.79	20.2	
	2	4.91	4.90	4.96	1.21	177
alpha-Chlordane	1	7.84	7.86	7.92	3200	
	2	6.51	6.54	6.60	1210	90
delta-BHC	1	6.52	6.53	6.59	8.73	
	2	5.63	5.67	5.73	22.9	90
Dieldrin	1	8.24	8.25	8.31	6.62	
	2	6.85	6.88	6.94	8.85	29
Endosulfan I	1	7.88	7.93	7.99	19.1	
	2	6.56	6.60	6.66	126	147
Endosulfan II	1	8.77	8.80	8.86	35.2	
	2	7.48	7.51	7.57	286	156
Endosulfan sulfate	1	9.21	9.25	9.31	8.38	
	2	7.96	7.98	8.04	15.2	58
Endrin	1	8.50	8.53	8.59	6.87	
	2	7.16	7.18	7.24	97.2	174
Endrin aldehyde	1	8.91	8.96	9.02	50.6	
	2	7.70	7.72	7.78	14.9	109
Endrin ketone	1	9.82	9.85	9.91	1.15	
	2	8.57	8.58	8.64	2.59	77
gamma-Chlordane	1	7.75	7.78	7.84	2590	
	2	6.45	6.47	6.53	1290	67
Heptachlor	1	6.62	6.65	6.71	236	
	2	5.47	5.48	5.54	200	17
Heptachlor epoxide	1	7.45	7.49	7.55	479	
	2	6.20	6.22	6.28	72.6	147

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB25-0204

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-20 Date(s) Analyzed: 01/06/2011 01/06/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.66	8.69	8.75	631	
	2	7.32	7.34	7.40	331	62
4,4'-DDE	1	8.04	8.07	8.13	1090	
	2	6.71	6.73	6.79	630	53
4,4'-DDT	1	9.04	9.07	9.13	77.2	
	2	7.60	7.62	7.68	64.3	18
Aldrin	1	6.99	7.01	7.07	0.596	
	2	5.74	5.74	5.80	0.626	5
alpha-Chlordane	1	7.83	7.86	7.92	7.30	
	2	6.50	6.54	6.60	1.68	125
Dieldrin	1	8.22	8.25	8.31	3.96	
	2	6.85	6.88	6.94	4.79	19
Endosulfan I	1	7.92	7.93	7.99	0.194	
	2	6.59	6.60	6.66	0.881	128
Endosulfan II	1	8.75	8.80	8.86	0.280	
	2	7.46	7.51	7.57	2.84	164
Endosulfan sulfate	1	9.20	9.25	9.31	0.204	
	2	7.97	7.98	8.04	2.91	174
Endrin	1	8.49	8.53	8.59	5.39	
	2	7.16	7.18	7.24	9.89	59
Endrin aldehyde	1	8.93	8.96	9.02	0.327	
	2	7.69	7.72	7.78	0.953	98
gamma-Chlordane	1	7.75	7.78	7.84	1.16	
	2	6.46	6.47	6.53	26.8	183
Heptachlor epoxide	1	7.45	7.49	7.55	1.77	
	2	6.21	6.22	6.28	0.781	78
Methoxychlor	1	9.62	9.67	9.73	7.17	
	2	8.29	8.31	8.37	0.528	173

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB25-0204

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-20RE1 Date(s) Analyzed: 01/05/2011 01/05/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.66	8.69	8.75	545	
	2	7.32	7.34	7.40	497	9
4,4'-DDE	1	8.04	8.07	8.13	986	
	2	6.71	6.73	6.79	914	8
4,4'-DDT	1	9.04	9.07	9.13	107	
	2	7.60	7.62	7.68	120	12
alpha-Chlordane	1	7.83	7.86	7.92	8.24	
	2	6.54	6.54	6.60	6.85	18
Endrin	1	8.49	8.53	8.59	6.54	
	2	7.16	7.18	7.24	20.1	102

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB26-0005

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-08 Date(s) Analyzed: 01/03/2011 01/03/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.82	8.99	9.05	68.8	
	2	7.45	7.60	7.66	42.8	47
4,4'-DDE	1	8.19	8.36	8.42	103	
	2	6.84	6.98	7.04	69.4	39
4,4'-DDT	1	9.20	9.37	9.43	66.7	
	2	7.74	7.89	7.95	60.6	10
Aldrin	1	7.17	7.29	7.35	0.416	
	2	5.85	5.96	6.02	0.440	6
alpha-Chlordane	1	7.99	8.16	8.22	1.88	
	2	6.64	6.78	6.84	1.55	19
delta-BHC	1	6.63	6.79	6.85	0.178	
	2	5.76	5.89	5.95	0.325	59
Dieldrin	1	8.37	8.56	8.62	1.54	
	2	6.99	7.13	7.19	8.52	139
Endosulfan sulfate	1	9.36	9.56	9.62	0.691	
	2	8.12	8.26	8.32	5.19	153
Endrin	1	8.65	8.84	8.90	13.7	
	2	7.29	7.44	7.50	5.36	87
Endrin aldehyde	1	9.10	9.27	9.33	1.24	
	2	7.84	7.99	8.05	1.01	20
gamma-Chlordane	1	7.92	8.07	8.13	4.02	
	2	6.58	6.72	6.78	4.35	8
Heptachlor epoxide	1	7.60	7.78	7.84	3.48	
	2	6.33	6.46	6.52	0.122	186
Methoxychlor	1	9.78	9.97	10.03	1.75	
	2	8.46	8.58	8.64	3.04	54

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB26-0005

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-08RE1 Date(s) Analyzed: 01/03/2011 01/03/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.82	8.99	9.05	63.8	
	2	7.45	7.60	7.66	42.5	40
4,4'-DDE	1	8.19	8.36	8.42	95.4	
	2	6.84	6.98	7.04	69.5	31
4,4'-DDT	1	9.20	9.37	9.43	62.1	
	2	7.74	7.89	7.95	60.4	3
alpha-Chlordane	1	7.99	8.16	8.22	1.66	
	2	6.64	6.78	6.84	1.52	9
Dieldrin	1	8.37	8.56	8.62	1.48	
	2	6.99	7.13	7.19	8.57	141
Endosulfan II	1	8.91	9.11	9.17	0.469	
	2	7.61	7.78	7.84	6.29	172
Endosulfan sulfate	1	9.37	9.56	9.62	0.717	
	2	8.12	8.26	8.32	5.47	154
Endrin	1	8.65	8.84	8.90	13.2	
	2	7.29	7.44	7.50	5.63	80
Endrin aldehyde	1	9.09	9.27	9.33	1.20	
	2	7.84	7.99	8.05	0.857	33
gamma-Chlordane	1	7.91	8.07	8.13	1.04	
	2	6.58	6.72	6.78	4.53	125
Methoxychlor	1	9.78	9.97	10.03	1.17	
	2	8.46	8.58	8.64	2.94	86

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB26-0406

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-09 Date(s) Analyzed: 01/03/2011 01/03/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.83	8.99	9.05	1410	
	2	7.46	7.60	7.66	602	80
4,4'-DDE	1	8.19	8.36	8.42	215	
	2	6.84	6.98	7.04	86.0	86
4,4'-DDT	1	9.20	9.37	9.43	52.4	
	2	7.73	7.89	7.95	120	78
Aldrin	1	7.14	7.29	7.35	2.48	
	2	5.85	5.96	6.02	9.71	119
alpha-BHC	1	5.87	5.98	6.04	1.05	
	2	5.01	5.09	5.15	4.29	122
alpha-Chlordane	1	7.99	8.16	8.22	14.2	
	2	6.64	6.78	6.84	19.3	30
beta-BHC	1	6.39	6.53	6.59	0.919	
	2	5.55	5.67	5.73	5.08	139
delta-BHC	1	6.66	6.79	6.85	1.53	
	2	5.76	5.89	5.95	7.77	134
Dieldrin	1	8.37	8.56	8.62	13.4	
	2	6.99	7.13	7.19	66.4	133
Endosulfan I	1	8.03	8.23	8.29	4.51	
	2	6.72	6.85	6.91	1.68	92
Endosulfan II	1	8.91	9.11	9.17	4.04	
	2	7.61	7.78	7.84	25.6	146
Endosulfan sulfate	1	9.37	9.56	9.62	2.17	
	2	8.12	8.26	8.32	22.7	165
Endrin	1	8.65	8.84	8.90	93.7	
	2	7.29	7.44	7.50	12.9	152
Endrin aldehyde	1	9.09	9.27	9.33	5.63	
	2	7.84	7.99	8.05	10.9	64
gamma-BHC (Lindane)	1	6.19	6.31	6.37	0.581	
	2	5.26	5.39	5.45	2.76	130
gamma-Chlordane	1	7.92	8.07	8.13	42.2	
	2	6.58	6.72	6.78	47.1	11
Heptachlor	1	6.80	6.92	6.98	0.635	
	2	5.58	5.70	5.76	1.19	61
Heptachlor epoxide	1	7.60	7.78	7.84	64.7	
	2	6.34	6.46	6.52	1.90	189

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB26-0406

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-09RE1 Date(s) Analyzed: 01/03/2011 01/03/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.82	8.99	9.05	1090	
	2	7.45	7.60	7.66	744	38
4,4'-DDE	1	8.19	8.36	8.42	196	
	2	6.84	6.98	7.04	109	57
4,4'-DDT	1	9.20	9.37	9.43	55.8	
	2	7.73	7.89	7.95	179	105
Aldrin	1	7.14	7.29	7.35	3.37	
	2	5.85	5.96	6.02	18.2	137
alpha-Chlordane	1	7.99	8.16	8.22	15.7	
	2	6.64	6.78	6.84	33.5	73
delta-BHC	1	6.62	6.79	6.85	6.39	
	2	5.76	5.89	5.95	14.6	78
Dieldrin	1	8.37	8.56	8.62	16.9	
	2	6.99	7.13	7.19	86.9	135
Endosulfan I	1	8.03	8.23	8.29	6.00	
	2	6.73	6.85	6.91	5.84	3
Endrin	1	8.65	8.84	8.90	95.2	
	2	7.29	7.44	7.50	24.1	119
Endrin aldehyde	1	9.08	9.27	9.33	7.99	
	2	7.84	7.99	8.05	19.8	85
gamma-Chlordane	1	7.92	8.07	8.13	48.7	
	2	6.58	6.72	6.78	68.3	34
Heptachlor epoxide	1	7.60	7.78	7.84	70.3	
	2	6.33	6.46	6.52	4.48	176

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB27-0005

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-13 Date(s) Analyzed: 01/04/2011 01/04/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.72	8.69	8.75	28.8	
	2	7.37	7.34	7.40	16.6	54
4,4'-DDE	1	8.09	8.07	8.13	162	
	2	6.76	6.73	6.79	121	29
4,4'-DDT	1	9.10	9.07	9.13	171	
	2	7.65	7.62	7.68	152	12
Aldrin	1	7.05	7.01	7.07	1.24	
	2	5.78	5.74	5.80	1.29	4
alpha-BHC	1	5.79	5.73	5.79	0.362	
	2	4.94	4.90	4.96	0.509	34
alpha-Chlordane	1	7.89	7.86	7.92	4.74	
	2	6.56	6.54	6.60	3.84	21
delta-BHC	1	6.58	6.53	6.59	1.40	
	2	5.69	5.67	5.73	3.55	87
Dieldrin	1	8.27	8.25	8.31	1.81	
	2	6.90	6.88	6.94	9.22	134
Endosulfan II	1	8.82	8.80	8.86	0.855	
	2	7.55	7.51	7.57	0.291	98
Endosulfan sulfate	1	9.26	9.25	9.31	0.772	
	2	8.02	7.98	8.04	4.65	143
Endrin	1	8.55	8.53	8.59	12.7	
	2	7.21	7.18	7.24	22.6	57
Endrin aldehyde	1	8.98	8.96	9.02	0.769	
	2	7.75	7.72	7.78	0.644	18
gamma-BHC (Lindane)	1	6.07	6.06	6.12	0.617	
	2	5.22	5.19	5.25	0.144	124
gamma-Chlordane	1	7.81	7.78	7.84	2.92	
	2	6.50	6.47	6.53	4.31	38
Heptachlor epoxide	1	7.51	7.49	7.55	4.18	
	2	6.25	6.22	6.28	4.08	2

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB27-0005

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-13RE1 Date(s) Analyzed: 01/04/2011 01/04/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.72	8.69	8.75	28.3	
	2	7.37	7.34	7.40	20.1	34
4,4'-DDE	1	8.09	8.07	8.13	143	
	2	6.76	6.73	6.79	132	8
4,4'-DDT	1	9.09	9.07	9.13	148	
	2	7.65	7.62	7.68	160	8
Aldrin	1	7.05	7.01	7.07	1.14	
	2	5.78	5.74	5.80	1.76	43
alpha-Chlordane	1	7.89	7.86	7.92	4.08	
	2	6.56	6.54	6.60	4.48	9
delta-BHC	1	6.53	6.53	6.59	4.53	
	2	5.69	5.67	5.73	4.29	6
Dieldrin	1	8.27	8.25	8.31	1.21	
	2	6.90	6.88	6.94	11.2	161
Endrin	1	8.55	8.53	8.59	12.3	
	2	7.21	7.18	7.24	25.8	71
gamma-Chlordane	1	7.81	7.78	7.84	1.48	
	2	6.50	6.47	6.53	5.43	114
Heptachlor epoxide	1	7.51	7.49	7.55	4.27	
	2	6.26	6.22	6.28	4.45	4

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB27-0204

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-14 Date(s) Analyzed: 01/05/2011 01/05/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.66	8.69	8.75	5.41	
	2	7.32	7.34	7.40	5.25	3
4,4'-DDE	1	8.03	8.07	8.13	12.9	
	2	6.71	6.73	6.79	12.8	1
4,4'-DDT	1	9.04	9.07	9.13	8.51	
	2	7.60	7.62	7.68	9.10	7
alpha-Chlordane	1	7.84	7.86	7.92	0.383	
	2	6.51	6.54	6.60	0.466	20
gamma-Chlordane	1	7.75	7.78	7.84	0.301	
	2	6.46	6.47	6.53	1.08	113

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB28-0005

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-21 Date(s) Analyzed: 01/05/2011 01/05/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.66	8.69	8.75	2.92	
	2	7.32	7.34	7.40	2.81	4
4,4'-DDE	1	8.04	8.07	8.13	6.78	
	2	6.71	6.73	6.79	6.92	2
4,4'-DDT	1	9.03	9.07	9.13	5.37	
	2	7.60	7.62	7.68	5.44	1
alpha-Chlordane	1	7.84	7.86	7.92	0.145	
	2	6.52	6.54	6.60	0.203	33
gamma-Chlordane	1	7.75	7.78	7.84	0.147	
	2	6.46	6.47	6.53	0.326	76

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB28-0204

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-22 Date(s) Analyzed: 01/05/2011 01/05/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.66	8.69	8.75	55.1	
	2	7.32	7.34	7.40	33.8	48
4,4'-DDE	1	8.04	8.07	8.13	29.4	
	2	6.71	6.73	6.79	20.5	36
4,4'-DDT	1	9.04	9.07	9.13	16.7	
	2	7.60	7.62	7.68	16.1	4
alpha-BHC	1	5.72	5.73	5.79	0.897	
	2	4.90	4.90	4.96	0.172	136
alpha-Chlordane	1	7.85	7.86	7.92	2.53	
	2	6.51	6.54	6.60	0.610	122
delta-BHC	1	6.50	6.53	6.59	1.19	
	2	5.66	5.67	5.73	0.164	151
Dieldrin	1	8.21	8.25	8.31	0.745	
	2	6.85	6.88	6.94	1.05	34
Endosulfan I	1	7.91	7.93	7.99	1.68	
	2	6.58	6.60	6.66	1.01	50
Endosulfan II	1	8.77	8.80	8.86	1.13	
	2	7.49	7.51	7.57	5.33	130
Endosulfan sulfate	1	9.21	9.25	9.31	2.62	
	2	7.97	7.98	8.04	3.95	40
Endrin	1	8.46	8.53	8.59	2.95	
	2	7.16	7.18	7.24	2.26	27
Endrin aldehyde	1	8.94	8.96	9.02	1.09	
	2	7.71	7.72	7.78	1.13	4
Endrin ketone	1	9.81	9.85	9.91	0.715	
	2	8.53	8.58	8.64	2.84	120
gamma-BHC (Lindane)	1	6.03	6.06	6.12	19.0	
	2	5.18	5.19	5.25	3.61	136
gamma-Chlordane	1	7.74	7.78	7.84	14.8	
	2	6.46	6.47	6.53	3.57	122
Heptachlor	1	6.61	6.65	6.71	1.12	
	2	5.46	5.48	5.54	0.182	144
Methoxychlor	1	9.66	9.67	9.73	1.33	
	2	8.31	8.31	8.37	66.2	192

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB29-0005

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-23 Date(s) Analyzed: 01/05/2011 01/05/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.66	8.69	8.75	26.0	
	2	7.32	7.34	7.40	17.4	40
4,4'-DDE	1	8.04	8.07	8.13	41.7	
	2	6.71	6.73	6.79	33.7	21
4,4'-DDT	1	9.04	9.07	9.13	47.4	
	2	7.60	7.62	7.68	45.5	4
alpha-Chlordane	1	7.84	7.86	7.92	1.74	
	2	6.51	6.54	6.60	1.43	19
delta-BHC	1	6.52	6.53	6.59	1.06	
	2	5.65	5.67	5.73	0.447	82
Dieldrin	1	8.21	8.25	8.31	0.893	
	2	6.85	6.88	6.94	3.96	126
Endosulfan II	1	8.76	8.80	8.86	0.240	
	2	7.50	7.51	7.57	0.880	114
Endrin	1	8.49	8.53	8.59	3.67	
	2	7.16	7.18	7.24	5.65	42
Endrin aldehyde	1	8.93	8.96	9.02	0.323	
	2	7.70	7.72	7.78	0.660	69
gamma-BHC (Lindane)	1	6.02	6.06	6.12	3.31	
	2	5.18	5.19	5.25	0.600	139
gamma-Chlordane	1	7.75	7.78	7.84	2.05	
	2	6.46	6.47	6.53	2.20	7
Heptachlor	1	6.60	6.65	6.71	1.20	
	2	5.47	5.48	5.54	0.180	148
Heptachlor epoxide	1	7.45	7.49	7.55	1.99	
	2	6.21	6.22	6.28	0.288	150

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB29-0204

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-24 Date(s) Analyzed: 01/05/2011 01/05/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.66	8.69	8.75	19.7	
	2	7.32	7.34	7.40	13.1	40
4,4'-DDE	1	8.04	8.07	8.13	10.5	
	2	6.71	6.73	6.79	7.95	28
4,4'-DDT	1	9.04	9.07	9.13	4.07	
	2	7.60	7.62	7.68	3.61	12
Aldrin	1	6.98	7.01	7.07	0.356	
	2	5.74	5.74	5.80	0.557	44
alpha-Chlordane	1	7.84	7.86	7.92	1.88	
	2	6.52	6.54	6.60	1.68	11
beta-BHC	1	6.26	6.27	6.33	0.393	
	2	5.48	5.46	5.52	0.722	59
delta-BHC	1	6.50	6.53	6.59	1.20	
	2	5.65	5.67	5.73	0.282	124
Dieldrin	1	8.22	8.25	8.31	0.624	
	2	6.85	6.88	6.94	0.919	38
Endosulfan II	1	8.78	8.80	8.86	2.68	
	2	7.46	7.51	7.57	0.540	133
Endrin	1	8.49	8.53	8.59	1.17	
	2	7.16	7.18	7.24	0.371	104
gamma-Chlordane	1	7.75	7.78	7.84	2.36	
	2	6.45	6.47	6.53	2.08	13
Heptachlor epoxide	1	7.45	7.49	7.55	0.967	
	2	6.23	6.22	6.28	0.213	128

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB30-0005

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-06 Date(s) Analyzed: 01/03/2011 01/03/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.82	8.99	9.05	5.19	
	2	7.45	7.60	7.66	4.29	19
4,4'-DDE	1	8.19	8.36	8.42	1.91	
	2	6.84	6.98	7.04	1.33	36
4,4'-DDT	1	9.20	9.37	9.43	0.577	
	2	7.73	7.89	7.95	1.28	76
alpha-Chlordane	1	7.99	8.16	8.22	0.279	
	2	6.66	6.78	6.84	0.628	77
delta-BHC	1	6.63	6.79	6.85	1.16	
	2	5.76	5.89	5.95	0.633	59
Dieldrin	1	8.37	8.56	8.62	0.246	
	2	6.99	7.13	7.19	1.26	135
gamma-Chlordane	1	7.90	8.07	8.13	0.512	
	2	6.58	6.72	6.78	0.373	31
Heptachlor epoxide	1	7.60	7.78	7.84	1.13	
	2	6.35	6.46	6.52	0.556	68

FORM X
IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NTC12-SB30-00502

Lab Name: Empirical Laboratories, LLC

Lab Sample ID: 1012185-07 Date(s) Analyzed: 01/03/2011 01/03/2011

Instrument ID (1): GL-ECD3 Instrument ID (2): GL-ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDD	1	8.82	8.99	9.05	2.96	
	2	7.46	7.60	7.66	2.90	2
4,4'-DDE	1	8.19	8.36	8.42	0.989	
	2	6.84	6.98	7.04	0.960	3
4,4'-DDT	1	9.20	9.37	9.43	0.317	
	2	7.74	7.89	7.95	0.872	93
alpha-Chlordane	1	7.99	8.16	8.22	0.134	
	2	6.66	6.78	6.84	0.202	41
delta-BHC	1	6.63	6.79	6.85	0.310	
	2	5.77	5.89	5.95	0.228	31
Heptachlor epoxide	1	7.60	7.78	7.84	0.435	
	2	6.36	6.46	6.52	0.190	78

CTOF27AGL001

SAMPLE CALC	SAMPLE ID	NTC12-DUP02				
	Correction	COMPOUND OF	Vol. of extract			
CF	factor	INTEREST AREA	(ML)	Sample Wt. in grams (G)	Percent Solids	CONCENTRATION PPB
18848.29	10	797601	5	15.2	0.829	167.9135

4,4'-DDT = 168 ug/kg

Laboratory Name

SW-846 METHODS 8081A/8082

Data file : \\ELABNSH05\TARGET\chem\ecd3.i\010411.b\028R2801.D
Lab Smp Id: 1012185-11RE1
Inj Date : 04-JAN-2011 19:40
Operator : WAL Inst ID: ecd3.i
Smp Info : 1012185-11RE1;10
Misc Info : ;;;;;;PEST.sub
Comment :
Method : \\ELABNSH05\TARGET\chem\ecd3.i\010411.b\8081_82R.m
Meth Date : 06-Jan-2011 10:01 wlancaster Quant Type: ESTD
Cal Date : 02-DEC-2010 15:37 Cal File: 030R3001.D
Als bottle: 28
Dil Factor: 10.00000
Integrator: Falcon Compound Sublist: PEST.sub
Target Version: 4.04
Processing Host: TARGET18_VM

Compounds	RT	EXP RT	DLT RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	FINAL (ng/mL)
2 Aldrin [2C]	5.778	5.766	0.012	84263	3.18247	31.82
3 Alpha-BHC [2C]	4.943	4.929	0.014	66449	2.16167	21.62 NC
4 Alpha-Chlordane [2C]	6.559	6.566	-0.007	237303	9.54624	95.46 Fmt
5 Beta-BHC [2C]	5.478	5.491	-0.013	25608	2.46770	24.68 NC
12 4,4'-DDD [2C]	7.366	7.373	-0.007	1642015	77.8838	778.8 } fmt
13 4,4'-DDE [2C]	6.754	6.761	-0.007	250742	10.7685	107.7
14 4,4'-DDT [2C]	7.646	7.653	-0.007	797601	42.3169	423.2
15 Delta-BHC [2C]	5.689	5.698	-0.009	72855	2.78735	27.87 fmt
16 Dieldrin [2C]	6.901	6.906	-0.005	328779	12.8888	128.9 fmt
17 Endosulfan I [2C]	6.611	6.628	-0.017	11327	0.49684	4.968 fmt
19 Endosulfan Sulfate [2C]	8.023	8.011	0.012	96765	5.08673	50.87 fmt
20 Endrin [2C]	7.204	7.206	-0.002	55871	2.78136	27.81 ~~NC~~
21 Endrin Aldehyde [2C]	7.753	7.749	0.004	31218	1.65790	16.58
22 Endrin Ketone [2C]	8.626	8.608	0.018	66390	2.57270	25.73 NC
24 Gamma-Chlordane [2C]	6.499	6.501	-0.002	249379	9.74086	97.41
25 Heptachlor [2C]	5.508	5.509	-0.001	15952	0.61139	6.114
26 Heptachlor Epoxide [2C]	6.254	6.253	0.001	27700	1.12071	11.21
27 Methoxychlor [2C]	8.368	8.344	0.024	23432	2.25626	22.56 NC
$ 38 TCMX [2C]	4.479	4.486	-0.007	96766	4.02320	4.023 (R)
$ 39 DCB [2C]	9.921	9.923	-0.002	83239	4.02387	4.024 (R)

QC Flag Legend

R - Spike/Surrogate failed recovery limits.

m tly dieldrin, Endo sulfate, Endrin, hept, hept ep

1/6/11

SOIL (METALS)

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: **B. DAVIS** **DATE:** **FEBRUARY 8, 2011**

FROM: **TERRI L. SOLOMON** **COPIES:** **DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION –TAL METALS**
NTC GREAT LAKES CTO F27A
SAMPLE DELIVERY GROUP (SDG) – CTOF27AGL001

SAMPLES: 22/Soil/

NTC12-DUP01	NTC12-DUP02	NTC12-SB21-0005
NTC12-SB21-0507	NTC12-SB22-0005	NTC12-SB22-00502
NTC12-SB23-0005	NTC12-SB23-0810	NTC12-SB24-0005
NTC12-SB24-00502	NTC12-SB25-0005	NTC12-SB25-0204
NTC12-SB26-0005	NTC12-SB26-0406	NTC12-SB27-0005
NTC12-SB27-0204	NTC12-SB28-0005	NTC12-SB28-0204
NTC12-SB29-0005	NTC12-SB29-0204	NTC12-SB30-0005
NTC12-SB30-00502		

Overview

The sample set for NTC Great Lakes CTO F27A, SDG CTOF27AGL001, consists of twenty-two (22) soil environmental samples. Two (2) field duplicate pairs (NTC12-SB25-0204 / NTC12-DUP02 and NTC12-SB27-0204 / NTC12-DUP01) were included within this SDG.

All samples were analyzed for target analyte list (TAL) metals. The samples were collected by Tetra Tech on December 20, 2010 and analyzed by Empirical Laboratories, LLC. Metals analyses were conducted using SW-846 method 6010C. Mercury analyses were conducted using SW-846 methods 7471A.

Samples NTC12-DUP01, NTC12-DUP02, NTC12-SB21-0005, NTC12-SB25-0204 and NTC12-SB27-0204 were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Initial and Continuing Calibrations
• Laboratory Method / Preparation Blanks
• ICP Interference Analysis
* • Laboratory Control Sample Recoveries
• Matrix Spike / Matrix Spike Duplicate Recoveries
• ICP Serial Dilution Results
• Field Duplicate Results
* • Detection Limits
* • Analyte Quantitation

* - All quality control criteria were met for this parameter.

The remaining samples were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Initial and Continuing Calibrations
• Laboratory Method / Preparation Blanks
• Matrix Spike / Matrix Spike Duplicate Recoveries
• Field Duplicate Results
* • Detection Limits
* • Analyte Quantitation

* - All quality control criteria were met for this parameter.

Qualified (if applicable) analytical results are summarized in Appendix A. Results as reported by the laboratory are presented in Appendix B. Appendix C contains the documentation to support the findings as discussed in this validation report.

ICP Interference Analysis

The interfering analytes calcium, magnesium and/or iron were present in samples NTC12-DUP01, NTC12-SB21-0005, NTC12-SB25-0204 and NTCSB27-0204 at concentrations that were equal to the calcium, magnesium and/or iron concentrations in the Interference Check Sample (ICS) solution. The analytes cadmium, copper, manganese and/or zinc were present in the ICS solution at a concentration that exceeded the absolute value of the Method Detection Limit (MDL). Interference effects exist for cadmium in the affected samples. The positive results reported for cadmium were qualified as estimated, "J".

Matrix Spike / Matrix Spike Duplicate Recoveries

The matrix spike / matrix spike duplicate percent recoveries for antimony were < 30% quality control limit. The post digestion spike recovery for antimony was > 120% quality control limit. The positive and nondetected results reported for antimony were qualified as estimated, "J" and "UJ", respectively.

The matrix spike and/or matrix spike duplicate percent recoveries for cadmium, arsenic, barium and sodium were > 120% quality control limit. The positive results reported for cadmium, arsenic, barium and sodium were qualified as estimated, "J".

The matrix spike duplicate percent recovery for chromium was < 80% quality control limit. The positive results reported for chromium were qualified as estimated, "J".

ICP Serial Dilution Results

The ICP serial dilution percent difference was > 10% quality control limit (sample result > 50X IDL) for iron and manganese. The positive results reported for iron and manganese were qualified as estimated, "J".

Field Duplicate Results

Field duplicate imprecision (relative percent difference > 50%) was noted for lead and zinc for sample pairs NTC12-SB25-0204 / NTC12-DUP02 and NTC12-SB27-0204 / NTC12-DUP01. The positive results reported for lead and zinc were qualified as estimated, "J".

Field duplicate imprecision (relative percent difference > 50%) was noted for arsenic, cadmium, calcium, chromium, copper, magnesium, manganese, mercury, nickel and silver for sample pair NTC12-SB25-0204 / NTC12-DUP02. The positive results reported for the aforementioned analytes for samples NTC12-SB25-0204 and NTC12-DUP02 were qualified as estimated, "J".

Notes

The positive results greater than the method detection limit but below the limit of quantitation were qualified as estimated, "J".

Nondetected results were reported to the limit of detection (LOD).

The following contaminants were detected in the laboratory method/preparation blanks at the following maximum concentrations:

Analyte	Maximum Concentration	Action Level
Chromium[1]	0.407 mg/kg	2.035 mg/kg
Chromium[4]	0.113 mg/kg	0.565 mg/kg
Iron[2]	43.2 ug/L	10.8 mg/kg
Iron[4]	2.70 mg/kg	13.5 mg/kg
Lead[3]	1.71 ug/L	0.4275 mg/kg
Zinc[1]	0.102 mg/kg	0.51 mg/kg
Zinc[4]	0.455 mg/kg	2.275 mg/kg

(1) Maximum concentration present in a soil preparation blank affecting batch IA04001.
(2) Maximum concentration present in a method blank affecting all samples except NTC12-DUP02 and NTC12-SB29-0204.
(3) Maximum concentration present in a method blank affecting samples except NTC12-SB24-0005, NTC12-SB30-0005 and NTC12-SB30-00502.
(4) Maximum concentration present in a soil blank affecting batch IA04002.

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. No validation actions were taken as all sample results were greater than the action level.

The matrix spike / matrix spike duplicate relative percent difference for copper was > 20% laboratory control limit. No validation actions are required for matrix spike / matrix spike duplicate relative percent difference noncompliances.

Executive Summary

Laboratory Performance: None.

Other Factors Affecting Data Quality: The interfering analytes calcium, magnesium and/or iron were present in samples NTC12-DUP01, NTC12-SB21-0005, NTC12-SB25-0204 and NTCSB27-0204. Several matrix spike / matrix spike duplicate percent recoveries were outside the 80-120% quality control limits. The ICP serial dilution percent difference was > 10% quality control limit for iron and manganese. Field duplicate imprecision was noted for lead and zinc for sample pairs NTC12-SB25-0204 / NTC12-DUP02 and NTC12-SB27-0204 / NTC12-DUP01. Field duplicate imprecision was noted for arsenic, cadmium, calcium, chromium, copper, magnesium, manganese, mercury, nickel and silver for sample pair NTC12-SB25-0204 / NTC12-DUP02.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", October 2004, and the DOD document entitled "Quality System Manual (QSM) for Environmental Laboratories" (Jan 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: 02416	NSAMPLE	NTC12-DUP01			NTC12-DUP02			NTC12-SB21-0005			NTC12-SB21-0507		
SDG: CTOF27AGL001	LAB_ID	1012185-10			1012185-11			1012185-17			1012185-18		
FRACTION: M	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	89.4			82.9			85.0			85.3		
	DUP_OF	NTC12-SB27-0204			NTC12-SB25-0204								
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		10800			7940			8480			6720		
ANTIMONY		0.45	UJ	D	3.09	J	D	0.468	UJ	D	2.48	J	DP
ARSENIC		9.02	J	D	23.5	J	DG	10.3	J	D	18.3	J	D
BARIUM		62.3	J	D	125	J	D	244	J	D	432	J	D
BERYLLIUM		0.768			1.53	U		0.544			1.48	U	
CADMIUM		0.0875	J	DKP	9.91	J	DG	0.644	J	DK	5.65	J	D
CALCIUM		55800			48100	J	G	45300			44200		
CHROMIUM		15.4	J	D	53.6	J	DG	13.7	J	D	38.9	J	D
COBALT		11.8			13.7			10.5			9.44		
COPPER		36.7			325	J	G	32.5			362		
IRON		19800	J	I	22200	J	I	19100	J	I	18000		
LEAD		26.2	J	G	262	J	G	86	J	G	332	J	G
MAGNESIUM		27800			21100	J	G	23700			20800		
MANGANESE		537	J	I	890	J	GI	678	J	I	566		
MERCURY		0.0385			1.63	J	G	0.0861			0.96		
NICKEL		25.7			65.3	J	G	21.3			50.1		
POTASSIUM		1570			1750			1350			1420		
SELENIUM		0.365	J	P	7.55			0.527	J	P	5.07		
SILVER		0.112	U		25.1	J	G	0.27	J	P	15.2		
SODIUM		134	J	DP	197	J	DP	119	J	DP	173	J	DP
THALLIUM		0.225	U		1.22	U		0.234	U		1.18	U	
VANADIUM		19.9			19.8			16.5			18.6		
ZINC		98.1	J	G	645	J	G	241	J	G	912	J	G

PROJ_NO: 02416 SDG: CTOF27AGL001 FRACTION: M MEDIA: SOIL	NSAMPLE	NTC12-SB22-0005			NTC12-SB22-00502			NTC12-SB23-0005			NTC12-SB23-0810		
	LAB_ID	1012185-15			1012185-16			1012185-01			1012185-02		
	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	87.1			85.8			94.2			84.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		8140			9490			1530			2400		
ANTIMONY		0.471	UJ	D	0.471	UJ	D	0.429	UJ	D	0.477	UJ	D
ARSENIC		11.1	J	D	10.8	J	D	4.3	J	D	9.41	J	D
BARIUM		72.2	J	D	87.9	J	D	10	J	D	19.1	J	D
BERYLLIUM		1.17			0.611			0.177	J	P	0.154	J	P
CADMIUM		0.59	J	D	0.804	J	D	0.396	J	DP	0.708	J	D
CALCIUM		81300			37800			142000			61600		
CHROMIUM		13.7	J	D	15.7	J	D	4.97	J	D	7.07	J	D
COBALT		9.34			9.9			2.08			3.91		
COPPER		66.4			54.6			16.9			23		
IRON		15700			18600			5210			7870		
LEAD		66.6	J	G	77.4	J	G	17.9	J	G	39.4	J	G
MAGNESIUM		45900			20400			84600			24200		
MANGANESE		513			674			222			220		
MERCURY		0.192			0.159			0.0414			0.113		
NICKEL		22.2			24.9			5.57			9.43		
POTASSIUM		1430			1480			645			358		
SELENIUM		0.694			0.584	J	P	0.268	U		0.45	J	P
SILVER		0.553	J	P	1.35			0.234	J	P	0.334	J	P
SODIUM		157	J	DP	87.5	J	DP	308	J	D	149	J	DP
THALLIUM		0.294	U		0.235	U		0.322	U		0.239	U	
VANADIUM		18.6			19.1			4.82			6.85		
ZINC		292	J	G	226	J	G	81.9	J	G	119	J	G

PROJ_NO: 02416 SDG: CTOF27AGL001 FRACTION: M MEDIA: SOIL	NSAMPLE	NTC12-SB24-0005			NTC12-SB24-00502			NTC12-SB25-0005			NTC12-SB25-0204		
	LAB_ID	1012185-03			1012185-04			1012185-19			1012185-20		
	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	83.6			89.6			87.5			83.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		1410			1400			6630			7630		
ANTIMONY		0.491	UJ	D	0.451	UJ	D	0.459	UJ	D	0.327	J	DP
ARSENIC		4.28	J	D	4.26	J	D	16.9	J	D	7.74	J	DG
BARIUM		8.91	J	D	6.73	J	D	48.9	J	D	109	J	D
BERYLLIUM		0.158	J	P	0.208	J	P	0.47			0.554		
CADMIUM		0.141	J	DP	0.119	J	DP	0.724	J	DP	1.5	J	DGK
CALCIUM		30200			31000			92700			85700	J	G
CHROMIUM		5.19	J	D	4.65	J	D	13.4	J	D	25.1	J	DG
COBALT		2.35			2.37			7.22			7.66		
COPPER		8.77			6.56			57.1			88.4	J	G
IRON		4710			4650			14000			15900	J	I
LEAD		32.4	J	G	26.6	J	G	65.6	J	G	127	J	G
MAGNESIUM		13900			13200			54600			42600	J	G
MANGANESE		151			143			409			503	J	GI
MERCURY		0.0409	J	P	0.0327	J	P	0.164			0.908	J	G
NICKEL		4.96			4.36			18.5			22.5	J	G
POTASSIUM		232	J	P	239	J	P	1310			1490		
SELENIUM		0.307	U		0.271	J	P	0.322	J	P	0.807		
SILVER		0.123	U		0.113	U		0.304	J	P	5.28	J	G
SODIUM		94.9	J	DP	84.7	J	DP	160	J	DP	250	J	DP
THALLIUM		0.245	U		0.226	U		0.23	U		0.235	U	
VANADIUM		5.41			4.93			15.2			15.6		
ZINC		47.3	J	G	43.7	J	G	190	J	G	253	J	G

PROJ_NO: 02416 SDG: CTOF27AGL001 FRACTION: M MEDIA: SOIL	NSAMPLE	NTC12-SB26-0005			NTC12-SB26-0406			NTC12-SB27-0005			NTC12-SB27-0204		
	LAB_ID	1012185-08			1012185-09			1012185-13			1012185-14		
	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	89.7			79.9			83.5			86.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		7050			10300			10000			9680		
ANTIMONY		0.44	J	DP	4.24	J	D	0.458	J	DP	0.297	J	DP
ARSENIC		9.15	J	D	25	J	D	7.9	J	D	8.9	J	D
BARIUM		94.7	J	D	157	J	D	90.1	J	D	64	J	D
BERYLLIUM		0.56			3.11	U		5.5			1.02		
CADMIUM		0.824	J	D	7.31	J	D	0.514	J	D	0.287	J	DK
CALCIUM		86300			52200			49200			49500		
CHROMIUM		12.7	J	D	60.8	J	D	23.8	J	D	16.6	J	D
COBALT		7.87			17			11.2			10.4		
COPPER		100			274			271			58.8		
IRON		15900			19900			20300			19400	J	I
LEAD		107	J	G	300	J	G	138	J	G	46.8	J	G
MAGNESIUM		48700			21200			23900			26000		
MANGANESE		670			846			538			493	J	I
MERCURY		0.598			1.99			0.182			0.0631		
NICKEL		19.7			88.6			34.7			26.8		
POTASSIUM		1080			2110			1640			1340		
SELENIUM		0.472	J	P	6.57			0.584	J	P	0.283	U	
SILVER		0.811			22.3			0.408	J	P	0.0931	J	P
SODIUM		281	J	DP	270	J	DP	328	J	D	138	J	DP
THALLIUM		0.225	U		1.25	U		0.24	U		0.226	U	
VANADIUM		14.5			25.9			18.9			19.8		
ZINC		215	J	G	568	J	G	1530	J	G	232	J	G

PROJ_NO: 02416 SDG: CTOF27AGL001 FRACTION: M MEDIA: SOIL	NSAMPLE	NTC12-SB28-0005			NTC12-SB28-0204			NTC12-SB29-0005			NTC12-SB29-0204		
	LAB_ID	1012185-21			1012185-22			1012185-23			1012185-24		
	SAMP_DATE	12/20/2010			12/20/2010			12/20/2010			12/20/2010		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	87.7			89.0			86.5			83.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		7850			6470			7320			11700		
ANTIMONY		0.456	UJ	D	0.461	UJ	D	1.12	J	D	0.589	J	DP
ARSENIC		9.12	J	D	7	J	D	12.9	J	D	17.1	J	D
BARIUM		53.6	J	D	149	J	D	93.5	J	D	163	J	D
BERYLLIUM		0.528			0.496			0.177	J	P	0.933		
CADMIUM		0.555	J	DP	0.497	J	DP	1.03	J	D	1.08	J	D
CALCIUM		77200			62600			83300			46500		
CHROMIUM		15.3	J	D	10.6	J	D	17.3	J	D	21.5	J	D
COBALT		9.01			7.41			9.08			13.5		
COPPER		60.4			104			64.2			70.8		
IRON		15900			14900			14700			31400		
LEAD		53.9	J	G	168	J	G	263	J	G	845	J	G
MAGNESIUM		44000			31500			47300			22100		
MANGANESE		442			359			701			614		
MERCURY		0.131			0.208			0.316			0.0335	J	P
NICKEL		23.2			21			30.6			34.3		
POTASSIUM		1460			1130			963			1600		
SELENIUM		0.288	J	P	0.494	J	P	0.791			0.621	J	P
SILVER		0.527	J	P	0.125	J	P	1.33			0.233	U	
SODIUM		152	J	DP	172	J	DP	336	J	D	181	J	DP
THALLIUM		0.228	U		0.231	U		0.167	J	P	0.466	U	
VANADIUM		15.3			15.2			13.7			22		
ZINC		328	J	G	438	J	G	268	J	G	387	J	G

PROJ_NO: 02416 SDG: CTOF27AGL001 FRACTION: M MEDIA: SOIL	NSAMPLE	NTC12-SB30-0005			NTC12-SB30-00502		
	LAB_ID	1012185-06			1012185-07		
	SAMP_DATE	12/20/2010			12/20/2010		
	QC_TYPE	NM			NM		
	UNITS	MG/KG			MG/KG		
	PCT_SOLIDS	91.1			87.5		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		1250			1380		
ANTIMONY		0.446	UJ	D	0.604	J	D
ARSENIC		4.79	J	D	7.33	J	D
BARIUM		8.12	J	D	11.4	J	D
BERYLLIUM		0.147	J	P	0.175	J	P
CADMIUM		0.119	J	DP	0.212	J	DP
CALCIUM		24400			26800		
CHROMIUM		4.07	J	D	5.27	J	D
COBALT		2.25			2.94		
COPPER		6.55			10.3		
IRON		4760			5390		
LEAD		25.7	J	G	33.2	J	G
MAGNESIUM		11100			12000		
MANGANESE		137			188		
MERCURY		0.0235	J	P	0.0418		
NICKEL		4.49			5.8		
POTASSIUM		230	J	P	205	J	P
SELENIUM		0.279	U		0.214	J	P
SILVER		0.111	U		0.114	U	
SODIUM		75.3	J	DP	99.4	J	DP
THALLIUM		0.223	U		0.227	U	
VANADIUM		4.53			4.78		
ZINC		44.7	J	G	79.7	J	G

APPENDIX B
RESULTS AS REPORTED BY THE LABORATORY

ANALYSIS DATA SHEET

NTC12-DUP01

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 00:00
% Solids: 89.40

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-10
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.0385	0.0132	0.0336	0.0336	1		SW7471A	1A04009	01/05/11 10:55
7429-90-5	Aluminum	10800	14.1	28.1	56.2	5	D	SW6010C	1A04001	01/06/11 13:35
7440-36-0	Antimony		0.281	0.450	0.562	1	U N	SW6010C	1A04001	01/05/11 14:20
7440-38-2	Arsenic	9.02	0.169	0.337	0.562	1	N	SW6010C	1A04001	01/05/11 14:20
7440-39-3	Barium	62.3	0.281	0.562	2.25	1	N	SW6010C	1A04001	01/05/11 14:20
7440-41-7	Beryllium	0.768	0.0562	0.112	0.281	1		SW6010C	1A04001	01/05/11 14:20
7440-43-9	Cadmium	0.0875	0.0562	0.112	0.281	1	J N	SW6010C	1A04001	01/05/11 14:20
7440-70-2	Calcium	55800	281	562	1410	5	D	SW6010C	1A04001	01/06/11 13:35
7440-47-3	Chromium	15.4	0.112	0.225	0.562	1	N	SW6010C	1A04001	01/05/11 14:20
7440-48-4	Cobalt	11.8	0.281	0.562	0.703	1		SW6010C	1A04001	01/05/11 14:20
7440-50-8	Copper	36.7	0.225	0.450	0.562	1	*	SW6010C	1A04001	01/05/11 14:20
7439-89-6	Iron	19800	1.69	3.37	5.62	1		SW6010C	1A04001	01/05/11 14:20
7439-92-1	Lead	26.2	0.422	0.843	0.843	5	D	SW6010C	1A04001	01/06/11 13:35
7439-95-4	Magnesium	27800	56.2	169	281	1		SW6010C	1A04001	01/05/11 14:20
7439-96-5	Manganese	537	0.169	0.337	0.843	1		SW6010C	1A04001	01/05/11 14:20
7440-02-0	Nickel	25.7	0.169	0.337	0.562	1		SW6010C	1A04001	01/05/11 14:20
7440-09-7	Potassium	1570	56.2	169	281	1		SW6010C	1A04001	01/05/11 14:20
7782-49-2	Selenium	0.365	0.169	0.281	0.562	1	J	SW6010C	1A04001	01/05/11 14:20
7440-22-4	Silver		0.112	0.112	0.562	1	M U	SW6010C	1A04001	01/05/11 14:20
7440-23-5	Sodium	134	56.2	169	281	1	J N	SW6010C	1A04001	01/05/11 14:20
7440-28-0	Thallium		0.169	0.225	0.450	1	U	SW6010C	1A04001	01/05/11 14:20
7440-62-2	Vanadium	19.9	0.281	0.562	0.703	1		SW6010C	1A04001	01/05/11 14:20
7440-66-6	Zinc	98.1	1.41	2.81	5.62	5	D	SW6010C	1A04001	01/06/11 13:35

ANALYSIS DATA SHEET

NTC12-DUP02

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 00:00
% Solids: 82.90

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-11
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	1.63	0.0143	0.0362	0.0362	1		SW7471A	1A04009	01/05/11 10:57
7429-90-5	Aluminum	7940	15.3	30.6	61.2	5	D	SW6010C	1A04001	01/06/11 13:40
7440-36-0	Antimony	3.09	1.53	2.45	3.06	5	D N	SW6010C	1A04001	01/06/11 13:40
7440-38-2	Arsenic	23.5	0.918	1.84	3.06	5	D N	SW6010C	1A04001	01/06/11 13:40
7440-39-3	Barium	125	0.306	0.612	2.45	1	N	SW6010C	1A04001	01/05/11 14:41
7440-41-7	Beryllium		1.53	1.53	1.53	5	U M	SW6010C	1A04001	01/06/11 13:40
7440-43-9	Cadmium	9.91	0.306	0.612	1.53	5	D N	SW6010C	1A04001	01/06/11 13:40
7440-70-2	Calcium	48100	306	612	1530	5	D	SW6010C	1A04001	01/06/11 13:40
7440-47-3	Chromium	53.6	0.612	1.22	3.06	5	D N	SW6010C	1A04001	01/06/11 13:40
7440-48-4	Cobalt	13.7	1.53	3.06	3.83	5	D	SW6010C	1A04001	01/06/11 13:40
7440-50-8	Copper	325	1.22	2.45	3.06	5	D *	SW6010C	1A04001	01/06/11 13:40
7439-89-6	Iron	22200	9.18	18.4	30.6	5	D	SW6010C	1A04001	01/06/11 13:40
7439-92-1	Lead	262	0.459	0.918	0.918	5	D	SW6010C	1A04001	01/06/11 13:40
7439-95-4	Magnesium	21100	61.2	184	306	1		SW6010C	1A04001	01/05/11 14:41
7439-96-5	Manganese	890	0.918	1.84	4.59	5	D	SW6010C	1A04001	01/06/11 13:40
7440-02-0	Nickel	65.3	0.918	1.84	3.06	5	D	SW6010C	1A04001	01/06/11 13:40
7440-09-7	Potassium	1750	61.2	184	306	1		SW6010C	1A04001	01/05/11 14:41
7782-49-2	Selenium	7.55	0.918	1.53	3.06	5	D	SW6010C	1A04001	01/06/11 13:40
7440-22-4	Silver	25.1	0.306	0.612	3.06	5	D	SW6010C	1A04001	01/06/11 13:40
7440-23-5	Sodium	197	61.2	184	306	1	J N	SW6010C	1A04001	01/05/11 14:41
7440-28-0	Thallium		0.918	1.22	2.45	5	U	SW6010C	1A04001	01/06/11 13:40
7440-62-2	Vanadium	19.8	1.53	3.06	3.83	5	D	SW6010C	1A04001	01/06/11 13:40
7440-66-6	Zinc	645	1.53	3.06	6.12	5	D	SW6010C	1A04001	01/06/11 13:40

ANALYSIS DATA SHEET

NTC12-SB21-0005

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 16:20
% Solids: 85.01

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-17
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.0861	0.0143	0.0364	0.0364	1		SW7471A	1A04009	01/05/11 11:10
7429-90-5	Aluminum	8480	5.85	11.7	23.4	2	D	SW6010C	1A04001	01/06/11 14:32
7440-36-0	Antimony		0.293	0.468	0.585	1	U N	SW6010C	1A04001	01/05/11 15:25
7440-38-2	Arsenic	10.3	0.176	0.351	0.585	1	N	SW6010C	1A04001	01/05/11 15:25
7440-39-3	Barium	244	0.293	0.585	2.34	1	N	SW6010C	1A04001	01/05/11 15:25
7440-41-7	Beryllium	0.544	0.0585	0.117	0.293	1		SW6010C	1A04001	01/05/11 15:25
7440-43-9	Cadmium	0.644	0.0585	0.117	0.293	1	N	SW6010C	1A04001	01/05/11 15:25
7440-70-2	Calcium	45300	117	234	585	2	D	SW6010C	1A04001	01/06/11 14:32
7440-47-3	Chromium	13.7	0.117	0.234	0.585	1	N	SW6010C	1A04001	01/05/11 15:25
7440-48-4	Cobalt	10.5	0.293	0.585	0.732	1		SW6010C	1A04001	01/05/11 15:25
7440-50-8	Copper	32.5	0.234	0.468	0.585	1	*	SW6010C	1A04001	01/05/11 15:25
7439-89-6	Iron	19100	1.76	3.51	5.85	1		SW6010C	1A04001	01/05/11 15:25
7439-92-1	Lead	86.0	0.176	0.351	0.351	2	D	SW6010C	1A04001	01/06/11 14:32
7439-95-4	Magnesium	23700	58.5	176	293	1		SW6010C	1A04001	01/05/11 15:25
7439-96-5	Manganese	678	0.351	0.702	1.76	2	D	SW6010C	1A04001	01/06/11 14:32
7440-02-0	Nickel	21.3	0.176	0.351	0.585	1		SW6010C	1A04001	01/05/11 15:25
7440-09-7	Potassium	1350	58.5	176	293	1		SW6010C	1A04001	01/05/11 15:25
7782-49-2	Selenium	0.527	0.176	0.293	0.585	1	J	SW6010C	1A04001	01/05/11 15:25
7440-22-4	Silver	0.270	0.0585	0.117	0.585	1	J	SW6010C	1A04001	01/05/11 15:25
7440-23-5	Sodium	119	58.5	176	293	1	J N	SW6010C	1A04001	01/05/11 15:25
7440-28-0	Thallium		0.176	0.234	0.468	1	U	SW6010C	1A04001	01/05/11 15:25
7440-62-2	Vanadium	16.5	0.293	0.585	0.732	1		SW6010C	1A04001	01/05/11 15:25
7440-66-6	Zinc	241	0.585	1.17	2.34	2	D	SW6010C	1A04001	01/06/11 14:32

ANALYSIS DATA SHEET

NTC12-SB21-0507

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 16:25
% Solids: 85.25

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-18
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.960	0.0127	0.0323	0.0330	1		SW7471A	1A04009	01/05/11 11:15
7429-90-5	Aluminum	6720	14.8	29.6	59.2	5	D	SW6010C	1A04001	01/06/11 14:36
7440-36-0	Antimony	2.48	1.48	2.37	2.96	5	J D N	SW6010C	1A04001	01/06/11 14:36
7440-38-2	Arsenic	18.3	0.889	1.78	2.96	5	D N	SW6010C	1A04001	01/06/11 14:36
7440-39-3	Barium	432	1.48	2.96	11.8	5	D N	SW6010C	1A04001	01/06/11 14:36
7440-41-7	Beryllium		1.48	1.48	1.48	5	U M	SW6010C	1A04001	01/06/11 14:36
7440-43-9	Cadmium	5.65	0.296	0.592	1.48	5	D N	SW6010C	1A04001	01/06/11 14:36
7440-70-2	Calcium	44200	296	592	1480	5	D	SW6010C	1A04001	01/06/11 14:36
7440-47-3	Chromium	38.9	0.592	1.18	2.96	5	D N	SW6010C	1A04001	01/06/11 14:36
7440-48-4	Cobalt	9.44	1.48	2.96	3.70	5	D	SW6010C	1A04001	01/06/11 14:36
7440-50-8	Copper	362	1.18	2.37	2.96	5	D *	SW6010C	1A04001	01/06/11 14:36
7439-89-6	Iron	18000	1.78	3.55	5.92	1		SW6010C	1A04001	01/05/11 15:30
7439-92-1	Lead	332	0.444	0.889	0.889	5	D	SW6010C	1A04001	01/06/11 14:36
7439-95-4	Magnesium	20800	59.2	178	296	1		SW6010C	1A04001	01/05/11 15:30
7439-96-5	Manganese	566	0.178	0.355	0.889	1		SW6010C	1A04001	01/05/11 15:30
7440-02-0	Nickel	50.1	0.889	1.78	2.96	5	D	SW6010C	1A04001	01/06/11 14:36
7440-09-7	Potassium	1420	59.2	178	296	1		SW6010C	1A04001	01/05/11 15:30
7782-49-2	Selenium	5.07	0.889	1.48	2.96	5	D	SW6010C	1A04001	01/06/11 14:36
7440-22-4	Silver	15.2	0.0592	0.118	0.592	1		SW6010C	1A04001	01/05/11 15:30
7440-23-5	Sodium	173	59.2	178	296	1	J N	SW6010C	1A04001	01/05/11 15:30
7440-28-0	Thallium		0.889	1.18	2.37	5	U	SW6010C	1A04001	01/06/11 14:36
7440-62-2	Vanadium	18.6	1.48	2.96	3.70	5	D	SW6010C	1A04001	01/06/11 14:36
7440-66-6	Zinc	912	1.48	2.96	5.92	5	D	SW6010C	1A04001	01/06/11 14:36

ANALYSIS DATA SHEET

NTC12-SB22-0005

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 15:55
% Solids: 87.11

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-15
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.192	0.0144	0.0367	0.0367	1		SW7471A	1A04009	01/05/11 11:06
7429-90-5	Aluminum	8140	14.7	29.4	58.9	5	D	SW6010C	1A04001	01/06/11 14:22
7440-36-0	Antimony		0.294	0.471	0.589	1	U N	SW6010C	1A04001	01/05/11 15:15
7440-38-2	Arsenic	11.1	0.177	0.353	0.589	1	N	SW6010C	1A04001	01/05/11 15:15
7440-39-3	Barium	72.2	0.294	0.589	2.35	1	N	SW6010C	1A04001	01/05/11 15:15
7440-41-7	Beryllium	1.17	0.0589	0.118	0.294	1		SW6010C	1A04001	01/05/11 15:15
7440-43-9	Cadmium	0.590	0.118	0.235	0.589	2	D N	SW6010C	1A04001	01/06/11 14:18
7440-70-2	Calcium	81300	294	589	1470	5	D	SW6010C	1A04001	01/06/11 14:22
7440-47-3	Chromium	13.7	0.235	0.471	1.18	2	D N	SW6010C	1A04001	01/06/11 14:18
7440-48-4	Cobalt	9.34	0.294	0.589	0.736	1		SW6010C	1A04001	01/05/11 15:15
7440-50-8	Copper	66.4	0.235	0.471	0.589	1	*	SW6010C	1A04001	01/05/11 15:15
7439-89-6	Iron	15700	1.77	3.53	5.89	1		SW6010C	1A04001	01/05/11 15:15
7439-92-1	Lead	66.6	0.442	0.883	0.883	5	D	SW6010C	1A04001	01/06/11 14:22
7439-95-4	Magnesium	45900	118	353	589	2	D	SW6010C	1A04001	01/06/11 14:18
7439-96-5	Manganese	513	0.177	0.353	0.883	1		SW6010C	1A04001	01/05/11 15:15
7440-02-0	Nickel	22.2	0.177	0.353	0.589	1		SW6010C	1A04001	01/05/11 15:15
7440-09-7	Potassium	1430	58.9	177	294	1		SW6010C	1A04001	01/05/11 15:15
7782-49-2	Selenium	0.694	0.177	0.294	0.589	1		SW6010C	1A04001	01/05/11 15:15
7440-22-4	Silver	0.553	0.0589	0.118	0.589	1	J	SW6010C	1A04001	01/05/11 15:15
7440-23-5	Sodium	157	58.9	177	294	1	J N	SW6010C	1A04001	01/05/11 15:15
7440-28-0	Thallium		0.294	0.294	0.471	1	M U	SW6010C	1A04001	01/05/11 15:15
7440-62-2	Vanadium	18.6	0.294	0.589	0.736	1		SW6010C	1A04001	01/05/11 15:15
7440-66-6	Zinc	292	1.47	2.94	5.89	5	D	SW6010C	1A04001	01/06/11 14:22

ANALYSIS DATA SHEET

NTC12-SB22-00502

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 16:00
% Solids: 85.85

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-16
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.159	0.0142	0.0360	0.0360	1		SW7471A	1A04009	01/05/11 11:08
7429-90-5	Aluminum	9490	5.88	11.8	23.5	2	D	SW6010C	1A04001	01/06/11 14:27
7440-36-0	Antimony		0.294	0.471	0.588	1	U N	SW6010C	1A04001	01/05/11 15:20
7440-38-2	Arsenic	10.8	0.176	0.353	0.588	1	N	SW6010C	1A04001	01/05/11 15:20
7440-39-3	Barium	87.9	0.294	0.588	2.35	1	N	SW6010C	1A04001	01/05/11 15:20
7440-41-7	Beryllium	0.611	0.0588	0.118	0.294	1		SW6010C	1A04001	01/05/11 15:20
7440-43-9	Cadmium	0.804	0.0588	0.118	0.294	1	N	SW6010C	1A04001	01/05/11 15:20
7440-70-2	Calcium	37800	118	235	588	2	D	SW6010C	1A04001	01/06/11 14:27
7440-47-3	Chromium	15.7	0.118	0.235	0.588	1	N	SW6010C	1A04001	01/05/11 15:20
7440-48-4	Cobalt	9.90	0.294	0.588	0.735	1		SW6010C	1A04001	01/05/11 15:20
7440-50-8	Copper	54.6	0.235	0.471	0.588	1	*	SW6010C	1A04001	01/05/11 15:20
7439-89-6	Iron	18600	1.76	3.53	5.88	1		SW6010C	1A04001	01/05/11 15:20
7439-92-1	Lead	77.4	0.176	0.353	0.353	2	D	SW6010C	1A04001	01/06/11 14:27
7439-95-4	Magnesium	20400	58.8	176	294	1		SW6010C	1A04001	01/05/11 15:20
7439-96-5	Manganese	674	0.353	0.706	1.76	2	D	SW6010C	1A04001	01/06/11 14:27
7440-02-0	Nickel	24.9	0.176	0.353	0.588	1		SW6010C	1A04001	01/05/11 15:20
7440-09-7	Potassium	1480	58.8	176	294	1		SW6010C	1A04001	01/05/11 15:20
7782-49-2	Selenium	0.584	0.176	0.294	0.588	1	J	SW6010C	1A04001	01/05/11 15:20
7440-22-4	Silver	1.35	0.0588	0.118	0.588	1		SW6010C	1A04001	01/05/11 15:20
7440-23-5	Sodium	87.5	58.8	176	294	1	J N	SW6010C	1A04001	01/05/11 15:20
7440-28-0	Thallium		0.176	0.235	0.471	1	U	SW6010C	1A04001	01/05/11 15:20
7440-62-2	Vanadium	19.1	0.294	0.588	0.735	1		SW6010C	1A04001	01/05/11 15:20
7440-66-6	Zinc	226	0.588	1.18	2.35	2	D	SW6010C	1A04001	01/06/11 14:27

ANALYSIS DATA SHEET

NTC12-SB23-0005

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 13:00
% Solids: 94.21

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-01
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.0414	0.0129	0.0328	0.0330	1		SW7471A	1A04009	01/05/11 10:21
7429-90-5	Aluminum	1530	26.8	53.6	107	10	D	SW6010C	1A04001	01/06/11 15:51
7440-36-0	Antimony		0.268	0.429	0.536	1	U N	SW6010C	1A04001	01/05/11 13:42
7440-38-2	Arsenic	4.30	0.161	0.322	0.536	1	N	SW6010C	1A04001	01/05/11 13:42
7440-39-3	Barium	10.0	0.268	0.536	2.14	1	N	SW6010C	1A04001	01/05/11 13:42
7440-41-7	Beryllium	0.177	0.0536	0.107	0.268	1	J	SW6010C	1A04001	01/05/11 13:42
7440-43-9	Cadmium	0.396	0.268	0.536	1.34	5	J D N	SW6010C	1A04001	01/06/11 13:03
7440-70-2	Calcium	142000	536	1070	2680	10	D	SW6010C	1A04001	01/06/11 15:51
7440-47-3	Chromium	4.97	0.536	1.07	2.68	5	D N	SW6010C	1A04001	01/06/11 13:03
7440-48-4	Cobalt	2.08	0.268	0.536	0.670	1		SW6010C	1A04001	01/05/11 13:42
7440-50-8	Copper	16.9	0.214	0.429	0.536	1	*	SW6010C	1A04001	01/05/11 13:42
7439-89-6	Iron	5210	1.61	3.22	5.36	1		SW6010C	1A04001	01/05/11 13:42
7439-92-1	Lead	17.9	0.804	1.61	1.61	10	D	SW6010C	1A04001	01/06/11 15:51
7439-95-4	Magnesium	84600	268	804	1340	5	D	SW6010C	1A04001	01/06/11 13:03
7439-96-5	Manganese	222	0.161	0.322	0.804	1		SW6010C	1A04001	01/05/11 13:42
7440-02-0	Nickel	5.57	0.161	0.322	0.536	1		SW6010C	1A04001	01/05/11 13:42
7440-09-7	Potassium	645	53.6	161	268	1		SW6010C	1A04001	01/05/11 13:42
7782-49-2	Selenium		0.161	0.268	0.536	1	U	SW6010C	1A04001	01/05/11 13:42
7440-22-4	Silver	0.234	0.0536	0.107	0.536	1	J	SW6010C	1A04001	01/05/11 13:42
7440-23-5	Sodium	308	53.6	161	268	1	N	SW6010C	1A04001	01/05/11 13:42
7440-28-0	Thallium		0.322	0.322	0.429	1	M U	SW6010C	1A04001	01/05/11 13:42
7440-62-2	Vanadium	4.82	0.268	0.536	0.670	1		SW6010C	1A04001	01/05/11 13:42
7440-66-6	Zinc	81.9	2.68	5.36	10.7	10	D	SW6010C	1A04001	01/06/11 15:51

ANALYSIS DATA SHEET

NTC12-SB23-0810

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 13:20
% Solids: 84.20

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-02
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.113	0.0165	0.0420	0.0420	1		SW7471A	1A04009	01/05/11 10:23
7429-90-5	Aluminum	2400	14.9	29.8	59.7	5	D	SW6010C	1A04001	01/06/11 13:08
7440-36-0	Antimony		0.298	0.477	0.597	1	U N	SW6010C	1A04001	01/05/11 13:47
7440-38-2	Arsenic	9.41	0.179	0.358	0.597	1	N	SW6010C	1A04001	01/05/11 13:47
7440-39-3	Barium	19.1	0.298	0.597	2.39	1	N	SW6010C	1A04001	01/05/11 13:47
7440-41-7	Beryllium	0.154	0.0597	0.119	0.298	1	J	SW6010C	1A04001	01/05/11 13:47
7440-43-9	Cadmium	0.708	0.0597	0.119	0.298	1	N	SW6010C	1A04001	01/05/11 13:47
7440-70-2	Calcium	61600	298	597	1490	5	D	SW6010C	1A04001	01/06/11 13:08
7440-47-3	Chromium	7.07	0.119	0.239	0.597	1	N	SW6010C	1A04001	01/05/11 13:47
7440-48-4	Cobalt	3.91	0.298	0.597	0.746	1		SW6010C	1A04001	01/05/11 13:47
7440-50-8	Copper	23.0	0.239	0.477	0.597	1	*	SW6010C	1A04001	01/05/11 13:47
7439-89-6	Iron	7870	1.79	3.58	5.97	1		SW6010C	1A04001	01/05/11 13:47
7439-92-1	Lead	39.4	0.448	0.895	0.895	5	D	SW6010C	1A04001	01/06/11 13:08
7439-95-4	Magnesium	24200	59.7	179	298	1		SW6010C	1A04001	01/05/11 13:47
7439-96-5	Manganese	220	0.179	0.358	0.895	1		SW6010C	1A04001	01/05/11 13:47
7440-02-0	Nickel	9.43	0.179	0.358	0.597	1		SW6010C	1A04001	01/05/11 13:47
7440-09-7	Potassium	358	59.7	179	298	1		SW6010C	1A04001	01/05/11 13:47
7782-49-2	Selenium	0.450	0.179	0.298	0.597	1	J	SW6010C	1A04001	01/05/11 13:47
7440-22-4	Silver	0.334	0.0597	0.119	0.597	1	J	SW6010C	1A04001	01/05/11 13:47
7440-23-5	Sodium	149	59.7	179	298	1	J N	SW6010C	1A04001	01/05/11 13:47
7440-28-0	Thallium		0.179	0.239	0.477	1	U	SW6010C	1A04001	01/05/11 13:47
7440-62-2	Vanadium	6.85	0.298	0.597	0.746	1		SW6010C	1A04001	01/05/11 13:47
7440-66-6	Zinc	119	1.49	2.98	5.97	5	D	SW6010C	1A04001	01/06/11 13:08

ANALYSIS DATA SHEET

NTC12-SB24-0005

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 14:00
% Solids: 83.57

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-03
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.0409	0.0167	0.0423	0.0423	1	J	SW7471A	1A04009	01/05/11 10:31
7429-90-5	Aluminum	1410	3.07	6.14	12.3	1		SW6010C	1A04001	01/05/11 13:52
7440-36-0	Antimony		0.307	0.491	0.614	1	U N	SW6010C	1A04001	01/05/11 13:52
7440-38-2	Arsenic	4.28	0.184	0.368	0.614	1	N	SW6010C	1A04001	01/05/11 13:52
7440-39-3	Barium	8.91	0.307	0.614	2.45	1	N	SW6010C	1A04001	01/05/11 13:52
7440-41-7	Beryllium	0.158	0.0614	0.123	0.307	1	J	SW6010C	1A04001	01/05/11 13:52
7440-43-9	Cadmium	0.141	0.0614	0.123	0.307	1	J N	SW6010C	1A04001	01/05/11 13:52
7440-70-2	Calcium	30200	61.4	123	307	1		SW6010C	1A04001	01/05/11 13:52
7440-47-3	Chromium	5.19	0.123	0.245	0.614	1	N	SW6010C	1A04001	01/05/11 13:52
7440-48-4	Cobalt	2.35	0.307	0.614	0.767	1		SW6010C	1A04001	01/05/11 13:52
7440-50-8	Copper	8.77	0.245	0.491	0.614	1	*	SW6010C	1A04001	01/05/11 13:52
7439-89-6	Iron	4710	1.84	3.68	6.14	1		SW6010C	1A04001	01/05/11 13:52
7439-92-1	Lead	32.4	0.0920	0.184	0.184	1		SW6010C	1A04001	01/05/11 13:52
7439-95-4	Magnesium	13900	61.4	184	307	1		SW6010C	1A04001	01/05/11 13:52
7439-96-5	Manganese	151	0.184	0.368	0.920	1		SW6010C	1A04001	01/05/11 13:52
7440-02-0	Nickel	4.96	0.184	0.368	0.614	1		SW6010C	1A04001	01/05/11 13:52
7440-09-7	Potassium	232	61.4	184	307	1	J	SW6010C	1A04001	01/05/11 13:52
7782-49-2	Selenium		0.184	0.307	0.614	1	U	SW6010C	1A04001	01/05/11 13:52
7440-22-4	Silver		0.0614	0.123	0.614	1	U	SW6010C	1A04001	01/05/11 13:52
7440-23-5	Sodium	94.9	61.4	184	307	1	J N	SW6010C	1A04001	01/05/11 13:52
7440-28-0	Thallium		0.245	0.245	0.491	1	M U	SW6010C	1A04001	01/05/11 13:52
7440-62-2	Vanadium	5.41	0.307	0.614	0.767	1		SW6010C	1A04001	01/05/11 13:52
7440-66-6	Zinc	47.3	0.307	0.614	1.23	1		SW6010C	1A04001	01/05/11 13:52

ANALYSIS DATA SHEET

NTC12-SB24-00502

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 14:05
% Solids: 89.56

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-04
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.0327	0.0140	0.0357	0.0357	1	J	SW7471A	1A04009	01/05/11 10:34
7429-90-5	Aluminum	1400	5.64	11.3	22.6	2	D	SW6010C	1A04001	01/06/11 13:12
7440-36-0	Antimony		0.282	0.451	0.564	1	U N	SW6010C	1A04001	01/05/11 13:57
7440-38-2	Arsenic	4.26	0.169	0.338	0.564	1	N	SW6010C	1A04001	01/05/11 13:57
7440-39-3	Barium	6.73	0.282	0.564	2.26	1	N	SW6010C	1A04001	01/05/11 13:57
7440-41-7	Beryllium	0.208	0.0564	0.113	0.282	1	J	SW6010C	1A04001	01/05/11 13:57
7440-43-9	Cadmium	0.119	0.0564	0.113	0.282	1	J N	SW6010C	1A04001	01/05/11 13:57
7440-70-2	Calcium	31000	113	226	564	2	D	SW6010C	1A04001	01/06/11 13:12
7440-47-3	Chromium	4.65	0.113	0.226	0.564	1	N	SW6010C	1A04001	01/05/11 13:57
7440-48-4	Cobalt	2.37	0.282	0.564	0.705	1		SW6010C	1A04001	01/05/11 13:57
7440-50-8	Copper	6.56	0.226	0.451	0.564	1	*	SW6010C	1A04001	01/05/11 13:57
7439-89-6	Iron	4650	1.69	3.38	5.64	1		SW6010C	1A04001	01/05/11 13:57
7439-92-1	Lead	26.6	0.169	0.338	0.338	2	D	SW6010C	1A04001	01/06/11 13:12
7439-95-4	Magnesium	13200	56.4	169	282	1		SW6010C	1A04001	01/05/11 13:57
7439-96-5	Manganese	143	0.169	0.338	0.846	1		SW6010C	1A04001	01/05/11 13:57
7440-02-0	Nickel	4.36	0.169	0.338	0.564	1		SW6010C	1A04001	01/05/11 13:57
7440-09-7	Potassium	239	56.4	169	282	1	J	SW6010C	1A04001	01/05/11 13:57
7782-49-2	Selenium	0.271	0.169	0.282	0.564	1	J	SW6010C	1A04001	01/05/11 13:57
7440-22-4	Silver		0.0564	0.113	0.564	1	U	SW6010C	1A04001	01/05/11 13:57
7440-23-5	Sodium	84.7	56.4	169	282	1	J N	SW6010C	1A04001	01/05/11 13:57
7440-28-0	Thallium		0.169	0.226	0.451	1	U	SW6010C	1A04001	01/05/11 13:57
7440-62-2	Vanadium	4.93	0.282	0.564	0.705	1		SW6010C	1A04001	01/05/11 13:57
7440-66-6	Zinc	43.7	0.564	1.13	2.26	2	D	SW6010C	1A04001	01/06/11 13:12

ANALYSIS DATA SHEET

NTC12-SB25-0005

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 16:35
% Solids: 87.55

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-19
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.164	0.0154	0.0390	0.0390	1		SW7471A	1A04009	01/05/11 11:16
7429-90-5	Aluminum	6630	14.3	28.7	57.4	5	D	SW6010C	1A04001	01/06/11 14:45
7440-36-0	Antimony		0.287	0.459	0.574	1	U N	SW6010C	1A04001	01/05/11 15:34
7440-38-2	Arsenic	16.9	0.172	0.344	0.574	1	N	SW6010C	1A04001	01/05/11 15:34
7440-39-3	Barium	48.9	0.287	0.574	2.30	1	N	SW6010C	1A04001	01/05/11 15:34
7440-41-7	Beryllium	0.470	0.0574	0.115	0.287	1		SW6010C	1A04001	01/05/11 15:34
7440-43-9	Cadmium	0.724	0.287	0.574	1.43	5	J D N	SW6010C	1A04001	01/06/11 14:45
7440-70-2	Calcium	92700	287	574	1430	5	D	SW6010C	1A04001	01/06/11 14:45
7440-47-3	Chromium	13.4	0.574	1.15	2.87	5	D N	SW6010C	1A04001	01/06/11 14:45
7440-48-4	Cobalt	7.22	0.287	0.574	0.717	1		SW6010C	1A04001	01/05/11 15:34
7440-50-8	Copper	57.1	0.230	0.459	0.574	1	*	SW6010C	1A04001	01/05/11 15:34
7439-89-6	Iron	14000	1.72	3.44	5.74	1		SW6010C	1A04001	01/05/11 15:34
7439-92-1	Lead	65.6	0.430	0.861	0.861	5	D	SW6010C	1A04001	01/06/11 14:45
7439-95-4	Magnesium	54600	287	861	1430	5	D	SW6010C	1A04001	01/06/11 14:45
7439-96-5	Manganese	409	0.172	0.344	0.861	1		SW6010C	1A04001	01/05/11 15:34
7440-02-0	Nickel	18.5	0.172	0.344	0.574	1		SW6010C	1A04001	01/05/11 15:34
7440-09-7	Potassium	1310	57.4	172	287	1		SW6010C	1A04001	01/05/11 15:34
7782-49-2	Selenium	0.322	0.172	0.287	0.574	1	J	SW6010C	1A04001	01/05/11 15:34
7440-22-4	Silver	0.304	0.0574	0.115	0.574	1	J	SW6010C	1A04001	01/05/11 15:34
7440-23-5	Sodium	160	57.4	172	287	1	J N	SW6010C	1A04001	01/05/11 15:34
7440-28-0	Thallium		0.172	0.230	0.459	1	U	SW6010C	1A04001	01/05/11 15:34
7440-62-2	Vanadium	15.2	0.287	0.574	0.717	1		SW6010C	1A04001	01/05/11 15:34
7440-66-6	Zinc	190	1.43	2.87	5.74	5	D	SW6010C	1A04001	01/06/11 14:45

ANALYSIS DATA SHEET

NTC12-SB25-0204

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 16:40
% Solids: 83.03

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-20
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.908	0.0168	0.0426	0.0426	1		SW7471A	1A04009	01/05/11 11:18
7429-90-5	Aluminum	7630	14.7	29.4	58.8	5	D	SW6010C	1A04001	01/06/11 14:50
7440-36-0	Antimony	0.327	0.294	0.470	0.588	1	J N	SW6010C	1A04001	01/05/11 15:39
7440-38-2	Arsenic	7.74	0.176	0.353	0.588	1	N	SW6010C	1A04001	01/05/11 15:39
7440-39-3	Barium	109	0.294	0.588	2.35	1	N	SW6010C	1A04001	01/05/11 15:39
7440-41-7	Beryllium	0.554	0.0588	0.118	0.294	1		SW6010C	1A04001	01/05/11 15:39
7440-43-9	Cadmium	1.50	0.294	0.588	1.47	5	D N	SW6010C	1A04001	01/06/11 14:50
7440-70-2	Calcium	85700	294	588	1470	5	D	SW6010C	1A04001	01/06/11 14:50
7440-47-3	Chromium	25.1	0.588	1.18	2.94	5	D N	SW6010C	1A04001	01/06/11 14:50
7440-48-4	Cobalt	7.66	0.294	0.588	0.734	1		SW6010C	1A04001	01/05/11 15:39
7440-50-8	Copper	88.4	0.235	0.470	0.588	1	*	SW6010C	1A04001	01/05/11 15:39
7439-89-6	Iron	15900	1.76	3.53	5.88	1		SW6010C	1A04001	01/05/11 15:39
7439-92-1	Lead	127	0.441	0.881	0.881	5	D	SW6010C	1A04001	01/06/11 14:50
7439-95-4	Magnesium	42600	294	881	1470	5	D	SW6010C	1A04001	01/06/11 14:50
7439-96-5	Manganese	503	0.176	0.353	0.881	1		SW6010C	1A04001	01/05/11 15:39
7440-02-0	Nickel	22.5	0.176	0.353	0.588	1		SW6010C	1A04001	01/05/11 15:39
7440-09-7	Potassium	1490	58.8	176	294	1		SW6010C	1A04001	01/05/11 15:39
7782-49-2	Selenium	0.807	0.176	0.294	0.588	1		SW6010C	1A04001	01/05/11 15:39
7440-22-4	Silver	5.28	0.0588	0.118	0.588	1		SW6010C	1A04001	01/05/11 15:39
7440-23-5	Sodium	250	58.8	176	294	1	J N	SW6010C	1A04001	01/05/11 15:39
7440-28-0	Thallium		0.176	0.235	0.470	1	U	SW6010C	1A04001	01/05/11 15:39
7440-62-2	Vanadium	15.6	0.294	0.588	0.734	1		SW6010C	1A04001	01/05/11 15:39
7440-66-6	Zinc	253	1.47	2.94	5.88	5	D	SW6010C	1A04001	01/06/11 14:50

ANALYSIS DATA SHEET

NTC12-SB26-0005

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 17:35
% Solids: 89.73

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-08
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.598	0.0117	0.0298	0.0330	1		SW7471A	1A04009	01/05/11 10:39
7429-90-5	Aluminum	7050	14.1	28.1	56.3	5	D	SW6010C	1A04001	01/06/11 13:22
7440-36-0	Antimony	0.440	0.281	0.450	0.563	1	J N	SW6010C	1A04001	01/05/11 14:10
7440-38-2	Arsenic	9.15	0.169	0.338	0.563	1	N	SW6010C	1A04001	01/05/11 14:10
7440-39-3	Barium	94.7	0.281	0.563	2.25	1	N	SW6010C	1A04001	01/05/11 14:10
7440-41-7	Beryllium	0.560	0.0563	0.113	0.281	1		SW6010C	1A04001	01/05/11 14:10
7440-43-9	Cadmium	0.824	0.113	0.225	0.563	2	D N	SW6010C	1A04001	01/06/11 13:17
7440-70-2	Calcium	86300	281	563	1410	5	D	SW6010C	1A04001	01/06/11 13:22
7440-47-3	Chromium	12.7	0.225	0.450	1.13	2	D N	SW6010C	1A04001	01/06/11 13:17
7440-48-4	Cobalt	7.87	0.281	0.563	0.704	1		SW6010C	1A04001	01/05/11 14:10
7440-50-8	Copper	100	0.225	0.450	0.563	1	*	SW6010C	1A04001	01/05/11 14:10
7439-89-6	Iron	15900	1.69	3.38	5.63	1		SW6010C	1A04001	01/05/11 14:10
7439-92-1	Lead	107	0.422	0.844	0.844	5	D	SW6010C	1A04001	01/06/11 13:22
7439-95-4	Magnesium	48700	113	338	563	2	D	SW6010C	1A04001	01/06/11 13:17
7439-96-5	Manganese	670	0.338	0.675	1.69	2	D	SW6010C	1A04001	01/06/11 13:17
7440-02-0	Nickel	19.7	0.169	0.338	0.563	1		SW6010C	1A04001	01/05/11 14:10
7440-09-7	Potassium	1080	56.3	169	281	1		SW6010C	1A04001	01/05/11 14:10
7782-49-2	Selenium	0.472	0.169	0.281	0.563	1	J	SW6010C	1A04001	01/05/11 14:10
7440-22-4	Silver	0.811	0.0563	0.113	0.563	1		SW6010C	1A04001	01/05/11 14:10
7440-23-5	Sodium	281	56.3	169	281	1	J N	SW6010C	1A04001	01/05/11 14:10
7440-28-0	Thallium		0.169	0.225	0.450	1	U	SW6010C	1A04001	01/05/11 14:10
7440-62-2	Vanadium	14.5	0.281	0.563	0.704	1		SW6010C	1A04001	01/05/11 14:10
7440-66-6	Zinc	215	1.41	2.81	5.63	5	D	SW6010C	1A04001	01/06/11 13:22

ANALYSIS DATA SHEET

NTC12-SB26-0406

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 17:40
% Solids: 79.89

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-09
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	1.99	0.0168	0.0427	0.0427	1		SW7471A	1A04009	01/05/11 10:51
7429-90-5	Aluminum	10300	15.6	31.1	62.3	5	D	SW6010C	1A04001	01/06/11 13:26
7440-36-0	Antimony	4.24	1.56	2.49	3.11	5	D N	SW6010C	1A04001	01/06/11 13:26
7440-38-2	Arsenic	25.0	0.934	1.87	3.11	5	D N	SW6010C	1A04001	01/06/11 13:26
7440-39-3	Barium	157	0.311	0.623	2.49	1	N	SW6010C	1A04001	01/05/11 14:15
7440-41-7	Beryllium		3.11	3.11	7.78	25	U M	SW6010C	1A04001	01/06/11 13:31
7440-43-9	Cadmium	7.31	0.311	0.623	1.56	5	D N	SW6010C	1A04001	01/06/11 13:26
7440-70-2	Calcium	52200	311	623	1560	5	D	SW6010C	1A04001	01/06/11 13:26
7440-47-3	Chromium	60.8	0.623	1.25	3.11	5	D N	SW6010C	1A04001	01/06/11 13:26
7440-48-4	Cobalt	17.0	1.56	3.11	3.89	5	D	SW6010C	1A04001	01/06/11 13:26
7440-50-8	Copper	274	1.25	2.49	3.11	5	D *	SW6010C	1A04001	01/06/11 13:26
7439-89-6	Iron	19900	1.87	3.74	6.23	1		SW6010C	1A04001	01/05/11 14:15
7439-92-1	Lead	300	0.467	0.934	0.934	5	D	SW6010C	1A04001	01/06/11 13:26
7439-95-4	Magnesium	21200	62.3	187	311	1		SW6010C	1A04001	01/05/11 14:15
7439-96-5	Manganese	846	0.934	1.87	4.67	5	D	SW6010C	1A04001	01/06/11 13:26
7440-02-0	Nickel	88.6	0.934	1.87	3.11	5	D	SW6010C	1A04001	01/06/11 13:26
7440-09-7	Potassium	2110	62.3	187	311	1		SW6010C	1A04001	01/05/11 14:15
7782-49-2	Selenium	6.57	0.934	1.56	3.11	5	D	SW6010C	1A04001	01/06/11 13:26
7440-22-4	Silver	22.3	0.311	0.623	3.11	5	D	SW6010C	1A04001	01/06/11 13:26
7440-23-5	Sodium	270	62.3	187	311	1	J N	SW6010C	1A04001	01/05/11 14:15
7440-28-0	Thallium		0.934	1.25	2.49	5	U	SW6010C	1A04001	01/06/11 13:26
7440-62-2	Vanadium	25.9	1.56	3.11	3.89	5	D	SW6010C	1A04001	01/06/11 13:26
7440-66-6	Zinc	568	1.56	3.11	6.23	5	D	SW6010C	1A04001	01/06/11 13:26

ANALYSIS DATA SHEET

NTC12-SB27-0005

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 15:30
% Solids: 83.51

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-13
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.182	0.0146	0.0370	0.0370	1		SW7471A	1A04009	01/05/11 10:59
7429-90-5	Aluminum	10000	15.0	29.9	59.9	5	D	SW6010C	1A04001	01/06/11 14:04
7440-36-0	Antimony	0.458	0.299	0.479	0.599	1	J N	SW6010C	1A04001	01/05/11 14:46
7440-38-2	Arsenic	7.90	0.898	1.80	2.99	5	D N	SW6010C	1A04001	01/06/11 14:04
7440-39-3	Barium	90.1	0.299	0.599	2.40	1	N	SW6010C	1A04001	01/05/11 14:46
7440-41-7	Beryllium	5.50	0.0599	0.120	0.299	1		SW6010C	1A04001	01/05/11 14:46
7440-43-9	Cadmium	0.514	0.0599	0.120	0.299	1	N	SW6010C	1A04001	01/05/11 14:46
7440-70-2	Calcium	49200	299	599	1500	5	D	SW6010C	1A04001	01/06/11 14:04
7440-47-3	Chromium	23.8	0.120	0.240	0.599	1	N	SW6010C	1A04001	01/05/11 14:46
7440-48-4	Cobalt	11.2	0.299	0.599	0.748	1		SW6010C	1A04001	01/05/11 14:46
7440-50-8	Copper	271	0.240	0.479	0.599	1	*	SW6010C	1A04001	01/05/11 14:46
7439-89-6	Iron	20300	1.80	3.59	5.99	1		SW6010C	1A04001	01/05/11 14:46
7439-92-1	Lead	138	0.449	0.898	0.898	5	D	SW6010C	1A04001	01/06/11 14:04
7439-95-4	Magnesium	23900	59.9	180	299	1		SW6010C	1A04001	01/05/11 14:46
7439-96-5	Manganese	538	0.180	0.359	0.898	1		SW6010C	1A04001	01/05/11 14:46
7440-02-0	Nickel	34.7	0.898	1.80	2.99	5	D	SW6010C	1A04001	01/06/11 14:04
7440-09-7	Potassium	1640	59.9	180	299	1		SW6010C	1A04001	01/05/11 14:46
7782-49-2	Selenium	0.584	0.180	0.299	0.599	1	J	SW6010C	1A04001	01/05/11 14:46
7440-22-4	Silver	0.408	0.0599	0.120	0.599	1	J	SW6010C	1A04001	01/05/11 14:46
7440-23-5	Sodium	328	59.9	180	299	1	N	SW6010C	1A04001	01/05/11 14:46
7440-28-0	Thallium		0.240	0.240	0.479	1	M U	SW6010C	1A04001	01/05/11 14:46
7440-62-2	Vanadium	18.9	0.299	0.599	0.748	1		SW6010C	1A04001	01/05/11 14:46
7440-66-6	Zinc	1530	1.50	2.99	5.99	5	D	SW6010C	1A04001	01/06/11 14:04

ANALYSIS DATA SHEET

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 15:35
% Solids: 86.58

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-14
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.0631	0.0129	0.0327	0.0330	1		SW7471A	1A04009	01/05/11 11:00
7429-90-5	Aluminum	9680	14.2	28.3	56.6	5	D	SW6010C	1A04001	01/06/11 14:08
7440-36-0	Antimony	0.297	0.283	0.453	0.566	1	J N	SW6010C	1A04001	01/05/11 14:50
7440-38-2	Arsenic	8.90	0.170	0.340	0.566	1	N	SW6010C	1A04001	01/05/11 14:50
7440-39-3	Barium	64.0	0.283	0.566	2.26	1	N	SW6010C	1A04001	01/05/11 14:50
7440-41-7	Beryllium	1.02	0.0566	0.113	0.283	1		SW6010C	1A04001	01/05/11 14:50
7440-43-9	Cadmium	0.287	0.0566	0.113	0.283	1	N	SW6010C	1A04001	01/05/11 14:50
7440-70-2	Calcium	49500	283	566	1420	5	D	SW6010C	1A04001	01/06/11 14:08
7440-47-3	Chromium	16.6	0.113	0.226	0.566	1	N	SW6010C	1A04001	01/05/11 14:50
7440-48-4	Cobalt	10.4	0.283	0.566	0.708	1		SW6010C	1A04001	01/05/11 14:50
7440-50-8	Copper	58.8	0.226	0.453	0.566	1	*	SW6010C	1A04001	01/05/11 14:50
7439-89-6	Iron	19400	1.70	3.40	5.66	1		SW6010C	1A04001	01/05/11 14:50
7439-92-1	Lead	46.8	0.425	0.849	0.849	5	D	SW6010C	1A04001	01/06/11 14:08
7439-95-4	Magnesium	26000	56.6	170	283	1		SW6010C	1A04001	01/05/11 14:50
7439-96-5	Manganese	493	0.170	0.340	0.849	1		SW6010C	1A04001	01/05/11 14:50
7440-02-0	Nickel	26.8	0.170	0.340	0.566	1		SW6010C	1A04001	01/05/11 14:50
7440-09-7	Potassium	1340	56.6	170	283	1		SW6010C	1A04001	01/05/11 14:50
7782-49-2	Selenium		0.170	0.283	0.566	1	U	SW6010C	1A04001	01/05/11 14:50
7440-22-4	Silver	0.0931	0.0566	0.113	0.566	1	J	SW6010C	1A04001	01/05/11 14:50
7440-23-5	Sodium	138	56.6	170	283	1	J N	SW6010C	1A04001	01/05/11 14:50
7440-28-0	Thallium		0.170	0.226	0.453	1	U	SW6010C	1A04001	01/05/11 14:50
7440-62-2	Vanadium	19.8	0.283	0.566	0.708	1		SW6010C	1A04001	01/05/11 14:50
7440-66-6	Zinc	232	1.42	2.83	5.66	5	D	SW6010C	1A04001	01/06/11 14:08

ANALYSIS DATA SHEET

NTC12-SB28-0005

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 17:00
% Solids: 87.72

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-21
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.131	0.0148	0.0376	0.0376	1		SW7471A	1A04009	01/05/11 11:20
7429-90-5	Aluminum	7850	14.2	28.5	57.0	5	D	SW6010C	1A04001	01/06/11 15:12
7440-36-0	Antimony		0.285	0.456	0.570	1	U N	SW6010C	1A04001	01/05/11 15:44
7440-38-2	Arsenic	9.12	0.171	0.342	0.570	1	N	SW6010C	1A04001	01/05/11 15:44
7440-39-3	Barium	53.6	0.285	0.570	2.28	1	N	SW6010C	1A04001	01/05/11 15:44
7440-41-7	Beryllium	0.528	0.0570	0.114	0.285	1		SW6010C	1A04001	01/05/11 15:44
7440-43-9	Cadmium	0.555	0.285	0.570	1.42	5	J D N	SW6010C	1A04001	01/06/11 15:12
7440-70-2	Calcium	77200	285	570	1420	5	D	SW6010C	1A04001	01/06/11 15:12
7440-47-3	Chromium	15.3	0.570	1.14	2.85	5	D N	SW6010C	1A04001	01/06/11 15:12
7440-48-4	Cobalt	9.01	0.285	0.570	0.712	1		SW6010C	1A04001	01/05/11 15:44
7440-50-8	Copper	60.4	0.228	0.456	0.570	1	*	SW6010C	1A04001	01/05/11 15:44
7439-89-6	Iron	15900	1.71	3.42	5.70	1		SW6010C	1A04001	01/05/11 15:44
7439-92-1	Lead	53.9	0.427	0.855	0.855	5	D	SW6010C	1A04001	01/06/11 15:12
7439-95-4	Magnesium	44000	285	855	1420	5	D	SW6010C	1A04001	01/06/11 15:12
7439-96-5	Manganese	442	0.171	0.342	0.855	1		SW6010C	1A04001	01/05/11 15:44
7440-02-0	Nickel	23.2	0.171	0.342	0.570	1		SW6010C	1A04001	01/05/11 15:44
7440-09-7	Potassium	1460	57.0	171	285	1		SW6010C	1A04001	01/05/11 15:44
7782-49-2	Selenium	0.288	0.171	0.285	0.570	1	J	SW6010C	1A04001	01/05/11 15:44
7440-22-4	Silver	0.527	0.0570	0.114	0.570	1	J	SW6010C	1A04001	01/05/11 15:44
7440-23-5	Sodium	152	57.0	171	285	1	J N	SW6010C	1A04001	01/05/11 15:44
7440-28-0	Thallium		0.171	0.228	0.456	1	U	SW6010C	1A04001	01/05/11 15:44
7440-62-2	Vanadium	15.3	0.285	0.570	0.712	1		SW6010C	1A04001	01/05/11 15:44
7440-66-6	Zinc	328	1.42	2.85	5.70	5	D	SW6010C	1A04001	01/06/11 15:12

ANALYSIS DATA SHEET

NTC12-SB28-0204

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 17:05
% Solids: 88.95

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-22
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.208	0.0122	0.0309	0.0330	1		SW7471A	1A04009	01/05/11 11:22
7429-90-5	Aluminum	6470	14.4	28.8	57.7	5	D	SW6010C	1A04002	01/06/11 15:22
7440-36-0	Antimony		0.288	0.461	0.577	1	U	SW6010C	1A04002	01/05/11 16:18
7440-38-2	Arsenic	7.00	0.173	0.346	0.577	1		SW6010C	1A04002	01/05/11 16:18
7440-39-3	Barium	149	0.288	0.577	2.31	1		SW6010C	1A04002	01/05/11 16:18
7440-41-7	Beryllium	0.496	0.0577	0.115	0.288	1		SW6010C	1A04002	01/05/11 16:18
7440-43-9	Cadmium	0.497	0.115	0.231	0.577	2	J D	SW6010C	1A04002	01/06/11 15:17
7440-70-2	Calcium	62600	288	577	1440	5	D	SW6010C	1A04002	01/06/11 15:22
7440-47-3	Chromium	10.6	0.231	0.461	1.15	2	D	SW6010C	1A04002	01/06/11 15:17
7440-48-4	Cobalt	7.41	0.288	0.577	0.721	1		SW6010C	1A04002	01/05/11 16:18
7440-50-8	Copper	104	0.231	0.461	0.577	1		SW6010C	1A04002	01/05/11 16:18
7439-89-6	Iron	14900	1.73	3.46	5.77	1		SW6010C	1A04002	01/05/11 16:18
7439-92-1	Lead	168	0.432	0.865	0.865	5	D	SW6010C	1A04002	01/06/11 15:22
7439-95-4	Magnesium	31500	115	346	577	2	D	SW6010C	1A04002	01/06/11 15:17
7439-96-5	Manganese	359	0.173	0.346	0.865	1		SW6010C	1A04002	01/05/11 16:18
7440-02-0	Nickel	21.0	0.173	0.346	0.577	1		SW6010C	1A04002	01/05/11 16:18
7440-09-7	Potassium	1130	57.7	173	288	1		SW6010C	1A04002	01/05/11 16:18
7782-49-2	Selenium	0.494	0.173	0.288	0.577	1	J	SW6010C	1A04002	01/05/11 16:18
7440-22-4	Silver	0.125	0.0577	0.115	0.577	1	J	SW6010C	1A04002	01/05/11 16:18
7440-23-5	Sodium	172	57.7	173	288	1	J	SW6010C	1A04002	01/05/11 16:18
7440-28-0	Thallium		0.173	0.231	0.461	1	U	SW6010C	1A04002	01/05/11 16:18
7440-62-2	Vanadium	15.2	0.288	0.577	0.721	1		SW6010C	1A04002	01/05/11 16:18
7440-66-6	Zinc	438	1.44	2.88	5.77	5	D	SW6010C	1A04002	01/06/11 15:22

ANALYSIS DATA SHEET

NTC12-SB29-0005

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 17:20
% Solids: 86.52

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-23
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.316	0.0145	0.0369	0.0369	1		SW7471A	1A04010	01/05/11 11:27
7429-90-5	Aluminum	7320	13.9	27.8	55.6	5	D	SW6010C	1A04002	01/06/11 15:31
7440-36-0	Antimony	1.12	0.278	0.445	0.556	1		SW6010C	1A04002	01/05/11 16:23
7440-38-2	Arsenic	12.9	0.167	0.333	0.556	1		SW6010C	1A04002	01/05/11 16:23
7440-39-3	Barium	93.5	0.278	0.556	2.22	1		SW6010C	1A04002	01/05/11 16:23
7440-41-7	Beryllium	0.177	0.0556	0.111	0.278	1	J	SW6010C	1A04002	01/05/11 16:23
7440-43-9	Cadmium	1.03	0.111	0.222	0.556	2	D	SW6010C	1A04002	01/06/11 15:26
7440-70-2	Calcium	83300	278	556	1390	5	D	SW6010C	1A04002	01/06/11 15:31
7440-47-3	Chromium	17.3	0.222	0.445	1.11	2	D	SW6010C	1A04002	01/06/11 15:26
7440-48-4	Cobalt	9.08	0.278	0.556	0.695	1		SW6010C	1A04002	01/05/11 16:23
7440-50-8	Copper	64.2	0.222	0.445	0.556	1		SW6010C	1A04002	01/05/11 16:23
7439-89-6	Iron	14700	1.67	3.33	5.56	1		SW6010C	1A04002	01/05/11 16:23
7439-92-1	Lead	263	0.417	0.834	0.834	5	D	SW6010C	1A04002	01/06/11 15:31
7439-95-4	Magnesium	47300	111	333	556	2	D	SW6010C	1A04002	01/06/11 15:26
7439-96-5	Manganese	701	0.333	0.667	1.67	2	D	SW6010C	1A04002	01/06/11 15:26
7440-02-0	Nickel	30.6	0.167	0.333	0.556	1		SW6010C	1A04002	01/05/11 16:23
7440-09-7	Potassium	963	55.6	167	278	1		SW6010C	1A04002	01/05/11 16:23
7782-49-2	Selenium	0.791	0.167	0.278	0.556	1		SW6010C	1A04002	01/05/11 16:23
7440-22-4	Silver	1.33	0.0556	0.111	0.556	1		SW6010C	1A04002	01/05/11 16:23
7440-23-5	Sodium	336	55.6	167	278	1		SW6010C	1A04002	01/05/11 16:23
7440-28-0	Thallium	0.167	0.167	0.222	0.445	1	J	SW6010C	1A04002	01/05/11 16:23
7440-62-2	Vanadium	13.7	0.278	0.556	0.695	1		SW6010C	1A04002	01/05/11 16:23
7440-66-6	Zinc	268	1.39	2.78	5.56	5	D	SW6010C	1A04002	01/06/11 15:31

ANALYSIS DATA SHEET

NTC12-SB29-0204

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
* Sampled: 12/20/10 17:25
% Solids: 83.01

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-24
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.0335	0.0147	0.0373	0.0373	1	J	SW7471A	1A04010	01/05/11 11:29
7429-90-5	Aluminum	11700	5.82	11.6	23.3	2	D	SW6010C	1A04002	01/06/11 15:36
7440-36-0	Antimony	0.589	0.582	0.931	1.16	2	J D	SW6010C	1A04002	01/06/11 15:36
7440-38-2	Arsenic	17.1	0.349	0.698	1.16	2	D	SW6010C	1A04002	01/06/11 15:36
7440-39-3	Barium	163	0.582	1.16	4.66	2	D	SW6010C	1A04002	01/06/11 15:36
7440-41-7	Beryllium	0.933	0.0582	0.116	0.291	1		SW6010C	1A04002	01/05/11 16:28
7440-43-9	Cadmium	1.08	0.116	0.233	0.582	2	D	SW6010C	1A04002	01/06/11 15:36
7440-70-2	Calcium	46500	116	233	582	2	D	SW6010C	1A04002	01/06/11 15:36
7440-47-3	Chromium	21.5	0.233	0.466	1.16	2	D	SW6010C	1A04002	01/06/11 15:36
7440-48-4	Cobalt	13.5	0.582	1.16	1.45	2	D	SW6010C	1A04002	01/06/11 15:36
7440-50-8	Copper	70.8	0.466	0.931	1.16	2	D	SW6010C	1A04002	01/06/11 15:36
7439-89-6	Iron	31400	3.49	6.98	11.6	2	D	SW6010C	1A04002	01/06/11 15:36
7439-92-1	Lead	845	0.175	0.349	0.349	2	D	SW6010C	1A04002	01/06/11 15:36
7439-95-4	Magnesium	22100	116	349	582	2	D	SW6010C	1A04002	01/06/11 15:36
7439-96-5	Manganese	614	0.349	0.698	1.75	2	D	SW6010C	1A04002	01/06/11 15:36
7440-02-0	Nickel	34.3	0.349	0.698	1.16	2	D	SW6010C	1A04002	01/06/11 15:36
7440-09-7	Potassium	1600	58.2	175	291	1		SW6010C	1A04002	01/05/11 16:28
7782-49-2	Selenium	0.621	0.349	0.582	1.16	2	J D	SW6010C	1A04002	01/06/11 15:36
7440-22-4	Silver		0.116	0.233	1.16	2	U	SW6010C	1A04002	01/06/11 15:36
7440-23-5	Sodium	181	58.2	175	291	1	J	SW6010C	1A04002	01/05/11 16:28
7440-28-0	Thallium		0.349	0.466	0.931	2	U	SW6010C	1A04002	01/06/11 15:36
7440-62-2	Vanadium	22.0	0.582	1.16	1.45	2	D	SW6010C	1A04002	01/06/11 15:36
7440-66-6	Zinc	387	0.582	1.16	2.33	2	D	SW6010C	1A04002	01/06/11 15:36

ANALYSIS DATA SHEET

NTC12-SB30-0005

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 14:20
% Solids: 91.08

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-06
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.0235	0.0116	0.0294	0.0330	1	J	SW7471A	1A04009	01/05/11 10:36
7429-90-5	Aluminum	1250	2.79	5.57	11.1	1		SW6010C	1A04001	01/05/11 14:01
7440-36-0	Antimony		0.279	0.446	0.557	1	U N	SW6010C	1A04001	01/05/11 14:01
7440-38-2	Arsenic	4.79	0.167	0.334	0.557	1	N	SW6010C	1A04001	01/05/11 14:01
7440-39-3	Barium	8.12	0.279	0.557	2.23	1	N	SW6010C	1A04001	01/05/11 14:01
7440-41-7	Beryllium	0.147	0.0557	0.111	0.279	1	J	SW6010C	1A04001	01/05/11 14:01
7440-43-9	Cadmium	0.119	0.0557	0.111	0.279	1	J N	SW6010C	1A04001	01/05/11 14:01
7440-70-2	Calcium	24400	55.7	111	279	1		SW6010C	1A04001	01/05/11 14:01
7440-47-3	Chromium	4.07	0.111	0.223	0.557	1	N	SW6010C	1A04001	01/05/11 14:01
7440-48-4	Cobalt	2.25	0.279	0.557	0.697	1		SW6010C	1A04001	01/05/11 14:01
7440-50-8	Copper	6.55	0.223	0.446	0.557	1	*	SW6010C	1A04001	01/05/11 14:01
7439-89-6	Iron	4760	1.67	3.34	5.57	1		SW6010C	1A04001	01/05/11 14:01
7439-92-1	Lead	25.7	0.0836	0.167	0.167	1		SW6010C	1A04001	01/05/11 14:01
7439-95-4	Magnesium	11100	55.7	167	279	1		SW6010C	1A04001	01/05/11 14:01
7439-96-5	Manganese	137	0.167	0.334	0.836	1		SW6010C	1A04001	01/05/11 14:01
7440-02-0	Nickel	4.49	0.167	0.334	0.557	1		SW6010C	1A04001	01/05/11 14:01
7440-09-7	Potassium	230	55.7	167	279	1	J	SW6010C	1A04001	01/05/11 14:01
7782-49-2	Selenium		0.167	0.279	0.557	1	U	SW6010C	1A04001	01/05/11 14:01
7440-22-4	Silver		0.0557	0.111	0.557	1	U	SW6010C	1A04001	01/05/11 14:01
7440-23-5	Sodium	75.3	55.7	167	279	1	J N	SW6010C	1A04001	01/05/11 14:01
7440-28-0	Thallium		0.223	0.223	0.446	1	M U	SW6010C	1A04001	01/05/11 14:01
7440-62-2	Vanadium	4.53	0.279	0.557	0.697	1		SW6010C	1A04001	01/05/11 14:01
7440-66-6	Zinc	44.7	0.279	0.557	1.11	1		SW6010C	1A04001	01/05/11 14:01

ANALYSIS DATA SHEET

NTC12-SB30-00502

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Soil
Sampled: 12/20/10 14:25
% Solids: 87.53

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1012185-07
Received: 12/21/10 09:15

CAS NO.	Analyte	Conc. (mg/Kg dry)	DL	LOD	LOQ	D.F.	Q	Method	Batch	Analyzed
7439-97-6	Mercury	0.0418	0.0135	0.0343	0.0343	1		SW7471A	1A04009	01/05/11 10:37
7429-90-5	Aluminum	1380	2.84	5.68	11.4	1		SW6010C	1A04001	01/05/11 14:06
7440-36-0	Antimony	0.604	0.284	0.455	0.568	1	N	SW6010C	1A04001	01/05/11 14:06
7440-38-2	Arsenic	7.33	0.171	0.341	0.568	1	N	SW6010C	1A04001	01/05/11 14:06
7440-39-3	Barium	11.4	0.284	0.568	2.27	1	N	SW6010C	1A04001	01/05/11 14:06
7440-41-7	Beryllium	0.175	0.0568	0.114	0.284	1	J	SW6010C	1A04001	01/05/11 14:06
7440-43-9	Cadmium	0.212	0.0568	0.114	0.284	1	J N	SW6010C	1A04001	01/05/11 14:06
7440-70-2	Calcium	26800	56.8	114	284	1		SW6010C	1A04001	01/05/11 14:06
7440-47-3	Chromium	5.27	0.114	0.227	0.568	1	N	SW6010C	1A04001	01/05/11 14:06
7440-48-4	Cobalt	2.94	0.284	0.568	0.710	1		SW6010C	1A04001	01/05/11 14:06
7440-50-8	Copper	10.3	0.227	0.455	0.568	1	*	SW6010C	1A04001	01/05/11 14:06
7439-89-6	Iron	5390	1.71	3.41	5.68	1		SW6010C	1A04001	01/05/11 14:06
7439-92-1	Lead	33.2	0.0853	0.171	0.171	1		SW6010C	1A04001	01/05/11 14:06
7439-95-4	Magnesium	12000	56.8	171	284	1		SW6010C	1A04001	01/05/11 14:06
7439-96-5	Manganese	188	0.171	0.341	0.853	1		SW6010C	1A04001	01/05/11 14:06
7440-02-0	Nickel	5.80	0.171	0.341	0.568	1		SW6010C	1A04001	01/05/11 14:06
7440-09-7	Potassium	205	56.8	171	284	1	J	SW6010C	1A04001	01/05/11 14:06
7782-49-2	Selenium	0.214	0.171	0.284	0.568	1	J	SW6010C	1A04001	01/05/11 14:06
7440-22-4	Silver		0.0568	0.114	0.568	1	U	SW6010C	1A04001	01/05/11 14:06
7440-23-5	Sodium	99.4	56.8	171	284	1	J N	SW6010C	1A04001	01/05/11 14:06
7440-28-0	Thallium		0.171	0.227	0.455	1	U	SW6010C	1A04001	01/05/11 14:06
7440-62-2	Vanadium	4.78	0.284	0.568	0.710	1		SW6010C	1A04001	01/05/11 14:06
7440-66-6	Zinc	79.7	0.284	0.568	1.14	1		SW6010C	1A04001	01/05/11 14:06

APPENDIX C
SUPPORT DOCUMENTATION

Sample Delivery Group Case Narrative

Receipt Information
The samples were received within the preservation guidelines for the associated methods. The information associated with sample receipt and the Sample Delivery Group (SDG) are included within section 4 of this package, which also provides information on the link between the client sample ID listed on the COC and laboratory's assigned unique sample ID or WorkOrder #. The sample is tracked through the laboratory for all analysis via the assigned WorkOrder #.

All samples that were received were analyzed and none of the samples were placed on hold without analyses. Samples were subcontracted to Test America for BTU Content by ASTM D240.

A trip blank was not received in the shipment.

Changes to the Revision
This is an original submittal of the final report package.

Analytical Information
All samples were prepped (where applicable) and analyzed within the standard allowed holding times, unless noted within the exceptions listed below. The laboratory analyzed all samples within the program and method guidelines. The following information is provided specific to individual methods:

Chromatographic Flags for Manual Integration:
The following letters are used to denote manual integrations on the laboratory's raw data in association with chromatographic integrations:

A: The peak was manually integrated as it was not integrated in the original chromatogram.
B: The peak was manually integrated due to resolution or coelution issues in the original chromatogram.
C: The peak was manually integrated to correct the baseline from the original chromatogram.
D: The peak was manually integrated to identify the correct peak as the wrong peak was identified in the original chromatogram.
E: The peak was manually integrated to include the entire peak as the original chromatogram only integrated part of the peak.

SW8260B TCLP:
The matrix spike associated to sample 1012185-12 exceeded criteria with a positive bias for Vinyl Chloride.

The continuing calibration verification 0L36401-CCV1 exceeded criteria with a positive bias for 2-Butanone.

The matrix spike associated to sample 1012185-14 exceeded criteria with a negative bias on column 2 for 4,4'-DDE.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW8151A TCLP:
The surrogate 2,4-Dichlorophenylacetic Acid exceeded criteria with a negative bias on both columns in sample 1012185-12 and on column 2 with a negative bias for 1012185-12MS and -12MSD.

The matrix spike duplicate associated to sample 1012185-12 exceeded criteria with a negative bias on both columns for 2,4,5-TP(Silvex) and exceeded the relative percent difference criteria for 2,4,5-TP(Silvex) on column 1.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

SW6010B/SW7471A/SW7470A:
The following samples are qualified with an M, for the compound indicated, to indicate that the LOD and/or DL were raised due to interference: 1012185-01, -03, -06, -13 and -15 (Thallium), 1012185-10 (Silver) and 1012185-11 and -18 (Beryllium).

The digestion blank 1A04001-BLK has positive results for Chromium and Zinc. The continuing calibration blanks 1A00702-CCB3 and –CCB4 have positive results for Iron. The digestion blank 1A04002-BLK1 has positive results for Chromium, Iron, Thallium and Zinc. The continuing calibration blank 1A00702-CCB5 has a positive result for Lead.

The matrix spikes associated to sample 1012185-14 exceeded criteria with a negative bias for Antimony and Chromium, with a positive bias for Cadmium, Arsenic, Barium and Sodium and exceeded the relative percent difference for Copper. Copper, Magnesium, Manganese and Potassium also exceeded criteria but the concentrations in the parent sample are greater then 4 times that amount spiked. The post spike associated to sample 1012185-14 exceeded criteria with a positive bias for Antimony, Arsenic, Cadmium, Magnesium, Manganese and Selenium and with a negative bias for Iron.

The serial dilution associated to sample 1012185-14 exceeded criteria for Iron and Manganese.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

Wet Chemistry:
Sample 1012185-12 was received after the EPA recommended holding time for pH.

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

Data Qualifiers

As applicable and where required, the following general qualifiers are associated with the sample results. Additional qualifiers will be specified within the reporting sections of the data package or within the body of the Case Narrative.

Analytical Report Terms and Qualifiers

MDL: The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The MDL is determined from analysis of a sample containing the analyte in a given matrix. For DoD QSM 4.1 reporting purposes, this definition is also applied to the reported Detection Limit (DL).

LOD: The Limit of Detection is an estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte- and matrix-specific and may be laboratory-dependent. This definition is further clarified in the DoD QSM 4.1 revisions as the smallest amount or concentration of a substance that must be present in a sample in order to be detected at a high level of confidence (99%). At the LOD, the false negative rate (Type II error) is 1%.

LOQ: The Limit of Quantitation is the minimum level, concentration, or quantity of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. This term is further clarified within the DoD QSM 4.1 as the lowest concentration that produces a quantitative result within specified limits of precision and bias.

*****: An exceeding quality control criteria is associated with the reported result.

B: The presence of a "B" to the right of an analytical value indicates that this compound was also detected in the method blank and the data should be interpreted with caution. One should consider the possibility that the correct sample result might be less than the reported result and, perhaps, zero.

D: When a sample (or sample extract) is rerun diluted because one of the compound concentrations exceeded the highest concentration range for the standard curve, all of the values obtained in the dilution run will be flagged with a "D".

E: The concentration for any compound found which exceeds the highest concentration level on the standard curve for that compound will be flagged with an "E". Usually the sample will be rerun at a dilution to quantitate the flagged compound.

H1: The result was analyzed outside of the EPA recommended holding time.

H2: The result was extracted outside of the EPA recommended holding time.

H3: The sample for this analyte was received outside of the EPA recommended holding time.

J: The presence of a "J" to the right of an analytical result indicates that the reported result is estimated. The mass spectral data pass the identification criteria showing that the compound is present, but the calculated result is less than the EQL. One should feel confident that the result is greater than zero and less than the EQL.

M: Indicates that the sample matrix interfered with the quantitation of the analyte. In dual column analysis the result is reported from the column with the lower concentration. In inorganics, it indicates that the parameters MDL/RL has been raised.

N: The MS/MSD accuracy and/or precision are outside criteria. The predigested spike recovery is not within control limits for the associated parameter.

P: The associated numerical value is an estimated quantity. There is greater than a 40% difference between the two GC columns for the detected concentrations. The higher of the two values is reported unless matrix interference is obvious or for HPLC analysis where the primary column is reported.

Q: The RPD and/or percent recovery exceeded limits in the associated Blank Spike and/or Blank Spike Duplicate.

S: The associated internal standard failed criteria.

U: The presence of a "U" indicates that the analyte was analyzed for but was not detected or the concentration of the analyte quantitated below the DL.

X: The parameter shows a potential positive bias on a reported concentration due to an ICV or CCV exceeding the upper control limit on the high side.

Y: The parameter shows a potential negative bias on a reported concentration due to an ICV or CCV exceeding the lower control limit on the low side.

Z: The parameter shows lack of confirmation/detection, which may be due to a negative bias in the ICV or CCV which exceeds the lower control limit.

LIMS Definitions / Naming Conventions:
The following are general naming conventions that are used throughout the laboratory; however, on a method by method basis, there are additional QAQC items that are named in a consistent format.

BLK: LIMS assigns a unique identifier to the Method Blank by naming it as the letters BLK appended to the Batch ID. A Method Blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The Method Blank is used to assess for possible contamination during preparation and/or analysis steps. Method Blanks within a Batch or Analytical sequence will be appended with a numerical value beginning with 1 that will increase incrementally.

BS: LIMS assigns a unique identifier to the Blank Spike by naming it as the letters BS appended to the Batch ID. The Blank Spike or Lab Control Sample is a controlled analyte-free matrix, which is spiked with known and verified concentrations of target analytes. Spiking concentrations can be referenced in the method SOP. The BS is used to evaluate the viability of analytes taken through the entire prep (when applicable) and analytical process. Blank Spikes within a Batch or Analytical sequence will be appended with a numerical value beginning with 1 that will increase incrementally. A duplicate Blank Spike will be designated as a BSD.

MS: The LIMS assigns each Client sample with a unique identifier. The Matrix Spike is designated with a MS at the end of the sample's unique identifier. The Matrix Spike sample is used to assess the effect of the sample matrix on the precision and accuracy of the results generated using the selected method. A duplicate Matrix Spike will be designated as a MSD.

IDs: The LIMS assigns each Client sample with a unique identifier. The letter "RE" may potentially be appended to the end of the LIMS Sample ID. And "**RE**" implies that the sample was either re-prepped, re-analyzed straight, or re-analyzed at a dilution. Subsequent re-analysis for the sample will be appended with a numerical value beginning with 1 that will increase incrementally. Eg: RE1, RE2, RE3, etc.

Statement of Data Authenticity:
I certify that, based upon my inquiry of those individuals immediately responsible for obtaining the information and to the best of my knowledge, the data package is in compliance with the terms and conditions of the contract, both technically and for completeness, with the exception of the conditions detailed in this Case Narrative, as verified by my signature below. During absences, Ms. Marcia K. McGinnity is authorized to sign this Statement of Data Authenticity.

Mr. Rick D. Davis
Laboratory Technical Director / VP Operations

EMPIRICAL LABORATORIES, LLC - CHAIN OF CUSTODY RECORD

SHIP TO: 621 Mainstream Drive, Suite 270 ♦ Nashville, TN 37228 ♦ 615-345-1115 ♦ (fax) 615-846-5426

12-439

Send Results to:	Send Invoice to:
Name Bob Davis	Name Accounting
Company Tetra Tech	Company Tetra Tech
Address 661 Anderson Dr. #7	Address
City Pittsburgh ~~PA~~ 15220	City
State, Zip PA 15220	State, Zip SAME
Phone 412-921-7251	Phone
Fax 412-921-4090	Fax
E-mail Robert.Davis@TetraTech.com	E-mail
Project No./Name: #TET10CTOF27A CTO F27A	**Sampler's (Signature):**

Analysis Requirements: SVOCs+PAHs (8270C); ~~PCBs (8082A)~~; Pesticides (8081B); TAL Metals (6010C); VOCs (8260B); * Multiple IDW parameters

Lab Use Only:

VOA Headspace	Y	N	(NA)
Field Filtered	Y	(N)	NA
Correct Containers	(Y)	N	NA
Discrepancies	Y	(N)	NA
Cust. Seals Intact	Y	N	(NA)
Containers Intact	(Y)	N	NA

Airbill #: 6345

CAR #:

Lab Use Only Lab #	Date/Time Sampled	Sample Description	Sample Matrix	Comments	No. of Bottles	Lab Use Only Containers/Pres.
101285-01	12-20-09/1300	NTC12-SB23-0005	SO		2	2 4oz
-02	/1320	NTC12-SB23-0810	SO		2	
-03	/1400	NTC12-SB24-0005	SO		2	
-04	/1405	NTC12-SB24-00502			2	
-05	—	TB01 #9060			2	* WS 12/21/10
-06	/1420	NTC12-SB30-0005			2	
-07	/1425	NTC12-SB30-00502			2	
-08	1735	NTC12-SB26-0005			2	
-09	1740	NTC12-SB26-0406			2	
-10	/0000	NTC12-DUP01			2	
-11	/0000	NTC12-DUP02			2	
-12	1800	NTC12-Soil-IDW			8	

	Date/Time	Received By: (Signature)
Sample Kit Prep'd by: (Signature)		
Relinquished by: (Signature)	12/20/10 1800	Received By: (Signature)
Relinquished by: (Signature)	12/20/10 1700	Received By: (Signature)
Relinquished by: (Signature)	Date/Time	Received By: (Signature)
Received for Laboratory by: (Signature)	Date/Time 12-21-10 09:15	Temperature 4.4 °C

REMARKS:

* See PO# for CTO F27A for full suite of parameters & not recd in shipment WS 12/21/10

Details:

Page 1 of 2

Cooler No. 2 of 2

Date Shipped 12-20-10

Shipped By Fed Ex

Turnaround

Distribution: Original and yellow copies accompany sample shipment to laboratory; Pink retained by samplers.

CTOF27AGL_001

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EMPIRICAL LABORATORIES, LLC - CHAIN OF CUSTODY RECORD

SHIP TO: 621 Mainstream Drive, Suite 270 ♦ Nashville, TN 37228 ♦ 615-345-1115 ♦ (fax) 615-846-5426 12440

Send Results to:	Send Invoice to:
Name Bob Davis	Name
Company Tetra Tech NUS Inc	Company
Address 661 Andersen Dr #7	Address
City Pittsburgh	City SAME
State, Zip PA, 15220	State, Zip
Phone 412-921-7251	Phone
Fax	Fax
E-mail Robert.Davis@TetraTech.com	E-mail
Project No./Name: #TET10CTOF27A	**Sampler's (Signature):**

Analysis Requirements: SVOCs, PAHs (8270C); PCBs (8082A); Pesticides (8081A); TAL Metals (6010C)

Lab Use Only:

VOA Headspace	Y	N	NA
Field Filtered	Y	N	NA
Correct Containers	Y	N	NA
Discrepancies	Y	N	NA
Cust. Seals Intact	Y	N	NA
Containers Intact	Y	N	NA

Airbill #: 6349

CAR #: —

Lab Use Only Lab #	Date/Time Sampled	Sample Description	Sample Matrix	Comments	No. of Bottles	Lab Use Only Containers/Pres.
10P185 -13	1530	NTC12-SB27-0005	SO		2	2 4oz
-14	1535	-SB27-0204		MS/MSD, pcbs	6	6 4oz
-15	1555	-SB22-0005			2	2 4oz
-16	1600	-SB22-0502			2	
-17	1620	-SB21-0005			2	
-18	1625	-SB21-0507		PCB analysis	2	
-19	1635	-SB25-0005			2	
-20	1640	-SB25-0204		pcb analysis	2	
-21	1700	-SB28-0005			2	
-22	1705	-SB28-0204		pcb analysis	2	
-23	1720	-SB29-0005			2	
-24	1725	-SB29-0204		pcb analysis	2	

	Date/Time	Received By: (Signature)
Sample Kit Prep'd by: (Signature)	12-17-10/1000	
Relinquished by: (Signature)	12-20-10/1700	Received By: (Signature)
Relinquished by: (Signature)	Date/Time	Received By: (Signature)
Received for Laboratory by: (Signature)	Date/Time 12-21-10 09:15	Temperature 4.4°C

REMARKS:

Details:
Page 1 of 2
Cooler No. 2 of 2
Date Shipped 12-20-10
Shipped By Fed Ex
Turnaround

Distribution: Original and yellow copies accompany sample shipment to laboratory; Pink retained by samplers.

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CTOF27AGL_001

HOLDTIME

SDG CTOF27AGL0

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
HG	MG/KG	NTC12-SB30-0005	1012185-06	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB30-00502	1012185-07	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB29-0204	1012185-24	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB29-0005	1012185-23	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB28-0204	1012185-22	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB28-0005	1012185-21	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB27-0204	1012185-14	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB27-0005	1012185-13	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB26-0406	1012185-09	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB26-0005	1012185-08	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB25-0204	1012185-20	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB25-0005	1012185-19	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-DUP02	1012185-11	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB24-00502	1012185-04	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-DUP01	1012185-10	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
HG	MG/KG	NTC12-SB21-0005	1012185-17	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB21-0507	1012185-18	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB22-0005	1012185-15	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB22-00502	1012185-16	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB23-0005	1012185-01	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB23-0810	1012185-02	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
HG	MG/KG	NTC12-SB24-0005	1012185-03	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB26-0005	1012185-08RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB27-0204	1012185-14	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB27-0005	1012185-13RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB27-0005	1012185-13	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB26-0406	1012185-09RE2	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB26-0406	1012185-09RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB26-0005	1012185-08	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB26-0005	1012185-08RE2	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB25-0204	1012185-20RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB27-0204	1012185-14RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB29-0005	1012185-23	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	NTC12-SB25-0204	1012185-20	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB26-0406	1012185-09	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB28-0005	1012185-21	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB28-0005	1012185-21RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB28-0204	1012185-22	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB29-0204	1012185-24RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB28-0204	1012185-22RE2	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB29-0005	1012185-23RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB29-0005	1012185-23RE2	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB29-0204	1012185-24	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB25-0005	1012185-19RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB23-0810	1012185-02	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB30-00502	1012185-07	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB30-0005	1012185-06	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB28-0204	1012185-22RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-DUP02	1012185-11RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-DUP01	1012185-10	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB24-0005	1012185-03	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	NTC12-DUP02	1012185-11	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB25-0005	1012185-19	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB21-0005	1012185-17	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB21-0005	1012185-17RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB21-0507	1012185-18	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB21-0507	1012185-18RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB22-0005	1012185-15	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB22-0005	1012185-15RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB22-00502	1012185-16	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB22-00502	1012185-16RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB23-0005	1012185-01	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB23-0005	1012185-01RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB23-0005	1012185-01RE2	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-DUP01	1012185-10RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB23-0810	1012185-02RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB24-00502	1012185-04	NM	12/20/2010	01/04/2011	01/05/2011	15	1	16
M	MG/KG	NTC12-SB24-00502	1012185-04RE1	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17
M	MG/KG	NTC12-SB22-0005	1012185-15RE2	NM	12/20/2010	01/04/2011	01/06/2011	15	2	17

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/L	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	01/03/2011	01/05/2011	14	2	16
CN	MG/KG	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	12/28/2010	12/29/2010	8	1	9
IGN	MG/KG	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	01/05/2011	01/05/2011	16	0	16
PH	S.U.	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	12/29/2010	12/29/2010	9	0	9
RSUL	MG/KG	NTC12-SOIL-IDW	1012185-12	NM	12/20/2010	01/03/2011	01/03/2011	14	0	14
OS	UG/KG	NTC12-SB27-0005	1012185-13	NM	12/20/2010	12/23/2010	01/10/2011	3	18	21
OS	UG/KG	NTC12-DUP02	1012185-11	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB21-0005	1012185-17	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB21-0507	1012185-18	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB22-0005	1012185-15	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB22-00502	1012185-16	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB23-0005	1012185-01	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB23-0810	1012185-02	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB24-0005	1012185-03	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB24-00502	1012185-04	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB25-0005	1012185-19	NM	12/20/2010	12/23/2010	01/06/2011	3	14	17
OS	UG/KG	NTC12-SB25-0204	1012185-20	NM	12/20/2010	12/23/2010	01/10/2011	3	18	21
OS	UG/KG	NTC12-DUP01	1012185-10	NM	12/20/2010	12/23/2010	01/10/2011	3	18	21

NTC GREAT LAKES
SOIL DATA
CTOF27AGL001

FRACTION	CHEMICAL	NTC12-SB25-0204	UNITS	NTC12-DUP02	RPD	D
M	ALUMINUM	7630	MG/KG	7940	3.98	310.00
M	ANTIMONY	0.327 J	MG/KG	3.09 J	**161.72**	2.76
M	ARSENIC	7.74 J	MG/KG	23.5 J	**100.90**	15.76
M	BARIUM	109 J	MG/KG	125 J	13.68	16.00
M	BERYLLIUM	0.554	MG/KG	ND	**200.00**	0.55
M	CADMIUM	1.5 J	MG/KG	9.91 J	**147.41**	8.41
M	CALCIUM	85700	MG/KG	48100	**56.20**	37600.00
M	CHROMIUM	25.1 J	MG/KG	53.6 J	**72.43**	28.50
M	COBALT	7.66	MG/KG	13.7	**56.55**	6.04
M	COPPER	88.4	MG/KG	325	**114.47**	236.60
M	IRON	15900 J	MG/KG	22200 J	33.07	6300.00
M	LEAD	127	MG/KG	262	**69.41**	135.00
M	MAGNESIUM	42600	MG/KG	21100	**67.50**	21500.00
M	MANGANESE	503 J	MG/KG	890 J	**55.56**	387.00
M	MERCURY	0.908	MG/KG	1.63	**56.90**	0.72
M	NICKEL	22.5	MG/KG	65.3	**97.49**	42.80
M	POTASSIUM	1490	MG/KG	1750	16.05	260.00
M	SELENIUM	0.807	MG/KG	7.55	**161.37**	6.74
M	SILVER	5.28	MG/KG	25.1	**130.48**	19.82
M	SODIUM	250 J	MG/KG	197 J	23.71	53.00
M	VANADIUM	15.6	MG/KG	19.8	23.73	4.20
M	ZINC	253	MG/KG	645	**87.31**	392.00

Current RPD Quality Control Limit: 50 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

NTC GREAT LAKES
SOIL DATA
CTOF27AGL001

FRACTION	CHEMICAL	NTC12-SB27-0204	UNITS	NTC12-DUP01	RPD	D
M	ALUMINUM	9680	MG/KG	10800	10.94	1120.00
M	ANTIMONY	0.297 J	MG/KG	ND	200.00	0.30
M	ARSENIC	8.9 J	MG/KG	9.02 J	1.34	0.12
M	BARIUM	64 J	MG/KG	62.3 J	2.69	1.70
M	BERYLLIUM	1.02	MG/KG	0.768	28.19	0.25
M	CADMIUM	0.287 J	MG/KG	0.0875 J	106.54	0.20
M	CALCIUM	49500	MG/KG	55800	11.97	6300.00
M	CHROMIUM	16.6 J	MG/KG	15.4 J	7.50	1.20
M	COBALT	10.4	MG/KG	11.8	12.61	1.40
M	COPPER	58.8	MG/KG	36.7	46.28	22.10
M	IRON	19400 J	MG/KG	19800 J	2.04	400.00
M	LEAD	46.8	MG/KG	26.2	56.44	20.60
M	MAGNESIUM	26000	MG/KG	27800	6.69	1800.00
M	MANGANESE	493 J	MG/KG	537 J	8.54	44.00
M	MERCURY	0.0631	MG/KG	0.0385	48.43	0.02
M	NICKEL	26.8	MG/KG	25.7	4.19	1.10
M	POTASSIUM	1340	MG/KG	1570	15.81	230.00
M	SELENIUM	ND	MG/KG	0.365 J	200.00	0.37
M	SILVER	0.0931 J	MG/KG	ND	200.00	0.09
M	SODIUM	138 J	MG/KG	134 J	2.94	4.00
M	VANADIUM	19.8	MG/KG	19.9	0.50	0.10
M	ZINC	232	MG/KG	98.1	81.13	133.90

Current RPD Quality Control Limit: 50 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

INITIAL AND CONTINUING CALIBRATION CHECK

SW1311_7470A

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-FIMS

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Calibration: 0363002
Sequence: 0L36311

Lab Sample ID	Analyte	True	Found	%R	Units	Control Limit
0L36311-ICV1	Mercury	4.000	3.920	98.0	ug/L	+/- 15.00%
0L36311-CCV1	Mercury	4.000	4.272	107	ug/L	+/- 15.00%
0L36311-CCV2	Mercury	4.000	4.287	107	ug/L	+/- 15.00%
0L36311-CCV3	Mercury	2.000	1.935	96.7	ug/L	+/- 15.00%

INITIAL AND CONTINUING CALIBRATION CHECK

SW7471A

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Instrument ID: ME-FIMS

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Calibration: 1007003

Sequence: 1A00505

Lab Sample ID	Analyte	True	Found	%R	Units	Control Limit
1A00505-ICV1	Mercury	4.000	4.149	104	ug/L	+/- 15.00%
1A00505-CCV1	Mercury	4.000	4.047	101	ug/L	+/- 15.00%
1A00505-CCV2	Mercury	4.000	4.044	101	ug/L	+/- 15.00%
1A00505-CCV3	Mercury	2.000	1.975	98.7	ug/L	+/- 15.00%
1A00505-CCV4	Mercury	2.000	1.959	97.9	ug/L	+/- 15.00%

INITIAL AND CONTINUING CALIBRATION CHECK

SW1311_6010C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-ICP

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Calibration: 1007001
Sequence: 1A00702

Lab Sample ID	Analyte	True	Found	%R	Units	Control Limit
1A00702-ICV1	Arsenic	1000	1017	102	ug/L	+/- 10.00%
	Barium	1000	1038	104	ug/L	+/- 10.00%
	Cadmium	1000	1059	106	ug/L	+/- 10.00%
	Chromium	1000	933.1	93.3	ug/L	+/- 10.00%
	Lead	1000	998.2	99.8	ug/L	+/- 10.00%
	Selenium	1000	1014	101	ug/L	+/- 10.00%
	Silver	500.0	483.5	96.7	ug/L	+/- 10.00%
1A00702-CCV1	Arsenic	1000	1003	100	ug/L	+/- 10.00%
	Barium	1000	999.2	99.9	ug/L	+/- 10.00%
	Cadmium	1000	1031	103	ug/L	+/- 10.00%
	Chromium	1000	931.1	93.1	ug/L	+/- 10.00%
	Lead	1000	986.2	98.6	ug/L	+/- 10.00%
	Selenium	1000	1015	101	ug/L	+/- 10.00%
	Silver	500.0	485.4	97.1	ug/L	+/- 10.00%
1A00702-CCV2	Arsenic	1000	989.4	98.9	ug/L	+/- 10.00%
	Barium	1000	991.6	99.2	ug/L	+/- 10.00%
	Cadmium	1000	1027	103	ug/L	+/- 10.00%
	Chromium	1000	915.6	91.6	ug/L	+/- 10.00%
	Lead	1000	984.8	98.5	ug/L	+/- 10.00%
	Selenium	1000	1014	101	ug/L	+/- 10.00%
	Silver	500.0	471.6	94.3	ug/L	+/- 10.00%

INITIAL AND CONTINUING CALIBRATION CHECK

SW6010C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-ICP

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Calibration: 1007001
Sequence: 1A00702

Lab Sample ID	Analyte	True	Found	%R	Units	Control Limit
1A00702-ICV1	Aluminum	10000	9912	99.1	ug/L	+/- 10.00%
	Antimony	1000	1014	101	ug/L	+/- 10.00%
	Arsenic	1000	1017	102	ug/L	+/- 10.00%
	Barium	1000	1038	104	ug/L	+/- 10.00%
	Beryllium	1000	1019	102	ug/L	+/- 10.00%
	Cadmium	1000	1059	106	ug/L	+/- 10.00%
	Calcium	50000	52480	105	ug/L	+/- 10.00%
	Chromium	1000	933.1	93.3	ug/L	+/- 10.00%
	Cobalt	1000	998.9	99.9	ug/L	+/- 10.00%
	Copper	1000	972.4	97.2	ug/L	+/- 10.00%
	Iron	10000	10360	104	ug/L	+/- 10.00%
	Lead	1000	998.2	99.8	ug/L	+/- 10.00%
	Magnesium	50000	49530	99.1	ug/L	+/- 10.00%
	Manganese	1000	989.6	99.0	ug/L	+/- 10.00%
	Nickel	1000	993.3	99.3	ug/L	+/- 10.00%
	Potassium	10000	9326	93.3	ug/L	+/- 10.00%
	Selenium	1000	1014	101	ug/L	+/- 10.00%
	Silver	500.0	483.5	96.7	ug/L	+/- 10.00%
	Sodium	50000	50170	100	ug/L	+/- 10.00%
	Thallium	1000	960.6	96.1	ug/L	+/- 10.00%
	Vanadium	1000	968.3	96.8	ug/L	+/- 10.00%
	Zinc	1000	1011	101	ug/L	+/- 10.00%
1A00702-CCV1	Aluminum	10000	9819	98.2	ug/L	+/- 10.00%
	Antimony	1000	1016	102	ug/L	+/- 10.00%
	Arsenic	1000	1003	100	ug/L	+/- 10.00%
	Barium	1000	999.2	99.9	ug/L	+/- 10.00%
	Beryllium	1000	984.8	98.5	ug/L	+/- 10.00%
	Cadmium	1000	1031	103	ug/L	+/- 10.00%
	Calcium	50000	50040	100	ug/L	+/- 10.00%
	Chromium	1000	931.1	93.1	ug/L	+/- 10.00%
	Cobalt	1000	974.4	97.4	ug/L	+/- 10.00%
	Copper	1000	999.0	99.9	ug/L	+/- 10.00%
	Iron	10000	10260	103	ug/L	+/- 10.00%
	Lead	1000	986.2	98.6	ug/L	+/- 10.00%
	Magnesium	50000	47770	95.5	ug/L	+/- 10.00%
	Manganese	1000	974.4	97.4	ug/L	+/- 10.00%
	Nickel	1000	973.9	97.4	ug/L	+/- 10.00%
	Potassium	10000	10050	101	ug/L	+/- 10.00%

INITIAL AND CONTINUING CALIBRATION CHECK

SW6010C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-ICP

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Calibration: 1007001
Sequence: 1A00702

Lab Sample ID	Analyte	True	Found	%R	Units	Control Limit
1A00702-CCV1	Selenium	1000	1015	101	ug/L	+/- 10.00%
	Silver	500.0	485.4	97.1	ug/L	+/- 10.00%
	Sodium	50000	50490	101	ug/L	+/- 10.00%
	Thallium	1000	980.2	98.0	ug/L	+/- 10.00%
	Vanadium	1000	948.0	94.8	ug/L	+/- 10.00%
	Zinc	1000	976.4	97.6	ug/L	+/- 10.00%
1A00702-CCV2	Aluminum	10000	9607	96.1	ug/L	+/- 10.00%
	Antimony	1000	1016	102	ug/L	+/- 10.00%
	Arsenic	1000	989.4	98.9	ug/L	+/- 10.00%
	Barium	1000	991.6	99.2	ug/L	+/- 10.00%
	Beryllium	1000	970.0	97.0	ug/L	+/- 10.00%
	Cadmium	1000	1027	103	ug/L	+/- 10.00%
	Calcium	50000	48890	97.8	ug/L	+/- 10.00%
	Chromium	1000	915.6	91.6	ug/L	+/- 10.00%
	Cobalt	1000	976.3	97.6	ug/L	+/- 10.00%
	Copper	1000	982.4	98.2	ug/L	+/- 10.00%
	Iron	10000	10030	100	ug/L	+/- 10.00%
	Lead	1000	984.8	98.5	ug/L	+/- 10.00%
	Magnesium	50000	46670	93.3	ug/L	+/- 10.00%
	Manganese	1000	952.8	95.3	ug/L	+/- 10.00%
	Nickel	1000	968.1	96.8	ug/L	+/- 10.00%
	Potassium	10000	9819	98.2	ug/L	+/- 10.00%
	Selenium	1000	1014	101	ug/L	+/- 10.00%
	Silver	500.0	471.6	94.3	ug/L	+/- 10.00%
	Sodium	50000	49780	99.6	ug/L	+/- 10.00%
	Thallium	1000	972.3	97.2	ug/L	+/- 10.00%
	Vanadium	1000	929.1	92.9	ug/L	+/- 10.00%
	Zinc	1000	964.5	96.4	ug/L	+/- 10.00%
1A00702-CCV3	Aluminum	10000	9517	95.2	ug/L	+/- 10.00%
	Antimony	1000	1016	102	ug/L	+/- 10.00%
	Arsenic	1000	973.6	97.4	ug/L	+/- 10.00%
	Barium	1000	982.2	98.2	ug/L	+/- 10.00%
	Beryllium	1000	976.0	97.6	ug/L	+/- 10.00%
	Cadmium	1000	1013	101	ug/L	+/- 10.00%
	Calcium	50000	48460	96.9	ug/L	+/- 10.00%
	Chromium	1000	917.8	91.8	ug/L	+/- 10.00%
	Cobalt	1000	970.4	97.0	ug/L	+/- 10.00%
	Copper	1000	984.2	98.4	ug/L	+/- 10.00%

INITIAL AND CONTINUING CALIBRATION CHECK

SW6010C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-ICP

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Calibration: 1007001
Sequence: 1A00702

Lab Sample ID	Analyte	True	Found	%R	Units	Control Limit
1A00702-CCV3	Iron	10000	10070	101	ug/L	+/- 10.00%
	Lead	1000	973.4	97.3	ug/L	+/- 10.00%
	Magnesium	50000	46700	93.4	ug/L	+/- 10.00%
	Manganese	1000	947.0	94.7	ug/L	+/- 10.00%
	Nickel	1000	952.7	95.3	ug/L	+/- 10.00%
	Potassium	10000	9623	96.2	ug/L	+/- 10.00%
	Selenium	1000	995.2	99.5	ug/L	+/- 10.00%
	Silver	500.0	466.9	93.4	ug/L	+/- 10.00%
	Sodium	50000	49670	99.3	ug/L	+/- 10.00%
	Thallium	1000	956.0	95.6	ug/L	+/- 10.00%
	Vanadium	1000	925.5	92.5	ug/L	+/- 10.00%
	Zinc	1000	954.2	95.4	ug/L	+/- 10.00%
1A00702-CCV4	Aluminum	10000	9541	95.4	ug/L	+/- 10.00%
	Antimony	1000	1006	101	ug/L	+/- 10.00%
	Arsenic	1000	966.3	96.6	ug/L	+/- 10.00%
	Barium	1000	978.7	97.9	ug/L	+/- 10.00%
	Beryllium	1000	1020	102	ug/L	+/- 10.00%
	Cadmium	1000	1019	102	ug/L	+/- 10.00%
	Calcium	50000	50000	100	ug/L	+/- 10.00%
	Chromium	1000	967.4	96.7	ug/L	+/- 10.00%
	Cobalt	1000	974.6	97.5	ug/L	+/- 10.00%
	Copper	1000	991.5	99.1	ug/L	+/- 10.00%
	Iron	10000	10020	100	ug/L	+/- 10.00%
	Lead	1000	975.8	97.6	ug/L	+/- 10.00%
	Magnesium	50000	47980	96.0	ug/L	+/- 10.00%
	Manganese	1000	965.5	96.5	ug/L	+/- 10.00%
	Nickel	1000	951.4	95.1	ug/L	+/- 10.00%
	Potassium	10000	9543	95.4	ug/L	+/- 10.00%
	Selenium	1000	996.0	99.6	ug/L	+/- 10.00%
	Silver	500.0	459.4	91.9	ug/L	+/- 10.00%
	Sodium	50000	50450	101	ug/L	+/- 10.00%
	Thallium	1000	951.8	95.2	ug/L	+/- 10.00%
	Vanadium	1000	961.0	96.1	ug/L	+/- 10.00%
	Zinc	1000	956.0	95.6	ug/L	+/- 10.00%
1A00702-CCV5	Aluminum	10000	9467	94.7	ug/L	+/- 10.00%
	Antimony	1000	1000	100	ug/L	+/- 10.00%
	Arsenic	1000	963.9	96.4	ug/L	+/- 10.00%
	Barium	1000	973.1	97.3	ug/L	+/- 10.00%

INITIAL AND CONTINUING CALIBRATION CHECK

SW6010C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-ICP

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Calibration: 1007001
Sequence: 1A00702

Lab Sample ID	Analyte	True	Found	%R	Units	Control Limit
1A00702-CCV5	Beryllium	1000	969.0	96.9	ug/L	+/- 10.00%
	Cadmium	1000	1004	100	ug/L	+/- 10.00%
	Calcium	50000	48040	96.1	ug/L	+/- 10.00%
	Chromium	1000	912.9	91.3	ug/L	+/- 10.00%
	Cobalt	1000	961.5	96.2	ug/L	+/- 10.00%
	Copper	1000	970.3	97.0	ug/L	+/- 10.00%
	Iron	10000	10120	101	ug/L	+/- 10.00%
	Lead	1000	969.5	96.9	ug/L	+/- 10.00%
	Magnesium	50000	46320	92.6	ug/L	+/- 10.00%
	Manganese	1000	937.3	93.7	ug/L	+/- 10.00%
	Nickel	1000	944.4	94.4	ug/L	+/- 10.00%
	Potassium	10000	9592	95.9	ug/L	+/- 10.00%
	Selenium	1000	984.6	98.5	ug/L	+/- 10.00%
	Silver	500.0	459.8	92.0	ug/L	+/- 10.00%
	Sodium	50000	49400	98.8	ug/L	+/- 10.00%
	Thallium	1000	945.6	94.6	ug/L	+/- 10.00%
	Vanadium	1000	918.3	91.8	ug/L	+/- 10.00%
	Zinc	1000	950.7	95.1	ug/L	+/- 10.00%

INITIAL AND CONTINUING CALIBRATION CHECK

SW6010C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Instrument ID: ME-ICP

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Calibration: 1007002

Sequence: 1A00706

Lab Sample ID	Analyte	True	Found	%R	Units	Control Limit
1A00706-ICV1	Aluminum	10000	9774	97.7	ug/L	+/- 10.00%
	Antimony	1000	1022	102	ug/L	+/- 10.00%
	Arsenic	1000	1020	102	ug/L	+/- 10.00%
	Barium	1000	1055	106	ug/L	+/- 10.00%
	Beryllium	1000	989.7	99.0	ug/L	+/- 10.00%
	Cadmium	1000	1068	107	ug/L	+/- 10.00%
	Calcium	50000	51060	102	ug/L	+/- 10.00%
	Chromium	1000	959.9	96.0	ug/L	+/- 10.00%
	Cobalt	1000	1007	101	ug/L	+/- 10.00%
	Copper	1000	987.0	98.7	ug/L	+/- 10.00%
	Iron	10000	10180	102	ug/L	+/- 10.00%
	Lead	1000	1007	101	ug/L	+/- 10.00%
	Magnesium	50000	48730	97.5	ug/L	+/- 10.00%
	Manganese	1000	1034	103	ug/L	+/- 10.00%
	Nickel	1000	1002	100	ug/L	+/- 10.00%
	Selenium	1000	1020	102	ug/L	+/- 10.00%
	Silver	500.0	491.6	98.3	ug/L	+/- 10.00%
	Thallium	1000	984.4	98.4	ug/L	+/- 10.00%
	Vanadium	1000	990.2	99.0	ug/L	+/- 10.00%
	Zinc	1000	1014	101	ug/L	+/- 10.00%
1A00706-CCV1	Aluminum	10000	9764	97.6	ug/L	+/- 10.00%
	Antimony	1000	1008	101	ug/L	+/- 10.00%
	Arsenic	1000	1007	101	ug/L	+/- 10.00%
	Barium	1000	1010	101	ug/L	+/- 10.00%
	Beryllium	1000	968.9	96.9	ug/L	+/- 10.00%
	Cadmium	1000	1036	104	ug/L	+/- 10.00%
	Calcium	50000	49630	99.3	ug/L	+/- 10.00%
	Chromium	1000	931.7	93.2	ug/L	+/- 10.00%
	Cobalt	1000	973.4	97.3	ug/L	+/- 10.00%
	Copper	1000	989.9	99.0	ug/L	+/- 10.00%
	Iron	10000	10150	102	ug/L	+/- 10.00%
	Lead	1000	982.9	98.3	ug/L	+/- 10.00%
	Magnesium	50000	47710	95.4	ug/L	+/- 10.00%
	Manganese	1000	997.1	99.7	ug/L	+/- 10.00%
	Nickel	1000	977.3	97.7	ug/L	+/- 10.00%
	Selenium	1000	1010	101	ug/L	+/- 10.00%
	Silver	500.0	486.5	97.3	ug/L	+/- 10.00%
	Thallium	1000	996.0	99.6	ug/L	+/- 10.00%

INITIAL AND CONTINUING CALIBRATION CHECK

SW6010C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-ICP

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Calibration: 1007002
Sequence: 1A00706

Lab Sample ID	Analyte	True	Found	%R	Units	Control Limit
1A00706-CCV1	Vanadium	1000	946.0	94.6	ug/L	+/- 10.00%
	Zinc	1000	978.9	97.9	ug/L	+/- 10.00%
1A00706-CCV2	Aluminum	10000	9805	98.0	ug/L	+/- 10.00%
	Antimony	1000	1012	101	ug/L	+/- 10.00%
	Arsenic	1000	1010	101	ug/L	+/- 10.00%
	Barium	1000	1014	101	ug/L	+/- 10.00%
	Beryllium	1000	988.4	98.8	ug/L	+/- 10.00%
	Cadmium	1000	1047	105	ug/L	+/- 10.00%
	Calcium	50000	50010	100	ug/L	+/- 10.00%
	Chromium	1000	967.6	96.8	ug/L	+/- 10.00%
	Cobalt	1000	983.9	98.4	ug/L	+/- 10.00%
	Copper	1000	998.9	99.9	ug/L	+/- 10.00%
	Iron	10000	9993	99.9	ug/L	+/- 10.00%
	Lead	1000	993.1	99.3	ug/L	+/- 10.00%
	Magnesium	50000	47930	95.9	ug/L	+/- 10.00%
	Manganese	1000	1010	101	ug/L	+/- 10.00%
	Nickel	1000	986.4	98.6	ug/L	+/- 10.00%
	Selenium	1000	1032	103	ug/L	+/- 10.00%
	Silver	500.0	478.4	95.7	ug/L	+/- 10.00%
	Thallium	1000	1011	101	ug/L	+/- 10.00%
	Vanadium	1000	973.6	97.4	ug/L	+/- 10.00%
	Zinc	1000	985.3	98.5	ug/L	+/- 10.00%
1A00706-CCV3	Aluminum	10000	9780	97.8	ug/L	+/- 10.00%
	Antimony	1000	1009	101	ug/L	+/- 10.00%
	Arsenic	1000	1003	100	ug/L	+/- 10.00%
	Barium	1000	1011	101	ug/L	+/- 10.00%
	Beryllium	1000	963.7	96.4	ug/L	+/- 10.00%
	Cadmium	1000	1034	103	ug/L	+/- 10.00%
	Calcium	50000	49170	98.3	ug/L	+/- 10.00%
	Chromium	1000	920.0	92.0	ug/L	+/- 10.00%
	Cobalt	1000	970.9	97.1	ug/L	+/- 10.00%
	Copper	1000	986.4	98.6	ug/L	+/- 10.00%
	Iron	10000	10090	101	ug/L	+/- 10.00%
	Lead	1000	981.4	98.1	ug/L	+/- 10.00%
	Magnesium	50000	47430	94.9	ug/L	+/- 10.00%
	Manganese	1000	988.0	98.8	ug/L	+/- 10.00%
	Nickel	1000	977.2	97.7	ug/L	+/- 10.00%
	Selenium	1000	1007	101	ug/L	+/- 10.00%

INITIAL AND CONTINUING CALIBRATION CHECK

SW6010C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Instrument ID: ME-ICP

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Calibration: 1007002

Sequence: 1A00706

Lab Sample ID	Analyte	True	Found	%R	Units	Control Limit
1A00706-CCV3	Silver	500.0	483.8	96.8	ug/L	+/- 10.00%
	Thallium	1000	991.9	99.2	ug/L	+/- 10.00%
	Vanadium	1000	937.5	93.8	ug/L	+/- 10.00%
	Zinc	1000	977.5	97.8	ug/L	+/- 10.00%
1A00706-CCV4	Aluminum	10000	9717	97.2	ug/L	+/- 10.00%
	Antimony	1000	1009	101	ug/L	+/- 10.00%
	Arsenic	1000	994.9	99.5	ug/L	+/- 10.00%
	Barium	1000	1005	101	ug/L	+/- 10.00%
	Beryllium	1000	966.4	96.6	ug/L	+/- 10.00%
	Cadmium	1000	1032	103	ug/L	+/- 10.00%
	Calcium	50000	48900	97.8	ug/L	+/- 10.00%
	Chromium	1000	931.9	93.2	ug/L	+/- 10.00%
	Cobalt	1000	975.7	97.6	ug/L	+/- 10.00%
	Copper	1000	985.2	98.5	ug/L	+/- 10.00%
	Iron	10000	9974	99.7	ug/L	+/- 10.00%
	Lead	1000	982.2	98.2	ug/L	+/- 10.00%
	Magnesium	50000	47240	94.5	ug/L	+/- 10.00%
	Manganese	1000	987.7	98.8	ug/L	+/- 10.00%
	Nickel	1000	973.0	97.3	ug/L	+/- 10.00%
	Selenium	1000	1011	101	ug/L	+/- 10.00%
	Silver	500.0	477.2	95.4	ug/L	+/- 10.00%
	Thallium	1000	1001	100	ug/L	+/- 10.00%
	Vanadium	1000	943.6	94.4	ug/L	+/- 10.00%
	Zinc	1000	972.2	97.2	ug/L	+/- 10.00%
1A00706-CCV5	Aluminum	10000	9676	96.8	ug/L	+/- 10.00%
	Antimony	1000	1004	100	ug/L	+/- 10.00%
	Arsenic	1000	988.8	98.9	ug/L	+/- 10.00%
	Barium	1000	1001	100	ug/L	+/- 10.00%
	Beryllium	1000	964.5	96.4	ug/L	+/- 10.00%
	Cadmium	1000	1026	103	ug/L	+/- 10.00%
	Calcium	50000	48500	97.0	ug/L	+/- 10.00%
	Chromium	1000	932.3	93.2	ug/L	+/- 10.00%
	Cobalt	1000	970.1	97.0	ug/L	+/- 10.00%
	Copper	1000	981.9	98.2	ug/L	+/- 10.00%
	Iron	10000	9932	99.3	ug/L	+/- 10.00%
	Lead	1000	977.5	97.7	ug/L	+/- 10.00%
	Magnesium	50000	47000	94.0	ug/L	+/- 10.00%
	Manganese	1000	985.4	98.5	ug/L	+/- 10.00%

INITIAL AND CONTINUING CALIBRATION CHECK

SW6010C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-ICP

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Calibration: 1007002
Sequence: 1A00706

Lab Sample ID	Analyte	True	Found	%R	Units	Control Limit
1A00706-CCV5	Nickel	1000	967.9	96.8	ug/L	+/- 10.00%
	Selenium	1000	1004	100	ug/L	+/- 10.00%
	Silver	500.0	474.0	94.8	ug/L	+/- 10.00%
	Thallium	1000	993.1	99.3	ug/L	+/- 10.00%
	Vanadium	1000	942.5	94.3	ug/L	+/- 10.00%
	Zinc	1000	969.5	96.9	ug/L	+/- 10.00%
1A00706-CCV6	Aluminum	10000	9619	96.2	ug/L	+/- 10.00%
	Antimony	1000	1024	102	ug/L	+/- 10.00%
	Arsenic	1000	996.8	99.7	ug/L	+/- 10.00%
	Barium	1000	1015	101	ug/L	+/- 10.00%
	Beryllium	1000	1001	100	ug/L	+/- 10.00%
	Cadmium	1000	1044	104	ug/L	+/- 10.00%
	Calcium	50000	49140	98.3	ug/L	+/- 10.00%
	Chromium	1000	968.9	96.9	ug/L	+/- 10.00%
	Cobalt	1000	995.8	99.6	ug/L	+/- 10.00%
	Copper	1000	992.2	99.2	ug/L	+/- 10.00%
	Iron	10000	9805	98.0	ug/L	+/- 10.00%
	Lead	1000	997.2	99.7	ug/L	+/- 10.00%
	Magnesium	50000	47690	95.4	ug/L	+/- 10.00%
	Manganese	1000	999.2	99.9	ug/L	+/- 10.00%
	Nickel	1000	980.5	98.0	ug/L	+/- 10.00%
	Selenium	1000	1029	103	ug/L	+/- 10.00%
	Silver	500.0	469.2	93.8	ug/L	+/- 10.00%
	Thallium	1000	1022	102	ug/L	+/- 10.00%
	Vanadium	1000	967.9	96.8	ug/L	+/- 10.00%
	Zinc	1000	979.7	98.0	ug/L	+/- 10.00%

CRDL STANDARD

SW1311_7470A

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Instrument ID: ME-FIMS

Calibration: 0363002

Sequence: 0L36311

Lab Sample ID	Analyte	True	Found	%R	Units	QC Limts
0L36311-CRL1	Mercury	0.2000	0.2166	108	ug/L	70 - 130
0L36311-CRL2	Mercury	0.2000	0.2301	115	ug/L	70 - 130

CRDL STANDARD

SW7471A

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Instrument ID: ME-FIMS

Calibration: 1007003

Sequence: 1A00505

Lab Sample ID	Analyte	True	Found	%R	Units	QC Limts
1A00505-CRL1	Mercury	0.2000	0.2271	114	ug/L	70 - 130
1A00505-CRL2	Mercury	0.2000	0.2191	110	ug/L	70 - 130

CRDL STANDARD

SW1311_6010C

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Instrument ID: ME-ICP

Calibration: 1007001

Sequence: 1A00702

Lab Sample ID	Analyte	True	Found	%R	Units	QC Limts
1A00702-CRL1	Barium	10.00	10.05	100	ug/L	80 - 120
	Cadmium	2.000	1.802	90.1	ug/L	80 - 120
	Chromium	4.000	3.985	99.6	ug/L	80 - 120
	Lead	3.000	3.223	107	ug/L	80 - 120
	Silver	2.000	2.012	101	ug/L	80 - 120
1A00702-CRL2	Arsenic	5.000	4.173	83.5	ug/L	80 - 120
	Selenium	5.000	5.421	108	ug/L	80 - 120

CRDL STANDARD

SW6010C

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Instrument ID: ME-ICP

Calibration: 1007001

Sequence: 1A00702

Lab Sample ID	Analyte	True	Found	%R	Units	QC Limts
1A00702-CRL1	Aluminum	100.0	108.8	109	ug/L	80 - 120
	Antimony	8.000	7.225	90.3	ug/L	80 - 120
	Barium	10.00	10.05	100	ug/L	80 - 120
	Beryllium	2.000	1.944	97.2	ug/L	80 - 120
	Cadmium	2.000	1.802	90.1	ug/L	80 - 120
	Calcium	2000	2000	100	ug/L	80 - 120
	Chromium	4.000	3.985	99.6	ug/L	80 - 120
	Cobalt	10.00	9.297	93.0	ug/L	80 - 120
	Copper	8.000	7.452	93.1	ug/L	80 - 120
	Iron	60.00	62.05	103	ug/L	80 - 120
	Lead	3.000	3.223	107	ug/L	80 - 120
	Magnesium	3000	2787	92.9	ug/L	80 - 120
	Manganese	6.000	6.115	102	ug/L	80 - 120
	Nickel	6.000	5.772	96.2	ug/L	80 - 120
	Potassium	3000	2880	96.0	ug/L	80 - 120
	Silver	2.000	2.012	101	ug/L	80 - 120
	Sodium	3000	2899	96.6	ug/L	80 - 120
	Thallium	4.000	4.734	118	ug/L	80 - 120
	Vanadium	10.00	9.450	94.5	ug/L	80 - 120
	Zinc	10.00	9.390	93.9	ug/L	80 - 120
1A00702-CRL2	Arsenic	5.000	4.173	83.5	ug/L	80 - 120
	Selenium	5.000	5.421	108	ug/L	80 - 120

CRDL STANDARD

SW6010C

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Instrument ID: ME-ICP

Calibration: 1007002

Sequence: 1A00706

Lab Sample ID	Analyte	True	Found	%R	Units	QC Limts
1A00706-CRL1	Aluminum	100.0	102.6	103	ug/L	80 - 120
	Antimony	8.000	6.729	84.1	ug/L	80 - 120
	Barium	10.00	10.26	103	ug/L	80 - 120
	Beryllium	2.000	1.990	99.5	ug/L	80 - 120
	Cadmium	2.000	2.149	107	ug/L	80 - 120
	Calcium	2000	2017	101	ug/L	80 - 120
	Chromium	4.000	4.256	106	ug/L	80 - 120
	Cobalt	10.00	9.258	92.6	ug/L	80 - 120
	Copper	8.000	7.506	93.8	ug/L	80 - 120
	Iron	60.00	64.84	108	ug/L	80 - 120
	Magnesium	3000	2845	94.8	ug/L	80 - 120
	Manganese	6.000	6.410	107	ug/L	80 - 120
	Nickel	6.000	6.128	102	ug/L	80 - 120
	Silver	2.000	2.016	101	ug/L	80 - 120
	Thallium	4.000	4.589	115	ug/L	80 - 120
	Vanadium	10.00	9.857	98.6	ug/L	80 - 120
	Zinc	10.00	9.416	94.2	ug/L	80 - 120
1A00706-CRL2	Arsenic	5.000	4.031	80.6	ug/L	80 - 120
	Lead	3.000	2.492	83.1	ug/L	80 - 120
1A00706-CRL3	Selenium	5.000	4.684	93.7	ug/L	80 - 120

BLANKS

SW1311_7470A

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Instrument ID: ME-FIMS

Project: Great Lakes CTO F27A

Sequence: 0L36311

Calibration: 0363002

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C	Method
0L36311-ICB1	Mercury	0.03762	0.0800	0.200	ug/L	U	SW1311_7470A
0L36311-CCB1	Mercury	0.0491	0.0800	0.200	ug/L	U	SW1311_7470A
0L29004-BLK1	Mercury	0.0000493	0.0000800	0.000200	mg/L	U	SW1311_7470A
0L36311-CCB2	Mercury	0.0406	0.0800	0.200	ug/L	U	SW1311_7470A
0L36311-CCB3	Mercury	0.0446	0.0800	0.200	ug/L	U	SW1311_7470A

BLANKS
SW7471A

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-FIMS
Project: Great Lakes CTO F27A
Sequence: 1A00505
Calibration: 1007003

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C	Method
1A00505-ICB1	Mercury	0.03677	0.0780	0.198	ug/L	U	SW7471A
1A04009-BLK1	Mercury	0.00632	0.0130	0.0330	mg/Kg wet	U	SW7471A
1A00505-CCB1	Mercury	0.0417	0.0780	0.198	ug/L	U	SW7471A
1A00505-CCB2	Mercury	0.0304	0.0780	0.198	ug/L	U	SW7471A
1A04010-BLK1	Mercury	0.00676	0.0130	0.0330	mg/Kg wet	U	SW7471A
1A00505-CCB3	Mercury	0.0262	0.0780	0.198	ug/L	U	SW7471A
1A00505-CCB4	Mercury	0.0306	0.0780	0.198	ug/L	U	SW7471A

BLANKS
SW6010C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-ICP
Project: Great Lakes CTO F27A
Sequence: 1A00702
Calibration: 1007001

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C	Method
1A00702-ICB1	Aluminum	-0.2264	50.0	200	ug/L	U	SW6010C
	Antimony	-0.4892	5.00	15.0	ug/L	U	SW6010C
	Arsenic	-1.039	3.00	6.00	ug/L	U	SW6010C
	Barium	0.01473	5.00	40.0	ug/L	U	SW6010C
	Beryllium	0.06007	1.00	5.00	ug/L	U	SW6010C
	Cadmium	-0.04296	1.00	5.00	ug/L	U	SW6010C
	Calcium	7.170	1000	5000	ug/L	U	SW6010C
	Chromium	0.2945	2.00	5.00	ug/L	U	SW6010C
	Cobalt	0.1721	5.00	12.5	ug/L	U	SW6010C
	Copper	-0.1981	5.00	10.0	ug/L	U	SW6010C
	Iron	2.530	30.0	100	ug/L	U	SW6010C
	Lead	-0.5180	1.50	3.00	ug/L	U	SW6010C
	Magnesium	7.920	1000	5000	ug/L	U	SW6010C
	Manganese	0.08100	3.00	15.0	ug/L	U	SW6010C
	Nickel	0.2405	3.00	10.0	ug/L	U	SW6010C
	Potassium	6.950	1000	5000	ug/L	U	SW6010C
	Selenium	1.194	3.00	6.00	ug/L	U	SW6010C
	Silver	-0.007070	1.00	5.00	ug/L	U	SW6010C
	Sodium	5.080	1000	5000	ug/L	U	SW6010C
	Thallium	0.4353	3.00	8.00	ug/L	U	SW6010C
	Vanadium	0.02547	5.00	12.5	ug/L	U	SW6010C
	Zinc	-0.03871	5.00	20.0	ug/L	U	SW6010C
1A00702-CCB1	Aluminum	2.91	50.0	200	ug/L	U	SW6010C
	Antimony	0.0347	5.00	15.0	ug/L	U	SW6010C
	Arsenic	-0.769	3.00	6.00	ug/L	U	SW6010C
	Barium	0.0736	5.00	40.0	ug/L	U	SW6010C
	Beryllium	0.192	1.00	5.00	ug/L	U	SW6010C
	Cadmium	-0.0442	1.00	5.00	ug/L	U	SW6010C
	Calcium	12.5	1000	5000	ug/L	U	SW6010C
	Chromium	0.182	2.00	5.00	ug/L	U	SW6010C
	Cobalt	0.256	5.00	12.5	ug/L	U	SW6010C
	Copper	-0.161	5.00	10.0	ug/L	U	SW6010C
	Iron	1.23	30.0	100	ug/L	U	SW6010C

BLANKS
SW6010C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-ICP
Project: Great Lakes CTO F27A
Sequence: 1A00702
Calibration: 1007001

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C	Method
1A00702-CCB1	Lead	0.210	1.50	3.00	ug/L	U	SW6010C
	Magnesium	16.9	1000	5000	ug/L	U	SW6010C
	Manganese	0.144	3.00	15.0	ug/L	U	SW6010C
	Nickel	0.366	3.00	10.0	ug/L	U	SW6010C
	Potassium	14.7	1000	5000	ug/L	U	SW6010C
	Selenium	2.09	3.00	6.00	ug/L	U	SW6010C
	Silver	0.0712	1.00	5.00	ug/L	U	SW6010C
	Sodium	17.9	1000	5000	ug/L	U	SW6010C
	Thallium	1.53	3.00	8.00	ug/L	U	SW6010C
	Vanadium	0.127	5.00	12.5	ug/L	U	SW6010C
	Zinc	0.0872	5.00	20.0	ug/L	U	SW6010C
1A00702-CCB2	Aluminum	5.36	50.0	200	ug/L	U	SW6010C
	Antimony	-0.377	5.00	15.0	ug/L	U	SW6010C
	Arsenic	-1.29	3.00	6.00	ug/L	U	SW6010C
	Barium	0.0667	5.00	40.0	ug/L	U	SW6010C
	Beryllium	0.0593	1.00	5.00	ug/L	U	SW6010C
	Cadmium	0.0604	1.00	5.00	ug/L	U	SW6010C
	Calcium	12.6	1000	5000	ug/L	U	SW6010C
	Chromium	0.300	2.00	5.00	ug/L	U	SW6010C
	Cobalt	0.251	5.00	12.5	ug/L	U	SW6010C
	Copper	-0.0136	5.00	10.0	ug/L	U	SW6010C
	Iron	1.27	30.0	100	ug/L	U	SW6010C
	Lead	0.509	1.50	3.00	ug/L	U	SW6010C
	Magnesium	6.49	1000	5000	ug/L	U	SW6010C
	Manganese	0.249	3.00	15.0	ug/L	U	SW6010C
	Nickel	0.427	3.00	10.0	ug/L	U	SW6010C
	Potassium	7.20	1000	5000	ug/L	U	SW6010C
	Selenium	1.23	3.00	6.00	ug/L	U	SW6010C
	Silver	0.0661	1.00	5.00	ug/L	U	SW6010C
	Sodium	2.89	1000	5000	ug/L	U	SW6010C
	Thallium	0.411	3.00	8.00	ug/L	U	SW6010C
	Vanadium	-0.0221	5.00	12.5	ug/L	U	SW6010C
	Zinc	-0.00248	5.00	20.0	ug/L	U	SW6010C

BLANKS
SW6010C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-ICP
Project: Great Lakes CTO F27A
Sequence: 1A00702
Calibration: 1007001

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C	Method
1A04001-BLK1	Aluminum	0.260	2.50	10.0	mg/Kg wet	U	SW6010C
	Antimony	-0.0447	0.250	0.500	mg/Kg wet	U	SW6010C
	Arsenic	-0.0911	0.150	0.500	mg/Kg wet	U	SW6010C
	Barium	0.0168	0.250	2.00	mg/Kg wet	U	SW6010C
	Beryllium	-0.00164	0.0500	0.250	mg/Kg wet	U	SW6010C
	Cadmium	0.0220	0.0500	0.250	mg/Kg wet	U	SW6010C
	Calcium	3.88	50.0	250	mg/Kg wet	U	SW6010C
	Chromium	0.102	0.100	0.500	mg/Kg wet	J	SW6010C
	Cobalt	0.00951	0.250	0.625	mg/Kg wet	U	SW6010C
	Copper	-0.00821	0.200	0.500	mg/Kg wet	U	SW6010C
	Iron	1.04	1.50	5.00	mg/Kg wet	U	SW6010C
	Lead	0.0354	0.0750	0.150	mg/Kg wet	U	SW6010C
	Magnesium	1.72	50.0	250	mg/Kg wet	U	SW6010C
	Manganese	0.0426	0.150	0.750	mg/Kg wet	U	SW6010C
	Nickel	0.00957	0.150	0.500	mg/Kg wet	U	SW6010C
	Potassium	1.93	50.0	250	mg/Kg wet	U	SW6010C
	Silver	-0.00668	0.0500	0.500	mg/Kg wet	U	SW6010C
	Sodium	0.0205	50.0	250	mg/Kg wet	U	SW6010C
	Thallium	-0.146	0.150	0.400	mg/Kg wet	U	SW6010C
	Vanadium	-0.00964	0.250	0.625	mg/Kg wet	U	SW6010C
	Zinc	0.407	0.250	1.00	mg/Kg wet	J	SW6010C
1A00702-CCB3	Aluminum	14.4	50.0	200	ug/L	U	SW6010C
	Antimony	-0.493	5.00	15.0	ug/L	U	SW6010C
	Arsenic	-0.885	3.00	6.00	ug/L	U	SW6010C
	Barium	0.158	5.00	40.0	ug/L	U	SW6010C
	Beryllium	0.0936	1.00	5.00	ug/L	U	SW6010C
	Cadmium	-0.0119	1.00	5.00	ug/L	U	SW6010C
	Calcium	87.1	1000	5000	ug/L	U	SW6010C
	Chromium	0.175	2.00	5.00	ug/L	U	SW6010C
	Cobalt	0.178	5.00	12.5	ug/L	U	SW6010C
	Copper	-0.208	5.00	10.0	ug/L	U	SW6010C
	Iron	31.4	30.0	100	ug/L	J	SW6010C
	Lead	0.492	1.50	3.00	ug/L	U	SW6010C

BLANKS
SW6010C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-ICP
Project: Great Lakes CTO F27A
Sequence: 1A00702
Calibration: 1007001

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C	Method
1A00702-CCB3	Magnesium	48.8	1000	5000	ug/L	U	SW6010C
	Manganese	0.946	3.00	15.0	ug/L	U	SW6010C
	Nickel	0.472	3.00	10.0	ug/L	U	SW6010C
	Potassium	6.09	1000	5000	ug/L	U	SW6010C
	Selenium	1.89	3.00	6.00	ug/L	U	SW6010C
	Silver	0.0627	1.00	5.00	ug/L	U	SW6010C
	Sodium	-3.10	1000	5000	ug/L	U	SW6010C
	Thallium	0.822	3.00	8.00	ug/L	U	SW6010C
	Vanadium	0.0328	5.00	12.5	ug/L	U	SW6010C
	Zinc	0.158	5.00	20.0	ug/L	U	SW6010C
1A00702-CCB4	Aluminum	16.9	50.0	200	ug/L	U	SW6010C
	Antimony	-0.574	5.00	15.0	ug/L	U	SW6010C
	Arsenic	-0.990	3.00	6.00	ug/L	U	SW6010C
	Barium	0.0972	5.00	40.0	ug/L	U	SW6010C
	Beryllium	0.181	1.00	5.00	ug/L	U	SW6010C
	Cadmium	-0.0469	1.00	5.00	ug/L	U	SW6010C
	Calcium	189	1000	5000	ug/L	U	SW6010C
	Chromium	0.187	2.00	5.00	ug/L	U	SW6010C
	Cobalt	0.241	5.00	12.5	ug/L	U	SW6010C
	Copper	-0.216	5.00	10.0	ug/L	U	SW6010C
	Iron	43.2	30.0	100	ug/L	J	SW6010C
	Lead	-0.396	1.50	3.00	ug/L	U	SW6010C
	Magnesium	103	1000	5000	ug/L	U	SW6010C
	Manganese	0.583	3.00	15.0	ug/L	U	SW6010C
	Nickel	0.119	3.00	10.0	ug/L	U	SW6010C
	Potassium	15.7	1000	5000	ug/L	U	SW6010C
	Selenium	0.336	3.00	6.00	ug/L	U	SW6010C
	Silver	0.0496	1.00	5.00	ug/L	U	SW6010C
	Sodium	-5.69	1000	5000	ug/L	U	SW6010C
	Thallium	0.512	3.00	8.00	ug/L	U	SW6010C
	Vanadium	-0.170	5.00	12.5	ug/L	U	SW6010C
	Zinc	0.171	5.00	20.0	ug/L	U	SW6010C
1A04002-BLK1	Aluminum	0.894	2.50	10.0	mg/Kg wet	U	SW6010C

BLANKS
SW6010C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-ICP
Project: Great Lakes CTO F27A
Sequence: 1A00702
Calibration: 1007001

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C	Method
1A04002-BLK1	Antimony	-0.0264	0.250	0.500	mg/Kg wet	U	SW6010C
	Arsenic	-0.0456	0.150	0.500	mg/Kg wet	U	SW6010C
	Barium	0.0315	0.250	2.00	mg/Kg wet	U	SW6010C
	Beryllium	-0.00103	0.0500	0.250	mg/Kg wet	U	SW6010C
	Cadmium	0.0167	0.0500	0.250	mg/Kg wet	U	SW6010C
	Calcium	5.96	50.0	250	mg/Kg wet	U	SW6010C
	Chromium	0.113	0.100	0.500	mg/Kg wet	J	SW6010C
	Cobalt	0.0180	0.250	0.625	mg/Kg wet	U	SW6010C
	Copper	-0.00672	0.200	0.500	mg/Kg wet	U	SW6010C
	Iron	2.70	1.50	5.00	mg/Kg wet	J	SW6010C
	Lead	0.0332	0.0750	0.150	mg/Kg wet	U	SW6010C
	Magnesium	2.80	50.0	250	mg/Kg wet	U	SW6010C
	Manganese	0.0704	0.150	0.750	mg/Kg wet	U	SW6010C
	Nickel	0.0166	0.150	0.500	mg/Kg wet	U	SW6010C
	Potassium	1.85	50.0	250	mg/Kg wet	U	SW6010C
	Silver	-0.0117	0.0500	0.500	mg/Kg wet	U	SW6010C
	Sodium	-0.546	50.0	250	mg/Kg wet	U	SW6010C
	Thallium	-0.155	0.150	0.400	mg/Kg wet	J	SW6010C
	Vanadium	-0.00222	0.250	0.625	mg/Kg wet	U	SW6010C
	Zinc	0.455	0.250	1.00	mg/Kg wet	J	SW6010C
1A00702-CCB5	Aluminum	6.35	50.0	200	ug/L	U	SW6010C
	Antimony	-1.07	5.00	15.0	ug/L	U	SW6010C
	Arsenic	-1.60	3.00	6.00	ug/L	U	SW6010C
	Barium	0.504	5.00	40.0	ug/L	U	SW6010C
	Beryllium	0.0517	1.00	5.00	ug/L	U	SW6010C
	Cadmium	0.153	1.00	5.00	ug/L	U	SW6010C
	Calcium	27.7	1000	5000	ug/L	U	SW6010C
	Chromium	0.464	2.00	5.00	ug/L	U	SW6010C
	Cobalt	0.466	5.00	12.5	ug/L	U	SW6010C
	Copper	-0.264	5.00	10.0	ug/L	U	SW6010C
	Iron	18.0	30.0	100	ug/L	U	SW6010C
	Lead	1.71	1.50	3.00	ug/L	J	SW6010C
	Magnesium	14.4	1000	5000	ug/L	U	SW6010C

BLANKS
SW6010C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-ICP
Project: Great Lakes CTO F27A
Sequence: 1A00702
Calibration: 1007001

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C	Method
1A00702-CCB5	Manganese	0.820	3.00	15.0	ug/L	U	SW6010C
	Nickel	0.533	3.00	10.0	ug/L	U	SW6010C
	Potassium	16.1	1000	5000	ug/L	U	SW6010C
	Selenium	1.57	3.00	6.00	ug/L	U	SW6010C
	Silver	0.0727	1.00	5.00	ug/L	U	SW6010C
	Sodium	-10.5	1000	5000	ug/L	U	SW6010C
	Thallium	0.307	3.00	8.00	ug/L	U	SW6010C
	Vanadium	-0.174	5.00	12.5	ug/L	U	SW6010C
	Zinc	0.532	5.00	20.0	ug/L	U	SW6010C

BLANKS
SW6010C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-ICP
Project: Great Lakes CTO F27A
Sequence: 1A00706
Calibration: 1007002

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C	Method
1A00706-ICB1	Aluminum	0.9189	50.0	200	ug/L	U	SW6010C
	Antimony	-0.4199	5.00	15.0	ug/L	U	SW6010C
	Arsenic	-0.8478	3.00	6.00	ug/L	U	SW6010C
	Barium	0.07823	5.00	40.0	ug/L	U	SW6010C
	Beryllium	0.03092	1.00	5.00	ug/L	U	SW6010C
	Cadmium	0.1551	1.00	5.00	ug/L	U	SW6010C
	Calcium	4.130	1000	5000	ug/L	U	SW6010C
	Chromium	0.2709	2.00	5.00	ug/L	U	SW6010C
	Cobalt	-0.04184	5.00	12.5	ug/L	U	SW6010C
	Copper	-0.3030	5.00	10.0	ug/L	U	SW6010C
	Iron	1.186	30.0	100	ug/L	U	SW6010C
	Lead	0.6892	1.50	3.00	ug/L	U	SW6010C
	Magnesium	5.960	1000	5000	ug/L	U	SW6010C
	Manganese	0.07888	3.00	15.0	ug/L	U	SW6010C
	Nickel	0.5002	3.00	10.0	ug/L	U	SW6010C
	Selenium	-0.09348	3.00	6.00	ug/L	U	SW6010C
	Silver	0.05392	1.00	5.00	ug/L	U	SW6010C
	Thallium	0.06798	3.00	8.00	ug/L	U	SW6010C
	Vanadium	0.1240	5.00	12.5	ug/L	U	SW6010C
	Zinc	-0.04176	5.00	20.0	ug/L	U	SW6010C
1A00706-CCB1	Aluminum	-4.01	50.0	200	ug/L	U	SW6010C
	Antimony	-0.122	5.00	15.0	ug/L	U	SW6010C
	Arsenic	0.292	3.00	6.00	ug/L	U	SW6010C
	Barium	0.0413	5.00	40.0	ug/L	U	SW6010C
	Beryllium	0.0226	1.00	5.00	ug/L	U	SW6010C
	Cadmium	0.244	1.00	5.00	ug/L	U	SW6010C
	Calcium	2.73	1000	5000	ug/L	U	SW6010C
	Chromium	0.310	2.00	5.00	ug/L	U	SW6010C
	Cobalt	-0.00144	5.00	12.5	ug/L	U	SW6010C
	Copper	-0.0794	5.00	10.0	ug/L	U	SW6010C
	Iron	0.0992	30.0	100	ug/L	U	SW6010C
	Lead	-0.0773	1.50	3.00	ug/L	U	SW6010C
	Magnesium	7.74	1000	5000	ug/L	U	SW6010C

BLANKS
SW6010C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-ICP
Sequence: 1A00706

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Calibration: 1007002

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C	Method
1A00706-CCB1	Manganese	0.0758	3.00	15.0	ug/L	U	SW6010C
	Nickel	0.263	3.00	10.0	ug/L	U	SW6010C
	Selenium	-1.63	3.00	6.00	ug/L	U	SW6010C
	Silver	0.228	1.00	5.00	ug/L	U	SW6010C
	Thallium	-0.152	3.00	8.00	ug/L	U	SW6010C
	Vanadium	0.0868	5.00	12.5	ug/L	U	SW6010C
	Zinc	0.0691	5.00	20.0	ug/L	U	SW6010C
1A00706-CCB2	Aluminum	-0.0824	50.0	200	ug/L	U	SW6010C
	Antimony	-0.00886	5.00	15.0	ug/L	U	SW6010C
	Arsenic	-0.840	3.00	6.00	ug/L	U	SW6010C
	Barium	0.132	5.00	40.0	ug/L	U	SW6010C
	Beryllium	0.0475	1.00	5.00	ug/L	U	SW6010C
	Cadmium	0.255	1.00	5.00	ug/L	U	SW6010C
	Calcium	4.81	1000	5000	ug/L	U	SW6010C
	Chromium	0.243	2.00	5.00	ug/L	U	SW6010C
	Cobalt	-0.0800	5.00	12.5	ug/L	U	SW6010C
	Copper	-0.152	5.00	10.0	ug/L	U	SW6010C
	Iron	1.47	30.0	100	ug/L	U	SW6010C
	Lead	-0.450	1.50	3.00	ug/L	U	SW6010C
	Magnesium	9.33	1000	5000	ug/L	U	SW6010C
	Manganese	0.0327	3.00	15.0	ug/L	U	SW6010C
	Nickel	0.389	3.00	10.0	ug/L	U	SW6010C
	Selenium	-0.562	3.00	6.00	ug/L	U	SW6010C
	Silver	-0.00678	1.00	5.00	ug/L	U	SW6010C
	Thallium	0.517	3.00	8.00	ug/L	U	SW6010C
	Vanadium	0.0525	5.00	12.5	ug/L	U	SW6010C
	Zinc	-0.0525	5.00	20.0	ug/L	U	SW6010C
1A04001-BLK2	Selenium	0.0278	0.150	0.500	mg/Kg wet	U	SW6010C
1A00706-CCB3	Aluminum	1.47	50.0	200	ug/L	U	SW6010C
	Antimony	-0.318	5.00	15.0	ug/L	U	SW6010C
	Arsenic	-1.30	3.00	6.00	ug/L	U	SW6010C
	Barium	0.221	5.00	40.0	ug/L	U	SW6010C
	Beryllium	0.0906	1.00	5.00	ug/L	U	SW6010C

BLANKS
SW6010C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
SDG: CTOF27AGL_001

Instrument ID: ME-ICP
Sequence: 1A00706
Project: Great Lakes CTO F27A
Calibration: 1007002

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C	Method
1A00706-CCB3	Cadmium	0.412	1.00	5.00	ug/L	U	SW6010C
	Calcium	8.84	1000	5000	ug/L	U	SW6010C
	Chromium	0.476	2.00	5.00	ug/L	U	SW6010C
	Cobalt	0.0124	5.00	12.5	ug/L	U	SW6010C
	Copper	-0.00850	5.00	10.0	ug/L	U	SW6010C
	Iron	1.41	30.0	100	ug/L	U	SW6010C
	Lead	-0.275	1.50	3.00	ug/L	U	SW6010C
	Magnesium	11.8	1000	5000	ug/L	U	SW6010C
	Manganese	0.268	3.00	15.0	ug/L	U	SW6010C
	Nickel	0.452	3.00	10.0	ug/L	U	SW6010C
	Selenium	-0.327	3.00	6.00	ug/L	U	SW6010C
	Silver	0.262	1.00	5.00	ug/L	U	SW6010C
	Thallium	0.327	3.00	8.00	ug/L	U	SW6010C
	Vanadium	0.0488	5.00	12.5	ug/L	U	SW6010C
	Zinc	0.0899	5.00	20.0	ug/L	U	SW6010C
1A00706-CCB4	Aluminum	2.83	50.0	200	ug/L	U	SW6010C
	Antimony	0.139	5.00	15.0	ug/L	U	SW6010C
	Arsenic	-0.526	3.00	6.00	ug/L	U	SW6010C
	Barium	0.114	5.00	40.0	ug/L	U	SW6010C
	Beryllium	0.0414	1.00	5.00	ug/L	U	SW6010C
	Cadmium	0.245	1.00	5.00	ug/L	U	SW6010C
	Calcium	8.06	1000	5000	ug/L	U	SW6010C
	Chromium	0.115	2.00	5.00	ug/L	U	SW6010C
	Cobalt	0.0462	5.00	12.5	ug/L	U	SW6010C
	Copper	-0.252	5.00	10.0	ug/L	U	SW6010C
	Iron	1.06	30.0	100	ug/L	U	SW6010C
	Lead	-0.848	1.50	3.00	ug/L	U	SW6010C
	Magnesium	6.87	1000	5000	ug/L	U	SW6010C
	Manganese	0.137	3.00	15.0	ug/L	U	SW6010C
	Nickel	0.455	3.00	10.0	ug/L	U	SW6010C
	Selenium	-2.59	3.00	6.00	ug/L	U	SW6010C
	Silver	0.0782	1.00	5.00	ug/L	U	SW6010C
	Thallium	0.283	3.00	8.00	ug/L	U	SW6010C

BLANKS
SW6010C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: ME-ICP
Project: Great Lakes CTO F27A
Sequence: 1A00706
Calibration: 1007002

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C	Method
1A00706-CCB4	Vanadium	0.0113	5.00	12.5	ug/L	U	SW6010C
	Zinc	0.147	5.00	20.0	ug/L	U	SW6010C
1A04002-BLK2	Selenium	0.0183	0.150	0.500	mg/Kg wet	U	SW6010C
1A00706-CCB5	Aluminum	3.31	50.0	200	ug/L	U	SW6010C
	Antimony	-0.353	5.00	15.0	ug/L	U	SW6010C
	Arsenic	-0.465	3.00	6.00	ug/L	U	SW6010C
	Barium	0.244	5.00	40.0	ug/L	U	SW6010C
	Beryllium	0.0936	1.00	5.00	ug/L	U	SW6010C
	Cadmium	0.411	1.00	5.00	ug/L	U	SW6010C
	Calcium	13.4	1000	5000	ug/L	U	SW6010C
	Chromium	0.189	2.00	5.00	ug/L	U	SW6010C
	Cobalt	0.116	5.00	12.5	ug/L	U	SW6010C
	Copper	-0.188	5.00	10.0	ug/L	U	SW6010C
	Iron	1.64	30.0	100	ug/L	U	SW6010C
	Lead	-0.000350	1.50	3.00	ug/L	U	SW6010C
	Magnesium	15.9	1000	5000	ug/L	U	SW6010C
	Manganese	0.136	3.00	15.0	ug/L	U	SW6010C
	Nickel	0.443	3.00	10.0	ug/L	U	SW6010C
	Selenium	-0.833	3.00	6.00	ug/L	U	SW6010C
	Silver	0.105	1.00	5.00	ug/L	U	SW6010C
	Thallium	0.498	3.00	8.00	ug/L	U	SW6010C
	Vanadium	-0.0676	5.00	12.5	ug/L	U	SW6010C
	Zinc	0.264	5.00	20.0	ug/L	U	SW6010C
1A00706-CCB6	Aluminum	-3.20	50.0	200	ug/L	U	SW6010C
	Antimony	-0.389	5.00	15.0	ug/L	U	SW6010C
	Arsenic	-0.729	3.00	6.00	ug/L	U	SW6010C
	Barium	0.160	5.00	40.0	ug/L	U	SW6010C
	Beryllium	0.0652	1.00	5.00	ug/L	U	SW6010C
	Cadmium	0.331	1.00	5.00	ug/L	U	SW6010C
	Calcium	3.61	1000	5000	ug/L	U	SW6010C
	Chromium	0.248	2.00	5.00	ug/L	U	SW6010C
	Cobalt	0.158	5.00	12.5	ug/L	U	SW6010C
	Copper	-0.0913	5.00	10.0	ug/L	U	SW6010C

BLANKS
SW6010C

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
SDG: CTOF27AGL_001

Instrument ID: ME-ICP
Sequence: 1A00706
Project: Great Lakes CTO F27A
Calibration: 1007002

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C	Method
1A00706-CCB6	Iron	-0.174	30.0	100	ug/L	U	SW6010C
	Lead	-0.448	1.50	3.00	ug/L	U	SW6010C
	Magnesium	6.29	1000	5000	ug/L	U	SW6010C
	Manganese	0.0831	3.00	15.0	ug/L	U	SW6010C
	Nickel	0.299	3.00	10.0	ug/L	U	SW6010C
	Selenium	-1.92	3.00	6.00	ug/L	U	SW6010C
	Silver	0.0357	1.00	5.00	ug/L	U	SW6010C
	Thallium	0.570	3.00	8.00	ug/L	U	SW6010C
	Vanadium	0.0545	5.00	12.5	ug/L	U	SW6010C
	Zinc	-0.00562	5.00	20.0	ug/L	U	SW6010C

SDG CTOF27AGL001

Soil

Affected Analyte	Sample	Reported Result	Qualifier	Interferent	Interferent level in ICS	Conc. ICS	Interferent Level	Est. Interference	Validation Action	Validation Action
Cd	DUP-01	0.0875		Fe	200000	-1.09	19800	-0.11	J	na
Cu		36.7			200000	-5.16	19800	-0.51	na	na
Mn		537			200000	3.71	19800	0.37	na	na
Cd	DUP-01	0.0875		Mg	500000	-1.09	27800	-0.06	J	na
Cu		36.7			500000	-5.16	27800	-0.29	na	na
Mn		537			500000	3.71	27800	0.21	na	na
Cd	SB21-0005	0.644		Fe	200000	-1.09	19100	-0.10	J	na
Cu		32.5			200000	-5.16	19100	-0.49	na	na
Cd	SB21-0005	0.644		Mg	500000	-1.09	23700	-0.05	na	na
Cu		32.5			500000	-5.16	23700	-0.24	na	na
Cd	SB21-0005	0.644		Ca	500000	-1.09	45300	-0.10	J	na
Cu		32.5			500000	-5.16	45300	-0.47	na	na
Mn		678			500000	3.92	45300	0.36	na	na
Zn		241			500000	6.47	45300	0.59	na	na
Cu	SB25-0204	88.4		Fe	200000	-5.16	15900	-0.41	na	na
Mn		503			200000	3.71	15900	0.29	na	na
Cd	SB25-0204	1.5		Ca	500000	-1.68	85700	-0.29	J	na
Cu		88.4			500000	-5.16	85700	-0.88	na	na
Mn		503			500000	3.71	85700	0.64	na	na
Zn		253			500000	6.47	85700	1.11	na	na
Cd	SB27-0204	0.287		Fe	200000	-1.09	19400	-0.11	J	na
Cu		58.8			200000	-5.16	19400	-0.50	na	na
Mn		493			200000	3.71	19400	0.36	na	na
Cd	SB27-0005	0.287		Mg	500000	-1.09	26000	-0.06	J	na
Cu		58.8			500000	-5.16	26000	-0.27	na	na
Mn		493			500000	3.71	26000	0.19	na	na

ICP INTERFERENCE CHECK SAMPLE

SW6010C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Instrument ID: ME-ICP

Sequence: 1A00706

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Calibration: 1007002

Lab Sample ID	Analyte	True	Found	%R	Units
1A00706-IFA1	Aluminum	500000	518,390.00	104	ug/L
	Antimony		-3.12		ug/L
	Arsenic		1.28		ug/L
	Barium		0.65		ug/L
	Beryllium		0.04		ug/L
	Cadmium		-1.68		ug/L
	Calcium	500000	475,610.00	95.1	ug/L
	Chromium		-1.53		ug/L
	Cobalt		0.89		ug/L
	Copper		-4.86		ug/L
	Iron	200000	200,510.00	100	ug/L
	Lead		-0.53		ug/L
	Magnesium	500000	496,840.00	99.4	ug/L
	Manganese		3.92		ug/L
	Nickel		-1.78		ug/L
	Selenium		1.57		ug/L
	Silver		-0.41		ug/L
	Thallium		-2.73		ug/L
	Vanadium		1.55		ug/L
	Zinc		6.47		ug/L
1A00706-IFB1	Aluminum	500000	464,770.00	93.0	ug/L
	Antimony	600.0	651.89	109	ug/L
	Arsenic	100.0	107.68	108	ug/L
	Barium	500.0	528.15	106	ug/L
	Beryllium	500.0	437.84	87.6	ug/L
	Cadmium	1000	1,150.30	115	ug/L
	Calcium	500000	428,670.00	85.7	ug/L
	Chromium	500.0	414.58	82.9	ug/L
	Cobalt	500.0	468.09	93.6	ug/L

ICP INTERFERENCE CHECK SAMPLE

SW6010C

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Instrument ID: ME-ICP

Calibration: 1007002

Sequence: 1A00706

Lab Sample ID	Analyte	True	Found	%R	Units
1A00706-IFB1	Copper	500.0	481.68	96.3	ug/L
	Iron	200000	177,230.00	88.6	ug/L
	Lead	50.00	50.61	101	ug/L
	Magnesium	500000	445,500.00	89.1	ug/L
	Manganese	500.0	434.47	86.9	ug/L
	Nickel	1000	909.78	91.0	ug/L
	Selenium	50.00	51.25	102	ug/L
	Silver	200.0	191.01	95.5	ug/L
	Thallium	100.0	81.63	81.6	ug/L
	Vanadium	500.0	425.09	85.0	ug/L
	Zinc	1000	946.29	94.6	ug/L

ICP INTERFERENCE CHECK SAMPLE

SW6010C

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Instrument ID: ME-ICP

Calibration: 1007001

Sequence: 1A00702

Lab Sample ID	Analyte	True	Found	%R	Units
1A00702-IFA1	Aluminum	500000	511,720.00	102	ug/L
	Antimony		-1.36		ug/L
	Arsenic		2.71		ug/L
	Barium		0.63		ug/L
	Beryllium		0.01		ug/L
	Cadmium		-1.09		ug/L
	Calcium	500000	490,980.00	98.2	ug/L
	Chromium		-1.35		ug/L
	Cobalt		0.11		ug/L
	Copper		-5.16		ug/L
	Iron	200000	200,590.00	100	ug/L
	Lead		10.50		ug/L
	Magnesium	500000	508,480.00	102	ug/L
	Manganese		3.71		ug/L
	Nickel		0.47		ug/L
	Potassium		-53.61		ug/L
	Selenium		-2.16		ug/L
	Silver		-0.39		ug/L
	Sodium		46.93		ug/L
	Thallium		-1.72		ug/L
	Vanadium		1.08		ug/L
	Zinc		7.16		ug/L
1A00702-IFB1	Aluminum	500000	457,640.00	91.5	ug/L
	Antimony	600.0	655.30	109	ug/L
	Arsenic	100.0	108.80	109	ug/L
	Barium	500.0	520.14	104	ug/L
	Beryllium	500.0	441.23	88.2	ug/L
	Cadmium	1000	1,143.70	114	ug/L
	Calcium	500000	431,680.00	86.3	ug/L

ICP INTERFERENCE CHECK SAMPLE

SW6010C

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Instrument ID: ME-ICP

Sequence: 1A00702

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Calibration: 1007001

Lab Sample ID	Analyte	True	Found	%R	Units
1A00702-IFB1	Chromium	500.0	421.72	84.3	ug/L
	Cobalt	500.0	468.08	93.6	ug/L
	Copper	500.0	488.90	97.8	ug/L
	Iron	200000	179,500.00	89.8	ug/L
	Lead	50.00	54.04	108	ug/L
	Magnesium	500000	442,990.00	88.6	ug/L
	Manganese	500.0	429.97	86.0	ug/L
	Nickel	1000	909.02	90.9	ug/L
	Potassium		-19.78		ug/L
	Selenium	50.00	53.95	108	ug/L
	Silver	200.0	191.26	95.6	ug/L
	Sodium		77.07		ug/L
	Thallium	100.0	81.84	81.8	ug/L
	Vanadium	500.0	432.42	86.5	ug/L
	Zinc	1000	941.72	94.2	ug/L

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW6010C

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Matrix: Solid

Batch: 1A04001

% Solids: 86.58

Source Sample Name: **1012185-14**

ANALYTE	SPIKE ADDED (mg/Kg dry)	SAMPLE CONCENTRATION (mg/Kg dry)	MS CONCENTRATION (mg/Kg dry)	MS % REC.	Q	QC LIMITS REC.
Antimony	14.37	0.2971	1.775	10.3	N	80 - 120
Arsenic	14.37	8.902	25.88	118		80 - 120
Barium	114.9	64.01	195.5	114		80 - 120
Beryllium	2.873	1.023	3.538	87.6		80 - 120
Cadmium	7.183	0.2874	9.355	126	N	80 - 120
Chromium	11.49	16.60	25.97	81.6		80 - 120
Cobalt	28.73	10.38	42.29	111		80 - 120
Copper	14.37	58.84	47.89	-76.2		80 - 120
Iron	57.46	19390	20370	1710		80 - 120
Magnesium	287.3	25990	287 U	-9040		80 - 120
Manganese	28.73	492.7	594.8	356		80 - 120
Nickel	28.73	26.78	55.84	101		80 - 120
Potassium	287.3	1343	2293	331		80 - 120
Selenium	14.37	ND	16.11	112		80 - 120
Silver	14.37	0.09312	15.74	109		80 - 120
Sodium	287.3	138.2	470.1	116		80 - 120
Thallium	14.37	ND	12.24	85.2		80 - 120
Vanadium	28.73	19.79	45.73	90.3		80 - 120

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW6010C

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Matrix: Solid

Batch: 1A04001

% Solids: 86.58

Source Sample Name: **1012185-14**

ANALYTE	SPIKE ADDED (mg/Kg dry)	MSD CONCENTRATION (mg/Kg dry)	MSD % REC. #	% RPD	Q	QC LIMITS RPD	QC LIMITS REC.
Antimony	14.15	2.121	12.9	17.7	N	20	80 - 120
Arsenic	14.15	26.16	122	1.07	N	20	80 - 120
Barium	113.2	201.1	121	2.81	N	20	80 - 120
Beryllium	2.831	3.392	83.7	4.22		20	80 - 120
Cadmium	7.077	9.541	131	1.97	N	20	80 - 120
Chromium	11.32	24.89	73.3	4.23	N	20	80 - 120
Cobalt	28.31	40.95	108	3.22		20	80 - 120
Copper	14.15	60.05	8.52	22.5	*	20	80 - 120
Iron	56.62	18900	-863	7.50		20	80 - 120
Magnesium	283.1	283 U	-9180			20	80 - 120
Manganese	28.31	586.7	332	1.38		20	80 - 120
Nickel	28.31	53.70	95.1	3.92		20	80 - 120
Potassium	283.1	1981	225	14.6		20	80 - 120
Selenium	14.15	16.65	118	3.32		20	80 - 120
Silver	14.15	15.70	110	0.259		20	80 - 120
Sodium	283.1	479.5	121	1.97	N	20	80 - 120
Thallium	14.15	11.83	83.5	3.43		20	80 - 120
Vanadium	28.31	44.42	87.0	2.91		20	80 - 120

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW6010C

NTC12-SB29-0204

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Batch: 1A04002

% Solids: 83.01

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Source Sample Name: **1012185-24**

ANALYTE	SPIKE ADDED (mg/Kg dry)	SAMPLE CONCENTRATION (mg/Kg dry)	MS CONCENTRATION (mg/Kg dry)	MS % REC.	Q	QC LIMITS REC.
Beryllium	2.924	0.9332	3.834	99.2		80 - 120
Potassium	292.4	1597	2082	166		80 - 120
Sodium	292.4	180.9	492.4	107		80 - 120

ANALYTE	SPIKE ADDED (mg/Kg dry)	MSD CONCENTRATION (mg/Kg dry)	MSD % REC. #	% RPD	Q	QC LIMITS RPD	QC LIMITS REC.
Beryllium	3.027	4.209	108	9.32		20	80 - 120
Potassium	302.7	1897	99.0	9.31		20	80 - 120
Sodium	302.7	530.4	115	7.43		20	80 - 120

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW7471A

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Batch: 1A04009

% Solids: 86.58

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Source Sample Name: **1012185-14**

ANALYTE	SPIKE ADDED (mg/Kg dry)	SAMPLE CONCENTRATION (mg/Kg dry)	MS CONCENTRATION (mg/Kg dry)	MS % REC.	Q	QC LIMITS REC.
Mercury	0.3983	0.06310	0.4916	108		80 - 120

ANALYTE	SPIKE ADDED (mg/Kg dry)	MSD CONCENTRATION (mg/Kg dry)	MSD % REC. #	% RPD	Q	QC LIMITS RPD	QC LIMITS REC.
Mercury	0.3609	0.4603	110	6.58		20	80 - 120

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW7471A

NTC12-SB29-0204

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Matrix: Solid

Batch: 1A04010

% Solids: 83.01

Source Sample Name: **1012185-24**

ANALYTE	SPIKE ADDED (mg/Kg dry)	SAMPLE CONCENTRATION (mg/Kg dry)	MS CONCENTRATION (mg/Kg dry)	MS % REC.	Q	QC LIMITS REC.
Mercury	0.3886	0.03347	0.4331	103		80 - 120

ANALYTE	SPIKE ADDED (mg/Kg dry)	MSD CONCENTRATION (mg/Kg dry)	MSD % REC. #	% RPD	Q	QC LIMITS RPD	QC LIMITS REC.
Mercury	0.3886	0.4467	106	3.07		20	80 - 120

POST DIGEST SPIKE SAMPLE RECOVERY

SW6010C

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A

Matrix: Solid
Laboratory ID: 1A04001-PS1

Batch: 1A04001
Lab Source ID: 1012185-14

Preparation: MET_3050B
Initial/Final: 2.04 g / 100 mL

Analyte	Spike Sample Result (SSR) (ug/L)	Sample Result (SR) (ug/L)	Spike Added (SA) (ug/L)	%R	Control Limit %R
Antimony	**322.6**	**5.248**	**250.0**	**127**	**80 - 120**
Arsenic	**466.5**	**157.2**	**250.0**	**124**	**80 - 120**
Barium	3487	1131	2000	118	80 - 120
Beryllium	68.92	18.06	50.00	102	80 - 120
Cadmium	**170.1**	**5.076**	**125.0**	**132**	**80 - 120**
Chromium	487.9	293.1	200.0	97.4	80 - 120
Cobalt	731.7	183.4	500.0	110	80 - 120
Copper	1337	1039	250.0	119	80 - 120
Iron	**341000**	**342400**	**1000**	**-139**	**80 - 120**
Magnesium	**470100**	**459000**	**5000**	**222**	**80 - 120**
Manganese	**9310**	**8702**	**500.0**	**122**	**80 - 120**
Nickel	1002	473.1	500.0	106	80 - 120
Potassium	28920	23720	5000	104	80 - 120
Selenium	**308.3**	**ND**	**250.0**	**123**	**80 - 120**
Silver	253.8	1.645	250.0	101	80 - 120
Sodium	7862	2440	5000	108	80 - 120
Thallium	226.9	ND	250.0	90.6	80 - 120
Vanadium	836.9	349.6	500.0	97.5	80 - 120

POST DIGEST SPIKE SAMPLE RECOVERY

SW6010C

NTC12-SB29-0204

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Batch: 1A04002

Preparation: MET_3050B

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Laboratory ID: 1A04002-PS1

Lab Source ID: 1012185-24

Initial/Final: 2.07 g / 100 mL

Analyte	Spike Sample Result (SSR) (ug/L)	Sample Result (SR) (ug/L)	Spike Added (SA) (ug/L)	%R	Control Limit %R
Beryllium	62.12	16.04	50.00	92.2	80 - 120
Potassium	32740	27440	5000	106	80 - 120
Sodium	8244	3108	5000	103	80 - 120

LCS / LCS DUPLICATE RECOVERY

SW1311_7470A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Matrix:	Water		
Batch:	0L29004	Laboratory ID:	0L29004-BS1
Preparation:	MET_HG_W_E	Initial/Final:	30 mL / 30 mL

ANALYTE	SPIKE ADDED (mg/L)	LCS CONCENTRATION (mg/L)	LCS % REC.	QC LIMITS REC.
Mercury	0.002000	0.002121	106	80 - 120

LCS / LCS DUPLICATE RECOVERY

SW1311_6010C

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Matrix:	Water		
Batch:	1A03005	Laboratory ID:	1A03005-BS1
Preparation:	MET_3010A	Initial/Final:	50 mL / 50 mL

ANALYTE	SPIKE ADDED (mg/L)	LCS CONCENTRATION (mg/L)	LCS % REC.	QC LIMITS REC.
Arsenic	0.2500	0.2413	96.5	80 - 120
Barium	2.000	2.087	104	80 - 120
Cadmium	0.1250	0.1294	104	80 - 120
Chromium	0.2000	0.2000	100	80 - 120
Lead	0.2500	0.2624	105	80 - 120
Selenium	0.2500	0.2434	97.3	80 - 120
Silver	0.2500	0.2247	89.9	80 - 120

LCS / LCS DUPLICATE RECOVERY

SW6010C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix: Solid
Batch: 1A04001
Laboratory ID: 1A04001-BS1
Preparation: MET_3050B
Initial/Final: 2 g / 100 mL

ANALYTE	SPIKE ADDED (mg/Kg wet)	LCS CONCENTRATION (mg/Kg wet)	LCS % REC.	QC LIMITS REC.
Aluminum	100.0	101.4	101	80 - 120
Antimony	12.50	12.53	100	80 - 120
Arsenic	12.50	11.78	94.3	80 - 120
Barium	100.0	109.3	109	80 - 120
Beryllium	2.500	2.554	102	80 - 120
Cadmium	6.250	6.297	101	80 - 120
Calcium	250.0	256.4	103	80 - 120
Chromium	10.00	10.18	102	80 - 120
Cobalt	25.00	26.69	107	80 - 120
Copper	12.50	12.80	102	80 - 120
Iron	50.00	56.44	113	80 - 120
Lead	12.50	12.76	102	80 - 120
Magnesium	250.0	236.1	94.4	80 - 120
Manganese	25.00	25.90	104	80 - 120
Nickel	25.00	26.58	106	80 - 120
Potassium	250.0	252.9	101	80 - 120
Selenium	12.50	11.63	93.1	80 - 120
Silver	12.50	11.73	93.8	80 - 120
Sodium	250.0	260.6	104	80 - 120
Thallium	12.50	11.78	94.2	80 - 120
Vanadium	25.00	25.25	101	80 - 120
Zinc	25.00	25.78	103	80 - 120

LCS / LCS DUPLICATE RECOVERY

SW6010C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Matrix: Solid
Batch: 1A04002
Laboratory ID: 1A04002-BS1
Preparation: MET_3050B
Initial/Final: 2 g / 100 mL

ANALYTE	SPIKE ADDED (mg/Kg wet)	LCS CONCENTRATION (mg/Kg wet)	LCS % REC.	QC LIMITS REC.
Aluminum	100.0	100.2	100	80 - 120
Antimony	12.50	12.38	99.0	80 - 120
Arsenic	12.50	11.39	91.1	80 - 120
Barium	100.0	106.6	107	80 - 120
Beryllium	2.500	2.569	103	80 - 120
Cadmium	6.250	6.159	98.5	80 - 120
Calcium	250.0	252.8	101	80 - 120
Chromium	10.00	10.10	101	80 - 120
Cobalt	25.00	26.08	104	80 - 120
Copper	12.50	12.69	101	80 - 120
Iron	50.00	57.58	115	80 - 120
Lead	12.50	12.43	99.5	80 - 120
Magnesium	250.0	234.7	93.9	80 - 120
Manganese	25.00	25.57	102	80 - 120
Nickel	25.00	25.78	103	80 - 120
Potassium	250.0	245.1	98.0	80 - 120
Selenium	12.50	11.22	89.8	80 - 120
Silver	12.50	11.59	92.8	80 - 120
Sodium	250.0	255.4	102	80 - 120
Thallium	12.50	11.54	92.4	80 - 120
Vanadium	25.00	24.93	99.7	80 - 120
Zinc	25.00	25.25	101	80 - 120

LCS / LCS DUPLICATE RECOVERY

SW7471A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Matrix:	Solid		
Batch:	1A04009	Laboratory ID:	1A04009-BS1
Preparation:	MET_HG_S	Initial/Final:	0.3 g / 50 mL

ANALYTE	SPIKE ADDED (mg/Kg wet)	LCS CONCENTRATION (mg/Kg wet)	LCS % REC.	QC LIMITS REC.
Mercury	0.3333	0.3742	112	80 - 120

LCS / LCS DUPLICATE RECOVERY

SW7471A

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOF27AGL_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Great Lakes CTO F27A
Matrix:	Solid		
Batch:	1A04010	Laboratory ID:	1A04010-BS1
Preparation:	MET_HG_S	Initial/Final:	0.3 g / 50 mL

ANALYTE	SPIKE ADDED (mg/Kg wet)	LCS CONCENTRATION (mg/Kg wet)	LCS % REC.	QC LIMITS REC.
Mercury	0.3333	0.3587	108	80 - 120

SERIAL DILUTION

SW6010C

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Solid
Sequence: 1A00702
Preparation: MET_3050B

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1A04001-DUP1
Lab Source ID: 1012185-14
Initial/Final: 2.04 / 100

Analyte	Initial Sample Result (I) ug/L	Serial Dilution Result (S) ug/L	% Difference	Q	Method	QC Limits % Difference
Antimony	5.2483	ND			SW6010C	10.00
Arsenic	157.23	141.26	-10.2		SW6010C	10.00
Barium	1130.6	1086.2	-3.93		SW6010C	10.00
Beryllium	18.064	19.123	5.86		SW6010C	10.00
Cadmium	5.0759	9.9575	96.2		SW6010C	10.00
Chromium	293.12	305.72	4.3		SW6010C	10.00
Cobalt	183.42	176.88	-3.57		SW6010C	10.00
Copper	1039.3	1009	-2.92		SW6010C	10.00
Iron	342410	387180	13.1	E	SW6010C	10.00
Magnesium	458990	470800	2.57		SW6010C	10.00
Manganese	8702.4	9968	14.5	E	SW6010C	10.00
Nickel	473.07	486.32	2.8		SW6010C	10.00
Potassium	23718	24239	2.19		SW6010C	10.00
Selenium	ND	ND			SW6010C	10.00
Silver	1.6447	ND			SW6010C	10.00
Sodium	2440.4	ND			SW6010C	10.00
Thallium	ND	ND			SW6010C	10.00
Vanadium	349.62	362.03	3.55		SW6010C	10.00

SERIAL DILUTION

SW6010C

NTC12-SB27-0204

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Solid
Sequence: 1A00706
Preparation: MET_3050B

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1A04001-DUP2
Lab Source ID: 1012185-14RE1
Initial/Final: 2.04 / 100

Analyte	Initial Sample Result (I) ug/L	Serial Dilution Result (S) ug/L	% Difference	Q	Method	QC Limits % Difference
Aluminum	34178	34056	-0.357		SW6010C	10.00
Calcium	174710	184160	5.41		SW6010C	10.00
Lead	165.42	161.35	-2.46		SW6010C	10.00
Zinc	820.17	791.3	-3.52		SW6010C	10.00

SERIAL DILUTION

SW6010C

NTC12-SB29-0204

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Matrix: Solid

Sequence: 1A00702

Preparation: MET_3050B

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Laboratory ID: 1A04002-DUP1

Lab Source ID: 1012185-24

Initial/Final: 2.07 / 100

Analyte	Initial Sample Result (I) ug/L	Serial Dilution Result (S) ug/L	% Difference	Q	Method	QC Limits % Difference
Beryllium	16.035	17.928	11.8		SW6010C	10.00
Potassium	27438	26750	-2.51		SW6010C	10.00
Sodium	3108	ND			SW6010C	10.00

SERIAL DILUTION

SW6010C

NTC12-SB29-0204

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Solid
Sequence: 1A00706
Preparation: MET_3050B

SDG: CTOF27AGL_001
Project: Great Lakes CTO F27A
Laboratory ID: 1A04002-DUP2
Lab Source ID: 1012185-24RE1
Initial/Final: 2.07 / 100

Analyte	Initial Sample Result (I) ug/L	Serial Dilution Result (S) ug/L	% Difference	Q	Method	QC Limits % Difference
Aluminum	100800	100680	-0.124		SW6010C	10.00
Antimony	5.0572	ND			SW6010C	10.00
Arsenic	147.06	132.04	-10.2		SW6010C	10.00
Barium	1399.7	1324.9	-5.35		SW6010C	10.00
Cadmium	9.2572	11.737	26.8		SW6010C	10.00
Calcium	399090	427640	7.15		SW6010C	10.00
Chromium	185.11	195.53	5.63		SW6010C	10.00
Cobalt	116.12	109.29	-5.89		SW6010C	10.00
Copper	608.09	597.8	-1.69		SW6010C	10.00
Iron	270150	295960	9.55		SW6010C	10.00
Lead	7257.2	7332	1.03		SW6010C	10.00
Magnesium	189700	190200	0.261		SW6010C	10.00
Manganese	5277.2	5799	9.89		SW6010C	10.00
Nickel	294.31	288.51	-1.97		SW6010C	10.00
Selenium	5.3339	ND			SW6010C	10.00
Silver	ND	ND			SW6010C	10.00
Thallium	ND	ND			SW6010C	10.00
Vanadium	188.9	195.79	3.64		SW6010C	10.00
Zinc	3322.7	3297	-0.773		SW6010C	10.00

METHOD DETECTION AND REPORTING LIMITS

Laboratory: Empirical Laboratories, LLC **SDG:** CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) **Project:** Great Lakes CTO F27A

Matrix: Water **Instrument:** ME-FIMS

Analyte	MDL	MRL	Units	Method
Mercury	0.0000800	0.000200	mg/L	SW1311_7470A
	0.0130	0.0330	mg/Kg	SW7471A

METHOD DETECTION AND REPORTING LIMITS

Laboratory: Empirical Laboratories, LLC **SDG:** CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) **Project:** Great Lakes CTO F27A

Matrix: Water **Instrument:** ME-ICP

Analyte	MDL	MRL	Units	Method
Arsenic	0.00300	0.0100	mg/L	SW1311_6010C
Barium	0.00500	0.0400	mg/L	SW1311_6010C
Cadmium	0.00100	0.00500	mg/L	SW1311_6010C
Chromium	0.00200	0.0100	mg/L	SW1311_6010C
Lead	0.00150	0.00300	mg/L	SW1311_6010C
Selenium	0.00300	0.0100	mg/L	SW1311_6010C
Silver	0.00100	0.0100	mg/L	SW1311_6010C
Aluminum	2.50	10.0	mg/Kg	SW6010C
Antimony	0.250	0.500	mg/Kg	SW6010C
Arsenic	0.150	0.500	mg/Kg	SW6010C
Barium	0.250	2.00	mg/Kg	SW6010C
Beryllium	0.0500	0.250	mg/Kg	SW6010C
Cadmium	0.0500	0.250	mg/Kg	SW6010C
Calcium	50.0	250	mg/Kg	SW6010C
Chromium	0.100	0.500	mg/Kg	SW6010C
Cobalt	0.250	0.625	mg/Kg	SW6010C
Copper	0.200	0.500	mg/Kg	SW6010C
Iron	1.50	5.00	mg/Kg	SW6010C
Lead	0.0750	0.150	mg/Kg	SW6010C
Magnesium	50.0	250	mg/Kg	SW6010C
Manganese	0.150	0.750	mg/Kg	SW6010C
Nickel	0.150	0.500	mg/Kg	SW6010C
Potassium	50.0	250	mg/Kg	SW6010C
Selenium	0.150	0.500	mg/Kg	SW6010C
Silver	0.0500	0.500	mg/Kg	SW6010C
Sodium	50.0	250	mg/Kg	SW6010C
Thallium	0.150	0.400	mg/Kg	SW6010C
Vanadium	0.250	0.625	mg/Kg	SW6010C
Zinc	0.250	1.00	mg/Kg	SW6010C

PREPARATION BATCH SUMMARY

SW6010C

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Batch: 1A04001 Batch Matrix: Solid Preparation: MET_3050B

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL./WEIGHT	FINAL VOL.
NTC12-SB23-0005	1012185-01	01/04/11 07:46	1.98	100.00
NTC12-SB23-0005	1012185-01RE1	01/04/11 07:46	1.98	100.00
NTC12-SB23-0005	1012185-01RE2	01/04/11 07:46	1.98	100.00
NTC12-SB23-0810	1012185-02	01/04/11 07:46	1.99	100.00
NTC12-SB23-0810	1012185-02RE1	01/04/11 07:46	1.99	100.00
NTC12-SB24-0005	1012185-03	01/04/11 07:46	1.95	100.00
NTC12-SB24-00502	1012185-04	01/04/11 07:46	1.98	100.00
NTC12-SB24-00502	1012185-04RE1	01/04/11 07:46	1.98	100.00
NTC12-SB30-0005	1012185-06	01/04/11 07:46	1.97	100.00
NTC12-SB30-00502	1012185-07	01/04/11 07:46	2.01	100.00
NTC12-SB26-0005	1012185-08	01/04/11 07:46	1.98	100.00
NTC12-SB26-0005	1012185-08RE1	01/04/11 07:46	1.98	100.00
NTC12-SB26-0005	1012185-08RE2	01/04/11 07:46	1.98	100.00
NTC12-SB26-0406	1012185-09	01/04/11 07:46	2.01	100.00
NTC12-SB26-0406	1012185-09RE1	01/04/11 07:46	2.01	100.00
NTC12-SB26-0406	1012185-09RE2	01/04/11 07:46	2.01	100.00
NTC12-DUP01	1012185-10	01/04/11 07:46	1.99	100.00
NTC12-DUP01	1012185-10RE1	01/04/11 07:46	1.99	100.00
NTC12-DUP02	1012185-11	01/04/11 07:46	1.97	100.00
NTC12-DUP02	1012185-11RE1	01/04/11 07:46	1.97	100.00
NTC12-SB27-0005	1012185-13	01/04/11 07:46	2.00	100.00
NTC12-SB27-0005	1012185-13RE1	01/04/11 07:46	2.00	100.00
NTC12-SB27-0204	1012185-14	01/04/11 07:46	2.04	100.00
NTC12-SB27-0204	1012185-14RE1	01/04/11 07:46	2.04	100.00
NTC12-SB22-0005	1012185-15	01/04/11 07:46	1.95	100.00
NTC12-SB22-0005	1012185-15RE1	01/04/11 07:46	1.95	100.00
NTC12-SB22-0005	1012185-15RE2	01/04/11 07:46	1.95	100.00
NTC12-SB22-00502	1012185-16	01/04/11 07:46	1.98	100.00
NTC12-SB22-00502	1012185-16RE1	01/04/11 07:46	1.98	100.00
NTC12-SB21-0005	1012185-17	01/04/11 07:46	2.01	100.00
NTC12-SB21-0005	1012185-17RE1	01/04/11 07:46	2.01	100.00
NTC12-SB21-0507	1012185-18	01/04/11 07:46	1.98	100.00
NTC12-SB21-0507	1012185-18RE1	01/04/11 07:46	1.98	100.00
NTC12-SB25-0005	1012185-19	01/04/11 07:46	1.99	100.00
NTC12-SB25-0005	1012185-19RE1	01/04/11 07:46	1.99	100.00
NTC12-SB25-0204	1012185-20	01/04/11 07:46	2.05	100.00
NTC12-SB25-0204	1012185-20RE1	01/04/11 07:46	2.05	100.00
NTC12-SB28-0005	1012185-21	01/04/11 07:46	2.00	100.00
NTC12-SB28-0005	1012185-21RE1	01/04/11 07:46	2.00	100.00
Blank	1A04001-BLK1	01/04/11 07:46	2.00	100.00
Blank	1A04001-BLK2	01/04/11 07:46	2.00	100.00
LCS	1A04001-BS1	01/04/11 07:46	2.00	100.00

PREPARATION BATCH SUMMARY

SW6010C

Laboratory: Empirical Laboratories, LLC

SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010)

Project: Great Lakes CTO F27A

Batch: 1A04001 Batch Matrix: Solid

Preparation: MET_3050B

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL./WEIGHT	FINAL VOL.
NTC12-SB27-0204	1A04001-DUP1	01/04/11 07:46	2.04	100.00
NTC12-SB27-0204	1A04001-DUP2	01/04/11 07:46	2.04	100.00
NTC12-SB27-0204	1A04001-MS1	01/04/11 07:46	2.01	100.00
NTC12-SB27-0204	1A04001-MSD1	01/04/11 07:46	2.04	100.00
NTC12-SB27-0204	1A04001-PS1	01/04/11 07:46	2.04	100.00

PREPARATION BATCH SUMMARY

SW6010C

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Batch: 1A04002 Batch Matrix: Solid Preparation: MET_3050B

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL./WEIGHT	FINAL VOL.
NTC12-SB28-0204	1012185-22	01/04/11 07:48	1.95	100.00
NTC12-SB28-0204	1012185-22RE1	01/04/11 07:48	1.95	100.00
NTC12-SB28-0204	1012185-22RE2	01/04/11 07:48	1.95	100.00
NTC12-SB29-0005	1012185-23	01/04/11 07:48	2.08	100.00
NTC12-SB29-0005	1012185-23RE1	01/04/11 07:48	2.08	100.00
NTC12-SB29-0005	1012185-23RE2	01/04/11 07:48	2.08	100.00
NTC12-SB29-0204	1012185-24	01/04/11 07:48	2.07	100.00
NTC12-SB29-0204	1012185-24RE1	01/04/11 07:48	2.07	100.00
Blank	1A04002-BLK1	01/04/11 07:48	2.00	100.00
Blank	1A04002-BLK2	01/04/11 07:48	2.00	100.00
LCS	1A04002-BS1	01/04/11 07:48	2.00	100.00
NTC12-SB29-0204	1A04002-DUP1	01/04/11 07:48	2.07	100.00
NTC12-SB29-0204	1A04002-DUP2	01/04/11 07:48	2.07	100.00
NTC12-SB29-0204	1A04002-MS1	01/04/11 07:48	2.06	100.00
NTC12-SB29-0204	1A04002-MSD1	01/04/11 07:48	1.99	100.00
NTC12-SB29-0204	1A04002-PS1	01/04/11 07:48	2.07	100.00

PREPARATION BATCH SUMMARY

SW7471A

Laboratory: Empirical Laboratories, LLC SDG: CTOF27AGL_001

Client: Tetra Tech NUS, Inc. (T010) Project: Great Lakes CTO F27A

Batch: 1A04009 Batch Matrix: Solid Preparation: MET_HG_S

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL./WEIGHT	FINAL VOL.
NTC12-SB23-0005	1012185-01	01/04/11 12:00	0.32	50.00
NTC12-SB23-0810	1012185-02	01/04/11 12:00	0.28	50.00
NTC12-SB24-0005	1012185-03	01/04/11 12:00	0.28	50.00
NTC12-SB24-00502	1012185-04	01/04/11 12:00	0.31	50.00
NTC12-SB30-0005	1012185-06	01/04/11 12:00	0.37	50.00
NTC12-SB30-00502	1012185-07	01/04/11 12:00	0.33	50.00
NTC12-SB26-0005	1012185-08	01/04/11 12:00	0.37	50.00
NTC12-SB26-0406	1012185-09	01/04/11 12:00	0.29	50.00
NTC12-DUP01	1012185-10	01/04/11 12:00	0.33	50.00
NTC12-DUP02	1012185-11	01/04/11 12:00	0.33	50.00
NTC12-SB27-0005	1012185-13	01/04/11 12:00	0.32	50.00
NTC12-SB27-0204	1012185-14	01/04/11 12:00	0.35	50.00
NTC12-SB22-0005	1012185-15	01/04/11 12:00	0.31	50.00
NTC12-SB22-00502	1012185-16	01/04/11 12:00	0.32	50.00
NTC12-SB21-0005	1012185-17	01/04/11 12:00	0.32	50.00
NTC12-SB21-0507	1012185-18	01/04/11 12:00	0.36	50.00
NTC12-SB25-0005	1012185-19	01/04/11 12:00	0.29	50.00
NTC12-SB25-0204	1012185-20	01/04/11 12:00	0.28	50.00
NTC12-SB28-0005	1012185-21	01/04/11 12:00	0.30	50.00
NTC12-SB28-0204	1012185-22	01/04/11 12:00	0.36	50.00
Blank	1A04009-BLK1	01/04/11 12:00	0.30	50.00
LCS	1A04009-BS1	01/04/11 12:00	0.30	50.00
NTC12-SB27-0204	1A04009-MS1	01/04/11 12:00	0.29	50.00
NTC12-SB27-0204	1A04009-MSD1	01/04/11 12:00	0.32	50.00

PREPARATION BATCH SUMMARY

SW7471A

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Batch: 1A04010 Batch Matrix: Solid
Preparation: MET_HG_S

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL./WEIGHT	FINAL VOL.
NTC12-SB29-0005	1012185-23	01/04/11 14:04	0.31	50.00
NTC12-SB29-0204	1012185-24	01/04/11 14:04	0.32	50.00
Blank	1A04010-BLK1	01/04/11 14:04	0.30	50.00
LCS	1A04010-BS1	01/04/11 14:04	0.30	50.00
NTC12-SB29-0204	1A04010-MS1	01/04/11 14:04	0.31	50.00
NTC12-SB29-0204	1A04010-MSD1	01/04/11 14:04	0.31	50.00

ANALYSIS SEQUENCE SUMMARY

SW6010C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 1A00702
Instrument: ME-ICP
Calibration: 1007001

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	1A00702-CAL1	010511A-001	01/05/11 09:38
Cal Standard	1A00702-CAL2	010511A-002	01/05/11 09:42
Cal Standard	1A00702-CAL3	010511A-004	01/05/11 09:52
Cal Standard	1A00702-CAL4	010511A-005	01/05/11 09:56
Cal Standard	1A00702-CAL5	010511A-006	01/05/11 10:01
Cal Standard	1A00702-CAL6	010511A-008	01/05/11 10:12
Cal Standard	1A00702-CAL7	010511A-010	01/05/11 10:22
Cal Standard	1A00702-CAL8	010511A-011	01/05/11 10:27
Initial Cal Check	1A00702-ICV1	010511B-001	01/05/11 10:56
Initial Cal Blank	1A00702-ICB1	010511B-002	01/05/11 11:03
Instrument RL Check	1A00702-CRL1	010511B-004	01/05/11 11:13
Instrument RL Check	1A00702-CRL2	010511B-007	01/05/11 11:31
Interference Check A	1A00702-IFA1	010511B-008	01/05/11 11:36
Interference Check B	1A00702-IFB1	010511B-009	01/05/11 11:43
Calibration Check	1A00702-CCV1	010511B-011	01/05/11 11:54
Calibration Blank	1A00702-CCB1	010511B-012	01/05/11 12:01
Calibration Check	1A00702-CCV2	010511B-027	01/05/11 13:19
Calibration Blank	1A00702-CCB2	010511B-028	01/05/11 13:27
Blank	1A04001-BLK1	010511B-029	01/05/11 13:31
LCS	1A04001-BS1	010511B-030	01/05/11 13:36
NTC12-SB23-0005	1012185-01	010511B-031	01/05/11 13:42
NTC12-SB23-0810	1012185-02	010511B-032	01/05/11 13:47
NTC12-SB24-0005	1012185-03	010511B-033	01/05/11 13:52
NTC12-SB24-00502	1012185-04	010511B-034	01/05/11 13:57
NTC12-SB30-0005	1012185-06	010511B-035	01/05/11 14:01
NTC12-SB30-00502	1012185-07	010511B-036	01/05/11 14:06
NTC12-SB26-0005	1012185-08	010511B-037	01/05/11 14:10
NTC12-SB26-0406	1012185-09	010511B-038	01/05/11 14:15
NTC12-DUP01	1012185-10	010511B-039	01/05/11 14:20
Calibration Check	1A00702-CCV3	010511B-040	01/05/11 14:29
Calibration Blank	1A00702-CCB3	010511B-041	01/05/11 14:36
NTC12-DUP02	1012185-11	010511B-042	01/05/11 14:41

ANALYSIS SEQUENCE SUMMARY

SW6010C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 1A00702
Instrument: ME-ICP
Calibration: 1007001

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
NTC12-SB27-0005	1012185-13	010511B-043	01/05/11 14:46
NTC12-SB27-0204	1012185-14	010511B-044	01/05/11 14:50
NTC12-SB27-0204	1A04001-MS1	010511B-045	01/05/11 14:55
NTC12-SB27-0204	1A04001-MSD1	010511B-046	01/05/11 15:00
NTC12-SB27-0204	1A04001-PS1	010511B-047	01/05/11 15:05
NTC12-SB27-0204	1A04001-DUP1	010511B-048	01/05/11 15:10
NTC12-SB22-0005	1012185-15	010511B-049	01/05/11 15:15
NTC12-SB22-00502	1012185-16	010511B-050	01/05/11 15:20
NTC12-SB21-0005	1012185-17	010511B-051	01/05/11 15:25
NTC12-SB21-0507	1012185-18	010511B-052	01/05/11 15:30
NTC12-SB25-0005	1012185-19	010511B-053	01/05/11 15:34
NTC12-SB25-0204	1012185-20	010511B-054	01/05/11 15:39
NTC12-SB28-0005	1012185-21	010511B-055	01/05/11 15:44
Calibration Check	1A00702-CCV4	010511B-056	01/05/11 15:52
✓ Calibration Blank	1A00702-CCB4	010511B-057	01/05/11 15:59
✓ Blank	1A04002-BLK1	010511C-001	01/05/11 16:07
LCS	1A04002-BS1	010511C-002	01/05/11 16:12
NTC12-SB28-0204	1012185-22	010511C-003	01/05/11 16:18
NTC12-SB29-0005	1012185-23	010511C-004	01/05/11 16:23
NTC12-SB29-0204	1012185-24	010511C-005	01/05/11 16:28
NTC12-SB29-0204	1A04002-MS1	010511C-006	01/05/11 16:33
NTC12-SB29-0204	1A04002-MSD1	010511C-007	01/05/11 16:37
NTC12-SB29-0204	1A04002-PS1	010511C-008	01/05/11 16:42
NTC12-SB29-0204	1A04002-DUP1	010511C-009	01/05/11 16:48
Calibration Check	1A00702-CCV5	010511C-010	01/05/11 16:54
✓ Calibration Blank	1A00702-CCB5	010511C-011	01/05/11 17:01

ANALYSIS SEQUENCE SUMMARY

SW6010C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 1A00706
Instrument: ME-ICP
Calibration: 1007002

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	1A00706-CAL1	010611A-001	01/06/11 09:46
Cal Standard	1A00706-CAL2	010611A-002	01/06/11 09:51
Cal Standard	1A00706-CAL3	010611A-003	01/06/11 09:56
Cal Standard	1A00706-CAL4	010611A-004	01/06/11 10:00
Cal Standard	1A00706-CAL5	010611A-005	01/06/11 10:05
Cal Standard	1A00706-CAL6	010611A-006	01/06/11 10:11
Cal Standard	1A00706-CAL7	010611A-007	01/06/11 10:16
Cal Standard	1A00706-CAL8	010611A-008	01/06/11 10:21
Initial Cal Check	1A00706-ICV1	010611B-001	01/06/11 10:50
Initial Cal Blank	1A00706-ICB1	010611B-002	01/06/11 10:57
Instrument RL Check	1A00706-CRL1	010611B-003	01/06/11 11:02
Instrument RL Check	1A00706-CRL2	010611B-005	01/06/11 11:12
Instrument RL Check	1A00706-CRL3	010611B-006	01/06/11 11:16
Interference Check A	1A00706-IFA1	010611B-008	01/06/11 11:28
Interference Check B	1A00706-IFB1	010611B-009	01/06/11 11:34
Calibration Check	1A00706-CCV1	010611B-011	01/06/11 11:45
Calibration Blank	1A00706-CCB1	010611B-012	01/06/11 11:52
Calibration Check	1A00706-CCV2	010611B-023	01/06/11 12:46
Calibration Blank	1A00706-CCB2	010611B-024	01/06/11 12:54
Blank	1A04001-BLK2	010611B-025	01/06/11 12:58
NTC12-SB23-0005	1012185-01RE1	010611B-026	01/06/11 13:03
NTC12-SB23-0810	1012185-02RE1	010611B-027	01/06/11 13:08
NTC12-SB24-00502	1012185-04RE1	010611B-028	01/06/11 13:12
NTC12-SB26-0005	1012185-08RE1	010611B-029	01/06/11 13:17
NTC12-SB26-0005	1012185-08RE2	010611B-030	01/06/11 13:22
NTC12-SB26-0406	1012185-09RE1	010611B-031	01/06/11 13:26
NTC12-SB26-0406	1012185-09RE2	010611B-032	01/06/11 13:31
NTC12-DUP01	1012185-10RE1	010611B-033	01/06/11 13:35
NTC12-DUP02	1012185-11RE1	010611B-034	01/06/11 13:40
Calibration Check	1A00706-CCV3	010611B-036	01/06/11 13:50
Calibration Blank	1A00706-CCB3	010611B-037	01/06/11 13:57
NTC12-SB27-0005	1012185-13RE1	010611C-001	01/06/11 14:04

ANALYSIS SEQUENCE SUMMARY

SW6010C

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 1A00706
Instrument: ME-ICP
Calibration: 1007002

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
NTC12-SB27-0204	1012185-14RE1	010611C-002	01/06/11 14:08
NTC12-SB27-0204	1A04001-DUP2	010611C-003	01/06/11 14:13
NTC12-SB22-0005	1012185-15RE1	010611C-004	01/06/11 14:18
NTC12-SB22-0005	1012185-15RE2	010611C-005	01/06/11 14:22
NTC12-SB22-00502	1012185-16RE1	010611C-006	01/06/11 14:27
NTC12-SB21-0005	1012185-17RE1	010611C-007	01/06/11 14:32
NTC12-SB21-0507	1012185-18RE1	010611C-008	01/06/11 14:36
NTC12-SB25-0005	1012185-19RE1	010611C-010	01/06/11 14:45
NTC12-SB25-0204	1012185-20RE1	010611C-011	01/06/11 14:50
Calibration Check	1A00706-CCV4	010611C-012	01/06/11 14:56
Calibration Blank	1A00706-CCB4	010611C-013	01/06/11 15:03
Blank	1A04002-BLK2	010611C-014	01/06/11 15:08
NTC12-SB28-0005	1012185-21RE1	010611C-015	01/06/11 15:12
NTC12-SB28-0204	1012185-22RE1	010611C-016	01/06/11 15:17
NTC12-SB28-0204	1012185-22RE2	010611C-017	01/06/11 15:22
NTC12-SB29-0005	1012185-23RE1	010611C-018	01/06/11 15:26
NTC12-SB29-0005	1012185-23RE2	010611C-019	01/06/11 15:31
NTC12-SB29-0204	1012185-24RE1	010611C-020	01/06/11 15:36
NTC12-SB29-0204	1A04002-DUP2	010611C-021	01/06/11 15:40
NTC12-SB23-0005	1012185-01RE2	010611C-023	01/06/11 15:51
Calibration Check	1A00706-CCV5	010611C-024	01/06/11 15:56
Calibration Blank	1A00706-CCB5	010611C-025	01/06/11 16:04
Calibration Check	1A00706-CCV6	010611C-030	01/06/11 16:28
Calibration Blank	1A00706-CCB6	010611C-031	01/06/11 16:35

ANALYSIS SEQUENCE SUMMARY

SW7471A

Laboratory: Empirical Laboratories, LLC
SDG: CTOF27AGL_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Great Lakes CTO F27A
Sequence: 1A00505
Instrument: ME-FIMS
Calibration: 1007003

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	1A00505-CAL1	COPY010511S-002	01/05/11 09:56
Cal Standard	1A00505-CAL2	COPY010511S-003	01/05/11 09:57
Cal Standard	1A00505-CAL3	COPY010511S-004	01/05/11 09:59
Cal Standard	1A00505-CAL4	COPY010511S-005	01/05/11 10:01
Cal Standard	1A00505-CAL5	COPY010511S-006	01/05/11 10:03
Cal Standard	1A00505-CAL6	COPY010511S-007	01/05/11 10:05
Cal Standard	1A00505-CAL7	COPY010511S-008	01/05/11 10:07
Cal Standard	1A00505-CAL8	COPY010511S-009	01/05/11 10:09
Initial Cal Check	1A00505-ICV1	COPY010511S-010	01/05/11 10:12
Initial Cal Blank	1A00505-ICB1	COPY010511S-011	01/05/11 10:13
Instrument RL Check	1A00505-CRL1	COPY010511S-012	01/05/11 10:15
LCS	1A04009-BS1	COPY010511S-013	01/05/11 10:17
Blank	1A04009-BLK1	COPY010511S-014	01/05/11 10:19
NTC12-SB23-0005	1012185-01	COPY010511S-015	01/05/11 10:21
NTC12-SB23-0810	1012185-02	COPY010511S-016	01/05/11 10:23
NTC12-SB24-0005	1012185-03	COPY010511S-017	01/05/11 10:31
NTC12-SB24-00502	1012185-04	COPY010511S-018	01/05/11 10:34
NTC12-SB30-0005	1012185-06	COPY010511S-019	01/05/11 10:36
NTC12-SB30-00502	1012185-07	COPY010511S-020	01/05/11 10:37
NTC12-SB26-0005	1012185-08	COPY010511S-021	01/05/11 10:39
Calibration Check	1A00505-CCV1	COPY010511S-022	01/05/11 10:41
Calibration Blank	1A00505-CCB1	COPY010511S-023	01/05/11 10:49
NTC12-SB26-0406	1012185-09	COPY010511S-024	01/05/11 10:51
NTC12-DUP01	1012185-10	COPY010511S-025	01/05/11 10:55
NTC12-DUP02	1012185-11	COPY010511S-026	01/05/11 10:57
NTC12-SB27-0005	1012185-13	COPY010511S-027	01/05/11 10:59
NTC12-SB27-0204	1012185-14	COPY010511S-028	01/05/11 11:00
NTC12-SB27-0204	1A04009-MS1	COPY010511S-029	01/05/11 11:02
NTC12-SB27-0204	1A04009-MSD1	COPY010511S-030	01/05/11 11:04
NTC12-SB22-0005	1012185-15	COPY010511S-031	01/05/11 11:06
NTC12-SB22-00502	1012185-16	COPY010511S-032	01/05/11 11:08
NTC12-SB21-0005	1012185-17	COPY010511S-033	01/05/11 11:10

ANALYSIS SEQUENCE SUMMARY

SW7471A

Laboratory: Empirical Laboratories, LLC

Client: Tetra Tech NUS, Inc. (T010)

Sequence: 1A00505

Calibration: 1007003

SDG: CTOF27AGL_001

Project: Great Lakes CTO F27A

Instrument: ME-FIMS

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Calibration Check	1A00505-CCV2	COPY010511S-034	01/05/11 11:11
Calibration Blank	1A00505-CCB2	COPY010511S-035	01/05/11 11:13
NTC12-SB21-0507	1012185-18	COPY010511S-036	01/05/11 11:15
NTC12-SB25-0005	1012185-19	COPY010511S-037	01/05/11 11:16
NTC12-SB25-0204	1012185-20	COPY010511S-038	01/05/11 11:18
NTC12-SB28-0005	1012185-21	COPY010511S-039	01/05/11 11:20
NTC12-SB28-0204	1012185-22	COPY010511S-040	01/05/11 11:22
LCS	1A04010-BS1	COPY010511S-041	01/05/11 11:24
Blank	1A04010-BLK1	COPY010511S-042	01/05/11 11:26
NTC12-SB29-0005	1012185-23	COPY010511S-043	01/05/11 11:27
NTC12-SB29-0204	1012185-24	COPY010511S-044	01/05/11 11:29
NTC12-SB29-0204	1A04010-MS1	COPY010511S-045	01/05/11 11:31
Calibration Check	1A00505-CCV3	COPY010511S-046	01/05/11 11:32
Calibration Blank	1A00505-CCB3	COPY010511S-047	01/05/11 11:34
NTC12-SB29-0204	1A04010-MSD1	COPY010511S-048	01/05/11 11:37
Instrument RL Check	1A00505-CRL2	COPY010511S-050	01/05/11 11:40
Calibration Check	1A00505-CCV4	COPY010511S-051	01/05/11 11:42
Calibration Blank	1A00505-CCB4	COPY010511S-052	01/05/11 11:43

Sample NTC12-SB30-0005
rep. result arsenic 4.79 mg/kg

Sample Name: 1012185-06 Acquired: 1/5/2011 14:01:39 Type: Unk
Method: DuoEnviroMethodNEW(v1932) Mode: CONC Corr. Factor: 1.000000
User: rburr Custom ID1: Custom ID2: Custom ID3:
Comment: TETRA $\left(\frac{85.881\ ug}{L}\right)\left(\frac{0.1\ L}{1.97\ g}\right)\left(\frac{1\ mg}{1000\ ug}\right)\left(\frac{1000\ g}{1\ kg}\right)\left(\frac{1}{.9108}\right) = 4.786\ \frac{mg}{kg}$

Elem	Ag3280	Al3961	As1890	B_2496	Ba2335	Be3130	Ca3179
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppm
Avg	**-.20772**	**22435.**	**85.881**	**43.714**	**145.73**	**2.6309**	**436.96**
Stddev	.26568	36.	1.610	.488	.35	.0067	1.83
%RSD	127.90	.15840	1.8745	1.1153	.23895	.25473	.41770
#1	-.32412	22446.	84.189	43.605	145.89	2.6323	435.83
#2	-.39534	22463.	86.059	44.247	145.33	2.6236	435.98
#3	.09630	22395.	87.394	43.290	145.97	2.6368	439.07

Elem	Cd2144	Cd2288	Co2286	Cr2677	Cu2199	Cu3247	Fe2611
Units	ppm	ppb	ppb	ppb	ppm	ppb	ppb
Avg	**.94573**	**2.1387**	**40.423**	**73.096**	**104.6**	**117.46**	**85450.**
Stddev	.05821	.1035	.058	.348	1.9	.68	174.
%RSD	6.1549	4.8408	.14269	.47620	1.836	.58236	.20354
#1	.96832	2.0292	40.413	73.224	102.7	117.33	85408.
#2	.87961	2.1520	40.485	72.702	104.6	116.85	85641.
#3	.98925	2.2350	40.371	73.362	106.6	118.20	85300.

Elem	K_7664	Mg2790	Mn2576	Mo2020	Na5895	Ni2316	Pb2203
Units	ppm	ppm	ppb	ppb	ppm	ppb	ppb
Avg	**4.1303**	**199.13**	**2461.3**	**9.1010**	**1.3516**	**80.471**	**460.61**
Stddev	.0065	.30	17.5	.3364	.0073	.388	3.12
%RSD	.15808	.15303	.71080	3.6963	.54020	.48234	.67677
#1	4.1274	199.25	2468.0	9.0707	1.3500	80.282	460.89
#2	4.1378	198.78	2441.4	8.7808	1.3595	80.214	457.36
#3	4.1258	199.35	2474.4	9.4516	1.3452	80.917	463.57

24

Elem	Sb2068	Se1960	Sn1899	Sr4215	Ti3349	Tl1908	V_2924
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avg	**.57404**	**2.9736**	**48.614**	**204.4**	**1314.0**	F **-3.9678**	**81.321**
Stddev	1.9772	2.6710	.660	.2	1.4	1.7482	.717
%RSD	344.43	89.823	1.3566	.0967	.10631	44.059	.88202
#1	-1.4876	3.1047	47.855	204.7	1315.2	-5.1246	81.416
#2	2.4542	5.5766	48.934	204.4	1312.4	-1.9568	80.561
#3	.75553	.23946	49.052	204.3	1314.3	-4.8222	81.987

Lab. #	Client	Waste Description	T.V. (ug/L) (mg/kg)	Analysis Time HH:MM (Military)	Matrix Type	Digestion		Analysis		Dilution	Peak Height	[Hg] ug/L	[Hg] mg/kg	Recovery %	Control Limits		RPD	Method
						Initial Sample Volume	Final Sample Volume (mL)	Initial Sample Volume (mL)	Final Sample Volume (mL)						Low Limit %	High Limit %		
1012185-09	TETRA			0.45267	SOIL	0.29	50.0	50.0	50.0	1.00	0.15805	9.23627	1.59246					7471A
~~1012185-10~~	~~TETRA~~			~~0.45356~~	~~SOIL~~	~~0.33~~	~~50.0~~	~~50.0~~	~~50.0~~	~~1.00~~	~~0.00011~~	~~-0.05112~~	~~-0.00774~~					~~7471A~~
1012185-10	TETRA			0.45516	SOIL	0.33	50.0	50.0	50.0	1.00	0.00484	0.22695	0.03439					7471A
1012185-11	TETRA			0.45659	SOIL	0.33	50.0	50.0	50.0	1.00	0.15243	8.90592	1.34938					7471A
1012185-13	TETRA			0.45800	SOIL	0.32	50.0	50.0	50.0	1.00	0.01749	0.97078	0.15168					7471A
1012185-14	TETRA			0.45891	SOIL	0.35	50.0	50.0	50.0	1.00	0.00748	0.38244	0.05463					7471A
1A04009-MS1	TETRA	10E0064	0.3348	0.46035	SOIL	0.29	50.0	50.0	50.0	1.00	0.04297	2.46897	0.42569	108.00	80.0	120.0	6.58	7471A
1A04009-MSD1	TETRA	10E0064	0.3125	0.46178	SOIL	0.32	50.0	50.0	50.0	1.00	0.04436	2.55072	0.39855	110.00	80.0	120.0		7471A
1012185-15	TETRA			0.46270	SOIL	0.31	50.0	50.0	50.0	1.00	0.01858	1.03486	0.16691					7471A
1012185-16	TETRA			0.46414	SOIL	0.32	50.0	50.0	50.0	1.00	0.01585	0.87462	0.13666					7471A
1012185-17	TETRA			0.46556	SOIL	0.32	50.0	50.0	50.0	1.00	0.00895	0.46848	0.07320					7471A
SEQ-CCV	QC	11A0091	4.0000	0.46639	H2O	50.00	50.0	50.0	50.0	1.00	0.06975	4.04363		101.09	85.0	115.0		7471A
SEQ-CCB	QC	DI H2O		0.46777	H2O	50.00	50.0	50.0	50.0	1.00	0.00149	0.03036						7471A
1012185-18	TETRA			0.46914	SOIL	0.36	50.0	50.0	50.0	1.00	0.10114	5.88987	0.81804					7471A
1012185-19 ✓	TETRA			0.47000	SOIL	0.29	50.0	50.0	50.0	1.00	0.01513	0.83223	0.14349					7471A
1012185-20	TETRA			0.47140	SOIL	0.28	50.0	50.0	50.0	1.00	0.07278	4.22203	0.75393					7471A
1012185-21	TETRA			0.47279	SOIL	0.30	50.0	50.0	50.0	1.00	0.01273	0.69093	0.11516					7471A
1012185-22	TETRA			0.47366	SOIL	0.36	50.0	50.0	50.0	1.00	0.02360	1.33037	0.18477					7471A
1A04010-BS1	QC	10E0064	0.3333	0.47508	SOIL	0.30	50.0	50.0	50.0	1.00	0.03757	2.15193	0.35865	107.61	80.0	120.0		7471A
1A04010-BLK1	QC	DI H2O		0.47649	SOIL	0.30	50.0	50.0	50.0	1.00	0.00167	0.04059	0.00676					7471A
1012185-23	TETRA			0.47738	SOIL	0.31	50.0	50.0	50.0	1.00	0.02984	1.69710	0.27373					7471A
1012185-24	TETRA			0.47881	SOIL	0.32	50.0	50.0	50.0	1.00	0.00400	0.17780	0.02778					7471A
1A04010-MS1	TETRA	10E0064	0.3226	0.48024	SOIL	0.31	50.0	50.0	50.0	1.00	0.03889	2.22911	0.35953	103.00	80.0	120.0	3.07	7471A
SEQ-CCV	QC	11A0090	2.0000	0.48116	H2O	50.00	50.0	50.0	50.0	1.00	0.03456	1.97488		98.74	85.0	115.0		7471A
SEQ-CCB	QC	DI H2O		0.48260	H2O	50.00	50.0	50.0	50.0	1.00	0.00142	0.02618						7471A
1A04010-MSD1	TETRA	10E0064	0.3226	0.48405	SOIL	0.31	50.0	50.0	50.0	1.00	0.04007	2.29870	0.37076	106.00	80.0	120.0		7471A
1012220-01	MICROBAC			0.48493	SOIL	0.28	50.0	50.0	50.0	1.00	0.00287	0.11099	0.01982					7471A
SEQ-CRL	QC	11A0086	0.2000	0.48631	H2O	50.00	50.0	50.0	50.0	1.00	0.00470	0.21912		109.56	70.0	130.0		7471A
SEQ-CCV	QC	11A0090	2.0000	0.48767	H2O	50.00	50.0	50.0	50.0	1.00	0.03429	1.95859		97.93	85.0	115.0		7471A
SEQ-CCB	QC	DI H2O		0.48851	H2O	50.00	50.0	50.0	50.0	1.00	0.00150	0.03059						7471A

Samples and Qc crossed out were rerun. Autosampler missed.
BS: 0.3g of boiling chips + 0.5mls of 10E0064 diluted to 50mls DI H2O final volume.
BLK: 0.3g of boiling chips into 50mls DI H2O final volume.

Sample NTC12-SB25-0005
Hg rep result 0.164 mg/kg

$$\left(\frac{0.83223\,ug}{L}\right)\left(\frac{0.05L}{0.29g}\right)\left(\frac{1\,mg}{1000\,ug}\right)\left(\frac{1000g}{1kg}\right)\left(\frac{1}{.8755}\right) = 0.1639\ mg/kg$$

3789

CTOF27AGL_001

SOIL LEACHATE

Tetra Tech **INTERNAL CORRESPONDENCE**

TO: **B. DAVIS** **DATE:** **FEBRUARY 1, 2013**

FROM: **TERRI L. SOLOMON** **COPIES:** **DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – SPLP TAL METALS**
NTC GREAT LAKES CTO F27A
SAMPLE DELIVERY GROUP (SDG) – NTC12

SAMPLES: 8/SPLP Metals/

NTC12-SB31-0305	NTC12-SB31-0507	NTC12-SB32-0204
NTC12-SB32-0406	NTC12-SB33-0204	NTC12-SB33-0406
NTC12-SB34-0204	NTC12-SB34-0406	

Overview

The sample set for NTC Great Lakes CTO F27A, SDG NTC12, consists of eight (8) soil environmental samples. No field duplicate pairs were included within this SDG.

All samples were analyzed for target analyte list (TAL) synthetic precipitation leaching procedure (SPLP) metals. The samples were collected by Tetra Tech on December 17, 2012 and analyzed by Trimatrix Laboratories. Metals analyses for aluminum, calcium, iron, magnesium, potassium and sodium were conducted using SW-846 method 6010C. Metals analyses for antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, nickel, selenium, silver, thallium, vanadium and zinc were conducted using SW-846 method 6020A. Mercury analyses were conducted using SW-846 7470A.

All samples were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Initial and Continuing Calibrations
• Laboratory Method / Preparation Blanks
• ICP Interference Analysis
* • Laboratory Control Sample Recoveries
• Matrix Spike / Matrix Spike Duplicate Recoveries
* • ICP Serial Dilution Results
• Internal Standard Recoveries
* • Detection Limits
* • Analyte Quantitation

* - All quality control criteria were met for this parameter.

Qualified (if applicable) analytical results are summarized in Appendix A. Results as reported by the laboratory are presented in Appendix B. Appendix C contains the documentation to support the findings as discussed in this validation report.

Laboratory Preparation / Method Blanks

The following contaminants were detected in the laboratory method / preparation blanks at the following maximum concentrations:

Analyte	Maximum Concentration	Action Level
Potassium[1]	45 ug/L	225 ug/L
Arsenic[2]	0.28 ug/L	1.4 ug/L
Antimony[3]	0.39 ug/L	1.95 ug/L
Copper[1]	0.17 ug/L	0.85 ug/L
Zinc[1]	2.2 ug/L	11 ug/L
Selenium[1]	0.41 ug/L	2.05 ug/L

(1) Maximum concentration present in a preparation blank.
(2) Maximum concentration present in a method blank (12/28/2012) affecting all samples.
(3) Maximum concentration present in a method blank (12/31/2012) affecting all samples.

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 and less than the limit of detection (LOD) were qualified "U" as a result of laboratory blank contamination and raised to the LOD. Positive results less than the blank action level and greater than the LOD were qualified "U" as a result of laboratory blank contamination.

Matrix Spike / Matrix Spike Duplicate Recoveries

The matrix spike / matrix spike duplicate percent recoveries for aluminum, barium, lead, manganese and zinc were > 120% quality control limit. The positive results reported for the aforementioned analytes were qualified as estimated, "J".

The matrix spike / matrix spike duplicate percent recoveries for sodium and antimony were < 80% quality control limit. The positive results reported for the aforementioned analytes were qualified as estimated, "J".

Internal Standard Recoveries

The internal standard percent recoveries for lithium-6 and bismuth-209 were > 125% quality control limit for sample NTC12-SB33-0406 analyzed on 12/18/2012 at 13:00. The positive results reported for chromium, cobalt, nickel and copper were qualified as estimated, "J".

Notes

The positive results greater than the detection limit (DL) but below the limit of quantitation (LOQ) were qualified as estimated, "J".

Nondetected results were reported to the limit of detection (LOD).

The interfering analyte calcium was present in sample NTC12-SB34-0204 at a concentration comparable to the concentration of calcium in the interference check sample (ICS) solution. The analyte potassium was present in the ICS solution at a concentration that exceeded the absolute value of the instrument detection limit (IDL). No interference effects exist.

Executive Summary

Laboratory Performance: Several contaminants were present in the laboratory method blanks. The internal standard percent recoveries for lithium-6 and bismuth-209 were > 125% quality control limit for sample NTC12-SB33-0406.

Other Factors Affecting Data Quality: The positive results greater than the DL but below the LOQ were qualified as estimated. Several matrix spike / matrix spike duplicate percent recoveries were outside the 80-120% quality control limits.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", October 2004, and the DOD document entitled "Quality System Manual (QSM) for Environmental Laboratories" (October 2010).

The text of this report has been formulated to address only those problem areas affecting data quality.

Tetra Tech
Terri L. Solomon
Environmental Scientist

Tetra Tech
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

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % 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 = ICP PDS Recovery Noncompliance; 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 (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% 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 deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed

PROJ_NO: 02416	NSAMPLE	NTC12-SB31-0305			NTC12-SB31-0507			NTC12-SB32-0204			NTC12-SB32-0406		
SDG: NTC12	LAB_ID	1212366-01			1212366-02			1212366-03			1212366-04		
FRACTION: SPLPM	SAMP_DATE	12/17/2012			12/17/2012			12/17/2012			12/17/2012		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		5300	J	D	970	J	D	770	J	D	1900	J	D
ANTIMONY		4.4	J	D	3.6	J	D	9.1	J	D	30	J	D
ARSENIC		5			1.9			5.3			3.8		
BARIUM		40	J	D	16	J	D	3.8	J	D	36	J	D
BERYLLIUM		0.32	J	P	0.4	U		0.4	U		0.4	U	
CADMIUM		0.75			0.47			0.1	U		0.28		
CALCIUM		27000			22000			38000			26000		
CHROMIUM		12			3.3			1.7			9		
COBALT		2.5			0.57	J	P	0.14	J	P	1.4		
COPPER		36			13			12			13		
IRON		5300			1100			10	U		2500		
LEAD		42	J	D	13	J	D	0.5	U		15	J	D
MAGNESIUM		5000			2700			500	U		3900		
MANGANESE		160	J	D	30	J	D	0.24	J	DP	39	J	D
MERCURY		0.3			0.067	J	P	0.1	U		0.1	U	
NICKEL		19			3.7			1.1			6		
POTASSIUM		2400			1100			1600			2600		
SELENIUM		2.1			3.6			1	U	A	1	U	
SILVER		3.5			1.4			0.1	U		1.6		
SODIUM		12000	J	D	12000	J	D	8700	J	DP	22000	J	D
THALLIUM		0.22	J	P	0.054	J	P	0.1	U		0.069	J	P
VANADIUM		9			1.7			32			5.3		
ZINC		100	J	D	31	J	D	4	U	A	53	J	D

PROJ_NO: 02416	NSAMPLE	NTC12-SB33-0204			NTC12-SB33-0406			NTC12-SB34-0204			NTC12-SB34-0406		
SDG: NTC12	LAB_ID	1212366-07			1212366-08			1212366-05			1212366-06		
FRACTION: SPLPM	SAMP_DATE	12/17/2012			12/17/2012			12/17/2012			12/17/2012		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALUMINUM		41	J	DP	10000	J	D	1400	J	D	2700	J	D
ANTIMONY		12	J	D	16	J	D	0.82	U	A	7.6	J	D
ARSENIC		5.5			15			0.5	U	A	16		
BARIUM		17	J	D	130	J	D	35	J	D	27	J	D
BERYLLIUM		0.4	U		0.71	J	P	0.4	U		0.23	J	P
CADMIUM		0.05	J	P	4.8			0.042	J	P	0.82		
CALCIUM		45000			32000			180000			13000		
CHROMIUM		0.77	J	P	46	J	N	6			14		
COBALT		0.13	J	P	13	J	N	0.31	J	P	3.7		
COPPER		4.2			92	J	N	9.5			51		
IRON		120			13000			210			7200		
LEAD		1.5	J	D	150	J	D	0.84	J	DP	94	J	D
MAGNESIUM		3200			8900			400	J	P	3300		
MANGANESE		2.9	J	D	360	J	D	6.7	J	D	110	J	D
MERCURY		0.1	U		1			0.1	U		0.24		
NICKEL		0.92	J	P	53	J	N	1.2			16		
POTASSIUM		1900			6000			4800			1200		
SELENIUM		1	U	A	1.6	U	A	1	U		1	U	A
SILVER		0.045	J	P	13			0.1	U		1.6		
SODIUM		13000	J	D	14000	J	D	11000	J	D	24000	J	D
THALLIUM		0.1	U		0.32	J	P	0.1	U		0.081	J	P
VANADIUM		8.7			20			0.74	J	P	7		
ZINC		4	U	A	350	J	D	4.4	U	A	170	J	D

APPENDIX B
RESULTS AS REPORTED BY THE LABORATORY

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12-SB31-0305

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 14:20
Solids: 0.00
QC Batch: 1215835

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-01
Prepared: 12/27/12 08:00
Preparation: 3020A SPLP Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, SPLP	1	4.4	ug/L	0.15	0.50	1.0		12/31/12 08:48
7440-38-2	Arsenic, SPLP	1	5.0	ug/L	0.18	0.50	1.0		12/28/12 12:01
7440-39-3	Barium, SPLP	1	40	ug/L	0.14	0.50	1.0		12/28/12 12:01
7440-41-7	Beryllium, SPLP	1	0.32	ug/L	0.11	0.40	1.0	J	12/28/12 16:00
7440-43-9	Cadmium, SPLP	1	0.75	ug/L	0.038	0.10	0.20		12/28/12 12:01
7440-47-3	Chromium, SPLP	1	12	ug/L	0.20	0.50	1.0		12/28/12 12:01
7440-48-4	Cobalt, SPLP	1	2.5	ug/L	0.050	0.20	1.0		12/28/12 12:01
7440-50-8	Copper, SPLP	1	36	ug/L	0.13	0.50	1.0		12/28/12 12:01
7439-92-1	Lead, SPLP	1	42	ug/L	0.15	0.50	1.0		12/28/12 12:01
7439-96-5	Manganese, SPLP	5	160	ug/L	0.70	2.5	5.0		12/28/12 13:28
7440-02-0	Nickel, SPLP	1	19	ug/L	0.17	0.50	1.0		12/28/12 12:01
7782-49-2	Selenium, SPLP	1	2.1	ug/L	0.31	1.0	1.0		12/28/12 16:00
7440-22-4	Silver, SPLP	1	3.5	ug/L	0.037	0.10	0.20		12/28/12 12:01
7440-28-0	Thallium, SPLP	1	0.22	ug/L	0.027	0.10	1.0	J	12/28/12 12:01
7440-62-2	Vanadium, SPLP	1	9.0	ug/L	0.066	0.20	1.0		12/28/12 16:00
7440-66-6	Zinc, SPLP	5	100	ug/L	7.5	20	50		12/28/12 13:28

INORGANIC ANALYSIS DATA SHEET
USEPA-6010C

NTC12-SB31-0305

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 14:20
Solids: 0.00
QC Batch: 1215834

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-01
Prepared: 12/27/12 08:00
Preparation: 3010A SPLP Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, SPLP	1	5300	ug/L	13	50	100		12/28/12 08:30
7440-70-2	Calcium, SPLP	1	27000	ug/L	230	500	500		12/28/12 08:30
7439-89-6	Iron, SPLP	1	5300	ug/L	6.5	10	10		12/28/12 08:30
7439-95-4	Magnesium, SPLP	1	5000	ug/L	140	500	500		12/28/12 08:30
7440-09-7	Potassium, SPLP	1	2400	ug/L	33	100	100		12/28/12 08:30
7440-23-5	Sodium, SPLP	1	12000	ug/L	5000	5000	10000		12/28/12 08:30

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12-SB31-0507

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 14:25
Solids: 0.00
QC Batch: 1215835

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-02
Prepared: 12/27/12 08:00
Preparation: 3020A SPLP Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, SPLP	1	3.6	ug/L	0.15	0.50	1.0		12/31/12 08:51
7440-38-2	Arsenic, SPLP	1	1.9	ug/L	0.18	0.50	1.0		12/28/12 12:06
7440-39-3	Barium, SPLP	1	16	ug/L	0.14	0.50	1.0		12/28/12 12:06
7440-41-7	Beryllium, SPLP	1	0.40	ug/L	0.11	0.40	1.0	U	12/28/12 16:03
7440-43-9	Cadmium, SPLP	1	0.47	ug/L	0.038	0.10	0.20		12/28/12 12:06
7440-47-3	Chromium, SPLP	1	3.3	ug/L	0.20	0.50	1.0		12/28/12 12:06
7440-48-4	Cobalt, SPLP	1	0.57	ug/L	0.050	0.20	1.0	J	12/28/12 12:06
7440-50-8	Copper, SPLP	1	13	ug/L	0.13	0.50	1.0		12/28/12 12:06
7439-92-1	Lead, SPLP	1	13	ug/L	0.15	0.50	1.0		12/28/12 12:06
7439-96-5	Manganese, SPLP	1	30	ug/L	0.14	0.50	1.0		12/28/12 12:06
7440-02-0	Nickel, SPLP	1	3.7	ug/L	0.17	0.50	1.0		12/28/12 12:06
7782-49-2	Selenium, SPLP	1	3.6	ug/L	0.31	1.0	1.0		12/28/12 16:03
7440-22-4	Silver, SPLP	1	1.4	ug/L	0.037	0.10	0.20		12/28/12 12:06
7440-28-0	Thallium, SPLP	1	0.054	ug/L	0.027	0.10	1.0	J	12/28/12 12:06
7440-62-2	Vanadium, SPLP	1	1.7	ug/L	0.066	0.20	1.0		12/28/12 16:03
7440-66-6	Zinc, SPLP	1	31	ug/L	1.5	4.0	10		12/28/12 12:06

INORGANIC ANALYSIS DATA SHEET
USEPA-6010C

NTC12-SB31-0507

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 14:25
Solids: 0.00
QC Batch: 1215834

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-02
Prepared: 12/27/12 08:00
Preparation: 3010A SPLP Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, SPLP	1	970	ug/L	13	50	100		12/28/12 08:34
7440-70-2	Calcium, SPLP	1	22000	ug/L	230	500	500		12/28/12 08:34
7439-89-6	Iron, SPLP	1	1100	ug/L	6.5	10	10		12/28/12 08:34
7439-95-4	Magnesium, SPLP	1	2700	ug/L	140	500	500		12/28/12 08:34
7440-09-7	Potassium, SPLP	1	1100	ug/L	33	100	100		12/28/12 08:34
7440-23-5	Sodium, SPLP	1	12000	ug/L	5000	5000	10000		12/28/12 08:34

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12-SB32-0204

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 14:35
Solids: 0.00
QC Batch: 1215835

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-03
Prepared: 12/27/12 08:00
Preparation: 3020A SPLP Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, SPLP	1	9.1	ug/L	0.15	0.50	1.0		12/31/12 08:53
7440-38-2	Arsenic, SPLP	1	5.3	ug/L	0.18	0.50	1.0		12/28/12 12:10
7440-39-3	Barium, SPLP	1	3.8	ug/L	0.14	0.50	1.0		12/28/12 12:10
7440-41-7	Beryllium, SPLP	1	0.40	ug/L	0.11	0.40	1.0	U	12/28/12 16:07
7440-43-9	Cadmium, SPLP	1	0.10	ug/L	0.038	0.10	0.20	U	12/28/12 12:10
7440-47-3	Chromium, SPLP	1	1.7	ug/L	0.20	0.50	1.0		12/28/12 12:10
7440-48-4	Cobalt, SPLP	1	0.14	ug/L	0.050	0.20	1.0	J	12/28/12 12:10
7440-50-8	Copper, SPLP	1	12	ug/L	0.13	0.50	1.0		12/28/12 12:10
7439-92-1	Lead, SPLP	1	0.50	ug/L	0.15	0.50	1.0	U	12/28/12 12:10
7439-96-5	Manganese, SPLP	1	0.24	ug/L	0.14	0.50	1.0	J	12/28/12 12:10
7440-02-0	Nickel, SPLP	1	1.1	ug/L	0.17	0.50	1.0		12/28/12 16:07
7782-49-2	Selenium, SPLP	1	0.66	ug/L	0.31	1.0	1.0	J	12/28/12 16:07
7440-22-4	Silver, SPLP	1	0.10	ug/L	0.037	0.10	0.20	U	12/28/12 12:10
7440-28-0	Thallium, SPLP	1	0.10	ug/L	0.027	0.10	1.0	U	12/28/12 12:10
7440-62-2	Vanadium, SPLP	1	32	ug/L	0.066	0.20	1.0		12/28/12 16:07
7440-66-6	Zinc, SPLP	1	4.0	ug/L	1.5	4.0	10	J	12/28/12 12:10

INORGANIC ANALYSIS DATA SHEET
USEPA-6010C

NTC12-SB32-0204

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 14:35
Solids: 0.00
QC Batch: 1215834

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-03
Prepared: 12/27/12 08:00
Preparation: 3010A SPLP Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, SPLP	1	770	ug/L	13	50	100		12/28/12 08:38
7440-70-2	Calcium, SPLP	1	38000	ug/L	230	500	500		12/28/12 08:38
7439-89-6	Iron, SPLP	1	10	ug/L	6.5	10	10	U	12/28/12 08:38
7439-95-4	Magnesium, SPLP	1	500	ug/L	140	500	500	U	12/28/12 08:38
7440-09-7	Potassium, SPLP	1	1600	ug/L	33	100	100		12/28/12 08:38
7440-23-5	Sodium, SPLP	1	8700	ug/L	5000	5000	10000	J	12/28/12 08:38

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12-SB32-0406

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 14:40
Solids: 0.00
QC Batch: 1215835

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-04
Prepared: 12/27/12 08:00
Preparation: 3020A SPLP Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, SPLP	1	30	ug/L	0.15	0.50	1.0		12/31/12 08:56
7440-38-2	Arsenic, SPLP	1	3.8	ug/L	0.18	0.50	1.0		12/28/12 12:15
7440-39-3	Barium, SPLP	1	36	ug/L	0.14	0.50	1.0		12/28/12 12:15
7440-41-7	Beryllium, SPLP	1	0.40	ug/L	0.11	0.40	1.0	U	12/28/12 16:10
7440-43-9	Cadmium, SPLP	1	0.28	ug/L	0.038	0.10	0.20		12/28/12 12:15
7440-47-3	Chromium, SPLP	1	9.0	ug/L	0.20	0.50	1.0		12/28/12 12:15
7440-48-4	Cobalt, SPLP	1	1.4	ug/L	0.050	0.20	1.0		12/28/12 12:15
7440-50-8	Copper, SPLP	1	13	ug/L	0.13	0.50	1.0		12/28/12 12:15
7439-92-1	Lead, SPLP	1	15	ug/L	0.15	0.50	1.0		12/28/12 12:15
7439-96-5	Manganese, SPLP	1	39	ug/L	0.14	0.50	1.0		12/28/12 12:15
7440-02-0	Nickel, SPLP	1	6.0	ug/L	0.17	0.50	1.0		12/28/12 12:15
7782-49-2	Selenium, SPLP	1	1.0	ug/L	0.31	1.0	1.0	U	12/28/12 16:10
7440-22-4	Silver, SPLP	1	1.6	ug/L	0.037	0.10	0.20		12/28/12 12:15
7440-28-0	Thallium, SPLP	1	0.069	ug/L	0.027	0.10	1.0	J	12/28/12 12:15
7440-62-2	Vanadium, SPLP	1	5.3	ug/L	0.066	0.20	1.0		12/28/12 16:10
7440-66-6	Zinc, SPLP	1	53	ug/L	1.5	4.0	10		12/28/12 12:15

INORGANIC ANALYSIS DATA SHEET
USEPA-6010C

NTC12-SB32-0406

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 14:40
Solids: 0.00
QC Batch: 1215834

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-04
Prepared: 12/27/12 08:00
Preparation: 3010A SPLP Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, SPLP	1	1900	ug/L	13	50	100		12/28/12 08:57
7440-70-2	Calcium, SPLP	1	26000	ug/L	230	500	500		12/28/12 08:57
7439-89-6	Iron, SPLP	1	2500	ug/L	6.5	10	10		12/28/12 08:57
7439-95-4	Magnesium, SPLP	1	3900	ug/L	140	500	500		12/28/12 08:57
7440-09-7	Potassium, SPLP	1	2600	ug/L	33	100	100		12/28/12 08:57
7440-23-5	Sodium, SPLP	1	22000	ug/L	5000	5000	10000		12/28/12 08:57

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12-SB33-0204

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 15:25
Solids: 0.00
QC Batch: 1215835

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-07
Prepared: 12/27/12 08:00
Preparation: 3020A SPLP Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, SPLP	1	12	ug/L	0.15	0.50	1.0		12/31/12 09:38
7440-38-2	Arsenic, SPLP	1	5.5	ug/L	0.18	0.50	1.0		12/28/12 12:56
7440-39-3	Barium, SPLP	1	17	ug/L	0.14	0.50	1.0		12/28/12 12:56
7440-41-7	Beryllium, SPLP	1	0.40	ug/L	0.11	0.40	1.0	U	12/28/12 16:41
7440-43-9	Cadmium, SPLP	1	0.050	ug/L	0.038	0.10	0.20	J	12/28/12 12:56
7440-47-3	Chromium, SPLP	1	0.77	ug/L	0.20	0.50	1.0	J	12/28/12 12:56
7440-48-4	Cobalt, SPLP	1	0.13	ug/L	0.050	0.20	1.0	J	12/28/12 12:56
7440-50-8	Copper, SPLP	1	4.2	ug/L	0.13	0.50	1.0		12/28/12 12:56
7439-92-1	Lead, SPLP	1	1.5	ug/L	0.15	0.50	1.0		12/28/12 12:56
7439-96-5	Manganese, SPLP	1	2.9	ug/L	0.14	0.50	1.0		12/28/12 12:56
7440-02-0	Nickel, SPLP	1	0.92	ug/L	0.17	0.50	1.0	J	12/28/12 12:56
7782-49-2	Selenium, SPLP	1	0.95	ug/L	0.31	1.0	1.0	J	12/28/12 16:41
7440-22-4	Silver, SPLP	1	0.045	ug/L	0.037	0.10	0.20	J	12/28/12 12:56
7440-28-0	Thallium, SPLP	1	0.10	ug/L	0.027	0.10	1.0	U	12/28/12 12:56
7440-62-2	Vanadium, SPLP	1	8.7	ug/L	0.066	0.20	1.0		12/28/12 16:41
7440-66-6	Zinc, SPLP	1	3.7	ug/L	1.5	4.0	10	J	12/28/12 12:56

INORGANIC ANALYSIS DATA SHEET
USEPA-6010C

NTC12-SB33-0204

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 15:25
Solids: 0.00
QC Batch: 1215834

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-07
Prepared: 12/27/12 08:00
Preparation: 3010A SPLP Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, SPLP	1	41	ug/L	13	50	100	J	12/28/12 09:23
7440-70-2	Calcium, SPLP	1	45000	ug/L	230	500	500		12/28/12 09:23
7439-89-6	Iron, SPLP	1	120	ug/L	6.5	10	10		12/28/12 09:23
7439-95-4	Magnesium, SPLP	1	3200	ug/L	140	500	500		12/28/12 09:23
7440-09-7	Potassium, SPLP	1	1900	ug/L	33	100	100		12/28/12 09:23
7440-23-5	Sodium, SPLP	1	13000	ug/L	5000	5000	10000		12/28/12 09:23

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12-SB33-0406

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 15:30
Solids: 0.00
QC Batch: 1215835

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-08
Prepared: 12/27/12 08:00
Preparation: 3020A SPLP Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, SPLP	1	16	ug/L	0.15	0.50	1.0		12/31/12 09:41
7440-38-2	Arsenic, SPLP	1	15	ug/L	0.18	0.50	1.0		12/28/12 13:00
7440-39-3	Barium, SPLP	5	130	ug/L	0.68	2.5	5.0		12/28/12 13:41
7440-41-7	Beryllium, SPLP	1	0.71	ug/L	0.11	0.40	1.0	J	12/28/12 16:44
7440-43-9	Cadmium, SPLP	1	4.8	ug/L	0.038	0.10	0.20		12/28/12 13:00
7440-47-3	Chromium, SPLP	1	46	ug/L	0.20	0.50	1.0		12/28/12 13:00
7440-48-4	Cobalt, SPLP	1	13	ug/L	0.050	0.20	1.0		12/28/12 13:00
7440-50-8	Copper, SPLP	1	92	ug/L	0.13	0.50	1.0		12/28/12 13:00
7439-92-1	Lead, SPLP	5	150	ug/L	0.76	2.5	5.0		12/28/12 13:41
7439-96-5	Manganese, SPLP	5	360	ug/L	0.70	2.5	5.0		12/28/12 13:41
7440-02-0	Nickel, SPLP	1	53	ug/L	0.17	0.50	1.0		12/28/12 13:00
7782-49-2	Selenium, SPLP	1	1.6	ug/L	0.31	1.0	1.0		12/28/12 16:44
7440-22-4	Silver, SPLP	1	13	ug/L	0.037	0.10	0.20		12/28/12 13:00
7440-28-0	Thallium, SPLP	1	0.32	ug/L	0.027	0.10	1.0	J	12/28/12 16:44
7440-62-2	Vanadium, SPLP	1	20	ug/L	0.066	0.20	1.0		12/28/12 16:44
7440-66-6	Zinc, SPLP	5	350	ug/L	7.5	20	50		12/28/12 13:41

INORGANIC ANALYSIS DATA SHEET
USEPA-6010C

NTC12-SB33-0406

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 15:30
Solids: 0.00
QC Batch: 1215834

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-08
Prepared: 12/27/12 08:00
Preparation: 3010A SPLP Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, SPLP	1	10000	ug/L	13	50	100		12/28/12 09:27
7440-70-2	Calcium, SPLP	1	32000	ug/L	230	500	500		12/28/12 09:27
7439-89-6	Iron, SPLP	1	13000	ug/L	6.5	10	10		12/28/12 09:27
7439-95-4	Magnesium, SPLP	1	8900	ug/L	140	500	500		12/28/12 09:27
7440-09-7	Potassium, SPLP	1	6000	ug/L	33	100	100		12/28/12 09:27
7440-23-5	Sodium, SPLP	1	14000	ug/L	5000	5000	10000		12/28/12 09:27

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12-SB34-0204

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 15:00
Solids: 0.00
QC Batch: 1215835

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-05
Prepared: 12/27/12 08:00
Preparation: 3020A SPLP Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, SPLP	1	0.82	ug/L	0.15	0.50	1.0	J	12/31/12 09:33
7440-38-2	Arsenic, SPLP	1	0.47	ug/L	0.18	0.50	1.0	J	12/28/12 12:47
7440-39-3	Barium, SPLP	1	35	ug/L	0.14	0.50	1.0		12/28/12 12:47
7440-41-7	Beryllium, SPLP	1	0.40	ug/L	0.11	0.40	1.0	U	12/28/12 16:34
7440-43-9	Cadmium, SPLP	1	0.042	ug/L	0.038	0.10	0.20	J	12/28/12 12:47
7440-47-3	Chromium, SPLP	1	6.0	ug/L	0.20	0.50	1.0		12/28/12 12:47
7440-48-4	Cobalt, SPLP	1	0.31	ug/L	0.050	0.20	1.0	J	12/28/12 12:47
7440-50-8	Copper, SPLP	1	9.5	ug/L	0.13	0.50	1.0		12/28/12 12:47
7439-92-1	Lead, SPLP	1	0.84	ug/L	0.15	0.50	1.0	J	12/28/12 12:47
7439-96-5	Manganese, SPLP	1	6.7	ug/L	0.14	0.50	1.0		12/28/12 12:47
7440-02-0	Nickel, SPLP	1	1.2	ug/L	0.17	0.50	1.0		12/28/12 16:34
7782-49-2	Selenium, SPLP	1	1.0	ug/L	0.31	1.0	1.0	U	12/28/12 16:34
7440-22-4	Silver, SPLP	1	0.10	ug/L	0.037	0.10	0.20	U	12/28/12 12:47
7440-28-0	Thallium, SPLP	1	0.10	ug/L	0.027	0.10	1.0	U	12/28/12 12:47
7440-62-2	Vanadium, SPLP	1	0.74	ug/L	0.066	0.20	1.0	J	12/28/12 16:34
7440-66-6	Zinc, SPLP	1	4.4	ug/L	1.5	4.0	10	J	12/28/12 12:47

INORGANIC ANALYSIS DATA SHEET
USEPA-6010C

NTC12-SB34-0204

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 15:00
Solids: 0.00
QC Batch: 1215834

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-05
Prepared: 12/27/12 08:00
Preparation: 3010A SPLP Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, SPLP	1	1400	ug/L	13	50	100		12/28/12 09:15
7440-70-2	Calcium, SPLP	1	180000	ug/L	230	500	500		12/28/12 09:15
7439-89-6	Iron, SPLP	1	210	ug/L	6.5	10	10		12/28/12 09:15
7439-95-4	Magnesium, SPLP	1	400	ug/L	140	500	500	J	12/28/12 09:15
7440-09-7	Potassium, SPLP	1	4800	ug/L	33	100	100		12/28/12 09:15
7440-23-5	Sodium, SPLP	1	11000	ug/L	5000	5000	10000		12/28/12 09:15

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

NTC12-SB34-0406

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 15:10
Solids: 0.00
QC Batch: 1215835

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-06
Prepared: 12/27/12 08:00
Preparation: 3020A SPLP Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7440-36-0	Antimony, SPLP	1	7.6	ug/L	0.15	0.50	1.0		12/31/12 09:35
7440-38-2	Arsenic, SPLP	1	16	ug/L	0.18	0.50	1.0		12/28/12 12:52
7440-39-3	Barium, SPLP	1	27	ug/L	0.14	0.50	1.0		12/28/12 12:52
7440-41-7	Beryllium, SPLP	1	0.23	ug/L	0.11	0.40	1.0	J	12/28/12 16:37
7440-43-9	Cadmium, SPLP	1	0.82	ug/L	0.038	0.10	0.20		12/28/12 12:52
7440-47-3	Chromium, SPLP	1	14	ug/L	0.20	0.50	1.0		12/28/12 12:52
7440-48-4	Cobalt, SPLP	1	3.7	ug/L	0.050	0.20	1.0		12/28/12 12:52
7440-50-8	Copper, SPLP	1	51	ug/L	0.13	0.50	1.0		12/28/12 12:52
7439-92-1	Lead, SPLP	1	94	ug/L	0.15	0.50	1.0		12/28/12 12:52
7439-96-5	Manganese, SPLP	5	110	ug/L	0.70	2.5	5.0		12/28/12 13:38
7440-02-0	Nickel, SPLP	1	16	ug/L	0.17	0.50	1.0		12/28/12 12:52
7782-49-2	Selenium, SPLP	1	0.48	ug/L	0.31	1.0	1.0	J	12/28/12 16:37
7440-22-4	Silver, SPLP	1	1.6	ug/L	0.037	0.10	0.20		12/28/12 12:52
7440-28-0	Thallium, SPLP	1	0.081	ug/L	0.027	0.10	1.0	J	12/28/12 12:52
7440-62-2	Vanadium, SPLP	1	7.0	ug/L	0.066	0.20	1.0		12/28/12 16:37
7440-66-6	Zinc, SPLP	5	170	ug/L	7.5	20	50		12/28/12 13:38

INORGANIC ANALYSIS DATA SHEET
USEPA-6010C

NTC12-SB34-0406

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 15:10
Solids: 0.00
QC Batch: 1215834

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-06
Prepared: 12/27/12 08:00
Preparation: 3010A SPLP Digestion
Initial/Final: 25 mL / 25 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7429-90-5	Aluminum, SPLP	1	2700	ug/L	13	50	100		12/28/12 09:19
7440-70-2	Calcium, SPLP	1	13000	ug/L	230	500	500		12/28/12 09:19
7439-89-6	Iron, SPLP	1	7200	ug/L	6.5	10	10		12/28/12 09:19
7439-95-4	Magnesium, SPLP	1	3300	ug/L	140	500	500		12/28/12 09:19
7440-09-7	Potassium, SPLP	1	1200	ug/L	33	100	100		12/28/12 09:19
7440-23-5	Sodium, SPLP	1	24000	ug/L	5000	5000	10000		12/28/12 09:19

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

NTC12-SB31-0305

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 14:20
Solids: 0.00
QC Batch: 1215801

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-01
Prepared: 12/27/12 07:00
Preparation: 7470A SPLP Digestion
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, SPLP	1	0.30	ug/L	0.055	0.10	0.20		12/27/12 15:32

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

NTC12-SB31-0507

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 14:25
Solids: 0.00
QC Batch: 1215801

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-02
Prepared: 12/27/12 07:00
Preparation: 7470A SPLP Digestion
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, SPLP	1	0.067	ug/L	0.055	0.10	0.20	J	12/27/12 15:37

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

NTC12-SB32-0204

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 14:35
Solids: 0.00
QC Batch: 1215801

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-03
Prepared: 12/27/12 07:00
Preparation: 7470A SPLP Digestion
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, SPLP	1	0.10	ug/L	0.055	0.10	0.20	U	12/27/12 15:42

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

NTC12-SB32-0406

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 14:40
Solids: 0.00
QC Batch: 1215867

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-04
Prepared: 01/02/13 08:00
Preparation: 7470A SPLP Digestion
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, SPLP	1	0.10	ug/L	0.055	0.10	0.20	U	01/03/13 08:35

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

NTC12-SB33-0204

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 15:25
Solids: 0.00
QC Batch: 1215801

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-07
Prepared: 12/27/12 07:00
Preparation: 7470A SPLP Digestion
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, SPLP	1	0.10	ug/L	0.055	0.10	0.20	U	12/27/12 16:23

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

NTC12-SB33-0406

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 15:30
Solids: 0.00
QC Batch: 1215801

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-08
Prepared: 12/27/12 07:00
Preparation: 7470A SPLP Digestion
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, SPLP	1	1.0	ug/L	0.055	0.10	0.20		12/27/12 16:28

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

NTC12-SB34-0204

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 15:00
Solids: 0.00
QC Batch: 1215801

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-05
Prepared: 12/27/12 07:00
Preparation: 7470A SPLP Digestion
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, SPLP	1	0.10	ug/L	0.055	0.10	0.20	U	12/27/12 16:02

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

NTC12-SB34-0406

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
Sampled: 12/17/12 15:10
Solids: 0.00
QC Batch: 1215801

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1212366-06
Prepared: 12/27/12 07:00
Preparation: 7470A SPLP Digestion
Initial/Final: 30 mL / 30 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	DL	LOD	LOQ	Q	Analyzed
7439-97-6	Mercury, SPLP	1	0.24	ug/L	0.055	0.10	0.20		12/27/12 16:07

APPENDIX C
SUPPORT DOCUMENTATION

TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

TETRA TECH NUS - Pittsburgh
NS Great Lakes CTO F27A

SDG Executive Summary

This case narrative applies to samples received on December 18, 2012. All samples were scheduled for analysis in accordance with parameters outlined on the field chain of custody record, the TriMatrix bid form, and/or oral and written correspondence between TETRA TECH NUS - Pittsburgh and TriMatrix Laboratories, Inc.

Each sample receipt event was assigned a unique TriMatrix work order number. Sample receipt documentation is included in section A of this data package.

Project Technical Issues/Problems

Project-related data qualification designations and reporting conventions are included in Attachment 1 - *Project Technical Narrative.*

QA/QC Data Qualifications/Narrations

Quality assurance issues and/or quality control data qualifications and narrations related to the analysis and reporting of this SDG are presented in Attachment 2 - *Statement of Data Qualifications.* The absence of a statement page for a particular analyte group (*e.g.* Percent Solids) implies that no qualifying statements were generated for that analyte.

Data Review and Approval

All data was peer-reviewed by a second analyst, and then by appropriate data management staff against laboratory quality control requirements and project specifications. It was then reviewed and approved by the group supervisor/manager prior to further review by the project chemist.

Data Deliverables

This report relates only to the sample(s) as received. Estimates of analytical uncertainties for the test results contained within this report are available upon request. Test results are in compliance with the requirements of the DoD Quality Systems Manual for Environmental Laboratories Version 4.2, the National Environmental Laboratory Accreditation Conference (NELAC), and one or more of the following certification programs:

ACLASS DoD-ELAP/ISO17025 (#ADE-1542); Arkansas DEP (#12-056-0); Florida DEP (#E87622-24); Georgia EPD (#E87622-24); Illinois DEP (#002841); Kansas DPH (#E-10302); Kentucky DEP (#0021); Louisiana DEP (#03068); Michigan DPH (#0034); Minnesota DPH (#367345); New York ELAP (#46503); North Carolina DNRE (#659); Texas CEQ (#T104704495-12-2); Virginia DCLS (#1622); Wisconsin DNR (#999472650); USDA Soil Import Permit (#P330-09-00163).

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Individual sample results relate only to the sample tested.

TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

The data deliverables, both hardcopy and/or electronic (EDD), that comprise this data package are intended to comply with the documents referenced in the introductory section of this narrative. The EDD, if requested, will be issued separately from this hardcopy report. Hold time reports for each test procedure are presented following the CLP-like forms section of this report.

Gary L. Wood, Project Chemist

1/16/13
Date

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Individual sample results relate only to the sample tested.

TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

Sample Receipt and Login -- Work Order: 1212366

TriMatrix Laboratories received the cooler(s) for this work order on December 18, 2012, at 09:00am. Receiving documents include field chain-of-custody (COC) record(s), sample receipt form(s), and FedEx shipping document(s). The condition of the custody seals, the type and location of the coolant, and the temperatures recorded for each cooler are presented on the TriMatrix *Sample Receiving / Log-In Checklist* provided in section A of this package. The receipt temperature of the samples was determined by using an infrared thermometer to record the temperature of three random samples of varying container types and the accompanying temperature blank, if present.

Samples were scheduled for the analyses listed on the corresponding COC form. Field IDs and assigned laboratory identifiers are presented in the table below.

Field Sample Name	Laboratory Sample ID	Matrix	Date Sampled
NTC12-SB31-0305	1212366-01	Soil	12/17/2012
NTC12-SB31-0507	1212366-02	Soil	12/17/2012
NTC12-SB32-0204	1212366-03	Soil	12/17/2012
NTC12-SB32-0406	1212366-04	Soil	12/17/2012
NTC12-SB34-0204	1212366-05	Soil	12/17/2012
NTC12-SB34-0406	1212366-06	Soil	12/17/2012
NTC12-SB33-0204	1212366-07	Soil	12/17/2012
NTC12-SB33-0406	1212366-08	Soil	12/17/2012

No administrative issues were encountered during the receipt and analysis of this work order.

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Individual sample results relate only to the sample tested.

TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

Attachment 1
Project Technical Narrative

Sample Result Reporting Convention

Sample results are reported as LOD "U" (e.g. 0.001 U) if the target analyte was not detected above the detection limit (DL). The LOD is the Limit of Detection as defined in the DoD QSM and numerically determined by TriMatrix.

If a sample for an organic analyte is reanalyzed and also reported, the second analysis includes the suffix "RE*n*" where *n* = the first, second, etc. reanalysis. If a sample is reanalyzed for confirmation purposes but that confirmation was not performed simultaneously, the second set of sample results is reported on a second Form 1 since the confirmation analysis did not occur at the same time and/or date.

Percent Solids and Metals Data Reporting

Unless otherwise noted, all soil samples requiring metals analysis are dried at 50° to 60° C to a constant weight prior to acid digestion. In order to report results on a dry weight basis, correction for percent solids is not applicable.

Data Qualifier Designation

If applicable, sample results are qualified with:

- a "U" flag as defined above;
- a "J" flag if the analyte was detected, but the concentration is greater than the DL and less than the LOQ (the Limit of Quantitation as defined in the DoD QSM);
- a "B" flag if the analyte was detected above one-half the LOQ (above the LOQ for a common laboratory contaminant) in the associated method blank, and the sample concentration was less than or equal to ten times the method blank result;
- a "E" flag if the analyte exceeded the instrument calibration range;
- a "N" flag for a non-target analyte identified as a tentatively identified compound using mass spectrometry;
- a LIMS-generated statement of qualification that will be reported in Attachment 2 to this narrative.

Batch and Analytical Batch Designation

A Quality Control (QC) Batch is a seven-digit number that associates all samples that have been prepared together (or analyzed together if there is no preparation). Quality Control batches are limited to no more than twenty samples, excluding batch QC (method blanks, control spikes, etc.). Some batches may contain multiple sets of method blanks (BLK) and laboratory control samples (BS), where a set of method quality control analyses were prepared in concert with each set of samples on a given day.

An Analytical Batch (or Sequence) is a seven-digit number that associates all samples analyzed as a set under one analytical run.

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Individual sample results relate only to the sample tested.

TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

SPLP Metals by EPA 1312/6000/7000 Series Methods

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-6010C

Sample/Analyte:	1212366-04 NTC12-SB32-0406	Aluminum
	1212366-04 NTC12-SB32-0406	Sodium

Analysis: USEPA-6020A

Sample/Analyte:	1212366-04 NTC12-SB32-0406	Antimony
	1212366-04 NTC12-SB32-0406	Manganese
	1212366-04 NTC12-SB32-0406	Zinc

Qualification: The MS or MSD recovery, but not both, was outside the control limit. The RPD is within the control limit. The unspiked sample result is considered estimated.

Analysis: USEPA-6020A

Sample/Analyte:	1212366-04 NTC12-SB32-0406	Barium

Qualification: The % difference between the values of the isotopes monitored for this analyte exceeded 25%; the lower of the two results has been reported.

Analysis: USEPA-6020A

Sample/Analyte:	1212366-01 NTC12-SB31-0305	Cadmium
	1212366-03 NTC12-SB32-0204	Nickel
	1212366-05 NTC12-SB34-0204	Nickel

Qualification: This analyte was not present in this sample at a concentration greater than 100 times the MDL, therefore serial dilution is not required.

Analysis: USEPA-6020A

Sample/Analyte:	1212366-04 NTC12-SB32-0406	Arsenic
	1212366-04 NTC12-SB32-0406	Chromium
	1212366-04 NTC12-SB32-0406	Nickel

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was greater than or equal to 4 times the spiked amount; matrix QC results are not available.

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Individual sample results relate only to the sample tested.

TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

SPLP Metals by EPA 1312/6000/7000 Series Methods

Analysis: USEPA-6010C

Sample/Analyte: 1212366-04 NTC12-SB32-0406 Iron

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Individual sample results relate only to the sample tested.

(SITE 12 SOILS)

TETRA TECH NUS, INC. Cart 8 | CHAIN OF CUSTODY | NUMBER 0495 | PAGE 1 OF 1

PROJECT NO: 2416 112G0~~2120~~	FACILITY: NAVST GREAT LAKES SITE 12	PROJECT MANAGER: COREY BOB DAVIS / RICH	PHONE NUMBER 4129217251	LABORATORY NAME AND CONTACT: TRIMATRIX / GARY WOOD
SAMPLERS (SIGNATURE) SJConti 1212366		FIELD OPERATIONS LEADER SCONTI	PHONE NUMBER 412 551 2629	ADDRESS 5560 CORPORATE EX. COURT SE
		CARRIER/WAYBILL NUMBER FED EX # 8020 3157 8634		CITY, STATE GRAND RAPIDS, MI

STANDARD TAT ☐
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☒ 14 day

	DATE YEAR 2012	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: SPLP TAL METALS (6020)	4°C	Schedule	COMMENTS
			SITE 12							G					
01	12/17	1420	NTC12-SB31-0305	SB 31	3	5	SO	G	1	1				01	
02	12/17	1425	NTC12-SB31-0507	"	5	7	SO	G	1	1				↓	
03	12/17	1435	NTC12-SB32-0204	SB 32	2	4	SO	G	1	1				↓	
04	12/17	1440	NTC12-SB32-0406	"	4	6	SO	G	(2)	(2)				02	DO MS/MSD
05	12/17	1500	NTC12-SB34-0204	SB 34	2	4	SO	G	1	1				01	
06	12/17	1510	NTC12-SB34-0406	"	4	6	SO	G	1	1				↓	
07	12/17	1525	NTC12-SB33-0204	SB 33	2	4	SO	G	1	1				↓	
08	12/17	1530	NTC12-SB33-0406	"	4	6	SO	G	1	1				↓	

1. RELINQUISHED BY SJConti	DATE 12/17/12	TIME 800	1. RECEIVED BY FED EX	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE 12.18.12	TIME 0900

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

SAMPLE ID SUMMARY

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

SDG: NTC12

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A

Client Sample Id:	Lab Sample Id:
NTC12-SB31-0305	1212366-01
NTC12-SB31-0507	1212366-02
NTC12-SB32-0204	1212366-03
NTC12-SB32-0406	1212366-04
NTC12-SB34-0204	1212366-05
NTC12-SB34-0406	1212366-06
NTC12-SB33-0204	1212366-07
NTC12-SB33-0406	1212366-08

HOLDTIME

SDG NTC12

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
SPLPM	UG/L	NTC12-SB33-0204	1212366-07	NM	12/17/2012	12/27/2012	12/27/2012	10	0	10
SPLPM	UG/L	NTC12-SB31-0305	1212366-01	NM	12/17/2012	12/27/2012	12/28/2012	10	1	11
SPLPM	UG/L	NTC12-SB31-0305	1212366-01	NM	12/17/2012	12/27/2012	12/31/2012	10	4	14
SPLPM	UG/L	NTC12-SB31-0507	1212366-02	NM	12/17/2012	12/27/2012	12/27/2012	10	0	10
SPLPM	UG/L	NTC12-SB31-0507	1212366-02	NM	12/17/2012	12/27/2012	12/28/2012	10	1	11
SPLPM	UG/L	NTC12-SB31-0507	1212366-02	NM	12/17/2012	12/27/2012	12/31/2012	10	4	14
SPLPM	UG/L	NTC12-SB32-0204	1212366-03	NM	12/17/2012	12/27/2012	12/27/2012	10	0	10
SPLPM	UG/L	NTC12-SB32-0204	1212366-03	NM	12/17/2012	12/27/2012	12/28/2012	10	1	11
SPLPM	UG/L	NTC12-SB32-0204	1212366-03	NM	12/17/2012	12/27/2012	12/31/2012	10	4	14
SPLPM	UG/L	NTC12-SB32-0406	1212366-04	NM	12/17/2012	12/27/2012	12/28/2012	10	1	11
SPLPM	UG/L	NTC12-SB31-0305	1212366-01	NM	12/17/2012	12/27/2012	12/27/2012	10	0	10
SPLPM	UG/L	NTC12-SB32-0406	1212366-04	NM	12/17/2012	1/2/2013	1/3/2013	16	1	17
SPLPM	UG/L	NTC12-SB34-0406	1212366-06	NM	12/17/2012	12/27/2012	12/31/2012	10	4	14
SPLPM	UG/L	NTC12-SB33-0204	1212366-07	NM	12/17/2012	12/27/2012	12/28/2012	10	1	11
SPLPM	UG/L	NTC12-SB33-0204	1212366-07	NM	12/17/2012	12/27/2012	12/31/2012	10	4	14

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
SPLPM	UG/L	NTC12-SB33-0406	1212366-08	NM	12/17/2012	12/27/2012	12/27/2012	10	0	10
SPLPM	UG/L	NTC12-SB33-0406	1212366-08	NM	12/17/2012	12/27/2012	12/28/2012	10	1	11
SPLPM	UG/L	NTC12-SB33-0406	1212366-08	NM	12/17/2012	12/27/2012	12/31/2012	10	4	14
SPLPM	UG/L	NTC12-SB34-0204	1212366-05	NM	12/17/2012	12/27/2012	12/27/2012	10	0	10
SPLPM	UG/L	NTC12-SB34-0204	1212366-05	NM	12/17/2012	12/27/2012	12/28/2012	10	1	11
SPLPM	UG/L	NTC12-SB34-0204	1212366-05	NM	12/17/2012	12/27/2012	12/31/2012	10	4	14
SPLPM	UG/L	NTC12-SB34-0406	1212366-06	NM	12/17/2012	12/27/2012	12/27/2012	10	0	10
SPLPM	UG/L	NTC12-SB34-0406	1212366-06	NM	12/17/2012	12/27/2012	12/28/2012	10	1	11
SPLPM	UG/L	NTC12-SB32-0406	1212366-04	NM	12/17/2012	12/27/2012	12/31/2012	10	4	14

HOLDING TIME SUMMARY
USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

SDG: NTC12

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A

SPLP Metals

Sample Name	Date Collected	Date Received	Date Leached	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	

HOLDING TIME SUMMARY
USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

SDG: NTC12

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A

SPLP Metals

Sample Name	Date Collected	Date Received	Date Leached	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	

HOLDING TIME SUMMARY
USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

SDG: NTC12

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A

SPLP Metals

Sample Name	Date Collected	Date Received	Date Leached	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: NTC12
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A
Sequence: 2L28003
Calibration: 2L28014
Control Limt: +/- 10.00%
Instrument ID: 311

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
2L28003-CCV1	Aluminum	2500	2380	95	ug/L	12/28/12 07:39
	Calcium	5.00	4.76	95	mg/L	12/28/12 07:39
	Iron	500	484	97	ug/L	12/28/12 07:39
	Magnesium	5.00	4.83	97	mg/L	12/28/12 07:39
	Potassium	5.00	4.78	96	mg/L	12/28/12 07:39
	Sodium	5.00	4.88	98	mg/L	12/28/12 07:39
2L28003-CCV2	Aluminum	2500	2350	94	ug/L	12/28/12 08:15
	Calcium	5.00	4.83	97	mg/L	12/28/12 08:15
	Iron	500	484	97	ug/L	12/28/12 08:15
	Magnesium	5.00	4.82	96	mg/L	12/28/12 08:15
	Potassium	5.00	4.85	97	mg/L	12/28/12 08:15
	Sodium	5.00	4.77	95	mg/L	12/28/12 08:15
2L28003-CCV3	Aluminum	2500	2460	98	ug/L	12/28/12 08:49
	Calcium	5.00	4.97	99	mg/L	12/28/12 08:49
	Iron	500	500	100	ug/L	12/28/12 08:49
	Magnesium	5.00	5.02	100	mg/L	12/28/12 08:49
	Potassium	5.00	4.91	98	mg/L	12/28/12 08:49
	Sodium	5.00	4.99	100	mg/L	12/28/12 08:49
2L28003-CCV4	Aluminum	2500	2530	101	ug/L	12/28/12 09:34
	Calcium	5.00	4.98	100	mg/L	12/28/12 09:34
	Iron	500	503	101	ug/L	12/28/12 09:34
	Magnesium	5.00	5.08	102	mg/L	12/28/12 09:34
	Potassium	5.00	4.85	97	mg/L	12/28/12 09:34
	Sodium	5.00	5.10	102	mg/L	12/28/12 09:34
2L28003-CCV5	Aluminum	2500	2510	100	ug/L	12/28/12 10:58
	Calcium	5.00	4.95	99	mg/L	12/28/12 10:58
	Iron	500	497	99	ug/L	12/28/12 10:58
	Magnesium	5.00	5.05	101	mg/L	12/28/12 10:58
	Potassium	5.00	4.82	96	mg/L	12/28/12 10:58
	Sodium	5.00	5.10	102	mg/L	12/28/12 10:58

* Values outside of QC limits

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Laboratory ID: 2L28003-SCV1

Sequence: 2L28003

SDG: NTC12

Project: NS Great Lakes CTO F27A

Instrument: 311

Calibration: 2L28014

Analyte	Expected	Found	% R	QC Limit	Units
Aluminum	2500	2380	95	90-110	ug/L
Calcium	5.00	4.76	95	90-110	mg/L
Iron	500	484	97	90-110	ug/L
Magnesium	5.00	4.83	97	90-110	mg/L
Potassium	5.00	4.78	96	90-110	mg/L
Sodium	5.00	4.88	98	90-110	mg/L

* Values outside of QC limits

BLANKS
USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 2L28003

SDG: NTC12
Project: NS Great Lakes CTO F27A
Calibration: 2L28014
Instrument ID: 311

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
2L28003-CCB1	Aluminum	-13	ug/L	13	50	100	U	12/28/12 07:42
	Calcium	-0.012	mg/L	0.23	0.50	0.50	U	12/28/12 07:42
	Iron	-1.5	ug/L	6.5	10	10	U	12/28/12 07:42
	Magnesium	0.0030	mg/L	0.14	0.50	0.50	U	12/28/12 07:42
	Potassium	0.022	mg/L	0.033	0.10	0.10	U	12/28/12 07:42
	Sodium	-0.0016	mg/L	5.0	5.0	10	U	12/28/12 07:42
2L28003-CCB2 ✓	Aluminum	-13	ug/L	13	50	100	U	12/28/12 08:18
	Calcium	-0.012	mg/L	0.23	0.50	0.50	U	12/28/12 08:18
	Iron	-2.1	ug/L	6.5	10	10	U	12/28/12 08:18
	Magnesium	0.0063	mg/L	0.14	0.50	0.50	U	12/28/12 08:18
	Potassium	0.029	mg/L	0.033	0.10	0.10	U	12/28/12 08:18
	Sodium	0.000023	mg/L	5.0	5.0	10	U	12/28/12 08:18
2L28003-CCB3 ✓	Aluminum	-18	ug/L	13	50	100	J	12/28/12 08:53
	Calcium	-0.011	mg/L	0.23	0.50	0.50	U	12/28/12 08:53
	Iron	-0.46	ug/L	6.5	10	10	U	12/28/12 08:53
	Magnesium	0.0029	mg/L	0.14	0.50	0.50	U	12/28/12 08:53
	Potassium	0.028	mg/L	0.033	0.10	0.10	U	12/28/12 08:53
	Sodium	0.0025	mg/L	5.0	5.0	10	U	12/28/12 08:53
2L28003-CCB4 ✓	Aluminum	-13	ug/L	13	50	100	J	12/28/12 09:38
	Calcium	-0.011	mg/L	0.23	0.50	0.50	U	12/28/12 09:38
	Iron	-0.50	ug/L	6.5	10	10	U	12/28/12 09:38
	Magnesium	0.013	mg/L	0.14	0.50	0.50	U	12/28/12 09:38
	Potassium	0.026	mg/L	0.033	0.10	0.10	U	12/28/12 09:38
	Sodium	0.014	mg/L	5.0	5.0	10	U	12/28/12 09:38
2L28003-CCB5	Aluminum	-16	ug/L	13	50	100	J	12/28/12 11:02
	Calcium	-0.012	mg/L	0.23	0.50	0.50	U	12/28/12 11:02
	Iron	1.0	ug/L	6.5	10	10	U	12/28/12 11:02
	Magnesium	0.0086	mg/L	0.14	0.50	0.50	U	12/28/12 11:02
	Potassium	0.034	mg/L	0.033	0.10	0.10	J	12/28/12 11:02
	Sodium	0.023	mg/L	5.0	5.0	10	U	12/28/12 11:02

* Values outside of QC limits

ICP INTERFERENCE CHECK SAMPLE

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Sequence: 2L28003

SDG: NTC12

Project: NS Great Lakes CTO F27A

Calibration: 2L28014

Instrument ID: 311

Lab Sample ID	Analyte	True	Found	%R	Units
2L28003-IFA1	Aluminum	100000	97400	97	ug/L
	Calcium	100	96.1	96	mg/L
	Iron	40000	38700	97	ug/L
	Magnesium	100	96.3	96	mg/L
	Potassium	0.00	0.0282		mg/L
	Sodium	0.00	0.00361		mg/L
2L28003-IFA2	Aluminum	0.00	4.64		ug/L
	Calcium	0.00	-0.0321		mg/L
	Iron	0.00	5.60		ug/L
	Magnesium	0.00	-0.0935		mg/L
	Potassium	0.00	0.0521		mg/L
	Sodium	0.00	0.0324		mg/L
2L28003-IFB1	Aluminum	100000	96500	96	ug/L
	Calcium	100	96.1	96	mg/L
	Iron	40000	38700	97	ug/L
	Magnesium	100	95.5	96	mg/L
2L28003-IFB2	Aluminum	1000	1020	102	ug/L
	Calcium	5.00	4.98	100	mg/L
	Magnesium	5.00	5.07	101	mg/L
	Sodium	5.00	5.18	104	mg/L

* Values outside of QC limits

ICP interf

SDG NTC12

Aqueous

Affected Analyte	Sample	Reported Result	Qualifier	Interferent	Interferent level in ICS	Conc. ICS	Interferent Level	Est. Interference	Validation Action	Validation Action
K	SB34-0204	4800		Ca	100000	52.1	4800	2.50	na	na

QC BATCH SUMMARY

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

SDG: NTC12

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A

QC Batch: 1215834 QC Batch Matrix: Soil

Preparation: 3010A SPLP Digestion

Sample Name	Lab Sample ID	Date Prepared	Observations
NTC12-SB31-0305	1212366-01	12/27/12 08:00	
NTC12-SB31-0507	1212366-02	12/27/12 08:00	
NTC12-SB32-0204	1212366-03	12/27/12 08:00	
NTC12-SB32-0406	1212366-04	12/27/12 08:00	
NTC12-SB34-0204	1212366-05	12/27/12 08:00	
NTC12-SB34-0406	1212366-06	12/27/12 08:00	
NTC12-SB33-0204	1212366-07	12/27/12 08:00	
NTC12-SB33-0406	1212366-08	12/27/12 08:00	
Blank	1215834-BLK1	12/27/12 08:00	
LCS	1215834-BS1	12/27/12 08:00	
NTC12-SB32-0406	1215834-MS1	12/27/12 08:00	
NTC12-SB32-0406	1215834-MSD1	12/27/12 08:00	

METHOD BLANK DATA SHEET
USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
SDG: NTC12
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A
Matrix: Soil
Laboratory ID: 1215834-BLK1
File ID: 2L28003-014
Prepared: 12/27/12 08:00
Analyzed: 12/28/12 08:22
Preparation: 3010A SPLP Digestion
Initial/Final: 25 mL / 25 mL
QC Batch: 1215834
Sequence: 2L28003
Calibration: 2L28014
Instrument: 311

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7429-90-5	Aluminum, SPLP	50	ug/L	13	50	100	U
7440-70-2	Calcium, SPLP	500	ug/L	230	500	500	U
7439-89-6	Iron, SPLP	10	ug/L	6.5	10	10	U
7439-95-4	Magnesium, SPLP	500	ug/L	140	500	500	U
7440-09-7	Potassium, SPLP	45	ug/L	33	100	100	J
7440-23-5	Sodium, SPLP	5000	ug/L	5000	5000	10000	U

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6010C

NTC12-SB32-0406

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

QC Batch: 1215834

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 1215834-MS1

Preparation: 3010A SPLP Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Aluminum, SPLP	2000	1900	8170	314 *	75 - 125	ug/L
Calcium, SPLP	20000	25500	47600	111	75 - 125	ug/L
Magnesium, SPLP	20000	3940	24200	101	75 - 125	ug/L
Potassium, SPLP	20000	2590	22600	100	75 - 125	ug/L
Sodium, SPLP	20000	22500	36100	68 *	75 - 125	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12-SB32-0406

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

QC Batch: 1215834

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 1215834-MSD1

Preparation: 3010A SPLP Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Aluminum, SPLP	2000	8090	309 *	1	20	75 - 125	ug/L
Calcium, SPLP	20000	46900	107	2	20	75 - 125	ug/L
Magnesium, SPLP	20000	24100	101	0.5	20	75 - 125	ug/L
Potassium, SPLP	20000	22100	98	2	20	75 - 125	ug/L
Sodium, SPLP	20000	35900	67 *	0.5	20	75 - 125	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6010C

NTC12-SB32-0406

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
% Solids:
Preparation: 3010A SPLP Digestion
QC Batch: 1215834

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1215834-PS1
Lab Source ID: 1212366-04
Initial/Final: 4 mL / 4 mL
Sequence: 2L28003

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Aluminum, SPLP	3150	1900	ug/L	1250	100	80 - 120
Calcium, SPLP	38.3	25.5	mg/L	12.5	102	80 - 120
Iron, SPLP	2750	2540	ug/L	250	86	80 - 120
Magnesium, SPLP	16.3	3.94	mg/L	12.5	99	80 - 120
Potassium, SPLP	14.7	2.59	mg/L	12.5	97	80 - 120
Sodium, SPLP	35.2	22.5	mg/L	12.5	102	80 - 120

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

QC Batch: 1215834

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 1215834-BS1

Preparation: 3010A SPLP Digestion

Initial/Final: 25 mL / 25 mL

Sequence: 2L28003

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Aluminum, SPLP	2000	1910	96	80 - 120	ug/L
Calcium, SPLP	20000	19300	97	80 - 120	ug/L
Iron, SPLP	400	400	100	80 - 120	ug/L
Magnesium, SPLP	20000	19700	99	80 - 120	ug/L
Potassium, SPLP	20000	19400	97	80 - 120	ug/L
Sodium, SPLP	20000	19600	98	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

SERIAL DILUTION

USEPA-6010C

NTC12-SB32-0406

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

% Solids:

QC Batch: 2L28003

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 2L28003-SRD1

Lab Source ID: 1212366-04

Sequence: 2L28003

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Aluminum, SPLP	1,900		1,820		4.0		ug/L	10
Calcium, SPLP	25.5		25.4				mg/L	10
Iron, SPLP	2,540		2,460		3.0		ug/L	10
Magnesium, SPLP	3.94		3.92		#		mg/L	10
Potassium, SPLP	2.59		2.65		3.0		mg/L	10
Sodium, SPLP	22.5		22.2	U	1.0 #		mg/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

Metals, Soil, SPLP Metals

Batch comments:

mas 12/26/12 12:00pm
tumbler#2@32rpm
splp i 160
21c

Lab Number	Container	Prepared	By	Initial (g)	Final (mL)	Client: Source ID	Client: Spike ID	Client: uL Spike	Comments
1212366-01	A	Dec-26-12 12:00	MAS	100	2000	TETRA TECH NUS - Pittsburgh			
SPLP Metals Extraction									
1212366-02	A	Dec-26-12 12:00	MAS	100	2000	TETRA TECH NUS - Pittsburgh			
SPLP Metals Extraction									
1212366-03	A	Dec-26-12 12:00	MAS	100	2000	TETRA TECH NUS - Pittsburgh			
SPLP Metals Extraction									
1212366-04	B	Dec-26-12 12:00	MAS	100	2000	TETRA TECH NUS - Pittsburgh			
SPLP Metals Extraction									
1212366-05	A	Dec-26-12 12:00	MAS	100	2000	TETRA TECH NUS - Pittsburgh			
SPLP Metals Extraction									
1212366-06	A	Dec-26-12 12:00	MAS	100	2000	TETRA TECH NUS - Pittsburgh			
SPLP Metals Extraction									
1212366-07	A	Dec-26-12 12:00	MAS	100	2000	TETRA TECH NUS - Pittsburgh			
SPLP Metals Extraction									
1212366-08	A	Dec-26-12 12:00	MAS	100	2000	TETRA TECH NUS - Pittsburgh			
SPLP Metals Extraction									

Comments:	Analyst Initials:

TriMatrix Laboratories, Inc.

PREPARATION BATCH **1215834** Page 1 of 1

Printed: 1/14/2013 12:15:11PM

Metals, Soil, 3010A SPLP Digestion

Batch comments:

RDB 12-27-12 8:00AM-4:00PM
INST#220 @94.2-94.5C #257
HOTBLOCK VESSEL LOT#1208057

Lab Number	Container	Prepared	By	Initial (mL)	Final (mL)	Client Source ID	Client Spike ID	Client uL Spike	Comments
1212366-01	A 01	Dec-27-12 08:00	RDB	25	25	TETRA TECH NUS - Pittsburgh			
Al SPLP 6010B	*Ca SPLP 6010B*	*Fe SPLP 6010B*	*K SPLP 6010B*	*Mg SPLP 6010B*	*Na SPLP 6010B*				
1212366-02	A 01	Dec-27-12 08:00	RDB	25	25	TETRA TECH NUS - Pittsburgh			
Al SPLP 6010B	*Ca SPLP 6010B*	*Fe SPLP 6010B*	*K SPLP 6010B*	*Mg SPLP 6010B*	*Na SPLP 6010B*				
1212366-03	A 01	Dec-27-12 08:00	RDB	25	25	TETRA TECH NUS - Pittsburgh			
Al SPLP 6010B	*Ca SPLP 6010B*	*Fe SPLP 6010B*	*K SPLP 6010B*	*Mg SPLP 6010B*	*Na SPLP 6010B*				
1212366-04	B 01	Dec-27-12 08:00	RDB	25	25	TETRA TECH NUS - Pittsburgh			
Al SPLP 6010B	*Ca SPLP 6010B*	*Fe SPLP 6010B*	*K SPLP 6010B*	*Mg SPLP 6010B*	*Na SPLP 6010B*				
1212366-05	A 01	Dec-27-12 08:00	RDB	25	25	TETRA TECH NUS - Pittsburgh			
Al SPLP 6010B	*Ca SPLP 6010B*	*Fe SPLP 6010B*	*K SPLP 6010B*	*Mg SPLP 6010B*	*Na SPLP 6010B*				
1212366-06	A 01	Dec-27-12 08:00	RDB	25	25	TETRA TECH NUS - Pittsburgh			
Al SPLP 6010B	*Ca SPLP 6010B*	*Fe SPLP 6010B*	*K SPLP 6010B*	*Mg SPLP 6010B*	*Na SPLP 6010B*				
1212366-07	A 01	Dec-27-12 08:00	RDB	25	25	TETRA TECH NUS - Pittsburgh			
Al SPLP 6010B	*Ca SPLP 6010B*	*Fe SPLP 6010B*	*K SPLP 6010B*	*Mg SPLP 6010B*	*Na SPLP 6010B*				
1212366-08	A 01	Dec-27-12 08:00	RDB	25	25	TETRA TECH NUS - Pittsburgh			
Al SPLP 6010B	*Ca SPLP 6010B*	*Fe SPLP 6010B*	*K SPLP 6010B*	*Mg SPLP 6010B*	*Na SPLP 6010B*				
1215834-BLK1		Dec-27-12 08:00	RDB	25	25				
1215834-BS1		Dec-27-12 08:00	RDB	25	25		2101174	200	
1215834-MS1		Dec-27-12 08:00	RDB	25	25	1212366-04	2101174	200	
1215834-MSD1		Dec-27-12 08:00	RDB	25	25	1212366-04	2101174	200	
1215834-PS1		Dec-28-12 08:00	KLV	4	4	1212366-04	2041322	20	

Comments:

Analyst Initials:

bch_TM_byAnalysis.rpt

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Sequence: 2L28003

SDG: NTC12

Project: NS Great Lakes CTO F27A

Calibration: 2L28014

Instrument: 311

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	2L28003-CAL1	2L28003-001	12/28/12 07:19
Cal Standard	2L28003-CAL2	2L28003-002	12/28/12 07:23
Cal Standard	2L28003-CAL3	2L28003-003	12/28/12 07:27
Cal Standard	2L28003-CAL4	2L28003-004	12/28/12 07:31
Cal Standard	2L28003-CAL5	2L28003-005	12/28/12 07:35
Secondary Cal Check	2L28003-SCV1	2L28003-006	12/28/12 07:39
Calibration Check	2L28003-CCV1	2L28003-006	12/28/12 07:39
Calibration Blank	2L28003-CCB1	2L28003-007	12/28/12 07:42
Interference Check A	2L28003-IFA1	2L28003-008	12/28/12 07:46
Interference Check A	2L28003-IFA2	2L28003-009	12/28/12 07:53
Interference Check B	2L28003-IFB1	2L28003-010	12/28/12 08:00
Interference Check B	2L28003-IFB2	2L28003-011	12/28/12 08:07
Calibration Check	2L28003-CCV2	2L28003-012	12/28/12 08:15
Calibration Blank	2L28003-CCB2	2L28003-013	12/28/12 08:18
Blank	1215834-BLK1	2L28003-014	12/28/12 08:22
LCS	1215834-BS1	2L28003-015	12/28/12 08:26
NTC12-SB31-0305	1212366-01	2L28003-016	12/28/12 08:30
NTC12-SB31-0305	1212366-01	2L28003-016	12/28/12 08:30
NTC12-SB31-0305	1212366-01	2L28003-016	12/28/12 08:30
NTC12-SB31-0305	1212366-01	2L28003-016	12/28/12 08:30
NTC12-SB31-0305	1212366-01	2L28003-016	12/28/12 08:30
NTC12-SB31-0305	1212366-01	2L28003-016	12/28/12 08:30
NTC12-SB31-0507	1212366-02	2L28003-017	12/28/12 08:34
NTC12-SB31-0507	1212366-02	2L28003-017	12/28/12 08:34
NTC12-SB31-0507	1212366-02	2L28003-017	12/28/12 08:34
NTC12-SB31-0507	1212366-02	2L28003-017	12/28/12 08:34
NTC12-SB31-0507	1212366-02	2L28003-017	12/28/12 08:34
NTC12-SB31-0507	1212366-02	2L28003-017	12/28/12 08:34
NTC12-SB32-0204	1212366-03	2L28003-018	12/28/12 08:38
NTC12-SB32-0204	1212366-03	2L28003-018	12/28/12 08:38
NTC12-SB32-0204	1212366-03	2L28003-018	12/28/12 08:38
NTC12-SB32-0204	1212366-03	2L28003-018	12/28/12 08:38

ANALYSIS BATCH (SEQUENCE) SUMMARY
USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 2L28003

SDG: NTC12
Project: NS Great Lakes CTO F27A
Calibration: 2L28014
Instrument: 311

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
NTC12-SB32-0204	1212366-03	2L28003-018	12/28/12 08:38
NTC12-SB32-0204	1212366-03	2L28003-018	12/28/12 08:38
Calibration Check	2L28003-CCV3	2L28003-020	12/28/12 08:49
Calibration Blank	2L28003-CCB3	2L28003-021	12/28/12 08:53
NTC12-SB32-0406	1212366-04	2L28003-022	12/28/12 08:57
NTC12-SB32-0406	1212366-04	2L28003-022	12/28/12 08:57
NTC12-SB32-0406	1212366-04	2L28003-022	12/28/12 08:57
NTC12-SB32-0406	1212366-04	2L28003-022	12/28/12 08:57
NTC12-SB32-0406	1212366-04	2L28003-022	12/28/12 08:57
NTC12-SB32-0406	1212366-04	2L28003-022	12/28/12 08:57
NTC12-SB32-0406	1215834-MS1	2L28003-023	12/28/12 09:01
NTC12-SB32-0406	1215834-MSD1	2L28003-024	12/28/12 09:04
NTC12-SB32-0406	2L28003-SRD1	2L28003-025	12/28/12 09:08
NTC12-SB32-0406	1215834-PS1	2L28003-026	12/28/12 09:12
NTC12-SB34-0204	1212366-05	2L28003-027	12/28/12 09:15
NTC12-SB34-0204	1212366-05	2L28003-027	12/28/12 09:15
NTC12-SB34-0204	1212366-05	2L28003-027	12/28/12 09:15
NTC12-SB34-0204	1212366-05	2L28003-027	12/28/12 09:15
NTC12-SB34-0204	1212366-05	2L28003-027	12/28/12 09:15
NTC12-SB34-0204	1212366-05	2L28003-027	12/28/12 09:15
NTC12-SB34-0406	1212366-06	2L28003-028	12/28/12 09:19
NTC12-SB34-0406	1212366-06	2L28003-028	12/28/12 09:19
NTC12-SB34-0406	1212366-06	2L28003-028	12/28/12 09:19
NTC12-SB34-0406	1212366-06	2L28003-028	12/28/12 09:19
NTC12-SB34-0406	1212366-06	2L28003-028	12/28/12 09:19
NTC12-SB34-0406	1212366-06	2L28003-028	12/28/12 09:19
NTC12-SB33-0204	1212366-07	2L28003-029	12/28/12 09:23
NTC12-SB33-0204	1212366-07	2L28003-029	12/28/12 09:23
NTC12-SB33-0204	1212366-07	2L28003-029	12/28/12 09:23
NTC12-SB33-0204	1212366-07	2L28003-029	12/28/12 09:23
NTC12-SB33-0204	1212366-07	2L28003-029	12/28/12 09:23
NTC12-SB33-0204	1212366-07	2L28003-029	12/28/12 09:23

ANALYSIS BATCH (SEQUENCE) SUMMARY
USEPA-6010C

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 2L28003

SDG: NTC12
Project: NS Great Lakes CTO F27A
Calibration: 2L28014
Instrument: 311

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
NTC12-SB33-0406	1212366-08	2L28003-030	12/28/12 09:27
NTC12-SB33-0406	1212366-08	2L28003-030	12/28/12 09:27
NTC12-SB33-0406	1212366-08	2L28003-030	12/28/12 09:27
NTC12-SB33-0406	1212366-08	2L28003-030	12/28/12 09:27
NTC12-SB33-0406	1212366-08	2L28003-030	12/28/12 09:27
NTC12-SB33-0406	1212366-08	2L28003-030	12/28/12 09:27
Calibration Check	2L28003-CCV4	2L28003-031	12/28/12 09:34
Calibration Blank	2L28003-CCB4	2L28003-032	12/28/12 09:38
Calibration Check	2L28003-CCV5	2L28003-039	12/28/12 10:58
Calibration Blank	2L28003-CCB5	2L28003-040	12/28/12 11:02

SAMPLE ID SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: NTC12

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A

Client Sample Id:	Lab Sample Id:
NTC12-SB31-0305	1212366-01
NTC12-SB31-0507	1212366-02
NTC12-SB32-0204	1212366-03
NTC12-SB32-0406	1212366-04
NTC12-SB34-0204	1212366-05
NTC12-SB34-0406	1212366-06
NTC12-SB33-0204	1212366-07
NTC12-SB33-0406	1212366-08

HOLDING TIME SUMMARY
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

SPLP Metals

SDG: NTC12

Project: NS Great Lakes CTO F27A

Sample Name	Date Collected	Date Received	Date Leached	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/31/12	5	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	

: 00167

HOLDING TIME SUMMARY
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: NTC12

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A

SPLP Metals

Sample Name	Date Collected	Date Received	Date Leached	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/31/12	5	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	

HOLDING TIME SUMMARY
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: NTC12

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A

SPLP Metals

Sample Name	Date Collected	Date Received	Date Leached	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/31/12	5	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/31/12	5	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	

: 00189

HOLDING TIME SUMMARY
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: NTC12

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A

SPLP Metals

Sample Name	Date Collected	Date Received	Date Leached	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/31/12	5	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	

: 001190

HOLDING TIME SUMMARY
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: NTC12

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A

SPLP Metals

Sample Name	Date Collected	Date Received	Date Leached	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/31/12	5	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	

: 00191

HOLDING TIME SUMMARY
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: NTC12

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A

SPLP Metals

Sample Name	Date Collected	Date Received	Date Leached	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/31/12	5	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/28/12	2	180	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/31/12	5	180	

: 00192

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: NTC12
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A
Sequence: 2L28019
Calibration: 2L28018
Control Limt: +/- 10.00%
Instrument ID: 201

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
2L28019-CCV1	Arsenic	40.0	38.4	96	ug/L	12/28/12 11:08
	Barium	40.0	38.7	97	ug/L	12/28/12 11:08
	Cadmium	40.0	38.3	96	ug/L	12/28/12 11:08
	Chromium	40.0	39.0	97	ug/L	12/28/12 11:08
	Cobalt	40.0	38.8	97	ug/L	12/28/12 11:08
	Copper	40.0	39.1	98	ug/L	12/28/12 11:08
	Lead	40.0	38.4	96	ug/L	12/28/12 11:08
	Manganese	40.0	38.6	97	ug/L	12/28/12 11:08
	Nickel	40.0	38.4	96	ug/L	12/28/12 11:08
	Silver	40.0	37.3	93	ug/L	12/28/12 11:08
	Thallium	40.0	38.0	95	ug/L	12/28/12 11:08
	Zinc	40.0	38.1	95	ug/L	12/28/12 11:08
2L28019-CCV2	Arsenic	40.0	37.8	95	ug/L	12/28/12 11:38
	Barium	40.0	38.3	96	ug/L	12/28/12 11:38
	Cadmium	40.0	38.3	96	ug/L	12/28/12 11:38
	Chromium	40.0	38.8	97	ug/L	12/28/12 11:38
	Cobalt	40.0	37.9	95	ug/L	12/28/12 11:38
	Copper	40.0	38.3	96	ug/L	12/28/12 11:38
	Lead	40.0	38.7	97	ug/L	12/28/12 11:38
	Manganese	40.0	37.8	94	ug/L	12/28/12 11:38
	Nickel	40.0	36.9	92	ug/L	12/28/12 11:38
	Silver	40.0	37.2	93	ug/L	12/28/12 11:38
	Thallium	40.0	38.9	97	ug/L	12/28/12 11:38
	Zinc	40.0	37.7	94	ug/L	12/28/12 11:38
2L28019-CCV3	Arsenic	40.0	38.2	96	ug/L	12/28/12 12:37
	Barium	40.0	39.7	99	ug/L	12/28/12 12:37
	Cadmium	40.0	38.1	95	ug/L	12/28/12 12:37
	Chromium	40.0	39.1	98	ug/L	12/28/12 12:37
	Cobalt	40.0	38.3	96	ug/L	12/28/12 12:37
	Copper	40.0	38.3	96	ug/L	12/28/12 12:37
	Lead	40.0	38.8	97	ug/L	12/28/12 12:37
	Manganese	40.0	38.0	95	ug/L	12/28/12 12:37
	Nickel	40.0	37.7	94	ug/L	12/28/12 12:37
	Silver	40.0	37.3	93	ug/L	12/28/12 12:37
	Thallium	40.0	38.5	96	ug/L	12/28/12 12:37
	Zinc	40.0	37.9	95	ug/L	12/28/12 12:37
2L28019-CCV4	Arsenic	40.0	38.0	95	ug/L	12/28/12 13:05
	Barium	40.0	38.9	97	ug/L	12/28/12 13:05

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INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: NTC12
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A
Sequence: 2L28019
Calibration: 2L28018
Control Limt: +/- 10.00%
Instrument ID: 201

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
2L28019-CCV4	Cadmium	40.0	38.7	97	ug/L	12/28/12 13:05
	Chromium	40.0	38.7	97	ug/L	12/28/12 13:05
	Cobalt	40.0	37.8	95	ug/L	12/28/12 13:05
	Copper	40.0	38.5	96	ug/L	12/28/12 13:05
	Lead	40.0	38.7	97	ug/L	12/28/12 13:05
	Manganese	40.0	38.2	95	ug/L	12/28/12 13:05
	Nickel	40.0	37.3	93	ug/L	12/28/12 13:05
	Silver	40.0	37.8	95	ug/L	12/28/12 13:05
	Thallium	40.0	38.5	96	ug/L	12/28/12 13:05
	Zinc	40.0	38.3	96	ug/L	12/28/12 13:05
2L28019-CCV5	Barium	40.0	39.2	98	ug/L	12/28/12 13:45
	Lead	40.0	38.6	96	ug/L	12/28/12 13:45
	Manganese	40.0	38.2	96	ug/L	12/28/12 13:45
	Zinc	40.0	38.6	97	ug/L	12/28/12 13:45

* Values outside of QC limits

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: NTC12
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A
Sequence: 2L28050
Calibration: 2L28023
Control Limt: +/- 10.00%
Instrument ID: 201

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
2L28050-CCV1	Beryllium	40.0	38.9	97	ug/L	12/28/12 15:25
	Nickel	40.0	39.0	98	ug/L	12/28/12 15:25
	Selenium	40.0	40.1	100	ug/L	12/28/12 15:25
	Thallium	40.0	39.2	98	ug/L	12/28/12 15:25
	Vanadium	40.0	38.8	97	ug/L	12/28/12 15:25
2L28050-CCV2	Beryllium	40.0	38.2	95	ug/L	12/28/12 15:45
	Nickel	40.0	38.5	96	ug/L	12/28/12 15:45
	Selenium	40.0	38.4	96	ug/L	12/28/12 15:45
	Thallium	40.0	39.5	99	ug/L	12/28/12 15:45
	Vanadium	40.0	38.2	95	ug/L	12/28/12 15:45
2L28050-CCV3	Beryllium	40.0	38.5	96	ug/L	12/28/12 16:26
	Nickel	40.0	38.2	95	ug/L	12/28/12 16:26
	Selenium	40.0	37.4	93	ug/L	12/28/12 16:26
	Thallium	40.0	38.9	97	ug/L	12/28/12 16:26
	Vanadium	40.0	38.2	95	ug/L	12/28/12 16:26
2L28050-CCV4	Beryllium	40.0	37.8	94	ug/L	12/28/12 16:47
	Nickel	40.0	38.8	97	ug/L	12/28/12 16:47
	Selenium	40.0	39.5	99	ug/L	12/28/12 16:47
	Thallium	40.0	39.9	100	ug/L	12/28/12 16:47
	Vanadium	40.0	37.9	95	ug/L	12/28/12 16:47

* Values outside of QC limits

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: NTC12
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A
Sequence: 2L31001
Calibration: 2L31002
Control Limt: +/- 10.00%
Instrument ID: 114

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
2L31001-CCV1	Antimony	40.0	41.3	103	ug/L	12/31/12 08:02
2L31001-CCV2	Antimony	40.0	38.4	96	ug/L	12/31/12 08:22
2L31001-CCV3	Antimony	40.0	37.2	93	ug/L	12/31/12 09:09
2L31001-CCV4	Antimony	40.0	36.1	90	ug/L	12/31/12 09:43

* Values outside of QC limits

· 00157

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Laboratory ID: 2L28019-SCV1
Sequence: 2L28019

SDG: NTC12
Project: NS Great Lakes CTO F27A
Instrument: 201
Calibration: 2L28018

Analyte	Expected	Found	% R	QC Limit	Units
Arsenic	40.0	38.4	96	90-110	ug/L
Barium	40.0	38.7	97	90-110	ug/L
Cadmium	40.0	38.3	96	90-110	ug/L
Chromium	40.0	39.0	98	90-110	ug/L
Cobalt	40.0	38.8	97	90-110	ug/L
Copper	40.0	39.1	98	90-110	ug/L
Lead	40.0	38.4	96	90-110	ug/L
Manganese	40.0	38.6	97	90-110	ug/L
Nickel	40.0	38.4	96	90-110	ug/L
Silver	40.0	37.3	93	90-110	ug/L
Thallium	40.0	38.0	95	90-110	ug/L
Zinc	40.0	38.1	95	90-110	ug/L

* Values outside of QC limits

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Laboratory ID: 2L28050-SCV1
Sequence: 2L28050

SDG: NTC12
Project: NS Great Lakes CTO F27A
Instrument: 201
Calibration: 2L28023

Analyte	Expected	Found	% R	QC Limit	Units
Beryllium	40.0	38.9	97	90-110	ug/L
Nickel	40.0	39.0	98	90-110	ug/L
Selenium	40.0	40.1	100	90-110	ug/L
Thallium	40.0	39.2	98	90-110	ug/L
Vanadium	40.0	38.8	97	90-110	ug/L

* Values outside of QC limits

00159

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Laboratory ID: 2L31001-SCV1

Sequence: 2L31001

SDG: NTC12

Project: NS Great Lakes CTO F27A

Instrument: 114

Calibration: 2L31002

Analyte	Expected	Found	% R	QC Limit	Units
Antimony	40.0	41.3	103	90-110	ug/L

* Values outside of QC limits

BLANKS
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: NTC12
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A
Sequence: 2L28019
Calibration: 2L28018
Instrument ID: 201

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
2L28019-CCB1	Arsenic	0.41	ug/L	0.18	0.50	1.0	J	12/28/12 11:18
	Barium	-0.0074	ug/L	0.14	0.50	1.0	U	12/28/12 11:18
	Cadmium	0.015	ug/L	0.038	0.10	0.20	U	12/28/12 11:18
	Chromium	-0.091	ug/L	0.20	0.50	1.0	U	12/28/12 11:18
	Cobalt	0.0068	ug/L	0.050	0.20	1.0	U	12/28/12 11:18
	Copper	-0.027	ug/L	0.13	0.50	1.0	U	12/28/12 11:18
	Lead	-0.0063	ug/L	0.15	0.50	1.0	U	12/28/12 11:18
	Manganese	-0.030	ug/L	0.14	0.50	1.0	U	12/28/12 11:18
	Nickel	-0.38	ug/L	0.17	0.50	1.0	J	12/28/12 11:18
	Silver	0.0076	ug/L	0.037	0.10	0.20	U	12/28/12 11:18
	Thallium	0.0021	ug/L	0.027	0.10	1.0	U	12/28/12 11:18
	Zinc	-0.41	ug/L	1.5	4.0	10	U	12/28/12 11:18
2L28019-CCB2	Arsenic	-0.11	ug/L	0.18	0.50	1.0	U	12/28/12 11:48
	Barium	0.0014	ug/L	0.14	0.50	1.0	U	12/28/12 11:48
	Cadmium	0.0045	ug/L	0.038	0.10	0.20	U	12/28/12 11:48
	Chromium	-0.49	ug/L	0.20	0.50	1.0	J	12/28/12 11:48
	Cobalt	0.0062	ug/L	0.050	0.20	1.0	U	12/28/12 11:48
	Copper	-0.069	ug/L	0.13	0.50	1.0	U	12/28/12 11:48
	Lead	-0.0067	ug/L	0.15	0.50	1.0	U	12/28/12 11:48
	Manganese	-0.022	ug/L	0.14	0.50	1.0	U	12/28/12 11:48
	Nickel	-0.30	ug/L	0.17	0.50	1.0	J	12/28/12 11:48
	Silver	0.0054	ug/L	0.037	0.10	0.20	U	12/28/12 11:48
	Thallium	0.00055	ug/L	0.027	0.10	1.0	U	12/28/12 11:48
	Zinc	0.43	ug/L	1.5	4.0	10	U	12/28/12 11:48
2L28019-CCB3	Arsenic	0.21	ug/L	0.18	0.50	1.0	J	12/28/12 12:43
	Barium	0.0044	ug/L	0.14	0.50	1.0	U	12/28/12 12:43
	Cadmium	0.0062	ug/L	0.038	0.10	0.20	U	12/28/12 12:43
	Chromium	-0.29	ug/L	0.20	0.50	1.0	J	12/28/12 12:43
	Cobalt	0.0092	ug/L	0.050	0.20	1.0	U	12/28/12 12:43
	Copper	-0.065	ug/L	0.13	0.50	1.0	U	12/28/12 12:43
	Lead	0.0075	ug/L	0.15	0.50	1.0	U	12/28/12 12:43
	Manganese	-0.053	ug/L	0.14	0.50	1.0	U	12/28/12 12:43
	Nickel	-0.47	ug/L	0.17	0.50	1.0	J	12/28/12 12:43

BLANKS
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 2L28019

SDG: NTC12
Project: NS Great Lakes CTO F27A
Calibration: 2L28018
Instrument ID: 201

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
2L28019-CCB3	Silver	0.012	ug/L	0.037	0.10	0.20	U	12/28/12 12:43
	Thallium	0.012	ug/L	0.027	0.10	1.0	U	12/28/12 12:43
	Zinc	-0.38	ug/L	1.5	4.0	10	U	12/28/12 12:43
2L28019-CCB4	Arsenic	0.28	ug/L	0.18	0.50	1.0	J	12/28/12 13:11
	Barium	0.014	ug/L	0.14	0.50	1.0	U	12/28/12 13:11
	Cadmium	0.0074	ug/L	0.038	0.10	0.20	U	12/28/12 13:11
	Chromium	-0.35	ug/L	0.20	0.50	1.0	J	12/28/12 13:11
	Cobalt	0.0070	ug/L	0.050	0.20	1.0	U	12/28/12 13:11
	Copper	-0.16	ug/L	0.13	0.50	1.0	J	12/28/12 13:11
	Lead	0.0070	ug/L	0.15	0.50	1.0	U	12/28/12 13:11
	Manganese	-0.067	ug/L	0.14	0.50	1.0	U	12/28/12 13:11
	Nickel	-0.48	ug/L	0.17	0.50	1.0	J	12/28/12 13:11
	Silver	0.014	ug/L	0.037	0.10	0.20	U	12/28/12 13:11
	Thallium	0.010	ug/L	0.027	0.10	1.0	U	12/28/12 13:11
	Zinc	-0.49	ug/L	1.5	4.0	10	U	12/28/12 13:11
2L28019-CCB5	Barium	0.00038	ug/L	0.14	0.50	1.0	U	12/28/12 13:50
	Lead	0.015	ug/L	0.15	0.50	1.0	U	12/28/12 13:50
	Manganese	-0.066	ug/L	0.14	0.50	1.0	U	12/28/12 13:50
	Zinc	-0.44	ug/L	1.5	4.0	10	U	12/28/12 13:50

* Values outside of QC limits

BLANKS
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 2L28050

SDG: NTC12
Project: NS Great Lakes CTO F27A
Calibration: 2L28023
Instrument ID: 201

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
2L28050-CCB1	Beryllium	0.0066	ug/L	0.11	0.40	1.0	U	12/28/12 15:29
	Nickel	-0.028	ug/L	0.17	0.50	1.0	U	12/28/12 15:29
	Selenium	-0.57	ug/L	0.31	1.0	1.0	J	12/28/12 15:29
	Thallium	0.018	ug/L	0.027	0.10	1.0	U	12/28/12 15:29
	Vanadium	0.080	ug/L	0.066	0.20	1.0	J	12/28/12 15:29
2L28050-CCB2	Beryllium	-0.0014	ug/L	0.11	0.40	1.0	U	12/28/12 15:50
	Nickel	-0.044	ug/L	0.17	0.50	1.0	U	12/28/12 15:50
	Selenium	-0.044	ug/L	0.31	1.0	1.0	U	12/28/12 15:50
	Thallium	0.014	ug/L	0.027	0.10	1.0	U	12/28/12 15:50
	Vanadium	-0.019	ug/L	0.066	0.20	1.0	U	12/28/12 15:50
2L28050-CCB3	Beryllium	0.014	ug/L	0.11	0.40	1.0	U	12/28/12 16:31
	Nickel	-0.037	ug/L	0.17	0.50	1.0	U	12/28/12 16:31
	Selenium	-0.37	ug/L	0.31	1.0	1.0	J	12/28/12 16:31
	Thallium	0.014	ug/L	0.027	0.10	1.0	U	12/28/12 16:31
	Vanadium	-0.0034	ug/L	0.066	0.20	1.0	U	12/28/12 16:31
2L28050-CCB4	Beryllium	-0.016	ug/L	0.11	0.40	1.0	U	12/28/12 16:51
	Nickel	-0.032	ug/L	0.17	0.50	1.0	U	12/28/12 16:51
	Selenium	0.087	ug/L	0.31	1.0	1.0	U	12/28/12 16:51
	Thallium	0.012	ug/L	0.027	0.10	1.0	U	12/28/12 16:51
	Vanadium	-0.047	ug/L	0.066	0.20	1.0	U	12/28/12 16:51

* Values outside of QC limits

BLANKS
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 2L31001

SDG: NTC12
Project: NS Great Lakes CTO F27A
Calibration: 2L31002
Instrument ID: 114

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
2L31001-CCB1	Antimony	0.22	ug/L	0.15	0.50	1.0	J	12/31/12 08:11
2L31001-CCB2	Antimony	0.12	ug/L	0.15	0.50	1.0	U	12/31/12 08:34
2L31001-CCB3	Antimony	0.37	ug/L	0.15	0.50	1.0	J	12/31/12 09:16
2L31001-CCB4	Antimony	0.39	ug/L	0.15	0.50	1.0	J	12/31/12 09:50

* Values outside of QC limits

ICP INTERFERENCE CHECK SAMPLE

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Sequence: 2L28019

SDG: NTC12

Project: NS Great Lakes CTO F27A

Calibration: 2L28018

Instrument ID: 201

Lab Sample ID	Analyte	True	Found	%R	Units
2L28019-IFA1	Arsenic	0.00	0.0584		ug/L
	Barium	0.00	0.0108		ug/L
	Cadmium	0.00	0.0216		ug/L
	Chromium	0.00	-0.434		ug/L
	Cobalt	0.00	0.0127		ug/L
	Copper	0.00	0.245		ug/L
	Lead	0.00	0.00917		ug/L
	Manganese	0.00	-0.0145		ug/L
	Nickel	0.00	-0.175		ug/L
	Silver	0.00	0.0118		ug/L
	Thallium	0.00	-0.000203		ug/L
	Zinc	0.00	0.119		ug/L
2L28019-IFB1	Arsenic	20.0	18.4	92	ug/L
	Barium	20.0	18.7	93	ug/L
	Cadmium	20.0	19.6	98	ug/L
	Chromium	20.0	19.0	95	ug/L
	Cobalt	20.0	18.7	94	ug/L
	Copper	20.0	18.6	93	ug/L
	Lead	20.0	19.1	95	ug/L
	Manganese	20.0	18.7	94	ug/L
	Nickel	20.0	18.0	90	ug/L
	Silver	20.0	18.5	93	ug/L
	Thallium	20.0	19.0	95	ug/L
	Zinc	20.0	18.8	94	ug/L

* Values outside of QC limits

ICP INTERFERENCE CHECK SAMPLE

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Sequence: 2L28050

SDG: NTC12

Project: NS Great Lakes CTO F27A

Calibration: 2L28023

Instrument ID: 201

Lab Sample ID	Analyte	True	Found	%R	Units
2L28050-IFB1	Beryllium	20.0	19.5	98	ug/L
	Nickel	20.0	19.3	96	ug/L
	Selenium	20.0	18.9	95	ug/L
	Thallium	20.0	19.3	97	ug/L
	Vanadium	20.0	19.1	95	ug/L
2L28050-IFA1	Beryllium	0.00	0.00332		ug/L
	Nickel	0.00	0.189		ug/L
	Selenium	0.00	-0.0194		ug/L
	Thallium	0.00	0.00364		ug/L
	Vanadium	0.00	-0.0463		ug/L

* Values outside of QC limits

ICP INTERFERENCE CHECK SAMPLE

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Sequence: 2L31001

SDG: NTC12

Project: NS Great Lakes CTO F27A

Calibration: 2L31002

Instrument ID: 114

Lab Sample ID	Analyte	True	Found	%R	Units
2L31001-IFA1	Antimony	0.00	0.183		ug/L
2L31001-IFB1	Antimony	20.0	19.9	99	ug/L

* Values outside of QC limits

QC BATCH SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

QC Batch: 1215835 QC Batch Matrix: Soil

SDG: NTC12

Project: NS Great Lakes CTO F27A

Preparation: 3020A SPLP Digestion

Sample Name	Lab Sample ID	Date Prepared	Observations
NTC12-SB31-0305	1212366-01	12/27/12 08:00	
NTC12-SB31-0507	1212366-02	12/27/12 08:00	
NTC12-SB32-0204	1212366-03	12/27/12 08:00	
NTC12-SB32-0406	1212366-04	12/27/12 08:00	
NTC12-SB34-0204	1212366-05	12/27/12 08:00	
NTC12-SB34-0406	1212366-06	12/27/12 08:00	
NTC12-SB33-0204	1212366-07	12/27/12 08:00	
NTC12-SB33-0406	1212366-08	12/27/12 08:00	
Blank	1215835-BLK1	12/27/12 08:00	
Blank	1215835-BLK2	12/27/12 08:00	
Blank	1215835-BLK3	12/27/12 08:00	
LCS	1215835-BS1	12/27/12 08:00	
LCS	1215835-BS2	12/27/12 08:00	
LCS	1215835-BS3	12/27/12 08:00	
NTC12-SB32-0406	1215835-MS1	12/27/12 08:00	
NTC12-SB32-0406	1215835-MS2	12/27/12 08:00	
NTC12-SB32-0406	1215835-MS3	12/27/12 08:00	
NTC12-SB32-0406	1215835-MSD1	12/27/12 08:00	
NTC12-SB32-0406	1215835-MSD2	12/27/12 08:00	
NTC12-SB32-0406	1215835-MSD3	12/27/12 08:00	

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc. SDG: NTC12

Client: TETRA TECH NUS - Pittsburgh Project: NS Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1215835-BLK1 File ID: 2l28019-018

Prepared: 12/27/12 08:00 Analyzed: 12/28/12 11:53

Preparation: 3020A SPLP Digestion Initial/Final: 25 mL / 25 mL

QC Batch: 1215835 Sequence: 2L28019 Calibration: 2L28018 Instrument: 201

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7440-38-2	Arsenic, SPLP	0.50	ug/L	0.18	0.50	1.0	U
7440-39-3	Barium, SPLP	0.50	ug/L	0.14	0.50	1.0	U
7440-43-9	Cadmium, SPLP	0.10	ug/L	0.038	0.10	0.20	U
7440-47-3	Chromium, SPLP	0.50	ug/L	0.20	0.50	1.0	U
7440-48-4	Cobalt, SPLP	0.20	ug/L	0.050	0.20	1.0	U
7440-50-8	Copper, SPLP	0.17	ug/L	0.13	0.50	1.0	J
7439-92-1	Lead, SPLP	0.50	ug/L	0.15	0.50	1.0	U
7439-96-5	Manganese, SPLP	0.50	ug/L	0.14	0.50	1.0	U
7440-02-0	Nickel, SPLP	0.50	ug/L	0.17	0.50	1.0	U
7440-22-4	Silver, SPLP	0.10	ug/L	0.037	0.10	0.20	U
7440-28-0	Thallium, SPLP	0.10	ug/L	0.027	0.10	1.0	U
7440-66-6	Zinc, SPLP	2.2	ug/L	1.5	4.0	10	J

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METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc. SDG: NTC12

Client: TETRA TECH NUS - Pittsburgh Project: NS Great Lakes CTO F27A

Matrix: Soil Laboratory ID: 1215835-BLK2 File ID: 2l28050-027

Prepared: 12/27/12 08:00 Analyzed: 12/28/12 15:53

Preparation: 3020A SPLP Digestion Initial/Final: 25 mL / 25 mL

QC Batch: 1215835 Sequence: 2L28050 Calibration: 2L28023 Instrument: 201

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7440-41-7	Beryllium, SPLP	0.40	ug/L	0.11	0.40	1.0	U
7782-49-2	Selenium, SPLP	0.41	ug/L	0.31	1.0	1.0	J
7440-62-2	Vanadium, SPLP	0.20	ug/L	0.066	0.20	1.0	U

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: NTC12
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A
Matrix: Soil
Laboratory ID: 1215835-BLK3
File ID: 2l31001-015
Prepared: 12/27/12 08:00
Analyzed: 12/31/12 08:39
Preparation: 3020A SPLP Digestion
Initial/Final: 25 mL / 25 mL
QC Batch: 1215835
Sequence: 2L31001
Calibration: 2L31002
Instrument: 114

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7440-36-0	Antimony, SPLP	0.50	ug/L	0.15	0.50	1.0	U

00171

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12-SB32-0406

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

QC Batch: 1215835

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 1215835-MS1

Preparation: 3020A SPLP Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Arsenic, SPLP	50.0	3.79	48.5	89	75 - 125	ug/L
Barium, SPLP	50.0	35.5	98.5	126 *	75 - 125	ug/L
Cadmium, SPLP	50.0	0.277	45.7	91	75 - 125	ug/L
Chromium, SPLP	50.0	8.98	57.6	97	75 - 125	ug/L
Cobalt, SPLP	50.0	1.42	46.3	90	75 - 125	ug/L
Copper, SPLP	50.0	13.1	63.7	101	75 - 125	ug/L
Lead, SPLP	50.0	14.6	76.2	123	75 - 125	ug/L
Manganese, SPLP	50.0	38.6	128	179 *	75 - 125	ug/L
Nickel, SPLP	50.0	6.03	53.8	96	75 - 125	ug/L
Silver, SPLP	50.0	1.64	47.1	91	75 - 125	ug/L
Thallium, SPLP	50.0	0.0691	44.5	89	75 - 125	ug/L
Zinc, SPLP	50.0	52.7	176	246 *	75 - 125	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

NTC12-SB32-0406

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

QC Batch: 1215835

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 1215835-MSD1

Preparation: 3020A SPLP Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Arsenic, SPLP	50.0	48.6	90	0.1	20	75 - 125	ug/L
Barium, SPLP	50.0	96.9	123	2	20	75 - 125	ug/L
Cadmium, SPLP	50.0	46.0	91	0.6	20	75 - 125	ug/L
Chromium, SPLP	50.0	56.6	95	2	20	75 - 125	ug/L
Cobalt, SPLP	50.0	46.4	90	0.1	20	75 - 125	ug/L
Copper, SPLP	50.0	64.2	102	0.7	20	75 - 125	ug/L
Lead, SPLP	50.0	75.6	122	0.8	20	75 - 125	ug/L
Manganese, SPLP	50.0	127	178 *	0.6	20	75 - 125	ug/L
Nickel, SPLP	50.0	53.4	95	0.8	20	75 - 125	ug/L
Silver, SPLP	50.0	46.5	90	1	20	75 - 125	ug/L
Thallium, SPLP	50.0	43.9	88	1	20	75 - 125	ug/L
Zinc, SPLP	50.0	177	248 *	0.6	20	75 - 125	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

NTC12-SB32-0406

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

QC Batch: 1215835

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 1215835-MS2

Preparation: 3020A SPLP Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Beryllium, SPLP	50.0	ND	45.7	91	75 - 125	ug/L
Selenium, SPLP	50.0	ND	46.1	92	75 - 125	ug/L
Vanadium, SPLP	50.0	5.34	55.4	100	75 - 125	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

00174

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12-SB32-0406

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

QC Batch: 1215835

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 1215835-MSD2

Preparation: 3020A SPLP Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Beryllium, SPLP	50.0	45.8	92	0.3	20	75 - 125	ug/L
Selenium, SPLP	50.0	44.3	89	4	20	75 - 125	ug/L
Vanadium, SPLP	50.0	55.0	99	0.8	20	75 - 125	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

NTC12-SB32-0406

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

QC Batch: 1215835

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 1215835-MS3

Preparation: 3020A SPLP Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Antimony, SPLP	50.0	30.0	62.8	66 *	75 - 125	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

NTC12-SB32-0406

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

QC Batch: 1215835

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 1215835-MSD3

Preparation: 3020A SPLP Digestion

Initial/Final: 25 mL / 25 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Antimony, SPLP	50.0	65.9	72 *	5	20	75 - 125	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12-SB32-0406

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
% Solids:
Preparation: 3020A SPLP Digestion
QC Batch: 1215835

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1215835-PS1
Lab Source ID: 1212366-04
Initial/Final: 4 mL / 4 mL
Sequence: 2L28019

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Arsenic, SPLP	22.5	3.79	ug/L	20.0	94	80 - 120
Barium, SPLP	54.4	35.5	ug/L	20.0	95	80 - 120
Cadmium, SPLP	19.3	0.277	ug/L	20.0	95	80 - 120
Chromium, SPLP	27.7	8.98	ug/L	20.0	94	80 - 120
Cobalt, SPLP	19.8	1.42	ug/L	20.0	92	80 - 120
Copper, SPLP	31.6	13.1	ug/L	20.0	93	80 - 120
Lead, SPLP	33.4	14.6	ug/L	20.0	94	80 - 120
Manganese, SPLP	57.1	38.6	ug/L	20.0	92	80 - 120
Nickel, SPLP	24.0	6.03	ug/L	20.0	90	80 - 120
Silver, SPLP	21.2	1.64	ug/L	20.0	98	80 - 120
Thallium, SPLP	18.7	0.0691	ug/L	20.0	93	80 - 120
Zinc, SPLP	71.8	52.7	ug/L	20.0	95	80 - 120

* Values outside of QC limits

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12-SB32-0406

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
% Solids:
Preparation: 3020A SPLP Digestion
QC Batch: 1215835

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1215835-PS2
Lab Source ID: 1212366-04
Initial/Final: 4 mL / 4 mL
Sequence: 2L28050

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Beryllium, SPLP	19.2	0.0764	ug/L	20.0	96	80 - 120
Selenium, SPLP	20.3	-0.139	ug/L	20.0	102	80 - 120
Vanadium, SPLP	24.8	5.34	ug/L	20.0	97	80 - 120

* Values outside of QC limits

: 00179

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

NTC12-SB32-0406

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Matrix: Soil
% Solids:
Preparation: 3020A SPLP Digestion
QC Batch: 1215835

SDG: NTC12
Project: NS Great Lakes CTO F27A
Laboratory ID: 1215835-PS3
Lab Source ID: 1212366-04
Initial/Final: 4 mL / 4 mL
Sequence: 2L31001

Analyte	Spike Sample Result (SSR)	Sample Result (SR)	Units	Spike Added (SA)	%R	Control Limit %R
Antimony, SPLP	47.1	30.0	ug/L	20.0	86	80 - 120

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

QC Batch: 1215835

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 1215835-BS1

Preparation: 3020A SPLP Digestion

Initial/Final: 25 mL / 25 mL

Sequence: 2L28019

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Arsenic, SPLP	50.0	46.2	92	80 - 120	ug/L
Barium, SPLP	50.0	46.4	93	80 - 120	ug/L
Cadmium, SPLP	50.0	46.0	92	80 - 120	ug/L
Chromium, SPLP	50.0	47.1	94	80 - 120	ug/L
Cobalt, SPLP	50.0	46.5	93	80 - 120	ug/L
Copper, SPLP	50.0	47.2	94	80 - 120	ug/L
Lead, SPLP	50.0	47.4	95	80 - 120	ug/L
Manganese, SPLP	50.0	47.0	94	80 - 120	ug/L
Nickel, SPLP	50.0	45.9	92	80 - 120	ug/L
Silver, SPLP	50.0	46.7	93	80 - 120	ug/L
Thallium, SPLP	50.0	47.2	94	80 - 120	ug/L
Zinc, SPLP	50.0	46.1	92	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

QC Batch: 1215835

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 1215835-BS2

Preparation: 3020A SPLP Digestion

Initial/Final: 25 mL / 25 mL

Sequence: 2L28050

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Beryllium, SPLP	50.0	47.5	95	80 - 120	ug/L
Selenium, SPLP	50.0	47.7	95	80 - 120	ug/L
Vanadium, SPLP	50.0	47.6	95	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

QC Batch: 1215835

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 1215835-BS3

Preparation: 3020A SPLP Digestion

Initial/Final: 25 mL / 25 mL

Sequence: 2L31001

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Antimony, SPLP	50.0	52.5	105	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

SERIAL DILUTION

USEPA-6020A

NTC12-SB32-0406

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

% Solids:

QC Batch: 2L28019

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 2L28019-SRD1

Lab Source ID: 1212366-04

Sequence: 2L28019

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Arsenic, SPLP	3.79		3.39	J	10.0 #		ug/L	10
Barium, SPLP	35.5		35.6				ug/L	10
Cadmium, SPLP	0.277		0.285	J	3.0 #		ug/L	10
Chromium, SPLP	8.98		6.98		22.0 #		ug/L	10
Cobalt, SPLP	1.42		1.43	J	1.0 #		ug/L	10
Copper, SPLP	13.1		12.8		2.0		ug/L	10
Lead, SPLP	14.6		14.6		#		ug/L	10
Manganese, SPLP	38.6		38.8				ug/L	10
Nickel, SPLP	6.03		4.15	J	31.0 #		ug/L	10
Silver, SPLP	1.64		1.72		5.0 #		ug/L	10
Thallium, SPLP	0.0691	J	0.0817	U	18.0 #		ug/L	10
Zinc, SPLP	52.7		51.4		3.0 #		ug/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

: 0041AU

SERIAL DILUTION

USEPA-6020A

NTC12-SB32-0406

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

% Solids:

QC Batch: 2L28050

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 2L28050-SRD1

Lab Source ID: 1212366-04

Sequence: 2L28050

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Beryllium, SPLP	0.0764	U	0.200	U	162.0 #		ug/L	10
Selenium, SPLP	-0.139	U	-1.93	U	1,295.0 #		ug/L	10
Vanadium, SPLP	5.34		4.88	J	9.0 #		ug/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

SERIAL DILUTION

USEPA-6020A

NTC12-SB32-0406

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

% Solids:

QC Batch: 2L31001

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 2L31001-SRD1

Lab Source ID: 1212366-04

Sequence: 2L31001

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Antimony, SPLP	30.0		28.8		4.0		ug/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

Metals, Soil, 3020A SPLP Digestion

Batch comments:

RDB 12-27-12 8:00AM-4:00PM
INST#220 @94.2-94.5C #257
HOTBLOCK VESSEL LOT#1208057

Lab Number	Container	Prepared	By	Initial (mL)	Final (mL)	Client Source ID	Client Spike ID	Client uL Spike	Comments		
1212366-01	A 01	Dec-27-12 08:00	RDB	25	25	TETRA TECH NUS - Pittsburgh					
Ag SPLP 6020	*As SPLP 6020*	*Ba SPLP 6020*	*Be SPLP 6020*	*Cd SPLP 6020*	*Co SPLP 6020*	*Cr SPLP 6020*	*Cu SPLP 6020*				
Mn SPLP 6020	*Ni SPLP 6020*	*Pb SPLP 6020*	*Sb SPLP 6020*	*Se SPLP 6020*	*Tl SPLP 6020*	*V SPLP 6020*	*Zn SPLP 6020*				
1212366-02	A 01	Dec-27-12 08:00	RDB	25	25	TETRA TECH NUS - Pittsburgh					
Ag SPLP 6020	*As SPLP 6020*	*Ba SPLP 6020*	*Be SPLP 6020*	*Cd SPLP 6020*	*Co SPLP 6020*	*Cr SPLP 6020*	*Cu SPLP 6020*				
Mn SPLP 6020	*Ni SPLP 6020*	*Pb SPLP 6020*	*Sb SPLP 6020*	*Se SPLP 6020*	*Tl SPLP 6020*	*V SPLP 6020*	*Zn SPLP 6020*				
1212366-03	A 01	Dec-27-12 08:00	RDB	25	25	TETRA TECH NUS - Pittsburgh					
Ag SPLP 6020	*As SPLP 6020*	*Ba SPLP 6020*	*Be SPLP 6020*	*Cd SPLP 6020*	*Co SPLP 6020*	*Cr SPLP 6020*	*Cu SPLP 6020*				
Mn SPLP 6020	*Ni SPLP 6020*	*Pb SPLP 6020*	*Sb SPLP 6020*	*Se SPLP 6020*	*Tl SPLP 6020*	*V SPLP 6020*	*Zn SPLP 6020*				
1212366-04	B 01	Dec-27-12 08:00	RDB	25	25	TETRA TECH NUS - Pittsburgh					
Ag SPLP 6020	*As SPLP 6020*	*Ba SPLP 6020*	*Be SPLP 6020*	*Cd SPLP 6020*	*Co SPLP 6020*	*Cr SPLP 6020*	*Cu SPLP 6020*				
Mn SPLP 6020	*Ni SPLP 6020*	*Pb SPLP 6020*	*Sb SPLP 6020*	*Se SPLP 6020*	*Tl SPLP 6020*	*V SPLP 6020*	*Zn SPLP 6020*				
1212366-04RE1	B 01	Dec-27-12 08:00		25	25	TETRA TECH NUS - Pittsburgh			Added for SequenceQC in: 2L28050	Added for SequenceQC in: 2L28050	
Ni SPLP 6020	*Tl SPLP 6020*										
1212366-05	A 01	Dec-27-12 08:00	RDB	25	25	TETRA TECH NUS - Pittsburgh					
Ag SPLP 6020	*As SPLP 6020*	*Ba SPLP 6020*	*Be SPLP 6020*	*Cd SPLP 6020*	*Co SPLP 6020*	*Cr SPLP 6020*	*Cu SPLP 6020*				
Mn SPLP 6020	*Ni SPLP 6020*	*Pb SPLP 6020*	*Sb SPLP 6020*	*Se SPLP 6020*	*Tl SPLP 6020*	*V SPLP 6020*	*Zn SPLP 6020*				
1212366-06	A 01	Dec-27-12 08:00	RDB	25	25	TETRA TECH NUS - Pittsburgh					
Ag SPLP 6020	*As SPLP 6020*	*Ba SPLP 6020*	*Be SPLP 6020*	*Cd SPLP 6020*	*Co SPLP 6020*	*Cr SPLP 6020*	*Cu SPLP 6020*				
Mn SPLP 6020	*Ni SPLP 6020*	*Pb SPLP 6020*	*Sb SPLP 6020*	*Se SPLP 6020*	*Tl SPLP 6020*	*V SPLP 6020*	*Zn SPLP 6020*				
1212366-07	A 01	Dec-27-12 08:00	RDB	25	25	TETRA TECH NUS - Pittsburgh					
Ag SPLP 6020	*As SPLP 6020*	*Ba SPLP 6020*	*Be SPLP 6020*	*Cd SPLP 6020*	*Co SPLP 6020*	*Cr SPLP 6020*	*Cu SPLP 6020*				
Mn SPLP 6020	*Ni SPLP 6020*	*Pb SPLP 6020*	*Sb SPLP 6020*	*Se SPLP 6020*	*Tl SPLP 6020*	*V SPLP 6020*	*Zn SPLP 6020*				
1212366-08	A 01	Dec-27-12 08:00	RDB	25	25	TETRA TECH NUS - Pittsburgh					
Ag SPLP 6020	*As SPLP 6020*	*Ba SPLP 6020*	*Be SPLP 6020*	*Cd SPLP 6020*	*Co SPLP 6020*	*Cr SPLP 6020*	*Cu SPLP 6020*				
Mn SPLP 6020	*Ni SPLP 6020*	*Pb SPLP 6020*	*Sb SPLP 6020*	*Se SPLP 6020*	*Tl SPLP 6020*	*V SPLP 6020*	*Zn SPLP 6020*				

Comments:

Analyst Initials:

Metals, Soil, 3020A SPLP Digestion

Batch comments:

RDB 12-27-12 8:00AM-4:00PM
INST#220 @94.2-94.5C #257
HOTBLOCK VESSEL LOT#1208057

				Initial	Final	Client			
Lab Number	*Container*	*Prepared*	*By*	*(mL)*	*(mL)*	*Source ID*	*Spike ID*	*uL Spike*	*Comments*
1215835-BLK1		Dec-27-12 08:00	RDB	25	25				
1215835-BLK2		Dec-27-12 08:00	RDB	25	25				
1215835-BLK3		Dec-27-12 08:00	RDB	25	25				
1215835-BS1		Dec-27-12 08:00	RDB	25	25		2120873	25	
1215835-BS2		Dec-27-12 08:00	RDB	25	25		2120873	25	
1215835-BS3		Dec-27-12 08:00	RDB	25	25		2120874	25	
1215835-MS1		Dec-27-12 08:00	RDB	25	25	1212366-04	2120873	25	
1215835-MS2		Dec-27-12 08:00	RDB	25	25	1212366-04	2120873	25	
1215835-MS3		Dec-27-12 08:00	RDB	25	25	1212366-04	2120874	25	
1215835-MSD1		Dec-27-12 08:00	RDB	25	25	1212366-04	2120873	25	
1215835-MSD2		Dec-27-12 08:00	RDB	25	25	1212366-04	2120873	25	
1215835-MSD3		Dec-27-12 08:00	RDB	25	25	1212366-04	2120874	25	
1215835-PS1		Dec-28-12 08:00	CKD	4	4	1212366-04	2050765	20	
1215835-PS2		Dec-28-12 14:00	CKD	4	4	1212366-04	2050765	20	
1215835-PS3		Dec-31-12 09:15	DSC	4	4	1212366-04	2050766	20	

Comments:	Analyst Initials:

internal stds

Sample Information

Sample ID: 1212366-08
Autosampler Position: 30
Sample Date/Time: Friday, December 28, 2012 13:00:48
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L28019.sam
Method File: c:\elandata\Method\DOD_AQUEOUS_6020A_201_4.2.mth
Dataset File: C:\Elandata\DataSet\2L28019\2L28019\1212366-08.032
Tuning File: C:\Elandata\Tuning\28DEC2012_6020A_A.tun
Optimization File: C:\Elandata\Optimize\28DEC2012_6020A.dac

Sample 56 33-0406

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	Li	6	160612.611	160612.611				ug/L
	Be	9	79.668	0.000	0.785159	0.109	13.825	ug/L
	V	51	62023.915	0.171	19.347715	0.115	0.596	ug/L
	Cr	52	123018.993	0.333	45.752117	0.386	0.843	ug/L
	Cr	53	14678.216	0.039	45.443681	0.242	0.533	ug/L
	Mn	55	1266569.222	3.653	327.541209	6.909	2.109	ug/L
	Co	59	35170.735	0.101	12.627737	0.183	1.446	ug/L
	Ni	60	31878.641	0.091	53.272249	0.278	0.522	ug/L
	Ni	62	4879.048	0.014	53.804391	1.154	2.145	ug/L
	Cu	63	121186.163	0.348	92.352543	0.589	0.638	ug/L
	Cu	65	58587.915	0.169	92.459307	0.535	0.579	ug/L
	Zn	66	136381.121	0.392	329.519303	6.151	1.867	ug/L
	Zn	68	149863.536	0.281	333.912062	4.293	1.286	ug/L
>	Ge	72	346581.011	346581.011				ug/L
	As	75	10657.107	0.026	15.459747	0.158	1.021	ug/L
	Se	77	166.670	0.000	1.779786	0.427	24.001	ug/L
	Se	82	68.002	0.000	1.797135	0.677	37.687	ug/L
>	Rh	103	177546.426	177546.426				ug/L
	Ag	107	28844.081	0.162	12.747452	0.023	0.183	ug/L
	Cd	111	2529.330	0.014	4.752422	0.112	2.364	ug/L
	Cd	114	4584.883	0.026	3.629805	0.230	6.335	ug/L
>	In	115	209716.983	209716.983				ug/L
	Sb	121	32045.042	0.153	13.925352	0.180	1.295	ug/L
	Sb	123	24607.129	0.117	13.766725	0.155	1.129	ug/L
	Ba	135	69045.865	0.387	122.802409	0.877	0.714	ug/L
	Ba	137	118788.118	0.666	122.326226	1.472	1.203	ug/L
>	Tb	159	178164.210	178164.210				ug/L
	Tl	203	670.038	0.001	0.207920	0.006	2.762	ug/L
	Tl	205	1403.152	0.003	0.178804	0.004	1.968	ug/L
	Pb	208	1132026.230	2.430	108.376316	0.235	0.217	ug/L
>	Bi	209	465517.294	465517.294				ug/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	Li	6.015	129.650
	Be	9.012	
	V	50.944	
	Cr	51.941	
	Cr	52.941	
	Mn	54.938	
	Co	58.933	

	Ni	59.933	
	Ni	61.928	
	Cu	62.930	
	Cu	64.928	
	Zn	65.926	
	Zn	67.925	
>	Ge	71.922	106.812
	As	74.922	
	Se	76.920	
	Se	81.917	
>	Rh	102.905	96.527
	Ag	106.905	
	Cd	110.904	
	Cd	113.904	
>	In	114.904	100.117
	Sb	120.904	
	Sb	122.904	
	Ba	134.906	
	Ba	136.905	
>	Tb	158.925	101.179
	Tl	202.972	
	Tl	204.975	
	Pb	207.977	
>	Bi	208.980	152.872

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
Li 6 Int Std for sample	Li	6	Internal Standard outside of limit
Bi 209 Int Std for sample	Bi	209	Internal Standard outside of limit

Replicates

Repeat 1

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
Li	6	158891.548	158891.548		ug/L
Be	9	80.001	0.000	0.792024	ug/L
V	51	61335.478	0.172	19.459713	ug/L
Cr	52	121160.144	0.333	45.823230	ug/L
Cr	53	14378.803	0.039	45.256388	ug/L
Mn	55	1275407.812	3.739	335.321792	ug/L
Co	59	34844.129	0.102	12.720318	ug/L
Ni	60	31428.303	0.091	53.406383	ug/L
Ni	62	4654.888	0.014	54.449088	ug/L
Cu	63	118480.730	0.348	91.813488	ug/L
Cu	65	57583.835	0.168	92.421358	ug/L
Zn	66	133639.911	0.390	326.328985	ug/L
Zn	68	147318.136	0.281	333.868886	ug/L
Ge	72	340836.863	340836.863		ug/L
As	75	10488.336	0.026	15.474097	ug/L
Se	77	180.003	0.000	1.872739	ug/L
Se	82	58.801	0.000	1.652959	ug/L
Rh	103	175356.115	175356.115		ug/L
Ag	107	28474.828	0.162	12.741562	ug/L
Cd	111	2434.028	0.014	4.831006	ug/L
Cd	114	4891.185	0.028	3.865341	ug/L
In	115	205824.435	205824.435		ug/L
Sb	121	31801.388	0.155	14.123572	ug/L
Sb	123	24305.011	0.118	13.854141	ug/L
Ba	135	67825.287	0.384	121.851911	ug/L
Ba	137	115621.418	0.657	120.629950	ug/L
Tb	159	175867.464	175867.464		ug/L
Tl	203	847.036	0.001	0.204741	ug/L
Tl	205	1398.151	0.003	0.181825	ug/L
Pb	208	1110853.083	2.433	108.482978	ug/L
Bi	209	456358.549	456358.549		ug/L

Repeat 2

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
Li	6	161207.444	161207.444		ug/L
Be	9	80.001	0.001	0.880113	ug/L
V	51	62302.886	0.171	19.353908	ug/L
Cr	52	124406.264	0.335	46.087442	ug/L
Cr	53	14820.507	0.039	45.717034	ug/L
Mn	55	1282891.408	3.826	325.175759	ug/L
Co	59	35846.089	0.102	12.745447	ug/L
Ni	60	31821.040	0.090	52.952374	ug/L
Ni	62	4960.772	0.014	54.492420	ug/L
Cu	63	122506.837	0.360	92.981340	ug/L
Cu	65	59181.751	0.170	93.012422	ug/L
Zn	66	139703.344	0.400	336.178822	ug/L
Zn	68	151774.025	0.288	338.312511	ug/L
Ge	72	348013.727	348013.727		ug/L
As	75	10806.441	0.025	15.295182	ug/L

Sample Information

Sample ID: 1212366-01
Autosampler Position: 19
Sample Date/Time: Friday, December 28, 2012 12:01:58
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L28019.sam
Method File: c:\elandata\Method\DOD_AQUEOUS_6020A_201_4.2.mth
Dataset File: C:\Elandata\DataSet\2L28019\2L28019\1212366-01.019
Tuning File: C:\Elandata\Tuning\28DEC2012_6020A_A.tun
Optimization File: C:\Elandata\Optimize\28DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	Li	6	140791.426	140791.426				ug/L
	Be	9	33.000	0.000	0.344640	0.058	16.886	ug/L
	V	51	28702.383	0.077	8.750749	0.121	1.382	ug/L
	Cr	52	37304.208	0.089	12.259595	0.161	1.312	ug/L
	Cr	53	4690.921	0.011	12.508760	0.284	2.272	ug/L
	Mn	55	586926.183	1.747	X 156.685673	1.578	1.007	ug/L
	Co	59	6858.694	0.020	2.523621	0.034	1.354	ug/L
	Ni	60	11186.534	0.032	18.854428	0.361	1.913	ug/L
	Ni	62	1736.895	0.005	18.768412	0.285	1.521	ug/L
	Cu	63	46368.897	0.136	36.225606	0.704	1.943	ug/L
	Cu	65	22123.442	0.065	35.908949	0.547	1.524	ug/L
	Zn	66	41689.087	0.123	X 103.089273	0.996	0.966	ug/L
	Zn	68	78344.491	0.082	97.513399	1.442	1.479	ug/L
>	Ge	72	335390.363	335390.363				ug/L
	As	75	4536.831	0.008	5.027336	0.270	5.374	ug/L
	Se	77	154.337	0.000	1.584858	0.247	15.612	ug/L
	Se	82	79.761	0.000	2.071317	0.795	38.360	ug/L
>	Rh	103	175256.823	175256.823				ug/L
	Ag	107	7748.612	0.044	3.466206	0.032	0.935	ug/L
	Cd	111	615.706	0.003	X 1.167166	0.118	10.086	ug/L
	Cd	114	938.762	0.005	0.747369	0.017	2.249	ug/L
>	In	115	209176.023	209176.023				ug/L
	Sb	121	9757.506	0.046	4.234309	0.588	13.875	ug/L
	Sb	123	7099.463	0.034	3.965528	0.349	8.811	ug/L
	Ba	135	22453.465	0.126	40.067373	0.446	1.114	ug/L
	Ba	137	38470.719	0.217	39.750441	0.286	0.719	ug/L
>	Tb	159	177379.976	177379.976				ug/L
	Tl	203	477.354	0.002	0.224528	0.019	8.468	ug/L
	Tl	205	1024.084	0.003	0.197910	0.006	3.037	ug/L
	Pb	208	293595.251	0.952	42.434070	0.296	0.697	ug/L
>	Bi	209	308077.751	308077.751				ug/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	Li	6.015	113.650
	Be	9.012	
	V	50.944	
	Cr	51.941	
	Cr	52.941	
	Mn	54.938	
	Co	58.933	

	Ni	59.933	
	Ni	61.928	
	Cu	62.930	
	Cu	64.928	
	Zn	65.926	
	Zn	67.925	
>	Ge	71.922	103.363
	As	74.922	
	Se	76.920	
	Se	81.917	
>	Rh	102.905	95.282
	Ag	106.905	
	Cd	110.904	
	Cd	113.904	
>	In	114.904	99.859
	Sb	120.904	
	Sb	122.904	
	Ba	134.906	
	Ba	136.905	
>	Tb	158.925	100.734
	Tl	202.972	
	Tl	204.975	
	Pb	207.977	
>	Bi	208.980	101.170

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
Li	6	141511.436	141511.436		ug/L
Be	9	36.000	0.000	0.402289	ug/L
V	51	27944.832	0.078	8.812138	ug/L
Cr	52	36805.851	0.099	12.241511	ug/L
Cr	53	4584.504	0.011	12.267365	ug/L
Mn	55	573358.438	1.728	154.982430	ug/L
Co	59	8740.246	0.020	2.510549	ug/L
Ni	60	10823.455	0.032	18.830785	ug/L
Ni	62	1702.220	0.005	18.810104	ug/L
Cu	63	44815.586	0.135	35.438870	ug/L
Cu	65	21523.585	0.064	35.385532	ug/L
Zn	66	40724.188	0.121	101.838983	ug/L
Zn	68	76832.852	0.081	95.889467	ug/L
Ge	72	331285.052	331285.052		ug/L
As	75	4443.256	0.008	4.857202	ug/L
Se	77	151.003	0.000	1.542757	ug/L
Se	82	34.439	0.000	1.176083	ug/L
Rh	103	173685.804	173685.804		ug/L
Ag	107	7884.208	0.044	3.464380	ug/L
Cd	111	573.154	0.003	1.095308	ug/L
Cd	114	907.380	0.005	0.727873	ug/L
In	115	208178.457	208178.457		ug/L
Sb	121	8882.070	0.048	4.352182	ug/L
Sb	123	7749.008	0.037	4.348608	ug/L
Ba	135	22200.689	0.126	40.026568	ug/L
Ba	137	37878.547	0.215	38.547241	ug/L
Tb	159	175548.788	175548.788		ug/L
Tl	203	511.023	0.002	0.243772	ug/L
Tl	205	1025.084	0.003	0.200562	ug/L
Pb	208	267948.545	0.845	42.120737	ug/L
Bi	209	304412.321	304412.321		ug/L

Repeat 2

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
Li	6	140447.736	140447.736		ug/L
Be	9	33.000	0.000	0.345756	ug/L
V	51	28698.832	0.078	8.834398	ug/L
Cr	52	37785.053	0.080	12.428723	ug/L
Cr	53	4789.653	0.011	12.822002	ug/L
Mn	55	593083.563	1.783	156.059003	ug/L
Co	59	6975.474	0.021	2.562410	ug/L
Ni	60	11444.275	0.033	19.270433	ug/L
Ni	62	1725.226	0.005	18.567145	ug/L
Cu	63	47167.683	0.139	36.795811	ug/L
Cu	65	22498.602	0.066	36.459630	ug/L
Zn	66	41989.475	0.123	103.862334	ug/L
Zn	68	78801.072	0.083	98.644200	ug/L
Ge	72	335987.850	335987.850		ug/L
As	75	4710.551	0.009	5.325653	ug/L
Se	77	164.004	0.000	1.850637	ug/L
Se	82	110.709	0.000	2.692645	ug/L
Rh	103	176869.771	176869.771		ug/L

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Sample Information

Sample ID: 1212366-02
Autosampler Position: 20
Sample Date/Time: Friday, December 28, 2012 12:06:25
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L28019.sam
Method File: c:\elandata\Method\DOD_AQUEOUS_6020A_201_4.2.mth
Dataset File: C:\Elandata\DataSet\2L28019\2L28019\1212366-02.020
Tuning File: C:\Elandata\Tuning\28DEC2012_6020A_A.tun
Optimization File: C:\Elandata\Optimize\28DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
⌈>	Li	6	139510.141	139510.141				ug/L
⌊	Be	9	13.667	0.000	0.114762	0.027	23.656	ug/L
⌈	V	51	7533.466	0.014	1.627942	0.064	3.946	ug/L
|	Cr	52	15230.707	0.024	3.308761	0.056	1.684	ug/L
|	Cr	53	2047.314	0.003	3.462895	0.103	2.987	ug/L
|	Mn	55	111565.701	0.335	30.045505	0.169	0.562	ug/L
|	Co	59	1577.524	0.005	0.568973	0.023	4.038	ug/L
|	Ni	60	2514.801	0.006	3.742007	0.013	0.357	ug/L
|	Ni	62	405.016	0.001	3.209721	0.219	6.829	ug/L
|	Cu	63	16542.634	0.048	12.815708	0.139	1.081	ug/L
|	Cu	65	7752.283	0.023	12.595454	0.256	2.032	ug/L
|	Zn	66	12833.313	0.037	31.215674	0.119	0.381	ug/L
|	Zn	68	57237.991	0.022	25.732414	1.031	4.005	ug/L
| >	Ge	72	330457.786	330457.786				ug/L
|	As	75	2776.112	0.003	1.921255	0.178	9.283	ug/L
|	Se	77	208.672	0.000	3.216562	0.216	6.720	ug/L
⌊	Se	82	134.655	0.000	3.219634	0.949	29.479	ug/L
⌈>	Rh	103	176352.945	176352.945				ug/L
|	Ag	107	3219.091	0.018	1.428416	0.040	2.799	ug/L
|	Cd	111	249.109	0.001	0.466134	0.010	2.248	ug/L
⌊	Cd	114	693.978	0.004	0.547583	0.050	9.093	ug/L
⌈>	In	115	206211.406	206211.406				ug/L
|	Sb	121	7282.805	0.035	3.201745	0.338	10.561	ug/L
⌊	Sb	123	5349.247	0.026	3.024208	0.029	0.970	ug/L
⌈	Ba	135	8810.854	0.051	16.106780	0.033	0.205	ug/L
|	Ba	137	15033.626	0.087	15.914211	0.113	0.712	ug/L
⌊>	Tb	159	172712.925	172712.925				ug/L
⌈	Tl	203	123.669	0.000	0.053834	0.008	14.435	ug/L
|	Tl	205	226.673	0.001	0.039146	0.002	5.486	ug/L
|	Pb	208	91095.390	0.300	13.377437	0.107	0.801	ug/L
⌊>	Bi	209	302323.039	302323.039				ug/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
⌈>	Li	6.015	112.616
⌊	Be	9.012	
⌈	V	50.944	
|	Cr	51.941	
|	Cr	52.941	
|	Mn	54.938	
|	Co	58.933	

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	Ni	59.933
	Ni	61.928
	Cu	62.930
	Cu	64.928
	Zn	65.926
	Zn	67.925
>	Ge	71.922
	As	74.922
	Se	76.920
	Se	81.917
>	Rh	102.905
	Ag	106.905
	Cd	110.904
	Cd	113.904
>	In	114.904
	Sb	120.904
	Sb	122.904
	Ba	134.906
	Ba	136.905
>	Tb	158.925
	Tl	202.972
	Tl	204.975
	Pb	207.977
>	Bi	208.980

101.843

95.878

98.443

98.083

99.280

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
Li	6	143418.838	143418.838		ug/L
Be	9	16.000	0.000	0.137894	ug/L
V	51	7289.294	0.014	1.580048	ug/L
Cr	52	15287.495	0.025	3.371825	ug/L
Cr	53	2011.300	0.003	3.381046	ug/L
Mn	55	110231.144	0.333	29.870862	ug/L
Co	59	1527.179	0.004	0.553683	ug/L
Ni	60	2497.482	0.008	3.738937	ug/L
Ni	62	383.014	0.001	2.877174	ug/L
Cu	63	16341.836	0.048	12.736451	ug/L
Cu	65	7585.112	0.023	12.413448	ug/L
Zn	66	12786.578	0.037	31.322985	ug/L
Zn	68	58635.583	0.022	25.822726	ug/L
Ge	72	328402.858	328402.858		ug/L
As	75	2782.347	0.003	1.964944	ug/L
Se	77	218.005	0.000	3.466110	ug/L
Se	82	184.697	0.001	4.236082	ug/L
Rh	103	175144.003	175144.003		ug/L
Ag	107	3181.740	0.018	1.421855	ug/L
Cd	111	252.282	0.001	0.475402	ug/L
Cd	114	734.123	0.004	0.583481	ug/L
In	115	203379.218	203379.218		ug/L
Sb	121	8048.612	0.039	3.587872	ug/L
Sb	123	5248.710	0.026	3.008852	ug/L
Ba	135	9633.301	0.051	16.078282	ug/L
Ba	137	14853.181	0.066	15.802499	ug/L
Tb	159	189535.028	189535.028		ug/L
Tl	203	111.002	0.000	0.047674	ug/L
Tl	205	218.006	0.001	0.037470	ug/L
Pb	208	80082.536	0.287	13.257479	ug/L
Bi	209	301892.470	301892.470		ug/L

Repeat 2

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
Li	6	137675.517	137675.517		ug/L
Be	9	14.000	0.000	0.121372	ug/L
V	51	7548.406	0.014	1.636002	ug/L
Cr	52	15165.233	0.024	3.287753	ug/L
Cr	53	2035.310	0.003	3.423487	ug/L
Mn	55	112048.107	0.337	30.207810	ug/L
Co	59	1546.183	0.004	0.557644	ug/L
Ni	60	2520.470	0.008	3.756625	ug/L
Ni	62	407.016	0.001	3.239458	ug/L
Cu	63	16724.724	0.049	12.975841	ug/L
Cu	65	7920.466	0.023	12.868085	ug/L
Zn	66	12628.536	0.037	31.236587	ug/L
Zn	68	57436.575	0.022	25.654843	ug/L
Ge	72	330120.492	330120.492		ug/L
As	75	2666.204	0.003	1.725113	ug/L
Se	77	204.005	0.000	3.087305	ug/L
Se	82	94.354	0.000	2.399080	ug/L
Rh	103	176526.429	176526.429		ug/L

Sample Information

Sample ID: 1212366-03
Autosampler Position: 21
Sample Date/Time: Friday, December 28, 2012 12:10:52
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L28019.sam
Method File: c:\elandata\Method\DOD_AQUEOUS_6020A_201_4.2.mth
Dataset File: C:\Elandata\DataSet\2L28019\2L28019\1212366-03.021
Tuning File: C:\Elandata\Tuning\28DEC2012_6020A_A.tun
Optimization File: C:\Elandata\Optimize\28DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	Li	6	142184.960	142184.960				ug/L
	Be	9	3.667	-0.000	-0.006392	0.018	284.310	ug/L
	V	51	94042.397	0.279	31.599937	0.274	0.868	ug/L
	Cr	52	11359.139	0.013	1.738296	0.046	2.622	ug/L
	Cr	53	1575.523	0.002	1.852596	0.156	8.439	ug/L
	Mn	55	1711.889	0.003	0.240507	0.015	6.063	ug/L
	Co	59	434.351	0.001	0.139187	0.010	7.142	ug/L
	Ni	60	1080.759	0.002	4.210201	0.050	4.157	ug/L
	Ni	62	142.003	0.000	0.091741	0.071	77.232	ug/L
	Cu	63	14832.541	0.043	11.539709	0.212	1.840	ug/L
	Cu	65	7049.882	0.021	11.526876	0.064	0.559	ug/L
	Zn	66	2125.671	0.005	4.007474	0.078	1.934	ug/L
	Zn	68	48808.347	-0.003	-3.123805	1.392	44.568	ug/L
>	Ge	72	327720.272	327720.272				ug/L
	As	75	4594.047	0.009	5.323440	0.188	3.533	ug/L
	Se	77	133.336	0.000	1.078806	0.302	27.998	ug/L
	Se	82	44.579	0.000	1.387519	1.477	106.472	ug/L
>	Rh	103	175351.315	175351.315				ug/L
	Ag	107	84.668	0.000	0.033616	0.002	4.953	ug/L
	Cd	111	5.889	0.000	0.005337	0.011	203.791	ug/L
	Cd	114	54.451	0.000	0.037171	0.009	24.067	ug/L
>	In	115	205574.436	205574.436				ug/L
	Sb	121	17424.402	0.084	7.712373	0.057	0.745	ug/L
	Sb	123	13413.508	0.065	7.643712	0.137	1.786	ug/L
	Ba	135	2095.996	0.012	3.795019	0.189	4.983	ug/L
	Ba	137	3577.599	0.020	3.753470	0.073	1.940	ug/L
>	Tb	159	171988.477	171988.477				ug/L
	Tl	203	22.334	0.000	0.004057	0.002	52.039	ug/L
	Tl	205	17.000	-0.000	-0.003501	0.000	10.525	ug/L
	Pb	208	917.365	0.002	0.081579	0.009	11.334	ug/L
>	Bi	209	292348.148	292348.148				ug/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	Li	6.015	114.775
	Be	9.012	
	V	50.944	
	Cr	51.941	
	Cr	52.941	
	Mn	54.938	
	Co	58.933	

	Ni	59.933	
	Ni	61.928	
	Cu	62.930	
	Cu	64.928	
	Zn	65.926	
	Zn	67.925	
>	Ge	71.922	100.999
	As	74.922	
	Se	76.920	
	Se	81.917	
>	Rh	102.905	95.334
	Ag	106.905	
	Cd	110.904	
	Cd	113.904	
>	In	114.904	98.139
	Sb	120.904	
	Sb	122.904	
	Ba	134.906	
	Ba	136.905	
>	Tb	158.925	97.672
	Tl	202.972	
	Tl	204.975	
	Pb	207.977	
>	Bi	208.980	96.005

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

Analyte	Mass	Mass. Intensity	Net Intensity	Concentration	Report Unit
Li	6	142403.821	142403.821		ug/L
Be	9	4.000	-0.000	-0.002541	ug/L
V	51	82354.810	0.276	31.339405	ug/L
Cr	52	11240.850	0.013	1.738158	ug/L
Cr	53	1609.197	0.002	2.028825	ug/L
Mn	55	1751.232	0.003	0.256009	ug/L
Co	59	440.016	0.001	0.142989	ug/L
Ni	60	1069.091	0.002	1.208919	ug/L
Ni	62	140.003	0.000	0.065110	ug/L
Cu	63	14413.572	0.043	11.319887	ug/L
Cu	65	6975.474	0.021	11.520706	ug/L
Zn	66	2081.327	0.005	3.974119	ug/L
Zn	68	48753.302	-0.001	-1.544930	ug/L
Ge	72	324440.879	324440.879		ug/L
As	75	4431.212	0.008	5.108352	ug/L
Se	77	137.003	0.000	1.223482	ug/L
Se	82	-29.704	-0.000	-0.136841	ug/L
Rh	103	172306.194	172306.194		ug/L
Ag	107	79.001	0.000	0.031721	ug/L
Cd	111	-0.540	-0.000	-0.006820	ug/L
Cd	114	45.824	0.000	0.030856	ug/L
In	115	204438.793	204438.793		ug/L
Sb	121	17433.423	0.085	7.758365	ug/L
Sb	123	13088.884	0.084	7.487412	ug/L
Ba	135	1957.286	0.011	3.578208	ug/L
Ba	137	3517.901	0.020	3.729344	ug/L
Tb	159	170209.800	170209.800		ug/L
Tl	203	19.000	0.000	0.002470	ug/L
Tl	205	18.000	-0.000	-0.003672	ug/L
Pb	208	967.035	0.002	0.080841	ug/L
Bi	209	388897.343	388897.343		ug/L

Repeat 2

Analyte	Mass	Mass. Intensity	Net Intensity	Concentration	Report Unit
Li	6	142382.500	142382.500		ug/L
Be	9	2.000	-0.000	-0.026183	ug/L
V	51	94615.070	0.281	31.886235	ug/L
Cr	52	11440.268	0.013	1.784809	ug/L
Cr	53	1537.181	0.001	1.730583	ug/L
Mn	55	1700.219	0.003	0.238451	ug/L
Co	59	453.019	0.001	0.146863	ug/L
Ni	60	1050.088	0.002	1.160548	ug/L
Ni	62	136.003	0.000	0.024436	ug/L
Cu	63	14810.487	0.044	11.565481	ug/L
Cu	65	6864.493	0.021	11.465804	ug/L
Zn	66	2086.329	0.005	3.952228	ug/L
Zn	68	48535.828	-0.003	-3.651246	ug/L
Ge	72	326846.856	326846.856		ug/L
As	75	4636.481	0.009	5.425896	ug/L
Se	77	140.003	0.000	1.281296	ug/L
Se	82	113.421	0.000	2.810806	ug/L
Rh	103	177136.257	177136.257		ug/L

Sample Information

Sample ID: 1212366-04
Autosampler Position: 22
Sample Date/Time: Friday, December 28, 2012 12:15:21
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L28019.sam
Method File: c:\elandata\Method\DOD_AQUEOUS_6020A_201_4.2.mth
Dataset File: C:\Elandata\DataSet\2L28019\2L28019\1212366-04.022
Tuning File: C:\Elandata\Tuning\28DEC2012_6020A_A.tun
Optimization File: C:\Elandata\Optimize\28DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	Li	6	143716.330	143716.330				ug/L
	Be	9	13.000	0.000	0.102579	0.048	46.543	ug/L
	V	51	17714.724	0.045	5.061971	0.085	1.673	ug/L
	Cr	52	29163.713	0.065	8.979112	0.178	1.984	ug/L
	Cr	53	3670.980	0.008	9.038464	0.305	3.373	ug/L
	Mn	55	144725.401	0.431	38.644603	0.537	1.390	ug/L
	Co	59	3882.761	0.011	1.423934	0.028	1.992	ug/L
	Ni	60	3841.738	0.010	6.030505	0.201	3.332	ug/L
	Ni	62	574.029	0.001	5.153975	0.104	2.024	ug/L
	Cu	63	17017.421	0.049	13.058211	0.253	1.939	ug/L
	Cu	65	7910.457	0.023	12.723737	0.006	0.050	ug/L
	Zn	66	21494.510	0.063	52.699860	0.120	0.228	ug/L
	Zn	68	63906.273	0.040	47.372711	1.410	2.976	ug/L
>	Ge	72	333871.744	333871.744				ug/L
	As	75	3834.222	0.006	3.791727	0.413	10.891	ug/L
	Se	77	121.669	0.000	0.671077	0.370	55.155	ug/L
	Se	82	5.051	0.000	0.573875	0.847	147.512	ug/L
>	Rh	103	177721.724	177721.724				ug/L
	Ag	107	3724.676	0.021	1.640470	0.039	2.366	ug/L
	Cd	111	150.548	0.001	0.277210	0.026	9.358	ug/L
	Cd	114	370.024	0.002	0.286615	0.015	5.195	ug/L
>	In	115	206492.613	206492.613				ug/L
	Sb	121	53704.404	0.260	23.714451	0.322	1.356	ug/L
	Sb	123	41589.938	0.201	23.645160	0.332	1.406	ug/L
	Ba	135	19523.509	0.113	35.746928	0.411	1.149	ug/L
	Ba	137	33515.461	0.194	35.531329	0.274	0.772	ug/L
>	Tb	159	172845.798	172845.798				ug/L
	Tl	203	150.670	0.000	0.069055	0.003	3.750	ug/L
	Tl	205	268.674	0.001	0.049113	0.005	9.287	ug/L
	Pb	208	97191.297	0.328	14.633811	0.184	1.255	ug/L
>	Bi	209	294964.999	294964.999				ug/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	Li	6.015	116.011
	Be	9.012	
	V	50.944	
	Cr	51.941	
	Cr	52.941	
	Mn	54.938	
	Co	58.933	

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	Ni	59.933	
	Ni	61.928	
	Cu	62.930	
	Cu	64.928	
	Zn	65.926	
	Zn	67.925	
>	Ge	71.922	102.895
	As	74.922	
	Se	76.920	
	Se	81.917	
>	Rh	102.905	96.622
	Ag	106.905	
	Cd	110.904	
	Cd	113.904	
>	In	114.904	98.578
	Sb	120.904	
	Sb	122.904	
	Ba	134.906	
	Ba	136.905	
>	Tb	158.925	98.159
	Tl	202.972	
	Tl	204.975	
	Pb	207.977	
>	Bi	208.980	96.864

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

Analyte	Mass	Mass. Intensity	Net Intensity	Concentration	Report Unit
Li	6	145673.932	145673.932		ug/L
Be	9	13.000	0.000	0.100208	ug/L
V	51	17409.684	0.044	5.012323	ug/L
Cr	52	28746.022	0.085	8.915732	ug/L
Cr	53	3838.864	0.008	9.044700	ug/L
Mn	55	142639.555	0.429	38.433439	ug/L
Co	59	3800.049	0.011	1.405988	ug/L
Ni	60	3778.037	0.010	5.978365	ug/L
Ni	62	562.028	0.001	5.073129	ug/L
Cu	63	16714.701	0.049	12.936445	ug/L
Cu	65	7840.379	0.023	12.726764	ug/L
Zn	66	21349.070	0.063	52.826454	ug/L
Zn	68	63080.771	0.039	46.418308	ug/L
Ge	72	330837.558	330837.558		ug/L
As	75	3759.443	0.006	3.716316	ug/L
Se	77	108.002	0.000	0.253287	ug/L
Se	82	-43.157	-0.000	-0.400184	ug/L
Rh	103	175416.573	175416.573		ug/L
Ag	107	3578.832	0.020	1.597167	ug/L
Cd	111	146.470	0.001	0.273153	ug/L
Cd	114	376.970	0.002	0.295895	ug/L
In	115	204362.024	204362.024		ug/L
Sb	121	52321.449	0.256	23.346008	ug/L
Sb	123	40509.070	0.188	23.272505	ug/L
Ba	135	18324.286	0.113	35.752286	ug/L
Ba	137	33009.427	0.193	35.383059	ug/L
Tb	159	171051.562	171051.562		ug/L
Tl	203	154.003	0.000	0.071819	ug/L
Tl	205	280.009	0.001	0.054221	ug/L
Pb	208	94881.002	0.324	14.448857	ug/L
Bi	209	291679.085	291679.085		ug/L

Repeat 2

Analyte	Mass	Mass. Intensity	Net Intensity	Concentration	Report Unit
Li	6	143088.404	143088.404		ug/L
Be	9	9.000	0.000	0.058064	ug/L
V	51	17910.730	0.045	5.159743	ug/L
Cr	52	29502.095	0.087	9.180234	ug/L
Cr	53	3739.016	0.008	9.340178	ug/L
Mn	55	146252.561	0.436	39.255161	ug/L
Co	59	3850.131	0.012	1.456833	ug/L
Ni	60	3948.130	0.011	6.252371	ug/L
Ni	62	581.029	0.001	5.271719	ug/L
Cu	63	17295.086	0.050	13.349022	ug/L
Cu	65	7865.407	0.023	12.716426	ug/L
Zn	66	21340.043	0.063	52.567877	ug/L
Zn	68	64031.358	0.041	46.891742	ug/L
Ge	72	332157.773	332157.773		ug/L
As	75	4080.047	0.007	4.237198	ug/L
Se	77	131.003	0.000	0.858004	ug/L
Se	82	25.344	0.000	0.880127	ug/L
Rh	103	178509.837	178509.837		ug/L

Sample Information

Sample ID: 1212366-05
Autosampler Position: 27
Sample Date/Time: Friday, December 28, 2012 12:47:37
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L28019.sam
Method File: c:\elandata\Method\DOD_AQUEOUS_6020A_201_4.2.mth
Dataset File: C:\Elandata\DataSet\2L28019\2L28019\1212366-05.029
Tuning File: C:\Elandata\Tuning\28DEC2012_6020A_A.tun
Optimization File: C:\Elandata\Optimize\28DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
[>	Li	6	138816.529	138816.529				ug/L
[	Be	9	4.333	0.000	0.002970	0.037	1253.007	ug/L
[	V	51	4627.462	0.006	0.643619	0.106	16.422	ug/L
|	Cr	52	21422.624	0.043	5.952839	0.167	2.806	ug/L
|	Cr	53	2509.466	0.004	5.154034	0.168	3.268	ug/L
|	Mn	55	25160.825	0.074	6.651745	0.034	0.507	ug/L
|	Co	59	877.063	0.002	0.307305	0.008	2.454	ug/L
|	Ni	60	2751.557	0.007	X4.200021	0.044	1.040	ug/L
|	Ni	62	142.003	0.000	X0.089611	0.267	297.804	ug/L
|	Cu	63	12293.697	0.036	9.476461	0.083	0.871	ug/L
|	Cu	65	6019.263	0.018	9.794278	0.108	1.098	ug/L
|	Zn	66	2284.055	0.005	4.410943	0.076	1.734	ug/L
|	Zn	68	50524.909	0.003	2.972975	1.254	42.185	ug/L
|>	Ge	72	327960.012	327960.012				ug/L
|	As	75	1966.868	0.001	0.468084	0.272	58.074	ug/L
|	Se	77	112.669	0.000	0.474506	0.258	54.273	ug/L
[	Se	82	20.639	0.000	0.896255	0.488	54.399	ug/L
[>	Rh	103	175837.442	175837.442				ug/L
|	Ag	107	60.668	0.000	0.022776	0.004	16.442	ug/L
|	Cd	111	24.916	0.000	0.041667	0.026	62.314	ug/L
[	Cd	114	41.600	0.000	0.026731	0.009	32.663	ug/L
[>	In	115	208345.886	208345.886				ug/L
|	Sb	121	1549.517	0.007	0.654099	0.021	3.171	ug/L
[	Sb	123	1164.349	0.005	0.632198	0.026	4.191	ug/L
[	Ba	135	19158.860	0.110	34.879722	0.297	0.851	ug/L
|	Ba	137	33135.720	0.190	34.927449	0.243	0.697	ug/L
[>	Tb	159	173830.244	173830.244				ug/L
[	Tl	203	26.667	0.000	0.006422	0.003	47.159	ug/L
|	Tl	205	57.334	0.000	0.005093	0.002	38.748	ug/L
|	Pb	208	5871.341	0.019	0.844925	0.010	1.182	ug/L
[>	Bi	209	289814.476	289814.476				ug/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
[>	Li	6.015	112.056
[	Be	9.012	
[	V	50.944	
|	Cr	51.941	
|	Cr	52.941	
|	Mn	54.938	
|	Co	58.933	

	Ni	59.933	
	Ni	61.928	
	Cu	62.930	
	Cu	64.928	
	Zn	65.926	
	Zn	67.925	
>	Ge	71.922	101.073
	As	74.922	
	Se	76.920	
	Se	81.917	
>	Rh	102.905	95.598
	Ag	106.905	
	Cd	110.904	
	Cd	113.904	
>	In	114.904	99.462
	Sb	120.904	
	Sb	122.904	
	Ba	134.906	
	Ba	136.905	
>	Tb	158.925	98.718
	Tl	202.972	
	Tl	204.975	
	Pb	207.977	
>	Bi	208.980	95.173

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
Li	6	140974.978	140974.978		ug/L
Be	9	1.000	-0.000	-0.057689	ug/L
V	51	4893.953	0.007	0.764007	ug/L
Cr	52	21512.581	0.045	8.144586	ug/L
Cr	53	2445.443	0.004	5.077298	ug/L
Mn	55	24856.422	0.075	6.685682	ug/L
Co	59	866.081	0.002	0.306814	ug/L
Ni	60	2723.546	0.007	4.233891	ug/L
Ni	62	123.002	-0.000	-0.111841	ug/L
Cu	63	11888.139	0.035	9.381854	ug/L
Cu	65	5871.471	0.018	9.717225	ug/L
Zn	66	2279.386	0.005	4.469219	ug/L
Zn	68	50082.323	0.004	4.419188	ug/L
Ge	72	322390.063	322390.063		ug/L
As	75	2071.658	0.001	0.725238	ug/L
Se	77	118.002	0.000	0.626671	ug/L
Se	82	2.022	0.000	0.519187	ug/L
Rh	103	172714.883	172714.883		ug/L
Ag	107	50.001	0.000	0.018456	ug/L
Cd	111	34.868	0.000	0.081885	ug/L
Cd	114	30.140	0.000	0.018088	ug/L
In	115	206108.432	206108.432		ug/L
Sb	121	1842.182	0.007	0.858182	ug/L
Sb	123	1107.090	0.005	0.808801	ug/L
Ba	135	18726.703	0.111	35.048083	ug/L
Ba	137	32075.178	0.189	34.758520	ug/L
Tb	159	169095.784	169095.784		ug/L
Tl	203	32.000	0.000	0.009421	ug/L
Tl	205	46.001	0.000	0.002881	ug/L
Pb	208	5737.987	0.019	0.838979	ug/L
Bi	209	285126.224	285126.224		ug/L

Repeat 2

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
Li	6	139026.319	139026.319		ug/L
Be	9	7.000	0.000	0.034836	ug/L
V	51	4530.496	0.005	0.800767	ug/L
Cr	52	21353.082	0.043	5.874985	ug/L
Cr	53	2577.491	0.005	5.347184	ug/L
Mn	55	25171.526	0.074	6.618211	ug/L
Co	59	860.080	0.002	0.299124	ug/L
Ni	60	2738.552	0.007	4.150734	ug/L
Ni	62	168.004	0.000	0.382329	ug/L
Cu	63	12402.883	0.036	9.512854	ug/L
Cu	65	6124.636	0.018	9.817194	ug/L
Zn	66	2276.386	0.005	4.364822	ug/L
Zn	68	50813.190	0.002	2.315305	ug/L
Ge	72	329894.472	329894.472		ug/L
As	75	1993.498	0.001	0.495365	ug/L
Se	77	103.002	0.000	0.177203	ug/L
Se	82	12.046	0.000	0.722736	ug/L
Rh	103	176429.067	176429.067		ug/L

Sample Information

Sample ID: 1212366-06
Autosampler Position: 28
Sample Date/Time: Friday, December 28, 2012 12:52:00
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L28019.sam
Method File: c:\elandata\Method\DOD_AQUEOUS_6020A_201_4.2.mth
Dataset File: C:\Elandata\DataSet\2L28019\2L28019\1212366-06.030
Tuning File: C:\Elandata\Tuning\28DEC2012_6020A_A.tun
Optimization File: C:\Elandata\Optimize\28DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
⌈>	Li	6	139214.626	139214.626				ug/L
⌊	Be	9	24.000	0.000	0.240439	0.013	5.333	ug/L
⌈	V	51	22769.272	0.059	6.689721	0.129	1.924	ug/L
|	Cr	52	41027.282	0.099	13.665331	0.299	2.184	ug/L
|	Cr	53	5074.186	0.012	13.713267	0.282	2.056	ug/L
|	Mn	55	407278.571	1.203	107.891141	2.083	1.931	ug/L
|	Co	59	10188.700	0.030	3.734730	0.080	2.145	ug/L
|	Ni	60	9429.649	0.027	15.663323	0.175	1.117	ug/L
|	Ni	62	1491.504	0.004	15.768190	0.249	1.582	ug/L
|	Cu	63	65720.326	0.193	51.182339	0.578	1.129	ug/L
|	Cu	65	31194.962	0.092	50.390059	0.673	1.336	ug/L
|	Zn	66	68231.406	0.200	168.449463	1.411	0.838	ug/L
|	Zn	68	98797.252	0.141	167.577146	2.752	1.642	ug/L
|>	Ge	72	337758.498	337758.498				ug/L
|	As	75	10478.292	0.026	15.626765	0.179	1.144	ug/L
|	Se	77	131.669	0.000	0.915396	0.190	20.707	ug/L
⌊	Se	82	39.556	0.000	1.263609	0.368	29.157	ug/L
⌈>	Rh	103	182124.419	182124.419				ug/L
|	Ag	107	3693.659	0.020	1.587433	0.022	1.397	ug/L
|	Cd	111	447.763	0.002	0.815753	0.033	4.079	ug/L
⌊	Cd	114	808.332	0.004	0.618539	0.041	6.682	ug/L
⌈>	In	115	212107.543	212107.543				ug/L
|	Sb	121	14779.758	0.069	6.335671	0.040	0.633	ug/L
⌊	Sb	123	11455.079	0.054	6.322166	0.127	2.010	ug/L
⌈	Ba	135	15409.761	0.086	27.225458	0.181	0.665	ug/L
|	Ba	137	26573.618	0.148	27.185969	0.280	1.029	ug/L
⌊>	Tb	159	179009.263	179009.263				ug/L
⌈	Tl	203	180.671	0.001	0.080597	0.011	13.066	ug/L
|	Tl	205	427.684	0.001	0.078813	0.002	2.022	ug/L
|	Pb	208	646877.241	2.106	93.889086	1.061	1.130	ug/L
⌊>	Bi	209	307006.177	307006.177				ug/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
⌈>	Li	6.015	112.377
⌊	Be	9.012	
⌈	V	50.944	
|	Cr	51.941	
|	Cr	52.941	
|	Mn	54.938	
|	Co	58.933	

	Ni	59.933	
	Ni	61.928	
	Cu	62.930	
	Cu	64.928	
	Zn	65.926	
	Zn	67.925	
>	Ge	71.922	104.093
	As	74.922	
	Se	76.920	
	Se	81.917	
>	Rh	102.905	99.016
	Ag	106.905	
	Cd	110.904	
	Cd	113.904	
>	In	114.904	101.258
	Sb	120.904	
	Sb	122.904	
	Ba	134.906	
	Ba	136.905	
>	Tb	158.925	101.659
	Tl	202.972	
	Tl	204.975	
	Pb	207.977	
>	Bi	208.980	100.818

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

Analyte	Mass	Mass Intensity	Net Intensity	Concentration	Report Unit
Li	6	139122.158	139122.158		ug/L
Be	9	23.000	0.000	0.228507	ug/L
V	51	22188.717	0.058	6.553025	ug/L
Cr	52	39883.436	0.097	13.328186	ug/L
Cr	53	4976.783	0.012	13.510078	ug/L
Mn	55	385157.074	1.178	105.488548	ug/L
Co	59	9873.919	0.029	3.846816	ug/L
Ni	60	9243.089	0.026	15.483249	ug/L
Ni	62	1477.167	0.004	15.732863	ug/L
Cu	63	64553.027	0.191	50.855690	ug/L
Cu	65	30585.692	0.091	49.798773	ug/L
Zn	66	67082.291	0.198	166.804804	ug/L
Zn	68	57884.837	0.140	166.938040	ug/L
Ge	72	335181.241	335181.241		ug/L
As	75	10512.086	0.029	15.831498	ug/L
Se	77	134.003	0.000	1.008368	ug/L
Se	82	41.129	0.000	1.302183	ug/L
Rh	103	179140.337	179140.337		ug/L
Ag	107	3574.830	0.020	1.582125	ug/L
Cd	111	459.364	0.003	0.850822	ug/L
Cd	114	828.848	0.005	0.844744	ug/L
In	115	210280.577	210280.577		ug/L
Sb	121	14547.945	0.089	6.290510	ug/L
Sb	123	11111.490	0.053	8.185824	ug/L
Ba	135	15139.178	0.085	27.089772	ug/L
Ba	137	25852.320	0.146	26.870862	ug/L
Tb	159	176881.045	176881.045		ug/L
Tl	203	154.003	0.000	0.088522	ug/L
Tl	205	418.018	0.001	0.077817	ug/L
Pb	208	631346.576	2.078	92.874774	ug/L
Bi	209	303583.118	303583.118		ug/L

Repeat 2

Analyte	Mass	Mass Intensity	Net Intensity	Concentration	Report Unit
Li	6	138533.884	138533.884		ug/L
Be	9	26.000	0.000	0.253985	ug/L
V	51	23315.149	0.060	6.808649	ug/L
Cr	52	41820.088	0.101	13.886207	ug/L
Cr	53	5081.858	0.012	13.584489	ug/L
Mn	55	414843.753	1.215	108.992738	ug/L
Co	59	10325.581	0.030	3.753819	ug/L
Ni	60	9552.479	0.027	15.738455	ug/L
Ni	62	1464.189	0.004	15.536290	ug/L
Cu	63	66152.578	0.192	51.090889	ug/L
Cu	65	31387.034	0.092	50.246886	ug/L
Zn	66	69295.195	0.202	169.670973	ug/L
Zn	68	59946.569	0.139	165.201086	ug/L
Ge	72	340580.366	340580.366		ug/L
As	75	10498.386	0.026	15.501857	ug/L
Se	77	125.002	0.000	0.897220	ug/L
Se	82	57.444	0.000	1.811222	ug/L
Rh	103	184447.938	184447.938		ug/L

Sample Information

Sample ID: 1212366-07
Autosampler Position: 29
Sample Date/Time: Friday, December 28, 2012 12:56:24
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L28019.sam
Method File: c:\elandata\Method\DOD_AQUEOUS_6020A_201_4.2.mth
Dataset File: C:\Elandata\DataSet\2L28019\2L28019\1212366-07.031
Tuning File: C:\Elandata\Tuning\28DEC2012_6020A_A.tun
Optimization File: C:\Elandata\Optimize\28DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
⌈>	Li	6	154518.695	154518.695				ug/L
⌊	Be	9	3.000	-0.000	-0.017494	0.028	159.681	ug/L
⌈	V	51	28146.419	0.075	8.478331	0.056	0.663	ug/L
|	Cr	52	9351.545	0.006	0.772369	0.038	4.977	ug/L
|	Cr	53	1191.445	0.000	0.358773	0.159	44.275	ug/L
|	Mn	55	11700.693	0.032	2.872561	0.032	1.114	ug/L
|	Co	59	431.684	0.001	0.132884	0.004	3.380	ug/L
|	Ni	60	947.406	0.002	0.918023	0.060	6.494	ug/L
|	Ni	62	85.668	-0.000	-0.617885	0.143	23.075	ug/L
|	Cu	63	5944.532	0.016	4.189841	0.127	3.020	ug/L
|	Cu	65	2934.299	0.008	4.483463	0.175	3.908	ug/L
|	Zn	66	2055.316	0.004	3.660875	0.097	2.652	ug/L
|	Zn	68	50103.612	-0.004	-4.167873	1.804	43.285	ug/L
|>	Ge	72	338422.263	338422.263				ug/L
|	As	75	4834.530	0.009	5.484661	0.279	5.088	ug/L
|	Se	77	141.336	0.000	1.179479	0.184	15.612	ug/L
⌊	Se	82	78.225	0.000	2.025151	0.881	43.506	ug/L
⌈>	Rh	103	175643.725	175643.725				ug/L
|	Ag	107	109.669	0.001	0.044748	0.008	17.198	ug/L
|	Cd	111	29.398	0.000	0.050133	0.007	14.111	ug/L
⌊	Cd	114	68.315	0.000	0.048269	0.009	18.854	ug/L
⌈>	In	115	208394.147	208394.147				ug/L
|	Sb	121	22843.699	0.109	9.981536	0.057	0.576	ug/L
⌊	Sb	123	17550.539	0.084	9.873536	0.052	0.526	ug/L
⌈	Ba	135	9232.055	0.054	17.076640	0.083	0.485	ug/L
|	Ba	137	15887.809	0.093	17.018383	0.111	0.650	ug/L
⌊>	Tb	159	170735.469	170735.469				ug/L
⌈	Tl	203	39.334	0.000	0.012934	0.003	23.670	ug/L
|	Tl	205	61.334	0.000	0.005919	0.003	44.706	ug/L
|	Pb	208	10438.755	0.035	1.546564	0.022	1.443	ug/L
⌊>	Bi	209	290071.039	290071.039				ug/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
⌈>	Li	6.015	124.731
⌊	Be	9.012	
⌈	V	50.944	
|	Cr	51.941	
|	Cr	52.941	
|	Mn	54.938	
|	Co	58.933	

	Ni	59.933	
	Ni	61.928	
	Cu	62.930	
	Cu	64.928	
	Zn	65.926	
	Zn	67.925	
>	Ge	71.922	104.297
	As	74.922	
	Se	76.920	
	Se	81.917	
>	Rh	102.905	95.493
	Ag	106.905	
	Cd	110.904	
	Cd	113.904	
>	In	114.904	99.485
	Sb	120.904	
	Sb	122.904	
	Ba	134.906	
	Ba	136.905	
>	Tb	158.925	96.960
	Tl	202.972	
	Tl	204.975	
	Pb	207.977	
>	Bi	208.980	95.257

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
Li 6 Int Std for sample	Li	6	Internal Standard outside of limit

Replicates

Repeat 1

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
Li	6	152614.878	152614.878		ug/L
Be	9	2.000	-0.000	-0.027797	ug/L
V	51	28073.080	0.075	8.536894	ug/L
Cr	52	9207.022	0.005	0.747802	ug/L
Cr	53	1229.118	0.000	0.525443	ug/L
Mn	55	11663.832	0.032	2.690780	ug/L
Co	59	414.018	0.001	0.127799	ug/L
Ni	60	915.068	0.001	0.878344	ug/L
Ni	62	71.001	-0.000	-0.780024	ug/L
Cu	63	6014.561	0.016	4.288940	ug/L
Cu	65	2845.565	0.008	4.381400	ug/L
Zn	66	2012.304	0.004	3.598508	ug/L
Zn	68	49814.291	-0.003	-3.242886	ug/L
Ge	72	335354.078	335354.078		ug/L
As	75	4616.208	0.009	5.171281	ug/L
Se	77	135.003	0.000	1.035805	ug/L
Se	82	29.814	0.000	1.074679	ug/L
Rh	103	175537.491	175537.491		ug/L
Ag	107	116.002	0.001	0.046496	ug/L
Cd	111	27.544	0.000	0.046643	ug/L
Cd	114	56.333	0.000	0.038885	ug/L
In	115	208025.438	208025.438		ug/L
Sb	121	22675.161	0.109	9.825282	ug/L
Sb	123	17419.258	0.084	9.818888	ug/L
Ba	135	9176.983	0.054	17.012246	ug/L
Ba	137	15740.482	0.092	16.897880	ug/L
Tb	159	170357.255	170357.255		ug/L
Tl	203	41.001	0.000	0.014221	ug/L
Tl	205	46.001	0.000	0.002897	ug/L
Pb	208	10389.034	0.035	1.572205	ug/L
Bi	209	284103.855	284103.855		ug/L

Repeat 2

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
Li	6	152805.684	152805.684		ug/L
Be	9	1.000	-0.000	-0.036814	ug/L
V	51	28500.399	0.075	8.668015	ug/L
Cr	52	9432.318	0.005	0.752639	ug/L
Cr	53	1164.108	0.000	0.208122	ug/L
Mn	55	11722.729	0.032	2.835615	ug/L
Co	59	447.018	0.001	0.136307	ug/L
Ni	60	945.072	0.002	0.881422	ug/L
Ni	62	96.002	-0.000	-0.512099	ug/L
Cu	63	5843.448	0.015	4.046747	ug/L
Cu	65	2812.623	0.006	4.383205	ug/L
Zn	66	2063.318	0.004	3.610325	ug/L
Zn	68	50203.308	-0.005	-6.246812	ug/L
Ge	72	343120.258	343120.258		ug/L
As	75	5026.084	0.009	5.706180	ug/L
Se	77	141.003	0.000	1.115572	ug/L
Se	82	119.288	0.000	2.814930	ug/L

Sample Information

Sample ID: 1212366-01
Autosampler Position: 19
Sample Date/Time: Friday, December 28, 2012 16:00:17
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L28050.sam
Method File: c:\elandata\Method\DOD_AQUEOUS_6020A_201_4.2.mth
Dataset File: C:\Elandata\DataSet\2L28050\1212366-01.029
Tuning File: C:\Elandata\Tuning\28DEC2012_6020A_B.tun
Optimization File: C:\Elandata\Optimize\28DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
⌈>	Li	6	162699.048	162699.048				ug/L
⌊	Be	9	34.334	0.000	0.318865	0.033	10.372	ug/L
⌈	V	51	29077.438	0.077	9.006552	0.119	1.325	ug/L
|	Ni	60	11509.046	0.032	19.698104	0.248	1.260	ug/L
|	Ni	62	1765.903	0.005	20.073583	0.815	4.063	ug/L
|>	Ge	72	351302.530	351302.530				ug/L
|	Se	77	146.003	0.000	1.624364	0.112	6.911	ug/L
⌊	Se	82	102.765	0.000	2.069669	1.482	71.597	ug/L
⌈>	In	115	217489.506	217489.506				ug/L
|	Sb	121	10316.568	0.046	4.663373	0.382	8.183	ug/L
⌊	Sb	123	7857.591	0.035	4.629197	0.352	7.595	ug/L
⌈	Tl	203	485.021	0.003	0.231927	0.019	8.048	ug/L
|	Tl	205	1021.417	0.006	0.202888	0.004	1.762	ug/L
⌊>	Ho	165	171734.181	171734.181				mg/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
⌈>	Li	6.015	102.316
⌊	Be	9.012	
⌈	V	50.944	
|	Ni	59.933	
|	Ni	61.928	
|>	Ge	71.922	104.172
|	Se	76.920	
⌊	Se	81.917	
⌈>	In	114.904	102.842
|	Sb	120.904	
⌊	Sb	122.904	
⌈	Tl	202.972	
|	Tl	204.975	
⌊>	Ho	164.930	105.640

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
Li	6	162774.400	162774.400		ug/L
Be	9	35.000	0.000	0.325771	ug/L
V	51	28643.874	0.077	9.015790	ug/L
Ni	60	11443.273	0.033	19.800670	ug/L
Ni	62	1660.210	0.005	19.158136	ug/L
Ge	72	345748.583	345748.583		ug/L
Se	77	142.003	0.000	1.576899	ug/L
Se	82	27.182	0.000	0.561739	ug/L

Sample Information

Sample ID: 1212366-02
Autosampler Position: 20
Sample Date/Time: Friday, December 28, 2012 16:03:40
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L28050.sam
Method File: c:\elandata\Method\DOD_AQUEOUS_6020A_201_4.2.mth
Dataset File: C:\Elandata\DataSet\2L28050\1212366-02.030
Tuning File: C:\Elandata\Tuning\28DEC2012_6020A_B.tun
Optimization File: C:\Elandata\Optimize\28DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	Li	6	161193.934	161193.934				ug/L
	Be	9	11.333	0.000	0.074795	0.014	18.169	ug/L
	V	51	7357.547	0.015	1.743267	0.022	1.248	ug/L
	Ni	60	2650.852	0.007	4.309546	0.071	1.649	ug/L
	Ni	62	404.682	0.001	4.180271	0.163	3.905	ug/L
>	Ge	72	352613.431	352613.431				ug/L
	Se	77	218.006	0.000	3.587176	0.577	16.077	ug/L
	Se	82	180.889	0.001	3.643367	1.309	35.927	ug/L
>	In	115	218428.781	218428.781				ug/L
	Sb	121	9269.296	0.041	4.152739	1.315	31.655	ug/L
	Sb	123	5516.129	0.024	3.189688	0.120	3.759	ug/L
	Tl	203	128.002	0.001	0.055043	0.003	5.262	ug/L
	Tl	205	222.339	0.001	0.039023	0.003	8.776	ug/L
>	Ho	165	170707.312	170707.312				mg/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	Li	6.015	101.370
	Be	9.012	
	V	50.944	
	Ni	59.933	
	Ni	61.928	
>	Ge	71.922	104.561
	Se	76.920	
	Se	81.917	
>	In	114.904	103.286
	Sb	120.904	
	Sb	122.904	
	Tl	202.972	
	Tl	204.975	
>	Ho	164.930	105.008

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
Li	6	163084.354	163084.354		ug/L
Be	9	10.000	0.000	0.059104	ug/L
V	51	7257.910	0.015	1.733746	ug/L
Ni	60	2631.511	0.007	4.320414	ug/L
Ni	62	385.014	0.001	3.986422	ug/L
Ge	72	346186.413	346186.413		ug/L
Se	77	184.005	0.000	2.981709	ug/L
Se	82	158.580	0.000	3.184985	ug/L

Sample Information

Sample ID: 1212366-03
Autosampler Position: 21
Sample Date/Time: Friday, December 28, 2012 16:07:02
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L28050.sam
Method File: c:\elandata\Method\DOD_AQUEOUS_6020A_201_4.2.mth
Dataset File: C:\Elandata\DataSet\2L28050\1212366-03.031
Tuning File: C:\Elandata\Tuning\28DEC2012_6020A_B.tun
Optimization File: C:\Elandata\Optimize\28DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	Li	6	163955.507	163955.507				ug/L
	Be	9	5.667	0.000	0.012811	0.017	130.572	ug/L
	V	51	98214.067	0.271	31.843044	0.562	1.764	ug/L
	Ni	60	1103.763	0.003	1.627868	0.075	4.604	ug/L
	Ni	62	141.336	0.000	1.113170	0.092	8.294	ug/L
>	Ge	72	354026.496	354026.496				ug/L
	Se	77	122.002	0.000	0.934831	0.553	59.116	ug/L
	Se	82	32.597	0.000	0.659875	1.307	198.048	ug/L
>	In	115	216678.871	216678.871				ug/L
	Sb	121	17871.177	0.081	8.206283	0.059	0.717	ug/L
	Sb	123	13661.060	0.062	8.178026	0.065	0.794	ug/L
	Tl	203	25.667	0.000	0.003874	0.001	22.020	ug/L
	Tl	205	24.000	-0.000	-0.001932	0.001	62.342	ug/L
>	Ho	165	171198.899	171198.899				mg/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	Li	6.015	103.106
	Be	9.012	
	V	50.944	
	Ni	59.933	
	Ni	61.928	
>	Ge	71.922	104.980
	Se	76.920	
	Se	81.917	
>	In	114.904	102.458
	Sb	120.904	
	Sb	122.904	
	Tl	202.972	
	Tl	204.975	
>	Ho	164.930	105.310

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
Li	6	166371.912	166371.912		ug/L
Be	9	4.000	-0.000	-0.005588	ug/L
V	51	95298.325	0.265	31.189892	ug/L
Ni	60	1140.102	0.003	1.708672	ug/L
Ni	62	131.003	0.000	1.006388	ug/L
Ge	72	350475.859	350475.859		ug/L
Se	77	118.002	0.000	0.868781	ug/L
Se	82	39.091	0.000	0.795245	ug/L

Sample Information

Sample ID: 1212366-04
Autosampler Position: 22
Sample Date/Time: Friday, December 28, 2012 16:10:26
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L28050.sam
Method File: c:\elandata\Method\DOD_AQUEOUS_6020A_201_4.2.mth
Dataset File: C:\Elandata\DataSet\2L28050\1212366-04.032
Tuning File: C:\Elandata\Tuning\28DEC2012_6020A_B.tun
Optimization File: C:\Elandata\Optimize\28DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	Li	6	163627.576	163627.576				ug/L
	Be	9	11.667	0.000	0.076426	0.012	16.083	ug/L
	V	51	18350.702	0.046	5.339538	0.226	4.228	ug/L
	Ni	60	4015.169	0.011	6.594272	0.165	2.504	ug/L
	Ni	62	638.368	0.002	6.819953	0.178	2.608	ug/L
>	Ge	72	356438.367	356438.367				ug/L
	Se	77	113.669	0.000	0.684468	0.282	41.270	ug/L
	Se	82	-7.294	-0.000	-0.138647	0.437	314.947	ug/L
>	In	115	216259.263	216259.263				ug/L
	Sb	121	54566.203	0.251	25.396301	0.099	0.390	ug/L
	Sb	123	42035.094	0.193	25.507870	0.247	0.968	ug/L
	Tl	203	160.670	0.001	0.070832	0.002	3.253	ug/L
	Tl	205	297.343	0.002	0.054090	0.003	4.796	ug/L
>	Ho	165	171950.100	171950.100				mg/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	Li	6.015	102.900
	Be	9.012	
	V	50.944	
	Ni	59.933	
	Ni	61.928	
>	Ge	71.922	105.695
	Se	76.920	
	Se	81.917	
>	In	114.904	102.260
	Sb	120.904	
	Sb	122.904	
	Tl	202.972	
	Tl	204.975	
>	Ho	164.930	105.772

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

	Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
	Li	6	163933.471	163933.471		ug/L
	Be	9	11.000	0.000	0.069136	ug/L
	V	51	18611.796	0.046	5.568893	ug/L
	Ni	60	3955.134	0.011	6.687162	ug/L
	Ni	62	634.034	0.002	6.879891	ug/L
	Ge	72	346369.618	346369.618		ug/L
	Se	77	104.002	0.000	0.505823	ug/L
	Se	82	3.680	0.000	0.079464	ug/L

Sample Information

Sample ID: 1212366-05
Autosampler Position: 27
Sample Date/Time: Friday, December 28, 2012 16:34:31
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L28050.sam
Method File: c:\elandata\Method\DOD_AQUEOUS_6020A_201_4.2.mth
Dataset File: C:\Elandata\DataSet\2L28050\1212366-05.039
Tuning File: C:\Elandata\Tuning\28DEC2012_6020A_B.tun
Optimization File: C:\Elandata\Optimize\28DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	Li	6	158850.358	158850.358				ug/L
	Be	9	5.333	0.000	0.011136	0.036	320.913	ug/L
	V	51	4377.454	0.006	0.741780	0.031	4.223	ug/L
	Ni	60	2810.248	0.007	4.553026	0.028	0.622	ug/L
	Ni	62	153.337	0.000	1.249639	0.134	10.762	ug/L
>	Ge	72	354931.388	354931.388				ug/L
	Se	77	116.002	0.000	0.762428	0.203	26.684	ug/L
	Se	82	1.718	0.000	0.030135	0.650	2155.556	ug/L
>	In	115	218753.732	218753.732				ug/L
	Sb	121	1763.569	0.007	0.674586	0.013	1.932	ug/L
	Sb	123	1346.590	0.005	0.670630	0.010	1.508	ug/L
	Tl	203	28.334	0.000	0.005304	0.003	54.930	ug/L
	Tl	205	55.001	0.000	0.004529	0.001	13.233	ug/L
>	Ho	165	170096.342	170096.342				mg/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	Li	6.015	99.896
	Be	9.012	
	V	50.944	
	Ni	59.933	
	Ni	61.928	
>	Ge	71.922	105.248
	Se	76.920	
	Se	81.917	
>	In	114.904	103.439
	Sb	120.904	
	Sb	122.904	
	Tl	202.972	
	Tl	204.975	
>	Ho	164.930	104.632

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

	Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
	Li	6	161274.943	161274.943		ug/L
	Be	9	4.000	-0.000	-0.004246	ug/L
	V	51	4224.436	0.006	0.721794	ug/L
	Ni	60	2736.553	0.007	4.553780	ug/L
	Ni	62	160.003	0.000	1.365118	ug/L
	Ge	72	347367.788	347367.788		ug/L
	Se	77	108.002	0.000	0.606866	ug/L
	Se	82	-34.582	-0.000	-0.702158	ug/L

Sample Information

Sample ID: 1212366-06
Autosampler Position: 28
Sample Date/Time: Friday, December 28, 2012 16:37:50
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L28050.sam
Method File: c:\elandata\Method\DOD_AQUEOUS_6020A_201_4.2.mth
Dataset File: C:\Elandata\DataSet\2L28050\1212366-06.040
Tuning File: C:\Elandata\Tuning\28DEC2012_6020A_B.tun
Optimization File: C:\Elandata\Optimize\28DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	Li	6	156994.566	156994.566				ug/L
	Be	9	25.334	0.000	0.231934	0.117	50.447	ug/L
	V	51	23294.358	0.059	6.975491	0.046	0.661	ug/L
	Ni	60	9770.110	0.027	16.459377	0.215	1.307	ug/L
	Ni	62	1538.848	0.004	17.197425	0.745	4.331	ug/L
>	Ge	72	355883.956	355883.956				ug/L
	Se	77	125.669	0.000	1.018356	0.144	14.150	ug/L
	Se	82	23.905	0.000	0.478430	0.329	68.811	ug/L
>	In	115	221134.730	221134.730				ug/L
	Sb	121	14689.576	0.065	6.581479	0.115	1.747	ug/L
	Sb	123	11325.537	0.050	6.616749	0.117	1.773	ug/L
	Tl	203	172.670	0.001	0.075879	0.004	4.763	ug/L
	Tl	205	432.351	0.002	0.080889	0.007	8.616	ug/L
>	Ho	165	173810.248	173810.248				mg/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	Li	6.015	98.729
	Be	9.012	
	V	50.944	
	Ni	59.933	
	Ni	61.928	
>	Ge	71.922	105.531
	Se	76.920	
	Se	81.917	
>	In	114.904	104.565
	Sb	120.904	
	Sb	122.904	
	Tl	202.972	
	Tl	204.975	
>	Ho	164.930	106.917

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

	Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
>	Li	6	156889.979	156889.979		ug/L
	Be	9	33.000	0.000	0.313507	ug/L
	V	51	23163.285	0.080	7.018329	ug/L
	Ni	60	9527.445	0.027	16.229381	ug/L
	Ni	62	1466.165	0.004	16.553815	ug/L
>	Ge	72	351904.812	351904.812		ug/L
	Se	77	126.002	0.000	1.066298	ug/L
	Se	82	8.440	0.000	0.174226	ug/L

Sample Information

Sample ID: 1212366-07
Autosampler Position: 29
Sample Date/Time: Friday, December 28, 2012 16:41:09
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L28050.sam
Method File: c:\elandata\Method\DOD_AQUEOUS_6020A_201_4.2.mth
Dataset File: C:\Elandata\DataSet\2L28050\1212366-07.041
Tuning File: C:\Elandata\Tuning\28DEC2012_6020A_B.tun
Optimization File: C:\Elandata\Optimize\28DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
⌈>	Li	6	168155.305	168155.305				ug/L
⌊	Be	9	3.333	-0.000	-0.012893	0.006	45.802	ug/L
⌈	V	51	28640.681	0.074	8.659611	0.023	0.269	ug/L
|	Ni	60	925.069	0.002	1.297820	0.069	5.327	ug/L
|	Ni	62	112.335	0.000	0.760651	0.106	13.951	ug/L
|>	Ge	72	358863.196	358863.196				ug/L
|	Se	77	133.003	0.000	1.187658	0.091	7.677	ug/L
⌊	Se	82	48.078	0.000	0.954644	0.391	40.935	ug/L
⌈>	In	115	217410.262	217410.262				ug/L
|	Sb	121	23127.291	0.105	10.624927	0.168	1.582	ug/L
⌊	Sb	123	17818.039	0.081	10.673214	0.042	0.397	ug/L
⌈	Tl	203	37.000	0.000	0.009805	0.002	20.908	ug/L
|	Tl	205	72.668	0.000	0.008328	0.001	15.531	ug/L
⌊>	Ho	165	168609.915	168609.915				mg/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
⌈>	Li	6.015	105.748
⌊	Be	9.012	
⌈	V	50.944	
|	Ni	59.933	
|	Ni	61.928	
|>	Ge	71.922	106.414
|	Se	76.920	
⌊	Se	81.917	
⌈>	In	114.904	102.804
|	Sb	120.904	
⌊	Sb	122.904	
⌈	Tl	202.972	
|	Tl	204.975	
⌊>	Ho	164.930	103.718

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

	Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
⌈>	Li	6	168131.416	168131.416		ug/L
⌊	Be	9	3.000	-0.000	-0.016322	ug/L
⌈	V	51	28301.886	0.074	8.678096	ug/L
|	Ni	60	875.062	0.002	1.234139	ug/L
|	Ni	62	113.002	0.000	0.788038	ug/L
|>	Ge	72	353915.416	353915.416		ug/L
|	Se	77	129.002	0.000	1.128774	ug/L
⌊	Se	82	51.806	0.000	1.044365	ug/L

: 99369

Sample Information

Sample ID: 1212366-08
Autosampler Position: 30
Sample Date/Time: Friday, December 28, 2012 16:44:28
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L28050.sam
Method File: c:\elandata\Method\DOD_AQUEOUS_6020A_201_4.2.mth
Dataset File: C:\Elandata\DataSet\2L28050\1212366-08.042
Tuning File: C:\Elandata\Tuning\28DEC2012_6020A_B.tun
Optimization File: C:\Elandata\Optimize\28DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	Li	6	170062.074	170062.074				ug/L
	Be	9	74.668	0.000	0.714944	0.102	14.314	ug/L
	V	51	62572.760	0.167	19.538030	0.034	0.174	ug/L
	Ni	60	33309.192	0.091	55.697971	1.024	1.838	ug/L
	Ni	62	5222.962	0.014	58.491362	1.194	2.041	ug/L
>	Ge	72	362695.154	362695.154				ug/L
	Se	77	159.003	0.000	1.848981	0.567	30.654	ug/L
	Se	82	82.688	0.000	1.619378	0.895	55.279	ug/L
>	In	115	218065.283	218065.283				ug/L
	Sb	121	33435.148	0.152	15.387872	0.951	6.181	ug/L
	Sb	123	24392.862	0.111	14.618578	0.017	0.118	ug/L
	Tl	203	679.706	0.004	0.321413	0.005	1.474	ug/L
	Tl	205	1401.151	0.008	0.274607	0.001	0.538	ug/L
>	Ho	165	175559.973	175559.973				mg/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	Li	6.015	106.947
	Be	9.012	
	V	50.944	
	Ni	59.933	
	Ni	61.928	
>	Ge	71.922	107.551
	Se	76.920	
	Se	81.917	
>	In	114.904	103.114
	Sb	120.904	
	Sb	122.904	
	Tl	202.972	
	Tl	204.975	
>	Ho	164.930	107.993

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

	Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
	Li	6	171311.688	171311.688		ug/L
	Be	9	65.001	0.000	0.611003	ug/L
	V	51	61840.252	0.166	19.534864	ug/L
	Ni	60	32291.148	0.090	54.827775	ug/L
	Ni	62	5051.836	0.014	57.232359	ug/L
	Ge	72	358508.210	358508.210		ug/L
	Se	77	177.004	0.000	2.361911	ug/L
	Se	82	78.886	0.000	1.564850	ug/L

Sample Information

Sample ID: 1212366-01
Autosampler Position: 19
Sample Date/Time: Monday, December 31, 2012 08:48:44
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L31001.sam
Method File: c:\elandata\Method\Trimatrix_DoD4.2_Aqueous_6020a_114.mth
Dataset File: C:\Elandata\DataSet\2L31001\1212366-01.017
Tuning File: C:\Elandata\Tuning\31DEC2012_6020A_A.tun
Optimization File: C:\Elandata\Optimize\31DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	In	115	560443.899	560443.899				ug/L
	Sb	121	10560.350	0.019	4.381339	0.060	1.376	ug/L
	Sb	123	7975.195	0.014	4.379909	0.087	1.994	ug/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	In	114.904	97.196
	Sb	120.904	
	Sb	122.904	

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	562358.761	562358.761		ug/L
Sb	121	10431.172	0.018	4.312568	ug/L
Sb	123	7820.411	0.014	4.276892	ug/L

Repeat 2

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	558926.513	558926.513		ug/L
Sb	121	10588.402	0.019	4.424639	ug/L
Sb	123	7998.344	0.014	4.420404	ug/L

Repeat 3

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	562046.424	562046.424		ug/L
Sb	121	10851.476	0.019	4.408508	ug/L
Sb	123	8106.830	0.014	4.436632	ug/L

Sample Information

Sample ID: 1212366-02
Autosampler Position: 20
Sample Date/Time: Monday, December 31, 2012 08:51:19
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L31001.sam
Method File: c:\elandata\Method\Trimatrix_DoD4.2_Aqueous_6020a_114.mth
Dataset File: C:\Elandata\DataSet\2L31001\1212366-02.018
Tuning File: C:\Elandata\Tuning\31DEC2012_6020A_A.tun
Optimization File: C:\Elandata\Optimize\31DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	In	115	561124.714	561124.714				ug/L
	Sb	121	8652.284	0.015	3.582091	0.088	2.445	ug/L
	Sb	123	6556.177	0.012	3.592646	0.032	0.895	ug/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	In	114.904	97.314
	Sb	120.904	
	Sb	122.904	

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	558822.018	558822.018		ug/L
Sb	121	8799.118	0.016	3.657973	ug/L
Sb	123	6565.377	0.012	3.629159	ug/L

Repeat 2

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	559065.026	559065.026		ug/L
Sb	121	8682.985	0.015	3.602037	ug/L
Sb	123	6489.048	0.012	3.568526	ug/L

Repeat 3

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	564567.097	564567.097		ug/L
Sb	121	8474.751	0.015	3.486263	ug/L
Sb	123	6574.107	0.012	3.580252	ug/L

Sample Information

Sample ID: 1212366-03
Autosampler Position: 21
Sample Date/Time: Monday, December 31, 2012 08:53:55
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L31001.sam
Method File: c:\elandata\Method\Trimatrix_DoD4.2_Aqueous_6020a_114.mth
Dataset File: C:\Elandata\DataSet\2L31001\1212366-03.019
Tuning File: C:\Elandata\Tuning\31DEC2012_6020A_A.tun
Optimization File: C:\Elandata\Optimize\31DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	In	115	557831.177	557831.177				ug/L
	Sb	121	21866.254	0.039	9.134731	0.020	0.222	ug/L
	Sb	123	16445.348	0.029	9.095356	0.188	2.065	ug/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	In	114.904	96.743
	Sb	120.904	
	Sb	122.904	

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	559083.803	559083.803		ug/L
Sb	121	21864.247	0.038	9.113401	ug/L
Sb	123	16724.197	0.030	9.226545	ug/L

Repeat 2

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	563032.829	563032.829		ug/L
Sb	121	21883.736	0.039	9.137100	ug/L
Sb	123	16450.983	0.030	9.176997	ug/L

Repeat 3

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	551376.900	551376.900		ug/L
Sb	121	22050.780	0.039	9.153991	ug/L
Sb	123	16180.864	0.029	8.880525	ug/L

Sample Information

Sample ID: 1212366-04
Autosampler Position: 22
Sample Date/Time: Monday, December 31, 2012 08:56:31
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L31001.sam
Method File: c:\elandata\Method\Trimatrix_DoD4.2_Aqueous_6020a_114.mth
Dataset File: C:\Elandata\DataSet\2L31001\1212366-04.020
Tuning File: C:\Elandata\Tuning\31DEC2012_6020A_A.tun
Optimization File: C:\Elandata\Optimize\31DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	In	115	554137.909	554137.909				ug/L
	Sb	121	71024.443	0.128	29.911381	0.163	0.544	ug/L
	Sb	123	53717.913	0.097	29.950431	0.133	0.443	ug/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	In	114.904	96.102
	Sb	120.904	
	Sb	122.904	

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	554579.118	554579.118		ug/L
Sb	121	71215.850	0.128	29.966565	ug/L
Sb	123	53800.381	0.097	29.861313	ug/L

Repeat 2

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	551741.793	551741.793		ug/L
Sb	121	70282.314	0.127	29.727680	ug/L
Sb	123	53372.301	0.097	29.887172	ug/L

Repeat 3

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	556092.816	556092.816		ug/L
Sb	121	71575.166	0.129	30.037857	ug/L
Sb	123	54181.056	0.097	30.102809	ug/L

Sample Information

Sample ID: 1212366-05
Autosampler Position: 27
Sample Date/Time: Monday, December 31, 2012 09:33:21
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L31001.sam
Method File: c:\elandata\Method\Trimatrix_DoD4.2_Aqueous_6020a_114.mth
Dataset File: C:\Elandata\DataSet\2L31001\1212366-05.029
Tuning File: C:\Elandata\Tuning\31DEC2012_6020A_A.tun
Optimization File: C:\Elandata\Optimize\31DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	In	115	562939.847	562939.847				ug/L
	Sb	121	1981.942	0.003	0.803202	0.021	2.634	ug/L
	Sb	123	1523.868	0.003	0.817081	0.033	4.035	ug/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	In	114.904	97.629
	Sb	120.904	
	Sb	122.904	

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	567083.340	567083.340		ug/L
Sb	121	1944.285	0.003	0.781608	ug/L
Sb	123	1591.299	0.003	0.847853	ug/L

Repeat 2

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	561354.882	561354.882		ug/L
Sb	121	2026.287	0.004	0.823807	ug/L
Sb	123	1526.656	0.003	0.821104	ug/L

Repeat 3

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	560381.318	560381.318		ug/L
Sb	121	1975.273	0.003	0.804103	ug/L
Sb	123	1453.648	0.003	0.782286	ug/L

Sample Information

Sample ID: 1212366-06
Autosampler Position: 28
Sample Date/Time: Monday, December 31, 2012 09:35:55
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L31001.sam
Method File: c:\elandata\Method\Trimatrix_DoD4.2_Aqueous_6020a_114.mth
Dataset File: C:\Elandata\DataSet\2L31001\1212366-06.030
Tuning File: C:\Elandata\Tuning\31DEC2012_6020A_A.tun
Optimization File: C:\Elandata\Optimize\31DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	In	115	565798.615	565798.615				ug/L
	Sb	121	18517.781	0.033	7.623852	0.044	0.574	ug/L
	Sb	123	13924.097	0.025	7.588773	0.039	0.510	ug/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	In	114.904	98.124
	Sb	120.904	
	Sb	122.904	

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	564894.843	564894.843		ug/L
Sb	121	18601.650	0.033	7.670726	ug/L
Sb	123	13887.859	0.025	7.580679	ug/L

Repeat 2

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	566927.518	566927.518		ug/L
Sb	121	18537.495	0.033	7.618729	ug/L
Sb	123	13889.153	0.024	7.554542	ug/L

Repeat 3

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	565573.463	565573.463		ug/L
Sb	121	18414.198	0.032	7.584101	ug/L
Sb	123	13895.478	0.025	7.630797	ug/L

Sample Information

Sample ID: 1212366-07
Autosampler Position: 29
Sample Date/Time: Monday, December 31, 2012 09:38:30
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L31001.sam
Method File: c:\elandata\Method\Trimatrix_DoD4.2_Aqueous_6020a_114.mth
Dataset File: C:\Elandata\DataSet\2L31001\1212366-07.031
Tuning File: C:\Elandata\Tuning\31DEC2012_6020A_A.tun
Optimization File: C:\Elandata\Optimize\31DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	In	115	560345.590	560345.590				ug/L
	Sb	121	28439.428	0.051	11.833508	0.148	1.251	ug/L
	Sb	123	21292.724	0.038	11.728550	0.165	1.408	ug/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	In	114.904	97.179
	Sb	120.904	
	Sb	122.904	

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	561570.037	561570.037		ug/L
Sb	121	28224.969	0.050	11.718004	ug/L
Sb	123	20993.437	0.037	11.537977	ug/L

Repeat 2

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	562472.901	562472.901		ug/L
Sb	121	28424.705	0.050	11.782088	ug/L
Sb	123	21356.756	0.038	11.830156	ug/L

Repeat 3

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	556993.830	556993.830		ug/L
Sb	121	28868.810	0.051	12.000433	ug/L
Sb	123	21325.961	0.038	11.817516	ug/L

Sample Information

Sample ID: 1212366-08
Autosampler Position: 30
Sample Date/Time: Monday, December 31, 2012 09:41:04
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L31001.sam
Method File: c:\elandata\Method\Trimatrix_DoD4.2_Aqueous_6020a_114.mth
Dataset File: C:\Elandata\DataSet\2L31001\1212366-08.032
Tuning File: C:\Elandata\Tuning\31DEC2012_6020A_A.tun
Optimization File: C:\Elandata\Optimize\31DEC2012_6020A.dac

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	In	115	557319.736	557319.736				ug/L
	Sb	121	39129.326	0.070	16.377023	0.107	0.656	ug/L
	Sb	123	29663.034	0.053	16.435667	0.062	0.376	ug/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	In	114.904	96.654
	Sb	120.904	
	Sb	122.904	

QC Out Of Limits

Measurement Type	Analyte	Mass	Out of Limits Message

Replicates

Repeat 1

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	554935.874	554935.874		ug/L
Sb	121	39100.513	0.070	16.434863	ug/L
Sb	123	29521.449	0.053	16.427273	ug/L

Repeat 2

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	555442.980	555442.980		ug/L
Sb	121	39166.784	0.070	16.443077	ug/L
Sb	123	29681.437	0.053	16.501302	ug/L

Repeat 3

Analyte	Mass	Meas. Intensity	Net Intensity	Concentration	Report Unit
In	115	561580.545	561580.545		ug/L
Sb	121	39131.671	0.070	16.253130	ug/L
Sb	123	29786.215	0.053	16.378426	ug/L

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Sequence: 2L28019

SDG: NTC12

Project: NS Great Lakes CTO F27A

Calibration: 2L28018

Instrument: 201

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	2L28019-CAL1	2128019-002	12/28/12 10:36
Cal Standard	2L28019-CAL2	2128019-003	12/28/12 10:41
Cal Standard	2L28019-CAL3	2128019-004	12/28/12 10:45
Cal Standard	2L28019-CAL4	2128019-005	12/28/12 10:50
Cal Standard	2L28019-CAL5	2128019-006	12/28/12 10:54
Cal Standard	2L28019-CAL6	2128019-007	12/28/12 10:59
Cal Standard	2L28019-CAL7	2128019-008	12/28/12 11:03
Secondary Cal Check	2L28019-SCV1	2128019-009	12/28/12 11:08
Calibration Check	2L28019-CCV1	2128019-009	12/28/12 11:08
Calibration Blank	2L28019-CCB1	2128019-011	12/28/12 11:18
Interference Check A	2L28019-IFA1	2128019-013	12/28/12 11:29
Interference Check B	2L28019-IFB1	2128019-014	12/28/12 11:34
Calibration Check	2L28019-CCV2	2128019-015	12/28/12 11:38
Calibration Blank	2L28019-CCB2	2128019-017	12/28/12 11:48
Blank	1215835-BLK1	2128019-018	12/28/12 11:53
LCS	1215835-BS1	2128019-019	12/28/12 11:57
NTC12-SB31-0305	1212366-01	2128019-020	12/28/12 12:01
NTC12-SB31-0305	1212366-01	2128019-020	12/28/12 12:01
NTC12-SB31-0305	1212366-01	2128019-020	12/28/12 12:01
NTC12-SB31-0305	1212366-01	2128019-020	12/28/12 12:01
NTC12-SB31-0305	1212366-01	2128019-020	12/28/12 12:01
NTC12-SB31-0305	1212366-01	2128019-020	12/28/12 12:01
NTC12-SB31-0305	1212366-01	2128019-020	12/28/12 12:01
NTC12-SB31-0305	1212366-01	2128019-020	12/28/12 12:01
NTC12-SB31-0305	1212366-01	2128019-020	12/28/12 12:01
NTC12-SB31-0507	1212366-02	2128019-021	12/28/12 12:06
NTC12-SB31-0507	1212366-02	2128019-021	12/28/12 12:06
NTC12-SB31-0507	1212366-02	2128019-021	12/28/12 12:06
NTC12-SB31-0507	1212366-02	2128019-021	12/28/12 12:06
NTC12-SB31-0507	1212366-02	2128019-021	12/28/12 12:06
NTC12-SB31-0507	1212366-02	2128019-021	12/28/12 12:06

ANALYSIS BATCH (SEQUENCE) SUMMARY
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 2L28019

SDG: NTC12
Project: NS Great Lakes CTO F27A
Calibration: 2L28018
Instrument: 201

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
NTC12-SB31-0507	1212366-02	2128019-021	12/28/12 12:06
NTC12-SB31-0507	1212366-02	2128019-021	12/28/12 12:06
NTC12-SB31-0507	1212366-02	2128019-021	12/28/12 12:06
NTC12-SB31-0507	1212366-02	2128019-021	12/28/12 12:06
NTC12-SB31-0507	1212366-02	2128019-021	12/28/12 12:06
NTC12-SB31-0507	1212366-02	2128019-021	12/28/12 12:06
NTC12-SB32-0204	1212366-03	2128019-022	12/28/12 12:10
NTC12-SB32-0204	1212366-03	2128019-022	12/28/12 12:10
NTC12-SB32-0204	1212366-03	2128019-022	12/28/12 12:10
NTC12-SB32-0204	1212366-03	2128019-022	12/28/12 12:10
NTC12-SB32-0204	1212366-03	2128019-022	12/28/12 12:10
NTC12-SB32-0204	1212366-03	2128019-022	12/28/12 12:10
NTC12-SB32-0204	1212366-03	2128019-022	12/28/12 12:10
NTC12-SB32-0204	1212366-03	2128019-022	12/28/12 12:10
NTC12-SB32-0204	1212366-03	2128019-022	12/28/12 12:10
NTC12-SB32-0204	1212366-03	2128019-022	12/28/12 12:10
NTC12-SB32-0406	1212366-04	2128019-023	12/28/12 12:15
NTC12-SB32-0406	1212366-04	2128019-023	12/28/12 12:15
NTC12-SB32-0406	1212366-04	2128019-023	12/28/12 12:15
NTC12-SB32-0406	1212366-04	2128019-023	12/28/12 12:15
NTC12-SB32-0406	1212366-04	2128019-023	12/28/12 12:15
NTC12-SB32-0406	1212366-04	2128019-023	12/28/12 12:15
NTC12-SB32-0406	1212366-04	2128019-023	12/28/12 12:15
NTC12-SB32-0406	1212366-04	2128019-023	12/28/12 12:15
NTC12-SB32-0406	1212366-04	2128019-023	12/28/12 12:15
NTC12-SB32-0406	1212366-04	2128019-023	12/28/12 12:15
NTC12-SB32-0406	1212366-04	2128019-023	12/28/12 12:15
NTC12-SB32-0406	1212366-04	2128019-023	12/28/12 12:15
NTC12-SB32-0406	1215835-MS1	2128019-024	12/28/12 12:19
NTC12-SB32-0406	1215835-MSD1	2128019-025	12/28/12 12:24
NTC12-SB32-0406	2L28019-SRD1	2128019-026	12/28/12 12:28

001 US

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Sequence: 2L28019

SDG: NTC12

Project: NS Great Lakes CTO F27A

Calibration: 2L28018

Instrument: 201

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
NTC12-SB32-0406	1215835-PS1	2128019-027	12/28/12 12:32
Calibration Check	2L28019-CCV3	2128019-028	12/28/12 12:37
Calibration Blank	2L28019-CCB3	2128019-029	12/28/12 12:43
NTC12-SB34-0204	1212366-05	2128019-030	12/28/12 12:47
NTC12-SB34-0204	1212366-05	2128019-030	12/28/12 12:47
NTC12-SB34-0204	1212366-05	2128019-030	12/28/12 12:47
NTC12-SB34-0204	1212366-05	2128019-030	12/28/12 12:47
NTC12-SB34-0204	1212366-05	2128019-030	12/28/12 12:47
NTC12-SB34-0204	1212366-05	2128019-030	12/28/12 12:47
NTC12-SB34-0204	1212366-05	2128019-030	12/28/12 12:47
NTC12-SB34-0204	1212366-05	2128019-030	12/28/12 12:47
NTC12-SB34-0204	1212366-05	2128019-030	12/28/12 12:47
NTC12-SB34-0204	1212366-05	2128019-030	12/28/12 12:47
NTC12-SB34-0204	1212366-05	2128019-030	12/28/12 12:47
NTC12-SB34-0406	1212366-06	2128019-031	12/28/12 12:52
NTC12-SB34-0406	1212366-06	2128019-031	12/28/12 12:52
NTC12-SB34-0406	1212366-06	2128019-031	12/28/12 12:52
NTC12-SB34-0406	1212366-06	2128019-031	12/28/12 12:52
NTC12-SB34-0406	1212366-06	2128019-031	12/28/12 12:52
NTC12-SB34-0406	1212366-06	2128019-031	12/28/12 12:52
NTC12-SB34-0406	1212366-06	2128019-031	12/28/12 12:52
NTC12-SB34-0406	1212366-06	2128019-031	12/28/12 12:52
NTC12-SB34-0406	1212366-06	2128019-031	12/28/12 12:52
NTC12-SB33-0204	1212366-07	2128019-032	12/28/12 12:56
NTC12-SB33-0204	1212366-07	2128019-032	12/28/12 12:56
NTC12-SB33-0204	1212366-07	2128019-032	12/28/12 12:56
NTC12-SB33-0204	1212366-07	2128019-032	12/28/12 12:56
NTC12-SB33-0204	1212366-07	2128019-032	12/28/12 12:56
NTC12-SB33-0204	1212366-07	2128019-032	12/28/12 12:56
NTC12-SB33-0204	1212366-07	2128019-032	12/28/12 12:56

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 2L28019

SDG: NTC12
Project: NS Great Lakes CTO F27A
Calibration: 2L28018
Instrument: 201

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
NTC12-SB33-0204	1212366-07	2128019-032	12/28/12 12:56
NTC12-SB33-0204	1212366-07	2128019-032	12/28/12 12:56
NTC12-SB33-0204	1212366-07	2128019-032	12/28/12 12:56
NTC12-SB33-0204	1212366-07	2128019-032	12/28/12 12:56
NTC12-SB33-0406	1212366-08	2128019-033	12/28/12 13:00
NTC12-SB33-0406	1212366-08	2128019-033	12/28/12 13:00
NTC12-SB33-0406	1212366-08	2128019-033	12/28/12 13:00
NTC12-SB33-0406	1212366-08	2128019-033	12/28/12 13:00
NTC12-SB33-0406	1212366-08	2128019-033	12/28/12 13:00
NTC12-SB33-0406	1212366-08	2128019-033	12/28/12 13:00
NTC12-SB33-0406	1212366-08	2128019-033	12/28/12 13:00
Calibration Check	2L28019-CCV4	2128019-034	12/28/12 13:05
Calibration Blank	2L28019-CCB4	2128019-035	12/28/12 13:11
NTC12-SB31-0305	1212366-01	2128019-036	12/28/12 13:28
NTC12-SB31-0305	1212366-01	2128019-036	12/28/12 13:28
NTC12-SB32-0406	1215835-MS1	2128019-037	12/28/12 13:31
NTC12-SB32-0406	1215835-MSD1	2128019-038	12/28/12 13:35
NTC12-SB34-0406	1212366-06	2128019-039	12/28/12 13:38
NTC12-SB34-0406	1212366-06	2128019-039	12/28/12 13:38
NTC12-SB33-0406	1212366-08	2128019-040	12/28/12 13:41
NTC12-SB33-0406	1212366-08	2128019-040	12/28/12 13:41
NTC12-SB33-0406	1212366-08	2128019-040	12/28/12 13:41
NTC12-SB33-0406	1212366-08	2128019-040	12/28/12 13:41
Calibration Check	2L28019-CCV5	2128019-041	12/28/12 13:45
Calibration Blank	2L28019-CCB5	2128019-042	12/28/12 13:50

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 2L28050

SDG: NTC12
Project: NS Great Lakes CTO F27A
Calibration: 2L28023
Instrument: 201

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	2L28050-CAL1	2128050-013	12/28/12 15:01
Cal Standard	2L28050-CAL2	2128050-014	12/28/12 15:05
Cal Standard	2L28050-CAL3	2128050-015	12/28/12 15:08
Cal Standard	2L28050-CAL4	2128050-016	12/28/12 15:11
Cal Standard	2L28050-CAL5	2128050-017	12/28/12 15:15
Cal Standard	2L28050-CAL6	2128050-018	12/28/12 15:18
Cal Standard	2L28050-CAL7	2128050-019	12/28/12 15:22
Secondary Cal Check	2L28050-SCV1	2128050-020	12/28/12 15:25
Calibration Check	2L28050-CCV1	2128050-020	12/28/12 15:25
Calibration Blank	2L28050-CCB1	2128050-021	12/28/12 15:29
Interference Check B	2L28050-IFB1	2128050-023	12/28/12 15:36
Interference Check A	2L28050-IFA1	2128050-024	12/28/12 15:41
Calibration Check	2L28050-CCV2	2128050-025	12/28/12 15:45
Calibration Blank	2L28050-CCB2	2128050-026	12/28/12 15:50
Blank	1215835-BLK2	2128050-027	12/28/12 15:53
LCS	1215835-BS2	2128050-028	12/28/12 15:56
NTC12-SB31-0305	1212366-01	2128050-029	12/28/12 16:00
NTC12-SB31-0305	1212366-01	2128050-029	12/28/12 16:00
NTC12-SB31-0305	1212366-01	2128050-029	12/28/12 16:00
NTC12-SB31-0507	1212366-02	2128050-030	12/28/12 16:03
NTC12-SB31-0507	1212366-02	2128050-030	12/28/12 16:03
NTC12-SB31-0507	1212366-02	2128050-030	12/28/12 16:03
NTC12-SB32-0204	1212366-03	2128050-031	12/28/12 16:07
NTC12-SB32-0204	1212366-03	2128050-031	12/28/12 16:07
NTC12-SB32-0204	1212366-03	2128050-031	12/28/12 16:07
NTC12-SB32-0204	1212366-03	2128050-031	12/28/12 16:07
NTC12-SB32-0406	1212366-04	2128050-032	12/28/12 16:10
NTC12-SB32-0406	1212366-04	2128050-032	12/28/12 16:10
NTC12-SB32-0406	1212366-04	2128050-032	12/28/12 16:10
NTC12-SB32-0406	1215835-MS2	2128050-033	12/28/12 16:13
NTC12-SB32-0406	1215835-MSD2	2128050-034	12/28/12 16:17
NTC12-SB32-0406	2L28050-SRD1	2128050-035	12/28/12 16:20

ANALYSIS BATCH (SEQUENCE) SUMMARY
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 2L28050

SDG: NTC12
Project: NS Great Lakes CTO F27A
Calibration: 2L28023
Instrument: 201

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
NTC12-SB32-0406	1215835-PS2	2128050-036	12/28/12 16:23
Calibration Check	2L28050-CCV3	2128050-037	12/28/12 16:26
Calibration Blank	2L28050-CCB3	2128050-038	12/28/12 16:31
NTC12-SB34-0204	1212366-05	2128050-039	12/28/12 16:34
NTC12-SB34-0204	1212366-05	2128050-039	12/28/12 16:34
NTC12-SB34-0204	1212366-05	2128050-039	12/28/12 16:34
NTC12-SB34-0204	1212366-05	2128050-039	12/28/12 16:34
NTC12-SB34-0406	1212366-06	2128050-040	12/28/12 16:37
NTC12-SB34-0406	1212366-06	2128050-040	12/28/12 16:37
NTC12-SB34-0406	1212366-06	2128050-040	12/28/12 16:37
NTC12-SB33-0204	1212366-07	2128050-041	12/28/12 16:41
NTC12-SB33-0204	1212366-07	2128050-041	12/28/12 16:41
NTC12-SB33-0204	1212366-07	2128050-041	12/28/12 16:41
NTC12-SB33-0406	1212366-08	2128050-042	12/28/12 16:44
NTC12-SB33-0406	1212366-08	2128050-042	12/28/12 16:44
NTC12-SB33-0406	1212366-08	2128050-042	12/28/12 16:44
NTC12-SB33-0406	1212366-08	2128050-042	12/28/12 16:44
Calibration Check	2L28050-CCV4	2128050-043	12/28/12 16:47
Calibration Blank	2L28050-CCB4	2128050-044	12/28/12 16:51

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Sequence: 2L31001

SDG: NTC12

Project: NS Great Lakes CTO F27A

Calibration: 2L31002

Instrument: 114

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	2L31001-CAL1	2131001-001	12/31/12 07:44
Cal Standard	2L31001-CAL2	2131001-002	12/31/12 07:47
Cal Standard	2L31001-CAL3	2131001-003	12/31/12 07:50
Cal Standard	2L31001-CAL4	2131001-004	12/31/12 07:53
Cal Standard	2L31001-CAL5	2131001-005	12/31/12 07:56
Cal Standard	2L31001-CAL6	2131001-006	12/31/12 07:59
Secondary Cal Check	2L31001-SCV1	2131001-007	12/31/12 08:02
Calibration Check	2L31001-CCV1	2131001-007	12/31/12 08:02
Calibration Blank	2L31001-CCB1	2131001-009	12/31/12 08:11
Interference Check A	2L31001-IFA1	2131001-010	12/31/12 08:14
Interference Check B	2L31001-IFB1	2131001-011	12/31/12 08:19
Calibration Check	2L31001-CCV2	2131001-012	12/31/12 08:22
Calibration Blank	2L31001-CCB2	2131001-014	12/31/12 08:34
Blank	1215835-BLK3	2131001-015	12/31/12 08:39
LCS	1215835-BS3	2131001-016	12/31/12 08:42
NTC12-SB31-0305	1212366-01	2131001-017	12/31/12 08:48
NTC12-SB31-0507	1212366-02	2131001-018	12/31/12 08:51
NTC12-SB32-0204	1212366-03	2131001-019	12/31/12 08:53
NTC12-SB32-0406	1212366-04	2131001-020	12/31/12 08:56
NTC12-SB32-0406	1215835-MS3	2131001-021	12/31/12 08:59
NTC12-SB32-0406	1215835-MSD3	2131001-022	12/31/12 09:01
NTC12-SB32-0406	2L31001-SRD1	2131001-023	12/31/12 09:04
Calibration Check	2L31001-CCV3	2131001-025	12/31/12 09:09
Calibration Blank	2L31001-CCB3	2131001-026	12/31/12 09:16
NTC12-SB32-0406	1215835-PS3	2131001-028	12/31/12 09:26
NTC12-SB34-0204	1212366-05	2131001-029	12/31/12 09:33
NTC12-SB34-0406	1212366-06	2131001-030	12/31/12 09:35
NTC12-SB33-0204	1212366-07	2131001-031	12/31/12 09:38
NTC12-SB33-0406	1212366-08	2131001-032	12/31/12 09:41
Calibration Check	2L31001-CCV4	2131001-033	12/31/12 09:43
Calibration Blank	2L31001-CCB4	2131001-034	12/31/12 09:50

: 08153

SAMPLE ID SUMMARY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

SDG: NTC12

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A

Client Sample Id:	Lab Sample Id:
NTC12-SB31-0305	1212366-01
NTC12-SB31-0507	1212366-02
NTC12-SB32-0204	1212366-03
NTC12-SB32-0406	1212366-04
NTC12-SB34-0204	1212366-05
NTC12-SB34-0406	1212366-06
NTC12-SB33-0204	1212366-07
NTC12-SB33-0406	1212366-08

HOLDING TIME SUMMARY
USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

SDG: NTC12

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A

Analyte: Mercury

Sample Name	Date Collected	Date Received	Date Leached	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NTC12-SB31-0305	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/27/12	1	28	
NTC12-SB31-0507	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/27/12	1	28	
NTC12-SB32-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/27/12	1	28	
NTC12-SB32-0406	12/17/12	12/18/12	12/26/12	01/02/13	7	NA	01/03/13	8	28	
NTC12-SB34-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/27/12	1	28	
NTC12-SB34-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/27/12	1	28	
NTC12-SB33-0204	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/27/12	1	28	
NTC12-SB33-0406	12/17/12	12/18/12	12/26/12	12/27/12	1	NA	12/27/12	1	28	

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 2L27020
Control Limt: +/- 10.00%

SDG: NTC12
Project: NS Great Lakes CTO F27A
Calibration: 2L27010
Instrument ID: 216

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
2L27020-CCV1	Mercury	2.00	2.05	102	ug/L	12/27/12 10:44
2L27020-CCV5	Mercury	2.00	1.96	98	ug/L	12/27/12 15:12
2L27020-CCV6	Mercury	2.00	1.96	98	ug/L	12/27/12 16:12
2L27020-CCV7	Mercury	2.00	1.95	98	ug/L	12/27/12 16:38

* Values outside of QC limits

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.
SDG: NTC12
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A
Sequence: 3A03019
Calibration: 3A07001
Control Limt: +/- 10.00%
Instrument ID: 216

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
3A03019-CCV1	Mercury	2.00	2.05	102	ug/L	01/03/13 07:37
3A03019-CCV2	Mercury	2.00	1.98	99	ug/L	01/03/13 07:56
3A03019-CCV3	Mercury	2.00	2.00	100	ug/L	01/03/13 08:55

* Values outside of QC limits

: 00441

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Laboratory ID: 2L27020-SCV1

Sequence: 2L27020

SDG: NTC12

Project: NS Great Lakes CTO F27A

Instrument: 216

Calibration: 2L27010

Analyte	Expected	Found	% R	QC Limit	Units
Mercury	3.00	2.92	97	90-110	ug/L

* Values outside of QC limits

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Laboratory ID: 3A03019-SCV1

Sequence: 3A03019

SDG: NTC12

Project: NS Great Lakes CTO F27A

Instrument: 216

Calibration: 3A07001

Analyte	Expected	Found	% R	QC Limit	Units
Mercury	3.00	2.98	99	90-110	ug/L

* Values outside of QC limits

BLANKS
USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 2L27020

SDG: NTC12
Project: NS Great Lakes CTO F27A
Calibration: 2L27010
Instrument ID: 216

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
2L27020-CCB1	Mercury	0.0036	ug/L	0.055	0.10	0.20	U	12/27/12 10:54
2L27020-CCB5	Mercury	-0.019	ug/L	0.055	0.10	0.20	U	12/27/12 15:17
2L27020-CCB6	Mercury	0.019	ug/L	0.055	0.10	0.20	U	12/27/12 16:17
2L27020-CCB7	Mercury	0.0013	ug/L	0.055	0.10	0.20	U	12/27/12 16:43

* Values outside of QC limits

BLANKS
USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 3A03019

SDG: NTC12
Project: NS Great Lakes CTO F27A
Calibration: 3A07001
Instrument ID: 216

Lab Sample ID	Analyte	Found	Unit	DL	LOD	LOQ	C	Analyzed
3A03019-CCB1	Mercury	-0.060	ug/L	0.055	0.10	0.20	J	01/03/13 07:47
3A03019-CCB2	Mercury	-0.041	ug/L	0.055	0.10	0.20	U	01/03/13 08:01
3A03019-CCB3	Mercury	-0.051	ug/L	0.055	0.10	0.20	U	01/03/13 09:00

* Values outside of QC limits

: 60445

QC BATCH SUMMARY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

SDG: NTC12

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A

QC Batch: 1215801 QC Batch Matrix: Soil

Preparation: 7470A SPLP Digestion

Sample Name	Lab Sample ID	Date Prepared	Observations
NTC12-SB31-0305	1212366-01	12/27/12 07:00	
NTC12-SB31-0507	1212366-02	12/27/12 07:00	
NTC12-SB32-0204	1212366-03	12/27/12 07:00	
NTC12-SB34-0204	1212366-05	12/27/12 07:00	
NTC12-SB34-0406	1212366-06	12/27/12 07:00	
NTC12-SB33-0204	1212366-07	12/27/12 07:00	
NTC12-SB33-0406	1212366-08	12/27/12 07:00	
Blank	1215801-BLK1	12/27/12 07:00	
LCS	1215801-BS1	12/27/12 07:00	

QC BATCH SUMMARY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

SDG: NTC12

Client: TETRA TECH NUS - Pittsburgh

Project: NS Great Lakes CTO F27A

QC Batch: 1215867 QC Batch Matrix: Soil

Preparation: 7470A SPLP Digestion

Sample Name	Lab Sample ID	Date Prepared	Observations
NTC12-SB32-0406	1212366-04	01/02/13 08:00	
Blank	1215867-BLK1	01/02/13 08:00	
LCS	1215867-BS1	01/02/13 08:00	
NTC12-SB32-0406	1215867-MS1	01/02/13 08:00	
NTC12-SB32-0406	1215867-MSD1	01/02/13 08:00	

METHOD BLANK DATA SHEET
USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.
SDG: NTC12
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A
Matrix: Soil
Laboratory ID: 1215801-BLK1
File ID: d27wt-a2-185
Prepared: 12/27/12 07:00
Analyzed: 12/27/12 15:22
Preparation: 7470A SPLP Digestion
Initial/Final: 30 mL / 30 mL
QC Batch: 1215801
Sequence: 2L27020
Calibration: 2L27010
Instrument: 216

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7439-97-6	Mercury, SPLP	0.10	ug/L	0.055	0.10	0.20	U

METHOD BLANK DATA SHEET
USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.
SDG: NTC12
Client: TETRA TECH NUS - Pittsburgh
Project: NS Great Lakes CTO F27A
Matrix: Soil
Laboratory ID: 1215867-BLK1
File ID: j03wt-a2-064
Prepared: 01/02/13 08:00
Analyzed: 01/03/13 08:25
Preparation: 7470A SPLP Digestion
Initial/Final: 30 mL / 30 mL
QC Batch: 1215867
Sequence: 3A03019
Calibration: 3A07001
Instrument: 216

CAS No.	Analyte	Concentration	Unit	DL	LOD	LOQ	Q
7439-97-6	Mercury, SPLP	0.10	ug/L	0.055	0.10	0.20	U

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-7470A

NTC12-SB32-0406

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

QC Batch: 1215867

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 1215867-MS1

Preparation: 7470A SPLP Digestion

Initial/Final: 30 mL / 30 mL

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Mercury, SPLP	2.00	ND	1.95	98	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-7470A

NTC12-SB32-0406

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

QC Batch: 1215867

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 1215867-MSD1

Preparation: 7470A SPLP Digestion

Initial/Final: 30 mL / 30 mL

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Mercury, SPLP	2.00	1.92	96	1	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00051

LCS / LCS DUPLICATE RECOVERY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

QC Batch: 1215801

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 1215801-BS1

Preparation: 7470A SPLP Digestion

Initial/Final: 30 mL / 30 mL

Sequence: 2L27020

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Mercury, SPLP	2.00	2.23	111	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Matrix: Soil

QC Batch: 1215867

SDG: NTC12

Project: NS Great Lakes CTO F27A

Laboratory ID: 1215867-BS1

Preparation: 7470A SPLP Digestion

Initial/Final: 30 mL / 30 mL

Sequence: 3A03019

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Mercury, SPLP	2.00	2.11	106	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

TriMatrix Laboratories, Inc.

PREPARATION BATCH **1215801** Page 1 of 1

Printed: 1/14/2013 12:14:49PM

Metals, Soil, 7470A SPLP Digestion

Batch comments:

mas 12/27/12 7:00-9:00am
inst#218@91.9c- 93.6C #255
hotblock vessel lot#1207143

Lab Number	Container	Prepared	By	Initial (mL)	Final (mL)	Client Source ID	Client Spike ID	Client uL Spike	Comments
1212366-01	A 01	Dec-27-12 07:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
Hg SPLP 7470A									
1212366-02	A 01	Dec-27-12 07:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
Hg SPLP 7470A									
1212366-03	A 01	Dec-27-12 07:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
Hg SPLP 7470A									
1212366-05	A 01	Dec-27-12 07:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
Hg SPLP 7470A									
1212366-06	A 01	Dec-27-12 07:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
Hg SPLP 7470A									
1212366-07	A 01	Dec-27-12 07:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
Hg SPLP 7470A									
1212366-08	A 01	Dec-27-12 07:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
Hg SPLP 7470A									
1215801-BLK1		Dec-27-12 07:00	MAS	30	30				
1215801-BS1		Dec-27-12 07:00	MAS	30	30		2040001	60	
1215801-MS1		Dec-27-12 07:00	MAS	30	30	1212366-04	2040001	60	
1215801-MSD1		Dec-27-12 07:00	MAS	30	30	1212366-04	2040001	60	

Comments:

Analyst Initials:

bch_TM_byAnalysis.rpt

TriMatrix Laboratories, Inc.

PREPARATION BATCH **1215867** Page 1 of 1

Printed: 1/14/2013 12:16:22PM

Metals, Soil, 7470A SPLP Digestion

Batch comments:

MAS 01/02/13 8:00-10:00AM
INST#218@92.9-93.6C#255
HOTBLOCK VESSEL LOT#1207143

Lab Number	Container	Prepared	By	Initial (mL)	Final (mL)	Client Source ID	Client Spike ID	Client uL Spike	Comments
1212366-04	B 01	Jan-02-13 08:00	MAS	30	30	TETRA TECH NUS - Pittsburgh			
Hg SPLP 7470A									
1215867-BLK1		Jan-02-13 08:00	MAS	30	30				
1215867-BS1		Jan-02-13 08:00	MAS	30	30		2040001	60	
1215867-MS1		Jan-02-13 08:00	MAS	30	30	1212366-04	2040001	60	
1215867-MSD1		Jan-02-13 08:00	MAS	30	30	1212366-04	2040001	60	

Comments:

Analyst Initials:

bch_TM_byAnalysis.rpt

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.
Client: TETRA TECH NUS - Pittsburgh
Sequence: 2L27020

SDG: NTC12
Project: NS Great Lakes CTO F27A
Calibration: 2L27010
Instrument: 216

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	2L27020-CAL1	d27wt-a2-002	12/27/12 10:07
Cal Standard	2L27020-CAL2	d27wt-a2-005	12/27/12 10:11
Cal Standard	2L27020-CAL3	d27wt-a2-008	12/27/12 10:16
Cal Standard	2L27020-CAL4	d27wt-a2-011	12/27/12 10:21
Cal Standard	2L27020-CAL6	d27wt-a2-017	12/27/12 10:31
Cal Standard	2L27020-CAL5	d27wt-a2-020	12/27/12 10:39
Calibration Check	2L27020-CCV1	d27wt-a2-023	12/27/12 10:44
Secondary Cal Check	2L27020-SCV1	d27wt-a2-026	12/27/12 10:49
Calibration Blank	2L27020-CCB1	d27wt-a2-029	12/27/12 10:54
Calibration Check	2L27020-CCV5	d27wt-a2-179	12/27/12 15:12
Calibration Blank	2L27020-CCB5	d27wt-a2-182	12/27/12 15:17
Blank	1215801-BLK1	d27wt-a2-185	12/27/12 15:22
LCS	1215801-BS1	d27wt-a2-188	12/27/12 15:27
NTC12-SB31-0305	1212366-01	d27wt-a2-191	12/27/12 15:32
NTC12-SB31-0507	1212366-02	d27wt-a2-194	12/27/12 15:37
NTC12-SB32-0204	1212366-03	d27wt-a2-197	12/27/12 15:42
NTC12-SB34-0204	1212366-05	d27wt-a2-209	12/27/12 16:02
NTC12-SB34-0406	1212366-06	d27wt-a2-212	12/27/12 16:07
Calibration Check	2L27020-CCV6	d27wt-a2-215	12/27/12 16:12
Calibration Blank	2L27020-CCB6	d27wt-a2-218	12/27/12 16:17
NTC12-SB33-0204	1212366-07	d27wt-a2-221	12/27/12 16:23
NTC12-SB33-0406	1212366-08	d27wt-a2-224	12/27/12 16:28
Calibration Check	2L27020-CCV7	d27wt-a2-230	12/27/12 16:38
Calibration Blank	2L27020-CCB7	d27wt-a2-233	12/27/12 16:43

: 00438

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

Client: TETRA TECH NUS - Pittsburgh

Sequence: 3A03019

SDG: NTC12

Project: NS Great Lakes CTO F27A

Calibration: 3A07001

Instrument: 216

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	3A03019-CAL1	j03wt-a2-016	01/03/13 07:07
Cal Standard	3A03019-CAL2	j03wt-a2-019	01/03/13 07:12
Cal Standard	3A03019-CAL3	j03wt-a2-022	01/03/13 07:17
Cal Standard	3A03019-CAL4	j03wt-a2-025	01/03/13 07:22
Cal Standard	3A03019-CAL5	j03wt-a2-028	01/03/13 07:26
Cal Standard	3A03019-CAL6	j03wt-a2-031	01/03/13 07:31
Calibration Check	3A03019-CCV1	j03wt-a2-034	01/03/13 07:37
Secondary Cal Check	3A03019-SCV1	j03wt-a2-037	01/03/13 07:42
Calibration Blank	3A03019-CCB1	j03wt-a2-040	01/03/13 07:47
Calibration Check	3A03019-CCV2	j03wt-a2-046	01/03/13 07:56
Calibration Blank	3A03019-CCB2	j03wt-a2-049	01/03/13 08:01
Blank	1215867-BLK1	j03wt-a2-064	01/03/13 08:25
LCS	1215867-BS1	j03wt-a2-067	01/03/13 08:30
NTC12-SB32-0406	1212366-04	j03wt-a2-070	01/03/13 08:35
NTC12-SB32-0406	1215867-MS1	j03wt-a2-073	01/03/13 08:40
NTC12-SB32-0406	1215867-MSD1	j03wt-a2-076	01/03/13 08:45
Calibration Check	3A03019-CCV3	j03wt-a2-082	01/03/13 08:55
Calibration Blank	3A03019-CCB3	j03wt-a2-085	01/03/13 09:00

Sample Information

Sample ID: 1212366-01
Autosampler Position: 19
Sample Date/Time: Friday, December 28, 2012 12:01:58
Initial Sample Quantity (mg):
Sample Prep Volume (mL):
Aliquot Volume (mL):
Diluted To Volume (mL):
Number of Replicates: 3
Sample File: C:\Elandata\Sample\2L28019.sam
Method File: c:\elandata\Method\DOD_AQUEOUS_6020A_201_4.2.mth
Dataset File: C:\Elandata\DataSet\2L28019\2L28019\1212366-01.019
Tuning File: C:\Elandata\Tuning\28DEC2012_6020A_A.tun
Optimization File: C:\Elandata\Optimize\28DEC2012_6020A.dac

Sample SB31-0305 Arsenic rep result 5.0 ug/L

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Report Unit
>	Li	6	140791.426	140791.426				ug/L
	Be	9	33.000	0.000	0.344640	0.058	16.886	ug/L
	V	51	28702.383	0.077	8.750749	0.121	1.382	ug/L
	Cr	52	37304.208	0.089	12.259595	0.161	1.312	ug/L
	Cr	53	4690.921	0.011	12.508760	0.284	2.272	ug/L
	Mn	55	586926.183	1.747	X 156.685673	1.578	1.007	ug/L
	Co	59	6858.694	0.020	2.523621	0.034	1.354	ug/L
	Ni	60	11186.534	0.032	18.854428	0.361	1.913	ug/L
	Ni	62	1736.895	0.005	18.768412	0.285	1.521	ug/L
	Cu	63	46368.897	0.136	36.225606	0.704	1.943	ug/L
	Cu	65	22123.442	0.065	35.908949	0.547	1.524	ug/L
	Zn	66	41689.087	0.123	X 103.089273	0.996	0.966	ug/L
	Zn	68	78344.491	0.082	97.513399	1.442	1.479	ug/L
>	Ge	72	335390.363	335390.363				ug/L
	As	75	4536.831	0.008	5.027336	0.270	5.374	ug/L
	Se	77	154.337	0.000	1.584858	0.247	15.612	ug/L
	Se	82	79.761	0.000	2.071317	0.795	38.360	ug/L
>	Rh	103	175256.823	175256.823				ug/L
	Ag	107	7748.612	0.044	3.466206	0.032	0.935	ug/L
	Cd	111	615.706	0.003	X 1.167166	0.118	10.086	ug/L
	Cd	114	938.762	0.005	0.747369	0.017	2.249	ug/L
>	In	115	209176.023	209176.023				ug/L
	Sb	121	9757.506	0.046	4.234309	0.588	13.875	ug/L
	Sb	123	7099.463	0.034	3.965528	0.349	8.811	ug/L
	Ba	135	22453.465	0.126	40.067373	0.446	1.114	ug/L
	Ba	137	38470.719	0.217	39.750441	0.286	0.719	ug/L
>	Tb	159	177379.976	177379.976				ug/L
	Tl	203	477.354	0.002	0.224528	0.019	8.468	ug/L
	Tl	205	1024.084	0.003	0.197910	0.006	3.037	ug/L
	Pb	208	293595.251	0.952	42.434070	0.296	0.697	ug/L
>	Bi	209	308077.751	308077.751				ug/L

QC Calculated Values

	Analyte	Mass	Int Std % Recovery
>	Li	6.015	113.650
	Be	9.012	
	V	50.944	
	Cr	51.941	
	Cr	52.941	
	Mn	54.938	
	Co	58.933	

APPENDIX E

ANALYTICAL RESULTS – SITE 12 RI

E-1 SURFACE SOIL ANALYTICAL RESULTS

E-2 SUBSURFACE SOIL ANALYTICAL RESULTS

E-3 SEDIMENT ANALYTICAL RESULTS AND SAMPLING MAP

E-4 GROUNDWATER ANALYTICAL RESULTS

E-1 SURFACE SOIL ANALYTICAL RESULTS

LOCATION	NTC12SB21	NTC12SB22	NTC12SB23	NTC12SB24	NTC12SB25	NTC12SB26	NTC12SB27	NTC12SB28	NTC12SB29	NTC12SB30
SAMPLE ID	NTC12-SB21-0005	NTC12-SB22-0005	NTC12-SB23-0005	NTC12-SB24-0005	NTC12-SB25-0005	NTC12-SB26-0005	NTC12-SB27-0005	NTC12-SB28-0005	NTC12-SB29-0005	NTC12-SB30-0005
SAMPLE DATE	20101220	20101220	20101220	20101220	20101220	20101220	20101220	20101220	20101220	20101220
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO
SAMPLE TYPE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SUBMATRIX	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
TOP DEPTH	0	0	0	0	0	0	0	0	0	0
BOTTOM DEPTH	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
METALS (MG/KG)										
ALUMINUM	8480	8140	1530	1410	6630	7050	10000	7850	7320	1250
ANTIMONY	0.468 UJ	0.471 UJ	0.429 UJ	0.491 UJ	0.459 UJ	0.44 J	0.458 J	0.456 UJ	1.12 J	0.446 UJ
ARSENIC	10.3 J	11.1 J	4.3 J	4.28 J	16.9 J	9.15 J	7.9 J	9.12 J	12.9 J	4.79 J
BARIUM	244 J	72.2 J	10 J	8.91 J	48.9 J	94.7 J	90.1 J	53.6 J	93.5 J	8.12 J
BERYLLIUM	0.544	1.17	0.177 J	0.158 J	0.47	0.56	5.5	0.528	0.177 J	0.147 J
CADMIUM	0.644 J	0.59 J	0.396 J	0.141 J	0.724 J	0.824 J	0.514 J	0.555 J	1.03 J	0.119 J
CALCIUM	45300	81300	142000	30200	92700	86300	49200	77200	83300	24400
CHROMIUM	13.7 J	13.7 J	4.97 J	5.19 J	13.4 J	12.7 J	23.8 J	15.3 J	17.3 J	4.07 J
COBALT	10.5	9.34	2.08	2.35	7.22	7.87	11.2	9.01	9.08	2.25
COPPER	32.5	66.4	16.9	8.77	57.1	100	271	60.4	64.2	6.55
IRON	19100 J	15700	5210	4710	14000	15900	20300	15900	14700	4760
LEAD	86 J	66.6 J	17.9 J	32.4 J	65.6 J	107 J	138 J	53.9 J	263 J	25.7 J
MAGNESIUM	23700	45900	84600	13900	54600	48700	23900	44000	47300	11100
MANGANESE	678 J	513	222	151	409	670	538	442	701	137
MERCURY	0.0861	0.192	0.0414	0.0409 J	0.164	0.598	0.182	0.131	0.316	0.0235 J
NICKEL	21.3	22.2	5.57	4.96	18.5	19.7	34.7	23.2	30.6	4.49
POTASSIUM	1350	1430	645	232 J	1310	1080	1640	1460	963	230 J
SELENIUM	0.527 J	0.694	0.268 U	0.307 U	0.322 J	0.472 J	0.584 J	0.288 J	0.791	0.279 U
SILVER	0.27 J	0.553 J	0.234 J	0.123 U	0.304 J	0.811	0.408 J	0.527 J	1.33	0.111 U
SODIUM	119 J	157 J	308 J	94.9 J	160 J	281 J	328 J	152 J	336 J	75.3 J
THALLIUM	0.234 U	0.294 U	0.322 U	0.245 U	0.23 U	0.225 U	0.24 U	0.228 U	0.167 J	0.223 U
VANADIUM	16.5	18.6	4.82	5.41	15.2	14.5	18.9	15.3	13.7	4.53
ZINC	241 J	292 J	81.9 J	47.3 J	190 J	215 J	1530 J	328 J	268 J	44.7 J
PESTICIDES (UG/KG)										
4,4'-DDD	15.2 J	42.2	5.82	3.01	195	63.8	28.8	2.92	26	5.19
4,4'-DDE	119	168	4.16	1.29	197	95.4	143	6.92	41.7	1.91
4,4'-DDT	83.5	147	8.12	0.391 U	282	66.7	160	5.44	47.4	1.28 J
ALDRIN	0.374 J	1.87	0.347 U	0.391 U	20.8	0.44 J	1.29	0.378 U	0.378 U	0.364 U
ALPHA-BHC	0.382 U	0.641 J	0.347 U	0.391 U	1.1	0.376 U	0.509 J	0.378 U	0.378 U	0.364 U
ALPHA-CHLORDANE	54.8	243	0.512 J	0.14 J	3220	1.88	4.74	0.203 J	1.74	0.628 J
BETA-BHC	0.382 U	0.702 J	0.347 U	0.391 U	6.55	0.376 U	0.399 U	0.378 U	0.378 U	0.364 U
DELTA-BHC	1.62	2.09	0.151 J	0.722 J	4.65	0.325 J	3.55	0.378 U	1.06	1.16 J
DIELDRIN	1.77	1.63	0.271 J	0.391 U	16.6	1.54	1.81	0.378 U	0.893	0.246 J
ENDOSULFAN I	1.17	2.63	0.347 U	0.391 U	36.8	0.376 U	0.399 U	0.378 U	0.378 U	0.364 U
ENDOSULFAN II	0.504 J	2.07	0.478 J	0.394 J	53.5	0.376 U	0.855	0.378 U	0.24 J	0.364 U
ENDOSULFAN SULFATE	2.59	3.7	0.347 U	0.391 U	12.1	0.691 J	0.772 J	0.378 U	0.378 U	0.364 U
ENDRIN	0.74 J	2.52	1.18	0.391 U	12.2	13.7	22.6	0.378 U	5.65	0.364 U
ENDRIN ALDEHYDE	0.894	4.32	0.347 U	0.391 U	19.5	1.24	0.769 J	0.378 U	0.66 J	0.364 U
ENDRIN KETONE	0.382 U	0.378 U	0.347 U	0.391 U	1.14	0.376 U	0.399 U	0.378 U	0.378 U	0.364 U
GAMMA-BHC (LINDANE)	0.382 U	0.268 J	0.347 U	0.391 U	0.538 J	0.376 U	0.144 J	0.378 U	0.6 J	0.364 U
GAMMA-CHLORDANE	30.6	171	0.848	0.309 J	2600	4.35	4.31	0.326 J	2.2	0.512 J
HEPTACHLOR	1.36	4.7	0.347 U	0.391 U	236	0.376 UJ	0.399 U	0.378 U	0.18 J	0.364 UJ
HEPTACHLOR EPOXIDE	5.22	10.1	0.347 U	0.391 U	64	0.122 J	4.18	0.378 U	0.288 J	1.13 J
METHOXYCHLOR	0.595 J	0.378 U	0.347 U	0.383 J	0.381 U	3.04 J	0.399 U	0.378 U	0.378 U	0.364 UJ
TOXAPHENE	24.7 U	24.4 U	22.5 U	25.3 U	24.6 U	24.4 U	25.8 U	24.4 U	24.4 U	23.5 U
POLYCYCLIC AROMATIC HYDROCARBONS (UG/KG)										
2-METHYLNAPHTHALENE	28.8	28.4	10.8	11.2	35.6	49.2	72.7	8.03	87.9	4.77 J
ACENAPHTHENE	141	22.4	5.48 J	12.3	42.2	30.3	205	4.96 J	28.5	2.96 J
ACENAPHTHYLENE	98.1	56.2	4.21 J	3.96 U	95.3	31	75.3	37.6	17.3	3.61 U
ANTHRACENE	581	209	24.7	43.1	370	109	606	31.4	80.7	8.45
BAP EQUIVALENT	2083.63	1536.163	159.342	113.8146	1476.643	771.347	2063.786	293.446	433.355	32.9795
BENZO(A)ANTHRACENE	1830	1080	90.3	86.5	832	252	1070	158	298	29.3
BENZO(A)PYRENE	1430	1040	111	76.8	988	546	1460	211	296	21.8

LOCATION	NTC12SB21	NTC12SB22	NTC12SB23	NTC12SB24	NTC12SB25	NTC12SB26	NTC12SB27	NTC12SB28	NTC12SB29	NTC12SB30
SAMPLE ID	NTC12-SB21-0005	NTC12-SB22-0005	NTC12-SB23-0005	NTC12-SB24-0005	NTC12-SB25-0005	NTC12-SB26-0005	NTC12-SB27-0005	NTC12-SB28-0005	NTC12-SB29-0005	NTC12-SB30-0005
SAMPLE DATE	20101220	20101220	20101220	20101220	20101220	20101220	20101220	20101220	20101220	20101220
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO
SAMPLE TYPE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SUBMATRIX	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
TOP DEPTH	0	0	0	0	0	0	0	0	0	0
BOTTOM DEPTH	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
BENZO(B)FLUORANTHENE	919	1490	149	98.3	927	853	2260	273	475	31.8
BENZO(G,H,I)PERYLENE	711	531	61.2	44.4	437	247	594	101	158	13.5
BENZO(K)FLUORANTHENE	2280	621	67	42.6	1080	288	800	97.5	135	14.1 J
CHRYSENE	1530	953	122	98.6	943	267	886	151	305	38.5
DIBENZO(A,H)ANTHRACENE	287	183	17.8	14	258	87.4	204	29.1	44.5	3.61 U
FLUORANTHENE	4290	2250	204	213	2110	644	2630	318	597	74.3
FLUORENE	179	24.7	5.63 J	22.1	63.1	34.5	254	6.02 J	36.4	3.61 U
INDENO(1,2,3-CD)PYRENE	674	490	58.2	40.1	430	243	579	91.2	139	12.8
NAPHTHALENE	24.5	28.5	10.3	17.6	31.1	38.2	91.5	11.2	45	4.25 J
PHENANTHRENE	2370	529	108	214	970	428	2130	92.4	418	56.4
PYRENE	3190	1880	180	170	1860	553	2260	323	495	66
SEMIVOLATILES (UG/KG)										
1,1-BIPHENYL	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
2,2'-OXYBIS(1-CHLOROPROPANE)	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 UJ	181 U
2,4,5-TRICHLOROPHENOL	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
2,4,6-TRICHLOROPHENOL	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
2,4-DICHLOROPHENOL	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
2,4-DIMETHYLPHENOL	779 U	761 U	690 U	793 U	762 U	738 U	788 U	741 U	771 U	723 U
2,4-DINITROPHENOL	1950 U	1900 U	1730 U	1990 U	1910 U	1850 U	1970 U	1850 U	1930 UJ	1810 U
2,4-DINITROTOLUENE	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
2,6-DINITROTOLUENE	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
2-CHLORONAPHTHALENE	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
2-CHLOROPHENOL	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
2-METHYLPHENOL	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
2-NITROANILINE	779 UJ	761 UJ	690 UJ	793 UJ	762 UJ	738 UJ	788 UJ	741 UJ	771 UJ	723 UJ
2-NITROPHENOL	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
3,3'-DICHLOROBENZIDINE	195 UJ	190 UJ	173 UJ	199 UJ	191 UJ	185 UJ	197 UJ	185 UJ	193 U	181 UJ
3-NITROANILINE	779 U	761 U	690 U	793 U	762 U	738 U	788 U	741 U	771 U	723 U
4,6-DINITRO-2-METHYLPHENOL	1950 U	1900 U	1730 U	1990 U	1910 U	1850 U	1970 U	1850 U	1930 U	1810 U
4-BROMOPHENYL PHENYL ETHER	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
4-CHLORO-3-METHYLPHENOL	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
4-CHLOROANILINE	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
4-CHLOROPHENYL PHENYL ETHER	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
4-METHYLPHENOL	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
4-NITROANILINE	779 U	761 U	690 U	793 U	762 U	738 U	788 U	741 U	771 UJ	723 U
4-NITROPHENOL	779 U	761 U	690 U	793 U	762 U	738 U	788 U	741 U	771 UJ	723 U
ACETOPHENONE	195 U	190 U	173 U	199 U	191 U	185 UJ	197 UJ	185 UJ	193 U	181 U
ATRAZINE	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
BENZALDEHYDE	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
BIS(2-CHLOROETHOXY)METHANE	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
BIS(2-CHLOROETHYL)ETHER	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
BIS(2-ETHYLHEXYL)PHTHALATE	195 U	190 U	173 U	199 U	149 J	185 U	197 U	185 U	193 UJ	181 U
BUTYL BENZYL PHTHALATE	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 UJ	181 U
CAPROLACTAM	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
CARBAZOLE	254 J	190 UJ	173 UJ	199 UJ	191 UJ	185 UJ	167 J	185 UJ	193 U	181 UJ
DIBENZOFURAN	195 U	190 U	173 U	199 U	191 U	185 U	144 J	185 U	193 U	181 U
DIETHYL PHTHALATE	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
DIMETHYL PHTHALATE	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
DI-N-BUTYL PHTHALATE	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
DI-N-OCTYL PHTHALATE	195 U	190 U	173 U	199 U	191 U	185 UJ	197 UJ	185 UJ	193 UJ	181 U
HEXACHLOROBENZENE	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U
HEXACHLOROBUTADIENE	195 UJ	190 UJ	173 UJ	199 UJ	191 UJ	185 UJ	197 UJ	185 UJ	193 U	181 UJ
HEXACHLOROCYCLOPENTADIENE	195 UJ	190 UJ	173 UJ	199 UJ	191 UJ	185 U	197 U	185 U	193 U	181 UJ
HEXACHLOROETHANE	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U

LOCATION	NTC12SB21	NTC12SB22	NTC12SB23	NTC12SB24	NTC12SB25	NTC12SB26	NTC12SB27	NTC12SB28	NTC12SB29	NTC12SB30
SAMPLE ID	NTC12-SB21-0005	NTC12-SB22-0005	NTC12-SB23-0005	NTC12-SB24-0005	NTC12-SB25-0005	NTC12-SB26-0005	NTC12-SB27-0005	NTC12-SB28-0005	NTC12-SB29-0005	NTC12-SB30-0005
SAMPLE DATE	20101220	20101220	20101220	20101220	20101220	20101220	20101220	20101220	20101220	20101220
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO
SAMPLE TYPE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SUBMATRIX	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
TOP DEPTH	0	0	0	0	0	0	0	0	0	0
BOTTOM DEPTH	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
ISOPHORONE	195 UJ	190 UJ	173 UJ	199 UJ	191 UJ	185 UJ	197 UJ	185 UJ	193 U	181 UJ
NITROBENZENE	195 UJ	190 UJ	173 UJ	199 UJ	191 UJ	185 UJ	197 UJ	185 UJ	193 UJ	181 UJ
N-NITROSO-DI-N-PROPYLAMINE	195 UJ	190 UJ	173 UJ	199 UJ	191 UJ	185 UJ	197 UJ	185 UJ	193 UJ	181 UJ
N-NITROSODIPHENYLAMINE	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 UJ
PENTACHLOROPHENOL	779 U	761 U	690 U	793 U	762 U	738 U	788 U	741 U	771 U	723 U
PHENOL	195 U	190 U	173 U	199 U	191 U	185 U	197 U	185 U	193 U	181 U

E-2 SUBSURFACE SOIL ANALYTICAL RESULTS

LOCATION	NTC12SB21	NTC12SB22	NTC12SB23	NTC12SB24	NTC12SB25		NTC12SB26
SAMPLE ID	NTC12-SB21-0507	NTC12-SB22-00502	NTC12-SB23-0810	NTC12-SB24-00502	NTC12-SB25-0204	NTC12-SB25-0204-D	NTC12-SB26-0406
SAMPLE DATE	20101220	20101220	20101220	20101220	20101220	20101220	20101220
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
SAMPLE TYPE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB
TOP DEPTH	5	0.5	8	0.5	2	2	4
BOTTOM DEPTH	7	2	10	2	4	4	6
METALS (MG/KG)							
ALUMINUM	6720	9490	2400	1400	7630	7940	10300
ANTIMONY	2.48 J	0.471 UJ	0.477 UJ	0.451 UJ	0.327 J	3.09 J	4.24 J
ARSENIC	18.3 J	10.8 J	9.41 J	4.26 J	7.74 J	23.5 J	25 J
BARIUM	432 J	87.9 J	19.1 J	6.73 J	109 J	125 J	157 J
BERYLLIUM	1.48 U	0.611	0.154 J	0.208 J	0.554	1.53 U	3.11 U
CADMIUM	5.65 J	0.804 J	0.708 J	0.119 J	1.5 J	9.91 J	7.31 J
CALCIUM	44200	37800	61600	31000	85700 J	48100 J	52200
CHROMIUM	38.9 J	15.7 J	7.07 J	4.65 J	25.1 J	53.6 J	60.8 J
COBALT	9.44	9.9	3.91	2.37	7.66	13.7	17
COPPER	362	54.6	23	6.56	88.4 J	325 J	274
IRON	18000	18600	7870	4650	15900 J	22200 J	19900
LEAD	332 J	77.4 J	39.4 J	26.6 J	127 J	262 J	300 J
MAGNESIUM	20800	20400	24200	13200	42600 J	21100 J	21200
MANGANESE	566	674	220	143	503 J	890 J	846
MERCURY	0.96	0.159	0.113	0.0327 J	0.908 J	1.63 J	1.99
NICKEL	50.1	24.9	9.43	4.36	22.5 J	65.3 J	88.6
POTASSIUM	1420	1480	358	239 J	1490	1750	2110
SELENIUM	5.07	0.584 J	0.45 J	0.271 J	0.807	7.55	6.57
SILVER	15.2	1.35	0.334 J	0.113 U	5.28 J	25.1 J	22.3
SODIUM	173 J	87.5 J	149 J	84.7 J	250 J	197 J	270 J
THALLIUM	1.18 U	0.235 U	0.239 U	0.226 U	0.235 U	1.22 U	1.25 U
VANADIUM	18.6	19.1	6.85	4.93	15.6	19.8	25.9
ZINC	912 J	226 J	119 J	43.7 J	253 J	645 J	568 J
PCBS (UG/KG)							
AROCLOR-1016	80 U	--	--	--	9.84 U	--	--
AROCLOR-1221	80 U	--	--	--	11.8 U	--	--
AROCLOR-1232	80 U	--	--	--	9.84 U	--	--
AROCLOR-1242	80 U	--	--	--	17.7 U	--	--
AROCLOR-1248	80 U	--	--	--	23.6 U	--	--
AROCLOR-1254	799	--	--	--	105	--	--
AROCLOR-1260	80 U	--	--	--	59 UJ	--	--
PESTICIDES (UG/KG)							
4,4'-DDD	696	15.8	2.37	4.31	545	434	1090
4,4'-DDE	107	70.3	0.692 J	1.78	986 J	71.9 J	196
4,4'-DDT	823	64.4	0.9	0.362 J	77.2 J	168 J	55.8
ALDRIN	17	0.463 J	0.391 U	0.365 U	0.626 J	8.74 J	2.48
ALPHA-BHC	1.02	0.391 U	0.391 U	0.365 U	0.401 UJ	1.03 J	1.05
ALPHA-CHLORDANE	141	51.3	0.391 U	0.25 J	1.68 J	42.1 J	19.3
BETA-BHC	1.12	0.391 U	0.391 U	0.365 U	0.401 UJ	1.43 J	0.919
DELTA-BHC	6.05	0.389 J	0.217 J	2.43 J	0.401 UJ	7.68 J	1.53 J
DIELDRIN	5.47	4.32	0.391 U	0.321 J	4.79 J	5.98 J	13.4
ENDOSULFAN I	4.35	0.506 J	0.391 U	0.365 U	0.194 J	0.405 UJ	4.51
ENDOSULFAN II	5.63	0.322 J	0.391 U	0.365 U	0.28 J	0.493 J	4.04
ENDOSULFAN SULFATE	2.62	0.391 U	0.391 U	0.365 U	0.204 J	3.17 J	2.17
ENDRIN	7.4	6.75	0.391 U	0.235 J	9.89 J	5.5 J	12.9
ENDRIN ALDEHYDE	5.64	1.5	0.391 U	0.365 U	0.953 J	3.55 J	10.9
ENDRIN KETONE	0.388 U	0.391 U	0.391 U	0.365 U	0.401 U	0.405 UJ	0.415 U
GAMMA-BHC (LINDANE)	0.346 J	0.391 U	0.391 U	0.365 U	0.401 UJ	0.998 J	0.581 J
GAMMA-CHLORDANE	129	29.2	0.308 J	0.578 J	1.16 J	36.2 J	47.1

LOCATION	NTC12SB21	NTC12SB22	NTC12SB23	NTC12SB24	NTC12SB25		NTC12SB26
SAMPLE ID	NTC12-SB21-0507	NTC12-SB22-00502	NTC12-SB23-0810	NTC12-SB24-00502	NTC12-SB25-0204	NTC12-SB25-0204-D	NTC12-SB26-0406
SAMPLE DATE	20101220	20101220	20101220	20101220	20101220	20101220	20101220
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
SAMPLE TYPE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB
TOP DEPTH	5	0.5	8	0.5	2	2	4
BOTTOM DEPTH	7	2	10	2	4	4	6
HEPTACHLOR	1.83	1.45	0.391 U	0.365 UJ	0.401 U	1.43 J	1.19
HEPTACHLOR EPOXIDE	2.36	7	0.391 U	1.61	1.77 J	2.47 J	1.9
METHOXYCHLOR	0.388 U	0.391 U	0.391 U	0.954	0.528 J	0.405 UJ	0.415 U
TOXAPHENE	25.1 U	25.3 U	25.3 U	23.6 U	26 U	26.2 UJ	26.8 U
POLYCYCLIC AROMATIC HYDROCARBONS (UG/KG)							
2-METHYLNAPHTHALENE	431	26.5	49.4	8.5	69.7 J	682 J	545
ACENAPHTHENE	275	26.6	72.9	7.48	76.8 J	222 J	403
ACENAPHTHYLENE	75.3	39.7	25.8	3.62 U	20.8 J	82.9 J	73.1
ANTHRACENE	481	115	199	19	216 J	734 J	887
BAP EQUIVALENT	1977.52	907.868	210.84	55.549	1072.538	2646.81	2631.59
BENZO(A)ANTHRACENE	1290	475	204	41.3	493 J	2790 J	2580
BENZO(A)PYRENE	1350	632	149	40.1	770 J	1700 J	1840
BENZO(B)FLUORANTHENE	830	801	179	53.7	1080 J	2580 J	1380
BENZO(G,H,I)PERYLENE	620	417	52.4	26.9	314 J	757 J	841
BENZO(K)FLUORANTHENE	1450	515	87.7	27.6	486 J	746 J	2570
CHRYSENE	1120	518	223	63	478 J	1950 J	2090
DIBENZO(A,H)ANTHRACENE	336	106	17.4	3.62 U	109 J	320 J	283
FLUORANTHENE	2790	1400	500	118	1360 J	6030 J	6480
FLUORENE	282	41.7	73.7	10	77.4 J	303 J	608
INDENO(1,2,3-CD)PYRENE	639	366	50.4	19.9	309 J	804 J	848
NAPHTHALENE	255	18.2	61.3	8.38	122 J	472 J	439
PHENANTHRENE	2140	775	415	92.6	881 J	2840 J	5520
PYRENE	2500	1150	478	104	1120 J	5340 J	5890
SEMIVOLATILES (UG/KG)							
1,1-BIPHENYL	193 U	195 U	194 U	182 U	197 U	201 U	208 U
2,2'-OXYBIS(1-CHLOROPROPANE)	193 U	195 U	194 U	182 U	197 U	201 U	208 U
2,4,5-TRICHLOROPHENOL	193 U	195 U	194 U	182 U	197 U	201 U	208 U
2,4,6-TRICHLOROPHENOL	193 U	195 U	194 U	182 U	197 U	201 U	208 U
2,4-DICHLOROPHENOL	193 U	195 U	194 U	182 U	197 U	201 U	208 U
2,4-DIMETHYLPHENOL	772 U	777 U	777 U	725 U	788 U	805 U	829 U
2,4-DINITROPHENOL	1930 U	1950 U	1940 U	1820 U	1970 U	2010 U	2080 U
2,4-DINITROTOLUENE	193 U	195 U	194 U	182 U	197 U	201 U	208 U
2,6-DINITROTOLUENE	193 U	195 U	194 U	182 U	197 U	201 U	208 U
2-CHLORONAPHTHALENE	193 U	195 U	194 U	182 U	197 U	201 U	208 U
2-CHLOROPHENOL	193 U	195 U	194 U	182 U	197 U	201 U	208 U
2-METHYLPHENOL	193 U	195 U	194 U	182 U	197 U	201 U	208 U
2-NITROANILINE	772 UJ	777 UJ	777 UJ	725 UJ	788 UJ	805 UJ	829 UJ
2-NITROPHENOL	193 U	195 U	194 U	182 U	197 U	201 U	208 U
3,3'-DICHLOROBENZIDINE	193 UJ	195 UJ	194 UJ	182 UJ	197 UJ	201 UJ	208 UJ
3-NITROANILINE	772 U	777 U	777 U	725 U	788 U	805 U	829 U
4,6-DINITRO-2-METHYLPHENOL	1930 U	1950 U	1940 U	1820 U	1970 U	2010 U	2080 U
4-BROMOPHENYL PHENYL ETHER	193 U	195 U	194 U	182 U	197 U	201 U	208 U
4-CHLORO-3-METHYLPHENOL	193 U	195 U	194 U	182 U	197 U	201 U	208 U
4-CHLOROANILINE	193 U	195 U	194 U	182 U	197 U	201 U	208 U
4-CHLOROPHENYL PHENYL ETHER	193 U	195 U	194 U	182 U	197 U	201 U	208 U
4-METHYLPHENOL	268 J	195 U	194 U	182 U	375 J	348 J	167 J
4-NITROANILINE	772 U	777 U	777 U	725 U	788 U	805 U	829 U
4-NITROPHENOL	772 U	777 U	777 U	725 U	788 U	805 U	829 U
ACETOPHENONE	193 U	195 U	194 U	182 U	197 UJ	201 U	208 U
ATRAZINE	193 U	195 U	194 U	182 U	197 U	201 U	208 U

LOCATION	NTC12SB21	NTC12SB22	NTC12SB23	NTC12SB24	NTC12SB25		NTC12SB26
SAMPLE ID	NTC12-SB21-0507	NTC12-SB22-00502	NTC12-SB23-0810	NTC12-SB24-00502	NTC12-SB25-0204	NTC12-SB25-0204-D	NTC12-SB26-0406
SAMPLE DATE	20101220	20101220	20101220	20101220	20101220	20101220	20101220
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
SAMPLE TYPE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB
TOP DEPTH	5	0.5	8	0.5	2	2	4
BOTTOM DEPTH	7	2	10	2	4	4	6
BENZALDEHYDE	193 U	195 U	194 U	182 U	197 U	201 U	208 U
BIS(2-CHLOROETHOXY)METHANE	193 U	195 U	194 U	182 U	197 U	201 U	208 U
BIS(2-CHLOROETHYL)ETHER	193 U	195 U	194 U	182 U	197 U	201 U	208 U
BIS(2-ETHYLHEXYL)PHTHALATE	193 U	195 U	194 U	182 U	197 U	201 U	201 J
BUTYL BENZYL PHTHALATE	193 U	195 U	194 U	182 U	197 U	201 U	208 U
CAPROLACTAM	193 U	195 U	194 U	182 U	197 U	201 U	208 U
CARBAZOLE	193 UJ	195 UJ	194 UJ	182 UJ	197 UJ	201 UJ	494 J
DIBENZOFURAN	204 J	195 U	194 U	182 U	197 U	371 J	366 J
DIETHYL PHTHALATE	193 U	195 U	194 U	182 U	197 U	201 U	208 U
DIMETHYL PHTHALATE	193 U	195 U	194 U	182 U	197 U	201 U	208 U
DI-N-BUTYL PHTHALATE	193 U	195 U	194 U	182 U	197 U	201 U	208 U
DI-N-OCTYL PHTHALATE	193 U	195 U	194 U	182 U	197 UJ	201 U	208 U
HEXACHLOROBENZENE	193 U	195 U	194 U	182 U	197 U	201 U	208 U
HEXACHLOROBUTADIENE	193 UJ	195 UJ	194 UJ	182 UJ	197 UJ	201 UJ	208 UJ
HEXACHLOROCYCLOPENTADIENE	193 UJ	195 UJ	194 UJ	182 UJ	197 U	201 UJ	208 UJ
HEXACHLOROETHANE	193 U	195 U	194 U	182 U	197 U	201 U	208 U
ISOPHORONE	193 UJ	195 UJ	194 UJ	182 UJ	197 UJ	201 UJ	208 UJ
NITROBENZENE	193 UJ	195 UJ	194 UJ	182 UJ	197 UJ	201 UJ	208 UJ
N-NITROSO-DI-N-PROPYLAMINE	193 UJ	195 UJ	194 UJ	182 UJ	197 UJ	201 UJ	208 UJ
N-NITROSODIPHENYLAMINE	193 U	195 U	194 U	182 U	197 UJ	201 UJ	208 U
PENTACHLOROPHENOL	772 U	777 U	777 U	725 U	788 U	805 U	829 U
PHENOL	193 U	195 U	194 U	182 U	99.7 J	201 U	208 U
SPLP METALS (UG/L)							
ALUMINUM	--	--	--	--	--	--	--
ANTIMONY	--	--	--	--	--	--	--
ARSENIC	--	--	--	--	--	--	--
BARIUM	--	--	--	--	--	--	--
BERYLLIUM	--	--	--	--	--	--	--
CADMIUM	--	--	--	--	--	--	--
CALCIUM	--	--	--	--	--	--	--
CHROMIUM	--	--	--	--	--	--	--
COBALT	--	--	--	--	--	--	--
COPPER	--	--	--	--	--	--	--
IRON	--	--	--	--	--	--	--
LEAD	--	--	--	--	--	--	--
MAGNESIUM	--	--	--	--	--	--	--
MANGANESE	--	--	--	--	--	--	--
MERCURY	--	--	--	--	--	--	--
NICKEL	--	--	--	--	--	--	--
POTASSIUM	--	--	--	--	--	--	--
SELENIUM	--	--	--	--	--	--	--
SILVER	--	--	--	--	--	--	--
SODIUM	--	--	--	--	--	--	--
THALLIUM	--	--	--	--	--	--	--
VANADIUM	--	--	--	--	--	--	--
ZINC	--	--	--	--	--	--	--

LOCATION	NTC12SB27		NTC12SB28	NTC12SB29	NTC12SB30	NTC12SB31		NTC12SB32	
SAMPLE ID	NTC12-SB27-0204	NTC12-SB27-0204-D	NTC12-SB28-0204	NTC12-SB29-0204	NTC12-SB30-00502	NTC12-SB31-0305	NTC12-SB31-0507	NTC12-SB32-0204	NTC12-SB32-0406
SAMPLE DATE	20101220	20101220	20101220	20101220	20101220	20121217	20121217	20121217	20121217
SAMPLE CODE	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO	SO	SO
SAMPLE TYPE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB	SB	SB
TOP DEPTH	2	2	2	2	0.5	3	5	2	4
BOTTOM DEPTH	4	4	4	4	2	5	7	4	6
METALS (MG/KG)									
ALUMINUM	9680	10800	6470	11700	1380	--	--	--	--
ANTIMONY	0.297 J	0.45 UJ	0.461 UJ	0.589 J	0.604 J	--	--	--	--
ARSENIC	8.9 J	9.02 J	7 J	17.1 J	7.33 J	--	--	--	--
BARIUM	64 J	62.3 J	149 J	163 J	11.4 J	--	--	--	--
BERYLLIUM	1.02	0.768	0.496	0.933	0.175 J	--	--	--	--
CADMIUM	0.287 J	0.0875 J	0.497 J	1.08 J	0.212 J	--	--	--	--
CALCIUM	49500	55800	62600	46500	26800	--	--	--	--
CHROMIUM	16.6 J	15.4 J	10.6 J	21.5 J	5.27 J	--	--	--	--
COBALT	10.4	11.8	7.41	13.5	2.94	--	--	--	--
COPPER	58.8	36.7	104	70.8	10.3	--	--	--	--
IRON	19400 J	19800 J	14900	31400	5390	--	--	--	--
LEAD	46.8 J	26.2 J	168 J	845 J	33.2 J	--	--	--	--
MAGNESIUM	26000	27800	31500	22100	12000	--	--	--	--
MANGANESE	493 J	537 J	359	614	188	--	--	--	--
MERCURY	0.0631	0.0385	0.208	0.0335 J	0.0418	--	--	--	--
NICKEL	26.8	25.7	21	34.3	5.8	--	--	--	--
POTASSIUM	1340	1570	1130	1600	205 J	--	--	--	--
SELENIUM	0.283 U	0.365 J	0.494 J	0.621 J	0.214 J	--	--	--	--
SILVER	0.0931 J	0.112 U	0.125 J	0.233 U	0.114 U	--	--	--	--
SODIUM	138 J	134 J	172 J	181 J	99.4 J	--	--	--	--
THALLIUM	0.226 U	0.225 U	0.231 U	0.466 U	0.227 U	--	--	--	--
VANADIUM	19.8	19.9	15.2	22	4.78	--	--	--	--
ZINC	232 J	98.1 J	438 J	387 J	79.7 J	--	--	--	--
PCBS (UG/KG)									
AROCLOR-1016	9.43 U	--	22 U	11.6 U	--	--	--	--	--
AROCLOR-1221	9.43 U	--	22 U	11.6 U	--	--	--	--	--
AROCLOR-1232	9.43 U	--	22 U	11.6 U	--	--	--	--	--
AROCLOR-1242	9.43 U	--	22 U	11.6 U	--	--	--	--	--
AROCLOR-1248	9.43 U	--	22 U	11.6 U	--	--	--	--	--
AROCLOR-1254	9.43 U	--	48.1 J	29.8 J	--	--	--	--	--
AROCLOR-1260	9.43 UJ	--	22 U	11.6 U	--	--	--	--	--
PESTICIDES (UG/KG)									
4,4'-DDD	5.41 J	2.86 J	55.1	19.7	2.96	--	--	--	--
4,4'-DDE	12.9	12.1 J	29.4	10.5	0.989	--	--	--	--
4,4'-DDT	9.1	6.29 J	16.7	4.07	0.872	--	--	--	--
ALDRIN	0.385 U	0.373 UJ	0.375 U	0.557 J	0.383 U	--	--	--	--
ALPHA-BHC	0.385 U	0.373 UJ	0.172 J	0.394 U	0.383 U	--	--	--	--
ALPHA-CHLORDANE	0.466 J	0.373 UJ	0.61 J	1.88	0.202 J	--	--	--	--
BETA-BHC	0.385 U	0.373 UJ	0.375 U	0.722 J	0.383 U	--	--	--	--
DELTA-BHC	0.385 U	0.373 UJ	0.164 J	0.282 J	0.31 J	--	--	--	--
DIELDRIN	0.385 U	0.373 UJ	1.05	0.919	0.383 U	--	--	--	--
ENDOSULFAN I	0.385 U	0.373 UJ	1.68	0.394 U	0.383 U	--	--	--	--
ENDOSULFAN II	0.385 U	0.373 UJ	1.13	0.54 J	0.383 U	--	--	--	--
ENDOSULFAN SULFATE	0.385 U	0.373 UJ	3.95	0.394 U	0.383 U	--	--	--	--
ENDRIN	0.385 U	0.373 UJ	2.95	0.371 J	0.383 U	--	--	--	--
ENDRIN ALDEHYDE	0.385 U	0.373 UJ	1.13	0.394 U	0.383 U	--	--	--	--
ENDRIN KETONE	0.385 U	0.373 UJ	0.715 J	0.394 U	0.383 U	--	--	--	--
GAMMA-BHC (LINDANE)	0.385 U	0.373 UJ	3.61	0.394 U	0.383 U	--	--	--	--
GAMMA-CHLORDANE	0.301 J	0.206 J	3.57	2.36	0.383 U	--	--	--	--

LOCATION	NTC12SB27		NTC12SB28	NTC12SB29	NTC12SB30	NTC12SB31		NTC12SB32	
SAMPLE ID	NTC12-SB27-0204	NTC12-SB27-0204-D	NTC12-SB28-0204	NTC12-SB29-0204	NTC12-SB30-00502	NTC12-SB31-0305	NTC12-SB31-0507	NTC12-SB32-0204	NTC12-SB32-0406
SAMPLE DATE	20101220	20101220	20101220	20101220	20101220	20121217	20121217	20121217	20121217
SAMPLE CODE	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO	SO	SO
SAMPLE TYPE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB	SB	SB
TOP DEPTH	2	2	2	2	0.5	3	5	2	4
BOTTOM DEPTH	4	4	4	4	2	5	7	4	6
HEPTACHLOR	0.385 U	0.373 UJ	0.182 J	0.394 U	0.383 UJ	--	--	--	--
HEPTACHLOR EPOXIDE	0.385 U	0.373 UJ	0.375 U	0.213 J	0.435 J	--	--	--	--
METHOXYCHLOR	0.385 U	0.373 UJ	1.33	0.394 U	0.383 UJ	--	--	--	--
TOXAPHENE	24.9 U	24.1 UJ	24.2 U	25.5 U	24.8 U	--	--	--	--
POLYCYCLIC AROMATIC HYDRC									
2-METHYLNAPHTHALENE	15 J	180 J	266	22.7	3.31 J	--	--	--	--
ACENAPHTHENE	9.79	5.33 J	1120	6.64 J	5.87 J	--	--	--	--
ACENAPHTHYLENE	3.7 J	6.46 J	253	4.01 U	3.67 J	--	--	--	--
ANTHRACENE	22.3	14.1	5280	23.8	20.3	--	--	--	--
BAP EQUIVALENT	124.6174	107.3587	10608.94	103.8826	72.1627	--	--	--	--
BENZO(A)ANTHRACENE	75.6	65.1	9780	76.8	46.2	--	--	--	--
BENZO(A)PYRENE	87.8	74.2	7740	75.7	53.5	--	--	--	--
BENZO(B)FLUORANTHENE	129	106	10300	123	69.9	--	--	--	--
BENZO(G,H,I)PERYLENE	43.2	44	1110	49.3	34.8	--	--	--	--
BENZO(K)FLUORANTHENE	47.4 J	37.5 J	1500	47.6	25.7	--	--	--	--
CHRYSENE	83.4	63.7	7940	86.6	65.7	--	--	--	--
DIBENZO(A,H)ANTHRACENE	12	11.8	705	4.01 U	3.75 U	--	--	--	--
FLUORANTHENE	169	110	21100	158	123	--	--	--	--
FLUORENE	10.3	4.42 J	2510	10.2	3.75 U	--	--	--	--
INDENO(1,2,3-CD)PYRENE	38	38.1	1330	36.3	29.8	--	--	--	--
NAPHTHALENE	7.68 J	82.9 J	323	43.2	4 J	--	--	--	--
PHENANTHRENE	121 J	71 J	20200	120	75.4	--	--	--	--
PYRENE	143	103	16800	129	105	--	--	--	--
SEMIVOLATILES (UG/KG)									
1,1-BIPHENYL	189 U	187 U	186 U	201 U	188 U	--	--	--	--
2,2'-OXYBIS(1-CHLOROPROPANE)	189 U	187 U	186 U	201 UJ	188 U	--	--	--	--
2,4,5-TRICHLOROPHENOL	189 U	187 U	186 U	201 U	188 U	--	--	--	--
2,4,6-TRICHLOROPHENOL	189 U	187 U	186 U	201 U	188 U	--	--	--	--
2,4-DICHLOROPHENOL	189 U	187 U	186 U	201 U	188 U	--	--	--	--
2,4-DIMETHYLPHENOL	755 U	746 U	745 U	804 U	752 U	--	--	--	--
2,4-DINITROPHENOL	1890 U	1870 U	1860 U	2010 UJ	1880 U	--	--	--	--
2,4-DINITROTOLUENE	189 U	187 U	186 U	201 U	188 U	--	--	--	--
2,6-DINITROTOLUENE	189 U	187 U	186 U	201 U	188 U	--	--	--	--
2-CHLORONAPHTHALENE	189 U	187 U	186 U	201 U	188 U	--	--	--	--
2-CHLOROPHENOL	189 U	187 U	186 U	201 U	188 U	--	--	--	--
2-METHYLPHENOL	189 U	187 U	186 U	201 U	188 U	--	--	--	--
2-NITROANILINE	755 UJ	746 UJ	745 UJ	804 UJ	752 UJ	--	--	--	--
2-NITROPHENOL	189 U	187 U	186 U	201 U	188 U	--	--	--	--
3,3'-DICHLOROBENZIDINE	189 UJ	187 UJ	186 UJ	201 U	188 UJ	--	--	--	--
3-NITROANILINE	755 U	746 U	745 U	804 U	752 U	--	--	--	--
4,6-DINITRO-2-METHYLPHENOL	1890 U	1870 U	1860 U	2010 U	1880 U	--	--	--	--
4-BROMOPHENYL PHENYL ETHER	189 U	187 U	186 U	201 U	188 U	--	--	--	--
4-CHLORO-3-METHYLPHENOL	189 U	187 U	186 U	201 U	188 U	--	--	--	--
4-CHLOROANILINE	189 U	187 U	186 U	201 U	188 U	--	--	--	--
4-CHLOROPHENYL PHENYL ETHER	189 U	187 U	186 U	201 U	188 U	--	--	--	--
4-METHYLPHENOL	189 U	187 U	186 U	201 U	188 U	--	--	--	--
4-NITROANILINE	755 U	746 U	745 U	804 UJ	752 U	--	--	--	--
4-NITROPHENOL	755 U	746 U	745 U	804 UJ	752 U	--	--	--	--
ACETOPHENONE	189 UJ	187 UJ	186 U	201 U	188 U	--	--	--	--
ATRAZINE	189 U	187 U	186 U	201 U	188 U	--	--	--	--

LOCATION	NTC12SB27		NTC12SB28	NTC12SB29	NTC12SB30	NTC12SB31		NTC12SB32	
SAMPLE ID	NTC12-SB27-0204	NTC12-SB27-0204-D	NTC12-SB28-0204	NTC12-SB29-0204	NTC12-SB30-00502	NTC12-SB31-0305	NTC12-SB31-0507	NTC12-SB32-0204	NTC12-SB32-0406
SAMPLE DATE	20101220	20101220	20101220	20101220	20101220	20121217	20121217	20121217	20121217
SAMPLE CODE	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO	SO	SO
SAMPLE TYPE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB	SB	SB
TOP DEPTH	2	2	2	2	0.5	3	5	2	4
BOTTOM DEPTH	4	4	4	4	2	5	7	4	6
BENZALDEHYDE	189 U	187 U	186 U	201 U	188 U	--	--	--	--
BIS(2-CHLOROETHOXY)METHANE	189 U	187 U	93 U	201 U	188 U	--	--	--	--
BIS(2-CHLOROETHYL)ETHER	189 U	187 U	186 U	201 U	188 U	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	189 U	187 U	186 U	201 UJ	188 U	--	--	--	--
BUTYL BENZYL PHTHALATE	189 U	187 U	186 U	201 UJ	188 U	--	--	--	--
CAPROLACTAM	189 U	187 U	186 U	201 U	188 U	--	--	--	--
CARBAZOLE	189 UJ	187 UJ	1080 J	201 U	188 UJ	--	--	--	--
DIBENZOFURAN	189 U	187 U	1140	201 U	188 U	--	--	--	--
DIETHYL PHTHALATE	189 U	187 U	186 U	201 U	188 U	--	--	--	--
DIMETHYL PHTHALATE	189 U	187 U	186 U	201 U	188 U	--	--	--	--
DI-N-BUTYL PHTHALATE	189 U	187 U	186 U	201 U	188 U	--	--	--	--
DI-N-OCTYL PHTHALATE	189 UJ	187 UJ	186 U	201 UJ	188 U	--	--	--	--
HEXACHLOROBENZENE	189 U	187 U	186 U	201 U	188 U	--	--	--	--
HEXACHLOROBUTADIENE	189 UJ	187 UJ	186 UJ	201 U	188 UJ	--	--	--	--
HEXACHLOROCYCLOPENTADIENE	189 U	187 U	186 UJ	201 U	188 UJ	--	--	--	--
HEXACHLOROETHANE	189 U	187 U	186 U	201 U	188 U	--	--	--	--
ISOPHORONE	189 UJ	187 UJ	186 UJ	201 U	188 UJ	--	--	--	--
NITROBENZENE	189 UJ	187 UJ	186 UJ	201 UJ	188 UJ	--	--	--	--
N-NITROSO-DI-N-PROPYLAMINE	189 UJ	187 UJ	186 UJ	201 UJ	188 UJ	--	--	--	--
N-NITROSODIPHENYLAMINE	189 UJ	187 UJ	186 U	201 U	188 U	--	--	--	--
PENTACHLOROPHENOL	755 U	746 U	745 U	804 U	752 U	--	--	--	--
PHENOL	189 U	187 U	186 U	201 U	188 U	--	--	--	--
SPLP METALS (UG/L)									
ALUMINUM	--	--	--	--	--	5300 J	970 J	770 J	1900 J
ANTIMONY	--	--	--	--	--	4.4 J	3.6 J	9.1 J	30 J
ARSENIC	--	--	--	--	--	5	1.9	5.3	3.8
BARIUM	--	--	--	--	--	40 J	16 J	3.8 J	36 J
BERYLLIUM	--	--	--	--	--	0.32 J	0.4 U	0.4 U	0.4 U
CADMIUM	--	--	--	--	--	0.75	0.47	0.1 U	0.28
CALCIUM	--	--	--	--	--	27000	22000	38000	26000
CHROMIUM	--	--	--	--	--	12	3.3	1.7	9
COBALT	--	--	--	--	--	2.5	0.57 J	0.14 J	1.4
COPPER	--	--	--	--	--	36	13	12	13
IRON	--	--	--	--	--	5300	1100	10 U	2500
LEAD	--	--	--	--	--	42 J	13 J	0.5 U	15 J
MAGNESIUM	--	--	--	--	--	5000	2700	500 U	3900
MANGANESE	--	--	--	--	--	160 J	30 J	0.24 J	39 J
MERCURY	--	--	--	--	--	0.3	0.067 J	0.1 U	0.1 U
NICKEL	--	--	--	--	--	19	3.7	1.1	6
POTASSIUM	--	--	--	--	--	2400	1100	1600	2600
SELENIUM	--	--	--	--	--	2.1	3.6	1 U	1 U
SILVER	--	--	--	--	--	3.5	1.4	0.1 U	1.6
SODIUM	--	--	--	--	--	12000 J	12000 J	8700 J	22000 J
THALLIUM	--	--	--	--	--	0.22 J	0.054 J	0.1 U	0.069 J
VANADIUM	--	--	--	--	--	9	1.7	32	5.3
ZINC	--	--	--	--	--	100 J	31 J	4 U	53 J

LOCATION	NTC12SB33		NTC12SB34	
SAMPLE ID	**NTC12-SB33-0204**	**NTC12-SB33-0406**	**NTC12-SB34-0204**	**NTC12-SB34-0406**
SAMPLE DATE	**20121217**	**20121217**	**20121217**	**20121217**
SAMPLE CODE	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
MATRIX	**SO**	**SO**	**SO**	**SO**
SAMPLE TYPE	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
SUBMATRIX	**SB**	**SB**	**SB**	**SB**
TOP DEPTH	**2**	**4**	**2**	**4**
BOTTOM DEPTH	**4**	**6**	**4**	**6**
METALS (MG/KG)				
ALUMINUM	--	--	--	--
ANTIMONY	--	--	--	--
ARSENIC	--	--	--	--
BARIUM	--	--	--	--
BERYLLIUM	--	--	--	--
CADMIUM	--	--	--	--
CALCIUM	--	--	--	--
CHROMIUM	--	--	--	--
COBALT	--	--	--	--
COPPER	--	--	--	--
IRON	--	--	--	--
LEAD	--	--	--	--
MAGNESIUM	--	--	--	--
MANGANESE	--	--	--	--
MERCURY	--	--	--	--
NICKEL	--	--	--	--
POTASSIUM	--	--	--	--
SELENIUM	--	--	--	--
SILVER	--	--	--	--
SODIUM	--	--	--	--
THALLIUM	--	--	--	--
VANADIUM	--	--	--	--
ZINC	--	--	--	--
PCBS (UG/KG)				
AROCLOR-1016	--	--	--	--
AROCLOR-1221	--	--	--	--
AROCLOR-1232	--	--	--	--
AROCLOR-1242	--	--	--	--
AROCLOR-1248	--	--	--	--
AROCLOR-1254	--	--	--	--
AROCLOR-1260	--	--	--	--
PESTICIDES (UG/KG)				
4,4'-DDD	--	--	--	--
4,4'-DDE	--	--	--	--
4,4'-DDT	--	--	--	--
ALDRIN	--	--	--	--
ALPHA-BHC	--	--	--	--
ALPHA-CHLORDANE	--	--	--	--
BETA-BHC	--	--	--	--
DELTA-BHC	--	--	--	--
DIELDRIN	--	--	--	--
ENDOSULFAN I	--	--	--	--
ENDOSULFAN II	--	--	--	--
ENDOSULFAN SULFATE	--	--	--	--
ENDRIN	--	--	--	--
ENDRIN ALDEHYDE	--	--	--	--
ENDRIN KETONE	--	--	--	--
GAMMA-BHC (LINDANE)	--	--	--	--
GAMMA-CHLORDANE	--	--	--	--

LOCATION	NTC12SB33		NTC12SB34	
SAMPLE ID	**NTC12-SB33-0204**	**NTC12-SB33-0406**	**NTC12-SB34-0204**	**NTC12-SB34-0406**
SAMPLE DATE	**20121217**	**20121217**	**20121217**	**20121217**
SAMPLE CODE	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
MATRIX	**SO**	**SO**	**SO**	**SO**
SAMPLE TYPE	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
SUBMATRIX	**SB**	**SB**	**SB**	**SB**
TOP DEPTH	**2**	**4**	**2**	**4**
BOTTOM DEPTH	**4**	**6**	**4**	**6**
HEPTACHLOR	--	--	--	--
HEPTACHLOR EPOXIDE	--	--	--	--
METHOXYCHLOR	--	--	--	--
TOXAPHENE	--	--	--	--
POLYCYCLIC AROMATIC HYDRO				
2-METHYLNAPHTHALENE	--	--	--	--
ACENAPHTHENE	--	--	--	--
ACENAPHTHYLENE	--	--	--	--
ANTHRACENE	--	--	--	--
BAP EQUIVALENT	--	--	--	--
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	--	--	--	--
NAPHTHALENE	--	--	--	--
PHENANTHRENE	--	--	--	--
PYRENE	--	--	--	--
SEMIVOLATILES (UG/KG)				
1,1-BIPHENYL	--	--	--	--
2,2'-OXYBIS(1-CHLOROPROPANE)	--	--	--	--
2,4,5-TRICHLOROPHENOL	--	--	--	--
2,4,6-TRICHLOROPHENOL	--	--	--	--
2,4-DICHLOROPHENOL	--	--	--	--
2,4-DIMETHYLPHENOL	--	--	--	--
2,4-DINITROPHENOL	--	--	--	--
2,4-DINITROTOLUENE	--	--	--	--
2,6-DINITROTOLUENE	--	--	--	--
2-CHLORONAPHTHALENE	--	--	--	--
2-CHLOROPHENOL	--	--	--	--
2-METHYLPHENOL	--	--	--	--
2-NITROANILINE	--	--	--	--
2-NITROPHENOL	--	--	--	--
3,3'-DICHLOROBENZIDINE	--	--	--	--
3-NITROANILINE	--	--	--	--
4,6-DINITRO-2-METHYLPHENOL	--	--	--	--
4-BROMOPHENYL PHENYL ETHER	--	--	--	--
4-CHLORO-3-METHYLPHENOL	--	--	--	--
4-CHLOROANILINE	--	--	--	--
4-CHLOROPHENYL PHENYL ETHER	--	--	--	--
4-METHYLPHENOL	--	--	--	--
4-NITROANILINE	--	--	--	--
4-NITROPHENOL	--	--	--	--
ACETOPHENONE	--	--	--	--
ATRAZINE	--	--	--	--

LOCATION	NTC12SB33		NTC12SB34	
SAMPLE ID	**NTC12-SB33-0204**	**NTC12-SB33-0406**	**NTC12-SB34-0204**	**NTC12-SB34-0406**
SAMPLE DATE	**20121217**	**20121217**	**20121217**	**20121217**
SAMPLE CODE	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
MATRIX	**SO**	**SO**	**SO**	**SO**
SAMPLE TYPE	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
SUBMATRIX	**SB**	**SB**	**SB**	**SB**
TOP DEPTH	**2**	**4**	**2**	**4**
BOTTOM DEPTH	**4**	**6**	**4**	**6**
BENZALDEHYDE	--	--	--	--
BIS(2-CHLOROETHOXY)METHANE	--	--	--	--
BIS(2-CHLOROETHYL)ETHER	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	--	--	--	--
BUTYL BENZYL PHTHALATE	--	--	--	--
CAPROLACTAM	--	--	--	--
CARBAZOLE	--	--	--	--
DIBENZOFURAN	--	--	--	--
DIETHYL PHTHALATE	--	--	--	--
DIMETHYL PHTHALATE	--	--	--	--
DI-N-BUTYL PHTHALATE	--	--	--	--
DI-N-OCTYL PHTHALATE	--	--	--	--
HEXACHLOROBENZENE	--	--	--	--
HEXACHLOROBUTADIENE	--	--	--	--
HEXACHLOROCYCLOPENTADIENE	--	--	--	--
HEXACHLOROETHANE	--	--	--	--
ISOPHORONE	--	--	--	--
NITROBENZENE	--	--	--	--
N-NITROSO-DI-N-PROPYLAMINE	--	--	--	--
N-NITROSODIPHENYLAMINE	--	--	--	--
PENTACHLOROPHENOL	--	--	--	--
PHENOL	--	--	--	--

SPLP METALS (UG/L)

ALUMINUM	41 J	10000 J	1400 J	2700 J
ANTIMONY	12 J	16 J	0.82 U	7.6 J
ARSENIC	5.5	15	0.5 U	16
BARIUM	17 J	130 J	35 J	27 J
BERYLLIUM	0.4 U	0.71 J	0.4 U	0.23 J
CADMIUM	0.05 J	4.8	0.042 J	0.82
CALCIUM	45000	32000	180000	13000
CHROMIUM	0.77 J	46 J	6	14
COBALT	0.13 J	13 J	0.31 J	3.7
COPPER	4.2	92 J	9.5	51
IRON	120	13000	210	7200
LEAD	1.5 J	150 J	0.84 J	94 J
MAGNESIUM	3200	8900	400 J	3300
MANGANESE	2.9 J	360 J	6.7 J	110 J
MERCURY	0.1 U	1	0.1 U	0.24
NICKEL	0.92 J	53 J	1.2	16
POTASSIUM	1900	6000	4800	1200
SELENIUM	1 U	1.6 U	1 U	1 U
SILVER	0.045 J	13	0.1 U	1.6
SODIUM	13000 J	14000 J	11000 J	24000 J
THALLIUM	0.1 U	0.32 J	0.1 U	0.081 J
VANADIUM	8.7	20	0.74 J	7
ZINC	4 U	350 J	4.4 U	170 J

E-3 SEDIMENT ANALYTICAL RESULTS AND SAMPLING MAP

Table 1A
Semi-Volatile Organic Compounds in Sediment 2006 and 2007
Laboratory Analytical Reuslts - Target Analyte List
Naval Station Great Lakes, Illinois

																		Tier 1 Residential Soil Cleanup Objectives Route Specific Values		Soil Component of the Groundwater Ingestion Exposure Route Values	
	Field Sample ID		#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15				
	Date of Sample Collection:		6/15/2006	6/15/2006	6/15/2006	6/15/2006	6/15/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/15/2006	6/15/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006				
	Time of Sample Collection:		7:30 PM	4:30 PM	6:00 PM	6:20 PM	6:30 PM	11:00 AM	11:20 AM	11:45 AM	12:00 PM	8:00 PM	7:00 PM	1:15 PM	1:45 PM	2:45 PM	3:00 PM				
	Date Analyzed:		6/24/2006	6/24/2006	6/24/2006	6/24/2006	6/24/2006	6/24/2006	6/24/2006	6/24/2006	6/24/2006	6/24/2006	6/24/2006	6/24/2006	6/24/2006	6/24/2006	6/24/2006				
	GAL Sample ID		38015	38020	38025	38030	38035	38040	38045	38050	38055	38060	38065	38070	38075	38080	38085	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)
SVOCs (8270C)	Units	Rep. Limit																			
Phenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	23,000	C	100	100
Bis (2-Chloroethyl) Ether	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.6	0.2	0.0004	0.0004
2-Chlorophenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	390	53,000	4	4
1,3 - Dichlorobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
1,4 - Dichlorobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	C	11,000/340	2	11
Benzyl Alcohol	mg/kg	1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	NE	NE	NE	NE
1,2 - Dichlorobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	7,000	560/310	17	43
Bis (2-Chloroisopropyl) Ether	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2 - Methylphenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	3,900	C	15	15
Hexachloroethane	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	78	C	0.5	2.6
N - Nitrosodi - n - propylamine	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.09	C	0.00005	0.00005
4 - Methylphenol	mg/kg	0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	NE	NE	NE	NE
Nitrobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	39	92/9.4	0.16	0.1
Isophorone	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	15,600	4,600	8	8
2 - Nitrophenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2,4 - Dimethylphenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	1,600	C	9	9
Bis (2 - Chloroethoxy) Methane	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2,4 - Dichlorophenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	230	C	1	1
1,2,4 - Trichlorobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	780	3,200/920	5	53
Naphthalene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	1,600	170/1.8	12	18
4 - Chloroaniline	mg/kg	1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	310	C	0.7	0.7
Hexachlorobutadiene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2 - Methylnaphthalene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
4 - Chloro - 3 - Cresol	mg/kg	1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	NE	NE	NE	NE
Hexachlorocyclopentadiene	mg/kg	1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	550	10/1.1	400	2,200
2,4,6 - Trichlorophenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	58	200	0.2	0.77
2,4,5 - Trichlorophenol	mg/kg	1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	7,800	C	11	55
2 - Chloronaphthalene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
3 - Nitroaniline	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
Dimethyl Phthalate	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
Acenaphthylene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2,6 - Dinitrotoluene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.9	C	0.0007	0.0007
2,4 - Dinitrotoluene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.9	C	0.0008	0.0008
Acenaphthene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	4,700	C	570	2,900
Dibenzofuran	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2,4 - Dinitrophenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	160	C	0.2	0.2
2 - Nitroaniline	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
4 - Nitrophenol	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
Diethyl Phthalate	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	63,000	2,000	470	470
4 - Chlorophenylphenyl Ehter	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
Fluorene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	3,100	C	1	5
4 - Nitroaniline	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
N - Nitrosodiphenylamine & Diphenylamine*	mg/kg	0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	130	C	1	5.6
4,6 - Dinitro - 2 - Methylphenol	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
4 - Bromophenylphenyl Ether	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
Hexachlorobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.4	1	2	11
Pentachlorophenol	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	3	C	0.031	0.14
Phenanthrene	mg/kg	0.66	0.794	<0.66	0.902	<0.66	<0.66	<0.66	0.759	0.949	<0.66	<0.66	0.711	2.427	0.711	0.901	0.739	NE	NE	NE	NE
Anthracene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.777	<0.66	<0.66	<0.66	<0.66	0.692	<0.66	<0.66	<0.66	23,000	C	12,000	59,000
Carbazole	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	32	C	0.6	2.8
Di - N - Butyl Phthalate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NE	NE	NE	NE
Fluoranthene	mg/kg	0.66	1.29	0.753	1.26	0.661	<0.66	<0.66	0.805	1.29	<0.66	<0.66	0.855	3.235	1.01	1.25	0.951	3,100	C	4,300	21,000
Pyrene	mg/kg	0.66	1.15	<0.66	1.37	0.664	<0.66	<0.66	0.697	1.12	<0.66	<0.66	0.729	2.695	0.902	1.09	0.788	2,300	C	4,200	21,000
Butyl benzyl Phthalate	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	16,000	930	930	930
Benzo (A) Anthracene	mg/kg	0.66	<0.66	<0.66	0.771	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	**1.356**	<0.66	<0.66	<0.66	**0.9**	C	2	8
Chrysene	mg/kg	0.66	<0.66	<0.66	0.83	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	1.531	<0.66	<0.66	<0.66	88	C	160	800
3,3 - Dichlorobenzidine	mg/kg	1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	1	C	0.007	0.033
Bis (2 - ethylhexyl) Phthalate	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.678	<0.66	<0.66	<0.66	46	31,000	3,600	31,000
Di - N - Octyl Phthalate	mg/kg	0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	1,600	10,000	10,000	10,000
Benzo (B) Fluoranthene	mg/kg	0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	**1.155**	<0.92	<0.92	<0.92	**0.9**	C	5	25
Benzo (K) Fluoranthene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.953	<0.66	<0.66	<0.66	9	C	49	250
Benzo (A) Pyrene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	**0.864**	<0.66	<0.66	<0.66	**0.09**	C	8	82
Indeno (1,2,3-C,D) Pyrene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.799	<0.66	<0.66	<0.66	0.9	C	14	69
Dibenzo (A,H) Anthracene	mg/kg	0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	0.09	C	2	7.6
Benzo (G,H,I) Perylene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.683	<0.66	<0.66	<0.66	NE	NE	NE	NE

Bold denotes exceeded criteria

mg/kg = milligrams per kilogram NE = Not Established **17.8** Denotes values that exceed criteria

Source of Cleanup Objectivess - 35 IAC Subtitle G Chapter I Subchapter F Section 742 Appendix B Table A Tier 1 soil Remediation Objectives for Residential Properties

C - No toxicity criteria available for the route of exposure

'130/1.3 = Inhalation objective for residential/construction worker

Table 1A
Semi-Volatile Organic Compounds in Sediment 2006 and 2007
Laboratory Analytical Reuslts - Target Analyte List
Naval Station Great Lakes, Illinois

		Field Sample ID	#16	#17	#18	#19	#20	#21	#22	#23	#24	#25	#26	#27	#28	#29	#30	Tier 1 Residential Soil Cleanup Objectives Route Specific Values		Soil Component of the Groundwater Ingestion Exposure Route Values	
		Date of Sample Collection:	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006				
		Time of Sample Collection:	3:30 PM	4:15 PM	4:10 PM	5:15 PM	5:15 PM	5:30 PM	6:00 PM	6:10 PM	6:20 PM	6:45 PM	7:00 PM	7:10 PM	7:15 PM	7:00 PM	5:30 PM				
		Date Analyzed:	6/24/2006	6/25/2006	6/25/2006	6/25/2006	6/25/2006	6/25/2006	6/25/2006	6/25/2006	6/25/2006	6/25/2006	6/25/2006	6/25/2006	6/25/2006	6/25/2006	6/25/2006	Ingestion	Inhalation	Class I	Class II
		GAL Sample ID	38090	38095	38100	38105	38110	38115	38120	38125	38130	38135	38143	38148	38153	38158	38163	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
SVOCs (8270C)	Units	Rep. Limit																			
Phenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	23,000	C	100	100
Bis (2-Chloroethyl) Ether	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.6	0.2	0.0004	0.0004
2-Chlorophenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	390	53,000	4	4
1,3 - Dichlorobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
1,4 - Dichlorobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	C	11,000/340	2	11
Benzyl Alcohol	mg/kg	1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	NE	NE	NE	NE
1,2 - Dichlorobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	7,000	560/310	17	43
Bis (2-Chloroisopropyl) Ether	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2 - Methylphenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	3,900	C	15	15
Hexachloroethane	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	78	C	0.5	2.6
N - Nitrosodi - n - propylamine	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.09	C	0.00005	0.00005
4 - Methylphenol	mg/kg	0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	NE	NE	NE	NE
Nitrobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	39	92/9.4	0.16	0.1
Isophorone	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	15,600	4,600	8	8
2 - Nitrophenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2,4 - Dimethylphenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	1,600	C	9	9
Bis (2 - Chloroethoxy) Methane	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2,4 - Dichlorophenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	230	C	1	1
1,2,4 - Trichlorobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	780	3,200/920	5	53
Naphthalene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	1,600	170/1.8	12	18
4 - Chloroaniline	mg/kg	1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	310	C	0.7	0.7
Hexachlorobutadiene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2 - Methylnaphthalene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.675	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
4 - Chloro - 3 - Cresol	mg/kg	1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	NE	NE	NE	NE
Hexachlorocyclopentadiene	mg/kg	1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	550	10/1.1	400	2,200
2,4,6 - Trichlorophenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	58	200	0.2	0.77
2,4,5 - Trichlorophenol	mg/kg	1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	7,800	C	11	55
2 - Chloronaphthalene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
3 - Nitroaniline	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
Dimethyl Phthalate	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
Acenaphthylene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2,6 - Dinitrotoluene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.9	C	0.0007	0.0007
2,4 - Dinitrotoluene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.9	C	0.0008	0.0008
Acenaphthene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	4,700	C	570	2,900
Dibenzofuran	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2,4 - Dinitrophenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	160	C	0.2	0.2
2 - Nitroaniline	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
4 - Nitrophenol	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
Diethyl Phthalate	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	63,000	2,000	470	470
4 - Chlorophenylphenyl Ehter	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
Fluorene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	3,100	C	1	5
4 - Nitroaniline	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
N - Nitrosodiphenylamine and Diphenylamine*	mg/kg	0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	130	C	1	5.6
4,6 - Dinitro - 2 - Methylphenol	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
4 - Bromophenylphenyl Ether	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
Hexachlorobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.4	1	2	11
Pentachlorophenol	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	3	C	0.031	0.14
Phenanthrene	mg/kg	0.66	0.712	0.935	<0.66	<0.66	<0.66	0.818	1.32	2.37	2.97	4.1	<0.66	<0.66	<0.66	1.1	<0.66	NE	NE	NE	NE
Anthracene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.931	<0.66	<0.66	<0.66	<0.66	<0.66	23,000	C	12,000	59,000
Carbazole	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	32	C	0.6	2.8
Di - N - Butyl Phthalate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NE	NE	NE	NE
Fluoranthene	mg/kg	0.66	0.751	0.853	0.719	0.7	0.692	1.35	2.11	3.53	3.67	5.1	<0.66	<0.66	0.999	1.5	<0.66	3,100	C	4,300	21,000
Pyrene	mg/kg	0.66	<0.66	0.783	<0.66	<0.66	<0.66	1.15	1.7	2.81	2.88	3.92	<0.66	<0.66	0.906	1.36	<0.66	2,300	C	4,200	21,000
Butyl benzyl Phthalate	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	16,000	930	930	930
Benzo (A) Anthracene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.725	**1.21**	**1.29**	**1.93**	<0.66	<0.66	<0.66	0.723	<0.66	**0.9**	C	2	8
Chrysene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.681	0.984	1.59	1.6	2.15	<0.66	<0.66	<0.66	0.772	<0.66	88	C	160	800
3,3 - Dichlorobenzidine	mg/kg	1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	1	C	0.007	0.033
Bis (2 - ethylhexyl) Phthalate	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	4.18	3.62	2.98	6.16	1.97	<0.66	<0.66	<0.66	<0.66	<0.66	46	31,000	3,600	31,000
Di - N - Octyl Phthalate	mg/kg	0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	1.07	<0.86	<0.86	<0.86	<0.86	<0.86	1,600	10,000	10,000	10,000
Benzo (B) Fluoranthene	mg/kg	0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	**1.36**	**1.2**	**1.61**	<0.92	<0.92	<0.92	<0.92	<0.92	**0.9**	C	5	25
Benzo (K) Fluoranthene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	1.14	0.899	1.24	<0.66	<0.66	<0.66	<0.66	<0.66	9	C	49	250
Benzo (A) Pyrene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	**0.714**	<0.66	**1.21**	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	**0.09**	C	8	82
Indeno (1,2,3-C,D) Pyrene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.847	**0.936**	**1.16**	<0.66	<0.66	<0.66	<0.66	<0.66	**0.9**	C	14	69
Dibenzo (A,H) Anthracene	mg/kg	0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	0.09	C	2	7.6
Benzo (G,H,I) Perylene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.747	0.757	0.987	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE

Bold denotes exceeded criteria

mg/kg = milligrams per kilogram NE = Not Established **17.8** Denotes values that exceed criteria

Source of Cleanup Objectivess - 35 IAC Subtitle G Chapter I Subchapter F Section 742 Appendix B Table A Tier 1 soil Remediation Objectives for Residential Properties

C - No toxicity criteria available for the route of exposure

'130/1.3 = Inhalation objective for residential/construction worker

Table 1A
Semi-Volatile Organic Compounds in Sediment 2006 and 2007
Laboratory Analytical Reuslts - Target Analyte List
Naval Station Great Lakes, Illinois

			Field Sample ID	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45A	Tier 1 Residential Soil Cleanup Objectives		Soil Component of the Groundwater Ingestion Exposure Route Values	
			Date of Sample Collection:	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/13/2007	6/13/2007	6/14/2007	6/13/2007	6/14/2007	6/13/2007	6/13/2007	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)
			Time of Sample Collection:	4:40 PM	4:00 PM	8:30 AM	2:30 PM	3:15 PM	12:20 PM	11:25 AM	1:00 PM	10:10 AM	3:15 PM	9:10 AM	6:50 PM	1:45 PM		5:05 PM				
			Date Analyzed:	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007				
			GAL Sample ID	0706036-15	0706036-14	0706036-06	0706036-12	0706036-13	0706036-09	0706036-08	0706036-10	0706036-02	0706036-01	0706036-07	0706036-05	0706036-11	0706036-04	0706036-03				
SVOCs (8270C)	**Units**	**Rep. Limit**																				
Phenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	23,000	C	100	100
Bis (2-Chloroethyl) Ether	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.6	0.2	0.0004	0.0004
2-Chlorophenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	390	53,000	4	4
1,3 - Dichlorobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
1,4 - Dichlorobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	C	11,000/340	2	11
Benzyl Alcohol	mg/kg	1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	NE	NE	NE	NE
1,2 - Dichlorobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	7,000	560/310	17	43
Bis (2-Chloroisopropyl) Ether	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2 - Methylphenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	3,900	C	15	15
Hexachloroethane	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	78	C	0.5	2.6
N - Nitrosodi - n - propylamine	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.09	C	0.00005	0.00005
3-4 Methylphenol	mg/kg	0.83	0.90	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	1.58	<0.83	<0.83	<0.83	<0.83	NE	NE	NE	NE
Nitrobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	39	92/9.4	0.16	0.1
Isophorone	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	15,600	4,600	8	8
2 - Nitrophenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2,4 - Dimethylphenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	1,600	C	9	9
Bis (2 - Chloroethoxy) Methane	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2,4 - Dichlorophenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	230	C	1	1
1,2,4 - Trichlorobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	780	3,200/920	5	53
Naphthalene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	1,600	170/1.8	12	18
4 - Chloroaniline	mg/kg	1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	310	C	0.7	0.7
Hexachlorobutadiene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2-Methylnaphthalene	mg/kg	0.66	0.80	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
4 - Chloro - 3 - Cresol	mg/kg	1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	NE	NE	NE	NE
Hexachlorocyclopentadiene	mg/kg	1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	550	10/1.1	400	2,200
2,4,6 - Trichlorophenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	58	200	0.2	0.77
2,4,5 - Trichlorophenol	mg/kg	1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	7,800	C	11	55
2 - Chloronaphthalene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
3 - Nitroaniline	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
Dimethyl Phthalate	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
Acenaphthylene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2,6 - Dinitrotoluene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.9	C	0.0007	0.0007
2,4 - Dinitrotoluene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.9	C	0.0008	0.0008
Acenaphthene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	4,700	C	570	2,900
Dibenzofuran	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
2,4 - Dinitrophenol	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	160	C	0.2	0.2
2 - Nitroaniline	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
4 - Nitrophenol	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
Diethyl Phthalate	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	63,000	2,000	470	470
4 - Chlorophenylphenyl Ehter	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
Fluorene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	3,100	C	1	5
4 - Nitroaniline	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
N - Nitrosodiphenylamine and Diphenylamine*	mg/kg	0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	130	C	1	5.6
4,6 - Dinitro - 2 - Methylphenol	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	NE	NE	NE	NE
4 - Bromophenylphenyl Ether	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
Hexachlorobenzene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.4	1	2	11
Pentachlorophenol	mg/kg	3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	3	C	0.031	0.14
Phenanthrene	mg/kg	0.66	2.55	2.13	1.86	1.21	2.52	1.09	<0.66	0.85	<0.66	<0.66	1.09	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE
Anthracene	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	23,000	C	12,000	59,000
Di - N - Butyl Phthalate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NE	NE	NE	NE
Fluoranthene	mg/kg	0.66	3.32	3.32	3.52	1.85	3.6	1.58	<0.66	1.3	0.68	0.72	2.3	<0.66	<0.66	<0.66	<0.66	<0.66	3,100	C	4,300	21,000
Pyrene	mg/kg	0.66	2.59	2.63	2.74	1.55	2.96	1.34	<0.66	1.12	<0.66	0.66	1.93	<0.66	<0.66	<0.66	<0.66	<0.66	2,300	C	4,200	21,000
Butyl benzyl Phthalate	mg/kg	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	16,000	930	930	930
Benzo (A) Anthracene	mg/kg	0.66	**1.19**	**1.09**	**1.22**	<0.66	**1.23**	<0.66	<0.66	<0.66	<0.66	<0.66	**1.01**	<0.66	<0.66	<0.66	<0.66	<0.66	**0.9**	C	2	8
Chrysene	mg/kg	0.66	1.39	1.45	1.47	0.86	1.51	0.75	<0.66	<0.66	<0.66	<0.66	0.99	<0.66	<0.66	<0.66	<0.66	<0.66	88	C	160	800
3,3 - Dichlorobenzidine	mg/kg	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	1	C	0.007	0.033
Bis-2 ethylhexyl phthalate	mg/kg	0.66	2.32	1.95	3.54	6.82	6.3	0.72	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	46	31,000	3,600	31,000
Di - N - Octyl Phthalate	mg/kg	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	<0.86	1,600	10,000	10,000	10,000
Benzo (B) Fluoranthene	mg/kg	0.92	**0.95**	**0.99**	**1.29**	<0.92	**1.12**	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	**0.9**	C	5	25
Benzo (K) Fluoranthene	mg/kg	0.66	0.76	0.77	0.95	1.27	0.85	<0.66	<0.66	<0.66	<0.66	<0.66	0.72	<0.66	<0.66	<0.66	<0.66	<0.66	9	C	49	250
Benzo (A) Pyrene	mg/kg	0.66	**0.88**	**0.82**	**1.21**	<0.66	**1.02**	<0.66	<0.66	<0.66	<0.66	<0.66	**0.79**	<0.66	<0.66	<0.66	<0.66	<0.66	**0.09**	C	8	82
Indeno (1,2,3-cd) Pyrene	mg/kg	0.66	<0.66	<0.66	0.87	<0.66	0.75	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	0.9	C	14	69
Dibenzo (A,H) Anthracene	mg/kg	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	0.09	C	2	7.6
Benzo (g,h,i) Perylene	mg/kg	0.66	<0.66	<0.66	0.77	<0.66	0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	NE	NE	NE	NE

mg/kg = milligrams per kilogram NE = Not Established **17.8** Denotes values that exceed criteria **Bold** denotes exceeded criteria

Source of Cleanup Objectivess - 35 IAC Subtitle G Chapter I Subchapter F Section 742 Appendix B Table A Tier 1 soil Remediation Objectives for Residential Properties

C - No toxicity criteria available for the route of exposure

'130/1.3 = Inhalation objective for residential/construction worker

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Table 1B
Volatile Organic Compounds in Sediment 2006 and 2007
Laboratory Analytical Results - Target Analyte List
Naval Station Great Lakes, Illinois

																		Tier 1 Residential Soil Cleanup Objectives Route Specific Values		Soil Component of the Groundwater Ingestion Exposure Route Values	
		Field Sample ID	#1	#8	#9	#10	#12	#13	#14	#19	#20	#21	#22	#23	#24	#25	#27				
		Date of Sample Collection:	6/15/2006	6/16/2006	6/16/2006	6/15/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006				
		Time of Sample Collection:	7:30 PM	11:45 AM	12:00 PM	8:00 PM	1:15 PM	1:45 PM	2:45 PM	5:15 PM	5:15 PM	5:30 PM	6:00 PM	6:10 PM	6:20 PM	6:45 PM	7:10 PM				
		GAL Sample ID	38022	38047	38052	38057	38067	38072	38077	38102	38107	38112	38117	38122	38127	38132	38145	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)
VOCs (5035/8260B)																					
Date Analyzed:	**Units**	**Rep. Limit**	6/20/2006	6/20/2006	6/20/2006	6/20/2006	6/20/2006	6/20/2006	6/20/2006	6/20/2006	6/20/2006	6/20/2006	6/21/2006	6/21/2006	6/21/2006	6/21/2006	6/21/2006				
Chloromethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE
Vinyl Chloride	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.46	0.28	0.01	0.07
Bromomethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE
Chloroethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE
Acetone	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	70,000	100,000	25	25
1,1 - Dichloroethene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	3,900	290/3	0.06	0.3
Methylene Chloride	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	85	13	0.02	0.2
Carbon Disulfide	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	7,800	720	32	160
Trans-1,2-Dichloroethene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	1,600	3,100	0.7	3.4
1,1-Dichloroethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	7,800	1,300/130	23	110
Vinyl Acetate	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE
2-Butanone	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE
Cis-1,2-Dichloroethene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	780	1,200	0.4	1.1
Chloroform	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	100	0.3	0.6	2.9
1,2-Dichloroethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE
1,1,1-Trichloroethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	C	1,200	2	9.6
Carbon Tetrachloride	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	5	0.3	0.07	0.33
Benzene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	1.2	0.8	0.03	0.17
1,2-Dichloropropane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	9	15/0.5	0.03	0.15
Trichloroethene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	58	5	0.06	0.3
Bromodichloromethane	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	10	3,000	0.6	0.6
Cis-1,3-Dichloropropene	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	6.4	1.1/0.39	0.004	0.02
4-Methyl-2-Pentanone	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE
Trans-1,3-Dichloropropene	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	6.4	1.1/0.39	0.004	0.02
1,1,2-Trichloroethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	310	1,800	0.02	0.3
Toluene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	1,600	1,500/42	4	18
Dibromochloromethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	1,600	1,300	0.4	0.4
2-Hexanone	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE
Tetrachloroethene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	12	11	0.06	0.3
Chlorobenzene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	1,600	130/1.3	1	6.5
Ethyl Benzene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	7,800	400/58	13	19
Bromoform	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	81	53	0.8	0.8
Styrene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	16,000	1,500/430	4	18
Xylenes (Total)	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	16,000	320/5.6	150	150
1,1,2,2-Tetrachloroethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE

Bold denotes exceeded criteria

mg/kg = milligrams per kilogram

17.8 Denotes values that exceed criteria

Source of Cleanup Objectivess - 35 IAC Subtitle G Chapter I Subchapter F Section 742 Appendix B Table A Tier 1 soil Remediation Objectives for Residential Properties

C - No toxicity criteria available for the route of exposure

130/1.3 = Inhalation objective for residential/construction worker

NE = Not Established

Table 1B
Volatile Organic Compounds in Sediment 2006 and 2007
Laboratory Analytical Results - Target Analyte List
Naval Station Great Lakes, Illinois

			Field Sample ID	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45A	Tier 1 Residential Soil Cleanup Objectives		Soil Component of the Groundwater Ingestion Exposure Route Values	
			Date of Sample Collection:	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/13/2007	6/13/2007	6/14/2007	6/13/2007	6/14/2007	6/13/2007	6/13/2007				
			Time of Sample Collection:	4:40 PM	4:00 PM	8:30 AM	2:30 PM	3:15 PM	12:20 PM	11:25 AM	1:00 PM	10:10 AM	3:15 PM	9:10 AM	6:50 PM	1:45 PM		5:05 PM	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)
			Date Analyzed:	6/19/2007	6/19/2007	6/19/2007	6/19/2007	6/19/2007	6/19/2007	6/19/2007	6/19/2007	6/19/2007	6/19/2007	6/19/2007	6/20/2007	6/19/2007	6/19/2007	6/19/2007				
			GAL Sample ID	0706036-15	0706036-14	0706036-06	0706036-12	0706036-13	0706036-09	0706036-08	0706036-10	0706036-02	0706036-01	0706036-07	0706036-05	0706036-11	0706036-04	0706036-03				
VOCs (8260B)	**Units**	**Rep. Limit**																				
Chloromethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE
Vinyl chloride	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.46	0.28	0.01	0.07
Bromomethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE
Chloroethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE
Acetone	mg/kg	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	70,000	100,000	25	25
1,1-Dichloroethene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	3,900	290/3	0.06	0.3
Methylene chloride	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	85	13	0.02	0.2
Carbon Disulfide	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	7,800	720	32	160
trans-1,2-Dichloroethene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	1,600	3,100	0.7	3.4
1,1-Dichloroethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	7,800	1,300/130	23	110
Vinyl Acetate	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE
2-Butanone	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.011	<0.005	<0.005	<0.005	NE	NE	NE	NE
cis-1,2-Dichloroethene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	780	1,200	0.4	1.1
Chloroform	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	100	0.3	0.6	2.9
1,2-Dichloroethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE
1,1,1-Trichloroethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	C	1,200	2	9.6
Carbon tetrachloride	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	5	0.3	0.07	0.33
Benzene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	1.2	0.8	0.03	0.17
1,2-Dichloropropane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	9	15/0.5	0.03	0.15
Trichloroethene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	58	5	0.06	0.3
Bromodichloromethane	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	10	3,000	0.6	0.6
cis-1,3-Dichloropropene	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	6.4	1.1/0.39	0.004	0.02
4-Methyl-2-Pentanone	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE
trans-1,3-Dichloropropene	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	6.4	1.1/0.39	0.004	0.02
1,1,2-Trichloroethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	310	1800	0.02	0.3
Toluene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	1,600	1,500/42	4	18
Chlorodibromomethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	1,600	1,300	0.4	0.4
2-Hexanone	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE
Tetrachloroethene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	12	11	0.06	0.3
Chlorobenzene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	1,600	130/1.3	1	6.5
Ethylbenzene	mg/kg	0.005	<0.005	<0.005	0.02	<0.005	<0.005	<0.005	<0.005	<0.005	0.009	0.009	<0.005	0.01	<0.005	0.006	<0.005	7,800	400/58	13	19	
Bromoform	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	81	53	0.8	0.8
Styrene	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	16,000	1,500/430	4	18
Xylenes, total	mg/kg	0.005	<0.005	<0.005	0.08	<0.005	<0.005	<0.005	0.029	<0.005	0.039	0.035	0.015	0.039	<0.005	0.025	<0.005	16,000	320/5.6	150	150	
1,1,2,2-Tetrachloroethane	mg/kg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE

Bold denotes exceeded criteria

mg/kg = milligrams per kilogram **17.8** Denotes values that exceed criteria
Source of Cleanup Objectivess - 35 IAC Subtitle G Chapter I Subchapter F Section 742 Appendix B Table A Tier 1 soil Remediation Objectives for Residential Properties
C - No toxicity criteria available for the route of exposure
130/1.3 = Inhalation objective for residential/construction worker
NE = Not Established

DRAFT

Table 1C
Metals and Cyanide in Sediment 2006 and 2007
Laboratory Analytical Results - Target Analyte List
Naval Station Great Lakes, Illinois

Field Sample ID:			#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	Tier 1 Residential Soil Cleanup Objectives		Soil Component of the Groundwater Ingestion Exposure Route Values
Date of Sample Collection:			6/15/2006	6/15/2006	6/15/2006	6/15/2006	6/15/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/15/2006	6/15/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	Ingestion	Inhalation	
Time of Sample Collection:			7:30 PM	4:30 PM	6:00 PM	6:20 PM	6:30 PM	11:00 AM	11:20 AM	11:45 AM	12:00 PM	8:00 PM	7:00 PM	1:15 PM	1:45 PM	2:45 PM	3:00 PM	(mg/kg)	(mg/kg)	Class I (mg/kg) / Class II (mg/kg)
GAL Sample ID			38014	38019	38024	38029	38034	38039	38044	38049	38054	38059	38064	38069	38074	38079	38084			
Cyanide, Total (4500CN,C,E)																				
Date Analyzed:	Units	Rep. Limit	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/26/2006			
Cyanide, Total	mg/kg	0.10	<0.10	<0.10	0.29	0.23	<0.10	<0.10	<0.10	<0.10	0.27	1.25	<0.10	<0.10	0.17	<0.10	<0.10	1,600	---	40 / 120
Total Metals (6010B)																				
Date Analyzed:	Units	Rep. Limit	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006			
Aluminum	mg/kg	5.0	2580	2260	6040	5970	4780	3360	2600	6580	6080	10300	2040	6920	8610	6780	3420	NE	NE	- / -
Antimony	mg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.94	<1.0	<1.0	<1.0	<1.0	<1.0	31	C	5 / 20
Arsenic	mg/kg	0.2	8.3	6.3	12.6	11.3	12.0	7.1	5.5	11.0	**23.0**	**19.3**	5.2	**29.4**	11.5	9.6	7.0	**13**	750	30 / 120
Barium	mg/kg	0.1	11.9	12.7	39.5	31.7	22.0	14.0	9.3	34.0	38.1	86.4	9.2	69.8	43.7	35.3	13.9	5,500	690,000	1,800 / 1,800
Beryllium	mg/kg	0.1	0.2	0.3	0.5	0.5	0.4	0.3	0.3	0.6	0.4	0.9	0.3	0.7	0.7	0.6	0.3	160	1,300	1,000 / 130,000
Cadmium	mg/kg	0.1	0.6	0.5	2.1	1.2	0.8	0.3	0.3	1.0	3.2	4.7	1.0	4.1	1.6	0.9	0.3	78	1,800	59 / 590
Calcium	mg/kg	10	67200	62800	88100	99100	68700	82600	72300	96800	73800	80400	68600	99600	94700	97200	85500	G	C	- / -
Chromium	mg/kg	0.1	11.8	11.4	37.0	32.9	15.1	13.6	7.2	24.8	45.5	63.0	9.3	86.4	37.9	21.2	10.1	230	270	32 / -
Cobalt	mg/kg	0.1	3.7	3.1	7.0	6.7	5.6	4.7	3.5	7.2	9.1	9.8	3.8	8.4	8.1	7.2	4.7	4,700	C	- / -
Copper	mg/kg	0.1	26.7	20.7	112.0	65.3	32.4	14.7	9.2	71.8	156	286.2	37.9	138.0	100.0	56.4	17.5	2,900	C	330,000 / 330,000
Iron	mg/kg	1.0	9320	8370	15200	15100	12400	8720	7300	16400	18300	19000	14200	21400	18500	16700	9170	C	C	- / -
Lead	mg/kg	0.2	40.3	29.0	**125.0**	**115.0**	**116.0**	61.3	43.8	**129.0**	96.7	**193**	16.2	**237**	**156.0**	79.2	105.0	400	C	107 / 1,420
Magnesium	mg/kg	10	42900	28600	42700	50100	25900	37200	31500	62000	35800	37400	32000	46200	49500	68300	39100	325,000	C	- / -
Manganese	mg/kg	0.1	347	275	564	550	959	324	269	671	474	743	274	655	622	767	342	1,600	69,000	- / -
Nickel	mg/kg	0.1	9.3	7.2	26.8	20.7	12.3	8.5	6.2	19.0	19.8	93.1	7.0	43.2	24.4	17.1	9.1	1,600	13,000	700 / 14,000
Potassium	mg/kg	10	856	804	2300	2330	1300	1150	798	2580	2300	3020	629	2660	3320	2880	1120	G	C	- / -
Selenium	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	1.3	<0.2	<0.2	<0.2	<0.2	<0.2	390	C	3.3 / 3.3
Silver	mg/kg	0.1	0.2	0.3	4.9	4.6	<0.1	<0.1	<0.1	0.7	1.4	25.3	<0.1	9.5	2.0	0.3	<0.1	390	C	39 / -
Sodium	mg/kg	10	409	377	542	624	558	535	433	635	462	643	403	625	594	619	538	G	C	- / -
Thallium	mg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6.3	C	3.4 / 34
Vanadium	mg/kg	1.0	11.2	15.1	17.5	18.3	15.9	12.3	10.8	23.1	23.1	30.2	25.2	21.4	23.1	21.6	12.4	550	C	980 / -
Zinc	mg/kg	0.5	118.0	82.1	274	212	289	85.3	68.2	214	279	516	93.8	378.3	284	168	85.2	23,000	C	16,000 / 32,000
Total Metals (7470A)																				
Date Analyzed:	Units	Rep. Limit	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006			
Mercury	mg/kg	0.05	0.15	0.10	0.51	0.43	0.07	<0.05	<0.05	0.19	0.48	0.59	<0.05	0.66	0.25	0.17	<0.05	23	10	6.4 / 32

Bold denotes exceeded criteria

mg/kg = milligrams per kilogram

17.8 Denotes values that exceed criteria

NE - Not Established

Source of Cleanup Objectives - 35 IAC Subtitle G Chapter I Subchapter F Section 742 Appendix B Table A Tier 1 soil Remediation Objectives for Residential Properties

C - No toxicity criteria available for the route of exposure

G - chemical-specific properties are such that this route is not of concern at any soil contaminant concentration

Soil component for the groundwater ingestion route uses the pH specific tables from Appendix B Tables C and D with a pH from June 2006 testing of pH with an average value of 7.45 units

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Table 1C
Metals and Cyanide in Sediment 2006 and 2007
Laboratory Analytical Results - Target Analyte List
Naval Station Great Lakes, Illinois

																		Tier 1 Residential Soil Cleanup Objectives		Soil Component of the Groundwater Ingestion Exposure Route Values	
Field Sample ID			#16	#17	#18	#19	#20	#21	#22	#23	#24	#25	#26	#27	#28	#29	#30				
Date of Sample Collection:			6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006				
Time of Sample Collection:			3:30 PM	4:15 PM	4:10 PM	5:15 PM	5:15 PM	5:30 PM	6:00 PM	6:10 PM	6:20 PM	6:45 PM	7:00 PM	7:10 PM	7:15 PM	7:00 PM	5:30 PM				
GAL Sample ID			38089	38094	38099	38104	38109	38114	38119	38124	38129	38139	38142	38147	38152	38157	38162	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)
Cyanide, Total (4500CN,C,E)																					
Date Analyzed:	Units	Rep. Limit	6/26/2006	6/26/2006	6/26/2006	6/26/2006	6/26/2006	6/26/2006	6/26/2006	6/26/2006	6/26/2006	6/26/2006	6/26/2006	6/26/2006	6/26/2006	6/26/2006	6/26/2006				
Cyanide, Total	mg/kg	0.10	<0.10	<0.10	0.37	<0.10	0.19	0.35	0.37	0.35	3.02	0.46	<0.10	0.20	<0.10	<0.10	<0.10	1,600	---	40	120
Total Metals (6010B)																					
Date Analyzed:	Units	Rep. Limit	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/28/2006				
Aluminum	mg/kg	5.0	2020	2650	6270	3990	7490	12500	8930	8060	14300	5900	1310	5200	4830	4730	2560	NE	NE	-	-
Antimony	mg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10.4	1.4	<1.0	<1.0	<1.0	<1.0	1.23	31	C	5	20
Arsenic	mg/kg	0.2	5.5	7.7	**31.3**	5.5	**13.9**	12.0	11.4	9.7	**24.3**	**14.1**	1.6	**13.9**	8.0	12.3	4.8	**13**	750	30	120
Barium	mg/kg	0.1	9.0	8.3	38.2	16.8	43.7	68.8	61.3	62.7	189	52.1	5.1	31.7	23.1	30.7	11.5	5,500	690,000	1,800	1,800
Beryllium	mg/kg	0.1	0.2	0.3	0.6	0.3	0.6	0.8	0.7	0.7	1.4	0.7	0.1	0.4	0.4	0.5	0.2	160	1,300	1,000	130,000
Cadmium	mg/kg	0.1	0.1	0.3	2.5	0.4	1.4	2.0	2.7	2.5	12.2	1.5	0.2	1.6	0.5	1.0	0.7	78	1,800	59	590
Calcium	mg/kg	10	43000	66600	81300	71237	88500	98200	61800	73000	62200	50800	41500	89100	86100	110000	81600	G	C	-	-
Chromium	mg/kg	0.1	6.2	10.0	65.9	11.4	38.7	34.3	42.8	33.0	179	19.3	3.4	34.9	14.5	24.3	15.7	230	270	32	-
Cobalt	mg/kg	0.1	2.7	3.9	6.9	4.4	7.5	11.0	8.6	8.0	20.7	8.2	1.8	6.4	5.7	6.0	6.1	4,700	C	-	-
Copper	mg/kg	0.1	24.4	11.4	99.6	32.9	98.5	156.0	235	264	353	238	11.2	85.8	38.1	48.7	36.7	2,900	C	330,000	330,000
Iron	mg/kg	1.0	6740	9450	19200	9329	17200	24000	18600	18100	26600	13300	6520	15100	12200	14900	27400	C	C	-	-
Lead	mg/kg	0.2	41.5	76.3	**176**	55.7	**258**	**121.0**	**180**	**210**	**313**	**171**	5.3	**174**	80.9	**132.0**	25.0	400	C	107	1,420
Magnesium	mg/kg	10	18300	29600	38800	32650	44500	51800	31700	37800	29000	26000	19000	46500	45600	60800	49600	325,000	C	-	-
Manganese	mg/kg	0.1	213	288	507	374.6	583	743	529	592	748	464	159	560	519	625	410	1,600	69,000	-	-
Nickel	mg/kg	0.1	5.4	8.1	25.5	9.5	26.3	30.6	28.5	29.2	216	29.8	2.7	20.9	12.5	16.0	10.3	1,600	13,000	700	14,000
Potassium	mg/kg	10	511	808	2200	1512	2740	3000	2720	2520	3610	1940	354	1950	1850	1630	785	G	C	-	-
Selenium	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**5.7**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	390	C	3.3	3.3
Silver	mg/kg	0.1	<0.1	<0.1	3.7	0.1	1.6	1.7	3.7	3.4	**107.0**	3.9	<0.1	1.8	<0.1	0.3	<0.1	390	C	39	-
Sodium	mg/kg	10	311	404	513	410	517	616	487	37800	661	693	269	467	434	633	442	G	C	-	-
Thallium	mg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6.3	C	3.4	34
Vanadium	mg/kg	1.0	8.7	12.6	19.0	12.7	18.8	30.0	21.8	22.4	36.1	19.0	9.8	17.0	15.8	18.3	82.2	550	C	980	-
Zinc	mg/kg	0.5	53.6	85.8	359	95.0	249	473	700	998	703	612	51.6	228	125	188	132	23,000	C	16,000	32,000
Total Metals (7470A)																					
Date Analyzed:	Units	Rep. Limit	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/23/2006	6/27/2006	6/27/2006	6/27/2006	6/28/2006	6/27/2006	6/27/2006	6/27/2006	6/27/2006	6/27/2006	6/27/2006				
Mercury	mg/kg	0.05	<0.05	<0.05	0.64	0.10	0.34	0.43	0.52	0.41	1.29	0.31	0.10	<0.05	<0.05	0.25	<0.05	23	10	6.4	32

Bold denotes exceeded criteria

mg/kg = milligrams per kilogram **17.8** Denotes values that exceed criteria
NE - Not Established
Source of Cleanup Objectives - 35 IAC Subtitle G Chapter I Subchapter F Section 742 Appendix B Table A Tier 1 soil Remediation Objectives for Residential Properties
C - No toxicity criteria available for the route of exposure
G - chemical-specific properties are such that this route is not of concern at any soil contaminant concentration
Soil component for the groundwater ingestion route uses the pH specific tables from Appendix B Tables C and D with a pH from June 2006 testing of pH with an average value of 7.08 units

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Table 1C
Metals and Cyanide in Sediment 2006 and 2007
Laboratory Analytical Results - Target Analyte List
Naval Station Great Lakes, Illinois

Field Sample ID			31	32	33	34	35	36	37	38	39	40	41	42	43	44	45A	Tier 1 Residential Soil Cleanup Objectives		Soil Component of the Groundwater Ingestion Exposure Route Values	
Date of Sample Collection:			6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/13/2007	6/13/2007	6/14/2007	6/13/2007	6/14/2007	6/13/2007	6/13/2007				
Time of Sample Collection:			4:40 PM	4:00 PM	8:30 AM	2:30 PM	3:15 PM	12:20 PM	11:25 AM	1:00 PM	10:10 AM	3:15 PM	9:10 AM	6:50 PM	1:45 PM		5:05 PM				
GAL Sample ID			0706036-15	0706036-14	0706036-06	0706036-12	0706036-13	0706036-09	0706036-08	0706036-10	0706036-02	0706036-01	0706036-07	0706036-05	0706036-11	0706036-04	0706036-03	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)
Cyanide, Total (4500CN,C,E)																					
Date Analyzed:	**Units**	**Rep. Limit**	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007	6/20/2007				
Cyanide, Total	mg/kg	0.10	0.87	1.59	0.62	3.50	1.69	0.65	<0.1	0.82	0.87	0.57	0.78	<0.1	0.34	<0.1	<0.1	1,600	---	40	120
Total Metals (6010B)																					
Date Analyzed:	**Units**	**Rep. Limit**	6/27/2007	6/27/2007	6/27/2007	6/27/2007	6/27/2007	6/27/2007	6/27/2007	6/27/2007	6/27/2007	6/27/2007	6/27/2007	6/27/2007	6/27/2007	6/27/2007	6/27/2007				
Aluminum	mg/kg	5.0	7729	9745	5273	9023	18881	5424	3733	10449	6910	6170	7945	3482	4986	5675	2758	NE	NE	-	-
Antimony	mg/kg	1.0	2.81	4.42	<1.0	2.92	5.95	<1.0	<1.0	1.68	2.68	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	31	C	5	20
Arsenic	mg/kg	0.2	8.98	**20.9**	9.93	**13.0**	**27.8**	**13.3**	4.41	**34.5**	**33**	**14.6**	**38.1**	4.64	9.37	**13.4**	7.86	**13**	750	30	120
Barium	mg/kg	0.1	50.5	95.4	30.6	58.7	139.0	32.3	15.4	71.5	58.9	31.9	47.7	14.8	22.2	29.1	15.7	5,500	690,000	1,800	1,800
Beryllium	mg/kg	0.1	0.84	0.88	0.54	1.02	1.39	0.42	0.25	0.84	0.67	0.54	0.64	0.26	0.4	0.39	0.26	160	1,300	1,000	130,000
Cadmium	mg/kg	0.1	4.49	10.8	1.88	5.54	6.74	1.98	0.76	7.24	4.96	2.43	3.52	0.9	1.71	2.86	0.90	78	1,800	59	590
Calcium	mg/kg	10	67659	83002	61988	82945	105514	58342	94589	99613	92580	91535	85055	101096	112650	96871	66641	G	C	-	-
Chromium	mg/kg	0.1	27.2	59.1	21.1	64.9	82.9	29.7	8.7	90.0	70.2	49.3	73.2	10.1	21.1	43.1	13.7	230	270	32	-
Cobalt	mg/kg	0.1	8.84	18.30	6.98	8.89	13.5	5.23	4.29	11.4	8.05	6.89	7.85	5.29	6.2	6.62	4.4	4,700	C	-	-
Copper	mg/kg	0.1	284	468.8	127	630	307	92.4	34.7	225	153	76.8	178	23.6	70.4	116	23.1	2,900	C	330,000	330,000
Iron	mg/kg	1.0	15441	23588	15028	20117	29155	12361	12208	27932	20797	16741	21784	11335	15697	21685	9513	C	C	-	-
Lead	mg/kg	0.2	213	299	**276.0**	321	**301**	**91.3**	**16.8**	**256**	**1974**	**131**	251	**26.8**	63.3	**124**	114.0	**400**	C	107	1,420
Magnesium	mg/kg	10	35654	39658	33007	41545	46410	29665	49565	49470	44680	45768	43889	49259	58699	47007	30291	325,000	C	-	-
Manganese	mg/kg	0.1	507	762	415	550	1228	393	455	687	596	486	630	373	489	478	278	1,600	69,000	-	-
Nickel	mg/kg	0.1	102	73.9	21.5	70.7	118	25.6	9.5	42.7	47	25.9	34.3	10.1	16.1	18.8	11	1,600	13,000	700	14,000
Potassium	mg/kg	10	2372	3066	1610	2974	6743	1695	1236	3466	2402	2187	2307	1186	1794	1844	722	G	C	-	-
Selenium	mg/kg	0.2	5.76	2.51	<0.2	1.6	2.78	<0.2	<0.2	<0.2	**<0.2**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	390	C	3.3	3.3
Silver	mg/kg	0.1	17.8	16.8	1.74	35.6	23.4	5.93	0.13	8.24	**9.3**	3.78	4.16	<0.1	0.53	0.78	<0.1	390	C	39	-
Sodium	mg/kg	10	477	545.0	403	510	853	367	454	589	483	405	449	438	501	454	348	G	C	-	-
Thallium	mg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6.3	C	3.4	34
Vanadium	mg/kg	1.0	19.7	26.5	17.4	23.3	43.6	14.1	14.6	26.9	24.2	18.9	19.2	20.3	25.1	18.2	10.3	550	C	980	-
Zinc	mg/kg	0.5	696	1179	445	1312.0	805	223	90	542	463	238	431	83	190	229	113	23,000	C	16,000	32,000
Total Metals (7470A)																					
Date Analyzed:	**Units**	**Rep. Limit**	6/21/2007	6/21/2007	6/21/2007	6/21/2007	6/21/2007	6/21/2007	6/21/2007	6/21/2007	6/21/2007	6/21/2007	6/21/2007	6/21/2007	6/21/2007	6/21/2007	6/21/2007				
Mercury	mg/kg	0.05	1.04	0.63	0.47	0.66	1.53	0.49	0.06	0.87	0.63	0.27	0.96	<0.05	0.18	0.06	0.08	23	10	6.4	32
Herbicides (8141/8151)	**Units**	**Rep. Limit**																			
Alachlor	mg/kg	0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	8	C		
Aldicarb	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	78	C		
Atrazine	mg/kg	0.048	<0.048	<0.048	<0.048	<0.048	<0.048	<0.048	<0.048	<0.048	<0.048	<0.048	<0.048	<0.048	<0.048	<0.048	<0.048	2,700	C		
Carborfuran	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	390	C		
Simazine	mg/kg	0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	390	C		
Silvex	mg/kg	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	360	C		
2,4-D	mg/kg	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	780	C		

Bold denotes exceeded criteria

mg/kg = milligrams per kilogram
17.8 Denotes values that exceed criteria
NE - Not Established
Source of Cleanup Objectives - 35 IAC Subtitle G Chapter I Subchapter F Section 742 Appendix B Table A Tier 1 soil Remediation Objectives for Residential Properties
C - No toxicity criteria available for the route of exposure
G - chemical-specific properties are such that this route is not of concern at any soil contaminant concentration
Soil component for the groundwater ingestion route uses the pH specific tables from Appendix B Tables C and D with a pH from June 2006 testing of pH with an average value of 7.45 units

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Table 1D
Pesticides and PCBs in Sediment 2006 and 2007
Laboratory Analytical Results - Target Analyte List
Naval Station Great Lakes, Illinois

Field Sample ID:			#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	Tier 1 Residential Soil Cleanup Objectives Route Specific Values		Soil Component of the Groundwater Ingestion Exposure Route Values	
Date of Sample Collection:			6/15/2006	6/15/2006	6/15/2006	6/15/2006	6/15/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/15/2006	6/15/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006				
Time of Sample Collection:			7:30 PM	4:30 PM	6:00 PM	6:20 PM	6:30 PM	11:00 AM	11:20 AM	11:45 AM	12:00 PM	8:00 PM	7:00 PM	1:15 PM	1:45 PM	2:45 PM	3:00 PM				
Date Analyzed:			6/28/2006	6/28/2006	6/28/2006	6/28/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	Ingestion	Inhalation	Class I	Class II
GAL Sample ID			38015	38020	38025	38030	38035	38040	38045	38050	38055	38060	38065	38070	38075	38080	38085	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Pesticides (8081A)	Units	Rep. Limit																			
4,4'-DDD	mg/kg	0.016	0.055	<0.016	0.074	<0.016	0.04	0.021	0.033	0.103	0.103	0.254	0.068	1.412	0.244	0.189	0.028	3	C	16	80
4,4'-DDE	mg/kg	0.016	<0.016	<0.016	0.039	<0.016	0.019	<0.016	0.018	0.061	0.048	0.073	0.023	0.448	0.115	0.086	0.017	2	C	54	270
4,4'-DDT	mg/kg	0.016	<0.016	<0.016	<0.016	<0.016	<0.016	0.104	<0.016	<0.016	<0.016	<0.016	<0.016	0.059	0.023	0.019	<0.016	2	G/ 2,100	32	160
Aldrin	mg/kg	0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.014	0.023	<0.008	<0.008	0.04	3	0.5	2.5
alpha-BHC	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.1	0.8	0.0005	0.003
beta-BHC	mg/kg	0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	NE	NE	NE	NE
delta-BHC	mg/kg	0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	NE	NE	NE	NE
gamma-BHC	mg/kg	0.008	<0.008	<0.008	<0.008	**0.015**	**0.129**	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.5	C	**0.009**	**0.047**
Chlordane	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1.8	72	10	48
Dieldrin	mg/kg	0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	0.04	1	0.004	0.02
Endosulfan I	mg/kg	0.008	<0.008	<0.008	<0.008	<0.008	0.015	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	470	C	18	90
Endosulfan II	mg/kg	0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	0.02	<0.016	<0.016	<0.016	NE	NE	NE	NE
Endosulfan Sulfate	mg/kg	0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	0.019	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	NE	NE	NE	NE
Endrin	mg/kg	0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	0.029	0.022	0.032	<0.016	0.107	0.046	0.038	0.017	23	C	1	5
Endrin Aldehyde	mg/kg	0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	0.04	<0.016	<0.016	<0.016	NE	NE	NE	NE
Endrin Ketone	mg/kg	0.016	<0.016	<0.016	<0.016	0.064	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	NE	NE	NE	NE
Heptachlor	mg/kg	0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.1	0.1	23	110
Heptachlor Epoxide	mg/kg	0.008	<0.008	<0.008	<0.008	<0.008	0.032	<0.008	0.009	0.013	<0.008	<0.008	<0.008	0.036	0.016	0.021	0.011	0.07	5	0.7	3.3
Methoxychlor	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	0.093	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	390	C	160	780
Toxaphene	mg/kg	0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	0.6	89	31	150
PCBs (8081A)																					
Aroclor 1016	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1*	C	H	H
Aroclor 1221	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1*	C	H	H
Aroclor 1232	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1*	C	H	H
Aroclor 1242	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1*	C	H	H
Aroclor 1248	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1*	C	H	H
Aroclor 1254	mg/kg	0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	1*	C	H	H
Aroclor 1260	mg/kg	0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	1*	C	H	H

Bold denotes exceeded criteria

mg/kg = milligrams per kilogram **17.8** Denotes values that exceed criteria
Source of Cleanup Objectivess - 35 IAC Subtitle G Chapter I Subchapter F Section 742 Appendix B Table A Tier 1 soil Remediation Objectives for Residential Properties
* - Cleanup objectives are for total PCB concentrations (all aroclors)
C - No toxicity criteria available for the route of exposure
G - chemical-specific properties are such that this route is not of concern at any soil contaminant concentration
G/2100 = Inhalation objective for residential/construction worker
H - 40 CFR 761 contains applicability requirements and methods for developing remedial objectives.
NE = Not Established

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Table 1D
Pesticides and PCBs in Sediment 2006 and 2007
Laboratory Analytical Results - Target Analyte List
Naval Station Great Lakes, Illinois

Field Sample ID:			#16	#17	#18	#19	#20	#21	#22	#23	#24	#25	#26	#27	#28	#29	#30	Tier 1 Residential Soil Cleanup Objectives Route Specific Values		Soil Component of the Groundwater Ingestion Exposure Route Values	
Date of Sample Collection:			6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006	6/16/2006				
Time of Sample Collection:			3:30 PM	4:15 PM	4:10 PM	5:15 PM	5:15 PM	5:30 PM	6:00 PM	6:10 PM	6:20 PM	6:45 PM	7:00 PM	7:10 PM	7:15 PM	7:00 PM	5:30 PM				
Date Analyzed:			6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	6/29/2006	Ingestion	Inhalation	Class I	Class II
GAL Sample ID			38090	38095	38100	38105	38110	38114	38119	38124	38129	38139	38142	38147	38152	38157	38162	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Pesticides/PCBs (808	**Units**	**Rep. Limit**																			
4,4'-DDD	mg/kg	0.016	<0.016	<0.016	0.026	0.113	0.144	0.237	0.631	0.883	2.698	**3.606**	<0.016	<0.016	0.032	0.019	<0.016	**3**	C	16	80
4,4'-DDE	mg/kg	0.016	<0.016	<0.016	<0.016	0.044	0.085	0.185	0.306	0.435	0.745	0.915	<0.016	<0.016	0.021	<0.016	<0.016	2	C	54	270
4,4'-DDT	mg/kg	0.016	<0.016	<0.016	<0.016	<0.016	<0.016	0.022	0.037	0.053	0.177	0.137	<0.016	<0.016	<0.016	<0.016	<0.016	2	G/ 2,100	32	160
Aldrin	mg/kg	0.008	<0.008	<0.008	0.008	<0.008	<0.008	<0.008	<0.008	0.009	0.022	0.025	<0.008	<0.008	0.013	0.024	<0.008	0.04	3	0.5	2.5
alpha-BHC	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.1	0.8	0.0005	0.003
beta-BHC	mg/kg	0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.009	<0.008	NE	NE	NE	NE
delta-BHC	mg/kg	0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	NE	NE	NE	NE
gamma-BHC	mg/kg	0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	**0.009**	**0.017**	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.5	C	**0.009**	**0.047**
Chlordane	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1.8	72	10	48
Dieldrin	mg/kg	0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	**0.02**	**0.023**	<0.016	<0.016	<0.016	<0.016	<0.016	0.04	1	**0.004**	**0.02**
Endosulfan I	mg/kg	0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	470	C	18	90
Endosulfan II	mg/kg	0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	0.019	0.033	0.046	<0.016	<0.016	<0.016	<0.016	<0.016	NE	NE	NE	NE
Endosulfan Sulfate	mg/kg	0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	NE	NE	NE	NE
Endrin	mg/kg	0.016	<0.016	<0.016	<0.016	0.019	0.034	0.048	0.082	0.112	0.207	0.34	<0.016	<0.016	<0.016	<0.016	<0.016	23	C	1	5
Endrin Aldehyde	mg/kg	0.016	<0.016	<0.016	<0.016	<0.016	0.053	<0.016	0.03	0.037	0.087	0.137	<0.016	<0.016	<0.016	<0.016	<0.016	NE	NE	NE	NE
Endrin Ketone	mg/kg	0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	0.121	<0.016	<0.016	<0.016	<0.016	NE	NE	NE	NE
Heptachlor	mg/kg	0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.011	<0.008	0.026	<0.008	0.1	0.1	23	110
Heptachlor Epoxide	mg/kg	0.008	<0.008	<0.008	0.01	<0.008	0.016	0.015	0.024	0.034	0.048	0.047	0.026	<0.008	<0.008	<0.008	<0.008	0.07	5	0.7	3.3
Methoxychlor	mg/kg	0.08	<0.08	<0.08	<0.08	0.11	<0.08	<0.08	<0.08	<0.08	0.083	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	390	C	160	780
Toxaphene	mg/kg	0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	0.6	89	31	150
PCBs (8081A)																					
Aroclor 1016	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1*	C	H	H
Aroclor 1221	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1*	C	H	H
Aroclor 1232	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1*	C	H	H
Aroclor 1242	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1*	C	H	H
Aroclor 1248	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1*	C	H	H
Aroclor 1254	mg/kg	0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	1*	C	H	H
Aroclor 1260	mg/kg	0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	1*	C	H	H

Bold denotes exceeded criteria

mg/kg = milligrams per kilogram **17.8** Denotes values that exceed criteria
Source of Cleanup Objectivess - 35 IAC Subtitle G Chapter I Subchapter F Section 742 Appendix B Table A Tier 1 soil Remediation Objectives for Residential Properties
* - Cleanup objectives are for total PCB concentrations (all aroclors)
C - No toxicity criteria available for the route of exposure
G - chemical-specific properties are such that this route is not of concern at any soil contaminant concentration
G/2100 = Inhalation objective for residential/construction worker
H - 40 CFR 761 contains applicability requirements and methods for developing remedial objectives.
NE = Not Established

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Table 1D
Pesticides and PCBs in Sediment 2006 and 2007
Laboratory Analytical Results - Target Analyte List
Naval Station Great Lakes, Illinois

																		Tier 1 Residential Soil Cleanup Objectives		Soil Component of the Groundwater Ingestion Exposure Route Values	
Field Sample ID			31	32	33	34	35	36	37	38	39	40	41	42	44	43	45A				
Date of Sample Collection:			6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/14/2007	6/13/2007	6/13/2007	6/14/2007	6/13/2007	6/13/2007	6/14/2007	6/13/2007				
Time of Sample Collection:			4:40 PM	4:00 PM	8:30 AM	2:30 PM	3:15 PM	12:20 PM	11:25 AM	1:00 PM	10:10 AM	3:15 PM	9:10 AM	6:50 PM		1:45 PM	5:05 PM	Ingestion	Inhalation	Class I	Class II
Date Analyzed:			6/25/2007	6/25/2007	6/22/2007	6/25/2007	6/25/2007	6/23/2007	6/23/2007	6/23/2007	6/25/2007	6/23/2007	6/23/2007	6/23/2007	6/23/2007	6/23/2007	6/23/2007	(mg/kg)	(mg/kg)		
GAL Sample ID			0706036-15	0706036-14	0706036-06	0706036-12	0706036-13	0706036-09	0706036-08	0706036-10	0706036-02	0706036-01	0706036-07	0706036-05	0706036-04	0706036-11	0706036-03			(mg/kg)	(mg/kg)
Pesticides (8081A)	**Units**	**Rep. Limit**																			
4,4'-DDD	mg/kg	0.016	2.763	0.939	0.44	0.499	0.857	0.15	<0.016	0.235	0.263	0.075	0.085	<0.016	0.016	0.018	0.021	**3**	C	16	80
4,4'-DDE	mg/kg	0.016	0.624	0.378	0.289	0.238	0.26	0.066	<0.016	0.119	0.084	0.04	0.049	<0.016	<0.016	<0.016	<0.016	2	C	54	270
4,4'-DDT	mg/kg	0.016	0.425	0.085	0.07	0.047	0.058	<0.016	<0.016	0.018	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	2	G/ 2,100	32	160
Aldrin	mg/kg	0.008	**0.093**	0.027	0.017	0.017	0.021	0.011	<0.008	0.017	0.008	<0.008	0.016	<0.008	<0.008	<0.008	0.015	**0.04**	3	0.5	2.5
alpha-BHC	mg/kg	0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.1	0.8	0.0005	0.003
beta-BHC	mg/kg	0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	NE	NE	NE	NE
Delta BHC	mg/kg	0.008	<0.008	<0.008	<0.008	0.01	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	NE	NE	NE	NE
gamma-BHC	mg/kg	0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.5	C	**0.009**	0.047
Chlordane	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1.8	72	10	48
Dieldrin	mg/kg	0.016	**0.036**	**0.029**	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	0.04	1	**0.004**	**0.02**
Endosulfan 1	mg/kg	0.008	<0.008	<0.008	0.022	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	470	C	18	90
Endosulfan II	mg/kg	0.016	0.061	0.048	0.018	0.026	0.025	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	NE	NE	NE	NE
Endosulfan Sulfate	mg/kg	0.016	<0.016	0.028	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	NE	NE	NE	NE
Endrin	mg/kg	0.016	0.268	0.138	0.047	0.069	0.068	0.023	<0.016	0.039	0.033	0.017	0.018	<0.016	<0.016	<0.016	<0.016	23	C	1	5
Endrin Aldehyde	mg/kg	0.016	0.406	0.042	<0.016	0.024	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	NE	NE	NE	NE
Endrin Ketone	mg/kg	0.016	0.081	0.062	<0.016	0.032	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	NE	NE	NE	NE
Heptachlor	mg/kg	0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.1	0.1	23	110
Heptachlor Epoxide	mg/kg	0.008	0.054	0.037	0.01	0.012	0.032	0.009	<0.008	0.02	0.011	<0.008	0.018	<0.008	0.01	<0.008	0.017	0.07	5	0.7	3.3
Methoxychlor	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	390	C	160	780
Toxaphene	mg/kg	0.16	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	0.6	89	31	150
PCBs (8081A)																					
Aroclor 1016	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1*	C	H	H
Aroclor 1221	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1*	C	H	H
Aroclor 1232	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1*	C	H	H
Aroclor 1242	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1*	C	H	H
Aroclor 1248	mg/kg	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	1*	C	H	H
Aroclor 1254	mg/kg	0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	1*	C	H	H
Aroclor 1260	mg/kg	0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	1*	C	H	H

Bold denotes exceeded criteria

mg/kg = milligrams per kilogram **17.8** Denotes values that exceed criteria
Source of Cleanup Objectivess - 35 IAC Subtitle G Chapter I Subchapter F Section 742 Appendix B Table A Tier 1 soil Remediation Objectives for Residential Properties
* - Cleanup objectives are for total PCB concentrations (all aroclors)
C - No toxicity criteria available for the route of exposure
G - chemical-specific properties are such that this route is not of concern at any soil contaminant concentration
G/2100 = Inhalation objective for residential/construction worker
H - 40 CFR 761 contains applicability requirements and methods for developing remedial objectives.
NE = Not Established

Table 2A
Great Lakes Navel Station
Sediment TCLP Analyses Summary - Metals

Parameter	Total Metals Avg (mg/kg)			TCLP Results (mg/kg)			Limits*
	WC-1	WC-2	WC-3	WC-1	WC-2	WC-3	
Arsenic	11	7	9.5	0.116	ND	0.161	5.0
Cadmium	3.4	NA	NA	0.0099	ND	ND	1.0
Lead	161	90	80	0.0686	0.0243	0.0244	5.0
*RCRA hazardous waste limits							
Note: Composite samples include the following vibracore locations:							
	WC-1:	23, 24, & 25					
	WC-2;	21 & 22					
	WC-3:	5, 7, 8, 9, 12, 13, & 14					
The selected core locations were composited vertically as well as across the							
designated core locations.							

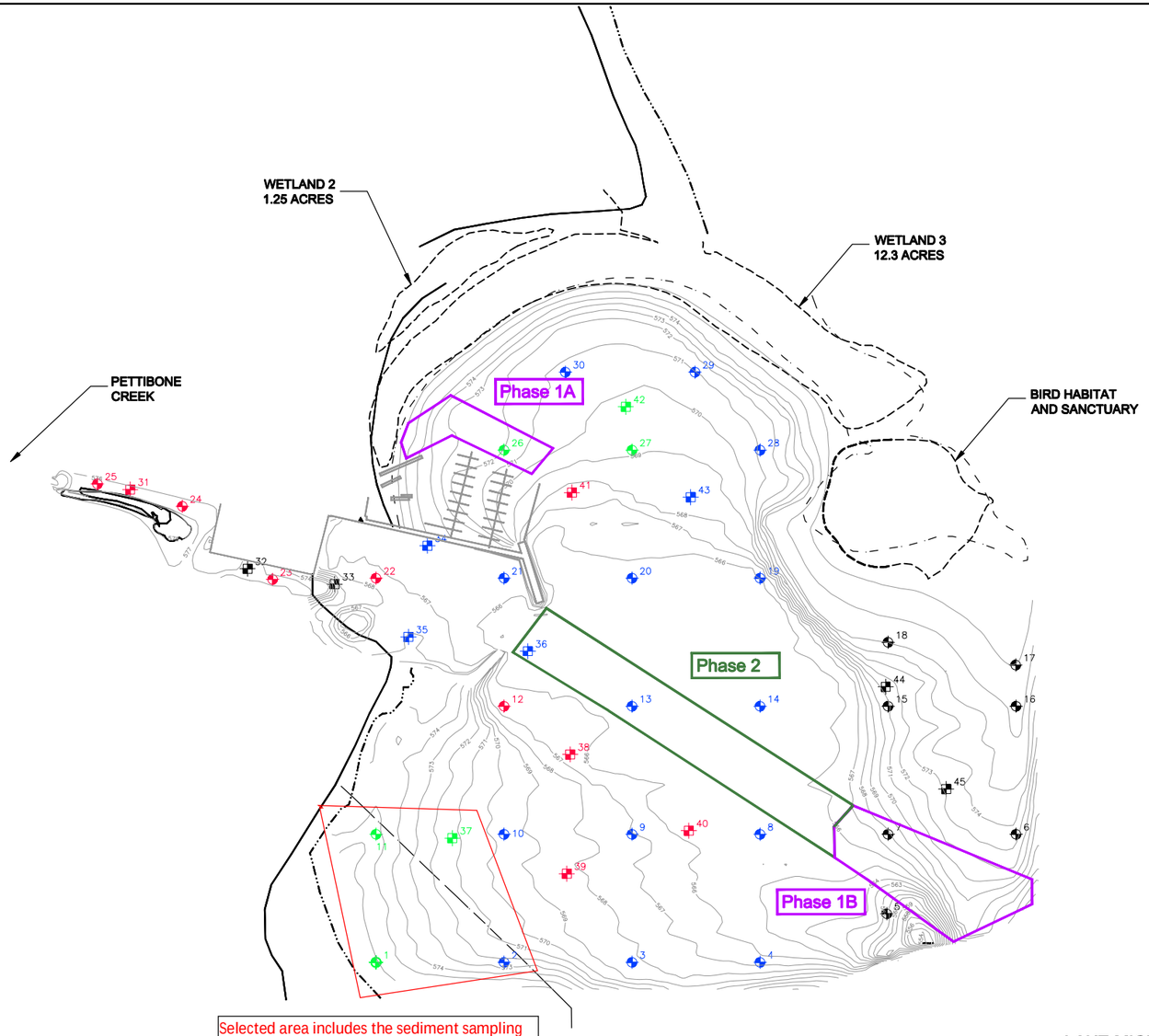
Table 2B
TCCP Analyses Summary
Laboratory Analytical Results - Waste Characterization of Sediment Samples
Naval Station Great Lakes - Dredging Permit Application Modification

		Sample ID	WC-1	WC-2	WC-3	TCLP
		Date of Sample Collection:				Regulatory
	Units	Rep. Limit				Level
Total Metals (6010B)						
Arsenic	mg/L	0.1	0.116	0.116	0.116	5.0
Barium	mg/L	1.0	<1.000	<1.000	<1.000	100.0
Cadmium	mg/L	0.0025	0.0099	0.0099	0.0099	1.0
Chromium	mg/L	0.010	<0.010	<0.010	<0.010	5.0
Lead	mg/L	0.005	0.0686	0.0243	0.0244	5.0
Mercury	mg/L	0.001	<0.001	<0.001	<0.001	0.2
Selenium	mg/L	0.025	<0.025	<0.025	<0.025	1.0
Silver	mg/L	0.001	<0.001	<0.001	<0.001	5.0
Pesticides (8081A)						
Lindane	mg/L	0.1	<0.1	<0.1	<0.1	0.4
Heptachlor	mg/L	0.002	<0.002	<0.002	<0.002	0.008
Endrin	mg/L	0.01	<0.01	<0.01	<0.01	0.02
Methoxychlor	mg/L	2.0	<2.0	<2.0	<2.0	10.0
Chlordane	mg/L	0.01	<0.01	<0.01	<0.01	0.03
Toxaphene	mg/L	0.11	<0.10	<0.10	<0.10	0.5
Herbicides (8151)						
2,4,5-TP (Silvex)	mg/L	0.0005	<0.0005	<0.0005	<0.0005	1.0
2,4-D	mg/L	0.002	<0.002	<0.002	<0.002	10.0
PCBs (8082)						
Aroclor 1016	mg/kg	0.08	<0.08	<0.08	<0.08	NE
Aroclor 1221	mg/kg	0.08	<0.08	<0.08	<0.08	NE
Aroclor 1232	mg/kg	0.08	<0.08	<0.08	<0.08	NE
Aroclor 1242	mg/kg	0.08	<0.08	<0.08	<0.08	NE
Aroclor 1248	mg/kg	0.08	<0.08	<0.08	<0.08	NE
Aroclor 1254	mg/kg	0.16	<0.16	<0.16	<0.16	NE
Aroclor 1260	mg/kg	0.16	<0.16	<0.16	<0.16	NE
SVOCs (8270C)						
1,4 - Dichlorobenzene	mg/L	1	<1	<1	<1	7.4
2 - Methylphenol	mg/L	2	<2	<2	<2	200.0
Hexachloroethane	mg/L	1	<1	<1	<1	3.0
Nitrobenzene	mg/L	0.1	<0.1	<0.1	<0.1	2.0
4 - Methylphenol	mg/L	2	<2	<2	<2	200.0
Hexachlorobutadiene	mg/L	0.2	<0.2	<0.2	<0.2	0.5
2,4,6 - Trichlorophenol	mg/L	0.2	<0.2	<0.2	<0.2	400.0
2,4,5 - Trichlorophenol	mg/L	1	<01	<01	<01	2.0
2,4 - Dinitrotoluene	mg/L	0.1	<0.1	<0.1	<0.1	0.1
Hexachlorobenzene	mg/L	0.1	<0.1	<0.1	<0.1	0.1
Pentachlorophenol	mg/L	1	<1	<1	<1	100.0
Pyridine	mg/L	1	<1	<1	<1	5.0
3-Methylphenol	mg/L	2	<2	<2	<2	200.0
VOCs (8260B)						
Vinyl Chloride	mg/L	0.02	<0.02	<0.02	<0.02	0.2
1,1 - Dichloroethene	mg/L	0.02	<0.02	<0.02	<0.02	0.7
2-Butanone	mg/L	2	<2	<2	<2	200.0
Chloroform	mg/L	0.02	<0.02	<0.02	<0.02	6.0
1,2-Dichloroethane	mg/L	0.1	<0.1	<0.1	<0.1	0.5
Carbon Tetrachloride	mg/L	0.02	<0.02	<0.02	<0.02	0.5
Benzene	mg/L	0.02	<0.02	<0.02	<0.02	0.5
Trichloroethene	mg/L	0.02	<0.02	<0.02	<0.02	0.5
Tetrachloroethene	mg/L	0.02	<0.02	<0.02	<0.02	0.7
Chlorobenzene	mg/L	0.5	<0.5	<0.5	<0.5	100.0
Other Waste Parameters						
pH	NA	NA	7.1	7.11	7.03	>2 <12
Flash Point	NA	@100°C	No Flash	No Flash	No Flash	<210°F
Paint Filter	NA	NA	Pass	Pass	Pass	NA
Cyanide, Reactive	mg/kg	10	<10	<10	<10	NA
Sulfide, Reactive	mg/kg	10	<10	<10	<10	NA
Phenols	mg/kg	2.5	<2.5	<2.5	<2.5	NA
EOX	mg/kg	30	<30	<30	<30	NA
Ammonia (as N)	mg/L	0.1	4.3	5.2	3.4	NA
COD	mg/L	10	18	14	11	NA
Oil & Grease	mg/L	1	<5	<2	<2	NA
Cyanide, Total	mg/L	0.005	<0.005	<0.005	<0.005	NA

Table 3
Geotechnical Soil Testing Results Summary
Great Lakes Naval Station

Sample #	Sample Depth	Material Description	USCS	Atterberg Limits			Moisture Content (%)	Organic Content (%)
				PL	LL	PI		
1	1.0' to 3.0'	Fine Sand Trace Silt Trace Clay - Brown and Gray	SP	-	-	-	0.20	0.64
2	2.3' to 2.9'	Fine - Medium Sand Some Silt Little Clay Trace F Gravel - Gray	SM	14	16	2	0.39	0.44
3	0.0' to 1.0'	Clayey Silt Some Fine to Medium Sand - Brown and Gray	CL-ML	19	23	4	0.63	1.69
4	2.0' to 2.5'	Silty Clay Little Fine - Medium Sand - Brown and Gray	CL	19	28	9	1.12	2.00
5	0.5' to 1.5'	Fine - Medium Sand Little Silt Trace Clay - Brown and Gray SHALE NOTED	(SM)	-	-	-	0.37	1.05
6	1.0' to 3.0'	Fine Sand Trace Silt Trace Clay - Brown and Gray	(SP-SM)	-	-	-	0.22	0.65
7	5.0' to 6.0'	Silty Fine - Medium Sand Trace Clay - Brown and Gray	(SM)	-	-	-	0.55	1.88
8	2.0' to 3.0'	Silty Clay Little Fine - Medium Sand - Brown and Gray ROOTS AND SHALE NOTED	CL	23	31	8	1.17	2.57
9	0.0' to 1.0'	Silty Clay Little Fine - Medium Sand - Brown and Gray ROOTS AND SHALE NOTED	CL	23	34	11	1.40	2.84
10	4.0'	Silty Fine - Medium Sand Trace Clay - Gray	SM	18	18	NP	29.75	2.13
11A	3.5' FROM TOP	Silty Clay and F-C Sand Trace F Gravel - Gray (CL)	(CL)	-	-	-	1.03	0.85
11B							19.63	0.54
12	4.0'	Clayey Silt Little Fine - Medium Sand - Gray	ML	34	43	9	61.12	3.90
13	3.0'	Clayey Silt Little Fine - Medium Sand - Gray	ML	28	40	12	54.49	2.21
14	3.0'	Clayey Silt Little Fine - Medium Sand - Gray	ML	28	40	12	53.20	2.46
15	6.0'	Silty Fine - Medium Sand Trace Clay - Gray	(SM)	-	-	-	23.21	0.91
16	5.0'	Fine - Medium Sand Trace Silt Trace Clay - Brown	(SM)	-	-	-	25.81	1.30
17	7.0'	Fine - Medium Sand Little Silt Sand Trace Clay - Brown	(SM)	-	-	-	27.65	1.71
18	6.0'	Clayey Silt Some Fine - Medium Sand - Gray	ML	26	30	4	45.92	1.89
19	4.0'	Clayey Silt Little F-M Sand - Gray	ML	30	48	18	64.60	2.48
20	3.0'	Clayey Silt Little Fine - Medium Sand - Gray	ML	29	44	15	76.28	2.52
21	3.0'	Silty Clay Trace Fine - Medium Sand - Gray	CL	26	45	19	57.52	2.27
22	5.5'	Silty Clay Trace Fine - Medium Sand - Gray	CL	26	45	19	54.48	3.29
23	5.0'	Clayey Silt Little Fine - Medium Sand - Gray	ML	27	43	16	53.58	4.01
24	4.0'	Clayey Silt Little Fine - Medium Sand - Gray	ML	24	32	8	41.59	3.17
25	5.0'	Clayey Silt Little Fine - Medium Sand - Gray	ML	28	42	14	53.23	5.59
26	0.0' to 0.5'	Fine - Medium Sand Trace Silt Trace Clay - Gray	(SP-SM)	-	-	-	0.14	0.34
27	0.0' to 1.0'	Silt Some Fine Sand Trace Clay - Gray	ML	23	22	NP	0.81	1.37
28	2.5' to 3.0'	Clayey Silt Little Fine Sand - Gray ROOTS NOTED	CL-ML	18	24	6	0.83	1.78
29	2.5' to 3.0'	Silty Clay Some Fine - Medium Sand - Brown and Gray ROOTS AND SHALE NOTED	CL	22	32	10	1.15	2.56
30	0.0' to 1.0'	Fine - Medium Sand Little Silt Trace Clay Trace F Gravel - Brown and Gray	(SP-SM)	-	-	-	0.18	0.44
31	0.0-8.2'	Clayey Silt Some Fine to Medium Sand - Dark Brown - Organics Noted	ML	-	-	-	-	-
34	0.0-6.3'	Fine to Medium Sand Some Silt Little Clay - Brown - Organics Noted	SM	-	-	-	-	-
38	0-6.1'	Clayey Silt Little Fine to Medium Sand - Gray	ML	-	-	-	-	-
41	0-7.4'	Clayey Silt Some Fine to Medium Sand - Dark Gray	ML	-	-	-	-	-

Notes: - No Data or Not Plastic



Selected area includes the sediment sampling locations closest to Site 12.

Dredge Area Name	Acreage	Volume of Material (cu. yds)	Depth of Dredging (IGLD85)
Phase 1 A	1.17	5,143	570
Phase 1 B	3.03	24, 568	562*
Phase 2	4.76	26,495	562*

* Depth of Dredging based on approximate elevation of original harbor bottom. Actual dredging depth may vary depending on the actual depth of the harbor bottom encounted during dredging operations.

LEGEND

- 650 — MAJOR CONTOUR (NAVD88)
- 648 — MINOR CONTOUR (NAVD88)
- 564 — 2006 LAKE BOTTOM CONTOUR (IGLD85)
- — — — — 20" ABANDONED SEWER

SEDIMENT SAMPLE ZONE COLOR CODE KEY

- 32 6 — SAND 3' TO 7' DEEP ON TOP OF 1' TO 4' OF SAND/SILT/CLAY MIXTURE
- 36 13 — MUCK 2' TO 7' DEEP ON TOP OF 1' TO 5' OF SAND AND SAND/SILT/CLAY MIXTURE
- 42 27 — SAND TO DEPTHS OF 3' TO 5'
- 32 12 — MUCK TO DEPTHS OF 6' TO 7'

NOTES

1. ELEVATION CONVERSIONS: 0.0 NTC DATUM = 580.6 MSL = 579.2 IGLD55 = 579.53 IGLD85 = 579.81 NAVD88 = +2.4 LWD
2. ELEVATIONS BASED ON 2006 SOUNDING SURVEY FROM STS CONSULTANTS. CONTOURS ARE INTERPRETED BASED UPON THE BEST AVAILABLE DATA.
3. UPLAND CONTOURS OBTAINED FROM APRIL 2002 LIDAR SURVEY PROVIDED BY THE LAKE COUNTY DEPARTMENT OF INFORMATION AND TECHNOLOGY.
4. ORIGINAL HARBOR DREDGE DEPTH = −16.72 NTC = 562.81 IGLD85.

N

200 0 200 400

1" = 200'

PROPOSED STS SAMPLING PLAN
FOR PHASE 1 AND 2

DRAWN D.C.H. | DATE February 2010 | DWG. NO. Figure 1 | REV. NO. —
SCALE 1"=200' | W.O. NO. 13676.008.001.0010 | SHT. 1 OF 1

CHECKED — | DES. ENG. — | PROJ. MGR. — | APPROVED — | APPROVED —
DATE | CLIENT APPROVALS | DATE | ISSUED FOR | DATE

GREAT LAKES NAVAL STATION
HARBOR DREDGING PROJECT
North Chicago Illinois

WESTON SOLUTIONS
VERNON HILLS ILLINOIS

NO. | DATE | APPR. | REVISION

E-4 GROUNDWATER ANALYTICAL RESULTS

LOCATION	NTC12MW01	NTC12MW02	NTC12MW03			NTC12MW04
SAMPLE ID	NTC12GW-01	NTC12GW-02	NTC12GW-03	NTC12GW-03-AVG	NTC12GW-03-D	NTC12GW-04
SAMPLE DATE	20130815	20130815	20130815	20130815	20130815	20130815
SAMPLE CODE	NORMAL	NORMAL	ORIG	AVG	DUP	NORMAL
MATRIX	GW	GW	GW	GW	GW	GW
DISSOLVED METALS (UG/L)						
ALUMINUM	50 U	50 U	50 U	50 U	50 U	50 U
ANTIMONY	1.9 U	1.8 U	0.5 U	0.5 U	0.5 U	0.5 U
ARSENIC	1.1 U	5.8	27	27.5	28	71
BARIUM	48	160	110	115	120	220
BERYLLIUM	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
CADMIUM	0.45	0.12 J	0.1 U	0.1 U	0.1 U	0.1 U
CALCIUM	190000	240000	130000	135000	140000	210000
CHROMIUM	0.95 U	0.69 U	0.5 U	0.5 U	0.5 U	0.5 U
COBALT	3.3	9	0.21 J	0.21	0.21 J	0.7 J
COPPER	7.4 J	1.8 J	0.66 J	0.705	0.75 J	0.98 J
IRON	55	3800	9100	9350	9600	18000
LEAD	0.5 U	0.22 J	0.5 U	0.5 U	0.5 U	0.5 U
MAGNESIUM	150000	58000	52000	53000	54000	85000
MANGANESE	240 J	640 J	270 J	275	280 J	670 J
MERCURY	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
NICKEL	9.3	48	0.59 J	0.775	0.96 J	1.4
POTASSIUM	5500	6700	5500	5600	5700	6900
SELENIUM	1 U	3.9 U	1 U	1 U	1 U	1 U
SILVER	0.077 J	0.1 U	0.1 U	0.056 J	0.056 J	0.1 U
SODIUM	63000	160000	95000	96500	98000	110000
THALLIUM	0.055 J	0.029 J	0.1 U	0.1 U	0.1 U	0.1 U
VANADIUM	0.55 U	0.47 U	0.21 U	0.21 U	0.21 U	0.27 U
ZINC	44	130	4.1 J	3.9	3.7 J	6.9 J
METALS (UG/L)						
ALUMINUM	50 U	50 U	50 U	50 U	50 U	57 J
ANTIMONY	1.8 U	1.8 U	0.5 U	0.5 U	0.5 U	0.5 U
ARSENIC	1 U	5.3	28	28.5	29	78
BARIUM	45 J	150 J	120 J	120	120 J	240 J
BERYLLIUM	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
CADMIUM	0.39	0.11 J	0.1 U	0.1 U	0.1 U	0.054 J
CALCIUM	190000	240000	130000	130000	130000	210000
CHROMIUM	0.81 J	0.48 J	0.24 J	0.24 J	1 U	0.5 J
COBALT	2.6	7	0.19 J	0.2	0.21 J	0.68 J
COPPER	7 J	1.6 J	0.72 J	0.75	0.78 J	2.5 J
IRON	66	3700	9300	9250	9200	19000
LEAD	0.5 U	0.21 J	0.2 J	0.205	0.21 J	2.1
MAGNESIUM	160000	56000	51000	51000	51000	87000
MANGANESE	220 J	610 J	280 J	280	280 J	740 J
MERCURY	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
NICKEL	7.2	40	0.91 J	0.945	0.98 J	1.4
POTASSIUM	5700	6400	5300	5300	5300	7100
SELENIUM	1 U	4.2	1 U	1 U	1 U	1 U
SILVER	0.06 J	0.1 U	0.1 U	0.046 J	0.046 J	0.1 U
SODIUM	65000	160000	92000	92000	92000	110000
THALLIUM	0.056 J	0.035 J	0.1 U	0.1 U	0.1 U	0.1 U
VANADIUM	0.37 J	0.22 J	0.11 J	0.11 J	1 U	0.42 J
ZINC	41	130	4.8 J	4.85	4.9 J	12

APPENDIX F

HUMAN HEALTH RISK ASSESSMENT

F-1 ILLINOIS EPA SUGGESTED NON-CANCER TOXICITY DATA – ORAL/DERMAL AND INHALATION

F-2 RAGS PART D TABLES

F-3 PROUCL OUTPUT

F-4 SAMPLE CALCULATIONS

F-1 ILLINOIS EPA SUGGESTED NON-CANCER TOXICITY DATA – ORAL/DERMAL AND INHALATION

APPENDIX F - TABLE 1
ILLINOIS EPA SUGGESTED NON-CANCER TOXICITY DATA - ORAL/DERMAL
SITE 12 - HARBOR DREDGE SPOILS AREA
NAVAL STATION GREAT LAKES, ILLINOIS

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Used in HHRA		Illinois EPA suggested RfD	Difference between Illinois EPA RfD and HHRA RfD
		Value	Units		
Chronic Toxicity Criteria					
NAPHTHALENE	Chronic	0.02	mg/kg/day	--	
AROCLOR 1254	Chronic	0.00002	mg/kg/day	--	
ALPHA-CHLORDANE	Chronic	0.0005	mg/kg/day	--	
GAMMA-CHLORDANE	Chronic	0.0005	mg/kg/day	--	
HEPTACHLOR	Chronic	0.0005	mg/kg/day	--	
HEPTACHLOR EPOXIDE	Chronic	0.000013	mg/kg/day	--	
ALUMINUM	Chronic	1	mg/kg/day	--	
ANTIMONY	Chronic	0.0004	mg/kg/day	--	
ARSENIC	Chronic	0.0003	mg/kg/day	--	
BARIUM	Chronic	0.2	mg/kg/day	--	
CADMIUM	Chronic	0.001	mg/kg/day	--	
CHROMIUM VI	Chronic	0.003	mg/kg/day	--	
COBALT	Chronic	0.0003	mg/kg/day	--	
COPPER	Chronic	0.04	mg/kg/day	--	
IRON	Chronic	0.7	mg/kg/day	--	
MANGANESE	Chronic	**0.024**	mg/kg/day	0.023	Less conservative
MERCURY[(1)]	Chronic	0.0003	mg/kg/day	--	
Subchronic Toxicity Criteria					
NAPHTHALENE	Subchronic	0.6	mg/kg/day	0.6	
AROCLOR 1254	Subchronic	0.00003	mg/kg/day	0.00003	
ALPHA-CHLORDANE	Subchronic	0.0006	mg/kg/day	0.0006	
GAMMA-CHLORDANE	Subchronic	0.0006	mg/kg/day	0.0006	
HEPTACHLOR	Chronic for SubChronic	**0.0005**	mg/kg/day	0.0001	ATSDR intermediate RfD. Lower than chronic value; therefore no change.
HEPTACHLOR EPOXIDE	Chronic for SubChronic	**0.000013**	mg/kg/day	0.00001	ATSDR intermediate RfD. Lower than chronic value; therefore no change.
ALUMINUM	Chronic for SubChronic	1	mg/kg/day	1	
ANTIMONY	Chronic for SubChronic	0.0004	mg/kg/day	0.0004	
ARSENIC	Chronic for SubChronic	0.0003	mg/kg/day	0.0003	
BARIUM	Chronic for SubChronic	0.2	mg/kg/day	0.2	
CADMIUM	Chronic for SubChronic	**0.001**	mg/kg/day	0.0005	ATSDR intermediate RfD. Lower than chronic value; therefore no change.
CHROMIUM VI	Subchronic	**0.02**	mg/kg/day	0.005	ATSDR RfD published September 2012 and was not available when HHRA was conducted. HEAST value used in HHRA as presented in USEPA RSL calculator from June 2011. HHRA less conservative; however, changing this toxicity value would not have little impact on risk characterization.
COBALT	Subchronic	0.003	mg/kg/day	0.003	
COPPER	Chronic for SubChronic	**0.04**	mg/kg/day	0.01	ATSDR intermediate RfD. Lower than chronic value; therefore no change.
IRON	Chronic for SubChronic	0.7	mg/kg/day	0.7	
MANGANESE	Chronic for SubChronic	**0.024**	mg/kg/day	0.023	Lower than chronic value; therefore no change.
MERCURY[(1)]	Subchronic	0.002	mg/kg/day	0.002	

Notes:

[1] - Values are for mercuric chloride.

Bold = Illinois EPA-suggested RfDs that differ from those in Site 12 Risk Assessment. Addressed in Uncertainty Section.

ATSDR = Agency for Toxic Substances and Disease Registry

HEAST = Health Effects Assessment Summary Tables

APPENDIX F - TABLE 2
ILLINOIS EPA SUGGESTED NON-CANCER TOXICITY DATA - INHALATION
SITE 12 - HARBOR DREDGE SPOILS AREA
NAVAL STATION GREAT LAKES, ILLINOIS

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC Used in HHRA		Illinois EPA suggested RfC	Difference between Illinois EPA RfC and HHRA RfC
		Value	Units		
Chronic Toxicity Criteria					
NAPHTHALENE	Chronic	3.0E-03	mg/m^3	--	
ALPHA-CHLORDANE	Chronic	7.00E-04	mg/m^3	--	
GAMMA-CHLORDANE	Chronic	7.00E-04	mg/m^3	--	
ALUMINUM	Chronic	5.0E-03	mg/m^3	--	
ARSENIC	Chronic	1.50E-05	mg/m^3	--	
BARIUM	Chronic	5.0E-04	mg/m^3	--	
CADMIUM	Chronic	2.0E-05	mg/m3	--	
CHROMIUM VI	Chronic	1.0E-04	mg/m^3	--	
COBALT	Chronic	6.0E-06	mg/m^3	--	
MANGANESE	Chronic	5.0E-05	mg/m^3	--	
MERCURY	Chronic	3.0E-04	mg/m^3	--	
Subchronic Toxicity Criteria					
NAPHTHALENE	Chronic for SubChronic	3.0E-03	mg/m^3	--	
ALPHA-CHLORDANE	Chronic for SubChronic	**7.00E-04**	mg/m^3	2.0E-04	ATSDR intermediate RfC. Lower than chronic value; therefore no change.
GAMMA-CHLORDANE	Chronic for SubChronic	**7.00E-04**	mg/m^3	2.0E-04	ATSDR intermediate RfC. Lower than chronic value; therefore no change.
ALUMINUM	Chronic for SubChronic	5.0E-03	mg/m^3	5.0E-03	
ARSENIC	Chronic for SubChronic	1.5E-05	mg/m^3	--	
BARIUM	Subchronic	5.0E-03	mg/m^3	--	
CADMIUM	Chronic for SubChronic	2.0E-05	mg/m^3	--	
Chromium VI	Chronic for SubChronic	**1.0E-04**	mg/m^3	3.0E-04	HHRA more conservative.
COBALT	Subchronic	2.0E-05	mg/m^3	2.0E-05	
MANGANESE	Chronic for SubChronic	5.0E-05	mg/m^3	--	
MERCURY	Chronic for SubChronic	3.0E-04	mg/m^3	--	

Notes:

Bold = Illinois EPA-suggested RfDs that differ from those in Site 12 Risk Assessment. Addressed in Uncertainty Section.

ATSDR = Agency for Toxic Substances and Disease Registry

F-2 RAGS-PART D TABLES

RAGS Part D Table 1

Selection Of Exposure Pathways

TABLE 1

SELECTION OF EXPOSURE PATHWAYS
SITE 12 - HARBOR DREDGE SPOILS AREA
NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Surface Soil	Surface Soil	Site 12	Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with surface soil during excavation activities.
				Occupational Worker	Adult	Ingestion Dermal	Quant Quant	Occupational workers may contact surface soil during normal work activities.
				Trespassers	Adolescent	Ingestion Dermal	Quant Quant	Trespassers may contact surface soil while at the site.
				Trespassers	Adult	Ingestion Dermal	Quant Quant	Trespassers may contact surface soil while at the site.
		Air	Site 12	Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to fugitive dust and volatile emissions during construction activities.
				Occupational Worker	Adult	Inhalation	Quant	Occupational workers may be exposed to fugitive dust and volatile emissions during work activities.
				Trespassers	Adolescent	Inhalation	Quant	Trespassers may be exposed to fugitive dust and volatile emissions while at the site.
				Trespassers	Adult	Inhalation	Quant	Trespassers may be exposed to fugitive dust and volatile emissions while at the site.
	Subsurface Soil	Subsurface Soil	Site 12	Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Occupational Worker	Adult	Ingestion Dermal	Quant Quant	Although exposures to subsurface soil by occupational workers is considered unlikely at the site this scenario is included to aid in future risk management decisions.
		Air	Site 12	Construction Workers	Adult	Inhalation	Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Occupational Worker	Adult	Inhalation	Quant	Although exposures to subsurface soil by occupational workers is considered unlikely at the site this scenario is included to aid in future risk management decisions.
Future	Surface Soil	Surface Soil	SWMU 18	Residents	Child	Ingestion Dermal	Quant Quant	Although a future residential scenario is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Ingestion Dermal	Quant Quant	
		Air	SWMU 18	Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Inhalation	Quant	
	Subsurface Soil	Subsurface Soil	SWMU 18	Residents	Child	Ingestion Dermal	Quant Quant	Although a future residential scenario is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Ingestion Dermal	Quant Quant	
		Air	SWMU 18	Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site this scenario is included to aid in future risk management decisions.
					Adult	Inhalation	Quant	

Notes:
Qual - Qualitative.
Quant - Quantitative.

RAGS Part D Table 2

Occurrence, Distribution And Selection Of Chemicals Of Potential Concern

TABLE 2-1

HUMAN HEALTH SURFACE SOIL COPC SELECTION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS No.	Minimum Result	Maximum Result	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects(1)	Concentration Used for Screening(2)	TACO - Residential Soil Inhalation(3)	TACO - Residential Soil Ingestion(3)	TACO - Industrial - Commercial Soil Inhalation(3)	TACO - Industrial - Commercial Soil Ingestion(3)	TACO - Construction Worker Soil Inhalation(3)	TACO - Construction Worker Soil Ingestion(3)	Non-TACO - Residential Soil Inhalation(4)	Non-TACO - Residential Soil Ingestion(4)	Non-TACO - Industrial/ Commercial/Soil Inhalation(4)	Non-TACO - Industrial Commercial Soil Ingestion(4)	Non-TACO - Construction Worker Soil Inhalation(4)	Non-TACO - Construction Worker Soil Ingestion(4)	USEPA Residential Soil Criteria(5)	USEPA Industrial Soil Criteria(5)	USEPA Residential Inhalation SSLs(6)	USEPA Industrial Inhalation SSLs(6)	USEPA Construction Worker Direct Contact SSLs(7)	USEPA Construction Worker Inhalation SSLs(7)	COPC Flag(8)	Rationale for Contaminant Deletion or Selection
SEMIVOLATILES (ug/kg)																											
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	149 J	149 J	NTC12-SB25-0005	1/10	346-398	149	31000000 SAT	46000 C	31000000 SAT	410000 C	31000000 SAT	410000 N	NC	NC	NC	NC	NC	NC	35000 C	120000 C	1400000000 C	7700000000 C	1200000 C	100000000 C	NO	BSL
CARBAZOLE	86-74-8	167 J	254 J	NTC12-SB21-0005	2/10	346-398	254	NC	32000 C	NC	290000 C	NC	6200000 C	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
DIBENZOFURAN	132-64-9	144 J	144 J	NTC12-SB27-0005	1/10	346-398	144	NC	NC	NC	NC	NC	NC	NC	7800 N	NC	200000 N	NC	82000 N	7800 N	100000 N	NC	NC	31000 N	NC	NO	BSL
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/kg)																											
2-METHYLNAPHTHALENE	91-57-6	4.77 J	87.9	NTC12-SB29-0005	10/10	--	87.9	NC	NC	NC	NC	NC	NC	NC	31000 N	NC	820000 N	NC	82000 N	23000 N	220000 N	NC	NC	89000 N	NC	NO	BSL
ACENAPHTHENE	83-32-9	2.96 J	205	NTC12-SB27-0005	10/10	--	205	NC	470000 N	NC	12000000 N	NC	12000000 N	NC	NC	NC	NC	NC	NC	340000 N	3300000 N	NC	NC	1300000 N	NC	NO	BSL
ACENAPHTHYLENE	208-96-8	4.21 J	98.1	NTC12-SB21-0005	8/10	7.22-7.92	98.1	NC	NC	NC	NC	NC	NC	NC	230000 N	NC	6100000 N	NC	6100000 N	340000 N(13)	3300000 N(13)	NC	NC	1300000 N(13)	NC	NO	BSL
ANTHRACENE	120-12-7	8.45	606	NTC12-SB27-0005	10/10	--	606	NC	2300000 N	NC	61000000 N	NC	61000000 N	NC	NC	NC	NC	NC	NC	1700000 N	17000000 N	NC	NC	6700000 N	NC	NO	BSL
BAP EQUIVALENT - FULLND(9)	NA	33.0	2084	NTC12-SB21-0005	10/10	--	2084	NC	**90 C**	NC	**800 C**	NC	17000 C	NC	NC	NC	NC	NC	NC	**15 C**	**210 C**	3000000 C	17000000 C	2100 C	230000 C	YES	ASL
BENZO(A)ANTHRACENE	56-55-3	29.3	1830	NTC12-SB21-0005	10/10	--	1830	NC	**900 C**	NC	8000 C	NC	170000 C	NC	NC	NC	NC	NC	NC	**150 C**	2100 C	30000000 C	170000000 C	21000 C	2300000 C	YES	ASL
BENZO(A)PYRENE	50-32-8	21.8	1460	NTC12-SB27-0005	10/10	--	1460	NC	**90 C**	NC	**800 C**	NC	17000 C	NC	NC	NC	NC	NC	NC	**15 C**	**210 C**	3000000 C	17000000 C	2100 C	230000 C	YES	ASL
BENZO(B)FLUORANTHENE	205-99-2	31.8	2260	NTC12-SB27-0005	10/10	--	2260	NC	**900 C**	NC	8000 C	NC	170000 C	NC	NC	NC	NC	NC	NC	**150 C**	**2100 C**	30000000 C	170000000 C	21000 C	2300000 C	YES	ASL
BENZO(G,H,I)PERYLENE	191-24-2	13.5	711	NTC12-SB21-0005	10/10	--	711	NC	NC	NC	NC	NC	NC	NC	230000 N	NC	6100000 N	NC	6100000 N	170000 N(14)	1700000 N(14)	NC	NC	670000 N(14)	NC	NO	BSL
BENZO(K)FLUORANTHENE	207-08-9	14.1 J	2280	NTC12-SB21-0005	10/10	--	2280	NC	9000 C	NC	78000 C	NC	1700000 C	NC	NC	NC	NC	NC	NC	**1500 C**	21000 C	30000000 C	170000000 C	210000 C	2300000 C	YES	ASL
CHRYSENE	218-01-9	38.5	1530	NTC12-SB21-0005	10/10	--	1530	NC	88000 C	NC	780000 C	NC	17000000 C	NC	NC	NC	NC	NC	NC	15000 C	210000 C	300000000 C	1700000000 C	2100000 C	23000000 C	NO	BSL
DIBENZO(A,H)ANTHRACENE	53-70-3	14	287	NTC12-SB21-0005	9/10	7.22	287	NC	**90 C**	NC	800 C	NC	17000 C	NC	NC	NC	NC	NC	NC	**15 C**	**210 C**	2800000 C	15000000 C	2100 C	210000 C	YES	ASL
FLUORANTHENE	206-44-0	74.3	4290	NTC12-SB21-0005	10/10	--	4290	NC	310000 N	NC	8200000 N	NC	8200000 N	NC	NC	NC	NC	NC	NC	230000 N	2200000 N	NC	NC	890000 N	NC	NO	BSL
FLUORENE	86-73-7	5.63 J	254	NTC12-SB27-0005	9/10	7.22	254	NC	310000 N	NC	8200000 N	NC	8200000 N	NC	NC	NC	NC	NC	NC	230000 N	2200000 N	NC	NC	890000 N	NC	NO	BSL
INDENO(1,2,3-CD)PYRENE	193-39-5	12.8	674	NTC12-SB21-0005	10/10	--	674	NC	900 C	NC	8000 C	NC	170000 C	NC	NC	NC	NC	NC	NC	**150 C**	2100 C	30000000 C	170000000 C	21000 C	2300000 C	YES	ASL
NAPHTHALENE	91-20-3	4.25 J	91.5	NTC12-SB27-0005	10/10	--	91.5	17000 N	160000 N	27000 N	4100000 N	180 N	410000 N	NC	NC	NC	NC	NC	NC	3600 C	18000 C	3600 C	20000 C	450000 N	31000 C	NO	BSL
PHENANTHRENE	85-01-8	56.4	2370	NTC12-SB21-0005	10/10	--	2370	NC	NC	NC	NC	NC	NC	NC	230000 N	NC	6100000 N	NC	6100000 N	170000 N(14)	1700000 N(14)	NC	NC	670000 N(14)	NC	NO	BSL
PYRENE	129-00-0	66	3190	NTC12-SB21-0005	10/10	--	3190	NC	230000 N	NC	6100000 N	NC	6100000 N	NC	NC	NC	NC	NC	NC	170000 N	1700000 N	NC	NC	670000 N	NC	NO	BSL
PESTICIDES (ug/kg)																											
4,4'-DDD	72-54-8	2.92	195	NTC12-SB25-0005	10/10	--	195	NC	3000 C	NC	24000 C	NC	520000 C	NC	NC	NC	NC	NC	NC	2000 C	7200 C	48000000 C	270000000 C	69000 C	3600000 C	NO	BSL
4,4'-DDE	72-55-9	1.29	197	NTC12-SB25-0005	10/10	--	197	NC	2000 C	NC	17000 C	NC	370000 C	NC	NC	NC	NC	NC	NC	1400 C	5100 C	34000000 C	190000000 C	49000 C	2600000 C	NO	BSL
4,4'-DDT	50-29-3	1.28 J	282	NTC12-SB25-0005	9/10	0.782	282	NC	2000 C	1500000 C	17000 C	2100000 C	10000 N	NC	NC	NC	NC	NC	NC	1700 C	7000 C	34000000 C	190000000 C	58000 C	2600000 C	NO	BSL
ALDRIN	309-00-2	0.374 J	20.8	NTC12-SB25-0005	5/10	0.694-0.782	20.8	3000 C	40 C	6600 C	300 C	9300 C	610 N	NC	NC	NC	NC	NC	NC	29 C	100 C	680000 C	3800000 C	980 C	51000 C	NO	BSL
ALPHA-BHC	319-84-6	0.509 J	1.1	NTC12-SB25-0005	3/10	0.694-0.782	1.1	800 C	100 C	1500 C	900 C	2100 C	20000 C	NC	NC	NC	NC	NC	NC	77 C	270 C	1800000 C	10000000 C	2600 C	140000 C	NO	BSL
ALPHA-CHLORDANE	5103-71-9	0.14 J	3220	NTC12-SB25-0005	10/10	--	3220	72000 C	1800 C	140000 C	16000 C	**2200 N**	10000 N	NC	NC	NC	NC	NC	NC	**1600 C**	6500 C	33000000 C	190000000 C	55000 C	250000 N	YES	ASL
BETA-BHC	319-85-7	0.702 J	6.55	NTC12-SB25-0005	2/10	0.694-0.798	6.55	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	270 C	960 C	6200000 C	35000000 C	9300 C	470000 C	NO	BSL
DELTA-BHC	319-86-8	0.151 J	4.65	NTC12-SB25-0005	9/10	0.756	4.65	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	77 C(15)	270 C(15)	1800000 C(15)	10000000 C(15)	2600 C(15)	140000 C(15)	NO	BSL
DIELDRIN	60-57-1	0.246 J	16.6	NTC12-SB25-0005	8/10	0.756-0.782	16.6	1000 C	40 C	2200 C	400 C	3100 C	7800 C	NC	NC	NC	NC	NC	NC	30 C	110 C	720000 C	4000000 C	1000 C	54000 C	NO	BSL
ENDOSULFAN I(10)	959-98-8	1.17	36.8	NTC12-SB25-0005	3/10	0.694-0.798	36.8	NC	47000 N	NC	1200000 N	NC	120000 N	NC	NC	NC	NC	NC	NC	37000 N	370000 N	NC	NC	140000 N	NC	NO	BSL
ENDOSULFAN II(10)	33213-65-9	0.24 J	53.5	NTC12-SB25-0005	7/10	0.728-0.756	53.5	NC	47000 N	NC	1200000 N	NC	120000 N	NC	NC	NC	NC	NC	NC	37000 N	370000 N	NC	NC	140000 N	NC	NO	BSL
ENDOSULFAN SULFATE(10)	1031-07-8	0.691 J	12.1	NTC12-SB25-0005	5/10	0.694-0.782	12.1	NC	47000 N	NC	1200000 N	NC	120000 N	NC	NC	NC	NC	NC	NC	37000 N	370000 N	NC	NC	140000 N	NC	NO	BSL
ENDRIN	72-20-8	0.74 J	22.6	NTC12-SB27-0005	7/10	0.728-0.782	22.6	NC	2300 N	NC	61000 N	NC	6100 N	NC	NC	NC	NC	NC	NC	1800 N	18000 N	NC	NC	7100 N	NC	NO	BSL
ENDRIN ALDEHYDE(11)	7421-93-4	0.66 J	19.5	NTC12-SB25-0005	6/10	0.694-0.782	19.5	NC	2300 N	NC	61000 N	NC	6100 N	NC	NC	NC	NC	NC	NC	1800 N	18000 N	NC	NC	7100 N	NC	NO	BSL
ENDRIN KETONE(11)	53494-70-5	1.14	1.14	NTC12-SB25-0005	1/10	0.694-0.798	1.14	NC	2300 N	NC	61000 N	NC	6100 N	NC	NC	NC	NC	NC	NC	1800 N	18000 N	NC	NC	7100 N	NC	NO	BSL
GAMMA-BHC (LINDANE)	58-89-9	0.144 J	0.6 J	NTC12-SB29-0005	4/10	0.694-0.782	0.6	NC	500 C	NC	4000 C	NC	96000 C	NC	NC	NC	NC	NC	NC	520 C	2100 C	11000000 C	60000000 C	18000 C	800000 C	NO	BSL
GAMMA-CHLORDANE	5103-74-2	0.309 J	2600	NTC12-SB25-0005	10/10	--	2600	72000 C	1800 C	140000 C	16000 C	**2200 N**	10000 N	NC	NC	NC	NC	NC	NC	**1600 C**	6500 C	33000000 C	190000000 C	55000 C	250000 N	YES	ASL
HEPTACHLOR	76-44-8	0.18 J	236	NTC12-SB25-0005	4/10	0.694-0.798	236	**100 C**	**100 C**	11000 C	1000 C	16000 C	28000 C	NC	NC	NC	NC	NC	NC	**110 C**	380 C	2500000 C	4000000 C	3700 C	190000 C	YES	ASL
HEPTACHLOR EPOXIDE	1024-57-3	0.122 J	64	NTC12-SB25-0005	7/10	0.694-0.782	64	5000 C	70 C	9200 C	600 C	13000 C	270 N	NC	NC	NC	NC	NC	NC	**53 C**	190 C	1300000 C	7100000 C	1800 C	96000 C	YES	ASL
METHOXYCHLOR	72-43-5	0.383 J	3.04 J	NTC12-SB26-0005	3/10	0.694-0.798	3.04	NC	39000 N	NC	1000000 N	NC	100000 N	NC	NC	NC	NC	NC	NC	31000 N	310000 N	NC	NC	120000 N	NC	NO	BSL
INORGANICS (mg/kg)																											
ALUMINUM	7429-90-5	1250	10000	NTC12-SB27-0005	10/10	--	10000	NC	NC	NC	NC	NC	NC	100000 N	**7800 N**	100000 N	100000 N	87000 N	20000 N	**7700 N**	99000 N	710000 N	3300000 N	31000 N	**1800 N**	YES	ASL
ANTIMONY	7440-36-0	0.44 J	1.12 J	NTC12-SB29-0005	3/10	0.858-0.982	1.12	NC	3.1 N	NC	82 N	NC	8.2 N	NC	NC	NC	NC	NC	NC	3.1 N	41 N	NC	NC	12 N	NC N	NO	BSL
ARSENIC	7440-38-2	4.28 J	16.9 J	NTC12-SB25-0005	10/10	--	16.9	750 C	**13** (16)	1200 C	**13** (16)	25000 C	61 N	NC	NC	NC	NC	NC	NC	**0.61 C**	**2.4 C**	770 C	4300 C	**13 C**	**5.3 N**	YES	ASL
BARIUM	7440-39-3	8.12 J	244 J	NTC12-SB21-0005	10/10	--	244	69000 N	550 N	91000 N	14000 N	87000 N	1400 N	NC	NC	NC	NC	NC	NC	1500 N	19000 N	71000 N	330000 N	6200 N	**180 N**	YES	ASL
BERYLLIUM	7440-41-7	0.147 J	5.5	NTC12-SB27-0005	10/10	--	5.5	1300 C	16 N	2100 C	410 N	44000 C	41 N	NC	NC	NC	NC	NC	NC	16 N	200 N	1400 C	7700 C	62 N	7.1 N	NO	BSL
CADMIUM	7440-43-9	0.119 J	1.03 J	NTC12-SB29-0005	10/10	--	1.03	1800 C	7.8 N	2800 C	200 N	59000 C	20 N	NC	NC	NC	NC	NC	NC	7 N	80 N	1800 C	10000 C	28 N	3.6 N	NO	BSL
CALCIUM	7440-70-2	24400	142000	NTC12-SB23-0005	10/10	--	142000	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
CHROMIUM(12)	7440-47-3	4.07 J	23.8 J	NTC12-SB27-0005	10/10	--	23.8	270 C	**23 N**	420 C	610 N	69 N	410 N	NC	NC	NC	NC	NC	NC	**0.29 C**	**5.6 C**	**39 C**	220 C	43 C	**3 C**	YES	ASL
COBALT	7440-48-4	2.08	11.2	NTC12-SB27-0005	10/10	--	11.2	NC	470 N	NC	12000 N	NC	1200 N	NC	NC	NC	NC	NC	NC	**2.3 N**	30 N	370 C	2100 C	**9.3 N**	**2.1 N**	YES	ASL
COPPER	7440-50-8	6.55	271	NTC12-SB27-0005	10/10	--	271	NC	290 N	NC	8200 N	NC	820 N	NC	NC	NC	NC	NC	NC	310 N	4100 N	NC	NC	1200 N	NC	NO	BSL
IRON	7439-89-6	4710	20300	NTC12-SB27-0005	10/10	--	20300	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	**5500 N**	72000 N	NC	NC	22000 N	NC	YES	ASL
LEAD	7439-92-1	17.9 J	263 J	NTC12-SB29-0005	10/10	--	263	NC	400	NC	800	NC	700	NC	NC	NC	NC	NC	NC	400 N	800 N	NC	NC	NC	NC	NO	BSL
MAGNESIUM	7439-95-4	11100	84600	NTC12-SB23-0005	10/10	--	84600	NC	325000	NC	NC	NC	730000	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
MANGANESE	7439-96-5	137	701	NTC12-SB29-0005	10/10	--	701	6900 N	**160 N**	9100 N	4100 N	870 N	**410 N**	NC	NC	NC	NC	NC	NC	**180 N**	2300 N	7100 N	33000 N	7400 N	**18 N**	YES	ASL
MERCURY	7439-97-6	0.0235 J	0.598	NTC12-SB26-0005	10/10	--	0.598	1 N	2.3 N	1.6 N	61 N	**0.01 N**	6.1 N	NC	NC	NC	NC	NC	NC	2.3 N(17)	31 N(17)	43000 N(17)	200000 N(17)	9.3 N(17)	110 N(17)	YES	ASL
NICKEL	7440-02-0	4.49	34.7	NTC12-SB27-0005	10/10	--	34.7	13000 C	160 N	21000 C	4100 N	440000 C	410 N	NC	NC	NC	NC	NC	NC	150 N	2000 N	13000 C	71000 C	620 N	NC N	NO	BSL
POTASSIUM	7440-09-7	230 J	1640	NTC12-SB27-0005	10/10	--	1640	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
SELENIUM	7782-49-2	0.288 J	0.791	NTC12-SB29-0005	7/10	0.536-0.614	0.791	NC	39 N	NC	1000 N	NC	100 N	NC	NC	NC	NC	NC	NC	39 N	510 N	2800000 N	13000000 N	150 N	7100 N	NO	BSL
SILVER	7440-22-4	0.234 J	1.33	NTC12-SB29-0005	8/10	0.222-0.246	1.33	NC	39 N	NC	1000 N	NC	100 N	NC	NC	NC	NC	NC	NC	39 N	510 N	NC	NC	150 N	NC	NO	BSL
SODIUM	7440-23-5	75.3 J	336 J	NTC12-SB29-0005	10/10	--	336	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
THALLIUM	7440-28-0	0.167 J	0.167 J	NTC12-SB29-0005	1/10	0.446-0.644	0.167	NC	0.63 N	NC	16 N	NC	16 N	NC	NC	NC	NC	NC	NC	**0.078 N**	1 N	NC	NC	0.31 N	NC	YES	ASL
VANADIUM	7440-62-2	4.53	18.9	NTC12-SB27-0005	10/10	--	18.9	NC	55 N	NC	1400 N	NC	140 N	NC	NC	NC	NC	NC	NC	39 N	520 N	14000 N	66000 N	150 N	36 N	NO	BSL
ZINC	7440-66-6	44.7 J	1530 J	NTC12-SB27-0005	10/10	--	1530	NC	2300 N	NC	61000 N	NC	6100 N	NC	NC	NC	NC	NC	NC	2300 N	31000 N	NC	NC	9300 N	NC	NO	BSL

Notes:

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Screening values for risk-based non-carcinogenic values (denoted with a "N" flag) were reduced by a factor of 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values (denoted with a "C" flag) represent an incremental cancer risk of 1.0E-06.

Footnotes:

1 - Values presented are sample-specific quantitation limits.
2 - The maximum detected concentration is used for screening purposes
3 - Section 742 Table A and Table B, Tier 1, Soil Remediation Objectives - Residential/Industrial/Commercial (Ingestion or Inhalation)(Illinois EPA, 2013a).
4 - Soil Remediation Objectives for Residential/Industrial/Commercial properties, Non-TACO Chemicals. (Illinois EPA, 2013a).
5 - USEPA RSL Screening Level (USEPA, 2013).
6 - SSLs for the migration of chemicals from soil to air were calculated by Tetra Tech using the methodology and equations presented in the Supplemental Guidance For Developing Soil Screening Levels for Superfund Sites, OSWER 93355.4-24, December 2002 and online at http://rais.ornl.gov/epa/ssl1.shtml since these values are more recent than those published in the 1996 and 2002 SSL guidance documents.
7 - Soil Screening Levels for Migration from Soil to Air for Construction Worker Scenario were calculated by Tetra Tech using methodology and equations presented in the Supplemental Guidance For Developing Soil Screening Levels for Superfund Sites, OSWER 93355.4-24, December 2002.
8 - The chemical is selected as a COPC if the maximum detected concentration exceeds a screening level.
9 - A toxicity equivalence factor (TEF) approach was used based on the relative potency of each carcinogenic PAH compound relative to that of benzo(a)pyrene. The limit of detection was used to represent non-detected concentrations in the calculation.
10 - Endosulfan is used as a surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
11 - Endrin is used as a surrogate for endrin aldehyde and endrin ketone.
12 - Hexavalent chromium is used as a surrogate for chromium.
13 - Acenaphthene is used as a surrogate for acenaphthylene
14- Pyrene is used as a surrogate for benzo(ghi)perylene and phenanthrene
15 - Alpha-BHC used as a surrogate for delta-BHC.
16 - Background value provided in TACO Appendix A, Table G used as screening value (Illinois EPA, 2013a).
17 - Value for mercuric chloride (and other mercury salts).

Definitions:

C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Non-carcinogen
NC = No criteria
NA = Not applicable/not available
SAT = Saturation

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC screening level
For Elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient

TABLE 2-2

HUMAN HEALTH SURFACE SOIL MIGRATION TO GROUNDWATER SCREENING ASSESSMENT
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS #	Minimum Result	Maximum Result[1]	Average Positive Result	Overall Average	Illinois Background Levels[2]	TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[3,4]	NON-TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[5]	USEPA Risk Based SSLs - Migration from Soil to Groundwater[6]	USEPA Risk Based SSLs - Migration from Soil to Groundwater with a DAF of 15[6]	USEPA MCL Based SSLs - Migration from Soil to Groundwater[6]	USEPA MCL Based SSLs - Migration from Soil to Groundwater with a DAF of 15[6]
SEMIVOLATILES (ug/kg)												
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	149 J	149 J	149	185	NC	3600000	NC	1100	16500	1400	21000
CARBAZOLE	86-74-8	167 J	254 J	211	192	NC	600	NC	NC	NC	NC	NC
DIBENZOFURAN	132-64-9	144 J	144 J	144	184	NC	NC	3000	**110**	1650	NC	NC
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/kg)												
2-METHYLNAPHTHALENE	91-57-6	4.77 J	87.9	33.7	33.7	140	NC	1900	140	2100	NC	NC
ACENAPHTHENE	83-32-9	2.96 J	205	49.5	49.5	**130**	570000	NC	4100	61500	NC	NC
ACENAPHTHYLENE	208-96-8	4.21 J	98.1	51.9	42.3	**70**	NC	85000	4100[7]	61500	NC	NC
ANTHRACENE	120-12-7	8.45	606	206	206	**400**	12000000	NC	42000	630000	NC	NC
BAP EQUIVALENT	NA	33.0	2084	896	896	2100	8000	NC	**3.5**	**52.5**	**240**	4800
BENZO(A)ANTHRACENE	56-55-3	29.3	1830	573	573	**1800**	2000	NC	**10**	**150**	NC	NC
BENZO(A)PYRENE	50-32-8	21.8	1460	618	618	2100	8000	NC	**3.5**	**52.5**	**240**	3600
BENZO(B)FLUORANTHENE	205-99-2	31.8	2260	748	748	**2100**	5000	NC	**35**	**525**	NC	NC
BENZO(G,H,I)PERYLENE	191-24-2	13.5	711	290	290	1700	NC	27000000	9500[8]	142500	NC	NC
BENZO(K)FLUORANTHENE	207-08-9	14.1 J	2280	543	543	**1700**	49000	NC	**350**	5250	NC	NC
CHRYSENE	218-01-9	38.5	1530	529	529	2700	160000	NC	**1100**	16500	NC	NC
DIBENZO(A,H)ANTHRACENE	53-70-3	14	287	125	113	420	2000	NC	**11**	**165**	NC	NC
FLUORANTHENE	206-44-0	74.3	4290	1330	1330	**4100**	4300000	NC	70000	1050000	NC	NC
FLUORENE	86-73-7	5.63 J	254	69.5	62.9	**180**	560000	NC	4000	60000	NC	NC
INDENO(1,2,3-CD)PYRENE	193-39-5	12.8	674	276	276	1600	14000	NC	**200**	3000	NC	NC
NAPHTHALENE	91-20-3	4.25 J	91.5	30.2	30.2	200	12000	NC	**0.47**	**7.05**	NC	NC
PHENANTHRENE	85-01-8	56.4	2370	732	732	2500	NC	210000	9500[8]	142500	NC	NC
PYRENE	129-00-0	66	3190	1100	1100	**3000**	4200000	NC	9500	142500	NC	NC
PESTICIDES (ug/kg)												
4,4'-DDD	72-54-8	2.92	195	38.8	38.8	NC	16000	NC	**6.4**	**96**	NC	NC
4,4'-DDE	72-55-9	1.29	197	77.8	77.8	NC	54000	NC	**46**	690	NC	NC
4,4'-DDT	50-29-3	1.28 J	282	89.0	80.2	NC	32000	NC	**67**	1005	NC	NC
ALDRIN	309-00-2	0.374 J	20.8	5.0	2.7	NC	500	NC	**0.65**	**9.75**	NC	NC
ALPHA-BHC	319-84-6	0.509 J	1.1	0.75	0.49	NC	**0.5**	NC	**0.036**	**0.54**	NC	NC
ALPHA-CHLORDANE	5103-71-9	0.14 J	3220	353	353	NC	10000	NC	**13**	**195**	**140**	**2100**
BETA-BHC	319-85-7	0.702 J	6.55	3.6	1.0	NC	NC	NC	**0.13**	**1.95**	NC	NC
DELTA-BHC[9]	319-86-8	0.151 J	4.65	1.7	1.6	NC	**0.5**	NC	**0.036**	**0.54**	NC	NC
DIELDRIN	60-57-1	0.246 J	16.6	3.1	2.6	NC	**4**	NC	**0.061**	**0.915**	NC	NC
ENDOSULFAN I[10]	959-98-8	1.17	36.8	13.5	4.3	NC	18000	NC	1100	16500	NC	NC
ENDOSULFAN II[10]	33213-65-9	0.24 J	53.5	8.3	5.9	NC	18000	NC	1100	16500	NC	NC
ENDOSULFAN SULFATE[10]	1031-07-8	0.691 J	12.1	4.0	2.2	NC	18000	NC	1100	16500	NC	NC
ENDRIN	72-20-8	0.74 J	22.6	8.4	6.0	NC	1000	NC	68	1020	81	1215
ENDRIN ALDEHYDE[11]	7421-93-4	0.66 J	19.5	4.6	2.9	NC	1000	NC	68	1020	81	1215
ENDRIN KETONE[11]	53494-70-5	1.14	1.14	1.1	0.45	NC	1000	NC	68	1020	81	1215
GAMMA-BHC (LINDANE)	58-89-9	0.144 J	0.6 J	0.39	0.38	NC	9	NC	**0.21**	3.15	1.2	18
GAMMA-CHLORDANE	5103-74-2	0.309 J	2600	281	281	NC	10000	NC	**13**	**195**	**140**	**2100**
HEPTACHLOR	76-44-8	0.18 J	236	60.6	24.4	NC	23000	NC	**0.14**	**2.1**	**33**	495
HEPTACHLOR EPOXIDE	1024-57-3	0.122 J	64	12.1	8.6	NC	700	NC	**0.068**	**1.02**	**4.1**	**61.5**
METHOXYCHLOR	72-43-5	0.383 J	3.04 J	1.3	0.66	NC	160000	NC	1500	22500	2200	33000

TABLE 2-2

HUMAN HEALTH SURFACE SOIL MIGRATION TO GROUNDWATER SCREENING ASSESSMENT
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS #	Minimum Result	Maximum Result[1]	Average Positive Result	Overall Average	Illinois Background Levels[2]	TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[3,4]	NON-TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[5]	USEPA Risk Based SSLs - Migration from Soil to Groundwater[6]	USEPA Risk Based SSLs - Migration from Soil to Groundwater with a DAF of 15[6]	USEPA MCL Based SSLs - Migration from Soil to Groundwater[6]	USEPA MCL Based SSLs - Migration from Soil to Groundwater with a DAF of 15[6]
INORGANICS (mg/kg)												
ALUMINUM	7429-90-5	1250	10000	5970	5970	**9500**	NC	NC	23000	345000	NC	NC
ANTIMONY	7440-36-0	0.44 J	1.12 J	0.67	0.52	4	5 *	NC	**0.27**	4.05	**0.27**	4.05
ARSENIC	7440-38-2	4.28 J	16.9 J	9.1	9.1	**13**	30 *	NC	**0.0013**	**0.0195**	**0.29**	**4.35**
BARIUM	7440-39-3	8.12 J	244 J	72.4	72.4	**110**	1800 *	NC	120	1800	**82**	1230
BERYLLIUM	7440-41-7	0.147 J	5.5	0.94	0.94	**0.59**	1000 *	NC	13	195	**3.2**	48
CADMIUM	7440-43-9	0.119 J	1.03 J	0.55	0.55	**0.6**	59 *	NC	**0.52**	7.8	**0.38**	5.7
CALCIUM	7440-70-2	24400	142000	71200	71200	**9300**	NC	NC	NC	NC	NC	NC
CHROMIUM[12]	7440-47-3	4.07 J	23.8 J	12.4	12.4	**16.2**	32 *	NC	**0.00059**	**0.00885**	180000[13]	2700000
COBALT	7440-48-4	2.08	11.2	7.1	7.1	**8.9**	NC	NC	**0.21**	**3.15**	NC	NC
COPPER	7440-50-8	6.55	271	68.4	68.4	**19.6**	330000 *	NC	**22**	330	**46**	690
IRON	7439-89-6	4710	20300	13000	13000	**15900**	NC	NC	**270**	**4050**	NC	NC
LEAD	7439-92-1	17.9 J	263 J	85.6	85.6	**36**	**107 ***	NC	NC	NC	**14**	**210**
MAGNESIUM	7439-95-4	11100	84600	39800	39800	**4820**	NC	NC	NC	NC	NC	NC
MANGANESE	7439-96-5	137	701	446	446	**636**	NC	NC	**21**	**315**	NC	NC
MERCURY	7439-97-6	0.0235 J	0.598	0.18	0.18	**0.06**	6.4 *	NC	**0.033**	**0.495**	**0.1**	1.5
NICKEL	7440-02-0	4.49	34.7	18.5	18.5	**18**	700 *	NC	20	300	NC	NC
POTASSIUM	7440-09-7	230 J	1640	1030	1030	**1268**	NC	NC	NC	NC	NC	NC
SELENIUM	7782-49-2	0.288 J	0.791	0.53	0.45	**0.48**	3.3 *	NC	**0.4**	6	**0.26**	3.9
SILVER	7440-22-4	0.234 J	1.33	0.55	0.47	**0.55**	39 *	NC	**0.6**	9	NC	NC
SODIUM	7440-23-5	75.3 J	336 J	201	201	**130**	NC	NC	NC	NC	NC	NC
THALLIUM	7440-28-0	0.167 J	0.167 J	0.17	0.24	0.32	3.4 *	NC	**0.011**	**0.165**	**0.14**	2.1
VANADIUM	7440-62-2	4.53	18.9	12.7	12.7	25.2	980 *	NC	63	945	NC	NC
ZINC	7440-66-6	44.7 J	1530 J	324	324	**95**	16000 *	NC	**290**	4350	NC	NC

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria or Illinois background values.
Shaded chemical name indicates that the maximum detected concentration exceeds one or more screening criteria and Illinois background values..
Bold, italicized chemical name indicates that maximum detection, although exceeding groundwater protection criterion, is lower than Illinois background.

Footnotes:

1 - The maximum detected concentration is used for screening purposes
2 - Illinois background values: Section 742 Appendix A, Tables G & H (Illinois EPA, 2013a).
3 - TACO values: Section 742 Appendix B, Table A, Tier 1 Soil Remediation Objectives for Residential Properties (Illinois EPA, 2013a). Unless otherwise noted.
4 - * values are pH dependent criteria (site-specific pH result of 7.58), Section 742 Appendix B, Table C (Illinois EPA, 2013a).
5 - Soil Remediation Objectives for Residential Properties, Non-TACO Chemicals (Illinois EPA, 2013a).
6 - USEPA RSL Soil Screening Level for the Protection of Groundwater (USEPA, 2013). Dilution Attenuation Factor (DAF) of 15; selected based on information from USEPA soil screening guidance (USEPA, 1996a) and a source area of 1.75 acres.
7 - Acenaphthene is used as a surrogate for acenaphthylene
8 - Pyrene is used as a surrogate for benzo(ghi)perylene and phenanthrene
9 - Alpha-BHC used as a surrogate for delta-BHC.
10 - Endosulfan is used as a surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
11 - Endrin is used as a surrogate for endrin aldehyde and endrin ketone.
12 - Hexavalent chromium is used as a surrogate for chromium.
13 - Value for total chromium.

Definitions:

J = Estimated value
NC = No criteria
NA = not available/not applicable

TABLE 2-3

HUMAN HEALTH SUBSURFACE SOIL COPC SELECTION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS No.	Minimum Result	Maximum Result	Samples of Maximum Concentration	Frequency of Detection	Range of Nondetects(1)	Concentration Used for Screening(2)	TACO - Residential Soil Inhalation(3)	TACO - Residential Soil Ingestion(3)	TACO - Industrial - Commercial Soil Inhalation(3)	TACO - Industrial - Commercial Soil Ingestion(3)	TACO - Construction Worker Soil Inhalation(3)	TACO - Construction Worker Soil Ingestion(3)	Non-TACO - Residential Soil Inhalation(4)	Non-TACO - Residential Soil Ingestion(4)	Non-TACO - Industrial-Commercial Soil Inhalation(4)	Non-TACO - Industrial-Commercial Soil Ingestion(4)	Non-TACO - Construction Worker Soil Inhalation(4)	Non-TACO - Construction Worker Soil Ingestion(4)	USEPA Residential Soil Criteria(5)	USEPA Industrial Soil Criteria(5)	USEPA Residential Inhalation SSLs(6)	USEPA Industrial Inhalation SSLs(6)	USEPA Construction Worker Direct Contact SSLs(7)	USEPA Construction Worker Inhalation SSLs(7)	COPC Flag(8)	Rationale for Contaminant Deletion or Selection
SEMIVOLATILES																											
4-METHYLPHENOL	106-44-5	167 J	375 J	NTC12-SB25-0204	3/10	364-402	375	NC	NC	NC	NC	NC	NC	10000000 N	780000 N	17000000 N	20000000 N	330000 N	410000 N	610000 N	6200000 N	85000000000 N	4E+11 N	2400000 N	210000000 N	NO	BSL
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	201 J	201 J	NTC12-SB26-0406	1/10	364-402	201	31000000 SAT	46000 C	31000000 SAT	410000 C	31000000 SAT	410000 N	NC	NC	NC	NC	NC	NC	35000 C	120000 C	1400000000 C	7700000000 C	1200000 C	100000000 C	NO	BSL
CARBAZOLE	86-74-8	494 J	1080 J	NTC12-SB28-0204	2/10	364-402	1080	NC	32000 C	NC	290000 C	NC	6200000 C	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
DIBENZOFURAN	132-64-9	204 J	1140	NTC12-SB28-0204	3/10	364-402	1140	NC	NC	NC	NC	NC	NC	NC	7800 N	NC	200000 N	NC	82000 N	7800 N	100000 N	NC	NC	31000 N	NC	NO	BSL
PHENOL	108-95-2	99.7 J	99.7 J	NTC12-SB25-0204	1/10	364-416	99.7	NC	2300000 N	NC	61000000 N	NC	6100000 N	NC	NC	NC	NC	NC	NC	1800000 N	18000000 N	28000000000 N	1.3E+11 N	7100000 N	71000000 N	NO	BSL
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/kg)																											
2-METHYLNAPHTHALENE	91-57-6	3.31 J	545	NTC12-SB26-0406	10/10	--	545	NC	NC	NC	NC	NC	NC	NC	31000 N	NC	820000 N	NC	82000 N	23000 N	220000 N	NC	NC	89000 N	NC	NO	BSL
ACENAPHTHENE	83-32-9	5.87 J	1120	NTC12-SB28-0204	10/10	--	1120	NC	470000 N	NC	12000000 N	NC	12000000 N	NC	NC	NC	NC	NC	NC	340000 N	3300000 N	NC	NC	1300000 N	NC	NO	BSL
ACENAPHTHYLENE	208-96-8	3.67 J	253	NTC12-SB28-0204	8/10	7.24-8.02	253	NC	NC	NC	NC	NC	NC	NC	230000 N	NC	6100000 N	NC	6100000 N	340000 N (13)	3300000 N (13)	NC	NC	1300000 N (13)	NC	NO	BSL
ANTHRACENE	120-12-7	19	5280	NTC12-SB28-0204	10/10	--	5280	NC	2300000 N	NC	61000000 N	NC	61000000 N	NC	NC	NC	NC	NC	NC	1700000 N	17000000 N	NC	NC	6700000 N	NC	NO	BSL
BAP EQUIVALENT-FULLND(9)	NA	55.5	10609	NTC12-SB28-0204	10/10	--	10609	NC	90 C	NC	800 C	NC	17000 C	NC	NC	NC	NC	NC	NC	15 C	210 C	1200000 C	15000000 C	2100 C	230000 C	YES	ASL
BENZO(A)ANTHRACENE	56-55-3	41.3	9780	NTC12-SB28-0204	10/10	--	9780	NC	900 C	NC	8000 C	NC	170000 C	NC	NC	NC	NC	NC	NC	150 C	2100 C	12000000 C	150000000 C	21000 C	2300000 C	YES	ASL
BENZO(A)PYRENE	50-32-8	40.1	7740	NTC12-SB28-0204	10/10	--	7740	NC	90 C	NC	800 C	NC	17000 C	NC	NC	NC	NC	NC	NC	15 C	210 C	1200000 C	15000000 C	2100 C	230000 C	YES	ASL
BENZO(B)FLUORANTHENE	205-99-2	53.7	10300	NTC12-SB28-0204	10/10	--	10300	NC	900 C	NC	8000 C	NC	170000 C	NC	NC	NC	NC	NC	NC	150 C	2100 C	12000000 C	150000000 C	21000 C	2300000 C	YES	ASL
BENZO(G,H,I)PERYLENE	191-24-2	26.9	1110	NTC12-SB28-0204	10/10	--	1110	NC	NC	NC	NC	NC	NC	NC	230000 N	NC	6100000 N	NC	6100000 N	170000 N (14)	1700000 N (14)	NC	NC	670000 N (14)	NC	NO	BSL
BENZO(K)FLUORANTHENE	207-08-9	25.7	2570	NTC12-SB26-0406	10/10	--	2570	NC	9000 C	NC	78000 C	NC	1700000 C	NC	NC	NC	NC	NC	NC	1500 C	21000 C	12000000 C	150000000 C	210000 C	2300000 C	YES	ASL
CHRYSENE	218-01-9	63	7940	NTC12-SB28-0204	10/10	--	7940	NC	88000 C	NC	780000 C	NC	17000000 C	NC	NC	NC	NC	NC	NC	15000 C	210000 C	120000000 C	1500000000 C	2100000 C	23000000 C	NO	BSL
DIBENZO(A,H)ANTHRACENE	53-70-3	12	705	NTC12-SB28-0204	7/10	7.24-8.02	705	NC	90 C	NC	800 C	NC	17000 C	NC	NC	NC	NC	NC	NC	15 C	210 C	1100000 C	14000000 C	2100 C	210000 C	YES	ASL
FLUORANTHENE	206-44-0	118	21100	NTC12-SB28-0204	10/10	--	21100	NC	310000 N	NC	8200000 N	NC	8200000 N	NC	NC	NC	NC	NC	NC	230000 N	2200000 N	NC	NC	890000 N	NC	NO	BSL
FLUORENE	86-73-7	10	2510	NTC12-SB28-0204	9/10	7.5	2510	NC	310000 N	NC	8200000 N	NC	8200000 N	NC	NC	NC	NC	NC	NC	230000 N	2200000 N	NC	NC	890000 N	NC	NO	BSL
INDENO(1,2,3-CD)PYRENE	193-39-5	19.9	1330	NTC12-SB28-0204	10/10	--	1330	NC	900 C	NC	8000 C	NC	170000 C	NC	NC	NC	NC	NC	NC	150 C	2100 C	12000000 C	150000000 C	21000 C	2300000 C	YES	ASL
NAPHTHALENE	91-20-3	4 J	439	NTC12-SB26-0406	10/10	--	439	17000 N	160000 N	27000 N	4100000 N	180 N	410000 N	NC	NC	NC	NC	NC	NC	3600 C	18000 C	3600 C	18000 C	450000 N	31000 N	YES	ASL
PHENANTHRENE	85-01-8	75.4	20200	NTC12-SB28-0204	10/10	--	20200	NC	NC	NC	NC	NC	NC	NC	230000 N	NC	6100000 N	NC	6100000 N	170000 N (14)	1700000 N (14)	NC	NC	670000 N (14)	NC	NO	BSL
PYRENE	129-00-0	104	16800	NTC12-SB28-0204	10/10	--	16800	NC	230000 N	NC	6100000 N	NC	6100000 N	NC	NC	NC	NC	NC	NC	170000 N	1700000 N	NC	NC	670000 N	NC	NO	BSL
PCBs (ug/kg)																											
AROCLOR-1254	11097-69-1	29.8 J	799	NTC12-SB21-0507	4/5	18.86	799	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	220 N (18)	740 C	5800000 C	33000000 C	440 N	44000 N	YES	ASL
PESTICIDES																											
4,4'-DDD	72-54-8	2.37	1090	NTC12-SB26-0406	10/10	--	1090	NC	3000 C	NC	24000 C	NC	520000 C	NC	NC	NC	NC	NC	NC	2000 C	7200 C	48000000 C	270000000 C	69000 C	3600000 C	NO	BSL
4,4'-DDE	72-55-9	0.692 J	986 J	NTC12-SB25-0204	10/10	--	986	NC	2000 C	NC	17000 C	NC	370000 C	NC	NC	NC	NC	NC	NC	1400 C	5100 C	34000000 C	190000000 C	49000 C	2600000 C	NO	BSL
4,4'-DDT	50-29-3	0.362 J	823	NTC12-SB21-0507	10/10	--	823	NC	2000 C	1500000 C	17000 C	2100000 C	10000 N	NC	NC	NC	NC	NC	NC	1700 C	7000 C	34000000 C	190000000 C	58000 C	2600000 C	NO	BSL
ALDRIN	309-00-2	0.463 J	17	NTC12-SB21-0507	5/10	0.73-0.782	17	3000 C	40 C	6600 C	300 C	9300 C	610 N	NC	NC	NC	NC	NC	NC	29 C	100 C	680000 C	3800000 C	980 C	51000 C	NO	BSL
ALPHA-BHC	319-84-6	0.172 J	1.05	NTC12-SB26-0406	3/10	0.73-0.802	1.05	800 C	100 C	1500 C	900 C	2100 C	20000 C	NC	NC	NC	NC	NC	NC	77 C	270 C	1800000 C	10000000 C	2600 C	140000 C	NO	BSL
ALPHA-CHLORDANE	5103-71-9	0.202 J	141	NTC12-SB21-0507	9/10	0.782	141	72000 C	1800 C	140000 C	16000 C	2200 N	10000 N	NC	NC	NC	NC	NC	NC	1600 C	6500 C	33000000 C	190000000 C	55000 C	250000 N	NO	BSL
BETA-BHC	319-85-7	0.722 J	1.12	NTC12-SB21-0507	3/10	0.73-0.802	1.12	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	270 C	960 C	6200000 C	35000000 C	9300 C	470000 C	NO	BSL
DELTA-BHC	319-86-8	0.164 J	6.05	NTC12-SB21-0507	8/10	0.77-0.802	6.05	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	77 C (15)	270 C (15)	1800000 C (15)	10000000 C (15)	2600 C (15)	140000 C (15)	NO	BSL
DIELDRIN	60-57-1	0.321 J	13.4	NTC12-SB26-0406	7/10	0.766-0.782	13.4	1000 C	40 C	2200 C	400 C	3100 C	7800 C	NC	NC	NC	NC	NC	NC	30 C	110 C	720000 C	4000000 C	1000 C	54000 C	NO	BSL
ENDOSULFAN I(10)	959-98-8	0.194 J	4.51	NTC12-SB26-0406	5/10	0.73-0.788	4.51	NC	47000 N	NC	1200000 N	NC	120000 N	NC	NC	NC	NC	NC	NC	37000 N	370000 N	NC	NC	140000 N	NC	NO	BSL
ENDOSULFAN II(10)	33213-65-9	0.28 J	5.63	NTC12-SB21-0507	6/10	0.73-0.782	5.63	NC	47000 N	NC	1200000 N	NC	120000 N	NC	NC	NC	NC	NC	NC	37000 N	370000 N	NC	NC	140000 N	NC	NO	BSL
ENDOSULFAN SULFATE(10)	1031-07-8	0.204 J	3.95	NTC12-SB28-0204	4/10	0.73-0.788	3.95	NC	47000 N	NC	1200000 N	NC	120000 N	NC	NC	NC	NC	NC	NC	37000 N	370000 N	NC	NC	140000 N	NC	NO	BSL
ENDRIN	72-20-8	0.235 J	12.9	NTC12-SB26-0406	7/10	0.766-0.782	12.9	NC	2300 N	NC	61000 N	NC	6100 N	NC	NC	NC	NC	NC	NC	1800 N	18000 N	NC	NC	7100 N	NC	NO	BSL
ENDRIN ALDEHYDE(11)	7421-93-4	0.953 J	10.9	NTC12-SB26-0406	5/10	0.73-0.788	10.9	NC	2300 N	NC	61000 N	NC	6100 N	NC	NC	NC	NC	NC	NC	1800 N	18000 N	NC	NC	7100 N	NC	NO	BSL
ENDRIN KETONE(11)	53494-70-5	0.715 J	0.715 J	NTC12-SB28-0204	1/10	0.73-0.83	0.715	NC	2300 N	NC	61000 N	NC	6100 N	NC	NC	NC	NC	NC	NC	1800 N	18000 N	NC	NC	7100 N	NC	NO	BSL
GAMMA-BHC (LINDANE)	58-89-9	0.346 J	3.61	NTC12-SB28-0204	3/10	0.73-0.802	3.61	NC	500 C	NC	4000 C	NC	96000 C	NC	NC	NC	NC	NC	NC	520 C	2100 C	11000000 C	60000000 C	18000 C	800000 C	NO	BSL
GAMMA-CHLORDANE	5103-74-2	0.301 J	129	NTC12-SB21-0507	9/10	0.766	129	7200 C	1800 C	140000 C	16000 C	2200 N	10000 N	NC	NC	NC	NC	NC	NC	1600 C	6500 C	33000000 C	190000000 C	55000 C	250000 N	NO	BSL
HEPTACHLOR	76-44-8	0.182 J	1.83	NTC12-SB21-0507	4/10	0.73-0.802	1.83	100 C	100 C	11000 C	1000 C	16000 C	28000 C	NC	NC	NC	NC	NC	NC	110 C	380 C	2500000 C	14000000 C	3700 C	190000 C	NO	BSL
HEPTACHLOR EPOXIDE	1024-57-3	0.213 J	7	NTC12-SB22-00502	7/10	0.75-0.782	7	5000 C	70 C	9200 C	600 C	13000 C	270 N	NC	NC	NC	NC	NC	NC	53 C	190 C	1300000 C	7100000 C	1800 C	96000 C	NO	BSL
METHOXYCHLOR	72-43-5	0.528 J	1.33	NTC12-SB28-0204	3/10	0.766-0.83	1.33	NC	39000 N	NC	1000000 N	NC	100000 N	NC	NC	NC	NC	NC	NC	31000 N	310000 N	NC	NC	120000 N	NC	NO	BSL
INORGANICS (mg/kg)																											
ALUMINUM	7429-90-5	1380	11700	NTC12-SB29-0204	10/10	--	11700	NC	NC	NC	NC	NC	NC	100000 N	7800 N	100000 N	100000 N	87000 N	20000 N	7700 N	99000 N	710000 N	3300000 N	31000 N	1800 N	YES	ASL
ANTIMONY	7440-36-0	0.297 J	4.24 J	NTC12-SB26-0406	6/10	0.902-0.954	4.24	NC	3.1 N	NC	82 N	NC	8.2 N	NC	NC	NC	NC	NC	NC	3.1 N	41 N	NC	NC	12 N	NC	YES	ASL
ARSENIC	7440-38-2	4.26 J	25 J	NTC12-SB26-0406	10/10	--	25	750 C	13 (16)	1200 C	13 (16)	25000 C	61 N	NC	NC	NC	NC	NC	NC	0.61 C	2.4 C	770 C	4300 C	13 C	5.3 N	YES	ASL
BARIUM	7440-39-3	6.73 J	432 J	NTC12-SB21-0507	10/10	--	432	69000 N	550 N	91000 N	14000 N	87000 N	1400 N	NC	NC	NC	NC	NC	NC	1500 N	19000 N	71000 N	330000 N	6200 N	180 N	YES	ASL
BERYLLIUM	7440-41-7	0.154 J	1.02	NTC12-SB27-0204	8/10	2.96-6.22	1.02	1300 C	16 N	2100 C	410 N	44000 C	41 N	NC	NC	NC	NC	NC	NC	16 N	200 N	1400 C	7700 C	62 N	7.1 N	NO	BSL
CADMIUM	7440-43-9	0.119 J	7.31 J	NTC12-SB26-0406	10/10	--	7.31	1800 C	7.8 N	2800 C	200 N	59000 C	20 N	NC	NC	NC	NC	NC	NC	7 N	80 N	1800 C	10000 C	28 N	3.6 N	YES	ASL
CALCIUM	7440-70-2	26800	85700 J	NTC12-SB25-0204	10/10	--	85700	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
CHROMIUM(12)	7440-47-3	4.65 J	60.8 J	NTC12-SB26-0406	10/10	--	60.8	270 C	23 N	420 C	610 N	69 N	410 N	NC	NC	NC	NC	NC	NC	0.29 C	5.6 C	16 C	220 C	43 C	3 C	YES	ASL
COBALT	7440-48-4	2.37	17	NTC12-SB26-0406	10/10	--	17	NC	470 N	NC	12000 N	NC	1200 N	NC	NC	NC	NC	NC	NC	2.3 N	30 N	370 C	2100 C	9.3 N	2.1 N	YES	ASL
COPPER	7440-50-8	6.56	362	NTC12-SB21-0507	10/10	--	362	NC	290 N	NC	8200 N	NC	820 N	NC	NC	NC	NC	NC	NC	310 N	4100 N	NC	NC	1200 N	NC	YES	ASL
IRON	7439-89-6	4650	31400	NTC12-SB29-0204	10/10	--	31400	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	5500 N	72000 N	NC	NC	22000 N	NC	YES	ASL
LEAD	7439-92-1	26.6 J	845 J	NTC12-SB29-0204	10/10	--	845	NC	400	NC	800	NC	700	NC	NC	NC	NC	NC	NC	400 N	800 N	NC	NC	NC	NC	YES	ASL
MAGNESIUM	7439-95-4	12000	42600 J	NTC12-SB25-0204	10/10	--	42600	NC	325000	NC	NC	NC	730000	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
MANGANESE	7439-96-5	143	846	NTC12-SB26-0406	10/10	--	846	6900 N	160 N	9100 N	4100 N	870 N	410 N	NC	NC	NC	NC	NC	NC	180 N	2300 N	7100 N	33000 N	7400 N	18 N	YES	ASL
MERCURY	7439-97-6	0.0327 J	1.99	NTC12-SB26-0406	10/10	--	1.99	1 N	2.3 N	1.6 N	61 N	0.01 N	6.1 N	NC	NC	NC	NC	NC	NC	2.3 N (17)	31 N (17)	43000 N (17)	200000 N (17)	9.3 N (17)	110 N (17)	YES	ASL
NICKEL	7440-02-0	4.36	88.6	NTC12-SB26-0406	10/10	--	88.6	13000 C	160 N	21000 C	4100 N	440000 C	410 N	NC	NC	NC	NC	NC	NC	150 N	2000 N	13000 C	71000 C	620 N	NC	NO	BSL
POTASSIUM	7440-09-7	205 J	2110	NTC12-SB26-0406	10/10	--	2110	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
SELENIUM	7782-49-2	0.214 J	6.57	NTC12-SB26-0406	9/10	0.566	6.57	NC	39 N	NC	1000 N	NC	100 N	NC	NC	NC	NC	NC	NC	39 N	510 N	2800000 N	13000000 N	150 N	7100 N	NO	BSL
SILVER	7440-22-4	0.0931 J	22.3	NTC12-SB26-0406	7/10	0.226-0.466	22.3	NC	39 N	NC	1000 N	NC	100 N	NC	NC	NC	NC	NC	NC	39 N	510 N	NC	NC	150 N	NC	NO	BSL
SODIUM	7440-23-5	84.7 J	270 J	NTC12-SB26-0406	10/10	--	270	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
VANADIUM	7440-62-2	4.78	25.9	NTC12-SB26-0406	10/10	--	25.9	NC	55 N	NC	1400 N	NC	140 N	NC	NC	NC	NC	NC	NC	39 N	520 N	14000 N	66000 N	150 N	36 N	NO	BSL
ZINC	7440-66-6	43.7 J	912 J	NTC12-SB21-0507	10/10	--	912	NC	2300 N	NC	61000 N	NC	6100 N	NC	NC	NC	NC	NC	NC	2300 N	31000 N	NC	NC	9300 N	NC	NO	BSL

Notes:
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.
Screening values for risk-based non-carcinogenic values (denoted with a "N" flag) were reduced by a factor of 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values (denoted with a "C" flag) represent an incremental cancer risk of 1.0E-06.

Footnotes:
1 - Values presented are sample-specific quantitation limits.
2 - The maximum detected concentration is used for screening purposes
3 - Section 742 Table A and Table B, Tier 1, Soil Remediation Objectives - Residential/Industrial/Commercial (Ingestion or Inhalation)(Illinois EPA, 2013a).
4 - Soil Remediation Objectives for Residential/Industrial/Commercial properties, Non-TACO Chemicals. (Illinois EPA, 2013a).
5 - USEPA RSL Screening Level (USEPA, 2013).
6 - SSLs for the migration of chemicals from soil to air were calculated by Tetra Tech using the methodology and equations presented in the Supplemental Guidance For Developing Soil Screening Levels for Superfund Sites, OSWER 93355.4-24, December 2002 and online at http://rais.ornl.gov/epa/ssl1.shtml since these values are more recent than those published in the 1996 and 2002 SSL guidance documents.
7 - Soil Screening Levels for Migration from Soil to Air for Construction Worker Scenario were calculated by Tetra Tech using methodology and equations presented in the Supplemental Guidance For Developing Soil Screening Levels for Superfund Sites, OSWER 93355.4-24, December 2002.
8 - The chemical is selected as a COPC if the maximum detected concentration exceeds a screening level.
9 - A toxicity equivalence factor (TEF) approach was used based on the relative potency of each carcinogenic PAH compound relative to that of benzo(a)pyrene. The limit of detection was used to represent non-detected concentrations in the calculation.
10 - Endosulfan is used as a surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
11 - Endrin is used as a surrogate for endrin aldehyde and endrin ketone.
12 - Hexavalent chromium is used as a surrogate for chromium.
13 - Acenaphthene is used as a surrogate for acenaphthylene
14- Pyrene is used as a surrogate for benzo(ghi)perylene and phenanthrene
15 - Alpha-BHC used as a surrogate for delta-BHC.
16 - Background value provided in TACO Appendix A, Table G used as screening value (Illinois EPA, 2013a).
17 - Value for mercuric chloride (and other mercury salts).
18 - One-tenth of the noncarcinogenic value is less than the carcinogenic value. Therefore, the noncarcinogenic value is presented.

Definitions:
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Non-carcinogen
NC = No criteria
NA = Not applicable/not available
SAT = Saturation

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level
For Elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient

TABLE 2-4

HUMAN HEALTH SUBSURFACE SOIL MIGRATION TO GROUNDWATER SCREENING ASSESSMENT
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS #	Minimum Result	Maximum Result[1]	Average Positive Result	Overall Average	Illinois Background Levels[2]	TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[3,4]	NON-TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[5]	USEPA Risk Based SSLs - Migration from Soil to Groundwater[6]	USEPA Risk Based SSLs - Migration from Soil to Groundwater with a DAF of 15[6]	USEPA MCL Based SSLs - Migration from Soil to Groundwater[6]	USEPA MCL Based SSLs - Migration from Soil to Groundwater with a DAF of 15[6]
SEMIVOLATILES (ug/kg)												
4-METHYLPHENOL	106-44-5	167 J	375 J	270	215	NC	NC	3900	1100	16500	NC	NC
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	201 J	201 J	201	193	NC	3600000	NC	1100	16500	1400	21000
CARBAZOLE	86-74-8	494 J	1080 J	787	311	NC	**600**	NC	NC	NC	NC	NC
DIBENZOFURAN	132-64-9	204 J	1140	570	306	NC	NC	3000	**110**	1650	NC	NC
PHENOL	108-95-2	99.7 J	99.7 J	99.7	184	NC	100000	NC	2600	39000	NC	NC
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/kg)												
2-METHYLNAPHTHALENE	91-57-6	3.31 J	545	144	144	**140**	NC	1900	**140**	2100	NC	NC
ACENAPHTHENE	83-32-9	5.87 J	1120	200	200	**130**	570000	NC	4100	61500	NC	NC
ACENAPHTHYLENE	208-96-8	3.67 J	253	61.9	50.3	**70**	NC	85000	4100[7]	61500	NC	NC
ANTHRACENE	120-12-7	19	5280	726	726	**400**	12000000	NC	42000	630000	NC	NC
BAP EQUIVALENT	NA	55.5	10609	1780	1780	**2100**	**8000**	NC	**3.5**	**52.5**	**240**	4800
BENZO(A)ANTHRACENE	56-55-3	41.3	9780	1510	1510	**1800**	**2000**	NC	**10**	**150**	NC	NC
BENZO(A)PYRENE	50-32-8	40.1	7740	1270	1270	**2100**	8000	NC	**3.5**	**52.5**	**240**	3600
BENZO(B)FLUORANTHENE	205-99-2	53.7	10300	1490	1490	**2100**	**5000**	NC	**35**	**525**	NC	NC
BENZO(G,H,I)PERYLENE	191-24-2	26.9	1110	351	351	1700	NC	27000000	9500[8]	142500	NC	NC
BENZO(K)FLUORANTHENE	207-08-9	25.7	2570	676	676	**1700**	49000	NC	**350**	5250	NC	NC
CHRYSENE	218-01-9	63	7940	1270	1270	**2700**	160000	NC	**1100**	16500	NC	NC
DIBENZO(A,H)ANTHRACENE	53-70-3	12	705	224	158	**420**	2000	NC	**11**	**165**	NC	NC
FLUORANTHENE	206-44-0	118	21100	3420	3420	**4100**	4300000	NC	70000	1050000	NC	NC
FLUORENE	86-73-7	10	2510	403	363	**180**	560000	NC	4000	60000	NC	NC
INDENO(1,2,3-CD)PYRENE	193-39-5	19.9	1330	367	367	1600	14000	NC	**200**	3000	NC	NC
NAPHTHALENE	91-20-3	4 J	439	128	128	**200**	12000	NC	**0.47**	**7.05**	NC	NC
PHENANTHRENE	85-01-8	75.4	20200	3030	3030	**2500**	NC	210000	9500[8]	142500	NC	NC
PYRENE	129-00-0	104	16800	2840	2840	**3000**	4200000	NC	**9500**	142500	NC	NC
PCBs (ug/kg)												
AROCLOR-1254	11097-69-1	29.8 J	799	245	198	NC	NC	NC	**8.8**	**132**	NC	NC
PESTICIDES (ug/kg)												
4,4'-DDD	72-54-8	2.37	1090	244	244	NC	16000	NC	**6.4**	**96**	NC	NC
4,4'-DDE	72-55-9	0.692 J	986 J	142	142	NC	54000	NC	**46**	**690**	NC	NC
4,4'-DDT	50-29-3	0.362 J	823	105	105	NC	32000	NC	**67**	1005	NC	NC
ALDRIN	309-00-2	0.463 J	17	4.2	2.3	NC	500	NC	**0.65**	**9.75**	NC	NC
ALPHA-BHC	319-84-6	0.172 J	1.05	0.75	0.5	NC	**0.5**	NC	**0.036**	**0.54**	NC	NC
ALPHA-CHLORDANE	5103-71-9	0.202 J	141	24.1	21.7	NC	10000	NC	**13**	195	**140**	2100
BETA-BHC	319-85-7	0.722 J	1.12	0.92	0.55	NC	NC	NC	**0.13**	1.95	NC	NC
DELTA-BHC[9]	319-86-8	0.164 J	6.05	1.4	1.2	NC	**0.5**	NC	**0.036**	**0.54**	NC	NC
DIELDRIN	60-57-1	0.321 J	13.4	4.3	3.1	NC	**4**	NC	**0.061**	**0.915**	NC	NC
ENDOSULFAN I[10]	959-98-8	0.194 J	4.51	2.2	1.3	NC	18000	NC	1100	16500	NC	NC
ENDOSULFAN II[10]	33213-65-9	0.28 J	5.63	2.0	1.3	NC	18000	NC	1100	16500	NC	NC
ENDOSULFAN SULFATE[10]	1031-07-8	0.204 J	3.95	2.2	1.1	NC	18000	NC	1100	16500	NC	NC
ENDRIN	72-20-8	0.235 J	12.9	5.8	4.2	NC	1000	NC	68	1020	81	1215
ENDRIN ALDEHYDE[11]	7421-93-4	0.953 J	10.9	4.0	2.2	NC	1000	NC	68	1020	81	1215
ENDRIN KETONE[11]	53494-70-5	0.715 J	0.715 J	0.72	0.42	NC	1000	NC	68	1020	81	1215
GAMMA-BHC (LINDANE)	58-89-9	0.346 J	3.61	1.5	0.72	NC	9	NC	**0.21**	**3.15**	**1.2**	18
GAMMA-CHLORDANE	5103-74-2	0.301 J	129	23.7	21.4	NC	10000	NC	**13**	195	140	2100
HEPTACHLOR	76-44-8	0.182 J	1.83	1.2	0.7	NC	23000	NC	**0.14**	2.1	33	495
HEPTACHLOR EPOXIDE	1024-57-3	0.213 J	7	2.2	1.6	NC	700	NC	**0.068**	**1.02**	**4.1**	61.5
METHOXYCHLOR	72-43-5	0.528 J	1.33	0.94	0.56	NC	160000	NC	1500	22500	2200	33000
INORGANICS (mg/kg)												
ALUMINUM	7429-90-5	1380	11700	6720	6720	**9500**	NC	NC	23000	345000	NC	NC
ANTIMONY	7440-36-0	0.297 J	4.24 J	1.4	1.0	**4**	5 *	NC	**0.27**	**4.05**	**0.27**	4.05
ARSENIC	7440-38-2	4.26 J	25 J	11.6	11.6	**13**	30 *	NC	**0.0013**	**0.0195**	**0.29**	**4.35**
BARIUM	7440-39-3	6.73 J	432 J	120	120	**110**	1800 *	NC	**120**	1800	**82**	1230
BERYLLIUM	7440-41-7	0.154 J	1.02	0.52	0.87	**0.59**	1000 *	NC	13	195	3.2	48
CADMIUM	7440-43-9	0.119 J	7.31 J	1.8	1.8	**0.6**	59 *	NC	**0.52**	7.8	**0.38**	5.7
CALCIUM	7440-70-2	26800	85700 J	49800	49800	**9300**	NC	NC	NC	NC	NC	NC
CHROMIUM[12]	7440-47-3	4.65 J	60.8 J	20.6	20.6	**16.2**	**32***	NC	**0.00059**	**0.00885**	180000[13]	2700000
COBALT	7440-48-4	2.37	17	8.5	8.5	**8.9**	NC	NC	**0.21**	**3.15**	NC	NC
COPPER	7440-50-8	6.56	362	105	105	**19.6**	330000 *	NC	**22**	**330**	**46**	690
IRON	7439-89-6	4650	31400	15600	15600	**15900**	NC	NC	**270**	**4050**	NC	NC
LEAD	7439-92-1	26.6 J	845 J	200	200	**36**	**107 ***	NC	NC	NC	**14**	**210**
MAGNESIUM	7439-95-4	12000	42600 J	23400	23400	**4820**	NC	NC	NC	NC	NC	NC
MANGANESE	7439-96-5	143	846	461	461	**636**	NC	NC	**21**	**315**	NC	NC
MERCURY	7439-97-6	0.0327 J	1.99	0.45	0.45	**0.06**	6.4 *	NC	**0.033**	**0.495**	**0.1**	1.5
NICKEL	7440-02-0	4.36	88.6	28.8	28.8	**18**	700 *	NC	**20**	300	NC	NC
POTASSIUM	7440-09-7	205 J	2110	1140	1140	**1268**	NC	NC	NC	NC	NC	NC
SELENIUM	7782-49-2	0.214 J	6.57	1.7	1.5	**0.48**	**3.3 ***	NC	**0.4**	**6**	**0.26**	**3.9**
SILVER	7440-22-4	0.0931 J	22.3	6.4	4.5	**0.55**	39 *	NC	**0.6**	**9**	NC	NC
SODIUM	7440-23-5	84.7 J	270 J	160	160	**130**	NC	NC	NC	NC	NC	NC
VANADIUM	7440-62-2	4.78	25.9	15.3	15.3	**25.2**	980 *	NC	68	945	NC	NC
ZINC	7440-66-6	43.7 J	912 J	326	326	**95**	16000 *	NC	**290**	4350	NC	NC

TABLE 2-4

HUMAN HEALTH SUBSURFACE SOIL MIGRATION TO GROUNDWATER SCREENING ASSESSMENT
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS #	Minimum Result	Maximum Result[1]	Average Positive Result	Overall Average	Illinois Background Levels[2]	TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[3,4]	NON-TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[5]	USEPA Risk Based SSLs - Migration from Soil to Groundwater[6]	USEPA Risk Based SSLs - Migration from Soil to Groundwater with a DAF of 15[6]	USEPA MCL Based SSLs - Migration from Soil to Groundwater[6]	USEPA MCL Based SSLs - Migration from Soil to Groundwater with a DAF of 15[6]

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria or Illinois background values.
Shaded chemical name indicates that the maximum detected concentration exceeds one or more screening criteria and Illinois background values..
Bold, italicized chemical name indicates that maximum detection, although exceeding groundwater protection criterion, is lower than Illinois background.

Footnotes:
1 - The maximum detected concentration is used for screening purposes
2 - Illinois background values: Section 742 Appendix A, Tables G & H (Illinois EPA, 2013a).
3 - TACO values: Section 742 Appendix B, Table A, Tier 1 Soil Remediation Objectives for Residential Properties (Illinois EPA, 2013a). Unless otherwise noted.
4 - * values are pH dependent criteria (site-specific pH result of 7.58), Section 742 Appendix B, Table C (Illinois EPA, 2013a).
5 - Soil Remediation Objectives for Residential Properties, Non-TACO Chemicals (Illinois EPA, 2013a).
6 - USEPA RSL Soil Screening Level for the Protection of Groundwater (USEPA, 2013). Dilution Attenuation Factor (DAF) of 15; selected based on information from USEPA soil screening guidance (USEPA, 1996a) and a source area of 1.75 acres.
7 - Acenaphthene is used as a surrogate for acenaphthylene
8 - Pyrene is used as a surrogate for benzo(ghi)perylene and phenanthrene
9 - Alpha-BHC used as a surrogate for delta-BHC.
10 - Endosulfan is used as a surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
11 - Endrin is used as a surrogate for endrin aldehyde and endrin ketone.
12 - Hexavalent chromium is used as a surrogate for chromium.
13 - Value for total chromium.

Definitions:
J = Estimated value
NC = No criteria
NA = not available/not applicable

TABLE 2-5

HUMAN HEALTH GROUNDWATER COPC SELECTION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	Minimum Concentration[1]	Maximum Concentration[1]	Sample of Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Adjusted USEPA Regional Screening Level - Tap Water[4]	USEPA MCL[5]	TACO - Class I[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
DISSOLVED METALS (µg/L)											
ARSENIC	5.8	71	NTC12GW-04	3/4	1.1	71	**0.045 C**	**10**	**50**	**YES**	ASL
BARIUM	48	220	NTC12GW-04	4/4	--	220	290 N	2000	2000	NO	BSL
CADMIUM	0.12 J	0.45	NTC12GW-01	2/4	0.1	0.45	0.69 N	5	5	NO	BSL
CALCIUM	130000	240000	NTC12GW-02	4/4	--	240000	NA	NA	NA	NO	NUT
COBALT	0.21 J	9	NTC12GW-02	4/4	--	9	**0.47 N**	NA	1000	**YES**	ASL
COPPER	0.66 J	7.4 J	NTC12GW-01	4/4	--	7.4	62 N	1300	650	NO	BSL
IRON	55	18000	NTC12GW-04	4/4	--	18000	**1100 N**	NA	**5000**	**YES**	ASL
LEAD	0.22 J	0.22 J	NTC12GW-02	1/4	0.5	0.22	NA	15	7.5	NO	BSL
MAGNESIUM	52000	150000	NTC12GW-01	4/4	--	150000	NA	NA	NA	NO	NUT
MANGANESE	240 J	670 J	NTC12GW-04	4/4	--	670	**32 N**	NA	**150**	**YES**	ASL
NICKEL	0.59 J	48	NTC12GW-02	4/4	--	48	**30 N**	NA	100	**YES**	ASL
POTASSIUM	5500	6900	NTC12GW-04	4/4	--	6900	NA	NA	NA	NO	NUT
SILVER	0.056 J	0.077 J	NTC12GW-01	2/4	0.1	0.077	7.1 N	NA	50	NO	BSL
SODIUM	63000	160000	NTC12GW-02	4/4	--	160000	NA	NA	NA	NO	NUT
THALLIUM	0.029 J	0.055 J	NTC12GW-01	2/4	0.1	0.055	**0.016 N**	2	2	**YES**	ASL
ZINC	3.7 J	130	NTC12GW-02	4/4	--	130	470 N	NA	5000	NO	BSL
METALS (µg/L)											
ALUMINUM	57 J	57 J	NTC12GW-04	1/4	50	57	1600 N	NA	NA	NO	BSL
ARSENIC	5.3	78	NTC12GW-04	3/4	1	78	**0.045 C**	**10**	**50**	**YES**	ASL
BARIUM	45 J	240 J	NTC12GW-04	4/4	--	240	290 N	2000	2000	NO	BSL
CADMIUM	0.054 J	0.39	NTC12GW-01	3/4	0.1	0.39	0.69 N	5	5	NO	BSL
CALCIUM	130000	240000	NTC12GW-02	4/4	--	240000	NA	NA	NA	NO	NUT
CHROMIUM	0.24 J	0.81 J	NTC12GW-01	4/4	1	0.81	**0.031 C[8]**	100	100	**YES**	ASL
COBALT	0.19 J	7	NTC12GW-02	4/4	--	7	**0.47 N**	NA	1000	**YES**	ASL
COPPER	0.72 J	7 J	NTC12GW-01	4/4	--	7	62 N	1300	650	NO	BSL
IRON	66	19000	NTC12GW-04	4/4	--	19000	**1100 N**	NA	**5000**	**YES**	ASL
LEAD	0.2 J	2.1	NTC12GW-04	3/4	0.5	2.1	NA	15	7.5	NO	BSL
MAGNESIUM	51000	160000	NTC12GW-01	4/4	--	160000	NA	NA	NA	NO	NUT
MANGANESE	220 J	740 J	NTC12GW-04	4/4	--	740	**32 N**	NA	**150**	**YES**	ASL
NICKEL	0.91 J	40	NTC12GW-02	4/4	--	40	**30 N**	NA	100	**YES**	ASL
POTASSIUM	5300	7100	NTC12GW-04	4/4	--	7100	NA	NA	NA	NO	NUT
SELENIUM	4.2	4.2	NTC12GW-02	1/4	1	4.2	7.8 N	50	50	NO	BSL
SILVER	0.046 J	0.06 J	NTC12GW-01	2/4	0.1	0.06	7.1 N	NA	50	NO	BSL
SODIUM	65000	160000	NTC12GW-02	4/4	--	160000	NA	NA	NA	NO	NUT
THALLIUM	0.035 J	0.056 J	NTC12GW-01	2/4	0.1	0.056	**0.016 N**	2	2	**YES**	ASL
VANADIUM	0.11 J	0.42 J	NTC12GW-04	4/4	1	0.42	6.3 N	NA	49	NO	BSL
ZINC	4.8 J	130	NTC12GW-02	4/4	--	130	470 N	NA	5000	NO	BSL

TABLE 2-5

HUMAN HEALTH GROUNDWATER COPC SELECTION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Adjusted USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, 2013.
[Cancer benchmark value = 1E-06, hazard quotient (HQ) = 0.1].
5 - 2012 Edition of the Drinking Water Standards and Health Advisories (USEPA, 2012a).
6 - Section 742 Table E, Tier 1 Groundwater Remediation Objectives (Illinois EPA, 2013a).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
8 - The value is for hexavalent chromium.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level
For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient

Definitions:

C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

RAGS Part D Table 3

Medium-Specific Exposure Point Concentration Summary

TABLE 3.1.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean[1]	95% UCL (Distribution)	Maximum Concentration (Qualifier)[2]	Exposure Point Concentration (EPC)			
						Value[3]	Units	Statistic	Rationale
Site 12	BENZO(A)PYRENE EQUIVALENTS	mg/kg	0.897	1.37 (N)	2.084	1.37	mg/kg	95% Student's-t	ProUCL 4.1.01
	ALPHA-CHLORDANE	mg/kg	0.353	20.9 (LN)	3.22	3.22	mg/kg	Maximum Detected Concentration	UCL>Max
	GAMMA-CHLORDANE	mg/kg	0.281	2.85 (LN)	2.600	2.600	mg/kg	Maximum Detected Concentration	UCL>Max
	HEPTACHLOR	mg/kg	0.024	0.072 (G)	0.236	0.072	mg/kg	95% KM (t)	ProUCL 4.1.01
	HEPTACHLOR EPOXIDE	mg/kg	0.0086	0.02 (G)	0.064	0.02	mg/kg	95% (BCA)	ProUCL 4.1.01
	ALUMINUM	mg/kg	5966	10491 (NP)	10000	10000	mg/kg	Maximum Detected Concentration	UCL>Max
	ARSENIC	mg/kg	9.07	11.4 (N)	16.9	11.4	mg/kg	95% Student's-t	ProUCL 4.1.01
	BARIUM	mg/kg	72.4	141 (G)	244	141	mg/kg	95% Approximate Gamma	ProUCL 4.1.01
	CHROMIUM VI	mg/kg	12.4	15.99 (N)	23.8	15.99	mg/kg	95% Student's-t	ProUCL 4.1.01
	COBALT	mg/kg	7.09	12 (NP)	11.2	11.2	mg/kg	Maximum Detected Concentration	UCL>Max
	IRON	mg/kg	13028	21193 (NP)	20300	20300	mg/kg	Maximum Detected Concentration	UCL>Max
	MANGANESE	mg/kg	446	571 (N)	701	571	mg/kg	95% Student's-t	ProUCL 4.1.01
	MERCURY	mg/kg	0.177	0.326 (G)	0.598	0.326	mg/kg	95% Approximate Gamma	ProUCL 4.1.01

G = Gamma
L = Lognormal
N = Normal
NP = Nonparametric
EPC = Exposure point concentration

1 - EPC for the CTE scenario for construction workers and residents.
2 - EPC for the RME scenario for construction workers and residents.
3 - EPC for the RME and CTE scenarios for occupational/maintenance workers and trespassers.

TABLE 3.2.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean[1]	95% UCL (Distribution)	Maximum Concentration (Qualifier)[2]	Exposure Point Concentration			
						Value[3]	Units	Statistic	Rationale
Site 12	BENZO(A)PYRENE EQUIVALENTS	mg/kg	1.777	6.302 (G)	10.609	6.302	mg/kg	95% Adjusted Gamma	ProUCL 4.1.01
	NAPHTHALENE	mg/kg	0.128	0.326 (G)	0.439	0.326	mg/kg	95% Approximate Gamma	ProUCL 4.1.01
	AROCLOR-1254	mg/kg	0.197	0.877 (G)	0.799	0.877	mg/kg	95% KM (Chebyshev)	ProUCL 4.1.01
	ALUMINUM	mg/kg	6717	8924 (N)	11700	8924	mg/kg	95% Student's t	ProUCL 4.1.01
	ANTIMONY	mg/kg	0.95	1.8 (G)	4.24	1.8	mg/kg	95% KM (BCA)	ProUCL 4.1.01
	ARSENIC	mg/kg	11.6	15.3 (N)	25	15.3	mg/kg	95% Student's t	ProUCL 4.1.01
	BARIUM	mg/kg	120	249 (G)	432	249	mg/kg	95% Approximate Gamma	ProUCL 4.1.01
	CADMIUM	mg/kg	1.82	4.2 (G)	7.31	4.2	mg/kg	95% Approximate Gamma	ProUCL 4.1.01
	CHROMIUM VI	mg/kg	20.6	30.8 (N)	60.8	30.8	mg/kg	95% Student's t	ProUCL 4.1.01
	COBALT	mg/kg	8.45	11.2 (N)	17	11.2	mg/kg	95% Student's t	ProUCL 4.1.01
	COPPER	mg/kg	105	222 (G)	362	222	mg/kg	95% Approximate Gamma	ProUCL 4.1.01
	IRON	mg/kg	15600	20260 (N)	31400	20260	mg/kg	95% Student's t	ProUCL 4.1.01
	MANGANESE	mg/kg	461	594 (N)	846	594	mg/kg	95% Student's t	ProUCL 4.1.01
	MERCURY	mg/kg	0.45	1.14 (G)	1.99	1.14	mg/kg	95% Approximate Gamma	ProUCL 4.1.01

G = Gamma
N = Normal

1 - EPC for the CTE scenario for construction workers and residents.
2 - EPC for the RME scenario for construction workers and residents.
3 - EPC for the RME and CTE scenarios for occupational/maintenance workers and trespassers.

RAGS Part D Table 4

Values Used For Daily Intake Calculations

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RAGS PART D TABLE 4
VALUES USED FOR DAILY INTAKE CALCULATIONS

Table No.	
	Reasonable Maximum Exposures
4.1.RME	Construction Workers Exposed to Surface Soil/Subsurface Soil
4.2.RME	Construction Workers Exposed to Air Emissions from Surface Soil/Subsurface Soil
4.3.RME	Industrial Workers Exposed to Surface Soil/Subsurface Soil
4.4.RME	Industrial Workers Exposed to Air Emissions from Surface Soil/Subsurface Soil
4.5.RME	Adolescent Trespassers Exposed to Surface Soil
4.6.RME	Adolescent Trespassers Exposed to Air Emissions from Surface Soil
4.7.RME	Adult Trespassers Exposed to Surface Soil
4.8.RME	Adult Trespassers Exposed to Air Emissions from Surface Soil
4.9.RME	Child Residents Exposed to Surface Soil/Subsurface Soil
4.10.RME	Child Residents Exposed to Air Emissions from Surface Soil/Subsurface Soil
4.11.RME	Adult Residents Exposed to Surface Soil/Subsurface Soil
4.12.RME	Adult Residents Exposed to Air Emissions from Surface Soil/Subsurface Soil
	Central Tendency Exposures
4.1.CTE	Construction Workers Exposed to Surface Soil/Subsurface Soil
4.2.CTE	Construction Workers Exposed to Air Emissions from Surface Soil/Subsurface Soil
4.3.CTE	Industrial Workers Exposed to Surface Soil/Subsurface Soil
4.4.CTE	Industrial Workers Exposed to Air Emissions from Surface Soil/Subsurface Soil
4.5.CTE	Adolescent Trespassers Exposed to Surface Soil/Subsurface Soil
4.6.CTE	Adolescent Trespassers Exposed to Air Emissions from Surface Soil/Subsurface Soil
4.7.CTE	Adult Trespassers Exposed to Surface Soil/Subsurface Soil
4.8.CTE	Adult Trespassers Exposed to Air Emissions from Surface Soil/Subsurface Soil
4.9.CTE	Child Residents Exposed to Surface Soil/Subsurface Soil
4.10.CTE	Child Residents Exposed to Air Emissions from Surface Soil/Subsurface Soil
4.11.CTE	Adult Residents Exposed to Surface Soil/Subsurface Soil
4.12.CTE	Adult Residents Exposed to Air Emissions from Surface Soil/Subsurface Soil

TABLE 4.1.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - CONSTRUCTION WORKERS- SOILS

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Construction Workers	Adult	Site 12	CS	Chemical concentration in soil	Max	mg/kg	USEPA, 2002a	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	330	mg/day	USEPA, 2002b	
				CF3	Conversion Factor 3	0.000001	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	USEPA, 1993	BW x AT
				EF	Exposure Frequency	30	days/year	Illinois EPA, 2013	
				ED	Exposure Duration	1	years	(1)	
				BW	Body Weight	70	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	42	days	Illinois EPA, 2013	
Dermal	Construction Workers	Adult	Site 12	CS	Chemical concentration in soil	Max	mg/kg	USEPA, 2002a	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	0.000001	kg/mg	--	
				SA	Skin Surface Available for Contact	3300	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.3	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	30	days/year	Illinois EPA, 2013	
				ED	Exposure Duration	1	years	(1)	
				BW	Body Weight	70	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	42	days	Illinois EPA, 2013	

Notes:

1 - Professional judgment.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002a:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Illinois EPA, 2013: Title 35 of the Illinois Adminstrative Code (IAC) Section 742: TACO, Appendix C, Table B SSL Parameters.

Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Cancer Ingestion Intake = 5.54E-09 Cancer Dermal Intake = 1.66E-08

Noncancer Ingestion Intake = 3.37E-06 Noncancer Dermal Intake = 1.01E-05

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

TABLE 4.1.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - CONSTRUCTION WORKERS - SOILS

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Construction Workers	Adult	Site 12	CS	Chemical concentration in soil	Mean	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	165	mg/day	(1)	
				CF3	Conversion Factor 3	0.000001	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	USEPA, 1993	BW x AT
				EF	Exposure Frequency	30	days/year	Illinois EPA, 2013	
				ED	Exposure Duration	1	years	(1)	
				BW	Body Weight	70	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	42	days	Illinois EPA, 2013	
Dermal	Construction Workers	Adult	Site 12	CS	Chemical concentration in soil	Mean	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	0.000001	kg/mg	--	
				SA	Skin Surface Available for Contact	3300	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.1	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	30	days/year	Illinois EPA, 2013	
				ED	Exposure Duration	1	years	(1)	
				BW	Body Weight	70	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	42	days	Illinois EPA, 2013	

Notes:

1 - Professional judgment. For some factors, CTE is assumed to be 50 percent of RME.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Illinois EPA, 2013: Title 35 of the Illinois Adminstrative Code (IAC) Section 742: TACO, Appendix C, Table B SSL Parameters.

Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Cancer Ingestion Intake = 2.77E-09 Cancer Dermal Intake = 5.54E-09

Noncancer Ingestion Intake = 1.68E-06 Noncancer Dermal Intake = 3.37E-06

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

TABLE 4.2.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - CONSTRUCTION WORKERS - SOILS TO AIR

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Construction Workers	Adult	Site 12	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max	mg/kg	USEPA, 2002b	
				ET	Exposure Time	8	hours/day	(1)	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				EF	Exposure Frequency	30	days/year	Illinois EPA, 2013	
				ED	Exposure Duration	1	years	(1)	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	42	days	Illinois EPA, 2013	
				PEF	Particulate Emission Factor	1.24E+08	m3/kg	Illinois EPA, 2013	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	85.81	g/m2-s per kg/m3	Illinois EPA, 2013	

Notes:

1 - Professional judgment.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

Illinois EPA, 2013: Title 35 of the Illinois Adminstrative Code (IAC) Section 742: TACO, Appendix C, Table B SSL Parameters.

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Cancer Inhalation Intake = 3.91E-04 Noncancer Inhalation Intake = 2.38E-01

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.2.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - CONSTRUCTION WORKERS - SOILS TO AIR

FORMER NCBC DAVISVILLE, NORTH KINGSTOWN, RHODE ISLAND

Scenario Timeframe: Current/Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Construction Workers	Adult	Site 12	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Mean	mg/kg	USEPA, 2002b	
				ET	Exposure Time	4	hours/day	(1)	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				EF	Exposure Frequency	30	days/year	Illinois EPA, 2013	
				ED	Exposure Duration	1	years	(1)	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	42	days	Illinois EPA, 2013	
				PEF	Particulate Emission Factor	1.24E+08	m3/kg	USEPA, 2002a	
				VF	Volatilization Factor	Chemical-specific	m3/kg	Illinois EPA, 2013	
				Q/C	Inverse of mean concentration at center of source	85.81	g/m2-s per kg/m3	Illinois EPA, 2013	

Notes:

1 - Professional judgment. For some factors, CTE is assumed to be 50 percent of RME.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

Illinois EPA, 2013: Title 35 of the Illinois Adminstrative Code (IAC) Section 742: TACO, Appendix C, Table B SSL Parameters.

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Cancer Inhalation Intake = 1.96E-04 Noncancer Inhalation Intake = 1.19E-01

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.3.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - OCCUPATIONAL/MAINTENANCE WORKERS - SOIL

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Occupational Workers	Adult	Site 12	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	USEPA, 1993	
				CF3	Conversion Factor 3	0.000001	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	USEPA, 1993	BW x AT
				EF	Exposure Frequency	250	days/year	USEPA, 1993	
				ED	Exposure Duration	25	years	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	9125	days	USEPA, 1989	
Dermal	Occupational Workers	Adult	Site 12	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	0.000001	kg/mg	--	
				SA	Skin Surface Available for Contact	3300	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	250	days/year	USEPA, 1993	
				ED	Exposure Duration	25	years	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	9125	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 1991: Human Health Evaluation Manual, Supplemental Guidance, Standard Default Exposure Factors. OSWER 9285.6-03.

USEPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Cancer Ingestion Intake = 3.49E-07 Cancer Dermal Intake = 2.31E-06

Noncancer Ingestion Intake = 9.78E-07 Noncancer Dermal Intake = 6.46E-06

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

TABLE 4.3.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - OCCUPATIONAL/MAINTENANCE WORKERS - SOIL

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Occupational Workers	Adult	Site 12	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	50	mg/day	USEPA, 1993	
				CF3	Conversion Factor 3	0.000001	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	USEPA, 1993	BW x AT
				EF	Exposure Frequency	219	days/year	USEPA, 1993	
				ED	Exposure Duration	9	years	USEPA, 1993	
				BW	Body Weight	70	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3285	days	USEPA, 1989	
Dermal	Occupational Workers	Adult	Site 12	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	0.000001	kg/mg	--	
				SA	Skin Surface Available for Contact	3300	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.02	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	219	days/year	USEPA, 1993	
				ED	Exposure Duration	9	years	USEPA, 1993	
				BW	Body Weight	70	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3285	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Cancer Ingestion Intake = 5.51E-08 Cancer Dermal Intake = 7.27E-08

Noncancer Ingestion Intake = 4.29E-07 Noncancer Dermal Intake = 5.66E-07

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

TABLE 4.4.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - OCCUPATIONAL/MAINTENANCE WORKERS - SOIL TO AIR

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Occupational Workers	Adult	Site 12	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	8	hours/day	Illinois EPA, 2013	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				EF	Exposure Frequency	250	days/year	USEPA, 1993	
				ED	Exposure Duration	25	years	USEPA, 1991	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	9125	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.24E+09	m3/kg	Illinois EPA, 2013	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	85.81	g/m2-s per kg/m3	Illinois EPA, 2013	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1991: Human Health Evaluation Manual, Supplemental Guidance, Standard Default Exposure Factors. OSWER 9285.6-03.

USEPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 1996: Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

Illinois EPA, 2013: Title 35 of the Illinois Adminstrative Code (IAC) Section 742: TACO, Appendix C, Table B SSL Parameters.

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Cancer Inhalation Intake = 8.15E-02 Noncancer Inhalation Intake = 2.28E-01

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.4.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - OCCUPATIONAL/MAINTENANCE WORKERS - SOIL TO AIR

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Occupational Workers	Adult	Site 12	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	4	hours/day	Illinois EPA, 2013	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				EF	Exposure Frequency	219	days/year	USEPA, 1993	
				ED	Exposure Duration	9	years	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	3285	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.24E+09	m3/kg	Illinois EPA, 2013	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	85.81	g/m2-s per kg/m3	Illinois EPA, 2013	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 1996: Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

Illinois EPA, 2013: Title 35 of the Illinois Adminstrative Code (IAC) Section 742: TACO, Appendix C, Table B SSL Parameters.

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Cancer Inhalation Intake = 1.29E-02 Noncancer Inhalation Intake = 1.00E-01

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.5.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADOLESCENT TRESPASSERS - SOILS

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Trespassers	Adolescent	Site 12	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	USEPA, 1993	
				CF3	Conversion Factor 3	0.000001	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	USEPA, 1993	BW x AT
				EF	Exposure Frequency	26	days/year	(1)	
				ED	Exposure Duration	10	years	(2)	
				BW	Body Weight	42	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3650	days	USEPA, 1989	
Dermal	Trespassers	Adolescent	Site 12	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	0.000001	kg/mg	--	
				SA	Skin Surface Available for Contact	3280	cm2	USEPA, 1997	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	26	days/year	(1)	
				ED	Exposure Duration	10	years	(2)	
				BW	Body Weight	42	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3650	days	USEPA, 1989	

Notes:

For chemicals that act via the mutagenic mode of action the intake will be multiplied by the appropriate age-dependent adjustment factor in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

1 - Assume one day a week in warm weather months for RME and one day every other week for CTE.

2 - Older child from age 7 to 16.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 1997: Exposure Factors Handbook. EPA/600/8-95/002FA.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Cancer Ingestion Intake = 2.42E-08 Cancer Dermal Intake = 1.59E-07

Noncancer Ingestion Intake = 1.70E-07 Noncancer Dermal Intake = 1.11E-06

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

TABLE 4.5.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - ADOLESCENT TRESPASSERS - SOILS
NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Trespassers	Adolescent	Site 12	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	50	mg/day	USEPA, 1993	
				CF3	Conversion Factor 3	0.000001	kg/mg	--	CSs x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	USEPA, 1993	BW x AT
				EF	Exposure Frequency	13	days/year	(1)	
				ED	Exposure Duration	10	years	(2)	
				BW	Body Weight	42	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3650	days	USEPA, 1989	
Dermal	Trespassers	Adolescent	Site 12	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	0.000001	kg/mg	--	
				SA	Skin Surface Available for Contact	3100	cm2	USEPA, 1997	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.04	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	13	days/year	(1)	
				ED	Exposure Duration	10	years	(2)	
				BW	Body Weight	42	kg	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3650	days	USEPA, 1989	

Notes:
1 - Assume one day a week in warm weather months for RME and one day every other week for CTE.
2 - Older child from age 7 to 16.

Sources:
USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.
USEPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.
USEPA, 1997: Exposure Factors Handbook. EPA/600/8-95/002FA.
USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)
Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Cancer Ingestion Intake = 6.06E-09 Cancer Dermal Intake = 1.50E-08
Noncancer Ingestion Intake = 4.24E-08 Noncancer Dermal Intake = 1.05E-07

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor
Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor
Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose
Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

TABLE 4.6.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADOLESCENT TRESPASSERS - SOILS TO AIR

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Trespassers	Adolescent	Site 12	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	2	hours/day	(1)	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				EF	Exposure Frequency	26	days/year	(2)	
				ED	Exposure Duration	10	years	(3)	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.32E+09	m3/kg	Illinois EPA, 2013	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	90.8	g/m2-s per kg/m3	Illinois EPA, 2013	

Notes:

For chemicals that act via the mutagenic mode of action the intake will be multiplied by the appropriate age-dependent adjustment factor in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

1 - Professional judgment.

2 - Assume one day a week in warm weather months for RME and one day every other week for CTE.

3 - Older child from age 7 to 16.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1996: Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

Illinois EPA, 2013: Title 35 of the Illinois Adminstrative Code (IAC) Section 742: TACO, Appendix C, Table B SSL Parameters.

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Cancer Inhalation Intake = 8.48E-04 Noncancer Inhalation Intake = 5.94E-03

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.6.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - ADOLESCENT TRESPASSERS - SOILS TO AIR

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Trespassers	Adolescent	Site 16	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	1	hours/day	(1)	CA x ET x EF x ED
				EF	Exposure Frequency	13	days/year	(2)	AT x 24 hours/day
				ED	Exposure Duration	10	years	(3)	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.32E+09	m3/kg	Illinois EPA, 2013	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	90.8	g/m2-s per kg/m3	Illinois EPA, 2013	

Notes:

1 - Professional judgment.

2 - Assume one day a week in warm weather months for RME and one day every other week for CTE.

3 - Older child from age 7 to 16.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1996: Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

Illinois EPA, 2013: Title 35 of the Illinois Adminstrative Code (IAC) Section 742: TACO, Appendix C, Table B SSL Parameters.

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Cancer Inhalation Intake = 2.12E-04 Noncancer Inhalation Intake = 1.48E-03

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.7.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADOLESCENT TRESPASSERS - SOILS

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Trespassers	Adult	Site 12	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	USEPA, 1993	
				CF3	Conversion Factor 3	0.000001	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	USEPA, 1993	BW x AT
				EF	Exposure Frequency	26	days/year	(1)	
				ED	Exposure Duration	24	years	USEPA, 1993	
				BW	Body Weight	70	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8760	days	USEPA, 1989	
Dermal	Trespassers	Adult	Site 12	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	0.000001	kg/mg	--	
				SA	Skin Surface Available for Contact	3300	cm2	USEPA 2004	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	26	days/year	(1)	
				ED	Exposure Duration	24	years	USEPA, 1993	
				BW	Body Weight	70	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8760	days	USEPA, 1989	

Notes:

For chemicals that act via the mutagenic mode of action the intake will be multiplied by the appropriate age-dependent adjustment factor in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

1 - Assume one day a week in warm weather months for RME and one day every other week for CTE.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Cancer Ingestion Intake = 3.49E-08 Cancer Dermal Intake = 2.30E-07

Noncancer Ingestion Intake = 1.02E-07 Noncancer Dermal Intake = 6.72E-07

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

TABLE 4.7.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - ADOLESCENT TRESPASSERS - SOILS

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Trespassers	Adult	Site 12	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	50	mg/day	USEPA, 1993	
				CF3	Conversion Factor 3	0.000001	kg/mg	--	CSs x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	USEPA, 1993	BW x AT
				EF	Exposure Frequency	13	days/year	(1)	
				ED	Exposure Duration	7	years	USEPA, 1993	
				BW	Body Weight	70	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2555	days	USEPA, 1989	
Dermal	Trespassers	Adult	Site 12	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	0.000001	kg/mg	--	
				SA	Skin Surface Available for Contact	3300	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.02	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	13	days/year	(1)	
				ED	Exposure Duration	7	years	USEPA, 1993	
				BW	Body Weight	70	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2555	days	USEPA, 1989	

Notes:

1 - Assume one day a week in warm weather months for RME and one day every other week for CTE.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Cancer Ingestion Intake = 2.54E-09 Cancer Dermal Intake = 3.36E-09

Noncancer Ingestion Intake = 2.54E-08 Noncancer Dermal Intake = 3.36E-08

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

TABLE 4.8.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADOLESCENT TRESPASSERS - SOILS TO AIR

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Trespassers	Adult	Site 12	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	2	hours/day	(1)	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				EF	Exposure Frequency	26	days/year	(2)	
				ED	Exposure Duration	24	years	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.32E+09	m3/kg	Illinois EPA, 2013	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	90.8	g/m2-s per kg/m3	Illinois EPA, 2013	

Notes:

For chemicals that act via the mutagenic mode of action the intake will be multiplied by the appropriate age-dependent adjustment factor in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

1 - Professional judgment.

2 - Assume one day a week in warm weather months for RME and one day every other week for CTE.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 1996: Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

Illinois EPA, 2013: Title 35 of the Illinois Adminstrative Code (IAC) Section 742: TACO, Appendix C, Table B SSL Parameters.

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Cancer Inhalation Intake = 2.04E-03 Noncancer Inhalation Intake = 5.94E-03

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.8.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - ADOLESCENT TRESPASSERS - SOILS TO AIR

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Trespassers	Adult	Site 16	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	1	hours/day	(1)	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				EF	Exposure Frequency	13	days/year	(2)	
				ED	Exposure Duration	7	years	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.32E+09	m3/kg	Illinois EPA, 2013	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	90.8	g/m2-s per kg/m3	Illinois EPA, 2013	

Notes:

1 - Professional judgment.

2 - Assume one day a week in warm weather months for RME and one day every other week for CTE.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 1996: Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

Illinois EPA, 2013: Title 35 of the Illinois Adminstrative Code (IAC) Section 742: TACO, Appendix C, Table B SSL Parameters.

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Cancer Inhalation Intake = 1.48E-04 Noncancer Inhalation Intake = 1.48E-03

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.9.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - CHILD RESIDENTS - SOILS

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Child	Site 12	CS	Chemical concentration in soil	Max	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	200	mg/day	USEPA, 1993	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	USEPA, 1993	BW x AT
				EF	Exposure Frequency	350	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 1993	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 1993	
				BW	Body Weight	15	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	
Dermal	Resident	Child	Site 12	CS	Chemical concentration in soil	Max	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	2,800	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 1993	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 1993	
				BW	Body Weight	15	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	

Notes:

1 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Non-Mutagenic Chemicals

Cancer Ingestion Intake (Age 0 - 6) = 1.10E-06 Cancer Dermal Intake (Age 0 - 6) = 3.07E-06

Mutagenic Chemicals

Cancer Ingestion Intake (Age 0 - 2) = 3.65E-07 Cancer Dermal Intake (Age 0 - 2) = 1.02E-06

Cancer Ingestion Intake (Age 2 - 6) = 7.31E-07 Cancer Dermal Intake (Age 2 - 6) = 2.05E-06

Noncarcinogenic Chemicals

Noncancer Ingestion Intake = 1.28E-05 Noncancer Dermal Intake = 3.58E-05

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

TABLE 4.9.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - CHILD RESIDENTS - SOILS
NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Child	Site 12	CS	Chemical concentration in soil	Mean	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	USEPA, 1993	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	USEPA, 1993	BW x AT
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 0 - 2)	1	years	(1), USEPA, 1993	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(1), USEPA, 1993	
				BW	Body Weight	15	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 1989	
Dermal	Resident	Child	Site 12	CS	Chemical concentration in soil	Mean	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	2,800	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.04	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 0 - 2)	1	years	(1), USEPA, 1993	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(1), USEPA, 1993	
				BW	Body Weight	15	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 1989	

Notes:

1 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Non-Mutagenic Chemicals

Cancer Ingestion Intake = 1.22E-07 Cancer Dermal Intake = 1.37E-07

Mutagenic Chemicals

Cancer Ingestion Intake (Age 0 - 2) = 6.11E-08 Cancer Dermal Intake (Age 0 - 2) = 6.84E-08

Cancer Ingestion Intake (Age 2 - 6) = 6.11E-08 Cancer Dermal Intake (Age 2 - 6) = 6.84E-08

Noncarcinogenic Chemicals

Noncancer Ingestion Intake = 4.27E-06 Noncancer Dermal Intake = 4.79E-06

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

TABLE 4.10.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - CHILD RESIDENTS SOILS TO AIR

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Child	Site 12	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max	mg/kg	USEPA, 2002b	
				ET	Exposure Time	24	hours/day	USEPA, 1997	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				EF	Exposure Frequency	350	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 1993	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 1993	$CA = (1/PEF + 1/VF) \times Cs$
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2190	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.32E+09	m3/kg	Illinois EPA, 2013	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	90.8	g/m2-s per kg/m3	Illinois EPA, 2013	

Notes:

1 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 1996: Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128.

USEPA, 1997: Exposure Factors Handbook. EPA/600/8-95/002FA.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

Illinois EPA, 2013: Title 35 of the Illinois Adminstrative Code (IAC) Section 742: TACO, Appendix C, Table B SSL Parameters.

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Non-Mutagenic Chemicals

Cancer Inhalation Intake (Age 0 - 6) = 8.22E-02

Noncarcinogenic Chemicals

Noncancer Inhalation Intake = 9.59E-01

Mutagenic Chemicals

Cancer Inhalation Intake (Age 0 - 2) = 2.74E-02

Cancer Inhalation Intake (Age 2 - 6) = 5.48E-02

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.10.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - CHILD RESIDENTS - SOILS TO AIR

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Child	Site 12	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Mean	mg/kg	USEPA, 2002b	
				ET	Exposure Time	24	hours/day	USEPA, 1997	CA x ET x EF x ED
				EF	Exposure Frequency	234	days/year	USEPA, 1993	AT x 24 hours/day
				ED1	Exposure Duration (Age 0 - 2)	1	years	(1), USEPA, 1993	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(1), USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.32E+09	m3/kg	Illinois EPA, 2013	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	90.8	g/m2-s per kg/m3	Illinois EPA, 2013	

Notes:

1 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 1996: Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128.

USEPA, 1997: Exposure Factors Handbook. EPA/600/8-95/002FA.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

Illinois EPA, 2013: Title 35 of the Illinois Adminstrative Code (IAC) Section 742: TACO, Appendix C, Table B SSL Parameters.

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Non-Mutagenic Chemicals

Cancer Inhalation Intake = 1.83E-02

Noncarcinogenic Chemicals

Noncancer Inhalation Intake = 6.41E-01

Mutagenic Chemicals

Cancer Inhalation Intake (Age 0 - 2) = 9.16E-03

Cancer Inhalation Intake (Age 2 - 6) = 9.16E-03

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.11.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADULT RESIDENTS - SOILS

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Adult	Site 12	CS	Chemical concentration in soil	Max	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	USEPA, 1993	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	USEPA, 1993	BW x AT
				EF	Exposure Frequency	350	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 1993	
				ED2	Exposure Duration (Age 16 - 30)	14	years	(1), USEPA, 1993	
				BW	Body Weight	70	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	
Dermal	Resident	Adult	Site 12	CS	Chemical concentration in soil	Max	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	5,700	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.07	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 1993	
				ED2	Exposure Duration (Age 16 - 30)	14	years	(1), USEPA, 1993	
				BW	Body Weight	70	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	

Notes:

1 - Adults will be evaluated as one age group (7 - 30 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential adults will be evaluated as two age groups, 7 - 16 years and 16 - 30 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Non-Mutagenic Chemicals

Cancer Ingestion Intake (Age 6 - 30) = 4.70E-07 Cancer Dermal Intake (Age 6 - 30) = 1.87E-06

Mutagenic Chemicals

Cancer Ingestion Intake (Age 6 - 16) = 1.96E-07 Cancer Dermal Intake (Age 6 - 16) = 7.81E-07

Cancer Ingestion Intake (Age 16 - 30) = 2.74E-07 Cancer Dermal Intake (Age 16 - 30) = 1.09E-06

Noncarcinogenic Chemicals

Noncancer Ingestion Intake = 1.37E-06 Noncancer Dermal Intake = 5.47E-06

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

TABLE 4.11.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - ADULT RESIDENTS - SOILS
NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Adult	Site 12	CS	Chemical concentration in soil	Mean	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	50	mg/day	USEPA, 1993	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	USEPA, 1993	BW x AT
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 6 - 16)	2	years	(1), USEPA, 1993	
				ED2	Exposure Duration (Age 16 - 30)	5	years	(1), USEPA, 1993	
				BW	Body Weight	70	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 1989	
Dermal	Resident	Adult	Site 12	CS	Chemical concentration in soil	Mean	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	5,700	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.01	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 6 - 16)	2	years	(1), USEPA, 1993	
				ED2	Exposure Duration (Age 16 - 30)	5	years	(1), USEPA, 1993	
				BW	Body Weight	70	kg	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 1989	

Notes:

1 - Adults will be evaluated as one age group (7 - 30 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential adults will be evaluated as two age groups, 7 - 16 years and 16 - 30 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

Unit Intake Calculations

Incidental Ingestion Intake = (IR-S x CF3 x FI x EF x ED)/(BW x AT)

Dermal Intake = (CF3 x SA x SSAF x EF x ED)/(BW x AT)

Non-Mutagenic Chemicals

Cancer Ingestion Intake = 4.58E-08 Cancer Dermal Intake = 5.22E-08

Mutagenic Chemicals

Cancer Ingestion Intake (Age 6 - 16) = 1.31E-08 Cancer Dermal Intake (Age 6 - 16) = 1.49E-08

Cancer Ingestion Intake (Age 16 - 30) = 3.27E-08 Cancer Dermal Intake (Age 16 - 30) = 3.73E-08

Noncarcinogenic Chemicals

Noncancer Ingestion Intake = 4.58E-07 Noncancer Dermal Intake = 5.22E-07

Cancer risk from ingestion = Soil concentration x Cancer Ingestion Intake x Oral Cancer Slope Factor

Cancer risk from dermal contact = Soil concentration x Cancer Dermal Intake x Absorption Factor x Dermal Cancer Slope Factor

Hazard Index from ingestion = Soil concentration x Noncancer Ingestion Intake / Oral Reference Dose

Hazard Index from dermal contact = Soil concentration x Noncancer Dermal Intake x Absorption Factor / Dermal Reference Dose

TABLE 4.12.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADULT RESIDENTS - SOILS TO AIR

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Adult	Site 12	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max	mg/kg	USEPA, 2002b	
				ET	Exposure Time	24	hours/day	USEPA, 2002a	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				EF	Exposure Frequency	350	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 1993	
				ED2	Exposure Duration (Age 16 - 30)	14	years	(1), USEPA, 1993	$CA = (1/PEF + 1/VF) \times Cs$
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8760	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.32E+09	m3/kg	Illinois EPA, 2013	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	90.8	g/m2-s per kg/m3	Illinois EPA, 2013	

Notes:

1 - Adults will be evaluated as one age group (7 - 30 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential adults will be evaluated as two age groups, 7 - 16 years and 16 - 30 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 1996: Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

Illinois EPA, 2013: Title 35 of the Illinois Adminstrative Code (IAC) Section 742: TACO, Appendix C, Table B SSL Parameters.

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Non-Mutagenic Chemicals

Cancer Inhalation Intake (Age 6 - 30) = 3.29E-01

Noncarcinogenic Chemicals

Noncancer Inhalation Intake = 9.59E-01

Mutagenic Chemicals

Cancer Inhalation Intake (Age 6 - 16) = 1.37E-01

Cancer Inhalation Intake (Age 16 - 30) = 1.92E-01

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

TABLE 4.12.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - ADULT RESIDENTS - SOILS TO AIR

NAVAL STATION GREAT LAKES, ILLINOIS

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Adult	Site 12	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Mean	mg/kg	USEPA, 2002b	
				ET	Exposure Time	24	hours/day	USEPA, 2002a	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 6 - 16)	2	years	(1), USEPA, 1993	
				ED2	Exposure Duration (Age 16 - 30)	5	years	(1), USEPA, 1993	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	2555	days	USEPA, 1989	
				PEF	Particulate Emission Factor	1.32E+09	m3/kg	Illinois EPA, 2013	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	90.8	g/m2-s per kg/m3	Illinois EPA, 2013	

Notes:

1 - Adults will be evaluated as one age group (7 - 30 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential adults will be evaluated as two age groups, 7 - 16 years and 16 - 30 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 1996: Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

Illinois EPA, 2013: Title 35 of the Illinois Adminstrative Code (IAC) Section 742: TACO, Appendix C, Table B SSL Parameters.

Unit Intake Calculations

Unit Exposure Concentration = (ET x EF x ED)/(AT x 24 hours/day)

Non-Mutagenic Chemicals

Cancer Inhalation Intake = 6.41E-02

Noncarcinogenic Chemicals

Noncancer Inhalation Intake = 6.41E-01

Mutagenic Chemicals

Cancer Inhalation Intake (Age 6 - 16) = 1.83E-02

Cancer Inhalation Intake (Age 16 - 30) = 4.58E-02

Cancer risk from ingestion = Air concentration x Cancer Inhalation Intake x Inhalation Cancer Slope Factor

Hazard Index from ingestion = Air concentration x Noncancer Inhalation Intake / Inhalation Reference Dose

RAGS Part D Table 5

Non-Cancer Toxicity Data

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RAGS PART D TABLE 5
NON-CANCER TOXICITY DATA

Table No.	
5-1	Non-Cancer Toxicity Data - Oral/Dermal
5-2	Non-Cancer Toxicity Data - Inhalation

TABLE 5-1
NON-CANCER TOXICITY DATA - ORAL/DERMAL
SITE 12 - HARBOR DREDGE SPOILS AREA
NAVAL STATION GREAT LAKES, ILLINOIS

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source	Date
Semivolatile Organic Compounds										
BENZO(A)PYRENE EQUIVALENTS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NAPHTHALENE	Subchronic	6.0E-01	mg/kg/day	1	6.0E-01	mg/kg/day	Body Weight	90/1	ATSDR	9/2005
	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Body Weight	3000/1	IRIS	1/28/2013
Pesticides/PCBs										
AROCLOR 1254	Subchronic	3.0E-05	mg/kg/day	1	3.0E-05	mg/kg/day	Central Nervous System	300/1	ATSDR	11/2000
	Chronic	2.0E-05	mg/kg/day	1	2.0E-05	mg/kg/day	Immune System	300/1	IRIS	1/28/2013
ALPHA-CHLORDANE	Subchronic	6.00E-04	mg/kg/day	1	6.00E-04	mg/kg/day	Liver	NA	ATSDR	5/1994
	Chronic	5.00E-04	mg/kg/day	1	5.00E-04	mg/kg/day	Liver	300/1	IRIS	1/28/2013
GAMMA-CHLORDANE	Subchronic	6.00E-04	mg/kg/day	1	6.00E-04	mg/kg/day	Liver	NA	ATSDR	5/1994
	Chronic	5.00E-04	mg/kg/day	1	5.00E-04	mg/kg/day	Liver	300/1	IRIS	1/28/2013
HEPTACHLOR	Chronic	5.00E-04	mg/kg/day	1	5.00E-04	mg/kg/day	Liver	300/1	IRIS	1/28/2013
HEPTACHLOR EPOXIDE	Chronic	1.30E-05	mg/kg/day	1	1.30E-05	mg/kg/day	Liver	1000/1	IRIS	1/28/2013
Inorganics										
ALUMINUM	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	CNS	100	PPRTV	10/23/2006
ANTIMONY	Chronic	4.0E-04	mg/kg/day	0.15	6.0E-05	mg/kg/day	Blood	1000/1	IRIS	1/28/2013
ARSENIC	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, CVS	3/1	IRIS	1/28/2013
BARIUM	Chronic	2.0E-01	mg/kg/day	0.07	1.4E-02	mg/kg/day	Kidney	300	IRIS	1/28/2013
CADMIUM	Chronic	1.0E-03	mg/kg/day	0.025	2.5E-05	mg/kg/day	Kidney	10/1	IRIS	1/28/2013
CHROMIUM VI	Subchronic	2.0E-02	mg/kg/day	0.025	5.0E-04	mg/kg/day	None Reported	100/3	HEAST	9/1997
	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	None Reported	300/3	IRIS	1/28/2013
COBALT	Subchronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Thyroid	300/1	PPRTV	8/25/2008
	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Thyroid	3000/1	PPRTV	8/25/2008
COPPER	Chronic	4.0E-02	mg/kg/day	1	4.0E-02	mg/kg/day	GS	NA	HEAST	7/1997
IRON	Chronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	GS	1.5	PPRTV	8/25/2008
MANGANESE	Chronic	2.4E-02	mg/kg/day	0.04	9.6E-04	mg/kg/day	CNS	1/3	IRIS	1/28/2013
MERCURY[3]	Subchronic	2.0E-03	mg/kg/day	0.07	1.4E-04	mg/kg/day	CNS	100	ATSDR	3/1999
	Chronic	3.0E-04	mg/kg/day	0.07	2.1E-05	mg/kg/day	CNS	1000/1	IRIS	1/28/2013

Notes:

1 - USEPA, July 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.

3 - Values are for mercuric chloride.

Definitions:

ATSDR = Agency for Toxic Substances and Disease Registry

CNS = Central nervous system

CVS = Cardiovascular system

GS = Gastrointestinal System

HEAST= Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System

PPRTV = Provisional Peer Reviewed Toxicity Value

NA = Not applicable

TABLE 5-2
NON-CANCER TOXICITY DATA - INHALATION
SITE 12 - HARBOR DREDGE SPOILS AREA
NAVAL STATION GREAT LAKES, ILLINOIS

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units			Source(s)	Date(s)
Semivolatile Organic Compounds							
BENZO(A)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA
CHRYSENE	NA	NA	NA	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	NA	NA	NA
NAPHTHALENE	Chronic	3.0E-03	mg/m^3	Respiratory	3000/1	IRIS	1/28/2013
Pesticides/PCBs							
AROCLOR 1254	NA	NA	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	Chronic	7.00E-04	mg/m^3	Liver	1000/1	IRIS	1/28/2013
GAMMA-CHLORDANE	Chronic	7.00E-04	mg/m^3	Liver	1000/1	IRIS	1/28/2013
HEPTACHLOR	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	NA	NA
Inorganics							
ALUMINUM	Chronic	5.0E-03	mg/m^3	CNS	300	NCEA	10/23/2006
ANTIMONY	NA	NA	NA	NA	NA	NA	NA
ARSENIC	Chronic	1.50E-05	mg/m^3	NA	NA	Cal EPA(1)	9/2009
BARIUM	Subchronic	5.0E-03	mg/m^3	Fetus	100	HEAST	7/1997
	Chronic	5.0E-04	mg/m^3	CVS	1000/1	HEAST	7/1997
CADMIUM	Chronic	2.0E-05	mg/m3	Kidney, Respiratory	NA	Cal EPA(1)	9/2009
CHROMIUM VI	Chronic	1.0E-04	mg/m^3	Respiratory	300/1	IRIS	1/28/2013
COBALT	Subchronic	2.0E-05	mg/m^3	Respiratory	100/1	PPRTV	8/25/2008
	Chronic	6.0E-06	mg/m^3	Respiratory	300/1	PPRTV	8/25/2008
COPPER	NA	NA	NA	NA	NA	NA	NA
IRON	NA	NA	NA	NA	NA	NA	NA
MANGANESE	Chronic	5.0E-05	mg/m^3	CNS	1000/1	IRIS	4/2009
MERCURY	Chronic	3.0E-04	mg/m^3	CNS	not available	Cal EPA(1)	9/2009

Notes:

Cal EPA(1) = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.

Definitions:

ATSDR = Agency for Toxic Substances and Disease Registry
CNS = Central Nervous System
CVS = Cardiovascular system
HEAST= Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
NA = Not Applicable
PPRTV = Provisional Peer Reviewed Toxicity Value

RAGS Part D Table 6

Cancer Toxicity Data

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CANCER TOXICITY DATA

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6-1	Cancer Toxicity Data - Oral/Dermal
6-2	Cancer Toxicity Data - Inhalation

TABLE 6-1
CANCER TOXICITY DATA - ORAL/DERMAL
SITE 12 - HARBOR DREDGE SPOILS AREA
NAVAL STATION GREAT LAKES, ILLINOIS

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence/ Cancer Guideline	Oral CSF	
	Value	Units		Value	Units	Description	Source	Date
Semivolatile Organic Compounds								
BENZO(A)PYRENE EQUIVALENTS[3]	7.3E+00	$(mg/kg/day)^{-1}$	1	7.3E+00	$(mg/kg/day)^{-1}$	B2	IRIS	1/28/2013
NAPHTHALENE	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides/PCBs								
AROCLOR 1254	2.0E+00	$(mg/kg/day)^{-1}$	1	2.0E+00	$(mg/kg/day)^{-1}$	B2	USEPA(2)	9/1996
ALPHA-CHLORDANE	3.5E-01	(mg/kg/day)-1	1	3.5E-01	(mg/kg/day)-1	B2	IRIS	1/28/2013
GAMMA-CHLORDANE	3.5E-01	(mg/kg/day)-1	1	3.5E-01	(mg/kg/day)-1	B2	IRIS	1/28/2013
HEPTACHLOR	4.5E+00	(mg/kg/day)-1	1	4.5E+00	(mg/kg/day)-1	B2	IRIS	1/28/2013
HEPTACHLOR EPOXIDE	9.1E+00	(mg/kg/day)-1	1	9.1E+00	(mg/kg/day)-1	B2	IRIS	1/28/2013
Inorganics								
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A	IRIS	1/28/2013
BARIUM	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	NA	NA	NA	NA	NA	NA	NA	NA
CHROMIUM[3]	5.0E-01	$(mg/kg/day)^{-1}$	0.025	2.0E+01	$(mg/kg/day)^{-1}$	D	NJDEP	4/8/2009
COBALT	NA	NA	NA	NA	NA	NA	NA	NA
COPPER	NA	NA	NA	NA	NA	NA	NA	NA
IRON	NA	NA	NA	NA	NA	NA	NA	NA
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA
MERCURY	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

1 - USEPA, 2004

2 - Adjusted dermal cancer slope factor = oral cancer slope factor/oral absorption efficiency for dermal

3 - Carcinogenic PAHs and hexavalent chromium are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

EPA Group:

A - Human carcinogen.

B1 - Probable human carcinogen - indicates that limited human data are available.

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans.

C - Possible human carcinogen.

D - Not classifiable as a human carcinogen.

E - Evidence of non-carcinogenicity.

Definitions:

IRIS = Integrated Risk Information System.

NA = Not available.

NJDEP = New Jersey Department of Environmental Protection.

USEPA(2) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

TABLE 6-2
CANCER TOXICITY DATA - INHALATION
SITE 12 - HARBOR DREDGE SPOILS AREA
NAVAL STATION GREAT LAKES, ILLINOIS

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[(1)]		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source	Date
Semivolatile Organic Compounds							
BENZO(A)PYRENE EQUIVALENTS	1.1E-03	$(ug/m^3)^{-1}$	3.9E+00	$(mg/kg/day)^{-1}$	B2	Cal EPA(1)	9/2009
NAPHTHALENE	3.4E-05	$(ug/m^3)^{-1}$	1.2E-01	$(mg/kg/day)^{-1}$	Carcinogenic potential cannot be determined	Cal EPA(2)	8/2004
Pesticides/PCBs							
AROCLOR 1254	5.7E-04	(ug/m^3)-1	2.0E+00	$(mg/kg/day)^{-1}$	B2	USEPA(2)	9/1996
ALPHA-CHLORDANE	1.0E-04	(ug/m^3)-1	3.5E-01	$(mg/kg/day)^{-1}$	B2	IRIS	1/28/2013
GAMMA-CHLORDANE	1.0E-04	(ug/m^3)-1	3.5E-01	$(mg/kg/day)^{-1}$	B2	IRIS	1/28/2013
HEPTACHLOR	1.3E-03	(ug/m^3)-1	4.6E+00	$(mg/kg/day)^{-1}$	B2	IRIS	1/28/2013
HEPTACHLOR EPOXIDE	2.6E-03	(ug/m^3)-1	9.1E+00	$(mg/kg/day)^{-1}$	B2	IRIS	1/28/2013
Inorganics							
ALUMINUM	NA	NA	NA	NA	NA	NA	NA
ARSENIC	4.3E-03	(ug/m^3)-1	1.5E+01	$(mg/kg/day)^{-1}$	A	IRIS	1/28/2013
BARIUM	NA	NA	NA	NA	NA	NA	NA
CADMIUM	1.8E-03	$(ug/m^3)^{-1}$	6.3E+00	$(mg/kg/day)^{-1}$	B1	IRIS	1/28/2013
CHROMIUM	8.4E-02	$(ug/m^3)^{-1}$	2.9E+02	$(mg/kg/day)^{-1}$	A/Known human carcinogen	IRIS	1/28/2013
COBALT	9.0E-03	$(ug/m^3)^{-1}$	3.2E+01	$(mg/kg/day)^{-1}$	NA	PPRTV	8/25/2008
COPPER	NA	NA	NA	NA	NA	NA	NA
IRON	NA	NA	NA	NA	NA	NA	NA
MANGANESE	NA	NA	NA	NA	NA	NA	NA
MERCURY	NA	NA	NA	NA	NA	NA	NA

1 - Inhalation CSF = Unit Risk * 70 kg / $20m^3$/day.

Definitions:

IRIS = Integrated Risk Information System.

PPRTV = Provisional Peer Reviewed Toxicity Value

Cal EPA(1) = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.

Cal EPA(2) = Air Toxic Hot Spots: Adoption of a Unit Risk Value for Naphthalene, August 2004.

USEPA(2) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

A - Human carcinogen.

B1 - Probable human carcinogen - indicates that limited human data are available.

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .

C - Possible human carcinogen.

D - Not classifiable as a human carcinogen.

E - Evidence of non-carcinogenicity.

RAGS Part D Table 7

Calculation Of Cancer Risks and Non-Cancer Hazards

TABLE 7.1.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	2.08	mg/kg	1.2E-08	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	8.4E-08	7.0E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	1.8E-08	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	6.2E-09	1.1E-05	(mg/kg/day)	6.0E-04	(mg/kg/day)	0.02
				GAMMA-CHLORDANE	2.60	mg/kg	1.4E-08	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	5.0E-09	8.8E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	0.01
				HEPTACHLOR	0.236	mg/kg	1.3E-09	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	5.9E-09	7.9E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.002
				HEPTACHLOR EPOXIDE	0.064	mg/kg	3.5E-10	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	3.2E-09	2.2E-07	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.02
				ALUMINUM	10,000	mg/kg	5.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.4E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.03
				ARSENIC	16.9	mg/kg	5.6E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	8.4E-08	3.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				BARIUM	244.0	mg/kg	1.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.2E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.004
				CHROMIUM VI	23.8	mg/kg	1.3E-07	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	6.6E-08	8.0E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.004
				COBALT	11.2	mg/kg	6.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.8E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.01
				IRON	20,300	mg/kg	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.8E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.10
				MANGANESE	701	mg/kg	3.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.10
				MERCURY	0.6	mg/kg	3.3E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.007
			Exp. Route Total								2.5E-07					0.4
			Dermal	BENZO(A)PYRENE EQUIVALENTS	2.08	mg/kg	4.5E-09	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	3.3E-08	2.7E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	5.3E-09	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	1.9E-09	3.3E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	0.005
				GAMMA-CHLORDANE	2.60	mg/kg	4.3E-09	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	1.5E-09	2.6E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	0.004
				HEPTACHLOR	0.236	mg/kg	3.9E-10	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.8E-09	2.4E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0005
				HEPTACHLOR EPOXIDE	0.064	mg/kg	1.1E-10	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	9.7E-10	6.5E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.005
				ALUMINUM	10,000	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ARSENIC	16.9	mg/kg	8.4E-09	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.3E-08	5.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				BARIUM	244.0	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CHROMIUM VI	23.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--
				COBALT	11.2	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	--
				IRON	20,300	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	701	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	1	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								5.2E-08					0.03
		Exposure Point Total									3.1E-07					0.5
	Exposure Medium Total										3.1E-07					0.5
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	1.7E-8	mg/m^3	6.6E-12	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	7.2E-12	4.0E-09	(mg/m^3)	NA	(mg/m^3)	--
				ALPHA-CHLORDANE	2.6E-8	mg/m^3	1.0E-11	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	1.0E-12	6.2E-09	(mg/m^3)	7.0E-04	(mg/m^3)	0.000009
				GAMMA-CHLORDANE	2.1E-8	mg/m^3	8.2E-12	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	8.2E-13	5.0E-09	(mg/m^3)	7.0E-04	(mg/m^3)	0.000007
				HEPTACHLOR	1.9E-9	mg/m^3	7.4E-13	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	9.7E-13	4.5E-10	(mg/m^3)	NA	(mg/m^3)	--
				HEPTACHLOR EPOXIDE	5.2E-10	mg/m^3	2.0E-13	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	5.3E-13	1.2E-10	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	0.000	mg/m^3	3.2E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.9E-05	(mg/m^3)	5.0E-03	(mg/m^3)	0.004
				ARSENIC	1.4E-7	mg/m^3	5.3E-11	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	2.3E-10	3.2E-08	(mg/m^3)	1.5E-05	(mg/m^3)	0.002
				BARIUM	2.0E-6	mg/m^3	7.7E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	4.7E-07	(mg/m^3)	5.0E-03	(mg/m^3)	0.00009
				CHROMIUM VI	1.9E-7	mg/m^3	7.5E-11	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	6.3E-09	4.6E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.0005
				COBALT	9.0E-8	mg/m^3	3.5E-11	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	3.2E-10	2.2E-08	(mg/m^3)	2.0E-05	(mg/m^3)	0.001
				IRON	0.000	mg/m^3	6.4E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	3.9E-05	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	5.7E-6	mg/m^3	2.2E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.3E-06	(mg/m^3)	5.0E-05	(mg/m^3)	0.03
				MERCURY	4.8E-9	mg/m^3	1.9E-12	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.1E-09	(mg/m^3)	3.0E-05	(mg/m^3)	0.00004
			Exp. Route Total								6.9E-09					0.03
		Exposure Point Total									6.9E-09					0.03
	Exposure Medium Total										6.9E-09					0.03
Medium Total											3.1E-07					0.5
Subsurface Soil	Subsurface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	11	mg/kg	5.9E-08	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	4.3E-07	3.6E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				NAPHTHALENE	0.4	mg/kg	2.4E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-06	(mg/kg/day)	6.0E-01	(mg/kg/day)	0.000002
				AROCLOR-1254	0.8	mg/kg	4.4E-09	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	8.8E-09	2.7E-06	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.09
				ALUMINUM	11,700	mg/kg	6.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.9E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.04
				ANTIMONY	4.240	mg/kg	2.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-05	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.04
				ARSENIC	25.0	mg/kg	8.3E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.2E-07	5.1E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.2
				BARIUM	432.0	mg/kg	2.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.007
				CADMIUM	7.31	mg/kg	4.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-05	(mg/kg/day)	1.0E-03	(mg/kg/day)	0.02
				CHROMIUM VI	60.8	mg/kg	3.4E-07	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.7E-07	2.0E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.01
				COBALT	17.00	mg/kg	9.4E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.7E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.02

TABLE 7.1.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				COPPER	362	mg/kg	2.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-03	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.03
				IRON	31,400	mg/kg	1.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.2
				MANGANESE	846	mg/kg	4.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.1
				MERCURY	1.990	mg/kg	1.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
			Exp. Route Total								7.3E-07					0.7
			Dermal	BENZO(A)PYRENE EQUIVALENTS	11	mg/kg	2.3E-08	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	1.7E-07	1.4E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				NAPHTHALENE	0.4	mg/kg	9.5E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.8E-07	(mg/kg/day)	6.0E-01	(mg/kg/day)	9.6E-7
				AROCLOR-1254	0.8	mg/kg	1.9E-09	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	3.7E-09	1.1E-06	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.04
				ALUMINUM	11,700	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ANTIMONY	4.240	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	6.0E-05	(mg/kg/day)	--
				ARSENIC	25.0	mg/kg	1.2E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.9E-08	7.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03
				BARIUM	432.0	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CADMIUM	7.31	mg/kg	1.2E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.4E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.003
				CHROMIUM VI	60.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--
				COBALT	17.00	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	--
				COPPER	362	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	4.0E-02	(mg/kg/day)	--
				IRON	31,400	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	846	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	1.990	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								1.9E-07					0.07
		Exposure Point Total									9.2E-07					0.8
	Exposure Medium Total										9.2E-07					0.8
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	0.0000001	mg/m^3	3.3E-11	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	3.7E-11	2.0E-08	(mg/m^3)	NA	(mg/m^3)	--
				NAPHTHALENE	0.000007	mg/m^3	2.8E-09	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	9.5E-11	1.7E-06	(mg/m^3)	3.0E-03	(mg/m^3)	0.0006
				AROCLOR-1254	6.4E-9	mg/m^3	2.5E-12	(mg/m^3)	5.7E-04	$(ug/m^3)^{-1}$	1.4E-12	1.5E-09	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	0.000	mg/m^3	3.7E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.2E-05	(mg/m^3)	5.0E-03	(mg/m^3)	0.004
				ANTIMONY	3.4E-8	mg/m^3	1.3E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	8.1E-09	(mg/m^3)	NA	(mg/m^3)	--
				ARSENIC	2.0E-7	mg/m^3	7.9E-11	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	3.4E-10	4.8E-08	(mg/m^3)	1.5E-05	(mg/m^3)	0.003
				BARIUM	3.5E-6	mg/m^3	1.4E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	8.3E-07	(mg/m^3)	5.0E-03	(mg/m^3)	0.0002
				CADMIUM	5.9E-8	mg/m^3	2.3E-11	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	4.2E-11	1.4E-08	(mg/m^3)	2.0E-05	(mg/m^3)	0.0007
				CHROMIUM VI	4.9E-7	mg/m^3	1.9E-10	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	1.6E-08	1.2E-07	(mg/m^3)	1.0E-04	(mg/m^3)	0.001
				COBALT	1.4E-7	mg/m^3	5.4E-11	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	4.8E-10	3.3E-08	(mg/m^3)	2.0E-05	(mg/m^3)	0.002
				COPPER	2.9E-6	mg/m^3	1.1E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	7.0E-07	(mg/m^3)	NA	(mg/m^3)	--
				IRON	0.000	mg/m^3	9.9E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	6.0E-05	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	6.8E-6	mg/m^3	2.7E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.6E-06	(mg/m^3)	5.0E-05	(mg/m^3)	0.03
				MERCURY	1.6E-8	mg/m^3	6.3E-12	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	3.8E-09	(mg/m^3)	3.0E-05	(mg/m^3)	0.0001
			Exp. Route Total								1.7E-08					0.04
		Exposure Point Total									1.7E-08					0.04
	Exposure Medium Total										1.7E-08					0.04
Medium Total											9.4E-07					0.8
										Total of Receptor Risks Across All Media	1.3E-06			Total of Receptor Hazards Across All Media		1.3

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.2.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Current
Receptor Population: Occupational/Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	1.37	mg/kg	4.8E-07	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	3.5E-06	1.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	1.1E-06	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	3.9E-07	3.2E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.006
				GAMMA-CHLORDANE	2.60	mg/kg	9.1E-07	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	3.2E-07	2.5E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.005
				HEPTACHLOR	0.072	mg/kg	2.5E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.1E-07	7.0E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0001
				HEPTACHLOR EPOXIDE	0.020	mg/kg	7.0E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	6.4E-08	2.0E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.002
				ALUMINUM	10,000	mg/kg	3.5E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	9.8E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.010
				ARSENIC	11.4	mg/kg	2.4E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.6E-06	6.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				BARIUM	141	mg/kg	4.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.4E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0007
				CHROMIUM VI	16.0	mg/kg	5.6E-06	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2.8E-06	1.6E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005
				COBALT	11.2	mg/kg	3.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.1E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.04
				IRON	20,300	mg/kg	7.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	2.0E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.03
				MANGANESE	571	mg/kg	2.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	5.6E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
				MERCURY	0.326	mg/kg	1.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.2E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.001
			Exp. Route Total								1.1E-05					0.1
			Dermal	BENZO(A)PYRENE EQUIVALENTS	1.37	mg/kg	4.1E-07	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	3.0E-06	1.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	7.4E-07	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	2.6E-07	2.1E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.004
				GAMMA-CHLORDANE	2.60	mg/kg	6.0E-07	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	2.1E-07	1.7E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.003
				HEPTACHLOR	0.072	mg/kg	1.7E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	7.5E-08	4.6E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00009
				HEPTACHLOR EPOXIDE	0.020	mg/kg	4.6E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	4.2E-08	1.3E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0010
				ALUMINUM	10,000	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ARSENIC	11.4	mg/kg	7.9E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.2E-06	2.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.007
				BARIUM	141	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CHROMIUM VI	16.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				COBALT	11.2	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				IRON	20,300	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	571	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	0.326	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								4.8E-06					0.02
		Exposure Point Total									1.6E-05					0.2
	Exposure Medium Total										1.6E-05					0.2
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	1.1E-9	mg/m^3	9.0E-11	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	9.9E-11	2.5E-10	(mg/m^3)	NA	(mg/m^3)	--
				ALPHA-CHLORDANE	2.6E-9	mg/m^3	2.1E-10	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	2.1E-11	5.9E-10	(mg/m^3)	7.0E-04	(mg/m^3)	8.5E-7
				GAMMA-CHLORDANE	2.1E-9	mg/m^3	1.7E-10	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	1.7E-11	4.8E-10	(mg/m^3)	7.0E-04	(mg/m^3)	6.8E-7
				HEPTACHLOR	5.8E-11	mg/m^3	4.7E-12	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	6.2E-12	1.3E-11	(mg/m^3)	NA	(mg/m^3)	--
				HEPTACHLOR EPOXIDE	1.6E-11	mg/m^3	1.3E-12	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	3.4E-12	3.7E-12	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	8.1E-6	mg/m^3	6.6E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	1.8E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.0004
				ARSENIC	9.2E-9	mg/m^3	7.5E-10	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	3.2E-09	2.1E-09	(mg/m^3)	1.5E-05	(mg/m^3)	0.0001
				BARIUM	1.1E-7	mg/m^3	9.3E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	2.6E-08	(mg/m^3)	5.0E-04	(mg/m^3)	0.00005
				CHROMIUM VI	1.3E-8	mg/m^3	1.1E-09	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	8.8E-08	2.9E-09	(mg/m^3)	1.0E-04	(mg/m^3)	0.00003
				COBALT	9.0E-9	mg/m^3	7.4E-10	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	6.6E-09	2.1E-09	(mg/m^3)	6.0E-06	(mg/m^3)	0.0003
				IRON	1.6E-5	mg/m^3	1.3E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	3.7E-06	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	4.6E-7	mg/m^3	3.8E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	1.1E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.002
				MERCURY	2.6E-10	mg/m^3	2.1E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	6.0E-11	(mg/m^3)	3.0E-05	(mg/m^3)	0.000002
			Exp. Route Total								9.8E-08					0.003
		Exposure Point Total									9.8E-08					0.003
	Exposure Medium Total										9.8E-08					0.003
Medium Total											1.6E-05					0.2
Subsurface Soil	Subsurface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	6.30	mg/kg	2.2E-06	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	1.6E-05	6.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				NAPHTHALENE	0.326	mg/kg	1.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.2E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.00002
				AROCLOR-1254	0.877	mg/kg	3.1E-07	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	6.1E-07	8.6E-07	(mg/kg/day)	2.0E-05	(mg/kg/day)	0.04
				ALUMINUM	8,924	mg/kg	3.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	8.7E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.009
				ANTIMONY	1.80	mg/kg	6.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.8E-06	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.004
				ARSENIC	15.3	mg/kg	3.2E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	4.8E-06	9.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03
				BARIUM	249	mg/kg	8.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	2.4E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.001
				CADMIUM	4.20	mg/kg	1.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	4.1E-06	(mg/kg/day)	1.0E-03	(mg/kg/day)	0.004
				CHROMIUM VI	30.8	mg/kg	1.1E-05	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	5.4E-06	3.0E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.01
				COBALT	11.2	mg/kg	3.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.1E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.04

TABLE 7.2.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Current
Receptor Population: Occupational/Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
				COPPER	222	mg/kg	7.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-04	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.005
				IRON	20,260	mg/kg	7.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.03
				MANGANESE	594	mg/kg	2.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.8E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.02
				MERCURY	1.14	mg/kg	4.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
			Exp. Route Total								2.7E-05					0.2
			Dermal	BENZO(A)PYRENE EQUIVALENTS	6.30	mg/kg	1.9E-06	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	1.4E-05	5.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				NAPHTHALENE	0.326	mg/kg	9.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.00001
				AROCLOR-1254	0.877	mg/kg	2.8E-07	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	5.7E-07	7.9E-07	(mg/kg/day)	2.0E-05	(mg/kg/day)	0.04
				ALUMINUM	8,924	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ANTIMONY	1.80	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	6.0E-05	(mg/kg/day)	--
				ARSENIC	15.3	mg/kg	1.1E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.6E-06	3.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.010
				BARIUM	249	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CADMIUM	4.20	mg/kg	9.7E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.001
				CHROMIUM VI	30.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				COBALT	11.2	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				COPPER	222	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	4.0E-02	(mg/kg/day)	--
				IRON	20,260	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	594	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	1.14	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								1.6E-05					0.05
		Exposure Point Total									4.3E-05					0.3
	Exposure Medium Total										4.3E-05					0.3
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	5.1E-9	mg/m^3	4.1E-10	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	4.6E-10	1.2E-09	(mg/m^3)	NA	(mg/m^3)	--
				NAPHTHALENE	5.2E-6	mg/m^3	4.2E-07	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	1.4E-08	1.2E-06	(mg/m^3)	3.0E-03	(mg/m^3)	0.0004
				AROCLOR-1254	7.1E-10	mg/m^3	5.8E-11	(mg/m^3)	5.7E-04	$(ug/m^3)^{-1}$	3.3E-11	1.6E-10	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	7.2E-6	mg/m^3	5.9E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.6E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.0003
				ANTIMONY	1.5E-9	mg/m^3	1.2E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	3.3E-10	(mg/m^3)	NA	(mg/m^3)	--
				ARSENIC	1.2E-8	mg/m^3	1.0E-09	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	4.3E-09	2.8E-09	(mg/m^3)	1.5E-05	(mg/m^3)	0.0002
				BARIUM	2.0E-7	mg/m^3	1.6E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	4.6E-08	(mg/m^3)	5.0E-04	(mg/m^3)	0.00009
				CADMIUM	3.4E-9	mg/m^3	2.8E-10	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	5.0E-10	7.7E-10	(mg/m^3)	2.0E-05	(mg/m^3)	0.00004
				CHROMIUM VI	2.5E-8	mg/m^3	2.0E-09	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	1.7E-07	5.7E-09	(mg/m^3)	1.0E-04	(mg/m^3)	0.00006
				COBALT	9.0E-9	mg/m^3	7.4E-10	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	6.6E-09	2.1E-09	(mg/m^3)	6.0E-06	(mg/m^3)	0.0003
				COPPER	1.8E-7	mg/m^3	1.5E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	4.1E-08	(mg/m^3)	NA	(mg/m^3)	--
				IRON	1.6E-5	mg/m^3	1.3E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	3.7E-06	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	4.8E-7	mg/m^3	3.9E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.1E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.002
				MERCURY	9.2E-10	mg/m^3	7.5E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.1E-10	(mg/m^3)	3.0E-05	(mg/m^3)	0.000007
			Exp. Route Total								2.0E-07					0.004
		Exposure Point Total									2.0E-07					0.004
	Exposure Medium Total										2.0E-07					0.004
Medium Total											4.3E-05					0.3
										Total of Receptor Risks Across All Media	5.9E-05			Total of Receptor Hazards Across All Media		0.4

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.3.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	1.37	mg/kg	1.0E-07	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	7.3E-07	2.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	7.8E-08	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	2.7E-08	5.5E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.001
				GAMMA-CHLORDANE	2.60	mg/kg	6.3E-08	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	2.2E-08	4.4E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0009
				HEPTACHLOR	0.072	mg/kg	1.7E-09	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	7.9E-09	1.2E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00002
				HEPTACHLOR EPOXIDE	0.020	mg/kg	4.8E-10	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	4.4E-09	3.4E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0003
				ALUMINUM	10,000	mg/kg	2.4E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.7E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.002
				ARSENIC	11.4	mg/kg	1.7E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.5E-07	1.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
				BARIUM	141	mg/kg	3.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0001
				CHROMIUM VI	16.0	mg/kg	1.2E-06	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	5.8E-07	2.7E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0009
				COBALT	11.2	mg/kg	2.7E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.006
				IRON	20,300	mg/kg	4.9E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.4E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.005
				MANGANESE	571	mg/kg	1.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.7E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.004
				MERCURY	0.326	mg/kg	7.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0002
			Exp. Route Total								1.6E-06					0.02
			Dermal	BENZO(A)PYRENE EQUIVALENTS	1.37	mg/kg	8.5E-08	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	6.2E-07	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	5.1E-08	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	1.8E-08	3.6E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0007
				GAMMA-CHLORDANE	2.60	mg/kg	4.1E-08	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	1.4E-08	2.9E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0006
				HEPTACHLOR	0.072	mg/kg	1.1E-09	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	5.1E-09	8.0E-09	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00002
				HEPTACHLOR EPOXIDE	0.020	mg/kg	3.2E-10	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	2.9E-09	2.2E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0002
				ALUMINUM	10,000	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ARSENIC	11.4	mg/kg	5.4E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	8.2E-08	3.8E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.001
				BARIUM	141	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CHROMIUM VI	16.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				COBALT	11.2	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				IRON	20,300	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	571	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	0.326	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								7.4E-07					0.003
		Exposure Point Total									2.4E-06					0.03
	Exposure Medium Total										2.4E-06					0.03
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	1.0E-9	mg/m^3	2.6E-12	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	2.9E-12	6.2E-12	(mg/m^3)	NA	(mg/m^3)	--
				ALPHA-CHLORDANE	2.4E-9	mg/m^3	2.1E-12	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	2.1E-13	1.4E-11	(mg/m^3)	7.0E-04	(mg/m^3)	2.1E-8
				GAMMA-CHLORDANE	2.0E-9	mg/m^3	1.7E-12	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	1.7E-13	1.2E-11	(mg/m^3)	7.0E-04	(mg/m^3)	1.7E-8
				HEPTACHLOR	5.5E-11	mg/m^3	4.6E-14	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	6.0E-14	3.2E-13	(mg/m^3)	NA	(mg/m^3)	--
				HEPTACHLOR EPOXIDE	1.5E-11	mg/m^3	1.3E-14	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	3.3E-14	9.0E-14	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	7.6E-6	mg/m^3	6.4E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	4.5E-08	(mg/m^3)	5.0E-03	(mg/m^3)	0.000009
				ARSENIC	8.6E-9	mg/m^3	7.3E-12	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	3.1E-11	5.1E-11	(mg/m^3)	1.5E-05	(mg/m^3)	0.000003
				BARIUM	1.1E-7	mg/m^3	9.1E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	6.3E-10	(mg/m^3)	5.0E-04	(mg/m^3)	0.000001
				CHROMIUM VI	1.2E-8	mg/m^3	3.1E-11	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	2.6E-09	7.2E-11	(mg/m^3)	1.0E-04	(mg/m^3)	7.2E-7
				COBALT	8.5E-9	mg/m^3	7.2E-12	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	6.5E-11	5.0E-11	(mg/m^3)	6.0E-06	(mg/m^3)	0.000008
				IRON	1.5E-5	mg/m^3	1.3E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	9.1E-08	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	4.3E-7	mg/m^3	3.7E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.6E-09	(mg/m^3)	5.0E-05	(mg/m^3)	0.00005
				MERCURY	2.5E-10	mg/m^3	2.1E-13	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.5E-12	(mg/m^3)	3.0E-05	(mg/m^3)	4.9E-8
			Exp. Route Total								2.7E-09					0.00007
		Exposure Point Total									2.7E-09					0.00007
	Exposure Medium Total										2.7E-09					0.00007
Medium Total											2.4E-06					0.03
										Total of Receptor Risks Across All Media	2.4E-06			Total of Receptor Hazards Across All Media		0.03

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.4.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	1.37	mg/kg	1.4E-07	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	1.0E-06	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	1.1E-07	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	3.9E-08	3.3E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0007
				GAMMA-CHLORDANE	2.60	mg/kg	9.1E-08	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	3.2E-08	2.6E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0005
				HEPTACHLOR	0.072	mg/kg	2.5E-09	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.1E-08	7.3E-09	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00001
				HEPTACHLOR EPOXIDE	0.020	mg/kg	7.0E-10	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	6.3E-09	2.0E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0002
				ALUMINUM	10,000	mg/kg	3.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.001
				ARSENIC	11.4	mg/kg	2.4E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.6E-07	7.0E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002
				BARIUM	141	mg/kg	4.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.00007
				CHROMIUM VI	16.0	mg/kg	1.7E-06	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	8.4E-07	1.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0005
				COBALT	11.2	mg/kg	3.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
				IRON	20,300	mg/kg	7.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.003
				MANGANESE	571	mg/kg	2.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.8E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.002
				MERCURY	0.326	mg/kg	1.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.3E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0001
			Exp. Route Total								2.3E-06					0.01
			Dermal	BENZO(A)PYRENE EQUIVALENTS	1.37	mg/kg	1.2E-07	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	9.0E-07	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	7.4E-08	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	2.6E-08	2.2E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0004
				GAMMA-CHLORDANE	2.60	mg/kg	6.0E-08	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	2.1E-08	1.7E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0003
				HEPTACHLOR	0.072	mg/kg	1.7E-09	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	7.5E-09	4.8E-09	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.000010
				HEPTACHLOR EPOXIDE	0.020	mg/kg	4.6E-10	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	4.2E-09	1.3E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0001
				ALUMINUM	10,000	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ARSENIC	11.4	mg/kg	7.9E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.2E-07	2.3E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0008
				BARIUM	141	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CHROMIUM VI	16.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				COBALT	11.2	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				IRON	20,300	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	571	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	0.326	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								1.1E-06					0.002
		Exposure Point Total									3.4E-06					0.02
	Exposure Medium Total										3.4E-06					0.02
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	1.0E-9	mg/m^3	6.3E-12	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	7.0E-12	6.2E-12	(mg/m^3)	NA	(mg/m^3)	--
				ALPHA-CHLORDANE	2.4E-9	mg/m^3	5.0E-12	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	5.0E-13	1.4E-11	(mg/m^3)	7.0E-04	(mg/m^3)	2.1E-8
				GAMMA-CHLORDANE	2.0E-9	mg/m^3	4.0E-12	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	4.0E-13	1.2E-11	(mg/m^3)	7.0E-04	(mg/m^3)	1.7E-8
				HEPTACHLOR	5.5E-11	mg/m^3	1.1E-13	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	1.4E-13	3.2E-13	(mg/m^3)	NA	(mg/m^3)	--
				HEPTACHLOR EPOXIDE	1.5E-11	mg/m^3	3.1E-14	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	8.0E-14	9.0E-14	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	7.6E-6	mg/m^3	1.5E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	4.5E-08	(mg/m^3)	5.0E-03	(mg/m^3)	0.000009
				ARSENIC	8.6E-9	mg/m^3	1.8E-11	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	7.6E-11	5.1E-11	(mg/m^3)	1.5E-05	(mg/m^3)	0.000003
				BARIUM	1.1E-7	mg/m^3	2.2E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	6.3E-10	(mg/m^3)	5.0E-04	(mg/m^3)	0.000001
				CHROMIUM VI	1.2E-8	mg/m^3	7.4E-11	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	6.2E-09	7.2E-11	(mg/m^3)	1.0E-04	(mg/m^3)	7.2E-7
				COBALT	8.5E-9	mg/m^3	1.7E-11	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	1.6E-10	5.0E-11	(mg/m^3)	6.0E-06	(mg/m^3)	0.000008
				IRON	1.5E-5	mg/m^3	3.1E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	9.1E-08	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	4.3E-7	mg/m^3	8.8E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.6E-09	(mg/m^3)	5.0E-05	(mg/m^3)	0.00005
				MERCURY	2.5E-10	mg/m^3	5.0E-13	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.5E-12	(mg/m^3)	3.0E-05	(mg/m^3)	4.9E-8
			Exp. Route Total								6.5E-09					0.00007
		Exposure Point Total									6.5E-09					0.00007
	Exposure Medium Total										6.5E-09					0.00007
Medium Total											3.4E-06					0.02
										Total of Receptor Risks Across All Media	3.4E-06			Total of Receptor Hazards Across All Media		0.02

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.5.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	2.08	mg/kg	1.2E-05	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	8.9E-05	2.7E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	3.5E-06	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	1.2E-06	4.1E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.08
				GAMMA-CHLORDANE	2.60	mg/kg	2.8E-06	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	1.0E-06	3.3E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.07
				HEPTACHLOR	0.236	mg/kg	2.6E-07	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.2E-06	3.0E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.006
				HEPTACHLOR EPOXIDE	0.064	mg/kg	7.0E-08	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	6.4E-07	8.2E-07	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.06
				ALUMINUM	10,000	mg/kg	1.1E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.3E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.1
				ARSENIC	16.9	mg/kg	1.1E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.7E-05	1.3E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.4
				BARIUM	244	mg/kg	2.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.1E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.02
				CHROMIUM VI	23.8	mg/kg	1.4E-04	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	7.0E-05	3.0E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.1
				COBALT	11.2	mg/kg	1.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.4E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.5
				IRON	20,300	mg/kg	2.2E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	2.6E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.4
				MANGANESE	701	mg/kg	7.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	9.0E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.4
				MERCURY	0.598	mg/kg	6.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	7.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03
			Exp. Route Total								1.8E-04					2.1
			Dermal	BENZO(A)PYRENE EQUIVALENTS	2.08	mg/kg	4.4E-06	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	3.2E-05	9.7E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	9.9E-07	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	3.5E-07	1.2E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.02
				GAMMA-CHLORDANE	2.60	mg/kg	8.0E-07	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	2.8E-07	9.3E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.02
				HEPTACHLOR	0.236	mg/kg	7.2E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	3.3E-07	8.4E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.002
				HEPTACHLOR EPOXIDE	0.064	mg/kg	2.0E-08	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.8E-07	2.3E-07	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.02
				ALUMINUM	10,000	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ARSENIC	16.9	mg/kg	1.6E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.3E-06	1.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.06
				BARIUM	244	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CHROMIUM VI	23.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	--	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				COBALT	11.2	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				IRON	20,300	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	701	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	0.598	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								3.6E-05					0.1
		Exposure Point Total									2.2E-04					2.3
	Exposure Medium Total										2.2E-04					2.3
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	1.6E-9	mg/m^3	6.9E-10	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	7.6E-10	1.5E-09	(mg/m^3)	NA	(mg/m^3)	--
				ALPHA-CHLORDANE	2.4E-9	mg/m^3	2.0E-10	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	2.0E-11	2.3E-09	(mg/m^3)	7.0E-04	(mg/m^3)	0.000003
				GAMMA-CHLORDANE	2.0E-9	mg/m^3	1.6E-10	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	1.6E-11	1.9E-09	(mg/m^3)	7.0E-04	(mg/m^3)	0.000003
				HEPTACHLOR	1.8E-10	mg/m^3	1.5E-11	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	1.9E-11	1.7E-10	(mg/m^3)	NA	(mg/m^3)	--
				HEPTACHLOR EPOXIDE	4.8E-11	mg/m^3	4.0E-12	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	1.0E-11	4.6E-11	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	7.6E-6	mg/m^3	6.2E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	7.3E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.001
				ARSENIC	1.3E-8	mg/m^3	1.1E-09	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	4.5E-09	1.2E-08	(mg/m^3)	1.5E-05	(mg/m^3)	0.0008
				BARIUM	1.8E-7	mg/m^3	1.5E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	1.8E-07	(mg/m^3)	5.0E-04	(mg/m^3)	0.0004
				CHROMIUM VI	1.8E-8	mg/m^3	7.9E-09	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	6.6E-07	1.7E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.0002
				COBALT	8.5E-9	mg/m^3	7.0E-10	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	6.3E-09	8.1E-09	(mg/m^3)	6.0E-06	(mg/m^3)	0.001
				IRON	1.5E-5	mg/m^3	1.3E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	1.5E-05	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	5.3E-7	mg/m^3	4.4E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	5.1E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.01
				MERCURY	4.5E-10	mg/m^3	3.7E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	4.3E-10	(mg/m^3)	3.0E-05	(mg/m^3)	0.00001
			Exp. Route Total								6.8E-07					0.01
		Exposure Point Total									6.8E-07					0.01
	Exposure Medium Total										6.8E-07					0.01
Medium Total											2.2E-04					2.3
Subsurface Soil	Subsurface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	10.61	mg/kg	6.2E-05	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	4.5E-04	1.4E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				NAPHTHALENE	0.439	mg/kg	4.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	5.6E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0003
				AROCLOR-1254	0.799	mg/kg	8.8E-07	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	1.8E-06	1.0E-05	(mg/kg/day)	2.0E-05	(mg/kg/day)	0.5
				ALUMINUM	11,700	mg/kg	1.3E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.5E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.1
				ANTIMONY	4.240	mg/kg	4.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	5.4E-05	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.1
				ARSENIC	25.0	mg/kg	1.6E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.5E-05	1.9E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.6
				BARIUM	432	mg/kg	4.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	5.5E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.03
				CADMIUM	7.31	mg/kg	8.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	9.3E-05	(mg/kg/day)	1.0E-03	(mg/kg/day)	0.09
				CHROMIUM VI	60.8	mg/kg	3.6E-04	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.8E-04	7.8E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.3
				COBALT	17.00	mg/kg	1.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	2.2E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.7

TABLE 7.5.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
				COPPER	362	mg/kg	4.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.6E-03	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.1
				IRON	31,400	mg/kg	3.4E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.0E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.6
				MANGANESE	846	mg/kg	9.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-02	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.5
				MERCURY	1.990	mg/kg	2.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08
			Exp. Route Total								6.6E-04					3.8
			Dermal	BENZO(A)PYRENE EQUIVALENTS	10.61	mg/kg	2.3E-05	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	1.6E-04	4.9E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				NAPHTHALENE	0.439	mg/kg	1.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0001
				AROCLOR-1254	0.799	mg/kg	3.4E-07	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	6.9E-07	4.0E-06	(mg/kg/day)	2.0E-05	(mg/kg/day)	0.2
				ALUMINUM	11,700	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ANTIMONY	4.240	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	6.0E-05	(mg/kg/day)	--
				ARSENIC	25.0	mg/kg	2.3E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.5E-06	2.7E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.09
				BARIUM	432	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CADMIUM	7.31	mg/kg	2.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.01
				CHROMIUM VI	60.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				COBALT	17.00	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				COPPER	362	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	4.0E-02	(mg/kg/day)	--
				IRON	31,400	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	846	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	1.990	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								1.7E-04					0.3
		Exposure Point Total									8.3E-04					4.1
	Exposure Medium Total										8.3E-04					4.1
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	8.0E-9	mg/m^3	3.5E-09	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	3.9E-09	7.7E-09	(mg/m^3)	NA	(mg/m^3)	--
				NAPHTHALENE	6.6E-6	mg/m^3	5.4E-07	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	1.9E-08	6.4E-06	(mg/m^3)	3.0E-03	(mg/m^3)	0.002
				AROCLOR-1254	6.1E-10	mg/m^3	5.0E-11	(mg/m^3)	5.7E-04	$(ug/m^3)^{-1}$	2.8E-11	5.8E-10	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	8.9E-6	mg/m^3	7.3E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	8.5E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.002
				ANTIMONY	3.2E-9	mg/m^3	2.6E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	3.1E-09	(mg/m^3)	NA	(mg/m^3)	--
				ARSENIC	1.9E-8	mg/m^3	1.6E-09	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	6.7E-09	1.8E-08	(mg/m^3)	1.5E-05	(mg/m^3)	0.001
				BARIUM	3.3E-7	mg/m^3	2.7E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	3.1E-07	(mg/m^3)	5.0E-04	(mg/m^3)	0.0006
				CADMIUM	5.5E-9	mg/m^3	4.6E-10	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	8.2E-10	5.3E-09	(mg/m^3)	2.0E-05	(mg/m^3)	0.0003
				CHROMIUM VI	4.6E-8	mg/m^3	2.0E-08	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	1.7E-06	4.4E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.0004
				COBALT	1.3E-8	mg/m^3	1.1E-09	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	9.5E-09	1.2E-08	(mg/m^3)	6.0E-06	(mg/m^3)	0.002
				COPPER	2.7E-7	mg/m^3	2.3E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.6E-07	(mg/m^3)	NA	(mg/m^3)	--
				IRON	2.4E-5	mg/m^3	2.0E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.3E-05	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	6.4E-7	mg/m^3	5.3E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	6.1E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.01
				MERCURY	1.5E-9	mg/m^3	1.2E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.4E-09	(mg/m^3)	3.0E-05	(mg/m^3)	0.00005
			Exp. Route Total								1.7E-06					0.02
		Exposure Point Total									1.7E-06					0.02
	Exposure Medium Total										1.7E-06					0.02
Medium Total											8.3E-04					4.1
										Total of Receptor Risks Across All Media	1.0E-03			Total of Receptor Hazards Across All Media		6.4

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.6.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	2.08	mg/kg	1.8E-06	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	1.3E-05	2.9E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	1.5E-06	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	5.3E-07	4.4E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.009
				GAMMA-CHLORDANE	2.60	mg/kg	1.2E-06	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	4.3E-07	3.6E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.007
				HEPTACHLOR	0.236	mg/kg	1.1E-07	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	5.0E-07	3.2E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0006
				HEPTACHLOR EPOXIDE	0.064	mg/kg	3.0E-08	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	2.7E-07	8.8E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.007
				ALUMINUM	10,000	mg/kg	4.7E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
				ARSENIC	16.9	mg/kg	4.8E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	7.1E-06	1.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.05
				BARIUM	244	mg/kg	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.3E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.002
				CHROMIUM VI	23.8	mg/kg	2.0E-05	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.0E-05	3.3E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.01
				COBALT	11.2	mg/kg	5.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.05
				IRON	20,300	mg/kg	9.5E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04
				MANGANESE	701	mg/kg	3.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.6E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.04
				MERCURY	0.598	mg/kg	2.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.2E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.003
			Exp. Route Total								3.2E-05					0.2
			Dermal	BENZO(A)PYRENE EQUIVALENTS	2.08	mg/kg	9.3E-07	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	6.8E-06	1.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	6.0E-07	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	2.1E-07	1.8E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.004
				GAMMA-CHLORDANE	2.60	mg/kg	4.9E-07	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	1.7E-07	1.4E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.003
				HEPTACHLOR	0.236	mg/kg	4.4E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	2.0E-07	1.3E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0003
				HEPTACHLOR EPOXIDE	0.064	mg/kg	1.2E-08	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.1E-07	3.5E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.003
				ALUMINUM	10,000	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ARSENIC	16.9	mg/kg	9.5E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.4E-06	2.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.009
				BARIUM	244	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CHROMIUM VI	23.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				COBALT	11.2	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				IRON	20,300	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	701	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	0.598	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								8.9E-06					0.02
		Exposure Point Total									4.1E-05					0.2
	Exposure Medium Total										4.1E-05					0.2
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	1.6E-9	mg/m^3	9.5E-10	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	1.0E-09	1.5E-09	(mg/m^3)	NA	(mg/m^3)	--
				ALPHA-CHLORDANE	2.4E-9	mg/m^3	8.0E-10	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	8.0E-11	2.3E-09	(mg/m^3)	7.0E-04	(mg/m^3)	0.000003
				GAMMA-CHLORDANE	2.0E-9	mg/m^3	6.5E-10	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	6.5E-11	1.9E-09	(mg/m^3)	7.0E-04	(mg/m^3)	0.000003
				HEPTACHLOR	1.8E-10	mg/m^3	5.9E-11	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	7.6E-11	1.7E-10	(mg/m^3)	NA	(mg/m^3)	--
				HEPTACHLOR EPOXIDE	4.8E-11	mg/m^3	1.6E-11	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	4.1E-11	4.6E-11	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	7.6E-6	mg/m^3	2.5E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	7.3E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.001
				ARSENIC	1.3E-8	mg/m^3	4.2E-09	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	1.8E-08	1.2E-08	(mg/m^3)	1.5E-05	(mg/m^3)	0.0008
				BARIUM	1.8E-7	mg/m^3	6.1E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.8E-07	(mg/m^3)	5.0E-04	(mg/m^3)	0.0004
				CHROMIUM VI	1.8E-8	mg/m^3	1.1E-08	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	9.1E-07	1.7E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.0002
				COBALT	8.5E-9	mg/m^3	2.8E-09	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	2.5E-08	8.1E-09	(mg/m^3)	6.0E-06	(mg/m^3)	0.001
				IRON	1.5E-5	mg/m^3	5.1E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.5E-05	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	5.3E-7	mg/m^3	1.7E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	5.1E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.01
				MERCURY	4.5E-10	mg/m^3	1.5E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	4.3E-10	(mg/m^3)	3.0E-05	(mg/m^3)	0.00001
			Exp. Route Total								9.6E-07					0.01
		Exposure Point Total									9.6E-07					0.01
	Exposure Medium Total										9.6E-07					0.01
Medium Total											4.2E-05					0.3
Subsurface Soil	Subsurface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	10.61	mg/kg	9.1E-06	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	6.7E-05	1.5E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				NAPHTHALENE	0.439	mg/kg	2.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.0E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.00003
				AROCLOR-1254	0.799	mg/kg	3.8E-07	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	7.5E-07	1.1E-06	(mg/kg/day)	2.0E-05	(mg/kg/day)	0.05
				ALUMINUM	11,700	mg/kg	5.5E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.02
				ANTIMONY	4.240	mg/kg	2.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.8E-06	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.01
				ARSENIC	25.0	mg/kg	7.0E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.1E-05	2.1E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				BARIUM	432	mg/kg	2.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.9E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.003
				CADMIUM	7.31	mg/kg	3.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-05	(mg/kg/day)	1.0E-03	(mg/kg/day)	0.01
				CHROMIUM VI	60.8	mg/kg	5.2E-05	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2.6E-05	8.3E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.03
				COBALT	17.00	mg/kg	8.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.08

TABLE 7.6.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
				COPPER	362	mg/kg	1.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.0E-04	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.01
				IRON	31,400	mg/kg	1.5E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.3E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.06
				MANGANESE	846	mg/kg	4.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.05
				MERCURY	1.990	mg/kg	9.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.009
			Exp. Route Total								1.0E-04					0.4
			Dermal	BENZO(A)PYRENE EQUIVALENTS	10.61	mg/kg	4.7E-06	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	3.5E-05	7.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				NAPHTHALENE	0.439	mg/kg	1.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.1E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.00002
				AROCLOR-1254	0.799	mg/kg	2.1E-07	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	4.2E-07	6.1E-07	(mg/kg/day)	2.0E-05	(mg/kg/day)	0.03
				ALUMINUM	11,700	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ANTIMONY	4.240	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	6.0E-05	(mg/kg/day)	--
				ARSENIC	25.0	mg/kg	1.4E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.1E-06	4.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				BARIUM	432	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CADMIUM	7.31	mg/kg	1.4E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.0E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.002
				CHROMIUM VI	60.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				COBALT	17.00	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				COPPER	362	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	4.0E-02	(mg/kg/day)	--
				IRON	31,400	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	846	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	1.990	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								3.7E-05					0.05
		Exposure Point Total									1.4E-04					0.4
	Exposure Medium Total										1.4E-04					0.4
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	8.0E-9	mg/m^3	4.8E-09	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	5.3E-09	7.7E-09	(mg/m^3)	NA	(mg/m^3)	--
				NAPHTHALENE	6.6E-6	mg/m^3	2.2E-06	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	7.4E-08	6.4E-06	(mg/m^3)	3.0E-03	(mg/m^3)	0.002
				AROCLOR-1254	6.1E-10	mg/m^3	2.0E-10	(mg/m^3)	5.7E-04	$(ug/m^3)^{-1}$	1.1E-10	5.8E-10	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	8.9E-6	mg/m^3	2.9E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	8.5E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.002
				ANTIMONY	3.2E-9	mg/m^3	1.1E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	3.1E-09	(mg/m^3)	NA	(mg/m^3)	--
				ARSENIC	1.9E-8	mg/m^3	6.2E-09	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	2.7E-08	1.8E-08	(mg/m^3)	1.5E-05	(mg/m^3)	0.001
				BARIUM	3.3E-7	mg/m^3	1.1E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	3.1E-07	(mg/m^3)	5.0E-04	(mg/m^3)	0.0006
				CADMIUM	5.5E-9	mg/m^3	1.8E-09	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	3.3E-09	5.3E-09	(mg/m^3)	2.0E-05	(mg/m^3)	0.0003
				CHROMIUM VI	4.6E-8	mg/m^3	2.8E-08	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	2.3E-06	4.4E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.0004
				COBALT	1.3E-8	mg/m^3	4.2E-09	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	3.8E-08	1.2E-08	(mg/m^3)	6.0E-06	(mg/m^3)	0.002
				COPPER	2.7E-7	mg/m^3	9.0E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.6E-07	(mg/m^3)	NA	(mg/m^3)	--
				IRON	2.4E-5	mg/m^3	7.8E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.3E-05	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	6.4E-7	mg/m^3	2.1E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	6.1E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.01
				MERCURY	1.5E-9	mg/m^3	5.0E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.4E-09	(mg/m^3)	3.0E-05	(mg/m^3)	0.00005
			Exp. Route Total								2.5E-06					0.02
		Exposure Point Total									2.5E-06					0.02
	Exposure Medium Total										2.5E-06					0.02
Medium Total											1.4E-04					0.5
										Total of Receptor Risks Across All Media	1.9E-04			Total of Receptor Hazards Across All Media		0.7

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.1.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	0.90	mg/kg	2.5E-09	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	1.8E-08	1.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	0.35	mg/kg	9.8E-10	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	3.4E-10	5.9E-07	(mg/kg/day)	6.0E-04	(mg/kg/day)	0.0010
				GAMMA-CHLORDANE	0.28	mg/kg	7.8E-10	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	2.7E-10	4.7E-07	(mg/kg/day)	6.0E-04	(mg/kg/day)	0.0008
				HEPTACHLOR	0.024	mg/kg	6.6E-11	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	3.0E-10	4.0E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00008
				HEPTACHLOR EPOXIDE	0.009	mg/kg	2.4E-11	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	2.2E-10	1.4E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.001
				ALUMINUM	5,966	mg/kg	1.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
				ARSENIC	9.1	mg/kg	1.5E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.3E-08	9.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.03
				BARIUM	72.4	mg/kg	2.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0006
				CHROMIUM VI	12.4	mg/kg	3.4E-08	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.7E-08	2.1E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.001
				COBALT	7.1	mg/kg	2.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.004
				IRON	13,028	mg/kg	3.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.03
				MANGANESE	446	mg/kg	1.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.03
				MERCURY	0	mg/kg	4.9E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.0E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.0001
			Exp. Route Total								5.9E-08					0.1
			Dermal	BENZO(A)PYRENE EQUIVALENTS	0.90	mg/kg	6.5E-10	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	4.7E-09	3.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	0.35	mg/kg	2.0E-10	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	6.8E-11	1.2E-07	(mg/kg/day)	6.0E-04	(mg/kg/day)	0.0002
				GAMMA-CHLORDANE	0.28	mg/kg	1.6E-10	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	5.4E-11	9.5E-08	(mg/kg/day)	6.0E-04	(mg/kg/day)	0.0002
				HEPTACHLOR	0.024	mg/kg	1.3E-11	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	6.0E-11	8.1E-09	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00002
				HEPTACHLOR EPOXIDE	0.009	mg/kg	4.8E-12	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	4.3E-11	2.9E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0002
				ALUMINUM	5,966	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ARSENIC	9.1	mg/kg	1.5E-09	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.3E-09	9.2E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.003
				BARIUM	72.4	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CHROMIUM VI	12.4	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--
				COBALT	7.1	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	--
				IRON	13,028	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	446	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	0	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-04	(mg/kg/day)	--
			Exp. Route Total								7.2E-09					0.004
		Exposure Point Total									6.6E-08					0.1
	Exposure Medium Total										6.6E-08					0.1
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	7.2E-9	mg/m^3	1.4E-12	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	1.6E-12	8.6E-10	(mg/m^3)	NA	(mg/m^3)	--
				ALPHA-CHLORDANE	2.8E-9	mg/m^3	5.6E-13	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	5.6E-14	3.4E-10	(mg/m^3)	7.0E-04	(mg/m^3)	4.8E-7
				GAMMA-CHLORDANE	2.3E-9	mg/m^3	4.4E-13	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	4.4E-14	2.7E-10	(mg/m^3)	7.0E-04	(mg/m^3)	3.9E-7
				HEPTACHLOR	1.9E-10	mg/m^3	3.8E-14	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	4.9E-14	2.3E-11	(mg/m^3)	NA	(mg/m^3)	--
				HEPTACHLOR EPOXIDE	6.9E-11	mg/m^3	1.4E-14	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	3.5E-14	8.3E-12	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	0.000	mg/m^3	9.4E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	5.7E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.001
				ARSENIC	7.3E-8	mg/m^3	1.4E-11	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	6.2E-11	8.7E-09	(mg/m^3)	1.5E-05	(mg/m^3)	0.0006
				BARIUM	5.8E-7	mg/m^3	1.1E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	7.0E-08	(mg/m^3)	5.0E-03	(mg/m^3)	0.00001
				CHROMIUM VI	1.0E-7	mg/m^3	2.0E-11	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	1.6E-09	1.2E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.0001
				COBALT	5.7E-8	mg/m^3	1.1E-11	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	1.0E-10	6.8E-09	(mg/m^3)	2.0E-05	(mg/m^3)	0.0003
				IRON	0.000	mg/m^3	2.1E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.3E-05	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	3.6E-6	mg/m^3	7.0E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	4.3E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.009
				MERCURY	1.4E-9	mg/m^3	2.8E-13	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.7E-10	(mg/m^3)	3.0E-05	(mg/m^3)	0.000006
			Exp. Route Total								1.8E-09					0.01
		Exposure Point Total									1.8E-09					0.01
	Exposure Medium Total										1.8E-09					0.01
Medium Total											6.8E-08					0.1
Subsurface Soil	Subsurface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	2	mg/kg	4.9E-09	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	3.6E-08	3.0E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				NAPHTHALENE	0.1	mg/kg	3.5E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-07	(mg/kg/day)	6.0E-01	(mg/kg/day)	3.6E-7
				AROCLOR-1254	0	mg/kg	5.5E-10	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	1.1E-09	3.3E-07	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.01
				ALUMINUM	6,717	mg/kg	1.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
				ANTIMONY	0.950	mg/kg	2.6E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-06	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.004
				ARSENIC	11.6	mg/kg	1.9E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.9E-08	1.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.04
				BARIUM	120.0	mg/kg	3.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.001
				CADMIUM	1.82	mg/kg	5.0E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.1E-06	(mg/kg/day)	1.0E-03	(mg/kg/day)	0.003
				CHROMIUM VI	20.6	mg/kg	5.7E-08	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2.9E-08	3.5E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.002
				COBALT	8.45	mg/kg	2.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.005

TABLE 7.1.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
				COPPER	105	mg/kg	2.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-04	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.004
				IRON	15,600	mg/kg	4.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.04
				MANGANESE	461	mg/kg	1.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.8E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.03
				MERCURY	0.450	mg/kg	1.2E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.6E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.0004
			Exp. Route Total								9.4E-08					0.2
			Dermal	BENZO(A)PYRENE EQUIVALENTS	2	mg/kg	1.3E-09	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	9.3E-09	7.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				NAPHTHALENE	0.1	mg/kg	9.2E-11	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.6E-08	(mg/kg/day)	6.0E-01	(mg/kg/day)	9.3E-8
				AROCLOR-1254	0.2	mg/kg	1.5E-10	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	3.1E-10	9.3E-08	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.003
				ALUMINUM	6,717	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ANTIMONY	0.950	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	6.0E-05	(mg/kg/day)	--
				ARSENIC	11.6	mg/kg	1.9E-09	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.9E-09	1.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
				BARIUM	120.0	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CADMIUM	1.82	mg/kg	1.0E-11	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.1E-09	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.0002
				CHROMIUM VI	20.6	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	5.0E-04	(mg/kg/day)	--
				COBALT	8.45	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-03	(mg/kg/day)	--
				COPPER	105	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	4.0E-02	(mg/kg/day)	--
				IRON	15,600	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	461	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	0.450	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-04	(mg/kg/day)	--
			Exp. Route Total								1.3E-08					0.007
		Exposure Point Total									1.1E-07					0.2
	Exposure Medium Total										1.1E-07					0.2
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	0.000	mg/m^3	2.8E-12	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	3.1E-12	1.7E-09	(mg/m^3)	NA	(mg/m^3)	--
				NAPHTHALENE	0.000	mg/m^3	4.1E-10	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	1.4E-11	2.5E-07	(mg/m^3)	3.0E-03	(mg/m^3)	0.00008
				AROCLOR-1254	1.6E-9	mg/m^3	3.1E-13	(mg/m^3)	5.7E-04	$(ug/m^3)^{-1}$	1.8E-13	1.9E-10	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	0.000	mg/m^3	1.1E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	6.4E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.001
				ANTIMONY	7.7E-9	mg/m^3	1.5E-12	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	9.1E-10	(mg/m^3)	NA	(mg/m^3)	--
				ARSENIC	9.4E-8	mg/m^3	1.8E-11	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	7.9E-11	1.1E-08	(mg/m^3)	1.5E-05	(mg/m^3)	0.0007
				BARIUM	9.7E-7	mg/m^3	1.9E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.2E-07	(mg/m^3)	5.0E-03	(mg/m^3)	0.00002
				CADMIUM	1.5E-8	mg/m^3	2.9E-12	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	5.2E-12	1.7E-09	(mg/m^3)	2.0E-05	(mg/m^3)	0.00009
				CHROMIUM VI	1.7E-7	mg/m^3	3.3E-11	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	2.7E-09	2.0E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.0002
				COBALT	6.8E-8	mg/m^3	1.3E-11	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	1.2E-10	8.1E-09	(mg/m^3)	2.0E-05	(mg/m^3)	0.0004
				COPPER	8.5E-7	mg/m^3	1.7E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.0E-07	(mg/m^3)	NA	(mg/m^3)	--
				IRON	0.000	mg/m^3	2.5E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.5E-05	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	3.7E-6	mg/m^3	7.3E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	4.4E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.009
				MERCURY	3.6E-9	mg/m^3	7.1E-13	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	4.3E-10	(mg/m^3)	3.0E-05	(mg/m^3)	0.00001
			Exp. Route Total								3.0E-09					0.01
		Exposure Point Total									3.0E-09					0.01
	Exposure Medium Total										3.0E-09					0.01
Medium Total											1.1E-07					0.2
										Total of Receptor Risks Across All Media	1.8E-07			Total of Receptor Hazards Across All Media		0.3

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.2.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Current
Receptor Population: Occupational/Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	1.37	mg/kg	7.5E-08	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	5.5E-07	5.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	1.8E-07	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	6.2E-08	1.4E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.003
				GAMMA-CHLORDANE	2.60	mg/kg	1.4E-07	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	5.0E-08	1.1E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.002
				HEPTACHLOR	0.072	mg/kg	4.0E-09	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.8E-08	3.1E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00006
				HEPTACHLOR EPOXIDE	0.020	mg/kg	1.1E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.0E-08	8.6E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0007
				ALUMINUM	10,000	mg/kg	5.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.004
				ARSENIC	11.4	mg/kg	3.8E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	5.7E-07	2.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				BARIUM	141	mg/kg	7.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.0E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0003
				CHROMIUM VI	16.0	mg/kg	8.8E-07	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	4.4E-07	6.9E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002
				COBALT	11.2	mg/kg	6.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				IRON	20,300	mg/kg	1.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.7E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
				MANGANESE	571	mg/kg	3.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.01
				MERCURY	0.326	mg/kg	1.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0005
			Exp. Route Total								1.7E-06					0.06
			Dermal	BENZO(A)PYRENE EQUIVALENTS	1.37	mg/kg	1.3E-08	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	9.5E-08	1.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	2.3E-08	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	8.2E-09	1.8E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0004
				GAMMA-CHLORDANE	2.60	mg/kg	1.9E-08	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	6.6E-09	1.5E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0003
				HEPTACHLOR	0.072	mg/kg	5.2E-10	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	2.4E-09	4.1E-09	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.000008
				HEPTACHLOR EPOXIDE	0.020	mg/kg	1.5E-10	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.3E-09	1.1E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.00009
				ALUMINUM	10,000	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ARSENIC	11.4	mg/kg	2.5E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.7E-08	1.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0006
				BARIUM	141	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CHROMIUM VI	16.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				COBALT	11.2	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				IRON	20,300	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	571	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	0.326	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								1.5E-07					0.001
		Exposure Point Total									1.8E-06					0.06
	Exposure Medium Total										1.8E-06					0.06
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	1.1E-9	mg/m^3	1.4E-11	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	1.6E-11	1.1E-10	(mg/m^3)	NA	(mg/m^3)	--
				ALPHA-CHLORDANE	2.6E-9	mg/m^3	3.3E-11	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	3.3E-12	2.6E-10	(mg/m^3)	7.0E-04	(mg/m^3)	3.7E-7
				GAMMA-CHLORDANE	2.1E-9	mg/m^3	2.7E-11	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	2.7E-12	2.1E-10	(mg/m^3)	7.0E-04	(mg/m^3)	3.0E-7
				HEPTACHLOR	5.8E-11	mg/m^3	7.5E-13	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	9.7E-13	5.8E-12	(mg/m^3)	NA	(mg/m^3)	--
				HEPTACHLOR EPOXIDE	1.6E-11	mg/m^3	2.1E-13	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	5.4E-13	1.6E-12	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	8.1E-6	mg/m^3	1.0E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	8.1E-07	(mg/m^3)	5.0E-03	(mg/m^3)	0.0002
				ARSENIC	9.2E-9	mg/m^3	1.2E-10	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	5.1E-10	9.2E-10	(mg/m^3)	1.5E-05	(mg/m^3)	0.00006
				BARIUM	1.1E-7	mg/m^3	1.5E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.1E-08	(mg/m^3)	5.0E-04	(mg/m^3)	0.00002
				CHROMIUM VI	1.3E-8	mg/m^3	1.7E-10	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	1.4E-08	1.3E-09	(mg/m^3)	1.0E-04	(mg/m^3)	0.00001
				COBALT	9.0E-9	mg/m^3	1.2E-10	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	1.0E-09	9.0E-10	(mg/m^3)	6.0E-06	(mg/m^3)	0.0002
				IRON	1.6E-5	mg/m^3	2.1E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.6E-06	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	4.6E-7	mg/m^3	5.9E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	4.6E-08	(mg/m^3)	5.0E-05	(mg/m^3)	0.0009
				MERCURY	2.6E-10	mg/m^3	3.4E-12	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.6E-11	(mg/m^3)	3.0E-05	(mg/m^3)	8.8E-7
			Exp. Route Total								1.6E-08					0.001
		Exposure Point Total									1.6E-08					0.001
	Exposure Medium Total										1.6E-08					0.001
Medium Total											1.9E-06					0.06
Subsurface Soil	Subsurface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	6.30	mg/kg	3.5E-07	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	2.5E-06	2.7E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				NAPHTHALENE	0.326	mg/kg	1.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.000007
				AROCLOR-1254	0.877	mg/kg	4.8E-08	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	9.7E-08	3.8E-07	(mg/kg/day)	2.0E-05	(mg/kg/day)	0.02
				ALUMINUM	8,924	mg/kg	4.9E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.8E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.004
				ANTIMONY	1.80	mg/kg	9.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.7E-07	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.002
				ARSENIC	15.3	mg/kg	5.1E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	7.6E-07	3.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				BARIUM	249	mg/kg	1.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0005
				CADMIUM	4.20	mg/kg	2.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-06	(mg/kg/day)	1.0E-03	(mg/kg/day)	0.002
				CHROMIUM VI	30.8	mg/kg	1.7E-06	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	8.5E-07	1.3E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.004
				COBALT	11.2	mg/kg	6.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02

TABLE 7.2.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Current
Receptor Population: Occupational/Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				COPPER	222	mg/kg	1.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.5E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.002
				IRON	20,260	mg/kg	1.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.7E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
				MANGANESE	594	mg/kg	3.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.01
				MERCURY	1.14	mg/kg	6.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002
			Exp. Route Total								4.2E-06					0.09
			Dermal	BENZO(A)PYRENE EQUIVALENTS	6.30	mg/kg	6.0E-08	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	4.3E-07	4.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				NAPHTHALENE	0.326	mg/kg	3.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-08	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.000001
				AROCLOR-1254	0.877	mg/kg	8.9E-09	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	1.8E-08	6.9E-08	(mg/kg/day)	2.0E-05	(mg/kg/day)	0.003
				ALUMINUM	8,924	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ANTIMONY	1.80	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	6.0E-05	(mg/kg/day)	--
				ARSENIC	15.3	mg/kg	3.3E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	5.0E-08	2.6E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0009
				BARIUM	249	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CADMIUM	4.20	mg/kg	3.1E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-09	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.00010
				CHROMIUM VI	30.8	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				COBALT	11.2	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				COPPER	222	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	4.0E-02	(mg/kg/day)	--
				IRON	20,260	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	594	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	1.14	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								5.0E-07					0.004
		Exposure Point Total									4.7E-06					0.1
	Exposure Medium Total										4.7E-06					0.1
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	5.1E-9	mg/m^3	6.5E-11	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	7.2E-11	5.1E-10	(mg/m^3)	NA	(mg/m^3)	--
				NAPHTHALENE	5.2E-6	mg/m^3	6.7E-08	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	2.3E-09	5.2E-07	(mg/m^3)	3.0E-03	(mg/m^3)	0.0002
				AROCLOR-1254	7.1E-10	mg/m^3	9.1E-12	(mg/m^3)	5.7E-04	$(ug/m^3)^{-1}$	5.2E-12	7.1E-11	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	7.2E-6	mg/m^3	9.3E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	7.2E-07	(mg/m^3)	5.0E-03	(mg/m^3)	0.0001
				ANTIMONY	1.5E-9	mg/m^3	1.9E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.5E-10	(mg/m^3)	NA	(mg/m^3)	--
				ARSENIC	1.2E-8	mg/m^3	1.6E-10	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	6.8E-10	1.2E-09	(mg/m^3)	1.5E-05	(mg/m^3)	0.00008
				BARIUM	2.0E-7	mg/m^3	2.6E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.0E-08	(mg/m^3)	5.0E-04	(mg/m^3)	0.00004
				CADMIUM	3.4E-9	mg/m^3	4.4E-11	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	7.8E-11	3.4E-10	(mg/m^3)	2.0E-05	(mg/m^3)	0.00002
				CHROMIUM VI	2.5E-8	mg/m^3	3.2E-10	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	2.7E-08	2.5E-09	(mg/m^3)	1.0E-04	(mg/m^3)	0.00002
				COBALT	9.0E-9	mg/m^3	1.2E-10	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	1.0E-09	9.0E-10	(mg/m^3)	6.0E-06	(mg/m^3)	0.0002
				COPPER	1.8E-7	mg/m^3	2.3E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.8E-08	(mg/m^3)	NA	(mg/m^3)	--
				IRON	1.6E-5	mg/m^3	2.1E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.6E-06	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	4.8E-7	mg/m^3	6.2E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	4.8E-08	(mg/m^3)	5.0E-05	(mg/m^3)	0.0010
				MERCURY	9.2E-10	mg/m^3	1.2E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	9.2E-11	(mg/m^3)	3.0E-05	(mg/m^3)	0.000003
			Exp. Route Total								3.1E-08					0.002
		Exposure Point Total									3.1E-08					0.002
	Exposure Medium Total										3.1E-08					0.002
Medium Total											4.8E-06					0.1
										Total of Receptor Risks Across All Media	6.6E-06			Total of Receptor Hazards Across All Media		0.2

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.3.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	1.37	mg/kg	2.5E-08	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	1.8E-07	5.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	2.0E-08	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	6.8E-09	1.4E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0003
				GAMMA-CHLORDANE	2.60	mg/kg	1.6E-08	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	5.5E-09	1.1E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0002
				HEPTACHLOR	0.072	mg/kg	4.4E-10	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	2.0E-09	3.1E-09	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.000006
				HEPTACHLOR EPOXIDE	0.020	mg/kg	1.2E-10	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.1E-09	8.5E-10	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.00007
				ALUMINUM	10,000	mg/kg	6.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.2E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0004
				ARSENIC	11.4	mg/kg	4.1E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	6.2E-08	2.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.001
				BARIUM	141	mg/kg	8.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.0E-06	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.00003
				CHROMIUM VI	16.0	mg/kg	2.9E-07	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.5E-07	6.8E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0002
				COBALT	11.2	mg/kg	6.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.7E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002
				IRON	20,300	mg/kg	1.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.6E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.001
				MANGANESE	571	mg/kg	3.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.001
				MERCURY	0.326	mg/kg	2.0E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00005
			Exp. Route Total								4.0E-07					0.006
			Dermal	BENZO(A)PYRENE EQUIVALENTS	1.37	mg/kg	8.0E-09	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	5.9E-08	1.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	4.8E-09	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	1.7E-09	3.4E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00007
				GAMMA-CHLORDANE	2.60	mg/kg	3.9E-09	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	1.4E-09	2.7E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00005
				HEPTACHLOR	0.072	mg/kg	1.1E-10	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	4.9E-10	7.6E-10	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.000002
				HEPTACHLOR EPOXIDE	0.020	mg/kg	3.0E-11	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	2.7E-10	2.1E-10	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.00002
				ALUMINUM	10,000	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ARSENIC	11.4	mg/kg	5.1E-09	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	7.7E-09	3.6E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0001
				BARIUM	141	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CHROMIUM VI	16.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				COBALT	11.2	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				IRON	20,300	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	571	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	0.326	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								7.0E-08					0.0003
		Exposure Point Total									4.7E-07					0.006
	Exposure Medium Total										4.7E-07					0.006
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	1.0E-9	mg/m^3	6.6E-13	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	7.3E-13	1.5E-12	(mg/m^3)	NA	(mg/m^3)	--
				ALPHA-CHLORDANE	2.4E-9	mg/m^3	5.2E-13	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	5.2E-14	3.6E-12	(mg/m^3)	7.0E-04	(mg/m^3)	5.2E-9
				GAMMA-CHLORDANE	2.0E-9	mg/m^3	4.2E-13	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	4.2E-14	2.9E-12	(mg/m^3)	7.0E-04	(mg/m^3)	4.2E-9
				HEPTACHLOR	5.5E-11	mg/m^3	1.2E-14	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	1.5E-14	8.1E-14	(mg/m^3)	NA	(mg/m^3)	--
				HEPTACHLOR EPOXIDE	1.5E-11	mg/m^3	3.2E-15	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	8.4E-15	2.2E-14	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	7.6E-6	mg/m^3	1.6E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.1E-08	(mg/m^3)	5.0E-03	(mg/m^3)	0.000002
				ARSENIC	8.6E-9	mg/m^3	1.8E-12	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	7.9E-12	1.3E-11	(mg/m^3)	1.5E-05	(mg/m^3)	8.5E-7
				BARIUM	1.1E-7	mg/m^3	2.3E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.6E-10	(mg/m^3)	5.0E-04	(mg/m^3)	3.2E-7
				CHROMIUM VI	1.2E-8	mg/m^3	7.7E-12	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	6.5E-10	1.8E-11	(mg/m^3)	1.0E-04	(mg/m^3)	1.8E-7
				COBALT	8.5E-9	mg/m^3	1.8E-12	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	1.6E-11	1.3E-11	(mg/m^3)	6.0E-06	(mg/m^3)	0.000002
				IRON	1.5E-5	mg/m^3	3.3E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.3E-08	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	4.3E-7	mg/m^3	9.2E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	6.4E-10	(mg/m^3)	5.0E-05	(mg/m^3)	0.00001
				MERCURY	2.5E-10	mg/m^3	5.2E-14	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	3.7E-13	(mg/m^3)	3.0E-05	(mg/m^3)	1.2E-8
			Exp. Route Total								6.7E-10					0.00002
		Exposure Point Total									6.7E-10					0.00002
	Exposure Medium Total										6.7E-10					0.00002
Medium Total											4.8E-07					0.006
										Total of Receptor Risks Across All Media	4.8E-07			Total of Receptor Hazards Across All Media		0.006

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.4.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	1.37	mg/kg	1.0E-08	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	7.6E-08	3.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	8.2E-09	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	2.9E-09	8.2E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0002
				GAMMA-CHLORDANE	2.60	mg/kg	6.6E-09	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	2.3E-09	6.6E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0001
				HEPTACHLOR	0.072	mg/kg	1.8E-10	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	8.2E-10	1.8E-09	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.000004
				HEPTACHLOR EPOXIDE	0.020	mg/kg	5.1E-11	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	4.6E-10	5.1E-10	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.00004
				ALUMINUM	10,000	mg/kg	2.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0003
				ARSENIC	11.4	mg/kg	1.7E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.6E-08	1.7E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0006
				BARIUM	141	mg/kg	3.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.6E-06	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.00002
				CHROMIUM VI	16.0	mg/kg	1.2E-07	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	6.1E-08	4.1E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0001
				COBALT	11.2	mg/kg	2.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0009
				IRON	20,300	mg/kg	5.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.2E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0007
				MANGANESE	571	mg/kg	1.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.0006
				MERCURY	0.326	mg/kg	8.3E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.3E-09	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00003
			Exp. Route Total								1.7E-07					0.004
			Dermal	BENZO(A)PYRENE EQUIVALENTS	1.37	mg/kg	1.8E-09	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	1.3E-08	6.0E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	3.22	mg/kg	1.1E-09	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	3.8E-10	1.1E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00002
				GAMMA-CHLORDANE	2.60	mg/kg	8.7E-10	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	3.1E-10	8.7E-09	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00002
				HEPTACHLOR	0.072	mg/kg	2.4E-11	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.1E-10	2.4E-10	(mg/kg/day)	5.0E-04	(mg/kg/day)	4.8E-7
				HEPTACHLOR EPOXIDE	0.020	mg/kg	6.7E-12	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	6.1E-11	6.7E-11	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.000005
				ALUMINUM	10,000	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ARSENIC	11.4	mg/kg	1.1E-09	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.7E-09	1.1E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00004
				BARIUM	141	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CHROMIUM VI	16.0	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				COBALT	11.2	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				IRON	20,300	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	571	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	0.326	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								1.6E-08					0.00008
		Exposure Point Total									1.9E-07					0.004
	Exposure Medium Total										1.9E-07					0.004
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	1.0E-9	mg/m^3	4.6E-13	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	5.1E-13	1.5E-12	(mg/m^3)	NA	(mg/m^3)	--
				ALPHA-CHLORDANE	2.4E-9	mg/m^3	3.6E-13	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	3.6E-14	3.6E-12	(mg/m^3)	7.0E-04	(mg/m^3)	5.2E-9
				GAMMA-CHLORDANE	2.0E-9	mg/m^3	2.9E-13	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	2.9E-14	2.9E-12	(mg/m^3)	7.0E-04	(mg/m^3)	4.2E-9
				HEPTACHLOR	5.5E-11	mg/m^3	8.1E-15	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	1.1E-14	8.1E-14	(mg/m^3)	NA	(mg/m^3)	--
				HEPTACHLOR EPOXIDE	1.5E-11	mg/m^3	2.2E-15	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	5.8E-15	2.2E-14	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	7.6E-6	mg/m^3	1.1E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.1E-08	(mg/m^3)	5.0E-03	(mg/m^3)	0.000002
				ARSENIC	8.6E-9	mg/m^3	1.3E-12	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	5.5E-12	1.3E-11	(mg/m^3)	1.5E-05	(mg/m^3)	8.5E-7
				BARIUM	1.1E-7	mg/m^3	1.6E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.6E-10	(mg/m^3)	5.0E-04	(mg/m^3)	3.2E-7
				CHROMIUM VI	1.2E-8	mg/m^3	5.4E-12	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	4.5E-10	1.8E-11	(mg/m^3)	1.0E-04	(mg/m^3)	1.8E-7
				COBALT	8.5E-9	mg/m^3	1.3E-12	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	1.1E-11	1.3E-11	(mg/m^3)	6.0E-06	(mg/m^3)	0.000002
				IRON	1.5E-5	mg/m^3	2.3E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.3E-08	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	4.3E-7	mg/m^3	6.4E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	6.4E-10	(mg/m^3)	5.0E-05	(mg/m^3)	0.00001
				MERCURY	2.5E-10	mg/m^3	3.7E-14	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	3.7E-13	(mg/m^3)	3.0E-05	(mg/m^3)	1.2E-8
			Exp. Route Total								4.7E-10					0.00002
		Exposure Point Total									4.7E-10					0.00002
	Exposure Medium Total										4.7E-10					0.00002
Medium Total											1.9E-07					0.004
										Total of Receptor Risks Across All Media	1.9E-07			Total of Receptor Hazards Across All Media		0.004

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.5.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	0.90	mg/kg	7.1E-07	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	5.2E-06	3.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	0.35	mg/kg	4.3E-08	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	1.5E-08	1.5E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.003
				GAMMA-CHLORDANE	0.28	mg/kg	3.4E-08	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	1.2E-08	1.2E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.002
				HEPTACHLOR	0.024	mg/kg	2.9E-09	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.3E-08	1.0E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0002
				HEPTACHLOR EPOXIDE	0.009	mg/kg	1.1E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	9.6E-09	3.7E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.003
				ALUMINUM	5,966	mg/kg	7.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.03
				ARSENIC	9.1	mg/kg	6.6E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.0E-06	2.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				BARIUM	72	mg/kg	8.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.1E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.002
				CHROMIUM VI	12.4	mg/kg	9.8E-06	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	4.9E-06	5.3E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.02
				COBALT	7.1	mg/kg	8.7E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				IRON	13,028	mg/kg	1.6E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.6E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.08
				MANGANESE	446	mg/kg	5.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.08
				MERCURY	0.177	mg/kg	2.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.6E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.003
			Exp. Route Total								1.1E-05					0.4
			Dermal	BENZO(A)PYRENE EQUIVALENTS	0.90	mg/kg	1.0E-07	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	7.6E-07	5.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	0.35	mg/kg	4.8E-09	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	1.7E-09	1.7E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0003
				GAMMA-CHLORDANE	0.28	mg/kg	3.8E-09	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	1.3E-09	1.3E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0003
				HEPTACHLOR	0.024	mg/kg	3.3E-10	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.5E-09	1.1E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00002
				HEPTACHLOR EPOXIDE	0.009	mg/kg	1.2E-10	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.1E-09	4.1E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0003
				ALUMINUM	5,966	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ARSENIC	9.1	mg/kg	3.7E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	5.6E-08	1.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.004
				BARIUM	72	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CHROMIUM VI	12.4	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				COBALT	7.1	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				IRON	13,028	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	446	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	0.177	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								8.2E-07					0.005
		Exposure Point Total									1.2E-05					0.4
	Exposure Medium Total										1.2E-05					0.4
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	6.8E-10	mg/m^3	8.1E-11	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	8.9E-11	4.4E-10	(mg/m^3)	NA	(mg/m^3)	--
				ALPHA-CHLORDANE	2.7E-10	mg/m^3	4.9E-12	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	4.9E-13	1.7E-10	(mg/m^3)	7.0E-04	(mg/m^3)	2.4E-7
				GAMMA-CHLORDANE	2.1E-10	mg/m^3	3.9E-12	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	3.9E-13	1.4E-10	(mg/m^3)	7.0E-04	(mg/m^3)	1.9E-7
				HEPTACHLOR	1.8E-11	mg/m^3	3.3E-13	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	4.3E-13	1.2E-11	(mg/m^3)	NA	(mg/m^3)	--
				HEPTACHLOR EPOXIDE	6.5E-12	mg/m^3	1.2E-13	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	3.1E-13	4.2E-12	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	4.5E-6	mg/m^3	8.3E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.9E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.0006
				ARSENIC	6.9E-9	mg/m^3	1.3E-10	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	5.4E-10	4.4E-09	(mg/m^3)	1.5E-05	(mg/m^3)	0.0003
				BARIUM	5.5E-8	mg/m^3	1.0E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	3.5E-08	(mg/m^3)	5.0E-04	(mg/m^3)	0.00007
				CHROMIUM VI	9.4E-9	mg/m^3	1.1E-09	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	9.4E-08	6.0E-09	(mg/m^3)	1.0E-04	(mg/m^3)	0.00006
				COBALT	5.4E-9	mg/m^3	9.8E-11	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	8.9E-10	3.4E-09	(mg/m^3)	6.0E-06	(mg/m^3)	0.0006
				IRON	9.9E-6	mg/m^3	1.8E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	6.3E-06	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	3.4E-7	mg/m^3	6.2E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.2E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.004
				MERCURY	1.3E-10	mg/m^3	2.5E-12	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	8.6E-11	(mg/m^3)	3.0E-05	(mg/m^3)	0.000003
			Exp. Route Total								9.5E-08					0.006
		Exposure Point Total									9.5E-08					0.006
	Exposure Medium Total										9.5E-08					0.006
Medium Total											1.2E-05					0.4
Subsurface Soil	Subsurface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	1.78	mg/kg	1.4E-06	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	1.0E-05	7.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				NAPHTHALENE	0.128	mg/kg	1.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.00003
				AROCLOR-1254	0.197	mg/kg	2.4E-08	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	4.8E-08	8.4E-07	(mg/kg/day)	2.0E-05	(mg/kg/day)	0.04
				ALUMINUM	6,717	mg/kg	8.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.9E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.03
				ANTIMONY	0.950	mg/kg	1.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.1E-06	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.01
				ARSENIC	11.6	mg/kg	8.5E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.3E-06	3.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				BARIUM	120	mg/kg	1.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.1E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.003
				CADMIUM	1.82	mg/kg	2.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.8E-06	(mg/kg/day)	1.0E-03	(mg/kg/day)	0.008
				CHROMIUM VI	20.6	mg/kg	1.6E-05	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	8.2E-06	8.8E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.03
				COBALT	8.45	mg/kg	1.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.6E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1

TABLE 7.5.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				COPPER	105	mg/kg	1.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.5E-04	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.01
				IRON	15,600	mg/kg	1.9E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.7E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.10
				MANGANESE	461	mg/kg	5.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.08
				MERCURY	0.450	mg/kg	5.5E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.006
			Exp. Route Total								2.0E-05					0.5
			Dermal	BENZO(A)PYRENE EQUIVALENTS	1.78	mg/kg	2.1E-07	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	1.5E-06	1.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				NAPHTHALENE	0.128	mg/kg	2.3E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.0E-08	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.000004
				AROCLOR-1254	0.197	mg/kg	3.8E-09	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	7.5E-09	1.3E-07	(mg/kg/day)	2.0E-05	(mg/kg/day)	0.007
				ALUMINUM	6,717	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ANTIMONY	0.950	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	6.0E-05	(mg/kg/day)	--
				ARSENIC	11.6	mg/kg	4.8E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	7.1E-08	1.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.006
				BARIUM	120	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CADMIUM	1.82	mg/kg	2.5E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.7E-09	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.0003
				CHROMIUM VI	20.6	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				COBALT	8.45	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				COPPER	105	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	4.0E-02	(mg/kg/day)	--
				IRON	15,600	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	461	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	0.450	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								1.6E-06					0.01
		Exposure Point Total									2.1E-05					0.5
	Exposure Medium Total										2.1E-05					0.5
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	1.3E-9	mg/m^3	1.6E-10	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	1.8E-10	8.6E-10	(mg/m^3)	NA	(mg/m^3)	--
				NAPHTHALENE	1.9E-6	mg/m^3	3.5E-08	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	1.2E-09	1.2E-06	(mg/m^3)	3.0E-03	(mg/m^3)	0.0004
				AROCLOR-1254	1.5E-10	mg/m^3	2.7E-12	(mg/m^3)	5.7E-04	$(ug/m^3)^{-1}$	1.6E-12	9.6E-11	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	5.1E-6	mg/m^3	9.3E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	3.3E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.0007
				ANTIMONY	7.2E-10	mg/m^3	1.3E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	4.6E-10	(mg/m^3)	NA	(mg/m^3)	--
				ARSENIC	8.8E-9	mg/m^3	1.6E-10	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	6.9E-10	5.6E-09	(mg/m^3)	1.5E-05	(mg/m^3)	0.0004
				BARIUM	9.1E-8	mg/m^3	1.7E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	5.8E-08	(mg/m^3)	5.0E-04	(mg/m^3)	0.0001
				CADMIUM	1.4E-9	mg/m^3	2.5E-11	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	4.5E-11	8.8E-10	(mg/m^3)	2.0E-05	(mg/m^3)	0.00004
				CHROMIUM VI	1.6E-8	mg/m^3	1.9E-09	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	1.6E-07	1.0E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.0001
				COBALT	6.4E-9	mg/m^3	1.2E-10	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	1.1E-09	4.1E-09	(mg/m^3)	6.0E-06	(mg/m^3)	0.0007
				COPPER	8.0E-8	mg/m^3	1.5E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	5.1E-08	(mg/m^3)	NA	(mg/m^3)	--
				IRON	1.2E-5	mg/m^3	2.2E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	7.6E-06	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	3.5E-7	mg/m^3	6.4E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.2E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.004
				MERCURY	3.4E-10	mg/m^3	6.2E-12	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.2E-10	(mg/m^3)	3.0E-05	(mg/m^3)	0.000007
			Exp. Route Total								1.6E-07					0.007
		Exposure Point Total									1.6E-07					0.007
	Exposure Medium Total										1.6E-07					0.007
Medium Total											2.2E-05					0.6
										Total of Receptor Risks Across All Media	3.4E-05			Total of Receptor Hazards Across All Media		1.0

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.6.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	0.90	mg/kg	6.5E-08	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	4.7E-07	4.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	0.35	mg/kg	1.6E-08	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	5.7E-09	1.6E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0003
				GAMMA-CHLORDANE	0.28	mg/kg	1.3E-08	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	4.5E-09	1.3E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0003
				HEPTACHLOR	0.024	mg/kg	1.1E-09	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	4.9E-09	1.1E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00002
				HEPTACHLOR EPOXIDE	0.009	mg/kg	3.9E-10	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	3.6E-09	3.9E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0003
				ALUMINUM	5,966	mg/kg	2.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
				ARSENIC	9.1	mg/kg	2.5E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.7E-07	2.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				BARIUM	72	mg/kg	3.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.3E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0002
				CHROMIUM VI	12.4	mg/kg	8.9E-07	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	4.5E-07	5.7E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002
				COBALT	7.1	mg/kg	3.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				IRON	13,028	mg/kg	6.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.0E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.009
				MANGANESE	446	mg/kg	2.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.009
				MERCURY	0.177	mg/kg	8.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.1E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0003
			Exp. Route Total								1.3E-06					0.04
			Dermal	BENZO(A)PYRENE EQUIVALENTS	0.90	mg/kg	9.6E-09	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	7.0E-08	6.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				ALPHA-CHLORDANE	0.35	mg/kg	1.8E-09	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	6.4E-10	1.8E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00004
				GAMMA-CHLORDANE	0.28	mg/kg	1.5E-09	(mg/kg/day)	3.5E-01	$(mg/kg/day)^{-1}$	5.1E-10	1.5E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.00003
				HEPTACHLOR	0.024	mg/kg	1.3E-10	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	5.6E-10	1.3E-09	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.000003
				HEPTACHLOR EPOXIDE	0.009	mg/kg	4.5E-11	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	4.1E-10	4.5E-10	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.00003
				ALUMINUM	5,966	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ARSENIC	9.1	mg/kg	1.4E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.1E-08	1.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0005
				BARIUM	72	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CHROMIUM VI	12.4	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				COBALT	7.1	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				IRON	13,028	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	446	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	0.177	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								9.3E-08					0.0006
		Exposure Point Total									1.4E-06					0.04
	Exposure Medium Total										1.4E-06					0.04
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	6.8E-10	mg/m^3	6.8E-11	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	7.5E-11	4.4E-10	(mg/m^3)	NA	(mg/m^3)	--
				ALPHA-CHLORDANE	2.7E-10	mg/m^3	1.7E-11	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	1.7E-12	1.7E-10	(mg/m^3)	7.0E-04	(mg/m^3)	2.4E-7
				GAMMA-CHLORDANE	2.1E-10	mg/m^3	1.4E-11	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	1.4E-12	1.4E-10	(mg/m^3)	7.0E-04	(mg/m^3)	1.9E-7
				HEPTACHLOR	1.8E-11	mg/m^3	1.2E-12	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	1.5E-12	1.2E-11	(mg/m^3)	NA	(mg/m^3)	--
				HEPTACHLOR EPOXIDE	6.5E-12	mg/m^3	4.2E-13	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	1.1E-12	4.2E-12	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	4.5E-6	mg/m^3	2.9E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.9E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.0006
				ARSENIC	6.9E-9	mg/m^3	4.4E-10	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	1.9E-09	4.4E-09	(mg/m^3)	1.5E-05	(mg/m^3)	0.0003
				BARIUM	5.5E-8	mg/m^3	3.5E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	3.5E-08	(mg/m^3)	5.0E-04	(mg/m^3)	0.00007
				CHROMIUM VI	9.4E-9	mg/m^3	9.5E-10	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	7.9E-08	6.0E-09	(mg/m^3)	1.0E-04	(mg/m^3)	0.00006
				COBALT	5.4E-9	mg/m^3	3.4E-10	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	3.1E-09	3.4E-09	(mg/m^3)	6.0E-06	(mg/m^3)	0.0006
				IRON	9.9E-6	mg/m^3	6.3E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	6.3E-06	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	3.4E-7	mg/m^3	2.2E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.2E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.004
				MERCURY	1.3E-10	mg/m^3	8.6E-12	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	8.6E-11	(mg/m^3)	3.0E-05	(mg/m^3)	0.000003
			Exp. Route Total								8.5E-08					0.006
		Exposure Point Total									8.5E-08					0.006
	Exposure Medium Total										8.5E-08					0.006
Medium Total											1.5E-06					0.05
Subsurface Soil	Subsurface Soil	Site 12	Ingestion	BENZO(A)PYRENE EQUIVALENTS	1.78	mg/kg	1.3E-07	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	9.3E-07	8.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				NAPHTHALENE	0.128	mg/kg	5.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.9E-08	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.000003
				AROCLOR-1254	0.197	mg/kg	9.0E-09	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	1.8E-08	9.0E-08	(mg/kg/day)	2.0E-05	(mg/kg/day)	0.005
				ALUMINUM	6,717	mg/kg	3.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.1E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.003
				ANTIMONY	0.950	mg/kg	4.4E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.4E-07	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.001
				ARSENIC	11.6	mg/kg	3.2E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	4.8E-07	3.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				BARIUM	120	mg/kg	5.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0003
				CADMIUM	1.82	mg/kg	8.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.3E-07	(mg/kg/day)	1.0E-03	(mg/kg/day)	0.0008
				CHROMIUM VI	20.6	mg/kg	1.5E-06	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	7.4E-07	9.4E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.003
				COBALT	8.45	mg/kg	3.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01

TABLE 7.6.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				COPPER	105	mg/kg	4.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.8E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.001
				IRON	15,600	mg/kg	7.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
				MANGANESE	461	mg/kg	2.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.009
				MERCURY	0.450	mg/kg	2.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0007
			Exp. Route Total								2.2E-06					0.06
			Dermal	BENZO(A)PYRENE EQUIVALENTS	1.78	mg/kg	1.9E-08	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	1.4E-07	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				NAPHTHALENE	0.128	mg/kg	8.7E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.7E-09	(mg/kg/day)	2.0E-02	(mg/kg/day)	4.3E-7
				AROCLOR-1254	0.197	mg/kg	1.4E-09	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	2.9E-09	1.4E-08	(mg/kg/day)	2.0E-05	(mg/kg/day)	0.0007
				ALUMINUM	6,717	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	--
				ANTIMONY	0.950	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	6.0E-05	(mg/kg/day)	--
				ARSENIC	11.6	mg/kg	1.8E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.7E-08	1.8E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0006
				BARIUM	120	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.4E-02	(mg/kg/day)	--
				CADMIUM	1.82	mg/kg	9.5E-11	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.5E-10	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.00004
				CHROMIUM VI	20.6	mg/kg	0.0E+00	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.5E-05	(mg/kg/day)	--
				COBALT	8.45	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				COPPER	105	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	4.0E-02	(mg/kg/day)	--
				IRON	15,600	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	--
				MANGANESE	461	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	9.6E-04	(mg/kg/day)	--
				MERCURY	0.450	mg/kg	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.1E-05	(mg/kg/day)	--
			Exp. Route Total								1.7E-07					0.001
		Exposure Point Total									2.3E-06					0.06
	Exposure Medium Total										2.3E-06					0.06
	Air	Site 12	Inhalation	BENZO(A)PYRENE EQUIVALENTS	1.3E-9	mg/m^3	1.4E-10	(mg/m^3)	1.1E-03	$(ug/m^3)^{-1}$	1.5E-10	8.6E-10	(mg/m^3)	NA	(mg/m^3)	--
				NAPHTHALENE	1.9E-6	mg/m^3	1.2E-07	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	4.2E-09	1.2E-06	(mg/m^3)	3.0E-03	(mg/m^3)	0.0004
				AROCLOR-1254	1.5E-10	mg/m^3	9.6E-12	(mg/m^3)	5.7E-04	$(ug/m^3)^{-1}$	5.5E-12	9.6E-11	(mg/m^3)	NA	(mg/m^3)	--
				ALUMINUM	5.1E-6	mg/m^3	3.3E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	3.3E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.0007
				ANTIMONY	7.2E-10	mg/m^3	4.6E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	4.6E-10	(mg/m^3)	NA	(mg/m^3)	--
				ARSENIC	8.8E-9	mg/m^3	5.6E-10	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	2.4E-09	5.6E-09	(mg/m^3)	1.5E-05	(mg/m^3)	0.0004
				BARIUM	9.1E-8	mg/m^3	5.8E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	5.8E-08	(mg/m^3)	5.0E-04	(mg/m^3)	0.0001
				CADMIUM	1.4E-9	mg/m^3	8.8E-11	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	1.6E-10	8.8E-10	(mg/m^3)	2.0E-05	(mg/m^3)	0.00004
				CHROMIUM VI	1.6E-8	mg/m^3	1.6E-09	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	1.3E-07	1.0E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.0001
				COBALT	6.4E-9	mg/m^3	4.1E-10	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	3.7E-09	4.1E-09	(mg/m^3)	6.0E-06	(mg/m^3)	0.0007
				COPPER	8.0E-8	mg/m^3	5.1E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	5.1E-08	(mg/m^3)	NA	(mg/m^3)	--
				IRON	1.2E-5	mg/m^3	7.6E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	7.6E-06	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	3.5E-7	mg/m^3	2.2E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.2E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.004
				MERCURY	3.4E-10	mg/m^3	2.2E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.2E-10	(mg/m^3)	3.0E-05	(mg/m^3)	0.000007
			Exp. Route Total								1.4E-07					0.007
		Exposure Point Total									1.4E-07					0.007
	Exposure Medium Total										1.4E-07					0.007
Medium Total											2.5E-06					0.07
										Total of Receptor Risks Across All Media	4.0E-06			Total of Receptor Hazards Across All Media		0.1

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

RAGS Part D Table 9

Summary Of Receptor Risks And Hazards For COPCs

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	8E-08	--	3E-08	--	1E-07	NA	--	--	--	--
			ALPHA-CHLORDANE	6E-09	--	2E-09	--	8E-09	Liver	0.02	--	0.005	0.02
			GAMMA-CHLORDANE	5E-09	--	2E-09	--	7E-09	Liver	0.01	--	0.004	0.02
			HEPTACHLOR	6E-09	--	2E-09	--	8E-09	Liver	0.002	--	0.0005	0.002
			HEPTACHLOR EPOXIDE	3E-09	--	1E-09	--	4E-09	Liver	0.02	--	0.005	0.02
			ALUMINUM	- -	--	- -	--	- -	CNS	0.03	--	--	0.03
			ARSENIC	8E-08	--	1E-08	--	1E-07	Skin, CVS	0.1	--	0.02	0.1
			BARIUM	- -	--	- -	--	- -	Kidney	0.004	--	--	0.004
			CHROMIUM VI	7E-08	--	- -	--	7E-08	None Specified	0.004	--	--	0.004
			COBALT	- -	--	- -	--	- -	Thyroid	0.01	--	--	0.01
			IRON	- -	--	- -	--	- -	GS	0.10	--	--	0.10
			MANGANESE	- -	--	- -	--	- -	CNS	0.10	--	--	0.10
			MERCURY	- -	--	- -	--	- -	CNS	0.007	--	--	0.007
			Chemical Total	3E-07	--	5E-08	--	3E-07		0.4	--	0.03	0.5
		Exposure Point Total						3E-07					0.5
	Exposure Medium Total							3E-07					0.5
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	7E-12	--	--	7E-12	NA	--	--	--	--
			ALPHA-CHLORDANE	--	1E-12	--	--	1E-12	Liver	--	0.000009	--	0.000009
			GAMMA-CHLORDANE	--	8E-13	--	--	8E-13	Liver	--	0.000007	--	0.000007
			HEPTACHLOR	--	1E-12	--	--	1E-12	NA	--	--	--	--
			HEPTACHLOR EPOXIDE	--	5E-13	--	--	5E-13	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.004	--	0.004
			ARSENIC	--	2E-10	--	--	2E-10	NA	--	0.002	--	0.002
			BARIUM	--	- -	--	--	- -	Fetotoxicity	--	0.00009	--	0.00009
			CHROMIUM VI	--	6E-09	--	--	6E-09	Respiratory	--	0.0005	--	0.0005
			COBALT	--	3E-10	--	--	3E-10	Respiratory	--	0.001	--	0.001
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.03	--	0.03
			MERCURY	--	- -	--	--	- -	CNS	--	0.00004	--	0.00004
			Chemical Total	--	7E-09	--	--	7E-09		- -	0.03	- -	0.03
		Exposure Point Total						7E-09					0.03
	Exposure Medium Total							7E-09					0.03
Medium Total								3E-07					0.5
Subsurface Soil	Subsurface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	4E-07	--	2E-07	--	6E-07	NA	--	--	--	--
			NAPHTHALENE	- -	--	- -	--	- -	Body Weight	0.000002	--	0.0000010	0.000003
			AROCLOR-1254	9E-09	--	4E-09	--	1E-08	CNS	0.09	--	0.04	0.1
			ALUMINUM	- -	--	- -	--	- -	CNS	0.04	--	--	0.04
			ANTIMONY	- -	--	- -	--	- -	Blood	0.04	--	--	0.04
			ARSENIC	1E-07	--	2E-08	--	1E-07	Skin, CVS	0.2	--	0.03	0.2
			BARIUM	- -	--	- -	--	- -	Kidney	0.007	--	--	0.007
			CADMIUM	- -	--	- -	--	- -	Kidney	0.02	--	0.003	0.03
			CHROMIUM VI	2E-07	--	- -	--	2E-07	None Specified	0.01	--	--	0.01
			COBALT	- -	--	- -	--	- -	Thyroid	0.02	--	--	0.02
			COPPER	- -	--	- -	--	- -	GS	0.03	--	--	0.03
			IRON	- -	--	- -	--	- -	GS	0.2	--	--	0.2
			MANGANESE	- -	--	- -	--	- -	CNS	0.1	--	--	0.1
			MERCURY	- -	--	- -	--	- -	CNS	0.02	--	--	0.02
			Chemical Total	7E-07	--	2E-07	--	9E-07		0.7	--	0.07	0.8
		Exposure Point Total						9E-07					0.8
	Exposure Medium Total							9E-07					0.8
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	4E-11	--	--	4E-11	NA	--	--	--	--
			NAPHTHALENE	--	9E-11	--	--	9E-11	Respiratory	--	0.0006	--	0.0006

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
			AROCLOR-1254	--	1E-12	--	--	1E-12	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.004	--	0.004
			ANTIMONY	--	- -	--	--	- -	NA	--	--	--	--
			ARSENIC	--	3E-10	--	--	3E-10	NA	--	0.003	--	0.003
			BARIUM	--	- -	--	--	- -	Fetotoxicity	--	0.0002	--	0.0002
			CADMIUM	--	4E-11	--	--	4E-11	Kidney, Respiratory	--	0.0007	--	0.0007
			CHROMIUM VI	--	2E-08	--	--	2E-08	Respiratory	--	0.001	--	0.001
			COBALT	--	5E-10	--	--	5E-10	Respiratory	--	0.002	--	0.002
			COPPER	--	- -	--	--	- -	NA	--	--	--	--
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.03	--	0.03
			MERCURY	--	- -	--	--	- -	CNS	--	0.0001	--	0.0001
			Chemical Total	--	2E-08	--	--	2E-08		- -	0.04	- -	0.04
		Exposure Point Total						2E-08					0.04
	Exposure Medium Total							2E-08					0.04
Medium Total								9E-07					0.8
Receptor Total							Receptor Risk Total	1E-06				Receptor HI Total	1

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Blood HI	0.04
Total Body Weight HI	0.000003
Total CNS HI	0.5
Total CVS HI	0.3
Total Fetotoxicity HI	0.0003
Total GS HI	0.3
Total Kidney HI	0.04
Total Liver HI	0.07
Total Respiratory HI	0.006
Total None Specified HI	0.01
Total Skin HI	0.3
Total Thyroid HI	0.03

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Current
Receptor Population: Occupational/Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	3E-06	--	3E-06	--	6E-06	NA	--	--	--	--
			ALPHA-CHLORDANE	4E-07	--	3E-07	--	7E-07	Liver	0.006	--	0.004	0.01
			GAMMA-CHLORDANE	3E-07	--	2E-07	--	5E-07	Liver	0.005	--	0.003	0.008
			HEPTACHLOR	1E-07	--	7E-08	--	2E-07	Liver	0.0001	--	0.00009	0.0002
			HEPTACHLOR EPOXIDE	6E-08	--	4E-08	--	1E-07	Liver	0.002	--	0.0010	0.002
			ALUMINUM	- -	--	- -	--	- -	CNS	0.010	--	--	0.010
			ARSENIC	4E-06	--	1E-06	--	5E-06	Skin, CVS	0.02	--	0.007	0.03
			BARIUM	- -	--	- -	--	- -	Kidney	0.0007	--	--	0.0007
			CHROMIUM VI	3E-06	--	- -	--	3E-06	None Specified	0.005	--	--	0.005
			COBALT	- -	--	- -	--	- -	Thyroid	0.04	--	--	0.04
			IRON	- -	--	- -	--	- -	GS	0.03	--	--	0.03
			MANGANESE	- -	--	- -	--	- -	CNS	0.02	--	--	0.02
			MERCURY	- -	--	- -	--	- -	CNS	0.001	--	--	0.001
			Chemical Total	1E-05	--	5E-06	--	2E-05		0.1	--	0.02	0.2
		Exposure Point Total						2E-05					0.2
	Exposure Medium Total							2E-05					0.2
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	1E-10	--	--	1E-10	NA	--	--	--	--
			ALPHA-CHLORDANE	--	2E-11	--	--	2E-11	Liver	--	0.0000008	--	0.0000008
			GAMMA-CHLORDANE	--	2E-11	--	--	2E-11	Liver	--	0.0000007	--	0.0000007
			HEPTACHLOR	--	6E-12	--	--	6E-12	NA	--	--	--	--
			HEPTACHLOR EPOXIDE	--	3E-12	--	--	3E-12	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.0004	--	0.0004
			ARSENIC	--	3E-09	--	--	3E-09	NA	--	0.0001	--	0.0001
			BARIUM	--	- -	--	--	- -	CVS	--	0.00005	--	0.00005
			CHROMIUM VI	--	9E-08	--	--	9E-08	Respiratory	--	0.00003	--	0.00003
			COBALT	--	7E-09	--	--	7E-09	Respiratory	--	0.0003	--	0.0003
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.002	--	0.002
			MERCURY	--	- -	--	--	- -	CNS	--	0.000002	--	0.000002
			Chemical Total	--	1E-07	--	--	1E-07		- -	0.003	- -	0.003
		Exposure Point Total						1E-07					0.003
	Exposure Medium Total							1E-07					0.003
Medium Total								2E-05					0.2
Subsurface Soil	Subsurface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	2E-05	--	1E-05	--	3E-05	NA	--	--	--	--
			NAPHTHALENE	- -	--	- -	--	- -	Body Weight	0.00002	--	0.00001	0.00003
			AROCLOR-1254	6E-07	--	6E-07	--	1E-06	Immune	0.04	--	0.04	0.08
			ALUMINUM	- -	--	- -	--	- -	CNS	0.009	--	--	0.009
			ANTIMONY	- -	--	- -	--	- -	Blood	0.004	--	--	0.004
			ARSENIC	5E-06	--	2E-06	--	6E-06	Skin, CVS	0.03	--	0.010	0.04
			BARIUM	- -	--	- -	--	- -	Kidney	0.001	--	--	0.001
			CADMIUM	- -	--	- -	--	- -	Kidney	0.004	--	0.001	0.005
			CHROMIUM VI	5E-06	--	- -	--	5E-06	None Specified	0.01	--	--	0.01
			COBALT	- -	--	- -	--	- -	Thyroid	0.04	--	--	0.04
			COPPER	- -	--	- -	--	- -	GS	0.005	--	--	0.005
			IRON	- -	--	- -	--	- -	GS	0.03	--	--	0.03
			MANGANESE	- -	--	- -	--	- -	CNS	0.02	--	--	0.02
			MERCURY	- -	--	- -	--	- -	CNS	0.004	--	--	0.004
			Chemical Total	3E-05	--	2E-05	--	4E-05		0.2	--	0.05	0.3
		Exposure Point Total						4E-05					0.3
	Exposure Medium Total							4E-05					0.3

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Current
Receptor Population: Occupational/Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	5E-10	--	--	5E-10	NA	--	--	--	--
			NAPHTHALENE	--	1E-08	--	--	1E-08	Respiratory	--	0.0004	--	0.0004
			AROCLOR-1254	--	3E-11	--	--	3E-11	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.0003	--	0.0003
			ANTIMONY	--	- -	--	--	- -	NA	--	--	--	--
			ARSENIC	--	4E-09	--	--	4E-09	NA	--	0.0002	--	0.0002
			BARIUM	--	- -	--	--	- -	CVS	--	0.00009	--	0.00009
			CADMIUM	--	5E-10	--	--	5E-10	Kidney, Respiratory	--	0.00004	--	0.00004
			CHROMIUM VI	--	2E-07	--	--	2E-07	Respiratory	--	0.00006	--	0.00006
			COBALT	--	7E-09	--	--	7E-09	Respiratory	--	0.0003	--	0.0003
			COPPER	--	- -	--	--	- -	NA	--	--	--	--
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.002	--	0.002
			MERCURY	--	- -	--	--	- -	CNS	--	0.000007	--	0.000007
			Chemical Total	--	2E-07	--	--	2E-07		- -	0.004	- -	0.004
		Exposure Point Total						2E-07					0.004
	Exposure Medium Total							2E-07					0.004
Medium Total								4E-05					0.3
Receptor Total							Receptor Risk Total	6E-05				Receptor HI Total	0.4

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Blood HI	0.004
Total Body Weight HI	0.00003
Total CNS HI	0.08
Total CVS HI	0.1
Total GS HI	0.06
Total Immune HI	0.08
Total Kidney HI	0.007
Total Liver HI	0.02
Total Respiratory HI	0.001
Total None Specified HI	0.02
Total Skin HI	0.1
Total Thyroid HI	0.07

TABLE 9.3.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	7E-07	--	6E-07	--	1E-06	NA	--	--	--	--
			ALPHA-CHLORDANE	3E-08	--	2E-08	--	5E-08	Liver	0.001	--	0.0007	0.002
			GAMMA-CHLORDANE	2E-08	--	1E-08	--	4E-08	Liver	0.0009	--	0.0006	0.001
			HEPTACHLOR	8E-09	--	5E-09	--	1E-08	Liver	0.00002	--	0.00002	0.00004
			HEPTACHLOR EPOXIDE	4E-09	--	3E-09	--	7E-09	Liver	0.0003	--	0.0002	0.0004
			ALUMINUM	- -	--	- -	--	- -	CNS	0.002	--	--	0.002
			ARSENIC	2E-07	--	8E-08	--	3E-07	Skin, CVS	0.004	--	0.001	0.005
			BARIUM	- -	--	- -	--	- -	Kidney	0.0001	--	--	0.0001
			CHROMIUM VI	6E-07	--	- -	--	6E-07	None Specified	0.0009	--	--	0.0009
			COBALT	- -	--	- -	--	- -	Thyroid	0.006	--	--	0.006
			IRON	- -	--	- -	--	- -	GS	0.005	--	--	0.005
			MANGANESE	- -	--	- -	--	- -	CNS	0.004	--	--	0.004
			MERCURY	- -	--	- -	--	- -	CNS	0.0002	--	--	0.0002
			Chemical Total	2E-06	--	7E-07	--	2E-06		0.02	--	0.003	0.03
		Exposure Point Total						2E-06					0.03
	Exposure Medium Total							2E-06					0.03
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	3E-12	--	--	3E-12	NA	--	--	--	--
			ALPHA-CHLORDANE	--	2E-13	--	--	2E-13	Liver	--	2E-8	--	2E-8
			GAMMA-CHLORDANE	--	2E-13	--	--	2E-13	Liver	--	2E-8	--	2E-8
			HEPTACHLOR	--	6E-14	--	--	6E-14	NA	--	--	--	--
			HEPTACHLOR EPOXIDE	--	3E-14	--	--	3E-14	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.000009	--	0.000009
			ARSENIC	--	3E-11	--	--	3E-11	NA	--	0.000003	--	0.000003
			BARIUM	--	- -	--	--	- -	CVS	--	0.000001	--	0.000001
			CHROMIUM VI	--	3E-09	--	--	3E-09	Respiratory	--	0.0000007	--	0.0000007
			COBALT	--	6E-11	--	--	6E-11	Respiratory	--	0.000008	--	0.000008
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.00005	--	0.00005
			MERCURY	--	- -	--	--	- -	CNS	--	5E-8	--	5E-8
			Chemical Total	--	3E-09	--	--	3E-09		- -	0.00007	- -	0.00007
		Exposure Point Total						3E-09					0.00007
	Exposure Medium Total							3E-09					0.00007
Medium Total								2E-06					0.03
Receptor Total							Receptor Risk Total	2E-06				Receptor HI Total	0.03

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total CNS HI	0.006
Total CVS HI	0.005
Total GS HI	0.005
Total Kidney HI	0.0001
Total Liver HI	0.004
Total Respiratory HI	0.000009
Total None Specified HI	0.0009
Total Skin HI	0.005
Total Thyroid HI	0.006

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	1E-06	--	9E-07	--	2E-06	NA	--	--	--	--
			ALPHA-CHLORDANE	4E-08	--	3E-08	--	7E-08	Liver	0.0007	--	0.0004	0.001
			GAMMA-CHLORDANE	3E-08	--	2E-08	--	5E-08	Liver	0.0005	--	0.0003	0.0009
			HEPTACHLOR	1E-08	--	7E-09	--	2E-08	Liver	0.00001	--	0.000010	0.00002
			HEPTACHLOR EPOXIDE	6E-09	--	4E-09	--	1E-08	Liver	0.0002	--	0.0001	0.0003
			ALUMINUM	- -	--	- -	--	- -	CNS	0.001	--	--	0.001
			ARSENIC	4E-07	--	1E-07	--	5E-07	Skin, CVS	0.002	--	0.0008	0.003
			BARIUM	- -	--	- -	--	- -	Kidney	0.00007	--	--	0.00007
			CHROMIUM VI	8E-07	--	- -	--	8E-07	None Specified	0.0005	--	--	0.0005
			COBALT	- -	--	- -	--	- -	Thyroid	0.004	--	--	0.004
			IRON	- -	--	- -	--	- -	GS	0.003	--	--	0.003
			MANGANESE	- -	--	- -	--	- -	CNS	0.002	--	--	0.002
			MERCURY	- -	--	- -	--	- -	CNS	0.0001	--	--	0.0001
			Chemical Total	2E-06	--	1E-06	--	3E-06		0.01	--	0.002	0.02
		Exposure Point Total						3E-06					0.02
	Exposure Medium Total							3E-06					0.02
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	7E-12	--	--	7E-12	NA	--	--	--	--
			ALPHA-CHLORDANE	--	5E-13	--	--	5E-13	Liver	--	2E-8	--	2E-8
			GAMMA-CHLORDANE	--	4E-13	--	--	4E-13	Liver	--	2E-8	--	2E-8
			HEPTACHLOR	--	1E-13	--	--	1E-13	NA	--	--	--	--
			HEPTACHLOR EPOXIDE	--	8E-14	--	--	8E-14	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.000009	--	0.000009
			ARSENIC	--	8E-11	--	--	8E-11	NA	--	0.000003	--	0.000003
			BARIUM	--	- -	--	--	- -	CVS	--	0.000001	--	0.000001
			CHROMIUM VI	--	6E-09	--	--	6E-09	Respiratory	--	0.0000007	--	0.0000007
			COBALT	--	2E-10	--	--	2E-10	Respiratory	--	0.000008	--	0.000008
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.00005	--	0.00005
			MERCURY	--	- -	--	--	- -	CNS	--	5E-8	--	5E-8
			Chemical Total	--	6E-09	--	--	6E-09		- -	0.00007	- -	0.00007
		Exposure Point Total						6E-09					0.00007
	Exposure Medium Total							6E-09					0.00007
Medium Total								3E-06					0.02
Receptor Total							Receptor Risk Total	3E-06				Receptor HI Total	0.02

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total CNS HI	0.004
Total CVS HI	0.003
Total GS HI	0.003
Total Kidney HI	0.00007
Total Liver HI	0.002
Total Respiratory HI	0.000009
Total None Specified HI	0.0005
Total Skin HI	0.003
Total Thyroid HI	0.004

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	9E-05	--	3E-05	--	1E-04	NA	--	--	--	--
			ALPHA-CHLORDANE	1E-06	--	3E-07	--	2E-06	Liver	0.08	--	0.02	0.1
			GAMMA-CHLORDANE	1E-06	--	3E-07	--	1E-06	Liver	0.07	--	0.02	0.09
			HEPTACHLOR	1E-06	--	3E-07	--	1E-06	Liver	0.006	--	0.002	0.008
			HEPTACHLOR EPOXIDE	6E-07	--	2E-07	--	8E-07	Liver	0.06	--	0.02	0.08
			ALUMINUM	- -	--	- -	--	- -	CNS	0.1	--	--	0.1
			ARSENIC	2E-05	--	2E-06	--	2E-05	Skin, CVS	0.4	--	0.06	0.5
			BARIUM	- -	--	- -	--	- -	Kidney	0.02	--	--	0.02
			CHROMIUM VI	7E-05	--	- -	--	7E-05	None Specified	0.1	--	--	0.1
			COBALT	- -	--	- -	--	- -	Thyroid	0.5	--	--	0.5
			IRON	- -	--	- -	--	- -	GS	0.4	--	--	0.4
			MANGANESE	- -	--	- -	--	- -	CNS	0.4	--	--	0.4
			MERCURY	- -	--	- -	--	- -	CNS	0.03	--	--	0.03
			Chemical Total	2E-04	--	4E-05	--	2E-04		2	--	0.1	2
		Exposure Point Total						2E-04					2
	Exposure Medium Total							2E-04					2
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	8E-10	--	--	8E-10	NA	--	--	--	--
			ALPHA-CHLORDANE	--	2E-11	--	--	2E-11	Liver	--	0.000003	--	0.000003
			GAMMA-CHLORDANE	--	2E-11	--	--	2E-11	Liver	--	0.000003	--	0.000003
			HEPTACHLOR	--	2E-11	--	--	2E-11	NA	--	--	--	--
			HEPTACHLOR EPOXIDE	--	1E-11	--	--	1E-11	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.001	--	0.001
			ARSENIC	--	5E-09	--	--	5E-09	NA	--	0.0008	--	0.0008
			BARIUM	--	- -	--	--	- -	CVS	--	0.0004	--	0.0004
			CHROMIUM VI	--	7E-07	--	--	7E-07	Respiratory	--	0.0002	--	0.0002
			COBALT	--	6E-09	--	--	6E-09	Respiratory	--	0.001	--	0.001
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.01	--	0.01
			MERCURY	--	- -	--	--	- -	CNS	--	0.00001	--	0.00001
			Chemical Total	--	7E-07	--	--	7E-07		- -	0.01	- -	0.01
		Exposure Point Total						7E-07					0.01
	Exposure Medium Total							7E-07					0.01
Medium Total								2E-04					2
Subsurface Soil	Subsurface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	5E-04	--	2E-04	--	6E-04	NA	--	--	--	--
			NAPHTHALENE	- -	--	- -	--	- -	Body Weight	0.0003	--	0.0001	0.0004
			AROCLOR-1254	2E-06	--	7E-07	--	2E-06	Immune	0.5	--	0.2	0.7
			ALUMINUM	- -	--	- -	--	- -	CNS	0.1	--	--	0.1
			ANTIMONY	- -	--	- -	--	- -	Blood	0.1	--	--	0.1
			ARSENIC	2E-05	--	3E-06	--	3E-05	Skin, CVS	1	--	0.09	1
			BARIUM	- -	--	- -	--	- -	Kidney	0.03	--	--	0.03
			CADMIUM	- -	--	- -	--	- -	Kidney	0.09	--	0.01	0.1
			CHROMIUM VI	2E-04	--	- -	--	2E-04	None Specified	0.3	--	--	0.3
			COBALT	- -	--	- -	--	- -	Thyroid	0.7	--	--	0.7
			COPPER	- -	--	- -	--	- -	GS	0.1	--	--	0.1
			IRON	- -	--	- -	--	- -	GS	0.6	--	--	0.6
			MANGANESE	- -	--	- -	--	- -	CNS	0.5	--	--	0.5
			MERCURY	- -	--	- -	--	- -	CNS	0.08	--	--	0.08
			Chemical Total	7E-04	--	2E-04	--	8E-04		4	--	0.3	4
		Exposure Point Total						8E-04					4
	Exposure Medium Total							8E-04					4

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	4E-09	--	--	4E-09	NA	--	--	--	--
			NAPHTHALENE	--	2E-08	--	--	2E-08	Respiratory	--	0.002	--	0.002
			AROCLOR-1254	--	3E-11	--	--	3E-11	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.002	--	0.002
			ANTIMONY	--	- -	--	--	- -	NA	--	--	--	--
			ARSENIC	--	7E-09	--	--	7E-09	NA	--	0.001	--	0.001
			BARIUM	--	- -	--	--	- -	CVS	--	0.0006	--	0.0006
			CADMIUM	--	8E-10	--	--	8E-10	Kidney, Respiratory	--	0.0003	--	0.0003
			CHROMIUM VI	--	2E-06	--	--	2E-06	Respiratory	--	0.0004	--	0.0004
			COBALT	--	1E-08	--	--	1E-08	Respiratory	--	0.002	--	0.002
			COPPER	--	- -	--	--	- -	NA	--	--	--	--
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.01	--	0.01
			MERCURY	--	- -	--	--	- -	CNS	--	0.00005	--	0.00005
			Chemical Total	--	2E-06	--	--	2E-06		- -	0.02	- -	0.02
		Exposure Point Total						2E-06					0.02
	Exposure Medium Total							2E-06					0.02
Medium Total								8E-04					4
Receptor Total							Receptor Risk Total	1E-03				Receptor HI Total	6

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Blood HI	0.1
Total Body Weight HI	0.0004
Total CNS HI	1
Total CVS HI	1
Total GS HI	1
Total Immune HI	0.7
Total Kidney HI	0.1
Total Liver HI	0.3
Total Respiratory HI	0.006
Total None Specified HI	0.4
Total Skin HI	1
Total Thyroid HI	1

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	1E-05	--	7E-06	--	2E-05	NA	--	--	--	--
			ALPHA-CHLORDANE	5E-07	--	2E-07	--	7E-07	Liver	0.009	--	0.004	0.01
			GAMMA-CHLORDANE	4E-07	--	2E-07	--	6E-07	Liver	0.007	--	0.003	0.010
			HEPTACHLOR	5E-07	--	2E-07	--	7E-07	Liver	0.0006	--	0.0003	0.0009
			HEPTACHLOR EPOXIDE	3E-07	--	1E-07	--	4E-07	Liver	0.007	--	0.003	0.009
			ALUMINUM	- -	--	- -	--	- -	CNS	0.01	--	--	0.01
			ARSENIC	7E-06	--	1E-06	--	9E-06	Skin, CVS	0.05	--	0.009	0.06
			BARIUM	- -	--	- -	--	- -	Kidney	0.002	--	--	0.002
			CHROMIUM VI	1E-05	--	- -	--	1E-05	None Specified	0.01	--	--	0.01
			COBALT	- -	--	- -	--	- -	Thyroid	0.05	--	--	0.05
			IRON	- -	--	- -	--	- -	GS	0.04	--	--	0.04
			MANGANESE	- -	--	- -	--	- -	CNS	0.04	--	--	0.04
			MERCURY	- -	--	- -	--	- -	CNS	0.003	--	--	0.003
			Chemical Total	3E-05	--	9E-06	--	4E-05		0.2	--	0.02	0.2
		Exposure Point Total						4E-05					0.2
	Exposure Medium Total							4E-05					0.2
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	1E-09	--	--	1E-09	NA	--	--	--	--
			ALPHA-CHLORDANE	--	8E-11	--	--	8E-11	Liver	--	0.000003	--	0.000003
			GAMMA-CHLORDANE	--	6E-11	--	--	6E-11	Liver	--	0.000003	--	0.000003
			HEPTACHLOR	--	8E-11	--	--	8E-11	NA	--	--	--	--
			HEPTACHLOR EPOXIDE	--	4E-11	--	--	4E-11	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.001	--	0.001
			ARSENIC	--	2E-08	--	--	2E-08	NA	--	0.0008	--	0.0008
			BARIUM	--	- -	--	--	- -	CVS	--	0.0004	--	0.0004
			CHROMIUM VI	--	9E-07	--	--	9E-07	Respiratory	--	0.0002	--	0.0002
			COBALT	--	3E-08	--	--	3E-08	Respiratory	--	0.001	--	0.001
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.01	--	0.01
			MERCURY	--	- -	--	--	- -	CNS	--	0.00001	--	0.00001
			Chemical Total	--	1E-06	--	--	1E-06		- -	0.01	- -	0.01
		Exposure Point Total						1E-06					0.01
	Exposure Medium Total							1E-06					0.01
Medium Total								4E-05					0.3
Subsurface Soil	Subsurface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	7E-05	--	3E-05	--	1E-04	NA	--	--	--	--
			NAPHTHALENE	- -	--	- -	--	- -	Body Weight	0.00003	--	0.00002	0.00005
			AROCLOR-1254	8E-07	--	4E-07	--	1E-06	Immune	0.05	--	0.03	0.09
			ALUMINUM	- -	--	- -	--	- -	CNS	0.02	--	--	0.02
			ANTIMONY	- -	--	- -	--	- -	Blood	0.01	--	--	0.01
			ARSENIC	1E-05	--	2E-06	--	1E-05	Skin, CVS	0.1	--	0.01	0.1
			BARIUM	- -	--	- -	--	- -	Kidney	0.003	--	--	0.003
			CADMIUM	- -	--	- -	--	- -	Kidney	0.01	--	0.002	0.01
			CHROMIUM VI	3E-05	--	- -	--	3E-05	None Specified	0.03	--	--	0.03
			COBALT	- -	--	- -	--	- -	Thyroid	0.08	--	--	0.08
			COPPER	- -	--	- -	--	- -	GS	0.01	--	--	0.01
			IRON	- -	--	- -	--	- -	GS	0.06	--	--	0.06
			MANGANESE	- -	--	- -	--	- -	CNS	0.05	--	--	0.05
			MERCURY	- -	--	- -	--	- -	CNS	0.009	--	--	0.009
			Chemical Total	1E-04	--	4E-05	--	1E-04		0.4	--	0.05	0.4
		Exposure Point Total						1E-04					0.4
	Exposure Medium Total							1E-04					0.4
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	5E-09	--	--	5E-09	NA	--	--	--	--
			NAPHTHALENE	--	7E-08	--	--	7E-08	Respiratory	--	0.002	--	0.002

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
			AROCLOR-1254	--	1E-10	--	--	1E-10	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.002	--	0.002
			ANTIMONY	--	- -	--	--	- -	NA	--	--	--	--
			ARSENIC	--	3E-08	--	--	3E-08	NA	--	0.001	--	0.001
			BARIUM	--	- -	--	--	- -	CVS	--	0.0006	--	0.0006
			CADMIUM	--	3E-09	--	--	3E-09	Kidney, Respiratory	--	0.0003	--	0.0003
			CHROMIUM VI	--	2E-06	--	--	2E-06	Respiratory	--	0.0004	--	0.0004
			COBALT	--	4E-08	--	--	4E-08	Respiratory	--	0.002	--	0.002
			COPPER	--	- -	--	--	- -	NA	--	--	--	--
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.01	--	0.01
			MERCURY	--	- -	--	--	- -	CNS	--	0.00005	--	0.00005
			Chemical Total	--	2E-06	--	--	2E-06		- -	0.02	- -	0.02
		Exposure Point Total						2E-06					0.02
	Exposure Medium Total							2E-06					0.02
Medium Total								1E-04					0.5
Receptor Total							Receptor Risk Total	2E-04				Receptor HI Total	0.7

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Blood HI	0.01
Total Body Weight HI	0.00005
Total CNS HI	0.2
Total CVS HI	0.1
Total GS HI	0.1
Total Immune HI	0.09
Total Kidney HI	0.02
Total Liver HI	0.03
Total Respiratory HI	0.006
Total None Specified HI	0.04
Total Skin HI	0.1
Total Thyroid HI	0.1

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	1E-04	--	4E-05	--	1E-04					
			ALPHA-CHLORDANE	2E-06	--	6E-07	--	2E-06					
			GAMMA-CHLORDANE	1E-06	--	4E-07	--	2E-06					
			HEPTACHLOR	2E-06	--	5E-07	--	2E-06					
			HEPTACHLOR EPOXIDE	9E-07	--	3E-07	--	1E-06					
			ALUMINUM	- -	--	- -	--	- -					
			ARSENIC	3E-05	--	4E-06	--	4E-05					
			BARIUM	- -	--	- -	--	- -					
			CHROMIUM VI	8E-05	--	- -	--	8E-05					
			COBALT	- -	--	- -	--	- -					
			IRON	- -	--	- -	--	- -					
			MANGANESE	- -	--	- -	--	- -					
			MERCURY	- -	--	- -	--	- -					
			Chemical Total	2E-04	--	4E-05	--	3E-04					
		Exposure Point Total						3E-04					
	Exposure Medium Total							3E-04					
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	2E-09	--	--	2E-09					
			ALPHA-CHLORDANE	--	1E-10	--	--	1E-10					
			GAMMA-CHLORDANE	--	8E-11	--	--	8E-11					
			HEPTACHLOR	--	1E-10	--	--	1E-10					
			HEPTACHLOR EPOXIDE	--	5E-11	--	--	5E-11					
			ALUMINUM	--	- -	--	--	- -					
			ARSENIC	--	2E-08	--	--	2E-08					
			BARIUM	--	- -	--	--	- -					
			CHROMIUM VI	--	2E-06	--	--	2E-06					
			COBALT	--	3E-08	--	--	3E-08					
			IRON	--	- -	--	--	- -					
			MANGANESE	--	- -	--	--	- -					
			MERCURY	--	- -	--	--	- -					
			Chemical Total	--	2E-06	--	--	2E-06					
		Exposure Point Total						2E-06					
	Exposure Medium Total							2E-06					
Medium Total								3E-04					
Subsurface Soil	Subsurface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	5E-04	--	2E-04	--	7E-04					
			NAPHTHALENE	- -	--	- -	--	- -					
			AROCLOR-1254	3E-06	--	1E-06	--	4E-06					
			ALUMINUM	- -	--	- -	--	- -					
			ANTIMONY	- -	--	- -	--	- -					
			ARSENIC	5E-05	--	6E-06	--	6E-05					
			BARIUM	- -	--	- -	--	- -					
			CADMIUM	- -	--	- -	--	- -					
			CHROMIUM VI	2E-04	--	- -	--	2E-04					
			COBALT	- -	--	- -	--	- -					
			COPPER	- -	--	- -	--	- -					
			IRON	- -	--	- -	--	- -					
			MANGANESE	- -	--	- -	--	- -					
			MERCURY	- -	--	- -	--	- -					
			Chemical Total	8E-04	--	2E-04	--	1E-03					
		Exposure Point Total						1E-03					
	Exposure Medium Total							1E-03					

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	9E-09	--	--	9E-09					
			NAPHTHALENE	--	9E-08	--	--	9E-08					
			AROCLOR-1254	--	1E-10	--	--	1E-10					
			ALUMINUM	--	- -	--	--	- -					
			ANTIMONY	--	- -	--	--	- -					
			ARSENIC	--	3E-08	--	--	3E-08					
			BARIUM	--	- -	--	--	- -					
			CADMIUM	--	4E-09	--	--	4E-09					
			CHROMIUM VI	--	4E-06	--	--	4E-06					
			COBALT	--	5E-08	--	--	5E-08					
			COPPER	--	- -	--	--	- -					
			IRON	--	- -	--	--	- -					
			MANGANESE	--	- -	--	--	- -					
			MERCURY	--	- -	--	--	- -					
			Chemical Total	--	4E-06	--	--	4E-06					
		Exposure Point Total						4E-06					
	Exposure Medium Total							4E-06					
Medium Total								1E-03					
Receptor Total							Receptor Risk Total	1E-03					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.1.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	2E-08	--	5E-09	--	2E-08	NA	--	--	--	--
			ALPHA-CHLORDANE	3E-10	--	7E-11	--	4E-10	Liver	0.0010	--	0.0002	0.001
			GAMMA-CHLORDANE	3E-10	--	5E-11	--	3E-10	Liver	0.0008	--	0.0002	0.0009
			HEPTACHLOR	3E-10	--	6E-11	--	4E-10	Liver	0.00008	--	0.00002	0.00010
			HEPTACHLOR EPOXIDE	2E-10	--	4E-11	--	3E-10	Liver	0.001	--	0.0002	0.001
			ALUMINUM	- -	--	- -	--	- -	CNS	0.01	--	--	0.01
			ARSENIC	2E-08	--	2E-09	--	2E-08	Skin, CVS	0.03	--	0.003	0.03
			BARIUM	- -	--	- -	--	- -	Kidney	0.0006	--	--	0.0006
			CHROMIUM VI	2E-08	--	- -	--	2E-08	None Specified	0.001	--	--	0.001
			COBALT	- -	--	- -	--	- -	Thyroid	0.004	--	--	0.004
			IRON	- -	--	- -	--	- -	GS	0.03	--	--	0.03
			MANGANESE	- -	--	- -	--	- -	CNS	0.03	--	--	0.03
			MERCURY	- -	--	- -	--	- -	CNS	0.0001	--	--	0.0001
			Chemical Total	6E-08	--	7E-09	--	7E-08		0.1	--	0.004	0.1
		Exposure Point Total						7E-08					0.1
	Exposure Medium Total							7E-08					0.1
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	2E-12	--	--	2E-12	NA	--	--	--	--
			ALPHA-CHLORDANE	--	6E-14	--	--	6E-14	Liver	--	0.0000005	--	0.0000005
			GAMMA-CHLORDANE	--	4E-14	--	--	4E-14	Liver	--	0.0000004	--	0.0000004
			HEPTACHLOR	--	5E-14	--	--	5E-14	NA	--	--	--	--
			HEPTACHLOR EPOXIDE	--	4E-14	--	--	4E-14	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.001	--	0.001
			ARSENIC	--	6E-11	--	--	6E-11	NA	--	0.0006	--	0.0006
			BARIUM	--	- -	--	--	- -	Fetotoxicity	--	0.00001	--	0.00001
			CHROMIUM VI	--	2E-09	--	--	2E-09	Respiratory	--	0.0001	--	0.0001
			COBALT	--	1E-10	--	--	1E-10	Respiratory	--	0.0003	--	0.0003
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.009	--	0.009
			MERCURY	--	- -	--	--	- -	CNS	--	0.000006	--	0.000006
			Chemical Total	--	2E-09	--	--	2E-09		- -	0.01	- -	0.01
		Exposure Point Total						2E-09					0.01
	Exposure Medium Total							2E-09					0.01
Medium Total								7E-08					0.1
Subsurface Soil	Subsurface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	4E-08	--	9E-09	--	5E-08	NA	--	--	--	--
			NAPHTHALENE	- -	--	- -	--	- -	Body Weight	0.0000004	--	9E-8	0.0000005
			AROCLOR-1254	1E-09	--	3E-10	--	1E-09	CNS	0.01	--	0.003	0.01
			ALUMINUM	- -	--	- -	--	- -	CNS	0.01	--	--	0.01
			ANTIMONY	- -	--	- -	--	- -	Blood	0.004	--	--	0.004
			ARSENIC	3E-08	--	3E-09	--	3E-08	Skin, CVS	0.04	--	0.004	0.04
			BARIUM	- -	--	- -	--	- -	Kidney	0.001	--	--	0.001
			CADMIUM	- -	--	- -	--	- -	Kidney	0.003	--	0.0002	0.003
			CHROMIUM VI	3E-08	--	- -	--	3E-08	None Specified	0.002	--	--	0.002
			COBALT	- -	--	- -	--	- -	Thyroid	0.005	--	--	0.005
			COPPER	- -	--	- -	--	- -	GS	0.004	--	--	0.004
			IRON	- -	--	- -	--	- -	GS	0.04	--	--	0.04
			MANGANESE	- -	--	- -	--	- -	CNS	0.03	--	--	0.03
			MERCURY	- -	--	- -	--	- -	CNS	0.0004	--	--	0.0004
			Chemical Total	9E-08	--	1E-08	--	1E-07		0.2	--	0.007	0.2
		Exposure Point Total						1E-07					0.2
	Exposure Medium Total							1E-07					0.2
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	3E-12	--	--	3E-12	NA	--	--	--	--
			NAPHTHALENE	--	1E-11	--	--	1E-11	Respiratory	--	0.00008	--	0.00008

TABLE 9.1.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
			AROCLOR-1254	--	2E-13	--	--	2E-13	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.001	--	0.001
			ANTIMONY	--	- -	--	--	- -	NA	--	--	--	--
			ARSENIC	--	8E-11	--	--	8E-11	NA	--	0.0007	--	0.0007
			BARIUM	--	- -	--	--	- -	Fetotoxicity	--	0.00002	--	0.00002
			CADMIUM	--	5E-12	--	--	5E-12	Kidney, Respiratory	--	0.00009	--	0.00009
			CHROMIUM VI	--	3E-09	--	--	3E-09	Respiratory	--	0.0002	--	0.0002
			COBALT	--	1E-10	--	--	1E-10	Respiratory	--	0.0004	--	0.0004
			COPPER	--	- -	--	--	- -	NA	--	--	--	--
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.009	--	0.009
			MERCURY	--	- -	--	--	- -	CNS	--	0.00001	--	0.00001
			Chemical Total	--	3E-09	--	--	3E-09		- -	0.01	- -	0.01
		Exposure Point Total						3E-09					0.01
	Exposure Medium Total							3E-09					0.01
Medium Total								1E-07					0.2
Receptor Total							Receptor Risk Total	2E-07				Receptor HI Total	0.3

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Blood HI	0.004
Total Body Weight HI	0.0000005
Total CNS HI	0.1
Total CVS HI	0.1
Total Fetotoxicity HI	0.00004
Total GS HI	0.07
Total Kidney HI	0.005
Total Liver HI	0.004
Total Respiratory HI	0.001
Total None Specified HI	0.003
Total Skin HI	0.1
Total Thyroid HI	0.009

TABLE 9.2.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Current
Receptor Population: Occupational/Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	6E-07	--	9E-08	--	6E-07	NA	--	--	--	--
			ALPHA-CHLORDANE	6E-08	--	8E-09	--	7E-08	Liver	0.003	--	0.0004	0.003
			GAMMA-CHLORDANE	5E-08	--	7E-09	--	6E-08	Liver	0.002	--	0.0003	0.003
			HEPTACHLOR	2E-08	--	2E-09	--	2E-08	Liver	0.00006	--	0.000008	0.00007
			HEPTACHLOR EPOXIDE	1E-08	--	1E-09	--	1E-08	Liver	0.0007	--	0.00009	0.0007
			ALUMINUM	- -	--	- -	--	- -	CNS	0.004	--	--	0.004
			ARSENIC	6E-07	--	4E-08	--	6E-07	Skin, CVS	0.01	--	0.0006	0.01
			BARIUM	- -	--	- -	--	- -	Kidney	0.0003	--	--	0.0003
			CHROMIUM VI	4E-07	--	- -	--	4E-07	None Specified	0.002	--	--	0.002
			COBALT	- -	--	- -	--	- -	Thyroid	0.02	--	--	0.02
			IRON	- -	--	- -	--	- -	GS	0.01	--	--	0.01
			MANGANESE	- -	--	- -	--	- -	CNS	0.01	--	--	0.01
			MERCURY	- -	--	- -	--	- -	CNS	0.0005	--	--	0.0005
			Chemical Total	2E-06	--	2E-07	--	2E-06		0.06	--	0.001	0.06
		Exposure Point Total						2E-06					0.06
	Exposure Medium Total							2E-06					0.06
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	2E-11	--	--	2E-11	NA	--	--	--	--
			ALPHA-CHLORDANE	--	3E-12	--	--	3E-12	Liver	--	0.0000004	--	0.0000004
			GAMMA-CHLORDANE	--	3E-12	--	--	3E-12	Liver	--	0.0000003	--	0.0000003
			HEPTACHLOR	--	1E-12	--	--	1E-12	NA	--	--	--	--
			HEPTACHLOR EPOXIDE	--	5E-13	--	--	5E-13	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.0002	--	0.0002
			ARSENIC	--	5E-10	--	--	5E-10	NA	--	0.00006	--	0.00006
			BARIUM	--	- -	--	--	- -	CVS	--	0.00002	--	0.00002
			CHROMIUM VI	--	1E-08	--	--	1E-08	Respiratory	--	0.00001	--	0.00001
			COBALT	--	1E-09	--	--	1E-09	Respiratory	--	0.0002	--	0.0002
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.0009	--	0.0009
			MERCURY	--	- -	--	--	- -	CNS	--	0.0000009	--	0.0000009
			Chemical Total	--	2E-08	--	--	2E-08		- -	0.001	- -	0.001
		Exposure Point Total						2E-08					0.001
	Exposure Medium Total							2E-08					0.001
Medium Total								2E-06					0.06
Subsurface Soil	Subsurface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	3E-06	--	4E-07	--	3E-06	NA	--	--	--	--
			NAPHTHALENE	- -	--	- -	--	- -	Body Weight	0.000007	--	0.000001	0.000008
			AROCLOR-1254	1E-07	--	2E-08	--	1E-07	Immune	0.02	--	0.003	0.02
			ALUMINUM	- -	--	- -	--	- -	CNS	0.004	--	--	0.004
			ANTIMONY	- -	--	- -	--	- -	Blood	0.002	--	--	0.002
			ARSENIC	8E-07	--	5E-08	--	8E-07	Skin, CVS	0.01	--	0.0009	0.01
			BARIUM	- -	--	- -	--	- -	Kidney	0.0005	--	--	0.0005
			CADMIUM	- -	--	- -	--	- -	Kidney	0.002	--	0.00010	0.002
			CHROMIUM VI	8E-07	--	- -	--	8E-07	None Specified	0.004	--	--	0.004
			COBALT	- -	--	- -	--	- -	Thyroid	0.02	--	--	0.02
			COPPER	- -	--	- -	--	- -	GS	0.002	--	--	0.002
			IRON	- -	--	- -	--	- -	GS	0.01	--	--	0.01
			MANGANESE	- -	--	- -	--	- -	CNS	0.01	--	--	0.01
			MERCURY	- -	--	- -	--	- -	CNS	0.002	--	--	0.002
			Chemical Total	4E-06	--	5E-07	--	5E-06		0.09	--	0.004	0.1
		Exposure Point Total						5E-06					0.1
	Exposure Medium Total							5E-06					0.1

TABLE 9.2.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Current
Receptor Population: Occupational/Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	7E-11	--	--	7E-11	NA	--	--	--	--
			NAPHTHALENE	--	2E-09	--	--	2E-09	Respiratory	--	0.0002	--	0.0002
			AROCLOR-1254	--	5E-12	--	--	5E-12	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.0001	--	0.0001
			ANTIMONY	--	- -	--	--	- -	NA	--	--	--	--
			ARSENIC	--	7E-10	--	--	7E-10	NA	--	0.00008	--	0.00008
			BARIUM	--	- -	--	--	- -	CVS	--	0.00004	--	0.00004
			CADMIUM	--	8E-11	--	--	8E-11	Kidney, Respiratory	--	0.00002	--	0.00002
			CHROMIUM VI	--	3E-08	--	--	3E-08	Respiratory	--	0.00002	--	0.00002
			COBALT	--	1E-09	--	--	1E-09	Respiratory	--	0.0002	--	0.0002
			COPPER	--	- -	--	--	- -	NA	--	--	--	--
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.0010	--	0.0010
			MERCURY	--	- -	--	--	- -	CNS	--	0.000003	--	0.000003
			Chemical Total	--	3E-08	--	--	3E-08		- -	0.002	- -	0.002
		Exposure Point Total						3E-08					0.002
	Exposure Medium Total							3E-08					0.002
Medium Total								5E-06					0.1
Receptor Total							Receptor Risk Total	7E-06				Receptor HI Total	0.2

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Blood HI	0.002
Total Body Weight HI	0.000008
Total CNS HI	0.03
Total CVS HI	0.02
Total GS HI	0.03
Total Immune HI	0.02
Total Kidney HI	0.003
Total Liver HI	0.006
Total Respiratory HI	0.0005
Total None Specified HI	0.007
Total Skin HI	0.02
Total Thyroid HI	0.03

TABLE 9.3.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	2E-07	--	6E-08	--	2E-07	NA	--	--	--	--
			ALPHA-CHLORDANE	7E-09	--	2E-09	--	9E-09	Liver	0.0003	--	0.00007	0.0003
			GAMMA-CHLORDANE	6E-09	--	1E-09	--	7E-09	Liver	0.0002	--	0.00005	0.0003
			HEPTACHLOR	2E-09	--	5E-10	--	2E-09	Liver	0.000006	--	0.000002	0.000008
			HEPTACHLOR EPOXIDE	1E-09	--	3E-10	--	1E-09	Liver	0.00007	--	0.00002	0.00008
			ALUMINUM	- -	--	- -	--	- -	CNS	0.0004	--	--	0.0004
			ARSENIC	6E-08	--	8E-09	--	7E-08	Skin, CVS	0.001	--	0.0001	0.001
			BARIUM	- -	--	- -	--	- -	Kidney	0.00003	--	--	0.00003
			CHROMIUM VI	1E-07	--	- -	--	1E-07	None Specified	0.0002	--	--	0.0002
			COBALT	- -	--	- -	--	- -	Thyroid	0.002	--	--	0.002
			IRON	- -	--	- -	--	- -	GS	0.001	--	--	0.001
			MANGANESE	- -	--	- -	--	- -	CNS	0.001	--	--	0.001
			MERCURY	- -	--	- -	--	- -	CNS	0.00005	--	--	0.00005
			Chemical Total	4E-07	--	7E-08	--	5E-07		0.006	--	0.0003	0.006
		Exposure Point Total						5E-07					0.006
	Exposure Medium Total							5E-07					0.006
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	7E-13	--	--	7E-13	NA	--	--	--	--
			ALPHA-CHLORDANE	--	5E-14	--	--	5E-14	Liver	--	5E-9	--	5E-9
			GAMMA-CHLORDANE	--	4E-14	--	--	4E-14	Liver	--	4E-9	--	4E-9
			HEPTACHLOR	--	2E-14	--	--	2E-14	NA	--	--	--	--
			HEPTACHLOR EPOXIDE	--	8E-15	--	--	8E-15	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.000002	--	0.000002
			ARSENIC	--	8E-12	--	--	8E-12	NA	--	0.0000009	--	0.0000009
			BARIUM	--	- -	--	--	- -	CVS	--	0.0000003	--	0.0000003
			CHROMIUM VI	--	6E-10	--	--	6E-10	Respiratory	--	0.0000002	--	0.0000002
			COBALT	--	2E-11	--	--	2E-11	Respiratory	--	0.000002	--	0.000002
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.00001	--	0.00001
			MERCURY	--	- -	--	--	- -	CNS	--	1E-8	--	1E-8
			Chemical Total	--	7E-10	--	--	7E-10		- -	0.00002	- -	0.00002
		Exposure Point Total						7E-10					0.00002
	Exposure Medium Total							7E-10					0.00002
Medium Total								5E-07					0.006
Receptor Total							Receptor Risk Total	5E-07				Receptor HI Total	0.006

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total CNS HI	0.001
Total CVS HI	0.001
Total GS HI	0.001
Total Kidney HI	0.00003
Total Liver HI	0.0007
Total Respiratory HI	0.000002
Total None Specified HI	0.0002
Total Skin HI	0.001
Total Thyroid HI	0.002

TABLE 9.4.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	8E-08	--	1E-08	--	9E-08	NA	--	--	--	--
			ALPHA-CHLORDANE	3E-09	--	4E-10	--	3E-09	Liver	0.0002	--	0.00002	0.0002
			GAMMA-CHLORDANE	2E-09	--	3E-10	--	3E-09	Liver	0.0001	--	0.00002	0.0001
			HEPTACHLOR	8E-10	--	1E-10	--	9E-10	Liver	0.000004	--	0.0000005	0.000004
			HEPTACHLOR EPOXIDE	5E-10	--	6E-11	--	5E-10	Liver	0.00004	--	0.000005	0.00004
			ALUMINUM	- -	--	- -	--	- -	CNS	0.0003	--	--	0.0003
			ARSENIC	3E-08	--	2E-09	--	3E-08	Skin, CVS	0.0006	--	0.00004	0.001
			BARIUM	- -	--	- -	--	- -	Kidney	0.00002	--	--	0.00002
			CHROMIUM VI	6E-08	--	- -	--	6E-08	None Specified	0.0001	--	--	0.0001
			COBALT	- -	--	- -	--	- -	Thyroid	0.0009	--	--	0.0009
			IRON	- -	--	- -	--	- -	GS	0.0007	--	--	0.0007
			MANGANESE	- -	--	- -	--	- -	CNS	0.0006	--	--	0.0006
			MERCURY	- -	--	- -	--	- -	CNS	0.00003	--	--	0.00003
			Chemical Total	2E-07	--	2E-08	--	2E-07		0.004	--	0.00008	0.004
		Exposure Point Total						2E-07					0.004
	Exposure Medium Total							2E-07					0.004
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	5E-13	--	--	5E-13	NA	--	--	--	--
			ALPHA-CHLORDANE	--	4E-14	--	--	4E-14	Liver	--	5E-9	--	5E-9
			GAMMA-CHLORDANE	--	3E-14	--	--	3E-14	Liver	--	4E-9	--	4E-9
			HEPTACHLOR	--	1E-14	--	--	1E-14	NA	--	--	--	--
			HEPTACHLOR EPOXIDE	--	6E-15	--	--	6E-15	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.000002	--	0.000002
			ARSENIC	--	6E-12	--	--	6E-12	NA	--	0.0000009	--	0.0000009
			BARIUM	--	- -	--	--	- -	CVS	--	0.0000003	--	0.0000003
			CHROMIUM VI	--	5E-10	--	--	5E-10	Respiratory	--	0.0000002	--	0.0000002
			COBALT	--	1E-11	--	--	1E-11	Respiratory	--	0.000002	--	0.000002
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.00001	--	0.00001
			MERCURY	--	- -	--	--	- -	CNS	--	1E-8	--	1E-8
			Chemical Total	--	5E-10	--	--	5E-10		- -	0.00002	- -	0.00002
		Exposure Point Total						5E-10					0.00002
	Exposure Medium Total							5E-10					0.00002
Medium Total								2E-07					0.004
Receptor Total							Receptor Risk Total	2E-07				Receptor HI Total	0.004

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total CNS HI	0.0009
Total CVS HI	0.001
Total GS HI	0.0007
Total Kidney HI	0.00002
Total Liver HI	0.0004
Total Respiratory HI	0.000002
Total None Specified HI	0.0001
Total Skin HI	0.001
Total Thyroid HI	0.0009

TABLE 9.5.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	5E-06	--	8E-07	--	6E-06	NA	--	--	--	--
			ALPHA-CHLORDANE	2E-08	--	2E-09	--	2E-08	Liver	0.003	--	0.0003	0.003
			GAMMA-CHLORDANE	1E-08	--	1E-09	--	1E-08	Liver	0.002	--	0.0003	0.003
			HEPTACHLOR	1E-08	--	1E-09	--	1E-08	Liver	0.0002	--	0.00002	0.0002
			HEPTACHLOR EPOXIDE	1E-08	--	1E-09	--	1E-08	Liver	0.003	--	0.0003	0.003
			ALUMINUM	- -	--	- -	--	- -	CNS	0.03	--	--	0.03
			ARSENIC	1E-06	--	6E-08	--	1E-06	Skin, CVS	0.1	--	0.004	0.1
			BARIUM	- -	--	- -	--	- -	Kidney	0.002	--	--	0.002
			CHROMIUM VI	5E-06	--	- -	--	5E-06	None Specified	0.02	--	--	0.02
			COBALT	- -	--	- -	--	- -	Thyroid	0.1	--	--	0.1
			IRON	- -	--	- -	--	- -	GS	0.08	--	--	0.08
			MANGANESE	- -	--	- -	--	- -	CNS	0.08	--	--	0.08
			MERCURY	- -	--	- -	--	- -	CNS	0.003	--	--	0.003
			Chemical Total	1E-05	--	8E-07	--	1E-05		0.4	--	0.005	0.4
		Exposure Point Total						1E-05					0.4
	Exposure Medium Total							1E-05					0.4
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	9E-11	--	--	9E-11	NA	--	--	--	--
			ALPHA-CHLORDANE	--	5E-13	--	--	5E-13	Liver	--	0.0000002	--	0.0000002
			GAMMA-CHLORDANE	--	4E-13	--	--	4E-13	Liver	--	0.0000002	--	0.0000002
			HEPTACHLOR	--	4E-13	--	--	4E-13	NA	--	--	--	--
			HEPTACHLOR EPOXIDE	--	3E-13	--	--	3E-13	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.0006	--	0.0006
			ARSENIC	--	5E-10	--	--	5E-10	NA	--	0.0003	--	0.0003
			BARIUM	--	- -	--	--	- -	CVS	--	0.00007	--	0.00007
			CHROMIUM VI	--	9E-08	--	--	9E-08	Respiratory	--	0.00006	--	0.00006
			COBALT	--	9E-10	--	--	9E-10	Respiratory	--	0.0006	--	0.0006
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.004	--	0.004
			MERCURY	--	- -	--	--	- -	CNS	--	0.000003	--	0.000003
			Chemical Total	--	1E-07	--	--	1E-07		- -	0.006	- -	0.006
		Exposure Point Total						1E-07					0.006
	Exposure Medium Total							1E-07					0.006
Medium Total								1E-05					0.4
Subsurface Soil	Subsurface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	1E-05	--	1E-06	--	1E-05	NA	--	--	--	--
			NAPHTHALENE	- -	--	- -	--	- -	Body Weight	0.00003	--	0.000004	0.00003
			AROCLOR-1254	5E-08	--	8E-09	--	6E-08	Immune	0.04	--	0.007	0.05
			ALUMINUM	- -	--	- -	--	- -	CNS	0.03	--	--	0.03
			ANTIMONY	- -	--	- -	--	- -	Blood	0.01	--	--	0.01
			ARSENIC	1E-06	--	7E-08	--	1E-06	Skin, CVS	0.1	--	0.006	0.1
			BARIUM	- -	--	- -	--	- -	Kidney	0.003	--	--	0.003
			CADMIUM	- -	--	- -	--	- -	Kidney	0.008	--	0.0003	0.008
			CHROMIUM VI	8E-06	--	- -	--	8E-06	None Specified	0.03	--	--	0.03
			COBALT	- -	--	- -	--	- -	Thyroid	0.1	--	--	0.1
			COPPER	- -	--	- -	--	- -	GS	0.01	--	--	0.01
			IRON	- -	--	- -	--	- -	GS	0.10	--	--	0.10
			MANGANESE	- -	--	- -	--	- -	CNS	0.08	--	--	0.08
			MERCURY	- -	--	- -	--	- -	CNS	0.006	--	--	0.006
			Chemical Total	2E-05	--	2E-06	--	2E-05		0.5	--	0.01	0.5
		Exposure Point Total						2E-05					0.5
	Exposure Medium Total							2E-05					0.5
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	2E-10	--	--	2E-10	NA	--	--	--	--
			NAPHTHALENE	--	1E-09	--	--	1E-09	Respiratory	--	0.0004	--	0.0004

TABLE 9.5.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
			AROCLOR-1254	--	2E-12	--	--	2E-12	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.0007	--	0.0007
			ANTIMONY	--	- -	--	--	- -	NA	--	--	--	--
			ARSENIC	--	7E-10	--	--	7E-10	NA	--	0.0004	--	0.0004
			BARIUM	--	- -	--	--	- -	CVS	--	0.0001	--	0.0001
			CADMIUM	--	5E-11	--	--	5E-11	Kidney, Respiratory	--	0.00004	--	0.00004
			CHROMIUM VI	--	2E-07	--	--	2E-07	Respiratory	--	0.0001	--	0.0001
			COBALT	--	1E-09	--	--	1E-09	Respiratory	--	0.0007	--	0.0007
			COPPER	--	- -	--	--	- -	NA	--	--	--	--
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.004	--	0.004
			MERCURY	--	- -	--	--	- -	CNS	--	0.000007	--	0.000007
			Chemical Total	--	2E-07	--	--	2E-07		- -	0.007	- -	0.007
		Exposure Point Total						2E-07					0.007
	Exposure Medium Total							2E-07					0.007
Medium Total								2E-05					0.6
Receptor Total							Receptor Risk Total	3E-05				Receptor HI Total	1

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Blood HI	0.01
Total Body Weight HI	0.00003
Total CNS HI	0.2
Total CVS HI	0.2
Total GS HI	0.2
Total Immune HI	0.05
Total Kidney HI	0.01
Total Liver HI	0.009
Total Respiratory HI	0.002
Total None Specified HI	0.05
Total Skin HI	0.2
Total Thyroid HI	0.2

TABLE 9.6.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	5E-07	--	7E-08	--	5E-07	NA	--	--	--	--
			ALPHA-CHLORDANE	6E-09	--	6E-10	--	6E-09	Liver	0.0003	--	0.00004	0.0004
			GAMMA-CHLORDANE	5E-09	--	5E-10	--	5E-09	Liver	0.0003	--	0.00003	0.0003
			HEPTACHLOR	5E-09	--	6E-10	--	6E-09	Liver	0.00002	--	0.000003	0.00002
			HEPTACHLOR EPOXIDE	4E-09	--	4E-10	--	4E-09	Liver	0.0003	--	0.00003	0.0003
			ALUMINUM	- -	--	- -	--	- -	CNS	0.003	--	--	0.003
			ARSENIC	4E-07	--	2E-08	--	4E-07	Skin, CVS	0.01	--	0.0005	0.01
			BARIUM	- -	--	- -	--	- -	Kidney	0.0002	--	--	0.0002
			CHROMIUM VI	4E-07	--	- -	--	4E-07	None Specified	0.002	--	--	0.002
			COBALT	- -	--	- -	--	- -	Thyroid	0.01	--	--	0.01
			IRON	- -	--	- -	--	- -	GS	0.009	--	--	0.009
			MANGANESE	- -	--	- -	--	- -	CNS	0.009	--	--	0.009
			MERCURY	- -	--	- -	--	- -	CNS	0.0003	--	--	0.0003
			Chemical Total	1E-06	--	9E-08	--	1E-06		0.04	--	0.0006	0.04
		Exposure Point Total						1E-06					0.04
	Exposure Medium Total							1E-06					0.04
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	8E-11	--	--	8E-11	NA	--	--	--	--
			ALPHA-CHLORDANE	--	2E-12	--	--	2E-12	Liver	--	0.0000002	--	0.0000002
			GAMMA-CHLORDANE	--	1E-12	--	--	1E-12	Liver	--	0.0000002	--	0.0000002
			HEPTACHLOR	--	2E-12	--	--	2E-12	NA	--	--	--	--
			HEPTACHLOR EPOXIDE	--	1E-12	--	--	1E-12	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.0006	--	0.0006
			ARSENIC	--	2E-09	--	--	2E-09	NA	--	0.0003	--	0.0003
			BARIUM	--	- -	--	--	- -	CVS	--	0.00007	--	0.00007
			CHROMIUM VI	--	8E-08	--	--	8E-08	Respiratory	--	0.00006	--	0.00006
			COBALT	--	3E-09	--	--	3E-09	Respiratory	--	0.0006	--	0.0006
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.004	--	0.004
			MERCURY	--	- -	--	--	- -	CNS	--	0.000003	--	0.000003
			Chemical Total	--	8E-08	--	--	8E-08		- -	0.006	- -	0.006
		Exposure Point Total						8E-08					0.006
	Exposure Medium Total							8E-08					0.006
Medium Total								1E-06					0.05
Subsurface Soil	Subsurface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	9E-07	--	1E-07	--	1E-06	NA	--	--	--	--
			NAPHTHALENE	- -	--	- -	--	- -	Body Weight	0.000003	--	0.0000004	0.000003
			AROCLOR-1254	2E-08	--	3E-09	--	2E-08	Immune	0.005	--	0.0007	0.005
			ALUMINUM	- -	--	- -	--	- -	CNS	0.003	--	--	0.003
			ANTIMONY	- -	--	- -	--	- -	Blood	0.001	--	--	0.001
			ARSENIC	5E-07	--	3E-08	--	5E-07	Skin, CVS	0.01	--	0.0006	0.01
			BARIUM	- -	--	- -	--	- -	Kidney	0.0003	--	--	0.0003
			CADMIUM	- -	--	- -	--	- -	Kidney	0.0008	--	0.00004	0.0009
			CHROMIUM VI	7E-07	--	- -	--	7E-07	None Specified	0.003	--	--	0.003
			COBALT	- -	--	- -	--	- -	Thyroid	0.01	--	--	0.01
			COPPER	- -	--	- -	--	- -	GS	0.001	--	--	0.001
			IRON	- -	--	- -	--	- -	GS	0.01	--	--	0.01
			MANGANESE	- -	--	- -	--	- -	CNS	0.009	--	--	0.009
			MERCURY	- -	--	- -	--	- -	CNS	0.0007	--	--	0.0007
			Chemical Total	2E-06	--	2E-07	--	2E-06		0.06	--	0.001	0.06
		Exposure Point Total						2E-06					0.06
	Exposure Medium Total							2E-06					0.06

TABLE 9.6.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	1E-10	--	--	1E-10	NA	--	--	--	--
			NAPHTHALENE	--	4E-09	--	--	4E-09	Respiratory	--	0.0004	--	0.0004
			AROCLOR-1254	--	5E-12	--	--	5E-12	NA	--	--	--	--
			ALUMINUM	--	- -	--	--	- -	CNS	--	0.0007	--	0.0007
			ANTIMONY	--	- -	--	--	- -	NA	--	--	--	--
			ARSENIC	--	2E-09	--	--	2E-09	NA	--	0.0004	--	0.0004
			BARIUM	--	- -	--	--	- -	CVS	--	0.0001	--	0.0001
			CADMIUM	--	2E-10	--	--	2E-10	Kidney, Respiratory	--	0.00004	--	0.00004
			CHROMIUM VI	--	1E-07	--	--	1E-07	Respiratory	--	0.0001	--	0.0001
			COBALT	--	4E-09	--	--	4E-09	Respiratory	--	0.0007	--	0.0007
			COPPER	--	- -	--	--	- -	NA	--	--	--	--
			IRON	--	- -	--	--	- -	NA	--	--	--	--
			MANGANESE	--	- -	--	--	- -	CNS	--	0.004	--	0.004
			MERCURY	--	- -	--	--	- -	CNS	--	0.000007	--	0.000007
			Chemical Total	--	1E-07	--	--	1E-07		- -	0.007	- -	0.007
		Exposure Point Total						1E-07					0.007
	Exposure Medium Total							1E-07					0.007
Medium Total								2E-06					0.07
Receptor Total							Receptor Risk Total	4E-06				Receptor HI Total	0.1

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Blood HI	0.001
Total Body Weight HI	0.000003
Total CNS HI	0.03
Total CVS HI	0.02
Total GS HI	0.02
Total Immune HI	0.005
Total Kidney HI	0.001
Total Liver HI	0.001
Total Respiratory HI	0.002
Total None Specified HI	0.005
Total Skin HI	0.02
Total Thyroid HI	0.02

TABLE 9.7.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	6E-06	--	8E-07	--	6E-06					
			ALPHA-CHLORDANE	2E-08	--	2E-09	--	2E-08					
			GAMMA-CHLORDANE	2E-08	--	2E-09	--	2E-08					
			HEPTACHLOR	2E-08	--	2E-09	--	2E-08					
			HEPTACHLOR EPOXIDE	1E-08	--	1E-09	--	1E-08					
			ALUMINUM	- -	--	- -	--	- -					
			ARSENIC	2E-06	--	8E-08	--	2E-06					
			BARIUM	- -	--	- -	--	- -					
			CHROMIUM VI	5E-06	--	- -	--	5E-06					
			COBALT	- -	--	- -	--	- -					
			IRON	- -	--	- -	--	- -					
			MANGANESE	- -	--	- -	--	- -					
			MERCURY	- -	--	- -	--	- -					
			Chemical Total	1E-05	--	9E-07	--	1E-05					
		Exposure Point Total						1E-05					
	Exposure Medium Total							1E-05					
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	2E-10	--	--	2E-10					
			ALPHA-CHLORDANE	--	2E-12	--	--	2E-12					
			GAMMA-CHLORDANE	--	2E-12	--	--	2E-12					
			HEPTACHLOR	--	2E-12	--	--	2E-12					
			HEPTACHLOR EPOXIDE	--	1E-12	--	--	1E-12					
			ALUMINUM	--	- -	--	--	- -					
			ARSENIC	--	2E-09	--	--	2E-09					
			BARIUM	--	- -	--	--	- -					
			CHROMIUM VI	--	2E-07	--	--	2E-07					
			COBALT	--	4E-09	--	--	4E-09					
			IRON	--	- -	--	--	- -					
			MANGANESE	--	- -	--	--	- -					
			MERCURY	--	- -	--	--	- -					
			Chemical Total	--	2E-07	--	--	2E-07					
		Exposure Point Total						2E-07					
	Exposure Medium Total							2E-07					
Medium Total								1E-05					
Subsurface Soil	Subsurface Soil	Site 12	BENZO(A)PYRENE EQUIVALENTS	1E-05	--	2E-06	--	1E-05					
			NAPHTHALENE	- -	--	- -	--	- -					
			AROCLOR-1254	7E-08	--	1E-08	--	8E-08					
			ALUMINUM	- -	--	- -	--	- -					
			ANTIMONY	- -	--	- -	--	- -					
			ARSENIC	3E-06	--	1E-07	--	3E-06					
			BARIUM	- -	--	- -	--	- -					
			CADMIUM	- -	--	- -	--	- -					
			CHROMIUM VI	9E-06	--	- -	--	9E-06					
			COBALT	- -	--	- -	--	- -					
			COPPER	- -	--	- -	--	- -					
			IRON	- -	--	- -	--	- -					
			MANGANESE	- -	--	- -	--	- -					
			MERCURY	- -	--	- -	--	- -					
			Chemical Total	2E-05	--	2E-06	--	2E-05					
		Exposure Point Total						2E-05					
	Exposure Medium Total							2E-05					

TABLE 9.7.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
NAVAL STATION GREAT LAKES

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Site 12	BENZO(A)PYRENE EQUIVALENTS	--	3E-10	--	--	3E-10					
			NAPHTHALENE	--	5E-09	--	--	5E-09					
			AROCLOR-1254	--	7E-12	--	--	7E-12					
			ALUMINUM	--	- -	--	--	- -					
			ANTIMONY	--	- -	--	--	- -					
			ARSENIC	--	3E-09	--	--	3E-09					
			BARIUM	--	- -	--	--	- -					
			CADMIUM	--	2E-10	--	--	2E-10					
			CHROMIUM VI	--	3E-07	--	--	3E-07					
			COBALT	--	5E-09	--	--	5E-09					
			COPPER	--	- -	--	--	- -					
			IRON	--	- -	--	--	- -					
			MANGANESE	--	- -	--	--	- -					
			MERCURY	--	- -	--	--	- -					
			Chemical Total	--	3E-07	--	--	3E-07					
		Exposure Point Total						3E-07					
	Exposure Medium Total							3E-07					
Medium Total								2E-05					
Receptor Total							Receptor Risk Total	4E-05					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

F-3 PROUCL OUTPUT

Surface Soil

General UCL Statistics for Full Data Sets		
User Selected Options		
From File	H:\Great Lakes\Site 12 Harbor Dredge Spoil Area RI RA report\update HHRA\proUCL\Site 12 SS.xls.wst	
Full Precision	OFF	
Confidence Coefficient	95%	
Number of Bootstrap Operations	2000	

BAP EQUIVALENT

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	10

Raw Statistics		**Log-transformed Statistics**	
Minimum	32.98	Minimum of Log Data	3.496
Maximum	2084	Maximum of Log Data	7.642
Mean	896.5	Mean of log Data	6.161
Geometric Mean	474	SD of log Data	1.408
Median	602.4		
SD	817.4		
Std. Error of Mean	258.5		
Coefficient of Variation	0.912		
Skewness	0.477		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.858	Shapiro Wilk Test Statistic	0.915
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1370	95% H-UCL	8314
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	3317
95% Adjusted-CLT UCL (Chen-1995)	1363	97.5% Chebyshev (MVUE) UCL	4283
95% Modified-t UCL (Johnson-1978)	1377	99% Chebyshev (MVUE) UCL	6178
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.707	**Data appear Normal at 5% Significance Level**	
Theta Star	1267		
MLE of Mean	896.5		
MLE of Standard Deviation	1066		
nu star	14.15		
Approximate Chi Square Value (.05)	6.674	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	1322
Adjusted Chi Square Value	5.805	95% Jackknife UCL	1370
		95% Standard Bootstrap UCL	1302
Anderson-Darling Test Statistic	0.35	95% Bootstrap-t UCL	1462
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	1291
Kolmogorov-Smirnov Test Statistic	0.205	95% Percentile Bootstrap UCL	1331
Kolmogorov-Smirnov 5% Critical Value	0.275	95% BCA Bootstrap UCL	1351

51	Data appear Gamma Distributed at 5% Significance Level									95% Chebyshev(Mean, Sd) UCL		2023
52										97.5% Chebyshev(Mean, Sd) UCL		2511
53	Assuming Gamma Distribution									99% Chebyshev(Mean, Sd) UCL		3468
54	95% Approximate Gamma UCL (Use when n >= 40)					1901						
55	95% Adjusted Gamma UCL (Use when n < 40)					2185						
56												
57	Potential UCL to Use									Use 95% Student's-t UCL		1370
58												
59	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
60	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
61	and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.											
62												
63												
64	ALPHA-CHLORDANE											
65												
66	General Statistics											
67	Number of Valid Observations					10				Number of Distinct Observations		10
68												
69	Raw Statistics									Log-transformed Statistics		
70	Minimum					0.14				Minimum of Log Data		-1.966
71	Maximum					3220				Maximum of Log Data		8.077
72	Mean					352.8				Mean of log Data		1.562
73	Geometric Mean					4.768				SD of log Data		3.287
74	Median					1.81						
75	SD					1010						
76	Std. Error of Mean					319.5						
77	Coefficient of Variation					2.864						
78	Skewness					3.13						
79												
80	Relevant UCL Statistics											
81	Normal Distribution Test									Lognormal Distribution Test		
82	Shapiro Wilk Test Statistic					0.41				Shapiro Wilk Test Statistic		0.898
83	Shapiro Wilk Critical Value					0.842				Shapiro Wilk Critical Value		0.842
84	Data not Normal at 5% Significance Level									Data appear Lognormal at 5% Significance Level		
85												
86	Assuming Normal Distribution									Assuming Lognormal Distribution		
87	95% Student's-t UCL					938.4				95% H-UCL		12845636
88	95% UCLs (Adjusted for Skewness)									95% Chebyshev (MVUE) UCL		942.5
89	95% Adjusted-CLT UCL (Chen-1995)					1216				97.5% Chebyshev (MVUE) UCL		1267
90	95% Modified-t UCL (Johnson-1978)					991.1				99% Chebyshev (MVUE) UCL		1903
91												
92	Gamma Distribution Test									Data Distribution		
93	k star (bias corrected)					0.189				Data appear Lognormal at 5% Significance Level		
94	Theta Star					1868						
95	MLE of Mean					352.8						
96	MLE of Standard Deviation					811.7						
97	nu star					3.778						
98	Approximate Chi Square Value (.05)					0.636				Nonparametric Statistics		
99	Adjusted Level of Significance					0.0267				95% CLT UCL		878.3
100	Adjusted Chi Square Value					0.452				95% Jackknife UCL		938.4

101										95% Standard Bootstrap UCL	866.3	
102				Anderson-Darling Test Statistic	1.197					95% Bootstrap-t UCL	20918	
103				Anderson-Darling 5% Critical Value	0.863					95% Hall's Bootstrap UCL	20875	
104				Kolmogorov-Smirnov Test Statistic	0.325					95% Percentile Bootstrap UCL	972.2	
105				Kolmogorov-Smirnov 5% Critical Value	0.295					95% BCA Bootstrap UCL	1305	
106				**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	1745	
107										97.5% Chebyshev(Mean, Sd) UCL	2348	
108				**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	3532	
109				95% Approximate Gamma UCL (Use when n >= 40)	2096							
110				95% Adjusted Gamma UCL (Use when n < 40)	2951							
111												
112				**Potential UCL to Use**						Use 95% Hall's Bootstrap UCL	20875	
113				**Recommended UCL exceeds the maximum observation**								
114				**In Case Bootstrap t and/or Hall's Bootstrap yields an unreasonably large UCL value, use 97.5% or 99% Chebyshev (Mean, Sd) UCL**								
115												
116				**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**								
117				**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**								
118				**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**								
119												
120												
121	**GAMMA-CHLORDANE**											
122												
123				**General Statistics**								
124				Number of Valid Observations	10					Number of Distinct Observations	10	
125												
126				**Raw Statistics**						**Log-transformed Statistics**		
127				Minimum	0.309					Minimum of Log Data	-1.174	
128				Maximum	2600					Maximum of Log Data	7.863	
129				Mean	281.4					Mean of log Data	1.702	
130				Geometric Mean	5.483					SD of log Data	2.964	
131				Median	3.255							
132				SD	816.4							
133				Std. Error of Mean	258.2							
134				Coefficient of Variation	2.901							
135				Skewness	3.138							
136												
137				**Relevant UCL Statistics**								
138				**Normal Distribution Test**						**Lognormal Distribution Test**		
139				Shapiro Wilk Test Statistic	0.403					Shapiro Wilk Test Statistic	0.882	
140				Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842	
141				**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**		
142												
143				**Assuming Normal Distribution**						**Assuming Lognormal Distribution**		
144				95% Student's-t UCL	754.7					95% H-UCL	956900	
145				**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	583.3	
146				95% Adjusted-CLT UCL (Chen-1995)	979.8					97.5% Chebyshev (MVUE) UCL	781.9	
147				95% Modified-t UCL (Johnson-1978)	797.4					99% Chebyshev (MVUE) UCL	1172	
148												
149				**Gamma Distribution Test**						**Data Distribution**		
150				k star (bias corrected)	0.199					**Data appear Lognormal at 5% Significance Level**		

151					Theta Star	1417						
152					MLE of Mean	281.4						
153					MLE of Standard Deviation	631.4						
154					nu star	3.973						
155					Approximate Chi Square Value (.05)	0.711	**Nonparametric Statistics**					
156					Adjusted Level of Significance	0.0267					95% CLT UCL	706.1
157					Adjusted Chi Square Value	0.51					95% Jackknife UCL	754.7
158											95% Standard Bootstrap UCL	680
159					Anderson-Darling Test Statistic	1.315					95% Bootstrap-t UCL	24599
160					Anderson-Darling 5% Critical Value	0.858					95% Hall's Bootstrap UCL	23893
161					Kolmogorov-Smirnov Test Statistic	0.339					95% Percentile Bootstrap UCL	786.8
162					Kolmogorov-Smirnov 5% Critical Value	0.295					95% BCA Bootstrap UCL	1058
163	**Data not Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	1407
164											97.5% Chebyshev(Mean, Sd) UCL	1894
165	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	2850
166	95% Approximate Gamma UCL (Use when n >= 40)					1572						
167	95% Adjusted Gamma UCL (Use when n < 40)					2191						
168												
169	**Potential UCL to Use**										Use 99% Chebyshev (Mean, Sd) UCL	2850
170	**Recommended UCL exceeds the maximum observation**											
171												
172	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
173	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
174	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
175												
176												
177	**ALUMINUM**											
178												
179	**General Statistics**											
180	Number of Valid Observations					10	Number of Distinct Observations					10
181												
182	**Raw Statistics**						**Log-transformed Statistics**					
183	Minimum					1250	Minimum of Log Data					7.131
184	Maximum					10000	Maximum of Log Data					9.21
185	Mean					5966	Mean of log Data					8.45
186	Geometric Mean					4676	SD of log Data					0.845
187	Median					7185						
188	SD					3283						
189	Std. Error of Mean					1038						
190	Coefficient of Variation					0.55						
191	Skewness					-0.723						
192												
193	**Relevant UCL Statistics**											
194	**Normal Distribution Test**						**Lognormal Distribution Test**					
195	Shapiro Wilk Test Statistic					0.821	Shapiro Wilk Test Statistic					0.729
196	Shapiro Wilk Critical Value					0.842	Shapiro Wilk Critical Value					0.842
197	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
198												
199	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
200	95% Student's-t UCL					7869	95% H-UCL					14680

	A	B	C	D	E	F	G	H	I	J	K	L
201	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					14134
202	95% Adjusted-CLT UCL (Chen-1995)					7420	97.5% Chebyshev (MVUE) UCL					17484
203	95% Modified-t UCL (Johnson-1978)					7829	99% Chebyshev (MVUE) UCL					24065
204												
205	**Gamma Distribution Test**						**Data Distribution**					
206	k star (bias corrected)					1.61	**Data do not follow a Discernable Distribution (0.05)**					
207	Theta Star					3705						
208	MLE of Mean					5966						
209	MLE of Standard Deviation					4702						
210	nu star					32.2						
211	Approximate Chi Square Value (.05)					20.23	**Nonparametric Statistics**					
212	Adjusted Level of Significance					0.0267	95% CLT UCL					7674
213	Adjusted Chi Square Value					18.6	95% Jackknife UCL					7869
214							95% Standard Bootstrap UCL					7580
215	Anderson-Darling Test Statistic					1.296	95% Bootstrap-t UCL					7608
216	Anderson-Darling 5% Critical Value					0.735	95% Hall's Bootstrap UCL					7357
217	Kolmogorov-Smirnov Test Statistic					0.35	95% Percentile Bootstrap UCL					7554
218	Kolmogorov-Smirnov 5% Critical Value					0.27	95% BCA Bootstrap UCL					7383
219	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					10491
220							97.5% Chebyshev(Mean, Sd) UCL					12449
221	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					16295
222	95% Approximate Gamma UCL (Use when n >= 40)					9496						
223	95% Adjusted Gamma UCL (Use when n < 40)					10329						
224												
225	**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL					10491
226	**Recommended UCL exceeds the maximum observation**											
227												
228	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
229	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
230	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
231												
232	**Note: For highly negative-skewed data, confidence limits**											
233	**(e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
234	**reliable. Chen's and Johnson's methods provide**											
235	**adjustments for positvely skewed data sets.**											
236												
237												
238	**ARSENIC**											
239												
240	**General Statistics**											
241	Number of Valid Observations					10	Number of Distinct Observations					10
242												
243	**Raw Statistics**						**Log-transformed Statistics**					
244	Minimum					4.28	Minimum of Log Data					1.454
245	Maximum					16.9	Maximum of Log Data					2.827
246	Mean					9.074	Mean of log Data					2.109
247	Geometric Mean					8.243	SD of log Data					0.474
248	Median					9.135						
249	SD					4.042						
250	Std. Error of Mean					1.278						

251					Coefficient of Variation	0.445						
252					Skewness	0.518						
253												
254	**Relevant UCL Statistics**											
255	**Normal Distribution Test**						**Lognormal Distribution Test**					
256					Shapiro Wilk Test Statistic	0.934					Shapiro Wilk Test Statistic	0.916
257					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
258	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
259												
260	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
261					95% Student's-t UCL	11.42					95% H-UCL	13.03
262	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	15.17
263					95% Adjusted-CLT UCL (Chen-1995)	11.4					97.5% Chebyshev (MVUE) UCL	17.79
264					95% Modified-t UCL (Johnson-1978)	11.45					99% Chebyshev (MVUE) UCL	22.94
265												
266	**Gamma Distribution Test**						**Data Distribution**					
267					k star (bias corrected)	3.824	**Data appear Normal at 5% Significance Level**					
268					Theta Star	2.373						
269					MLE of Mean	9.074						
270					MLE of Standard Deviation	4.64						
271					nu star	76.48						
272					Approximate Chi Square Value (.05)	57.34	**Nonparametric Statistics**					
273					Adjusted Level of Significance	0.0267					95% CLT UCL	11.18
274					Adjusted Chi Square Value	54.46					95% Jackknife UCL	11.42
275											95% Standard Bootstrap UCL	11.09
276					Anderson-Darling Test Statistic	0.36					95% Bootstrap-t UCL	11.49
277					Anderson-Darling 5% Critical Value	0.729					95% Hall's Bootstrap UCL	11.69
278					Kolmogorov-Smirnov Test Statistic	0.182					95% Percentile Bootstrap UCL	11.13
279					Kolmogorov-Smirnov 5% Critical Value	0.267					95% BCA Bootstrap UCL	11.41
280	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	14.64
281											97.5% Chebyshev(Mean, Sd) UCL	17.06
282	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	21.79
283					95% Approximate Gamma UCL (Use when n >= 40)	12.1						
284					95% Adjusted Gamma UCL (Use when n < 40)	12.74						
285												
286	**Potential UCL to Use**										Use 95% Student's-t UCL	11.42
287												
288	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
289	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
290	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
291												
292												
293	**BARIUM**											
294												
295	**General Statistics**											
296					Number of Valid Observations	10					Number of Distinct Observations	10
297												
298	**Raw Statistics**						**Log-transformed Statistics**					
299					Minimum	8.12					Minimum of Log Data	2.094
300					Maximum	244					Maximum of Log Data	5.497

301					Mean	72.4				Mean of log Data		3.782
302					Geometric Mean	43.91				SD of log Data		1.179
303					Median	62.9						
304					SD	69.65						
305					Std. Error of Mean	22.03						
306					Coefficient of Variation	0.962						
307					Skewness	1.765						
308												
309					**Relevant UCL Statistics**							
310			**Normal Distribution Test**						**Lognormal Distribution Test**			
311					Shapiro Wilk Test Statistic	0.803				Shapiro Wilk Test Statistic		0.869
312					Shapiro Wilk Critical Value	0.842				Shapiro Wilk Critical Value		0.842
313			**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**			
314												
315			**Assuming Normal Distribution**						**Assuming Lognormal Distribution**			
316					95% Student's-t UCL	112.8				95% H-UCL		345.2
317			**95% UCLs (Adjusted for Skewness)**							95% Chebyshev (MVUE) UCL		215.7
318					95% Adjusted-CLT UCL (Chen-1995)	121.8				97.5% Chebyshev (MVUE) UCL		274.7
319					95% Modified-t UCL (Johnson-1978)	114.8				99% Chebyshev (MVUE) UCL		390.5
320												
321			**Gamma Distribution Test**						**Data Distribution**			
322					k star (bias corrected)	0.863			**Data appear Gamma Distributed at 5% Significance Level**			
323					Theta Star	83.9						
324					MLE of Mean	72.4						
325					MLE of Standard Deviation	77.94						
326					nu star	17.26						
327					Approximate Chi Square Value (.05)	8.858			**Nonparametric Statistics**			
328					Adjusted Level of Significance	0.0267				95% CLT UCL		108.6
329					Adjusted Chi Square Value	7.833				95% Jackknife UCL		112.8
330										95% Standard Bootstrap UCL		106.9
331					Anderson-Darling Test Statistic	0.509				95% Bootstrap-t UCL		137.2
332					Anderson-Darling 5% Critical Value	0.746				95% Hall's Bootstrap UCL		275.9
333					Kolmogorov-Smirnov Test Statistic	0.195				95% Percentile Bootstrap UCL		108.5
334					Kolmogorov-Smirnov 5% Critical Value	0.273				95% BCA Bootstrap UCL		119.8
335			**Data appear Gamma Distributed at 5% Significance Level**							95% Chebyshev(Mean, Sd) UCL		168.4
336										97.5% Chebyshev(Mean, Sd) UCL		210
337			**Assuming Gamma Distribution**							99% Chebyshev(Mean, Sd) UCL		291.6
338					95% Approximate Gamma UCL (Use when n >= 40)	141.1						
339					95% Adjusted Gamma UCL (Use when n < 40)	159.5						
340												
341			**Potential UCL to Use**							Use 95% Approximate Gamma UCL		141.1
342												
343												
344												
345												
346												
347												
348	**CHROMIUM**											
349												
350												

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General Statistics

351	Number of Valid Observations				10	Number of Distinct Observations					9	
352												
353	**Raw Statistics**					**Log-transformed Statistics**						
354	Minimum				4.07	Minimum of Log Data					1.404	
355	Maximum				23.8	Maximum of Log Data					3.17	
356	Mean				12.41	Mean of log Data					2.377	
357	Geometric Mean				10.78	SD of log Data					0.6	
358	Median				13.55							
359	SD				6.177							
360	Std. Error of Mean				1.953							
361	Coefficient of Variation				0.498							
362	Skewness				0.149							
363												
364												
365	**Relevant UCL Statistics**											
366	**Normal Distribution Test**					**Lognormal Distribution Test**						
367	Shapiro Wilk Test Statistic				0.91	Shapiro Wilk Test Statistic					0.855	
368	Shapiro Wilk Critical Value				0.842	Shapiro Wilk Critical Value					0.842	
369	**Data appear Normal at 5% Significance Level**					**Data appear Lognormal at 5% Significance Level**						
370												
371	**Assuming Normal Distribution**					**Assuming Lognormal Distribution**						
372	95% Student's-t UCL				15.99	95% H-UCL					20.73	
373	**95% UCLs (Adjusted for Skewness)**					95% Chebyshev (MVUE) UCL					23.37	
374	95% Adjusted-CLT UCL (Chen-1995)				15.72	97.5% Chebyshev (MVUE) UCL					28.01	
375	95% Modified-t UCL (Johnson-1978)				16.01	99% Chebyshev (MVUE) UCL					37.12	
376												
377	**Gamma Distribution Test**					**Data Distribution**						
378	k star (bias corrected)				2.653	**Data appear Normal at 5% Significance Level**						
379	Theta Star				4.678							
380	MLE of Mean				12.41							
381	MLE of Standard Deviation				7.621							
382	nu star				53.06							
383	Approximate Chi Square Value (.05)				37.33	**Nonparametric Statistics**						
384	Adjusted Level of Significance				0.0267	95% CLT UCL					15.63	
385	Adjusted Chi Square Value				35.05	95% Jackknife UCL					15.99	
386						95% Standard Bootstrap UCL					15.42	
387	Anderson-Darling Test Statistic				0.71	95% Bootstrap-t UCL					16.07	
388	Anderson-Darling 5% Critical Value				0.73	95% Hall's Bootstrap UCL					16	
389	Kolmogorov-Smirnov Test Statistic				0.286	95% Percentile Bootstrap UCL					15.4	
390	Kolmogorov-Smirnov 5% Critical Value				0.268	95% BCA Bootstrap UCL					15.46	
391	**Data follow Appr. Gamma Distribution at 5% Significance Level**					95% Chebyshev(Mean, Sd) UCL					20.93	
392						97.5% Chebyshev(Mean, Sd) UCL					24.61	
393	**Assuming Gamma Distribution**					99% Chebyshev(Mean, Sd) UCL					31.85	
394	95% Approximate Gamma UCL (Use when n >= 40)				17.65							
395	95% Adjusted Gamma UCL (Use when n < 40)				18.79							
396												
397	**Potential UCL to Use**					Use 95% Student's-t UCL					15.99	
398												
399	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
400	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											

	A	B	C	D	E	F	G	H	I	J	K	L
401	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
402												
403												
404	**COBALT**											
405												
406	**General Statistics**											
407	Number of Valid Observations					10	Number of Distinct Observations					10
408												
409	**Raw Statistics**						**Log-transformed Statistics**					
410	Minimum					2.08	Minimum of Log Data					0.732
411	Maximum					11.2	Maximum of Log Data					2.416
412	Mean					7.09	Mean of log Data					1.784
413	Geometric Mean					5.956	SD of log Data					0.692
414	Median					8.44						
415	SD					3.541						
416	Std. Error of Mean					1.12						
417	Coefficient of Variation					0.499						
418	Skewness					-0.656						
419												
420	**Relevant UCL Statistics**											
421	**Normal Distribution Test**						**Lognormal Distribution Test**					
422	Shapiro Wilk Test Statistic					0.837	Shapiro Wilk Test Statistic					0.754
423	Shapiro Wilk Critical Value					0.842	Shapiro Wilk Critical Value					0.842
424	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
425												
426	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
427	95% Student's-t UCL					9.143	95% H-UCL					13.52
428	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					14.58
429	95% Adjusted-CLT UCL (Chen-1995)					8.684	97.5% Chebyshev (MVUE) UCL					17.71
430	95% Modified-t UCL (Johnson-1978)					9.104	99% Chebyshev (MVUE) UCL					23.85
431												
432	**Gamma Distribution Test**						**Data Distribution**					
433	k star (bias corrected)					2.184	**Data do not follow a Discernable Distribution (0.05)**					
434	Theta Star					3.246						
435	MLE of Mean					7.09						
436	MLE of Standard Deviation					4.798						
437	nu star					43.68						
438	Approximate Chi Square Value (.05)					29.52	**Nonparametric Statistics**					
439	Adjusted Level of Significance					0.0267	95% CLT UCL					8.932
440	Adjusted Chi Square Value					27.51	95% Jackknife UCL					9.143
441							95% Standard Bootstrap UCL					8.824
442	Anderson-Darling Test Statistic					1.112	95% Bootstrap-t UCL					8.86
443	Anderson-Darling 5% Critical Value					0.732	95% Hall's Bootstrap UCL					8.635
444	Kolmogorov-Smirnov Test Statistic					0.289	95% Percentile Bootstrap UCL					8.806
445	Kolmogorov-Smirnov 5% Critical Value					0.268	95% BCA Bootstrap UCL					8.665
446	**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					11.97
447							97.5% Chebyshev(Mean, Sd) UCL					14.08
448	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					18.23
449	95% Approximate Gamma UCL (Use when n >= 40)					10.49						
450	95% Adjusted Gamma UCL (Use when n < 40)					11.26						

451												
452	**Potential UCL to Use**									Use 95% Chebyshev (Mean, Sd) UCL		11.97
453	**Recommended UCL exceeds the maximum observation**											
454												
455	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
456	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
457	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
458												
459	**Note: For highly negative-skewed data, confidence limits**											
460	**(e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
461	**reliable. Chen's and Johnson's methods provide**											
462	**adjustments for positvely skewed data sets.**											
463												
464												
465	**IRON**											
466												
467	**General Statistics**											
468	Number of Valid Observations					10				Number of Distinct Observations		9
469												
470	**Raw Statistics**									**Log-transformed Statistics**		
471	Minimum					4710				Minimum of Log Data		8.457
472	Maximum					20300				Maximum of Log Data		9.918
473	Mean					13028				Mean of log Data		9.341
474	Geometric Mean					11398				SD of log Data		0.595
475	Median					15200						
476	SD					5924						
477	Std. Error of Mean					1873						
478	Coefficient of Variation					0.455						
479	Skewness					-0.627						
480												
481												
482	**Relevant UCL Statistics**											
483	**Normal Distribution Test**									**Lognormal Distribution Test**		
484	Shapiro Wilk Test Statistic					0.834				Shapiro Wilk Test Statistic		0.757
485	Shapiro Wilk Critical Value					0.842				Shapiro Wilk Critical Value		0.842
486	**Data not Normal at 5% Significance Level**									**Data not Lognormal at 5% Significance Level**		
487												
488	**Assuming Normal Distribution**									**Assuming Lognormal Distribution**		
489	95% Student's-t UCL					16462				95% H-UCL		21729
490	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL		24539
491	95% Adjusted-CLT UCL (Chen-1995)					15712				97.5% Chebyshev (MVUE) UCL		29387
492	95% Modified-t UCL (Johnson-1978)					16400				99% Chebyshev (MVUE) UCL		38908
493												
494	**Gamma Distribution Test**									**Data Distribution**		
495	k star (bias corrected)					2.796				**Data do not follow a Discernable Distribution (0.05)**		
496	Theta Star					4660						
497	MLE of Mean					13028						
498	MLE of Standard Deviation					7792						
499	nu star					55.91						
500	Approximate Chi Square Value (.05)					39.73				**Nonparametric Statistics**		

501					Adjusted Level of Significance	0.0267					95% CLT UCL	16109
502					Adjusted Chi Square Value	37.37					95% Jackknife UCL	16462
503											95% Standard Bootstrap UCL	15946
504					Anderson-Darling Test Statistic	1.129					95% Bootstrap-t UCL	16000
505					Anderson-Darling 5% Critical Value	0.73					95% Hall's Bootstrap UCL	15457
506					Kolmogorov-Smirnov Test Statistic	0.323					95% Percentile Bootstrap UCL	15850
507					Kolmogorov-Smirnov 5% Critical Value	0.268					95% BCA Bootstrap UCL	15616
508					**Data not Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	21193
509											97.5% Chebyshev(Mean, Sd) UCL	24726
510					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	31666
511					95% Approximate Gamma UCL (Use when n >= 40)	18336						
512					95% Adjusted Gamma UCL (Use when n < 40)	19493						
513												
514					**Potential UCL to Use**						Use 95% Chebyshev (Mean, Sd) UCL	21193
515					**Recommended UCL exceeds the maximum observation**							
516												
517					**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**							
518					**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**							
519					**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**							
520												
521					**Note: For highly negative-skewed data, confidence limits**							
522					**(e.g., Chen, Johnson, Lognormal, and Gamma) may not be**							
523					**reliable. Chen's and Johnson's methods provide**							
524					**adjustments for positvely skewed data sets.**							
525												
526												
527	**MANGANESE**											
528												
529					**General Statistics**							
530					Number of Valid Observations	10					Number of Distinct Observations	10
531												
532					**Raw Statistics**						**Log-transformed Statistics**	
533					Minimum	137					Minimum of Log Data	4.92
534					Maximum	701					Maximum of Log Data	6.553
535					Mean	446.1					Mean of log Data	5.955
536					Geometric Mean	385.8					SD of log Data	0.619
537					Median	477.5						
538					SD	215						
539					Std. Error of Mean	67.99						
540					Coefficient of Variation	0.482						
541					Skewness	-0.352						
542												
543					**Relevant UCL Statistics**							
544					**Normal Distribution Test**						**Lognormal Distribution Test**	
545					Shapiro Wilk Test Statistic	0.899					Shapiro Wilk Test Statistic	0.845
546					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
547					**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
548												
549					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
550					95% Student's-t UCL	570.7					95% H-UCL	766.5

551	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL	857.4	
552	95% Adjusted-CLT UCL (Chen-1995)	549.8								97.5% Chebyshev (MVUE) UCL	1031	
553	95% Modified-t UCL (Johnson-1978)	569.5								99% Chebyshev (MVUE) UCL	1371	
554												
555	**Gamma Distribution Test**									**Data Distribution**		
556	k star (bias corrected)	2.586								**Data appear Normal at 5% Significance Level**		
557	Theta Star	172.5										
558	MLE of Mean	446.1										
559	MLE of Standard Deviation	277.4										
560	nu star	51.71										
561	Approximate Chi Square Value (.05)	36.19								**Nonparametric Statistics**		
562	Adjusted Level of Significance	0.0267								95% CLT UCL	557.9	
563	Adjusted Chi Square Value	33.95								95% Jackknife UCL	570.7	
564										95% Standard Bootstrap UCL	551.7	
565	Anderson-Darling Test Statistic	0.6								95% Bootstrap-t UCL	556.6	
566	Anderson-Darling 5% Critical Value	0.731								95% Hall's Bootstrap UCL	541.3	
567	Kolmogorov-Smirnov Test Statistic	0.206								95% Percentile Bootstrap UCL	549.3	
568	Kolmogorov-Smirnov 5% Critical Value	0.268								95% BCA Bootstrap UCL	544	
569	**Data appear Gamma Distributed at 5% Significance Level**									95% Chebyshev(Mean, Sd) UCL	742.5	
570										97.5% Chebyshev(Mean, Sd) UCL	870.7	
571	**Assuming Gamma Distribution**									99% Chebyshev(Mean, Sd) UCL	1123	
572	95% Approximate Gamma UCL (Use when n >= 40)	637.3										
573	95% Adjusted Gamma UCL (Use when n < 40)	679.5										
574												
575	**Potential UCL to Use**									Use 95% Student's-t UCL	570.7	
576												
577	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
578	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
579	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
580												
581	**Note: For highly negative-skewed data, confidence limits**											
582	**(e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
583	**reliable. Chen's and Johnson's methods provide**											
584	**adjustments for positvely skewed data sets.**											
585												
586												
587	**MERCURY**											
588												
589	**General Statistics**											
590	Number of Valid Observations	10								Number of Distinct Observations	10	
591												
592	**Raw Statistics**									**Log-transformed Statistics**		
593	Minimum	0.0235								Minimum of Log Data	-3.751	
594	Maximum	0.598								Maximum of Log Data	-0.514	
595	Mean	0.177								Mean of log Data	-2.144	
596	Geometric Mean	0.117								SD of log Data	1.004	
597	Median	0.148										
598	SD	0.173										
599	Std. Error of Mean	0.0546										
600	Coefficient of Variation	0.972										

601					Skewness	1.824						
602												
603	**Relevant UCL Statistics**											
604	**Normal Distribution Test**						**Lognormal Distribution Test**					
605					Shapiro Wilk Test Statistic	0.809					Shapiro Wilk Test Statistic	0.966
606					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
607	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
608												
609	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
610					95% Student's-t UCL	0.277					95% H-UCL	0.549
611	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	0.444
612					95% Adjusted-CLT UCL (Chen-1995)	0.301					97.5% Chebyshev (MVUE) UCL	0.558
613					95% Modified-t UCL (Johnson-1978)	0.283					99% Chebyshev (MVUE) UCL	0.782
614												
615	**Gamma Distribution Test**						**Data Distribution**					
616					k star (bias corrected)	1.008	**Data appear Gamma Distributed at 5% Significance Level**					
617					Theta Star	0.176						
618					MLE of Mean	0.177						
619					MLE of Standard Deviation	0.177						
620					nu star	20.17						
621					Approximate Chi Square Value (.05)	10.97	**Nonparametric Statistics**					
622					Adjusted Level of Significance	0.0267					95% CLT UCL	0.267
623					Adjusted Chi Square Value	9.816					95% Jackknife UCL	0.277
624											95% Standard Bootstrap UCL	0.264
625					Anderson-Darling Test Statistic	0.248					95% Bootstrap-t UCL	0.36
626					Anderson-Darling 5% Critical Value	0.742					95% Hall's Bootstrap UCL	0.728
627					Kolmogorov-Smirnov Test Statistic	0.153					95% Percentile Bootstrap UCL	0.265
628					Kolmogorov-Smirnov 5% Critical Value	0.272					95% BCA Bootstrap UCL	0.3
629	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	0.415
630											97.5% Chebyshev(Mean, Sd) UCL	0.518
631	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	0.72
632					95% Approximate Gamma UCL (Use when n >= 40)	0.326						
633					95% Adjusted Gamma UCL (Use when n < 40)	0.365						
634												
635	**Potential UCL to Use**										Use 95% Approximate Gamma UCL	0.326
636												
637	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
638	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
639	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
640												

1				General UCL Statistics for Data Sets with Non-Detects							
2	User Selected Options										
3	From File			H:\Great Lakes\Site 12 Harbor Dredge Spoil Area RI RA report\update HHRA\proUCL\Site 12 SS.xls.wst							
4	Full Precision			OFF							
5	Confidence Coefficient			95%							
6	Number of Bootstrap Operations			2000							
7											
8											
9	HEPTACHLOR										
10											
11	General Statistics										
12	Number of Valid Data			10		Number of Detected Data				4	
13	Number of Distinct Detected Data			4		Number of Non-Detect Data				6	
14						Percent Non-Detects				60.00%	
15											
16	Raw Statistics					Log-transformed Statistics					
17	Minimum Detected			0.18		Minimum Detected				-1.715	
18	Maximum Detected			236		Maximum Detected				5.464	
19	Mean of Detected			60.56		Mean of Detected				1.401	
20	SD of Detected			117		SD of Detected				3.024	
21	Minimum Non-Detect			0.347		Minimum Non-Detect				-1.058	
22	Maximum Non-Detect			0.399		Maximum Non-Detect				-0.919	
23											
24	Note: Data have multiple DLs - Use of KM Method is recommended					Number treated as Non-Detect				7	
25	For all methods (except KM, DL/2, and ROS Methods),					Number treated as Detected				3	
26	Observations < Largest ND are treated as NDs					Single DL Non-Detect Percentage				70.00%	
27											
28	Warning: There are only 4 Distinct Detected Values in this data										
29	Note: It should be noted that even though bootstrap may be performed on this data set										
30	the resulting calculations may not be reliable enough to draw conclusions										
31											
32	It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.										
33											
34											
35	UCL Statistics										
36	Normal Distribution Test with Detected Values Only					Lognormal Distribution Test with Detected Values Only					
37	Shapiro Wilk Test Statistic			0.644		Shapiro Wilk Test Statistic				0.964	
38	5% Shapiro Wilk Critical Value			0.748		5% Shapiro Wilk Critical Value				0.748	
39	Data not Normal at 5% Significance Level					Data appear Lognormal at 5% Significance Level					
40											
41	Assuming Normal Distribution					Assuming Lognormal Distribution					
42	DL/2 Substitution Method					DL/2 Substitution Method					
43	Mean			24.34		Mean				-0.443	
44	SD			74.38		SD				2.36	
45	95% DL/2 (t) UCL			67.46		95% H-Stat (DL/2) UCL				1447	
46											
47	Maximum Likelihood Estimate(MLE) Method			N/A		Log ROS Method					
48	MLE yields a negative mean					Mean in Log Scale				-0.878	
49						SD in Log Scale				2.626	
50						Mean in Original Scale				24.28	

51											SD in Original Scale	74.41
52											95% t UCL	67.41
53											95% Percentile Bootstrap UCL	71.13
54											95% BCA Bootstrap UCL	94.59
55											95% H-UCL	5647
56												
57	**Gamma Distribution Test with Detected Values Only**						**Data Distribution Test with Detected Values Only**					
58					k star (bias corrected)	0.232	**Data appear Gamma Distributed at 5% Significance Level**					
59					Theta Star	261.1						
60					nu star	1.855						
61												
62					A-D Test Statistic	0.451	**Nonparametric Statistics**					
63					5% A-D Critical Value	0.715	Kaplan-Meier (KM) Method					
64					K-S Test Statistic	0.715	Mean	24.33				
65					5% K-S Critical Value	0.421	SD	70.57				
66	**Data appear Gamma Distributed at 5% Significance Level**						SE of Mean	25.77				
67							95% KM (t) UCL	71.57				
68	**Assuming Gamma Distribution**						95% KM (z) UCL	66.72				
69					Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	66.91				
70					Minimum	0.000001	95% KM (bootstrap t) UCL	1308				
71					Maximum	236	95% KM (BCA) UCL	236				
72					Mean	24.22	95% KM (Percentile Bootstrap) UCL	72.09				
73					Median	0.000001	95% KM (Chebyshev) UCL	136.7				
74					SD	74.43	97.5% KM (Chebyshev) UCL	185.3				
75					k star	0.12	99% KM (Chebyshev) UCL	280.7				
76					Theta star	201.2						
77					Nu star	2.408	**Potential UCLs to Use**					
78					AppChi2	0.221	95% KM (t) UCL	71.57				
79					95% Gamma Approximate UCL (Use when n >= 40)	263.8						
80					95% Adjusted Gamma UCL (Use when n < 40)	N/A						
81	**Note: DL/2 is not a recommended method.**											
82												
83	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
84	**These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).**											
85	**For additional insight, the user may want to consult a statistician.**											
86												
87												
88	**HEPTACHLOR EPOXIDE**											
89												
90	**General Statistics**											
91					Number of Valid Data	10	Number of Detected Data	7				
92					Number of Distinct Detected Data	7	Number of Non-Detect Data	3				
93							Percent Non-Detects	30.00%				
94												
95	**Raw Statistics**						**Log-transformed Statistics**					
96					Minimum Detected	0.122	Minimum Detected	-2.104				
97					Maximum Detected	64	Maximum Detected	4.159				
98					Mean of Detected	12.15	Mean of Detected	0.904				
99					SD of Detected	23.13	SD of Detected	2.148				
100					Minimum Non-Detect	0.347	Minimum Non-Detect	-1.058				

101					Maximum Non-Detect	0.391				Maximum Non-Detect		-0.939
102												
103	Note: Data have multiple DLs - Use of KM Method is recommended									Number treated as Non-Detect		5
104	For all methods (except KM, DL/2, and ROS Methods),									Number treated as Detected		5
105	Observations < Largest ND are treated as NDs									Single DL Non-Detect Percentage		50.00%
106												
107	**Warning: There are only 7 Detected Values in this data**											
108	**Note: It should be noted that even though bootstrap may be performed on this data set**											
109	**the resulting calculations may not be reliable enough to draw conclusions**											
110												
111	**It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.**											
112												
113												
114	**UCL Statistics**											
115	**Normal Distribution Test with Detected Values Only**									**Lognormal Distribution Test with Detected Values Only**		
116					Shapiro Wilk Test Statistic	0.586				Shapiro Wilk Test Statistic		0.975
117					5% Shapiro Wilk Critical Value	0.803				5% Shapiro Wilk Critical Value		0.803
118	**Data not Normal at 5% Significance Level**									**Data appear Lognormal at 5% Significance Level**		
119												
120	**Assuming Normal Distribution**									**Assuming Lognormal Distribution**		
121					DL/2 Substitution Method					DL/2 Substitution Method		
122					Mean	8.56				Mean		0.128
123					SD	19.75				SD		2.154
124					95% DL/2 (t) UCL	20.01				95% H-Stat (DL/2) UCL		727.9
125												
126					Maximum Likelihood Estimate(MLE) Method	N/A				Log ROS Method		
127	**MLE yields a negative mean**									Mean in Log Scale		0.119
128										SD in Log Scale		2.162
129										Mean in Original Scale		8.558
130										SD in Original Scale		19.75
131										95% t UCL		20.01
132										95% Percentile Bootstrap UCL		20.62
133										95% BCA Bootstrap UCL		27.08
134										95% H-UCL		754.7
135												
136	**Gamma Distribution Test with Detected Values Only**									**Data Distribution Test with Detected Values Only**		
137					k star (bias corrected)	0.33				**Data appear Gamma Distributed at 5% Significance Level**		
138					Theta Star	36.79						
139					nu star	4.623						
140												
141					A-D Test Statistic	0.342				**Nonparametric Statistics**		
142					5% A-D Critical Value	0.766				Kaplan-Meier (KM) Method		
143					K-S Test Statistic	0.766				Mean		8.566
144					5% K-S Critical Value	0.331				SD		18.74
145	**Data appear Gamma Distributed at 5% Significance Level**									SE of Mean		6.4
146										95% KM (t) UCL		20.3
147	**Assuming Gamma Distribution**									95% KM (z) UCL		19.09
148					Gamma ROS Statistics using Extrapolated Data					95% KM (jackknife) UCL		20.01
149					Minimum	0.000001				95% KM (bootstrap t) UCL		80.46
150					Maximum	64				95% KM (BCA) UCL		20.38

151					Mean	8.504			95% KM (Percentile Bootstrap) UCL			20.32
152					Median	0.709			95% KM (Chebyshev) UCL			36.46
153					SD	19.78			97.5% KM (Chebyshev) UCL			48.53
154					k star	0.163			99% KM (Chebyshev) UCL			72.24
155					Theta star	52.16						
156					Nu star	3.261			**Potential UCLs to Use**			
157					AppChi2	0.454			95% KM (BCA) UCL			20.38
158				95% Gamma Approximate UCL (Use when n >= 40)		61.13						
159				95% Adjusted Gamma UCL (Use when n < 40)		88.34						
160	**Note: DL/2 is not a recommended method.**											
161												
162	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
163	**These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).**											
164	**For additional insight, the user may want to consult a statistician.**											
165												
166												
167	**THALLIUM**											
168												
169	**General Statistics**											
170					Number of Valid Data	10			Number of Detected Data			1
171					Number of Distinct Detected Data	1			Number of Non-Detect Data			9
172									Percent Non-Detects			90.00%
173												
174	**Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!**											
175	**It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).**											
176												
177	**The data set for variable THALLIUM was not processed!**											
178												
179												

Subsurface Soil

	General UCL Statistics for Full Data Sets	
User Selected Options		
From File	H:\Great Lakes\Site 12 Harbor Dredge Spoil Area RI RA report\update HHRA\proUCL\Site 12 SB.xls.wst	
Full Precision	OFF	
Confidence Coefficient	95%	
Number of Bootstrap Operations	2000	

BAP EQUIVALENT

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	10

Raw Statistics		**Log-transformed Statistics**	
Minimum	55.55	Minimum of Log Data	4.017
Maximum	10609	Maximum of Log Data	9.269
Mean	1777	Mean of log Data	6.164
Geometric Mean	475.3	SD of log Data	1.783
Median	559.4		
SD	3230		
Std. Error of Mean	1021		
Coefficient of Variation	1.818		
Skewness	2.744		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.59	Shapiro Wilk Test Statistic	0.927
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	3649	95% H-UCL	42203
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	6126
95% Adjusted-CLT UCL (Chen-1995)	4403	97.5% Chebyshev (MVUE) UCL	8033
95% Modified-t UCL (Johnson-1978)	3796	99% Chebyshev (MVUE) UCL	11780
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.406	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	4380		
MLE of Mean	1777		
MLE of Standard Deviation	2790		
nu star	8.112		
Approximate Chi Square Value (.05)	2.8	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	3456
Adjusted Chi Square Value	2.287	95% Jackknife UCL	3649
		95% Standard Bootstrap UCL	3330
Anderson-Darling Test Statistic	0.54	95% Bootstrap-t UCL	8099
Anderson-Darling 5% Critical Value	0.78	95% Hall's Bootstrap UCL	9470
Kolmogorov-Smirnov Test Statistic	0.222	95% Percentile Bootstrap UCL	3702
Kolmogorov-Smirnov 5% Critical Value	0.281	95% BCA Bootstrap UCL	4731

51	**Data appear Gamma Distributed at 5% Significance Level**									95% Chebyshev(Mean, Sd) UCL		6228
52										97.5% Chebyshev(Mean, Sd) UCL		8155
53	**Assuming Gamma Distribution**									99% Chebyshev(Mean, Sd) UCL		11939
54	95% Approximate Gamma UCL (Use when n >= 40)					5147						
55	95% Adjusted Gamma UCL (Use when n < 40)					6302						
56												
57	**Potential UCL to Use**									Use 95% Adjusted Gamma UCL		6302
58												
59	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
60	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
61	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
62												
63												
64	**NAPHTHALENE**											
65												
66	**General Statistics**											
67	Number of Valid Observations					10				Number of Distinct Observations		10
68												
69	**Raw Statistics**									**Log-transformed Statistics**		
70	Minimum					4				Minimum of Log Data		1.386
71	Maximum					439				Maximum of Log Data		6.084
72	Mean					128.2				Mean of log Data		3.854
73	Geometric Mean					47.19				SD of log Data		1.692
74	Median					52.25						
75	SD					155.9						
76	Std. Error of Mean					49.3						
77	Coefficient of Variation					1.216						
78	Skewness					1.167						
79												
80	**Relevant UCL Statistics**											
81	**Normal Distribution Test**									**Lognormal Distribution Test**		
82	Shapiro Wilk Test Statistic					0.805				Shapiro Wilk Test Statistic		0.933
83	Shapiro Wilk Critical Value					0.842				Shapiro Wilk Critical Value		0.842
84	**Data not Normal at 5% Significance Level**									**Data appear Lognormal at 5% Significance Level**		
85												
86	**Assuming Normal Distribution**									**Assuming Lognormal Distribution**		
87	95% Student's-t UCL					218.6				95% H-UCL		2736
88	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL		523.2
89	95% Adjusted-CLT UCL (Chen-1995)					228.7				97.5% Chebyshev (MVUE) UCL		683.9
90	95% Modified-t UCL (Johnson-1978)					221.6				99% Chebyshev (MVUE) UCL		999.6
91												
92	**Gamma Distribution Test**									**Data Distribution**		
93	k star (bias corrected)					0.498				**Data appear Gamma Distributed at 5% Significance Level**		
94	Theta Star					257.5						
95	MLE of Mean					128.2						
96	MLE of Standard Deviation					181.7						
97	nu star					9.957						
98	Approximate Chi Square Value (.05)					3.915				**Nonparametric Statistics**		
99	Adjusted Level of Significance					0.0267				95% CLT UCL		209.3
100	Adjusted Chi Square Value					3.283				95% Jackknife UCL		218.6

101											95% Standard Bootstrap UCL	205.5
102				Anderson-Darling Test Statistic	0.35						95% Bootstrap-t UCL	265.2
103				Anderson-Darling 5% Critical Value	0.768						95% Hall's Bootstrap UCL	209.8
104				Kolmogorov-Smirnov Test Statistic	0.159						95% Percentile Bootstrap UCL	211
105				Kolmogorov-Smirnov 5% Critical Value	0.279						95% BCA Bootstrap UCL	222.8
106				**Data appear Gamma Distributed at 5% Significance Level**							95% Chebyshev(Mean, Sd) UCL	343.1
107											97.5% Chebyshev(Mean, Sd) UCL	436.1
108				**Assuming Gamma Distribution**							99% Chebyshev(Mean, Sd) UCL	618.7
109				95% Approximate Gamma UCL (Use when n >= 40)	326							
110				95% Adjusted Gamma UCL (Use when n < 40)	388.7							
111												
112				**Potential UCL to Use**							Use 95% Approximate Gamma UCL	326
113												
114	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
115	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
116	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
117												
118												
119	**ALUMINUM**											
120												
121	**General Statistics**											
122				Number of Valid Observations	10						Number of Distinct Observations	10
123												
124	**Raw Statistics**						**Log-transformed Statistics**					
125				Minimum	1380						Minimum of Log Data	7.23
126				Maximum	11700						Maximum of Log Data	9.367
127				Mean	6717						Mean of log Data	8.573
128				Geometric Mean	5286						SD of log Data	0.831
129				Median	7175							
130				SD	3807							
131				Std. Error of Mean	1204							
132				Coefficient of Variation	0.567							
133				Skewness	-0.415							
134												
135	**Relevant UCL Statistics**											
136	**Normal Distribution Test**						**Lognormal Distribution Test**					
137				Shapiro Wilk Test Statistic	0.897						Shapiro Wilk Test Statistic	0.804
138				Shapiro Wilk Critical Value	0.842						Shapiro Wilk Critical Value	0.842
139	**Data appear Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
140												
141	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
142				95% Student's-t UCL	8924						95% H-UCL	16060
143	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	15662
144				95% Adjusted-CLT UCL (Chen-1995)	8528						97.5% Chebyshev (MVUE) UCL	19344
145				95% Modified-t UCL (Johnson-1978)	8897						99% Chebyshev (MVUE) UCL	26577
146												
147	**Gamma Distribution Test**						**Data Distribution**					
148				k star (bias corrected)	1.634		**Data appear Normal at 5% Significance Level**					
149				Theta Star	4110							
150				MLE of Mean	6717							

151					MLE of Standard Deviation	5254						
152					nu star	32.68						
153					Approximate Chi Square Value (.05)	20.61				Nonparametric Statistics		
154					Adjusted Level of Significance	0.0267				95% CLT UCL	8697	
155					Adjusted Chi Square Value	18.96				95% Jackknife UCL	8924	
156										95% Standard Bootstrap UCL	8571	
157					Anderson-Darling Test Statistic	0.786				95% Bootstrap-t UCL	8729	
158					Anderson-Darling 5% Critical Value	0.735				95% Hall's Bootstrap UCL	8418	
159					Kolmogorov-Smirnov Test Statistic	0.267				95% Percentile Bootstrap UCL	8514	
160					Kolmogorov-Smirnov 5% Critical Value	0.269				95% BCA Bootstrap UCL	8465	
161					**Data follow Appr. Gamma Distribution at 5% Significance Level**					95% Chebyshev(Mean, Sd) UCL	11964	
162										97.5% Chebyshev(Mean, Sd) UCL	14235	
163					**Assuming Gamma Distribution**					99% Chebyshev(Mean, Sd) UCL	18695	
164					95% Approximate Gamma UCL (Use when n >= 40)	10649						
165					95% Adjusted Gamma UCL (Use when n < 40)	11576						
166												
167					**Potential UCL to Use**					Use 95% Student's-t UCL	8924	
168												
169	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
170	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
171	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
172												
173	**Note: For highly negative-skewed data, confidence limits**											
174	**(e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
175	**reliable. Chen's and Johnson's methods provide**											
176	**adjustments for positvely skewed data sets.**											
177												
178												
179	**ARSENIC**											
180												
181	**General Statistics**											
182	Number of Valid Observations					10	Number of Distinct Observations				10	
183												
184	**Raw Statistics**						**Log-transformed Statistics**					
185	Minimum					4.26	Minimum of Log Data				1.449	
186	Maximum					25	Maximum of Log Data				3.219	
187	Mean					11.58	Mean of log Data				2.321	
188	Geometric Mean					10.18	SD of log Data				0.53	
189	Median					9.155						
190	SD					6.46						
191	Std. Error of Mean					2.043						
192	Coefficient of Variation					0.558						
193	Skewness					1.15						
194												
195	**Relevant UCL Statistics**											
196	**Normal Distribution Test**						**Lognormal Distribution Test**					
197	Shapiro Wilk Test Statistic					0.873	Shapiro Wilk Test Statistic				0.957	
198	Shapiro Wilk Critical Value					0.842	Shapiro Wilk Critical Value				0.842	
199	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
200												

201	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
202				95% Student's-t UCL		15.33					95% H-UCL	17.48
203	**95% UCLs (Adjusted for Skewness)**										95% Chebyshev (MVUE) UCL	20.14
204				95% Adjusted-CLT UCL (Chen-1995)		15.74					97.5% Chebyshev (MVUE) UCL	23.86
205				95% Modified-t UCL (Johnson-1978)		15.45					99% Chebyshev (MVUE) UCL	31.17
206												
207	**Gamma Distribution Test**						**Data Distribution**					
208				k star (bias corrected)		2.89	**Data appear Normal at 5% Significance Level**					
209				Theta Star		4.008						
210				MLE of Mean		11.58						
211				MLE of Standard Deviation		6.814						
212				nu star		57.81						
213				Approximate Chi Square Value (.05)		41.33	**Nonparametric Statistics**					
214				Adjusted Level of Significance		0.0267					95% CLT UCL	14.94
215				Adjusted Chi Square Value		38.92					95% Jackknife UCL	15.33
216											95% Standard Bootstrap UCL	14.77
217				Anderson-Darling Test Statistic		0.402					95% Bootstrap-t UCL	16.92
218				Anderson-Darling 5% Critical Value		0.729					95% Hall's Bootstrap UCL	15.78
219				Kolmogorov-Smirnov Test Statistic		0.192					95% Percentile Bootstrap UCL	15
220				Kolmogorov-Smirnov 5% Critical Value		0.268					95% BCA Bootstrap UCL	15.6
221	**Data appear Gamma Distributed at 5% Significance Level**										95% Chebyshev(Mean, Sd) UCL	20.49
222											97.5% Chebyshev(Mean, Sd) UCL	24.34
223	**Assuming Gamma Distribution**										99% Chebyshev(Mean, Sd) UCL	31.91
224				95% Approximate Gamma UCL (Use when n >= 40)		16.2						
225				95% Adjusted Gamma UCL (Use when n < 40)		17.21						
226												
227	**Potential UCL to Use**										Use 95% Student's-t UCL	15.33
228												
229	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
230	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
231	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
232												
233												
234	**BARIUM**											
235												
236	**General Statistics**											
237				Number of Valid Observations		10					Number of Distinct Observations	10
238												
239	**Raw Statistics**						**Log-transformed Statistics**					
240				Minimum		6.73					Minimum of Log Data	1.907
241				Maximum		432					Maximum of Log Data	6.068
242				Mean		119.9					Mean of log Data	4.184
243				Geometric Mean		65.62					SD of log Data	1.33
244				Median		98.45						
245				SD		124.9						
246				Std. Error of Mean		39.51						
247				Coefficient of Variation		1.042						
248				Skewness		1.894						
249												
250	**Relevant UCL Statistics**											

	A	B	C	D	E	F	G	H	I	J	K	L
251	**Normal Distribution Test**						**Lognormal Distribution Test**					
252	Shapiro Wilk Test Statistic					0.797	Shapiro Wilk Test Statistic					0.919
253	Shapiro Wilk Critical Value					0.842	Shapiro Wilk Critical Value					0.842
254	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
255												
256	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
257	95% Student's-t UCL					192.3	95% H-UCL					864.4
258	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					406.9
259	95% Adjusted-CLT UCL (Chen-1995)					210.2	97.5% Chebyshev (MVUE) UCL					523.1
260	95% Modified-t UCL (Johnson-1978)					196.3	99% Chebyshev (MVUE) UCL					751.3
261												
262	**Gamma Distribution Test**						**Data Distribution**					
263	k star (bias corrected)					0.74	**Data appear Gamma Distributed at 5% Significance Level**					
264	Theta Star					162.1						
265	MLE of Mean					119.9						
266	MLE of Standard Deviation					139.4						
267	nu star					14.8						
268	Approximate Chi Square Value (.05)					7.122	**Nonparametric Statistics**					
269	Adjusted Level of Significance					0.0267	95% CLT UCL					184.9
270	Adjusted Chi Square Value					6.219	95% Jackknife UCL					192.3
271							95% Standard Bootstrap UCL					180.3
272	Anderson-Darling Test Statistic					0.319	95% Bootstrap-t UCL					242.9
273	Anderson-Darling 5% Critical Value					0.75	95% Hall's Bootstrap UCL					470.9
274	Kolmogorov-Smirnov Test Statistic					0.157	95% Percentile Bootstrap UCL					187.5
275	Kolmogorov-Smirnov 5% Critical Value					0.274	95% BCA Bootstrap UCL					207.5
276	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL					292.1
277							97.5% Chebyshev(Mean, Sd) UCL					366.7
278	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL					513
279	95% Approximate Gamma UCL (Use when n >= 40)					249.2						
280	95% Adjusted Gamma UCL (Use when n < 40)					285.3						
281												
282	**Potential UCL to Use**						Use 95% Approximate Gamma UCL					249.2
283												
284	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
285	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
286	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
287												
288												
289	**CADMIUM**											
290												
291	**General Statistics**											
292	Number of Valid Observations					10	Number of Distinct Observations					10
293												
294	**Raw Statistics**						**Log-transformed Statistics**					
295	Minimum					0.119	Minimum of Log Data					-2.129
296	Maximum					7.31	Maximum of Log Data					1.989
297	Mean					1.817	Mean of log Data					-0.199
298	Geometric Mean					0.82	SD of log Data					1.328
299	Median					0.756						
300	SD					2.523						

301					Std. Error of Mean	0.798						
302					Coefficient of Variation	1.389						
303					Skewness	1.766						
304												
305					**Relevant UCL Statistics**							
306					**Normal Distribution Test**					**Lognormal Distribution Test**		
307					Shapiro Wilk Test Statistic	0.682				Shapiro Wilk Test Statistic	0.957	
308					Shapiro Wilk Critical Value	0.842				Shapiro Wilk Critical Value	0.842	
309					**Data not Normal at 5% Significance Level**					**Data appear Lognormal at 5% Significance Level**		
310												
311					**Assuming Normal Distribution**					**Assuming Lognormal Distribution**		
312					95% Student's-t UCL	3.279				95% H-UCL	10.72	
313					**95% UCLs (Adjusted for Skewness)**					95% Chebyshev (MVUE) UCL	5.068	
314					95% Adjusted-CLT UCL (Chen-1995)	3.606				97.5% Chebyshev (MVUE) UCL	6.514	
315					95% Modified-t UCL (Johnson-1978)	3.354				99% Chebyshev (MVUE) UCL	9.355	
316												
317					**Gamma Distribution Test**					**Data Distribution**		
318					k star (bias corrected)	0.593				**Data appear Gamma Distributed at 5% Significance Level**		
319					Theta Star	3.063						
320					MLE of Mean	1.817						
321					MLE of Standard Deviation	2.359						
322					nu star	11.86						
323					Approximate Chi Square Value (.05)	5.136				**Nonparametric Statistics**		
324					Adjusted Level of Significance	0.0267				95% CLT UCL	3.129	
325					Adjusted Chi Square Value	4.392				95% Jackknife UCL	3.279	
326										95% Standard Bootstrap UCL	3.034	
327					Anderson-Darling Test Statistic	0.567				95% Bootstrap-t UCL	8.61	
328					Anderson-Darling 5% Critical Value	0.757				95% Hall's Bootstrap UCL	11.28	
329					Kolmogorov-Smirnov Test Statistic	0.208				95% Percentile Bootstrap UCL	3.185	
330					Kolmogorov-Smirnov 5% Critical Value	0.276				95% BCA Bootstrap UCL	3.583	
331					**Data appear Gamma Distributed at 5% Significance Level**					95% Chebyshev(Mean, Sd) UCL	5.295	
332										97.5% Chebyshev(Mean, Sd) UCL	6.8	
333					**Assuming Gamma Distribution**					99% Chebyshev(Mean, Sd) UCL	9.756	
334					95% Approximate Gamma UCL (Use when n >= 40)	4.196						
335					95% Adjusted Gamma UCL (Use when n < 40)	4.906						
336												
337					**Potential UCL to Use**					Use 95% Approximate Gamma UCL	4.196	
338												
339					**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**							
340					**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**							
341					**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**							
342												
343												
344	**CHROMIUM**											
345												
346					**General Statistics**							
347					Number of Valid Observations	10				Number of Distinct Observations	10	
348												
349					**Raw Statistics**					**Log-transformed Statistics**		
350					Minimum	4.65				Minimum of Log Data	1.537	

351					Maximum	60.8				Maximum of Log Data	4.108	
352					Mean	20.62				Mean of log Data	2.714	
353					Geometric Mean	15.09				SD of log Data	0.845	
354					Median	16.15						
355					SD	17.59						
356					Std. Error of Mean	5.562						
357					Coefficient of Variation	0.853						
358					Skewness	1.524						
359												
360	**Relevant UCL Statistics**											
361	**Normal Distribution Test**						**Lognormal Distribution Test**					
362					Shapiro Wilk Test Statistic	0.846				Shapiro Wilk Test Statistic	0.967	
363					Shapiro Wilk Critical Value	0.842				Shapiro Wilk Critical Value	0.842	
364	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
365												
366	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
367					95% Student's-t UCL	30.82				95% H-UCL	47.37	
368	**95% UCLs (Adjusted for Skewness)**									95% Chebyshev (MVUE) UCL	45.6	
369					95% Adjusted-CLT UCL (Chen-1995)	32.63				97.5% Chebyshev (MVUE) UCL	56.41	
370					95% Modified-t UCL (Johnson-1978)	31.26				99% Chebyshev (MVUE) UCL	77.65	
371												
372	**Gamma Distribution Test**						**Data Distribution**					
373					k star (bias corrected)	1.291	**Data appear Normal at 5% Significance Level**					
374					Theta Star	15.97						
375					MLE of Mean	20.62						
376					MLE of Standard Deviation	18.15						
377					nu star	25.82						
378					Approximate Chi Square Value (.05)	15.24	**Nonparametric Statistics**					
379					Adjusted Level of Significance	0.0267				95% CLT UCL	29.77	
380					Adjusted Chi Square Value	13.84				95% Jackknife UCL	30.82	
381										95% Standard Bootstrap UCL	29.3	
382					Anderson-Darling Test Statistic	0.223				95% Bootstrap-t UCL	39.2	
383					Anderson-Darling 5% Critical Value	0.737				95% Hall's Bootstrap UCL	80.08	
384					Kolmogorov-Smirnov Test Statistic	0.124				95% Percentile Bootstrap UCL	29.78	
385					Kolmogorov-Smirnov 5% Critical Value	0.27				95% BCA Bootstrap UCL	32.33	
386	**Data appear Gamma Distributed at 5% Significance Level**									95% Chebyshev(Mean, Sd) UCL	44.86	
387										97.5% Chebyshev(Mean, Sd) UCL	55.36	
388	**Assuming Gamma Distribution**									99% Chebyshev(Mean, Sd) UCL	75.96	
389					95% Approximate Gamma UCL (Use when n >= 40)	34.93						
390					95% Adjusted Gamma UCL (Use when n < 40)	38.45						
391												
392	**Potential UCL to Use**									Use 95% Student's-t UCL	30.82	
393												
394	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
395	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
396	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
397												
398												
399	**COBALT**											
400												

401	**General Statistics**											
402	Number of Valid Observations				10		Number of Distinct Observations				10	
403												
404	**Raw Statistics**						**Log-transformed Statistics**					
405	Minimum				2.37		Minimum of Log Data				0.863	
406	Maximum				17		Maximum of Log Data				2.833	
407	Mean				8.453		Mean of log Data				1.966	
408	Geometric Mean				7.141		SD of log Data				0.655	
409	Median				8.55							
410	SD				4.656							
411	Std. Error of Mean				1.472							
412	Coefficient of Variation				0.551							
413	Skewness				0.38							
414												
415	**Relevant UCL Statistics**											
416	**Normal Distribution Test**						**Lognormal Distribution Test**					
417	Shapiro Wilk Test Statistic				0.953		Shapiro Wilk Test Statistic				0.922	
418	Shapiro Wilk Critical Value				0.842		Shapiro Wilk Critical Value				0.842	
419	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
420												
421	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
422	95% Student's-t UCL				11.15		95% H-UCL				15.12	
423	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL				16.64	
424	95% Adjusted-CLT UCL (Chen-1995)				11.06		97.5% Chebyshev (MVUE) UCL				20.1	
425	95% Modified-t UCL (Johnson-1978)				11.18		99% Chebyshev (MVUE) UCL				26.91	
426												
427	**Gamma Distribution Test**						**Data Distribution**					
428	k star (bias corrected)				2.252		**Data appear Normal at 5% Significance Level**					
429	Theta Star				3.754							
430	MLE of Mean				8.453							
431	MLE of Standard Deviation				5.633							
432	nu star				45.04							
433	Approximate Chi Square Value (.05)				30.64		**Nonparametric Statistics**					
434	Adjusted Level of Significance				0.0267		95% CLT UCL				10.87	
435	Adjusted Chi Square Value				28.59		95% Jackknife UCL				11.15	
436							95% Standard Bootstrap UCL				10.78	
437	Anderson-Darling Test Statistic				0.327		95% Bootstrap-t UCL				11.32	
438	Anderson-Darling 5% Critical Value				0.732		95% Hall's Bootstrap UCL				11.42	
439	Kolmogorov-Smirnov Test Statistic				0.186		95% Percentile Bootstrap UCL				10.79	
440	Kolmogorov-Smirnov 5% Critical Value				0.268		95% BCA Bootstrap UCL				10.9	
441	**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL				14.87	
442							97.5% Chebyshev(Mean, Sd) UCL				17.65	
443	**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL				23.1	
444	95% Approximate Gamma UCL (Use when n >= 40)				12.42							
445	95% Adjusted Gamma UCL (Use when n < 40)				13.31							
446												
447	**Potential UCL to Use**						Use 95% Student's-t UCL				11.15	
448												
449	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
450	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

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General Statistics

Number of Valid Observations	10	Number of Distinct Observations	10

Raw Statistics		Log-transformed Statistics	
Minimum	6.56	Minimum of Log Data	1.881
Maximum	362	Maximum of Log Data	5.892
Mean	105.2	Mean of log Data	4.031
Geometric Mean	56.34	SD of log Data	1.287
Median	64.8		
SD	118.4		
Std. Error of Mean	37.43		
Coefficient of Variation	1.125		
Skewness	1.598		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.775	Shapiro Wilk Test Statistic	0.954
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	173.9	95% H-UCL	636.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	326.7
95% Adjusted-CLT UCL (Chen-1995)	187	97.5% Chebyshev (MVUE) UCL	418.9
95% Modified-t UCL (Johnson-1978)	177	99% Chebyshev (MVUE) UCL	600
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.719	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	146.4		
MLE of Mean	105.2		
MLE of Standard Deviation	124.1		
nu star	14.37		
Approximate Chi Square Value (.05)	6.829	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	166.8
Adjusted Chi Square Value	5.948	95% Jackknife UCL	173.9
		95% Standard Bootstrap UCL	163.5
Anderson-Darling Test Statistic	0.29	95% Bootstrap-t UCL	284.8
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	582.7
Kolmogorov-Smirnov Test Statistic	0.167	95% Percentile Bootstrap UCL	167.4
Kolmogorov-Smirnov 5% Critical Value	0.274	95% BCA Bootstrap UCL	179.8
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	268.4
		97.5% Chebyshev(Mean, Sd) UCL	339
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	477.7
95% Approximate Gamma UCL (Use when n >= 40)	221.5		
95% Adjusted Gamma UCL (Use when n < 40)	254.4		

	A	B	C	D	E	F	G	H	I	J	K	L
501												
502	**Potential UCL to Use**						Use 95% Approximate Gamma UCL					221.5
503												
504	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
505	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
506	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
507												
508												
509	**IRON**											
510												
511	**General Statistics**											
512	Number of Valid Observations					10	Number of Distinct Observations					10
513												
514	**Raw Statistics**						**Log-transformed Statistics**					
515	Minimum					4650	Minimum of Log Data					8.445
516	Maximum					31400	Maximum of Log Data					10.35
517	Mean					15601	Mean of log Data					9.505
518	Geometric Mean					13421	SD of log Data					0.622
519	Median					16950						
520	SD					8040						
521	Std. Error of Mean					2543						
522	Coefficient of Variation					0.515						
523	Skewness					0.342						
524												
525	**Relevant UCL Statistics**											
526	**Normal Distribution Test**						**Lognormal Distribution Test**					
527	Shapiro Wilk Test Statistic					0.92	Shapiro Wilk Test Statistic					0.88
528	Shapiro Wilk Critical Value					0.842	Shapiro Wilk Critical Value					0.842
529	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
530												
531	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
532	95% Student's-t UCL					20262	95% H-UCL					26820
533	**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL					29958
534	95% Adjusted-CLT UCL (Chen-1995)					20077	97.5% Chebyshev (MVUE) UCL					36026
535	95% Modified-t UCL (Johnson-1978)					20308	99% Chebyshev (MVUE) UCL					47946
536												
537	**Gamma Distribution Test**						**Data Distribution**					
538	k star (bias corrected)					2.503	**Data appear Normal at 5% Significance Level**					
539	Theta Star					6233						
540	MLE of Mean					15601						
541	MLE of Standard Deviation					9861						
542	nu star					50.06						
543	Approximate Chi Square Value (.05)					34.81	**Nonparametric Statistics**					
544	Adjusted Level of Significance					0.0267	95% CLT UCL					19783
545	Adjusted Chi Square Value					32.62	95% Jackknife UCL					20262
546							95% Standard Bootstrap UCL					19562
547	Anderson-Darling Test Statistic					0.565	95% Bootstrap-t UCL					20353
548	Anderson-Darling 5% Critical Value					0.731	95% Hall's Bootstrap UCL					20674
549	Kolmogorov-Smirnov Test Statistic					0.238	95% Percentile Bootstrap UCL					19540
550	Kolmogorov-Smirnov 5% Critical Value					0.268	95% BCA Bootstrap UCL					20205

551	Data appear Gamma Distributed at 5% Significance Level									95% Chebyshev(Mean, Sd) UCL		26684
552										97.5% Chebyshev(Mean, Sd) UCL		31479
553	Assuming Gamma Distribution									99% Chebyshev(Mean, Sd) UCL		40899
554	95% Approximate Gamma UCL (Use when n >= 40)					22433						
555	95% Adjusted Gamma UCL (Use when n < 40)					23944						
556												
557	Potential UCL to Use									Use 95% Student's-t UCL		20262
558												
559	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
560	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
561	and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.											
562												
563												
564	LEAD											
565												
566	General Statistics											
567	Number of Valid Observations					10				Number of Distinct Observations		10
568												
569	Raw Statistics									Log-transformed Statistics		
570	Minimum					26.6				Minimum of Log Data		3.281
571	Maximum					845				Maximum of Log Data		6.739
572	Mean					199.5				Mean of log Data		4.687
573	Geometric Mean					108.5				SD of log Data		1.152
574	Median					102.2						
575	SD					252.1						
576	Std. Error of Mean					79.72						
577	Coefficient of Variation					1.263						
578	Skewness					2.189						
579												
580	Relevant UCL Statistics											
581	Normal Distribution Test									Lognormal Distribution Test		
582	Shapiro Wilk Test Statistic					0.718				Shapiro Wilk Test Statistic		0.942
583	Shapiro Wilk Critical Value					0.842				Shapiro Wilk Critical Value		0.842
584	Data not Normal at 5% Significance Level									Data appear Lognormal at 5% Significance Level		
585												
586	Assuming Normal Distribution									Assuming Lognormal Distribution		
587	95% Student's-t UCL					345.7				95% H-UCL		783.9
588	95% UCLs (Adjusted for Skewness)									95% Chebyshev (MVUE) UCL		512.1
589	95% Adjusted-CLT UCL (Chen-1995)					389.6				97.5% Chebyshev (MVUE) UCL		650.8
590	95% Modified-t UCL (Johnson-1978)					354.9				99% Chebyshev (MVUE) UCL		923.3
591												
592	Gamma Distribution Test									Data Distribution		
593	k star (bias corrected)					0.734				Data appear Gamma Distributed at 5% Significance Level		
594	Theta Star					271.9						
595	MLE of Mean					199.5						
596	MLE of Standard Deviation					232.9						
597	nu star					14.68						
598	Approximate Chi Square Value (.05)					7.036				Nonparametric Statistics		
599	Adjusted Level of Significance					0.0267				95% CLT UCL		330.7
600	Adjusted Chi Square Value					6.14				95% Jackknife UCL		345.7

601											95% Standard Bootstrap UCL	322.7
602				Anderson-Darling Test Statistic	0.434						95% Bootstrap-t UCL	516.9
603				Anderson-Darling 5% Critical Value	0.75						95% Hall's Bootstrap UCL	773.1
604				Kolmogorov-Smirnov Test Statistic	0.18						95% Percentile Bootstrap UCL	345.5
605				Kolmogorov-Smirnov 5% Critical Value	0.274						95% BCA Bootstrap UCL	397.2
606				**Data appear Gamma Distributed at 5% Significance Level**							95% Chebyshev(Mean, Sd) UCL	547
607											97.5% Chebyshev(Mean, Sd) UCL	697.4
608				**Assuming Gamma Distribution**							99% Chebyshev(Mean, Sd) UCL	992.7
609				95% Approximate Gamma UCL (Use when n >= 40)	416.2							
610				95% Adjusted Gamma UCL (Use when n < 40)	476.9							
611												
612				**Potential UCL to Use**							Use 95% Approximate Gamma UCL	416.2
613												
614	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
615	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
616	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
617												
618												
619	**MANGANESE**											
620												
621					**General Statistics**							
622				Number of Valid Observations	10						Number of Distinct Observations	10
623												
624				**Raw Statistics**							**Log-transformed Statistics**	
625				Minimum	143						Minimum of Log Data	4.963
626				Maximum	846						Maximum of Log Data	6.741
627				Mean	460.6						Mean of log Data	5.991
628				Geometric Mean	399.8						SD of log Data	0.599
629				Median	498							
630				SD	229.7							
631				Std. Error of Mean	72.64							
632				Coefficient of Variation	0.499							
633				Skewness	0.0525							
634												
635					**Relevant UCL Statistics**							
636				**Normal Distribution Test**							**Lognormal Distribution Test**	
637				Shapiro Wilk Test Statistic	0.955						Shapiro Wilk Test Statistic	0.912
638				Shapiro Wilk Critical Value	0.842						Shapiro Wilk Critical Value	0.842
639				**Data appear Normal at 5% Significance Level**							**Data appear Lognormal at 5% Significance Level**	
640												
641				**Assuming Normal Distribution**							**Assuming Lognormal Distribution**	
642				95% Student's-t UCL	593.8						95% H-UCL	767.5
643				**95% UCLs (Adjusted for Skewness)**							95% Chebyshev (MVUE) UCL	865.4
644				95% Adjusted-CLT UCL (Chen-1995)	581.4						97.5% Chebyshev (MVUE) UCL	1037
645				95% Modified-t UCL (Johnson-1978)	594						99% Chebyshev (MVUE) UCL	1374
646												
647				**Gamma Distribution Test**							**Data Distribution**	
648				k star (bias corrected)	2.65						**Data appear Normal at 5% Significance Level**	
649				Theta Star	173.8							
650				MLE of Mean	460.6							

651					MLE of Standard Deviation	282.9						
652					nu star	53						
653					Approximate Chi Square Value (.05)	37.27				Nonparametric Statistics		
654					Adjusted Level of Significance	0.0267				95% CLT UCL		580.1
655					Adjusted Chi Square Value	34.99				95% Jackknife UCL		593.8
656										95% Standard Bootstrap UCL		574.1
657					Anderson-Darling Test Statistic	0.385				95% Bootstrap-t UCL		593.1
658					Anderson-Darling 5% Critical Value	0.73				95% Hall's Bootstrap UCL		583.3
659					Kolmogorov-Smirnov Test Statistic	0.22				95% Percentile Bootstrap UCL		572.5
660					Kolmogorov-Smirnov 5% Critical Value	0.268				95% BCA Bootstrap UCL		574.5
661					**Data appear Gamma Distributed at 5% Significance Level**					95% Chebyshev(Mean, Sd) UCL		777.3
662										97.5% Chebyshev(Mean, Sd) UCL		914.3
663					**Assuming Gamma Distribution**					99% Chebyshev(Mean, Sd) UCL		1183
664					95% Approximate Gamma UCL (Use when n >= 40)	654.9						
665					95% Adjusted Gamma UCL (Use when n < 40)	697.6						
666												
667					**Potential UCL to Use**					Use 95% Student's-t UCL		593.8
668												
669	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
670	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
671	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
672												
673												
674	**MERCURY**											
675												
676					**General Statistics**							
677					Number of Valid Observations	10				Number of Distinct Observations		10
678												
679					**Raw Statistics**					**Log-transformed Statistics**		
680					Minimum	0.0327				Minimum of Log Data		-3.42
681					Maximum	1.99				Maximum of Log Data		0.688
682					Mean	0.451				Mean of log Data		-1.779
683					Geometric Mean	0.169				SD of log Data		1.505
684					Median	0.136						
685					SD	0.647						
686					Std. Error of Mean	0.204						
687					Coefficient of Variation	1.434						
688					Skewness	1.81						
689												
690					**Relevant UCL Statistics**							
691					**Normal Distribution Test**					**Lognormal Distribution Test**		
692					Shapiro Wilk Test Statistic	0.709				Shapiro Wilk Test Statistic		0.899
693					Shapiro Wilk Critical Value	0.842				Shapiro Wilk Critical Value		0.842
694					**Data not Normal at 5% Significance Level**					**Data appear Lognormal at 5% Significance Level**		
695												
696					**Assuming Normal Distribution**					**Assuming Lognormal Distribution**		
697					95% Student's-t UCL	0.826				95% H-UCL		4.339
698					**95% UCLs (Adjusted for Skewness)**					95% Chebyshev (MVUE) UCL		1.378
699					95% Adjusted-CLT UCL (Chen-1995)	0.912				97.5% Chebyshev (MVUE) UCL		1.787
700					95% Modified-t UCL (Johnson-1978)	0.845				99% Chebyshev (MVUE) UCL		2.591

Gamma Distribution Test		**Data Distribution**
k star (bias corrected)	0.504	**Data appear Gamma Distributed at 5% Significance Level**
Theta Star	0.894	
MLE of Mean	0.451	
MLE of Standard Deviation	0.635	
nu star	10.08	
Approximate Chi Square Value (.05)	3.993	**Nonparametric Statistics**
Adjusted Level of Significance	0.0267	95% CLT UCL 0.787
Adjusted Chi Square Value	3.354	95% Jackknife UCL 0.826
		95% Standard Bootstrap UCL 0.763
Anderson-Darling Test Statistic	0.668	95% Bootstrap-t UCL 1.136
Anderson-Darling 5% Critical Value	0.767	95% Hall's Bootstrap UCL 0.834
Kolmogorov-Smirnov Test Statistic	0.239	95% Percentile Bootstrap UCL 0.818
Kolmogorov-Smirnov 5% Critical Value	0.278	95% BCA Bootstrap UCL 0.897
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 1.342
		97.5% Chebyshev(Mean, Sd) UCL 1.728
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 2.485
95% Approximate Gamma UCL (Use when n >= 40)	1.138	
95% Adjusted Gamma UCL (Use when n < 40)	1.355	
Potential UCL to Use		Use 95% Approximate Gamma UCL 1.138

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

1				General UCL Statistics for Data Sets with Non-Detects							
2	User Selected Options										
3	From File			H:\Great Lakes\Site 12 Harbor Dredge Spoil Area RI RA report\update HHRA\proUCL\Site 12 SB.xls.wst							
4	Full Precision			OFF							
5	Confidence Coefficient			95%							
6	Number of Bootstrap Operations			2000							
7											
8											
9	AROCLOR-1254										
10											
11	General Statistics										
12	Number of Valid Data			5		Number of Detected Data				4	
13	Number of Distinct Detected Data			4		Number of Non-Detect Data				1	
14	Number of Missing Values			4		Percent Non-Detects				20.00%	
15											
16	Raw Statistics					Log-transformed Statistics					
17	Minimum Detected			29.8		Minimum Detected				3.395	
18	Maximum Detected			799		Maximum Detected				6.683	
19	Mean of Detected			245.5		Mean of Detected				4.651	
20	SD of Detected			370.4		SD of Detected				1.451	
21	Minimum Non-Detect			9.43		Minimum Non-Detect				2.244	
22	Maximum Non-Detect			9.43		Maximum Non-Detect				2.244	
23											
24											
25	Warning: There are only 4 Distinct Detected Values in this data										
26	Note: It should be noted that even though bootstrap may be performed on this data set										
27	the resulting calculations may not be reliable enough to draw conclusions										
28											
29	It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.										
30											
31											
32	UCL Statistics										
33	Normal Distribution Test with Detected Values Only					Lognormal Distribution Test with Detected Values Only					
34	Shapiro Wilk Test Statistic			0.704		Shapiro Wilk Test Statistic				0.905	
35	5% Shapiro Wilk Critical Value			0.748		5% Shapiro Wilk Critical Value				0.748	
36	Data not Normal at 5% Significance Level					Data appear Lognormal at 5% Significance Level					
37											
38	Assuming Normal Distribution					Assuming Lognormal Distribution					
39	DL/2 Substitution Method					DL/2 Substitution Method					
40	Mean			197.3		Mean				4.031	
41	SD			338.4		SD				1.871	
42	95% DL/2 (t) UCL			519.9		95% H-Stat (DL/2) UCL				1220649	
43											
44	Maximum Likelihood Estimate(MLE) Method					Log ROS Method					
45	Mean			150.9		Mean in Log Scale				3.892	
46	SD			353.9		SD in Log Scale				2.113	
47	95% MLE (t) UCL			488.3		Mean in Original Scale				196.8	
48	95% MLE (Tiku) UCL			483.9		SD in Original Scale				338.7	
49						95% t UCL				519.8	
50						95% Percentile Bootstrap UCL				489.5	

51											95% BCA Bootstrap UCL	506.4
52											95% H UCL	15931426
53												
54	**Gamma Distribution Test with Detected Values Only**										**Data Distribution Test with Detected Values Only**	
55					k star (bias corrected)	0.344					**Data appear Gamma Distributed at 5% Significance Level**	
56					Theta Star	714.2						
57					nu star	2.75						
58												
59					A-D Test Statistic	0.492					**Nonparametric Statistics**	
60					5% A-D Critical Value	0.672					Kaplan-Meier (KM) Method	
61					K-S Test Statistic	0.672					Mean	202.3
62					5% K-S Critical Value	0.406					SD	299.6
63	**Data appear Gamma Distributed at 5% Significance Level**										SE of Mean	154.7
64											95% KM (t) UCL	532.2
65	**Assuming Gamma Distribution**										95% KM (z) UCL	456.8
66					Gamma ROS Statistics using Extrapolated Data						95% KM (jackknife) UCL	520.4
67					Minimum	0.000001					95% KM (bootstrap t) UCL	2145
68					Maximum	799					95% KM (BCA) UCL	498.6
69					Mean	196.4					95% KM (Percentile Bootstrap) UCL	491.3
70					Median	48.1					95% KM (Chebyshev) UCL	876.7
71					SD	339					97.5% KM (Chebyshev) UCL	1169
72					k star	0.203					99% KM (Chebyshev) UCL	1742
73					Theta star	967.8						
74					Nu star	2.029					**Potential UCLs to Use**	
75					AppChi2	0.155					95% KM (Chebyshev) UCL	876.7
76					95% Gamma Approximate UCL (Use when n >= 40)	2577						
77					95% Adjusted Gamma UCL (Use when n < 40)	N/A						
78	**Warning: Recommended UCL exceeds the maximum observation**											
79	**Note: DL/2 is not a recommended method.**											
80												
81	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
82	**These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).**											
83	**For additional insight, the user may want to consult a statistician.**											
84												
85												
86	**ANTIMONY**											
87												
88	**General Statistics**											
89					Number of Valid Data	10					Number of Detected Data	6
90					Number of Distinct Detected Data	6					Number of Non-Detect Data	4
91											Percent Non-Detects	40.00%
92												
93	**Raw Statistics**										**Log-transformed Statistics**	
94					Minimum Detected	0.297					Minimum Detected	-1.214
95					Maximum Detected	4.24					Maximum Detected	1.445
96					Mean of Detected	1.423					Mean of Detected	-0.169
97					SD of Detected	1.605					SD of Detected	1.095
98					Minimum Non-Detect	0.451					Minimum Non-Detect	-0.796
99					Maximum Non-Detect	0.477					Maximum Non-Detect	-0.74
100												

	A	B	C	D	E	F	G	H	I	J	K	L
101	Note: Data have multiple DLs - Use of KM Method is recommended										Number treated as Non-Detect	6
102	For all methods (except KM, DL/2, and ROS Methods),										Number treated as Detected	4
103	Observations < Largest ND are treated as NDs										Single DL Non-Detect Percentage	60.00%
104												
105	**Warning: There are only 6 Detected Values in this data**											
106	**Note: It should be noted that even though bootstrap may be performed on this data set**											
107	**the resulting calculations may not be reliable enough to draw conclusions**											
108												
109	**It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.**											
110												
111												
112	**UCL Statistics**											
113	**Normal Distribution Test with Detected Values Only**						**Lognormal Distribution Test with Detected Values Only**					
114	Shapiro Wilk Test Statistic					0.766	Shapiro Wilk Test Statistic					0.867
115	5% Shapiro Wilk Critical Value					0.788	5% Shapiro Wilk Critical Value					0.788
116	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
117												
118	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
119	DL/2 Substitution Method						DL/2 Substitution Method					
120	Mean					0.947	Mean					-0.685
121	SD					1.345	SD					1.054
122	95% DL/2 (t) UCL					1.727	95% H-Stat (DL/2) UCL					2.718
123												
124	Maximum Likelihood Estimate(MLE) Method					N/A	Log ROS Method					
125	**MLE yields a negative mean**						Mean in Log Scale					-0.612
126							SD in Log Scale					0.997
127							Mean in Original Scale					0.965
128							SD in Original Scale					1.335
129							95% t UCL					1.739
130							95% Percentile Bootstrap UCL					1.726
131							95% BCA Bootstrap UCL					1.942
132							95% H-UCL					2.494
133												
134	**Gamma Distribution Test with Detected Values Only**						**Data Distribution Test with Detected Values Only**					
135	k star (bias corrected)					0.659	**Data appear Gamma Distributed at 5% Significance Level**					
136	Theta Star					2.159						
137	nu star					7.907						
138												
139	A-D Test Statistic					0.581	**Nonparametric Statistics**					
140	5% A-D Critical Value					0.714	Kaplan-Meier (KM) Method					
141	K-S Test Statistic					0.714	Mean					0.979
142	5% K-S Critical Value					0.34	SD					1.259
143	**Data appear Gamma Distributed at 5% Significance Level**						SE of Mean					0.436
144							95% KM (t) UCL					1.778
145	**Assuming Gamma Distribution**						95% KM (z) UCL					1.696
146	Gamma ROS Statistics using Extrapolated Data						95% KM (jackknife) UCL					1.748
147	Minimum					0.000001	95% KM (bootstrap t) UCL					6.442
148	Maximum					4.24	95% KM (BCA) UCL					1.798
149	Mean					0.854	95% KM (Percentile Bootstrap) UCL					1.718
150	Median					0.312	95% KM (Chebyshev) UCL					2.88

	A	B	C	D	E	F	G	H	I	J	K	L
151					SD	1.404				97.5% KM (Chebyshev) UCL		3.702
152					k star	0.166				99% KM (Chebyshev) UCL		5.318
153					Theta star	5.148						
154					Nu star	3.317			**Potential UCLs to Use**			
155					AppChi2	0.472				95% KM (BCA) UCL		1.798
156				95% Gamma Approximate UCL (Use when n >= 40)		5.997						
157				95% Adjusted Gamma UCL (Use when n < 40)		8.644						
158	**Note: DL/2 is not a recommended method.**											
159												
160	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
161	**These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).**											
162	**For additional insight, the user may want to consult a statistician.**											
163												

F-4 SAMPLE CALCULATIONS

CALCULATION WORKSHEET

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL OCCUPATIONAL/MAINTENANCE WORKERS		
BASED ON: USEPA, DECEMBER 1989		
BY: L. GANSER	**CHECKED BY:** L. Crofani	**DATE:** 2/5/2013

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from incidental ingestion of surface soil.

EQUATION:

$$IEX = \frac{CS \times IR \times EF \times ED \times FI \times CF}{BW \times AT}$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Cs	=	exposure point concentration in soil (mg/kg)
IR	=	incidental ingestion rate (mg/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
FI	=	fraction ingested from contaminated source (unitless)
CF	=	conversion factor (1E-06 kg/mg)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFo	=	oral carcinogenic slope factor ($(mg/kg/day)^{-1}$)
RfDo	=	oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)-1
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDo (mg/kg/day)

ASSUMPTIONS:

Cs	=	11.4	mg/kg	Chemical: Arsenic
IR	=	100	mg/day	
EF	=	250	days/year	
ED	=	25	years	
FI	=	1		
CF	=	1E-06	kg/mg	
BW	=	70	kg	
ATc	=	25,550	days	
ATnc	=	9125	days	
CSFo	=	1.5E+00	$(mg/kg/day)^{-1}$	
RfDo	=	3.0E-04	(mg/kg/day)	

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL OCCUPATIONAL/MAINTENANCE WORKERS		
BASED ON: USEPA, DECEMBER 1989		
BY: L. GANSER	**CHECKED BY:** L. Cufari	**DATE:** 2/5/2013

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{11.4 \text{ mg/kg} \times 100 \text{ mg/day} \times 250 \text{ days/year} \times 25 \text{ years} \times 1 \times 1E\text{-}06 \text{ kg/mg}}{70 \text{ kg} \times 25550 \text{ days}}$$

IEXc = 3.98E-06 mg/kg/day

ILCR = 3.98E-06 mg/kg/day x 1.50E+00 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ILCR = 6.0E-06

EXAMPLE NONCARCINOGENIC CALCULATION

$$IEXnc = \frac{11.4 \text{ mg/kg} \times 100 \text{ mg/day} \times 250 \text{ days/year} \times 25 \text{ years} \times 1 \times 1E\text{-}06 \text{ kg/mg}}{70 \text{ kg} \times 9125 \text{ days}}$$

IEXnc = 1.12E-05 mg/kg/day

HQ = 1.12E-05 mg/kg/day / 3.00E-04 (mg/kg/day) = Hazard Quotient

HQ = 3.7E-02

CALCULATION WORKSHEET

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH SOIL OCCUPATIONAL/MAINTENANCE WORKERS		
BASED ON: USEPA, JULY 2004		
BY: L.GANSER	**CHECKED BY:** L. Cafaro	**DATE:** 2/5/2013

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from dermal contact with surface soil.

EQUATION:

$$DEX = \frac{Cs \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

Where:

DEX	=	estimated exposure intake (mg/kg/day)
Cs	=	exposure point concentration in soil (mg/kg)
CF	=	conversion factor (1E-06 kg/mg)
SA	=	skin surface available for contact (cm2/day)
ABS	=	absorption factor (unitless)
AF	=	adherence factor (mg/cm2)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFd	=	dermal carcinogenic slope factor ($(mg/kg/day)^{-1}$)
RfDd	=	dermal noncarcinogenic reference dose (mg/kg/day)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFd (mg/kg/day)-1
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDd (mg/kg/day)

ASSUMPTIONS:

Cs	=	11.4	mg/kg	Chemical: Arsenic
CF	=	1E-06	kg/mg	
SA	=	3,300	cm^2/day	
AF	=	0.2	mg/cm^2	
ABS	=	0.03		
EF	=	250	days/year	
ED	=	25	years	
BW	=	70	kg	
ATc	=	25,550	days	
ATnc	=	9125	days	
CSFd	=	1.5E+00	$(mg/kg/day)^{-1}$	
RfDd	=	3.0E-04	(mg/kg/day)	

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH SOIL OCCUPATIONAL/MAINTENANCE WORKERS		
BASED ON: USEPA, JULY 2004		
BY: L.GANSER	**CHECKED BY:**	**DATE:** 2/5/2013

EXAMPLE CARCINOGENIC CALCULATION

$$DEXc = \frac{11.4\ mg/kg \times 1E\text{-}06\ kg/mg \times 3300\ cm2/day \times 0.2\ mg/cm2 \times 0.03 \times 250\ days/year \times 25\ years}{70\ kg \times 25550\ days}$$

DEXc = 7.89E-07 mg/kg/day

ILCR = 7.89E-07 mg/kg/day x 1.50E+00 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ILCR = 1.2E-06

EXAMPLE NONCARCINOGENIC CALCULATION

$$DEXnc = \frac{11.4\ mg/kg \times 1E\text{-}06\ kg/mg \times 3300\ cm2/day \times 0.2\ mg/cm2 \times 0.03 \times 250\ days/year \times 25\ years}{70\ kg \times 9125\ days}$$

DEXnc = 2.21E-06 mg/kg/day

HQ = 2.21E-06 mg/kg/day / 3.00E-04 (mg/kg/day) = Hazard Quotient

HQ = 7.4E-03

CALCULATION WORKSHEET

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF FUGATIVE DUST EMISSIONS OCCUPATIONAL/MAINTENANCE WORKERS		
BASED ON: USEPA, JANUARY 2009		
BY: L.GANSER	**CHECKED BY:**	**DATE:** 2/5/2013

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from inhalation of surface soil.

EQUATION:

$$EC = \frac{Ca \times ET \times EF \times ED}{AT \times 24\ hours/day}$$

Where:

EC	=	exposure concentration (mg/m3)
Ca	=	exposure point concentration in air (mg/m3)
	=	Cs x 1/PEF
Cs	=	exposure point concentration in soil (mg/kg)
PEF	=	particulate emission factor (m3/kg)
ET	=	exposure time (hrs/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (hours)
IUR	=	inhalation unit risk ($(ug/m3)^{-1}$)
RfC	=	inhalation reference concentration (mg/m3)

RISKS:

ILCR (Carcinogens) = Exposure Concentration (mg/m3) x IURi (ug/m3)-1 x 1000 ug/mg
HQ (Noncarcinogens) = Exposure Concentration (mg/m3) / RFCi (mg/m3)

ASSUMPTIONS:

Cs	=	11.4	mg/kg	Chemical: Arsenic
PEF	=	1.24E+09	m3/kg	
Ca	=	9.19E-09	mg/m3	
ET	=	8	hours/day	
EF	=	250	days/year	
ED	=	25	years	
ATc	=	25,550	days	
ATnc	=	9,125	days	
IUR	=	4.3E-03	$(ug/m3)^{-1}$	
RfC	=	1.5E-05	(mg/m3)	

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF FUGATIVE DUST EMISSIONS OCCUPATIONAL/MAINTENANCE WORKERS		
BASED ON: USEPA, JANUARY 2009		
BY: L.GANSER	**CHECKED BY:**	**DATE:** 2/5/2013

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{9.19E\text{-}09 \text{ mg/m3} \times 8 \text{ hours/day} \times 250 \text{ days/year} \times 25 \text{ years}}{25550 \text{ days} \times 24 \text{ hours/day}}$$

IEXc = 7.50E-10 mg/m3

ILCR = 7.50E-10 mg/m3 x 4.30E-03 (ug/m3)-1 x 1000 ug/mg = Incremental Lifetime Cancer Risk

ILCR = 3.2E-09

EXAMPLE NONCARCINOGENIC CALCULATION

$$IEXnc = \frac{9.19E\text{-}09 \text{ mg/m3} \times 8 \text{ hours/day} \times 250 \text{ days/year} \times 25 \text{ years}}{9125 \text{ days} \times 24 \text{ hours/day}}$$

IEXnc = 2.10E-09 mg/m3

HQ = 2.10E-09 mg/m3 / 1.50E-05 (mg/m3) = Hazard Quotient

HQ **1.4E-04**

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: ESTIMATION OF AMBIENT AIR CONCENTRATIONS RESULTING FROM FUGITIVE DUST EMISSIONS AND VOLATILIZATION FROM SOIL FOR CONSTRUCTION WORKERS		
BASED ON: U.S. EPA 2002		
BY: L.GANSER	**CHECKED BY:** L. Ganser	**DATE:** 2/5/2013

PURPOSE: To calculate ambient air concentrations resulting from fugitive dust and volatilization from soil.

RELEVANT EQUATIONS:

$$Cair = Cs \times (1/PEF + 1/VF)$$

$$VF = \frac{Q/C \times (3.14 \times DA \times T)^{1/2} \times 10^{-4}\ m^2/cm^2}{2 \times pb \times DA} \times \frac{1}{F_D}$$

$$DA = \frac{(\theta a^{10/3} \times Di \times H + \theta w^{10/3} \times Dw)/\theta_T^{\,2}}{pb \times Kd + \theta w + \theta a \times H}$$

$$Csat = S/pb \times (Kd \times pb + \theta w + H \times \theta a)$$

Where:

Cair	=	Chemical concentration in air (mg/m^3)
Cs	=	Chemical concentration in soil (mg/kg)
PEF	=	Particulate emission factor (m^3/kg)
VF_{sc}	=	Subchronic volatilization factor (m^3/kg)
Q/C_{sa}	=	Inverse of mean conc. at center of source (g/m^2-s per kg/m^3).
F_D	=	Dispersion correction factor (unitless)
T	=	Total time over which construction occurs (seconds).
pb	=	Dry soil bulk density (g/cm^3).
ps	=	soil particle density (g/cm^3).
n	=	Total soil porosity (Lpore/Lsoil).
θw	=	Water-filled soil porosity (Lpore/Lsoil).
θa	=	Air-filled soil porosity (Lair/Lsoil).
Di	=	Diffusivity in air (cm^2/sec).
H	=	Dimensionless Henry's Law Constant.
S	=	Solubility limit (mg/L)
Dw	=	Diffusivity in water (cm^2/sec).
DA	=	Apparent diffusivity (cm^2/sec).
Kd	=	Soil-water partition coefficient (cm^3/g).
Koc	=	Soil organic carbon partition coefficient (cm^3/g).
foc	=	Fraction organic carbon in soil (g/g).

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: ESTIMATION OF AMBIENT AIR CONCENTRATIONS RESULTING FROM FUGITIVE DUST EMISSIONS AND VOLATILIZATION FROM SOIL FOR CONSTRUCTION WORKERS		
BASED ON: U.S. EPA 2002		
BY: L.GANSER	**CHECKED BY:**	**DATE:** 2/5/2013

ASSUMPTIONS:

Cs	=	0.4	mg/kg	Chemical: Naphthalene
PEF	=	1.24E+08	m3/kg	
Q/C	=	23.02	g/m2-s per kg/m3	
F_D	=	0.185		
T	=	3.15E+07	sec	
pb	=	1.5	g/cm3	
ps	=	2.65	g/cm3	
θ_T	=	0.434	Lpore/Lsoil	
θw	=	0.15	Lpore/Lsoil	
θa	=	0.284	Lair/Lsoil	
Di	=	6.05E-02	cm2/sec	
H	=	1.80E-02	Unitless	
S	=	3.10E+01	mg/L	
Dw	=	8.38E-06	cm2/sec	
Koc	=	1.54E+03	cm3/g	
foc	=	0.006	g/g	
Kd	=	9.24E+00	cm3/g	

EXAMPLE CALCULATIONS

$$DA = \frac{[(0.284^{10/3}) \times (0.0605\ cm2/sec) \times (1.80E\text{-}02) + (0.15^{10/3}) \times (8.38E\text{-}06\ cm2/sec)]/(0.434^2)}{(1.5\ g/cm3 \times 9.24\ cm3/g) + (0.15 + 0.284 \times 0.018)}$$

DA = 6.22E-06 cm^2/sec

$$VF = \frac{(23.02\ g/m2\text{-}s\ per\ kg/m3) \times [(3.14) \times (6.22E\text{-}06\ cm2/sec) \times (3.15E+07\ sec)]^{1/2} \times (1E\text{-}4\ m2/cm2)}{2 \times 1.5 g/cm3 \times 6.22E\text{-}06\ cm2/sec} \times \frac{1}{0.185}$$

VF = 1.66E+04 m^3/kg

Csat = (3.10E+01 mg/L)/(1.5 g/cm3) x [(9.24 cm3/g) x (1.5 g/cm3) + (0.15 + 1.80E-02 x 0.284)]

Csat = 2.90E+02 mg/kg

Csat is greater than Cs, therefore use Cs in calculation of air concentration.

Cair = 0.4 mg/kg x [(1/1.24E+08 m3/kg) + (1/1.66E+04 m3/kg)]

Cair = 2.42E-05 mg/m^3

CALCULATION WORKSHEET

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL FOR MUTAGENIC CHEMICALS - HYPOTHETICAL CHILD RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: L.GANSER	**CHECKED BY:** L. Ciafani	**DATE:** 2/5/2013

PURPOSE: To estimate intake and cancer risks for mutagenic chemicals from incidental ingestion of surface soil.

EQUATION:

$$IEX = \frac{CS \times IR \times EF \times ED \times FI \times CF}{BW \times AT} \times ADAF$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Cs	=	exposure point concentration in soil (mg/kg)
IR	=	incidental ingestion rate (mg/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
FI	=	fraction ingested from contaminated source (unitless)
CF	=	conversion factor (1.0E-6 kg/mg)
BW	=	body weight (kg)
AT	=	averaging time (days)
ADAF	=	age-dependent adjustment factor
CSFo	=	oral carcinogenic slope factor ($(mg/kg/day)^{-1}$)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)-1

ASSUMPTIONS:

Cs	=	2.08	mg/kg	Chemical: Benzo(a)pyrene Equivalents
IR	=	200	mg/day	
EF	=	350	days/year	
ED_1	=	2	years	
ED_2	=	4	years	
FI	=	1		
CF	=	1.0E-06	kg/mg	
BW	=	15	kg	
AT	=	25,550	days	
CSFo	=	7.3E+00	$(mg/kg/day)^{-1}$	
$ADAF_1$	=	10		
$ADAF_2$	=	3		

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL FOR MUTAGENIC CHEMICALS - HYPOTHETICAL CHILD RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: L.GANSER	**CHECKED BY:** L. Ciofani	**DATE:** 2/5/2013

EXAMPLE CARCINOGENIC CALCULATION

$$IEX_1 = \frac{2.08 \text{ mg/kg} \times 200 \text{ mg/day} \times 350 \text{ days/year} \times 2 \text{ years} \times 1 \times 1.0E\text{-}06 \text{ kg/mg}}{15 \text{ kg} \times 25550 \text{ days}} \times 10$$

IEX_1 = 7.60E-06 mg/kg/day

$$IEX_2 = \frac{2.08 \text{ mg/kg} \times 200 \text{ mg/day} \times 350 \text{ days/year} \times 4 \text{ years} \times 1 \times 1.0E\text{-}06 \text{ kg/mg}}{15 \text{ kg} \times 25550 \text{ days}} \times 3$$

IEX_2 = 4.56E-06 mg/kg/day

ILCR = (7.60E-06 mg/kg/day + 4.56E-06 mg/kg/day) x 7.30E+00 (mg/kg/day)-1

ILCR = 8.9E-05

CALCULATION WORKSHEET

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH SOIL FOR MUTAGENIC CHEMICALS HYPOTHETICAL CHILD RESIDENTS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: L.GANSER	**CHECKED BY:** L. Ciufani	**DATE:** 2/5/2013

PURPOSE: To estimate intake and cancer risks for mutagenic chemicals from dermal contact with surface soil.

EQUATION:

$$DEX = \frac{Cs \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT} \times ADAF$$

Where:

DEX	=	estimated exposure intake (mg/kg/day)
Cs	=	exposure point concentration in soil (mg/kg)
CF	=	conversion factor (1.0E-6 kg/mg)
SA	=	skin surface available for contact (cm^2/day)
ABS	=	absorption factor (unitless)
AF	=	adherence factor (mg/cm^2)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
ADAF	=	age-dependent adjustment factor
CSFd	=	dermal carcinogenic slope factor ($(mg/kg/day)^{-1}$)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFd (mg/kg/day)-1

ASSUMPTIONS:

Cs	=	2.08	mg/kg	Chemical: Benzo(a)pyrene Equivalents
CF	=	1.0E-06	kg/mg	
SA	=	2,800	cm^2/day	
AF	=	0.2	mg/cm^2	
ABS	=	0.13		
EF	=	350	days/year	
ED_1	=	2	years	
ED_2	=	4	years	
BW	=	15	kg	
AT	=	25,550	days	
CSFd	=	7.3E+00	$(mg/kg/day)^{-1}$	
$ADAF_1$	=	10		
$ADAF_2$	=	3		

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH SOIL FOR MUTAGENIC CHEMICALS HYPOTHETICAL CHILD RESIDENTS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: L.GANSER	**CHECKED BY:** L. Cuffaro	**DATE:** 2/5/2013

EXAMPLE CARCINOGENIC CALCULATION

$$DEXc = \frac{2.08\ mg/kg \times 1.0E\text{-}06\ kg/mg \times 2800\ cm2/day \times 0.2\ mg/cm2 \times 0.13 \times 350\ days/year \times 2\ years}{15\ kg \times 25550\ days} \times 10$$

DEXc = 2.77E-06 mg/kg/day

$$DEXc = \frac{2.08\ mg/kg \times 1.0E\text{-}06\ kg/mg \times 2800\ cm2/day \times 0.2\ mg/cm2 \times 0.13 \times 350\ days/year \times 4\ years}{15\ kg \times 25550\ days} \times 3$$

DEXc = 1.66E-06 mg/kg/day

ILCR = (2.77E-06 mg/kg/day + 1.66E-06 mg/kg/day) x 7.30E+00 (mg/kg/day)-1

ILCR = 3.2E-05

CALCULATION WORKSHEET

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF FUGATIVE DUST EMISSIONS FOR MUTAGENIC CHEMICALS - HYPOTHETICAL CHILD RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: L.GANSER	**CHECKED BY:**	**DATE:** 2/5/2013

PURPOSE: To estimate intake, carcinogenic risks for mutagenic chemicals from inhalation of surface soil.

EQUATION:

$$EC = \frac{Ca \times ET \times EF \times ED}{AT \times 24\ hours/day} \times ADAF$$

Where:

EC	=	estimated exposure concentration (mg/m3)
Ca	=	exposure point concentration in air (mg/m3)
	=	Cs x 1/PEF
Cs	=	exposure point concentration in soil (mg/kg)
PEF	=	particulate emission factor (m3/kg)
ET	=	exposure time (hrs/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
AT	=	averaging time (hours)
ADAF	=	age-dependent adjustment factor
IUR	=	inhalation unit risk$((ug/mg)^{-1})$

RISKS:

ILCR = Exposure concentration (mg/m3) x IURi (ug/m3)-1 x 1000 ug/mg

ASSUMPTIONS:

Cs	=	2.08	mg/kg	Chemical: Benzo(a)pyrene Equivalents
PEF	=	1.32E+09	m3/kg	
Ca	=	1.58E-09	mg/m3	
ET	=	24	hr/day	
EF	=	350	days/year	
ED_1	=	2	years	
ED_2	=	4	years	
ATc	=	25,550	days	
IUR	=	1.1E-03	$(ug/m3)^{-1}$	
$ADAF_1$	=	10		
$ADAF_2$	=	3		

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF FUGATIVE DUST EMISSIONS FOR MUTAGENIC CHEMICALS - HYPOTHETICAL CHILD RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: L.GANSER	**CHECKED BY:**	**DATE:** 2/5/2013

EXAMPLE CARCINOGENIC CALCULATION

$$EC = \frac{1.58E\text{-}09 \text{ mg/m3} \times 24 \text{ hr/day} \times 350 \text{ days/year} \times 2 \text{ years}}{25550 \text{ days} \times 24 \text{ hours/day}} \times 10$$

EC = 4.32E-10 mg/m3

$$EC = \frac{1.58E\text{-}09 \text{ mg/m3} \times 24 \text{ hr/day} \times 350 \text{ days/year} \times 4 \text{ years}}{25550 \text{ days} \times 24 \text{ hours/day}} \times 3$$

EC = 2.59E-10 mg/m3

ILCR = (4.32E-10 mg/m3 + 2.59E-10 mg/m3) x 1.10E-03 (ug/m3)-1 x 1000 ug/mg

ILCR = 7.6E-10

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL FOR MUTAGENIC CHEMICALS - HYPOTHETICAL ADULT RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: L.GANSER	**CHECKED BY:** L. Ciafoni	**DATE:** 2/5/2013

PURPOSE: To estimate intake and cancer risks for mutagenic chemicals from incidental ingestion of surface soil.

EQUATION:

$$IEX = \frac{CS \times IR \times EF \times ED \times FI \times CF}{BW \times AT} \times ADAF$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Cs	=	exposure point concentration in soil (mg/kg)
IR	=	incidental ingestion rate (mg/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
FI	=	fraction ingested from contaminated source (unitless)
CF	=	conversion factor (1.0E-6 kg/mg)
BW	=	body weight (kg)
AT	=	averaging time (days)
ADAF	=	age-dependent adjustment factor
CSFo	=	oral carcinogenic slope factor ($(mg/kg/day)^{-1}$)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)-1

ASSUMPTIONS:

Cs	=	2.08	mg/kg	Chemical: Benzo(a)pyrene Equivalents
IR	=	100	mg/day	
EF	=	350	days/year	
ED_1	=	10	years	
ED_2	=	14	years	
FI	=	1		
CF	=	1.0E-06	kg/mg	
BW	=	70	kg	
AT	=	25,550	days	
CSFo	=	7.3E+00	$(mg/kg/day)^{-1}$	
$ADAF_1$	=	3		
$ADAF_2$	=	1		

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL FOR MUTAGENIC CHEMICALS - HYPOTHETICAL ADULT RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: L.GANSER	**CHECKED BY:**	**DATE:** 2/5/2013

EXAMPLE CARCINOGENIC CALCULATION

$$IEX_1 = \frac{2.08 \text{ mg/kg} \times 100 \text{ mg/day} \times 350 \text{ days/year} \times 10 \text{ years} \times 1 \times 1.0E\text{-}06 \text{ kg/mg}}{70 \text{ kg} \times 25550 \text{ days}} \times 3$$

IEX_1 = 1.22E-06 mg/kg/day

$$IEX_2 = \frac{2.08 \text{ mg/kg} \times 100 \text{ mg/day} \times 350 \text{ days/year} \times 14 \text{ years} \times 1 \times 1.0E\text{-}06 \text{ kg/mg}}{70 \text{ kg} \times 25550 \text{ days}} \times 1$$

IEX_2 = 5.70E-07 mg/kg/day

ILCR = (1.22E-06 mg/kg/day + 5.70E-07 mg/kg/day) x 7.30E+00 (mg/kg/day)-1

ILCR = 1.3E-05

CALCULATION WORKSHEET

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH SOIL FOR MUTAGENIC CHEMICALS HYPOTHETICAL ADULT RESIDENTS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: L.GANSER	**CHECKED BY:** L. Ganser	**DATE:** 2/5/2013

PURPOSE: To estimate intake and cancer risks for mutagenic chemicals from dermal contact with surface soil.

EQUATION:

$$DEX = \frac{Cs \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT} \times ADAF$$

Where:

DEX	=	estimated exposure intake (mg/kg/day)
Cs	=	exposure point concentration in soil (mg/kg)
CF	=	conversion factor (1.0E-6 kg/mg)
SA	=	skin surface available for contact (cm^2/day)
ABS	=	absorption factor (unitless)
AF	=	adherence factor (mg/cm^2)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
ADAF	=	age-dependent adjustment factor
CSFd	=	dermal carcinogenic slope factor ($(mg/kg/day)^{-1}$)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFd (mg/kg/day)-1

ASSUMPTIONS:

Cs	=	2.08	mg/kg	Chemical: Benzo(a)pyrene Equivalents
CF	=	1.0E-06	kg/mg	
SA	=	5,700	cm^2/day	
AF	=	0.07	mg/cm^2	
ABS	=	0.13		
EF	=	350	days/year	
ED_1	=	10	years	
ED_2	=	14	years	
BW	=	70	kg	
AT	=	25,550	days	
CSFd	=	7.3E+00	$(mg/kg/day)^{-1}$	
$ADAF_1$	=	3		
$ADAF_2$	=	1		

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH SOIL FOR MUTAGENIC CHEMICALS HYPOTHETICAL ADULT RESIDENTS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: L.GANSER	**CHECKED BY:** L Ciafani	**DATE:** 2/5/2013

EXAMPLE CARCINOGENIC CALCULATION

$$DEXc = \frac{2.08\ mg/kg \times 1.0E\text{-}06\ kg/mg \times 5700\ cm2/day \times 0.07\ mg/cm2 \times 0.13 \times 350\ days/year \times 10\ years}{70\ kg \times 25550\ days} \times 3$$

DEXc = 6.33E-07 mg/kg/day

$$DEXc = \frac{2.08\ mg/kg \times 1.0E\text{-}06\ kg/mg \times 5700\ cm2/day \times 0.07\ mg/cm2 \times 0.13 \times 350\ days/year \times 14\ years}{70\ kg \times 25550\ days} \times 1$$

DEXc = 2.96E-07 mg/kg/day

ILCR = (6.33E-07 mg/kg/day + 2.96E-07 mg/kg/day) x 7.30E+00 (mg/kg/day)-1

ILCR = 6.8E-06

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF FUGATIVE DUST EMISSIONS FOR MUTAGENIC CHEMICALS - HYPOTHETICAL ADULT RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: L.GANSER	**CHECKED BY:** L. Ciferni	**DATE:** 2/5/2013

PURPOSE: To estimate intake, carcinogenic risks for mutagenic chemicals from inhalation of surface soil.

EQUATION:

$$EC = \frac{Ca \times ET \times EF \times ED}{AT \times 24\ hours/day} \times ADAF$$

Where:

EC	=	estimated exposure intake (mg/kg/day)
Ca	=	exposure point concentration in air (mg/m3)
	=	Cs x 1/PEF
Cs	=	exposure point concentration in soil (mg/kg)
PEF	=	particulate emission factor (m3/kg)
ET	=	exposure time (hrs/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (hours)
ADAF	=	age-dependent adjustment factor
IURi	=	inhalation unit risk($(ug/mg)^{-1}$)

RISKS:

ILCR = Exposure concentration (mg/m3) x IUR (ug/m3)-1 x 1000 ug/mg

ASSUMPTIONS:

Cs	=	2.08	mg/kg	Chemical: Benzo(a)pyrene Equivalents
PEF	=	1.32E+09	m3/kg	
Ca	=	1.58E-09	mg/m3	
ET	=	24	hr/day	
EF	=	350	days/year	
ED_1	=	10	years	
ED_2	=	14	years	
ATc	=	25,550	days	
IUR	=	1.1E-03	$(ug/m3)^{-1}$	
$ADAF_1$	=	3		
$ADAF_2$	=	1		

CLIENT: NAVAL STATION GREAT LAKES, ILLINOIS		**JOB NUMBER:** 112G02416
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF FUGATIVE DUST EMISSIONS FOR MUTAGENIC CHEMICALS - HYPOTHETICAL ADULT RESIDENTS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: L.GANSER	**CHECKED BY:** L. Cuffani	**DATE:** 2/5/2013

EXAMPLE CARCINOGENIC CALCULATION

$$EC = \frac{1.58E\text{-}09 \text{ mg/m3} \times 24 \text{ hr/day} \times 350 \text{ days/year} \times 10 \text{ years}}{25550 \text{ days} \times 24 \text{ hours/day}} \times 3$$

EC = 6.48E-10 mg/m3

$$EC = \frac{1.58E\text{-}09 \text{ mg/m3} \times 24 \text{ hr/day} \times 350 \text{ days/year} \times 14 \text{ years}}{25550 \text{ days} \times 24 \text{ hours/day}} \times 1$$

EC = 3.02E-10 mg/m3

ILCR = (6.48E-10 mg/m3 + 3.02E-10 mg/m3) x 1.10E-03 (ug/m3)-1 x 1000 ug/mg

ILCR = 1.0E-09

APPENDIX G

ECOLOGICAL RISK ASSESSMENT
SUPPORTING DOCUMENTATION

APPENDIX G

FOOD CHAIN MODEL RECEPTOR PROFILES

The following sections present the receptor profiles for the short-tailed shrew, American woodcock, meadow vole, and northern bobwhite quail. The majority of the information for the profiles was obtained from the Wildlife Exposure Factors Handbook (USEPA, 1993). The data for the incidental soil ingestion rates were obtained from the USEPA Ecological Soil Screening Guidance (USEPA, 2007).

The food ingestion rates are listed in g/g (of body weight)-day on a wet weight basis but were converted to dry weight for the ERA. The home ranges are presented in hectares in USEPA (1993) but were converted to acres by multiplying the number of hectares by 2.471. Also note that the estimated percent of soil in the diets are listed in dry weight. Table G.1 presents the exposure parameters. Table G.2 presents the calculation of the exposure parameters and how the calculations were done.

Short-Tailed Shrew (*Blarina brevicauda*)

Shrews inhabit a wide variety of habitats and are common in areas with abundant vegetative cover. They need cool, moist habitats because of their high metabolic and water-loss rates. The short-tailed shrew is primarily carnivorous, eating insects such as earthworms, slugs, and snails.

The adult body weight for the short-tailed shrew in various habitats ranged from 0.015 to 0.01921 kg with an average of 0.0161 kg. The listed food ingestion rates for shrews are 0.49 and 0.62 g/g-day (wet-weight). The food ingestion rates in kg/day were calculated as shown in Table G.2. The food ingestion rates were then multiplied by 0.16, which is the percent solids of worms (Sample et al., 1997) to convert the ingestion rate from a wet-weight value to a dry-weight value. The incidental soil ingestion rate was calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested (assumed 3% for conservative food chain model and 0.9% for the average food chain model) from USEPA (2007). 3% is the 90th percentile value and 0.9% is the 50th percentile value from USEPA (2007). The home range for the shrew (0. 9699 acres) was calculated using data from a tamarek bog in Manitoba (only value available).

American Woodcock (*Scolopax minor*)

Woodcocks inhabit both woodlands and abandoned fields, particularly those with rich and moderately to poorly drained loamy soils, which tend to support abundant earthworm populations. They feed primarily on invertebrates found in moist upland soils by probing the soil with their long prehensile-tipped bill. Earthworms are their preferred diet, but seeds and other plant matter may also be consumed.

The adult body weight for the woodcock ranges from 0.134 to 0.218 kg with an average of 0.173 kg. The listed food ingestion rate for the woodcock is 0.77 g/g-day (wet-weight). The food ingestion rates were then

multiplied by 0.16, which is the percent solids of worms (Sample et al., 1997) to convert the ingestion rate from a wet-weight value to a dry-weight value. The incidental soil ingestion rate was calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested (assumed 16.4% for conservative food chain model and 6.4% for the average food chain model) from USEPA (2007). 16.4% is the 90th percentile value and 6.4% is the 50th percentile value from USEPA (2007).

The range of home range sizes for the woodcock is 7.66 to 182 acres with an average home range of 61 acres.

Meadow Vole (*Microtus pennsylvanicus*)

Meadow voles inhabit grassy fields, marshes, and bogs; however, they prefer fields with more grass, more cover, and fewer woody plants. They typically consume green succulent vegetation, sedges, seeds, roots, bark, fungi, insects, and animal matter. However, green succulent vegetation makes up the majority of their diet.

The adult body weight for the vole ranges from 0.017 to 0.0524 kg with an average of 0.0358 kg. The only listed food ingestion rates for voles range from 0.30 to 0.35 g/g-day (wet-weight), with an average of 0.325 g/g-day. The food ingestion rates in kg/day were calculated as shown in Table G.2. The food ingestion rates were then multiplied by 0.15, which is the percent solids of plant foliage (USEPA, 2007) to convert the ingestion rate from a wet-weight value to a dry-weight value. Finally, the incidental soil ingestion rate is calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested (assumed 3.2% for the conservative food chain model and 1.2% for the average food chain model) from USEPA (2007). The home range for the meadow vole ranges from 0.000494 to 0.2051 acres with an average home range of 0.0659 acres.

Northern Bobwhite Quail (*Colinus virginianus*)

Quails inhabit grasslands, idle fields, pastures, and large clumps of grasses. Bobwhite quails forage in areas with open vegetation, some bare ground, and light litter. Seeds from weeds, woody plants, and grasses comprise the majority of an adult's diet, although green vegetation has been found to dominate the diet of this species in winter in the southern areas of the United States.

The adult body weight for the bobwhite quail ranges from 0.154 to 0.1939 kg with an average of 0.1751 kg. The listed food ingestion rates for quails range from 0.067 to 0.093 g/g-day (dry-weight), with an average of 0.078 g/g-day. The food ingestion rates in kg/day were calculated as shown in Table G.2. The food ingestion rates were already dry-weight values. Finally, the incidental soil ingestion rate is calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested, which was 13.9% for conservative food chain model and 6.1% for the average food chain model from USEPA (2007) and was based on the mourning

dove.

The home range for the quail ranges from 8.9 to 41.3 acres with an average home range of 18.8 acres.

References:

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Sample, B.E., M.S. Aplin, R.A. Efroymson, G.W., Suter II, and C.J.E. Welsh. 1997. Methods and Tools for Estimation of the Exposure of Terrestrial Wildlife to Contaminants. Oak Ridge National Laboratory. October. ORNL/TM-13391.

USEPA (U.S. Environmental Protection Agency), 1993. Wildlife Exposure Factors Handbook. U.S. Environmental Protection Agency. Office of Research and Development. Washington, D.C. December 1993. EPA/600/R-93/187a.

USEPA, 2007. Ecological Soil Screening Level Guidance. Office of Emergency and Remedial Response.

TABLE G.1

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL

Species/Exposure Inputs	Conservative Inputs		Average Inputs	
	Values	Units	Values	Units
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
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
Bobwhite Quail				
Body Weight = BW	1.540E-01	kg	1.751E-01	kg
Food Ingestion Rate = If	1.628E-02	kg/day	1.361E-02	kg/day
Soil Ingestion Rate = Is	2.263E-03	kg/day	8.304E-04	kg/day
Home Range = HR	Assume 100% on site		1.880E+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
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
American Woodcock				
Body Weight = BW	1.340E-01	kg	1.731E-01	kg
Food Ingestion Rate = If	2.686E-02	kg/day	2.132E-02	kg/day
Soil Ingestion Rate - Is	4.405E-03	kg/day	1.364E-03	kg/day
Home Range = HR	Assume 100% on site		6.100E+01	acres

Notes:

The exposure factors were derived as presented in Table G.2.

The soil ingestion rates were calculated by multiplying the food ingestion rates by the following incidental soil ingestion rates:

	Conservative	Average	Source
Meadow Vole	3.2%	1.2%	1
Bobwhite quail	13.9%	6.1%	1, 2
Short-tailed Shrew	3%	0.90%	1
American Woodcock	16.4%	6.40%	1

1 - USEPA (U.S. Environmental Protection Agency), 2007. Ecological Soil Screening Level Guidance, Office of Emergency and Remedial Response. February.

2 - Based on the mourning dove.

TABLE G.2

DRY WEIGHT DERIVATION OF BODY WEIGHT AND FOOD INTAKE FACTORS FOR TERRESTRIAL FOOD CHAIN MODELS

Data from EPA (1993)				Derivation of Factors for Modeling		
Species/Factor	Age/Sex/ Cond./Seas.	Value	Study Average	Calculation of Values		Notes
Short-Tailed Shrew						
Body Weight (g)	A B	15	15	Minimum Value	0.0150 kg	
				Maximum Value	0.01921 kg	
	M summer	19.21	17.27	Overall Study Average	0.01613 kg	
	F summer	17.4				
	M fall	16.87				
	M fall	15.58				
Food Ingestion Rate (g/g-day)	A B	0.49		Conservative value:	0.0016 kg/day	Maximum ingestion rate * Average Body weight * 0.16[(1)]
	A B	0.62		Average value	0.00143 kg/day	Average ingestion rate * Average Body weight * 0.16[(1)]
	Overall Study Average		0.555			[(1)] - 0.16 = percent solids in earthworms to convert to a dry weight ingestion rate
Meadow Vole						
Body Weight (g)	A M summer	40	36.7	Minimum Value	0.017 kg	
	A F summer	33.4		Maximum Value	0.052 kg	
				Overall Study Average	0.0358 kg	
	A M spring	52.4	48.0			
	A F spring	43.5				
	A B spring	26	21.2			
	A B summer	24.3				
	A B fall	17				
	A B winter	17.5				
	A M	35.5	37.3			
	A F	39				
Food Ingestion Rate (g/g-day)		0.3	0.33	Conservative value:	0.001878 kg/day	Maximum ingestion rate * Average Body weight * 0.15 [(1)]
		0.35				
				Average value	0.001744 kg/day	Average ingestion rate * Average Body weight * 0.15[(1)]
						[(1)] - 0.15 = percent solids in grass to convert to a dry weight ingestion rate
Northern Bobwhite Quail						
Body Weight (g)	A B fall	189.9	191	Minimum Value	0.154 kg	
	A B winter	193.9		Maximum Value	0.194 kg	
	A B spring	190		Overall Study Average	0.1751 kg	
	A M winter	181	177			
	A M summer	163				
	A F winter	183				
	A F summer	180				
	A M winter	161	157			
	A M summer	154				
	A F winter	157				
	A F summer	157				
Food Ingestion Rate (g/g-day)	A B winter	0.093	0.078	Conservative value:	0.01628 kg/day	Maximum ingestion rate * Average Body weight
	A B spring	0.067				
	A B summer	0.079		Average value	0.01361 kg/day	Average ingestion rate * Average Body weight
	A B fall	0.072				
						Dry weight to wet weight conversion factor not needed because food items on a dry weight basis in the wildlife exposure factors handbook.

TABLE G.2

DRY WEIGHT DERIVATION OF BODY WEIGHT AND FOOD INTAKE FACTORS FOR TERRESTRIAL FOOD CHAIN MODELS

Data from EPA (1993)				Derivation of Factors for Modeling		
Species/Factor	Age/Sex/ Cond./Seas.	Value	Study Average	Calculation of Values		Notes
American Woodcock						
Body Weight (g)	A M	176	197	Minimum Value	0.134 kg	
	A F	218		Maximum Value	0.218 kg	
				Overall Study Average	0.1731 kg	
	A M April	134.6	139.9			
	A M May	133.8				
	A M June	151.2				
	A M summer	145.9	164.4			
	A F summer	182.9				
	A M fall	169	191			
	A F fall	213				
Food Ingestion Rate (g/g-day)	A B winter	0.77		Conservative value:	0.02686 kg/day	Ingestion rate * Maximum Body weight * 0.16[(1)]
				Average value	0.02132 kg/day	Ingestion rate * Average Body weight * 0.16[(1)]
						[(1)] - 0.16 = percent solids in earthworms to convert to a dry weight ingestion rate

Notes:
A = Adult
F = Female, M = Male, B = Both
BW = Body Weight

APPENDIX G

BIOACCUMULATION FACTORS

This attachment presents the bioaccumulation factors (BAFs) that were used in the food chain models. The following sources of BAFs were used in the ecological risk assessment for most of the chemicals:

- Plant and Soil Invertebrate BAFs: EPA Guidance for Developing Ecological Soil Screening Levels, Attachment 4-1 (USEPA, 2007).

- Plant BAFs (organic chemicals): Toxicity and Chemical-Specific Factors Database (ORNL, 2012).

- Soil Invertebrate BAFs: Development and Validation of Bioaccumulation Models for Earthworms (Sample et al., 1998).

Table G.3 presents the BAFs that were used in the food-chain models for the individual constituents that were detected at Site 12. Note that dry weight BAFs were used for this ERA. A default value of 1.0 was used for the BAF if chemical-specific data were not available.

The EPA Guidance for Developing Ecological Soil Screening Levels (Eco SSLs) was the source of the BAFs for some of the chemicals. The majority of these BAFs are regression equations that are used to calculate the tissue concentration from the soil concentration.

The average BAFs for pesticides were calculated from field studies summarized in various studies. The sources of the BAFs are listed in the footnotes in Table G.4. BAFs were calculated by dividing the worm concentration by the soil concentration (if the BAFs were not calculated within the study). The BAFs were either presented on a wet-weight or dry weight basis. Wet weight BAFs were derived by multiplying the dry weight BAF by 0.16, which is the percent solids of soil invertebrates (Sample et. al., 1997), while dry-weight BAFs were derived by dividing the dry weight BAF by 0.16. For this ERA, the dry-weight BAFs were used in the food chain model.

An average BAF was calculated for each pesticide, when data from more than one study were available. The compost studies (from Beyer 1990) were not used in the calculation of the average BAFs because properties of the compost may be different than soil. The average BAF was used for both the conservative and average food chain models.

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Wheatley, G.A., and J.A. Hardman. 1968. Organochlorine Insecticide Residues in Earthworms from Arable Soils. J. Sci. Food. Agric. 19:219-225. Cited in Beyer, 1990.

TABLE G.3

TERRESTRIAL FOOD CHAIN MODEL - BIOACCUMULATION FACTORS

Chemical	Plant Bioaccumulation Factors			Earthworm Bioaccumulation Factors		
	Conservative	Average		Conservative	Average	
Metals						
ANTIMONY	EXP(0.938*LN(C)-3.233)		(1)	1		(1)
CADMIUM	EXP(0.546*LN(C)-0.475)		(1)	EXP(0.795*LN(C)+2.114)		(1)
COPPER	EXP(0.394*LN(C)+0.668)		(1)	0.515		(1)
LEAD	EXP(0.561*LN(C)-1.328)		(1)	EXP(0.807*LN(C)-0.218)		(1)
MERCURY	5	0.652	(2)	EXP(0.3369*LN(C)+0.0781)		(3)
SELENIUM	EXP(1.104*LN(C)-0.677)		(1)	EXP(0.733*LN(C)-0.075)		(1)
THALLIUM	0.004		(4)	1		
VANADIUM	0.00485		(1)	0.042		(1)
ZINC	EXP(0.554*LN(C)+1.575)		(1)	EXP(0.328*LN(C)+4.449)		(1)
Semivolatiles						
BIS(2-ETHYLHEXYL)PHTHALATE	0.0015		(4)	1		
Polycyclic Aromatic Hydrocarbons						
ACENAPHTHENE	EXP(-0.8556*LN(C)-5.562)		(1)	1.47		(1)
ACENAPHTHYLENE	EXP(0.791*LN(C)-1.144)		(1)	22.9		(1)
ANTHRACENE	EXP(0.7784*LN(C)-0.9887)		(1)	2.42		(1)
BENZO(A)ANTHRACENE	EXP(0.5944*LN(C)-2.7078)		(1)	1.59		(1)
BENZO(A)PYRENE	EXP(0.975*LN(C)-2.0615)		(1)	1.33		(1)
BENZO(B)FLUORANTHENE	0.31		(1)	2.6		(1)
BENZO(G,H,I)PERYLENE	EXP(1.1829*LN(C)-0.9313)		(1)	2.94		(1)
BENZO(K)FLUORANTHENE	EXP(0.8595*LN(C)-2.1579)		(1)	2.6		(1)
CHRYSENE	EXP(0.5944*LN(C)-2.7078)		(1)	2.29		(1)
DIBENZO(A,H)ANTHRACENE	0.13		(1)	2.31		(1)
FLUORANTHENE	0.5		(1)	3.04		(1)
FLUORENE	EXP(-0.8556*LN(C)-5.562)		(1)	9.57		(1)
INDENO(1,2,3-CD)PYRENE	0.11		(1)	2.86		(1)
PHENANTHRENE	EXP(0.6203*LN(C)-0.1665)		(1)	1.72		(1)
PYRENE	0.72		(1)	1.75		(1)
Pesticides						
4,4'-DDD	EXP(0.7524*LN(C)-2.5119)		(1)	EXP(0.6975*LN(C)+1.1613)		(1)
4,4'-DDE	EXP(0.7524*LN(C)-2.5119)		(1)	EXP(0.8804*LN(C)+2.4771)		(1)
4,4'-DDT	EXP(0.7524*LN(C)-2.5119)		(1)	EXP(0.8689*LN(C)+2.1247)		(1)
ALDRIN	0.00654		(4)	3.3		(5)
ALPHA-BHC	0.241		(4)	1		
ALPHA-CHLORDANE	0.0095		(4)	5		(5)
DELTA-BHC	0.153		(4)	1		
DIELDRIN	0.41		(1)	14.7		(1)
ENDOSULFAN II	0.231		(4)	1		
ENDOSULFAN SULFATE	0.29		(4)	1		
ENDRIN	0.0371		(4)	3.6		(5)
ENDRIN ALDEHYDE	0.0371		(4)	3.6		(5)
ENDRIN KETONE	0.0371		(4)	3.6		(5)
GAMMA-CHLORDANE	0.0095		(4)	5		(5)
HEPTACHLOR	0.0112		(4)	10		(5)
HEPTACHLOR EPOXIDE	0.0498		(4)	3		(5)

Notes:

A default value of 1.0 was assigned to chemicals with unknown BAFs. No footnotes are listed by these values.

Footnotes:

1 - USEPA (2007). Several tissue concentration will be calculated using regression equations (where C is the soil concentration) from USEPA (2007), Attachment 4-1, Tables 4a (for inorganics), 4b (for organics).
2 - ORNL (September, 1998) for all chemicals; conservative value is 90th percentile; average value is median value.
3 - Sample et al., (February, 1998).
4 - ORNL (2012).
5 - Calculated from literature field studies (see Appendix Table 4).

Sources:

ORNL (Oak Ridge National Laboratory). 1998. Empirical Model for the Uptake of Inorganic Chemicals from Soil by Plants. BJC/OR-133. September.
ORNL, 2012. Toxicity and Chemical-Specific Factors Database. Oak Ridge National Laboratory Web Page, http://rais.ornl.gov/cgi-bin/tools/TOX_search?select=chem_spef
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TABLE G.4

EARTHWORM BAFS FOR PESTICIDES

Parameter	Study Values					Calculated Values		Reference	Comments
	Worm Concentration		Soil	Dry	Wet	Final	Final		
	Dry Weight	Wet Weight	Conc. (dry weight)	Weight BAF	Weight BAF	Dry Weight[1] BAF	Wet Weight[2] BAF		
gamma-BHC	NA	NA	NA	NA	1.5-4.2	9.4-26.3	1.5-4.2	1	agricultural soil (0.004 ppm gamma-BHC in soil)
Average dry/wet weight BAF from field studies [3]				***NA***	***NA***	***18***	***2.85***		
Heptachlor	NA	NA	NA	10	NA	10	1.60	2	soil type unknown (11-year field study)
Average dry/wet weight BAF from field studies [3]				***NA***	***NA***	***10***	***1.6***		
Aldrin	NA	NA	NA	3.3	NA	3.3	0.528	3	from data collected in 7 agricultural fields
Chlordane	NA	NA	NA	5	NA	5.0	0.8	3	from data collected in 7 agricultural fields
Endrin	NA	NA	NA	3.6	NA	3.6	0.576	3	from data collected in 26 agricultural fields
Heptachlor epoxide	NA	NA	NA	3	NA	3.0	0.48	3	from data collected in 9 agricultural fields

Notes:

BAF - bioaccumulation factor = worm concentration/soil concentration

NA - Not applicable

The percent solids of earthworms is assummed to be 0.16 (Sample et al., 1997)

1 - The calculated dry weight BAF was either obtained directly from the study or was calculated by dividing the wet weight BAF by 0.16

2 - The calculated wet weight BAF was either obtained directly from the study or was calculated by multiplying the dry weight BAF by 0.16

3 - The compost studies were not used in calculation of average BAF because the properties of the compost may be different than soil. The compost studies were presented for informational purposes only.

References

1 - Wheatly and Hardman, 1968

2 - Beyer and Gish, 1980 and Beyer and Krynitsky, 1989

3 - Gish, 1970

TABLE G.5

TOXICITY REFERENCE VALUES

Chemical	Mammal		Bird	
	NOAEL	LOAEL	NOAEL	LOAEL
Metals				
Antimony	0.059	2.76	NV	NV
Cadmium	0.77	6.9	1.47	6.35
Copper	5.6	82.7	4.05	34.87
Lead	4.7	186.4	1.63	44.63
Mercury	0.032	0.16	0.0064	0.064
Selenium	0.143	0.661	0.29	0.819
Thallium	0.0074	0.074	NV	NV
Vanadium	4.16	9.44	0.34	1.69
Zinc	75.4	297.58	66.1	171.44
Semivolatiles				
Bis(2-ethylhexyl)phthalate	18.3	183	1.11	11.1
Polycyclic Aromatic Hydrocarbons				
Acenaphthene	65.6	356	2	20
Acenaphthylene	65.6	356	2	20
Anthracene	65.6	356	2	20
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
Chrysene	0.615	38.4	2	20
Dibenzo(a,h)anthracene	0.615	38.4	2	20
Fluoranthene	65.6	356	2	20
Fluorene	65.6	356	2	20
Indeno(1,2,3-cd)pyrene	0.615	38.4	2	20
Phenanthrene	65.6	356	2	20
Pyrene	0.615	38.4	2	20
Pesticides				
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
Delta-BHC	0.014	0.14	0.56	2.25
Dieldrin	0.015	1.27	0.0709	0.8
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-Chlordane	4.58	9.16	2.14	10.7
Heptachlor	0.1	1	NV	NV
Heptachlor Epoxide	0.1	1	NV	NV

The sources of these NOAELS and LOAELS are presented in the table titled "Sources and Endpoints for NOAELS and LOAELS for Terrestrial Wildlife" in this appendix.

The NOAELS and LOAELS in the source table were divided by 10 if a subchronic study was the basis for the value. Also, if only a NOAEL was available, the value was multiplied by 10 to estimate the LOAEL. If only a LOAEL was available, the value was divided by 10 to estimate the NOAEL.

TABLE G.6

SOURCES AND ENDPOINTS FOR NOAELS AND LOAELS FOR TERRESTRIAL WILDLIFE
PAGE 1 OF 2

Parameters	Concentration (mg/kg-day)	Endpoint	Effect	Chronic/ Subchronic	Species	Primary Reference	Source of Reference
Semivolatiles Organics							
7,12-Dimethylbenz(a)anthracene	20	LOAEL	systemic	chronic	nestling/starlings	Trust et al., 1994	
7,12-Dimethylbenz(a)anthracene	2	NOAEL	systemic	chronic	nestling/starlings	Trust et al., 1994	
Bis(2-ethylhexyl)phthalate	183.3	LOAEL	reproductive	chronic	mouse	Lamb et al., 1987	Sample et.al., 1996
Bis(2-ethylhexyl)phthalate	18.33	NOAEL	reproductive	chronic	mouse	Lamb et al., 1987	Sample et.al., 1996
Bis(2-ethylhexyl)phthalate	1.11	NOAEL	reproductive	chronic	ringed dove	Peakall, 1974	Sample et.al., 1996
High Molecular Weight PAHs	38.4	LOAEL	reproduction & growth	chronic	mammals	USEPA, 2007	
High Molecular Weight PAHs	0.615	NOAEL	reproduction & growth	chronic	mammals	USEPA, 2007	
Low Molecular Weight PAHs	356	LOAEL	reproduction & growth	chronic	mammals	USEPA, 2007	
Low Molecular Weight PAHs	65.6	NOAEL	reproduction & growth	chronic	mammals	USEPA, 2007	
Pesticides							
4,4'-DDT	5.56	LOAEL	reproduction & growth	chronic	mammals	USEPA, 2007	
4,4'-DDT	2.7	LOAEL	reproduction & growth	chronic	birds	USEPA, 2007	
4,4'-DDT	0.147	NOAEL	reproduction & growth	chronic	mammals	USEPA, 2007	
4,4'-DDT	0.227	NOAEL	reproduction & growth	chronic	birds	USEPA, 2007	
Aldrin	1	LOAEL	reproductive	chronic	rat	Treon and Cleveland, 1955	Sample et.al., 1996
Aldrin	0.2	NOAEL	reproductive	chronic	rat	Treon and Cleveland, 1955	Sample et.al., 1996
BHC (mixed isomers)	0.137	LOAEL	reproductive	chronic	mink	Bleavins et al., 1984	Sample et.al., 1996
BHC (mixed isomers)	2.25	LOAEL	reproductive	chronic	Japanese quail	Vos et al., 1971	Sample et.al., 1996
BHC (mixed isomers)	0.563	NOAEL	reproductive	chronic	Japanese quail	Vos et al., 1971	Sample et.al., 1996
Chlordane	10.7	LOAEL	mortality	chronic	red-winged blackbird	Stickel et al., 1983	Sample et.al., 1996
Chlordane	9.16	LOAEL	reproduction	chronic	mouse	WHO, 1984	Sample et.al., 1996
Chlordane	2.14	NOAEL	mortality	chronic	red-winged blackbird	Stickel et al., 1983	Sample et.al., 1996
Chlordane	4.58	NOAEL	reproduction	chronic	mouse	WHO, 1984	Sample et.al., 1996
Dieldrin	0.8	LOAEL	reproduction & growth	chronic	birds	USEPA, 2007	
Dieldrin	1.27	LOAEL	reproduction & growth	chronic	mammals	USEPA, 2007	
Dieldrin	0.0709	NOAEL	reproduction & growth	chronic	birds	USEPA, 2007	
Dieldrin	0.015	NOAEL	reproduction & growth	chronic	mammals	USEPA, 2007	
Endosulfan	1.5	NOAEL	reproduction	subchronic	rat	Dikshith et al., 1984	ATSDR, 2000
Endosulfan	10	NOAEL	reproduction	chronic	gray partridge	Abiola, 1992	Sample et.al., 1996
Endrin	0.92	LOAEL	reproduction	chronic	mouse	Good and Ware, 1969	Sample et.al., 1996
Endrin	0.1035	LOAEL	reproduction	chronic	screech owl	Fleming et al., 1982	Sample et.al., 1996
Heptachlor	1	LOAEL	reproduction	chronic	mink	Crum et al., 1993	Sample et.al., 1996
Inorganics							
Antimony	2.76	LOAEL	reproduction & growth	chronic	mammals	USEPA, 2005	
Antimony	0.059	NOAEL	reproduction & growth	chronic	rat	USEPA, 2005	
Cadmium	6.35	LOAEL	reproduction & growth	chronic	birds	USEPA, 2005	
Cadmium	6.9	LOAEL	reproduction & growth	chronic	mammals	USEPA, 2005	
Cadmium	1.47	NOAEL	reproduction & growth	chronic	birds	USEPA, 2005	
Cadmium	0.77	NOAEL	reproduction & growth	chronic	rat	USEPA, 2005	
Copper	34.87	LOAEL	reproduction & growth	chronic	birds	USEPA, 2007	
Copper	82.7	LOAEL	reproduction & growth	chronic	mammals	USEPA, 2007	
Copper	4.05	NOAEL	reproduction & growth	chronic	chicken	USEPA, 2007	
Copper	5.6	NOAEL	reproduction & growth	chronic	pig	USEPA, 2007	
Lead	44.6	LOAEL	reproduction & growth	chronic	birds	USEPA, 2005	
Lead	186.4	LOAEL	reproduction & growth	chronic	mammals	USEPA, 2005	
Lead	1.63	NOAEL	reproduction & growth	chronic	chicken	USEPA, 2005	
Lead	4.7	NOAEL	reproduction & growth	chronic	rat	USEPA, 2005	
Mercury	0.064	LOAEL	reproductive	chronic	mallard duck	Heinz, 1979	Sample et.al., 1996

TABLE G.6

SOURCES AND ENDPOINTS FOR NOAELS AND LOAELS FOR TERRESTRIAL WILDLIFE
PAGE 2 OF 2

Parameters	Concentration (mg/kg-day)	Endpoint	Effect	Chronic/ Subchronic	Species	Primary Reference	Source of Reference
Mercury	0.16	LOAEL	reproductive	chronic	rat	Verschuuren et al., 1976	Sample et.al., 1996
Mercury	0.032	NOAEL	reproductive	chronic	rat	Verschuuren et al., 1976	Sample et.al., 1996
Selenium	0.819	LOAEL	reproduction & growth	chronic	birds	USEPA, 2007	
Selenium	0.661	LOAEL	reproduction & growth	chronic	mammals	USEPA, 2007	
Selenium	0.29	NOAEL	reproduction & growth	chronic	chicken	USEPA, 2007	
Selenium	0.143	NOAEL	reproduction & growth	chronic	pig	USEPA, 2007	
Thallium	0.74	LOAEL	reproductive	subchronic	rat	Formigli et al., 1986	Sample et.al., 1996
Vanadium	1.7	LOAEL	reproduction & growth	chronic	birds	USEPA, 2005	
Vanadium	9.436	LOAEL	reproduction & growth	chronic	mammals	USEPA, 2005	
Vanadium	0.344	NOAEL	reproduction & growth	chronic	chicken	USEPA, 2005	
Vanadium	4.16	NOAEL	reproduction & growth	chronic	mouse	USEPA, 2005	
Zinc	297.58	LOAEL	reproduction & growth	chronic	mammals	USEPA, 2007	
Zinc	171.44	LOAEL	reproduction & growth	chronic	birds	USEPA, 2007	
Zinc	75.4	NOAEL	reproduction & growth	chronic	mammals	USEPA, 2007	
Zinc	66.1	NOAEL	reproduction & growth	chronic	birds	USEPA, 2007	

Notes:

NOAEL = No Observed Adverse Effects Level

LOAEL = Lowest Observed Adverse Effects Level

The NOAELS and LOAELS for the following PAHs are based on the Low Molecular Weight PAH values: acenapthylene, acenaphthene, anthracene, fluoranthene, fluorene, and phenanthrene.

The NOAELS and LOAELS for the following PAHs are based on the High Molecular Weight PAH values: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-c,d)pyrene, and pyrene.

The NOAELS and LOAELS for the PAHs for birds were based on 7,12-dimethylbenz(a)anthracene.

The LOAELs used for several metals were calculated as the geometric mean of growth and reproduction data from the Ecological Soil Screening Levels (USEPA, 2005, 2007).

References for the NOAELS and LOAELs are presented in this Attachment and Titled "TRV Source and Endpoint References".

* Value has been adjusted for chronic effects.

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APPENDIX G

CHEMICAL CONCENTRATIONS IN SURFACE SOIL AND TISSUE
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical	Surface Soil Concentrations (mg/kg)				Earthworm Bioaccumulation Factors		Earthworm Concentrations (mg/kg)		Plant Bioaccumulation Factors		Plant Concentrations (mg/kg)	
	Maximum Detection	Average of All Results	Average of Positive Results	Average [1]	Conservative	Average	Maximum Detection	Average	Conservative	Average	Maximum Detection	Average
METALS												
ANTIMONY	1.12E+00	5.24E-01	6.73E-01	5.24E-01	1.00E+00	1.00E+00	1.12E+00	5.24E-01	Regression equation from Eco SSL		4.39E-02	2.15E-02
CADMIUM	1.03E+00	5.54E-01	5.54E-01	5.54E-01	Regression equation from Eco SSL		8.48E+00	5.18E+00	Regression equation from Eco SSL		6.32E-01	4.50E-01
COPPER	2.71E+02	6.84E+01	6.84E+01	6.84E+01	5.15E-01	5.15E-01	1.40E+02	3.52E+01	Regression equation from Eco SSL		1.77E+01	1.03E+01
LEAD	2.63E+02	8.56E+01	8.56E+01	8.56E+01	Regression equation from Eco SSL		7.21E+01	2.92E+01	Regression equation from Eco SSL		6.04E+00	3.22E+00
MERCURY	5.98E-01	1.77E-01	1.77E-01	1.77E-01	Regression - Sample et al., (1998)		9.09E-01	6.04E-01	5.00E+00	6.52E-01	2.99E+00	1.16E-01
SELENIUM	7.91E-01	4.53E-01	5.25E-01	4.53E-01	Regression equation from Eco SSL		7.81E-01	5.19E-01	Regression equation from Eco SSL		3.92E-01	2.12E-01
THALLIUM	1.67E-01	2.41E-01	1.67E-01	1.67E-01	1.00E+00	1.00E+00	1.67E-01	1.67E-01	4.00E-03	4.00E-03	6.68E-04	6.68E-04
VANADIUM	1.89E+01	1.27E+01	1.27E+01	1.27E+01	4.20E-02	4.20E-02	7.94E-01	5.35E-01	4.85E-03	4.85E-03	9.17E-02	6.18E-02
ZINC	1.53E+03	3.24E+02	3.24E+02	3.24E+02	Regression equation from Eco SSL		9.48E+02	5.70E+02	Regression equation from Eco SSL		2.81E+02	1.19E+02
SEMIVOLATILES												
BIS(2-ETHYLHEXYL)PHTHALATE	1.49E-01	1.85E-01	1.49E-01	1.49E-01	1.00E+00	1.00E+00	1.49E-01	1.49E-01	1.50E-03	1.50E-03	2.24E-04	2.24E-04
POLYNUCLEAR AROMATIC HYDROCARBONS												
ACENAPHTHENE	2.05E-01	4.95E-02	4.95E-02	4.95E-02	1.47E+00	1.47E+00	3.01E-01	7.28E-02	Regression equation from Eco SSL		1.49E-02	5.03E-02
ACENAPHTHYLENE	9.81E-02	4.23E-02	5.19E-02	4.23E-02	2.29E+01	2.29E+01	2.25E+00	9.68E-01	Regression equation from Eco SSL		5.08E-02	2.61E-02
ANTHRACENE	6.06E-01	2.06E-01	2.06E-01	2.06E-01	2.42E+00	2.42E+00	1.47E+00	4.99E-01	Regression equation from Eco SSL		2.52E-01	1.09E-01
BENZO(A)ANTHRACENE	1.83E+00	5.73E-01	5.73E-01	5.73E-01	1.59E+00	1.59E+00	2.91E+00	9.10E-01	Regression equation from Eco SSL		9.55E-02	4.79E-02
BENZO(A)PYRENE	1.46E+00	6.18E-01	6.18E-01	6.18E-01	1.33E+00	1.33E+00	1.94E+00	8.22E-01	Regression equation from Eco SSL		1.84E-01	7.96E-02
BENZO(B)FLUORANTHENE	2.26E+00	7.48E-01	7.48E-01	7.48E-01	2.60E+00	2.60E+00	5.88E+00	1.94E+00	3.10E-01	3.10E-01	7.01E-01	2.32E-01
BENZO(G,H,I)PERYLENE	7.11E-01	2.90E-01	2.90E-01	2.90E-01	2.94E+00	2.94E+00	2.09E+00	8.52E-01	Regression equation from Eco SSL		2.63E-01	9.10E-02
BENZO(K)FLUORANTHENE	2.28E+00	5.43E-01	5.43E-01	5.43E-01	2.60E+00	2.60E+00	5.93E+00	1.41E+00	Regression equation from Eco SSL		2.35E-01	6.83E-02
CHRYSENE	1.53E+00	5.29E-01	5.29E-01	5.29E-01	2.29E+00	2.29E+00	3.50E+00	1.21E+00	Regression equation from Eco SSL		8.59E-02	4.57E-02
DIBENZO(A,H)ANTHRACENE	2.87E-01	1.13E-01	1.25E-01	1.13E-01	2.31E+00	2.31E+00	6.63E-01	2.61E-01	1.30E-01	1.30E-01	3.73E-02	1.47E-02
FLUORANTHENE	4.29E+00	1.33E+00	1.33E+00	1.33E+00	3.04E+00	3.04E+00	1.30E+01	4.05E+00	5.00E-01	5.00E-01	2.15E+00	6.67E-01
FLUORENE	2.54E-01	6.29E-02	6.95E-02	6.29E-02	9.57E+00	9.57E+00	2.43E+00	6.02E-01	Regression equation from Eco SSL		1.24E-02	4.10E-02
INDENO(1,2,3-CD)PYRENE	6.74E-01	2.76E-01	2.76E-01	2.76E-01	2.86E+00	2.86E+00	1.93E+00	7.89E-01	1.10E-01	1.10E-01	7.41E-02	3.03E-02
PHENANTHRENE	2.37E+00	7.32E-01	7.32E-01	7.32E-01	1.72E+00	1.72E+00	4.08E+00	1.26E+00	Regression equation from Eco SSL		1.45E+00	6.97E-01
PYRENE	3.19E+00	1.10E+00	1.10E+00	1.10E+00	1.75E+00	1.75E+00	5.58E+00	1.92E+00	7.20E-01	7.20E-01	2.30E+00	7.90E-01
PESTICIDES												
4,4'-DDD	1.95E-01	3.88E-02	3.88E-02	3.88E-02	Regression equation from Eco SSL		1.02E+00	3.31E-01	Regression equation from Eco SSL		2.37E-02	7.04E-03
4,4'-DDE	1.97E-01	7.78E-02	7.78E-02	7.78E-02	Regression equation from Eco SSL		2.85E+00	1.26E+00	Regression equation from Eco SSL		2.39E-02	1.19E-02
4,4'-DDT	2.82E-01	8.02E-02	8.90E-02	8.02E-02	Regression equation from Eco SSL		2.79E+00	9.34E-01	Regression equation from Eco SSL		3.13E-02	1.21E-02
ALDRIN	2.08E-02	2.66E-03	4.95E-03	2.66E-03	3.30E+00	3.30E+00	6.86E-02	8.79E-03	6.54E-03	6.54E-03	1.36E-04	1.74E-05
ALPHA-BHC	1.10E-03	4.87E-04	7.50E-04	4.87E-04	1.00E+00	1.00E+00	1.10E-03	4.87E-04	2.41E-01	2.41E-01	2.65E-04	1.17E-04
ALPHA-CHLORDANE	3.22E+00	3.53E-01	3.53E-01	3.53E-01	5.00E+00	5.00E+00	1.61E+01	1.76E+00	9.50E-03	9.50E-03	3.06E-02	3.35E-03
DELTA-BHC	4.65E-03	1.57E-03	1.70E-03	1.57E-03	1.00E+00	1.00E+00	4.65E-03	1.57E-03	1.53E-01	1.53E-01	7.11E-04	2.40E-04
DIELDRIN	1.66E-02	2.55E-03	3.10E-03	2.55E-03	1.47E+01	1.47E+01	2.44E-01	3.75E-02	4.10E-01	4.10E-01	6.81E-03	1.05E-03
ENDOSULFAN II	5.35E-02	5.92E-03	8.29E-03	5.92E-03	1.00E+00	1.00E+00	5.35E-02	5.92E-03	2.31E-01	2.31E-01	1.24E-02	1.37E-03
ENDOSULFAN SULFATE	1.21E-02	2.17E-03	3.97E-03	2.17E-03	1.00E+00	1.00E+00	1.21E-02	2.17E-03	2.90E-01	2.90E-01	3.51E-03	6.30E-04
ENDRIN	2.26E-02	5.97E-03	8.37E-03	5.97E-03	3.60E+00	3.60E+00	8.14E-02	2.15E-02	3.71E-02	3.71E-02	8.38E-04	2.22E-04
ENDRIN ALDEHYDE	1.95E-02	2.89E-03	4.56E-03	2.89E-03	3.60E+00	3.60E+00	7.02E-02	1.04E-02	3.71E-02	3.71E-02	7.23E-04	1.07E-04
ENDRIN KETONE	1.14E-03	4.53E-04	1.14E-03	4.53E-04	3.60E+00	3.60E+00	4.10E-03	1.63E-03	3.71E-02	3.71E-02	4.23E-05	1.68E-05
GAMMA-CHLORDANE	2.60E+00	2.81E-01	2.81E-01	2.81E-01	5.00E+00	5.00E+00	1.30E+01	1.41E+00	9.50E-03	9.50E-03	2.47E-02	2.67E-03
HEPTACHLOR	2.36E-01	2.44E-02	6.06E-02	2.44E-02	1.00E+01	1.00E+01	2.36E+00	2.44E-01	1.12E-02	1.12E-02	2.64E-03	2.74E-04
HEPTACHLOR EPOXIDE	6.40E-02	8.62E-03	1.21E-02	8.62E-03	3.00E+00	3.00E+00	1.92E-01	2.58E-02	4.98E-02	4.98E-02	3.19E-03	4.29E-04

1 - Average concentration is the mean concentration of all samples, using 1/2 the detection limit for non-detects, unless the value is greater than the maximum concentration. In that case, the average concentration is the mean of the positive detections.

APPENDIX G

MEADOW VOLE - TIER 1 INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical	Max Soil Conc. (mg/kg)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	Hazard Quotients LOAEL
METALS									
ANTIMONY	1.12E+00	4.39E-02	3.96E-03	4.85E-03	8.81E-03	5.90E-02	2.76E+00	1.5E-01	3.2E-03
CADMIUM	1.03E+00	6.32E-01	3.64E-03	6.98E-02	7.35E-02	7.70E-01	6.90E+00	9.5E-02	1.1E-02
COPPER	2.71E+02	1.77E+01	9.58E-01	1.96E+00	2.92E+00	5.60E+00	8.27E+01	5.2E-01	3.5E-02
LEAD	2.63E+02	6.04E+00	9.30E-01	6.67E-01	1.60E+00	4.70E+00	1.86E+02	3.4E-01	8.6E-03
MERCURY	5.98E-01	2.99E+00	2.11E-03	3.30E-01	3.32E-01	3.20E-02	1.60E-01	1.0E+01	2.1E+00
SELENIUM	7.91E-01	3.92E-01	2.80E-03	4.33E-02	4.61E-02	1.43E-01	6.61E-01	3.2E-01	7.0E-02
THALLIUM	1.67E-01	6.68E-04	5.90E-04	7.38E-05	6.64E-04	7.40E-03	7.40E-02	9.0E-02	9.0E-03
VANADIUM	1.89E+01	9.17E-02	6.68E-02	1.01E-02	7.69E-02	4.16E+00	9.44E+00	1.8E-02	8.2E-03
ZINC	1.53E+03	2.81E+02	5.41E+00	3.10E+01	3.64E+01	7.54E+01	2.98E+02	4.8E-01	1.2E-01
SEMIVOLATILES									
BIS(2-ETHYLHEXYL)PHTHALATE	1.49E-01	2.24E-04	5.27E-04	2.47E-05	5.51E-04	1.83E+01	1.83E+02	3.0E-05	3.0E-06
POLYNUCLEAR AROMATIC HYDROCARBONS									
ACENAPHTHENE	2.05E-01	1.49E-02	7.25E-04	1.65E-03	2.37E-03	6.56E+01	3.56E+02	3.6E-05	6.7E-06
ACENAPHTHYLENE	9.81E-02	5.08E-02	3.47E-04	5.61E-03	5.96E-03	6.56E+01	3.56E+02	9.1E-05	1.7E-05
ANTHRACENE	6.06E-01	2.52E-01	2.14E-03	2.78E-02	3.00E-02	6.56E+01	3.56E+02	4.6E-04	8.4E-05
BENZO(A)ANTHRACENE	1.83E+00	9.55E-02	6.47E-03	1.06E-02	1.70E-02	6.15E-01	3.84E+01	2.8E-02	4.4E-04
BENZO(A)PYRENE	1.46E+00	1.84E-01	5.16E-03	2.03E-02	2.55E-02	6.15E-01	3.84E+01	4.1E-02	6.6E-04
BENZO(B)FLUORANTHENE	2.26E+00	7.01E-01	7.99E-03	7.74E-02	8.54E-02	6.15E-01	3.84E+01	1.4E-01	2.2E-03
BENZO(G,H,I)PERYLENE	7.11E-01	2.63E-01	2.51E-03	2.91E-02	3.16E-02	6.15E-01	3.84E+01	5.1E-02	8.2E-04
BENZO(K)FLUORANTHENE	2.28E+00	2.35E-01	8.06E-03	2.59E-02	3.40E-02	6.15E-01	3.84E+01	5.5E-02	8.9E-04
CHRYSENE	1.53E+00	8.59E-02	5.41E-03	9.49E-03	1.49E-02	6.15E-01	3.84E+01	2.4E-02	3.9E-04
DIBENZO(A,H)ANTHRACENE	2.87E-01	3.73E-02	1.01E-03	4.12E-03	5.14E-03	6.15E-01	3.84E+01	8.4E-03	1.3E-04
FLUORANTHENE	4.29E+00	2.15E+00	1.52E-02	2.37E-01	2.52E-01	6.56E+01	3.56E+02	3.8E-03	7.1E-04
FLUORENE	2.54E-01	1.24E-02	8.98E-04	1.37E-03	2.27E-03	6.56E+01	3.56E+02	3.5E-05	6.4E-06
INDENO(1,2,3-CD)PYRENE	6.74E-01	7.41E-02	2.38E-03	8.19E-03	1.06E-02	6.15E-01	3.84E+01	1.7E-02	2.8E-04
PHENANTHRENE	2.37E+00	1.45E+00	8.38E-03	1.60E-01	1.68E-01	6.56E+01	3.56E+02	2.6E-03	4.7E-04
PYRENE	3.19E+00	2.30E+00	1.13E-02	2.54E-01	2.65E-01	6.15E-01	3.84E+01	4.3E-01	6.9E-03
PESTICIDES									
4,4'-DDD	1.95E-01	2.37E-02	6.89E-04	2.62E-03	3.31E-03	1.47E-01	5.56E+00	2.3E-02	6.0E-04
4,4'-DDE	1.97E-01	2.39E-02	6.96E-04	2.64E-03	3.34E-03	1.47E-01	5.56E+00	2.3E-02	6.0E-04
4,4'-DDT	2.82E-01	3.13E-02	9.97E-04	3.46E-03	4.45E-03	1.47E-01	5.56E+00	3.0E-02	8.0E-04
ALDRIN	2.08E-02	1.36E-04	7.35E-05	1.50E-05	8.86E-05	2.00E-01	1.00E+00	4.4E-04	8.9E-05
ALPHA-BHC	1.10E-03	2.65E-04	3.89E-06	2.93E-05	3.32E-05	1.40E-02	1.40E-01	2.4E-03	2.4E-04
ALPHA-CHLORDANE	3.22E+00	3.06E-02	1.14E-02	3.38E-03	1.48E-02	4.58E+00	9.16E+00	3.2E-03	1.6E-03
DELTA-BHC	4.65E-03	7.11E-04	1.64E-05	7.86E-05	9.50E-05	1.40E-02	1.40E-01	6.8E-03	6.8E-04
DIELDRIN	1.66E-02	6.81E-03	5.87E-05	7.52E-04	8.11E-04	1.50E-02	1.27E+00	5.4E-02	6.4E-04
ENDOSULFAN II	5.35E-02	1.24E-02	1.89E-04	1.37E-03	1.55E-03	1.50E-01	1.50E+00	1.0E-02	1.0E-03
ENDOSULFAN SULFATE	1.21E-02	3.51E-03	4.28E-05	3.88E-04	4.30E-04	1.50E-01	1.50E+00	2.9E-03	2.9E-04
ENDRIN	2.26E-02	8.38E-04	7.99E-05	9.26E-05	1.73E-04	9.20E-02	9.20E-01	1.9E-03	1.9E-04
ENDRIN ALDEHYDE	1.95E-02	7.23E-04	6.89E-05	7.99E-05	1.49E-04	9.20E-02	9.20E-01	1.6E-03	1.6E-04
ENDRIN KETONE	1.14E-03	4.23E-05	4.03E-06	4.67E-06	8.70E-06	9.20E-02	9.20E-01	9.5E-05	9.5E-06
GAMMA-CHLORDANE	2.60E+00	2.47E-02	9.19E-03	2.73E-03	1.19E-02	4.58E+00	9.16E+00	2.6E-03	1.3E-03
HEPTACHLOR	2.36E-01	2.64E-03	8.34E-04	2.92E-04	1.13E-03	1.00E-01	1.00E+00	1.1E-02	1.1E-03
HEPTACHLOR EPOXIDE	6.40E-02	3.19E-03	2.26E-04	3.52E-04	5.78E-04	1.00E-01	1.00E+00	5.8E-03	5.8E-04

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
Soil Ingestion Rate = (Is)	6.01E-05	kg/day	Cv = Contaminant concentration in vegetation	NOAEL = No Observed Adverse Effects Concentration
Home Range = (HR)	Assume 100% on site		Cs = Contaminant concentration in soil	
Contaminated Area = (CA)	Assume equal to home range		Total Dose = Dose (soil) + Dose (vegetation)	
			H=CA/HR (Assume = to 1)	

APPENDIX G

MEADOW VOLE - TIER 2, STEP 3A INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical	Average Soil Conc. (mg/kg)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	Hazard Quotients LOAEL
METALS									
ANTIMONY	5.24E-01	2.15E-02	3.06E-04	1.05E-03	1.35E-03	5.90E-02	2.76E+00	2.3E-02	4.9E-04
CADMIUM	5.54E-01	4.50E-01	3.24E-04	2.19E-02	2.23E-02	7.70E-01	6.90E+00	2.9E-02	3.2E-03
COPPER	6.84E+01	1.03E+01	4.00E-02	5.02E-01	5.42E-01	5.60E+00	8.27E+01	9.7E-02	6.6E-03
LEAD	8.56E+01	3.22E+00	5.00E-02	1.57E-01	2.07E-01	4.70E+00	1.86E+02	4.4E-02	1.1E-03
MERCURY	1.77E-01	1.16E-01	1.04E-04	5.64E-03	5.74E-03	3.20E-02	1.60E-01	1.8E-01	3.6E-02
SELENIUM	4.53E-01	2.12E-01	2.65E-04	1.03E-02	1.06E-02	1.43E-01	6.61E-01	7.4E-02	1.6E-02
THALLIUM	1.67E-01	6.68E-04	9.76E-05	3.25E-05	1.30E-04	7.40E-03	7.40E-02	1.8E-02	1.8E-03
VANADIUM	1.27E+01	6.18E-02	7.45E-03	3.01E-03	1.05E-02	4.16E+00	9.44E+00	2.5E-03	1.1E-03
ZINC	3.24E+02	1.19E+02	1.89E-01	5.79E+00	5.98E+00	7.54E+01	2.98E+02	7.9E-02	2.0E-02
SEMIVOLATILES									
BIS(2-ETHYLHEXYL)PHTHALATE	1.49E-01	2.24E-04	8.71E-05	1.09E-05	9.80E-05	1.83E+01	1.83E+02	5.4E-06	5.4E-07
POLYNUCLEAR AROMATIC HYDROCARBONS									
ACENAPHTHENE	4.95E-02	5.03E-02	2.89E-05	2.45E-03	2.48E-03	6.56E+01	3.56E+02	3.8E-05	7.0E-06
ACENAPHTHYLENE	4.23E-02	2.61E-02	2.47E-05	1.27E-03	1.30E-03	6.56E+01	3.56E+02	2.0E-05	3.6E-06
ANTHRACENE	2.06E-01	1.09E-01	1.21E-04	5.31E-03	5.43E-03	6.56E+01	3.56E+02	8.3E-05	1.5E-05
BENZO(A)ANTHRACENE	5.73E-01	4.79E-02	3.35E-04	2.33E-03	2.67E-03	6.15E-01	3.84E+01	4.3E-03	6.9E-05
BENZO(A)PYRENE	6.18E-01	7.96E-02	3.61E-04	3.88E-03	4.24E-03	6.15E-01	3.84E+01	6.9E-03	1.1E-04
BENZO(B)FLUORANTHENE	7.48E-01	2.32E-01	4.37E-04	1.13E-02	1.17E-02	6.15E-01	3.84E+01	1.9E-02	3.1E-04
BENZO(G,H,I)PERYLENE	2.90E-01	9.10E-02	1.69E-04	4.44E-03	4.60E-03	6.15E-01	3.84E+01	7.5E-03	1.2E-04
BENZO(K)FLUORANTHENE	5.43E-01	6.83E-02	3.17E-04	3.33E-03	3.65E-03	6.15E-01	3.84E+01	5.9E-03	9.5E-05
CHRYSENE	5.29E-01	4.57E-02	3.09E-04	2.23E-03	2.54E-03	6.15E-01	3.84E+01	4.1E-03	6.6E-05
DIBENZO(A,H)ANTHRACENE	1.13E-01	1.47E-02	6.60E-05	7.15E-04	7.81E-04	6.15E-01	3.84E+01	1.3E-03	2.0E-05
FLUORANTHENE	1.33E+00	6.67E-01	7.79E-04	3.25E-02	3.32E-02	6.56E+01	3.56E+02	5.1E-04	9.3E-05
FLUORENE	6.29E-02	4.10E-02	3.68E-05	2.00E-03	2.03E-03	6.56E+01	3.56E+02	3.1E-05	5.7E-06
INDENO(1,2,3-CD)PYRENE	2.76E-01	3.03E-02	1.61E-04	1.48E-03	1.64E-03	6.15E-01	3.84E+01	2.7E-03	4.3E-05
PHENANTHRENE	7.32E-01	6.97E-01	4.28E-04	3.40E-02	3.44E-02	6.56E+01	3.56E+02	5.2E-04	9.7E-05
PYRENE	1.10E+00	7.90E-01	6.42E-04	3.85E-02	3.91E-02	6.15E-01	3.84E+01	6.4E-02	1.0E-03
PESTICIDES									
4,4'-DDD	3.88E-02	7.04E-03	2.27E-05	3.43E-04	3.65E-04	1.47E-01	5.56E+00	2.5E-03	6.6E-05
4,4'-DDE	7.78E-02	1.19E-02	4.55E-05	5.79E-04	6.24E-04	1.47E-01	5.56E+00	4.2E-03	1.1E-04
4,4'-DDT	8.02E-02	1.21E-02	4.69E-05	5.92E-04	6.39E-04	1.47E-01	5.56E+00	4.3E-03	1.1E-04
ALDRIN	2.66E-03	1.74E-05	1.56E-06	8.49E-07	2.41E-06	2.00E-01	1.00E+00	1.2E-05	2.4E-06
ALPHA-BHC	4.87E-04	1.17E-04	2.84E-07	5.71E-06	6.00E-06	1.40E-02	1.40E-01	4.3E-04	4.3E-05
ALPHA-CHLORDANE	3.53E-01	3.35E-03	2.06E-04	1.63E-04	3.69E-04	4.58E+00	9.16E+00	8.1E-05	4.0E-05
DELTA-BHC	1.57E-03	2.40E-04	9.18E-07	1.17E-05	1.26E-05	1.40E-02	1.40E-01	9.0E-04	9.0E-05
DIELDRIN	2.55E-03	1.05E-03	1.49E-06	5.10E-05	5.25E-05	1.50E-02	1.27E+00	3.5E-03	4.1E-05
ENDOSULFAN II	5.92E-03	1.37E-03	3.46E-06	6.66E-05	7.00E-05	1.50E-01	1.50E+00	4.7E-04	4.7E-05
ENDOSULFAN SULFATE	2.17E-03	6.30E-04	1.27E-06	3.07E-05	3.19E-05	1.50E-01	1.50E+00	2.1E-04	2.1E-05
ENDRIN	5.97E-03	2.22E-04	3.49E-06	1.08E-05	1.43E-05	9.20E-02	9.20E-01	1.6E-04	1.6E-05
ENDRIN ALDEHYDE	2.89E-03	1.07E-04	1.69E-06	5.22E-06	6.90E-06	9.20E-02	9.20E-01	7.5E-05	7.5E-06
ENDRIN KETONE	4.53E-04	1.68E-05	2.65E-07	8.19E-07	1.08E-06	9.20E-02	9.20E-01	1.2E-05	1.2E-06
GAMMA-CHLORDANE	2.81E-01	2.67E-03	1.65E-04	1.30E-04	2.95E-04	4.58E+00	9.16E+00	6.4E-05	3.2E-05
HEPTACHLOR	2.44E-02	2.74E-04	1.43E-05	1.33E-05	2.76E-05	1.00E-01	1.00E+00	2.8E-04	2.8E-05
HEPTACHLOR EPOXIDE	8.62E-03	4.29E-04	5.04E-06	2.09E-05	2.59E-05	1.00E-01	1.00E+00	2.6E-04	2.6E-05

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	3.58E-02	kg	Dose (soil) = (Cs * Is)(H)/BW	Conc = Concentration
Food Ingestion Rate = (If)	1.74E-03	kg/day	Dose (vegetation) = (Cv * If)(H)/BW	LOAEL = Lowest Observed Adverse Effects Concentration
Soil Ingestion Rate = (Is)	2.09E-05	kg/day	Cv = Contaminant concentration in vegetation	NOAEL = No Observed Adverse Effects Concentration
Home Range = (HR)	6.59E-02	acres	Cs = Contaminant concentration in soil	
Contaminated Area = (CA)	Assume equal to home range		Total Dose = Dose (soil) + Dose (vegetation)	
			H=CA/HR (Assume = to 1)	

APPENDIX G

BOBWHITE QUAIL - TIER 1 INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical	Max Soil Conc. (mg/kg)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	Hazard Quotients LOAEL
METALS									
ANTIMONY	1.12E+00	4.39E-02	1.65E-02	4.64E-03	2.11E-02	NV	NV	NV	NV
CADMIUM	1.03E+00	6.32E-01	1.51E-02	6.68E-02	8.20E-02	1.47E+00	6.35E+00	5.6E-02	1.3E-02
COPPER	2.71E+02	1.77E+01	3.98E+00	1.87E+00	5.86E+00	4.05E+00	3.49E+01	1.4E+00	1.7E-01
LEAD	2.63E+02	6.04E+00	3.87E+00	6.38E-01	4.50E+00	1.63E+00	4.46E+01	2.8E+00	1.0E-01
MERCURY	5.98E-01	2.99E+00	8.79E-03	3.16E-01	3.25E-01	6.40E-03	6.40E-02	5.1E+01	5.1E+00
SELENIUM	7.91E-01	3.92E-01	1.16E-02	4.15E-02	5.31E-02	2.90E-01	8.19E-01	1.8E-01	6.5E-02
THALLIUM	1.67E-01	6.68E-04	2.45E-03	7.06E-05	2.53E-03	NV	NV	NV	NV
VANADIUM	1.89E+01	9.17E-02	2.78E-01	9.69E-03	2.87E-01	3.44E-01	1.69E+00	8.4E-01	1.7E-01
ZINC	1.53E+03	2.81E+02	2.25E+01	2.97E+01	5.22E+01	6.61E+01	1.71E+02	7.9E-01	3.0E-01
SEMIVOLATILES									
BIS(2-ETHYLHEXYL)PHTHALATE	1.49E-01	2.24E-04	2.19E-03	2.36E-05	2.21E-03	1.11E+00	1.11E+01	2.0E-03	2.0E-04
POLYNUCLEAR AROMATIC HYDROCARBONS									
ACENAPHTHENE	2.05E-01	1.49E-02	3.01E-03	1.58E-03	4.59E-03	2.00E+00	2.00E+01	2.3E-03	2.3E-04
ACENAPHTHYLENE	9.81E-02	5.08E-02	1.44E-03	5.37E-03	6.81E-03	2.00E+00	2.00E+01	3.4E-03	3.4E-04
ANTHRACENE	6.06E-01	2.52E-01	8.91E-03	2.66E-02	3.55E-02	2.00E+00	2.00E+01	1.8E-02	1.8E-03
BENZO(A)ANTHRACENE	1.83E+00	9.55E-02	2.69E-02	1.01E-02	3.70E-02	2.00E+00	2.00E+01	1.8E-02	1.8E-03
BENZO(A)PYRENE	1.46E+00	1.84E-01	2.15E-02	1.95E-02	4.09E-02	2.00E+00	2.00E+01	2.0E-02	2.0E-03
BENZO(B)FLUORANTHENE	2.26E+00	7.01E-01	3.32E-02	7.41E-02	1.07E-01	2.00E+00	2.00E+01	5.4E-02	5.4E-03
BENZO(G,H,I)PERYLENE	7.11E-01	2.63E-01	1.04E-02	2.78E-02	3.83E-02	2.00E+00	2.00E+01	1.9E-02	1.9E-03
BENZO(K)FLUORANTHENE	2.28E+00	2.35E-01	3.35E-02	2.48E-02	5.83E-02	2.00E+00	2.00E+01	2.9E-02	2.9E-03
CHRYSENE	1.53E+00	8.59E-02	2.25E-02	9.08E-03	3.16E-02	2.00E+00	2.00E+01	1.6E-02	1.6E-03
DIBENZO(A,H)ANTHRACENE	2.87E-01	3.73E-02	4.22E-03	3.94E-03	8.16E-03	2.00E+00	2.00E+01	4.1E-03	4.1E-04
FLUORANTHENE	4.29E+00	2.15E+00	6.31E-02	2.27E-01	2.90E-01	2.00E+00	2.00E+01	1.4E-01	1.4E-02
FLUORENE	2.54E-01	1.24E-02	3.73E-03	1.31E-03	5.04E-03	2.00E+00	2.00E+01	2.5E-03	2.5E-04
INDENO(1,2,3-CD)PYRENE	6.74E-01	7.41E-02	9.91E-03	7.84E-03	1.77E-02	2.00E+00	2.00E+01	8.9E-03	8.9E-04
PHENANTHRENE	2.37E+00	1.45E+00	3.48E-02	1.53E-01	1.88E-01	2.00E+00	2.00E+01	9.4E-02	9.4E-03
PYRENE	3.19E+00	2.30E+00	4.69E-02	2.43E-01	2.90E-01	2.00E+00	2.00E+01	1.4E-01	1.4E-02
PESTICIDES									
4,4'-DDD	1.95E-01	2.37E-02	2.87E-03	2.51E-03	5.37E-03	2.27E-01	2.70E+00	2.4E-02	2.0E-03
4,4'-DDE	1.97E-01	2.39E-02	2.90E-03	2.53E-03	5.42E-03	2.27E-01	2.70E+00	2.4E-02	2.0E-03
4,4'-DDT	2.82E-01	3.13E-02	4.14E-03	3.31E-03	7.45E-03	2.27E-01	2.70E+00	3.3E-02	2.8E-03
ALDRIN	2.08E-02	1.36E-04	3.06E-04	1.44E-05	3.20E-04	NV	NV	NV	NV
ALPHA-BHC	1.10E-03	2.65E-04	1.62E-05	2.80E-05	4.42E-05	5.60E-01	2.25E+00	7.9E-05	2.0E-05
ALPHA-CHLORDANE	3.22E+00	3.06E-02	4.73E-02	3.23E-03	5.06E-02	2.14E+00	1.07E+01	2.4E-02	4.7E-03
DELTA-BHC	4.65E-03	7.11E-04	6.83E-05	7.52E-05	1.44E-04	5.60E-01	2.25E+00	2.6E-04	6.4E-05
DIELDRIN	1.66E-02	6.81E-03	2.44E-04	7.20E-04	9.64E-04	7.09E-02	8.00E-01	1.4E-02	1.2E-03
ENDOSULFAN II	5.35E-02	1.24E-02	7.86E-04	1.31E-03	2.09E-03	1.00E+01	1.00E+02	2.1E-04	2.1E-05
ENDOSULFAN SULFATE	1.21E-02	3.51E-03	1.78E-04	3.71E-04	5.49E-04	1.00E+01	1.00E+02	5.5E-05	5.5E-06
ENDRIN	2.26E-02	8.38E-04	3.32E-04	8.87E-05	4.21E-04	1.04E-02	1.04E-01	4.1E-02	4.1E-03
ENDRIN ALDEHYDE	1.95E-02	7.23E-04	2.87E-04	7.65E-05	3.63E-04	1.00E-02	1.00E-01	3.6E-02	3.6E-03
ENDRIN KETONE	1.14E-03	4.23E-05	1.68E-05	4.47E-06	2.12E-05	1.00E-02	1.00E-01	2.1E-03	2.1E-04
GAMMA-CHLORDANE	2.60E+00	2.47E-02	3.82E-02	2.61E-03	4.08E-02	2.14E+00	1.07E+01	1.9E-02	3.8E-03
HEPTACHLOR	2.36E-01	2.64E-03	3.47E-03	2.79E-04	3.75E-03	NV	NV	NV	NV
HEPTACHLOR EPOXIDE	6.40E-02	3.19E-03	9.41E-04	3.37E-04	1.28E-03	NV	NV	NV	NV

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.54E-01	kg
Food Ingestion Rate = (If)	1.63E-02	kg/day
Soil Ingestion Rate = (Is)	2.26E-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 (vegetation) = (Cv * If)(H)/BW
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (vegetation)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
NV = No Value

APPENDIX G

BOBWHITE QUAIL - TIER 2, STEP 3A INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical	Average Soil Conc. (mg/kg)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	Hazard Quotients LOAEL
METALS									
ANTIMONY	5.24E-01	2.15E-02	2.48E-03	1.67E-03	4.16E-03	NV	NV	NV	NV
CADMIUM	5.54E-01	4.50E-01	2.63E-03	3.50E-02	3.76E-02	1.47E+00	6.35E+00	2.6E-02	5.9E-03
COPPER	6.84E+01	1.03E+01	3.24E-01	8.01E-01	1.13E+00	4.05E+00	3.49E+01	2.8E-01	3.2E-02
LEAD	8.56E+01	3.22E+00	4.06E-01	2.50E-01	6.56E-01	1.63E+00	4.46E+01	4.0E-01	1.5E-02
MERCURY	1.77E-01	1.16E-01	8.42E-04	9.00E-03	9.84E-03	6.40E-03	6.40E-02	1.5E+00	1.5E-01
SELENIUM	4.53E-01	2.12E-01	2.15E-03	1.65E-02	1.86E-02	2.90E-01	8.19E-01	6.4E-02	2.3E-02
THALLIUM	1.67E-01	6.68E-04	7.92E-04	5.19E-05	8.44E-04	NV	NV	NV	NV
VANADIUM	1.27E+01	6.18E-02	6.04E-02	4.81E-03	6.53E-02	3.44E-01	1.69E+00	1.9E-01	3.9E-02
ZINC	3.24E+02	1.19E+02	1.54E+00	9.23E+00	1.08E+01	6.61E+01	1.71E+02	1.6E-01	6.3E-02
SEMIVOLATILES									
BIS(2-ETHYLHEXYL)PHTHALATE	1.49E-01	2.24E-04	7.07E-04	1.74E-05	7.24E-04	1.11E+00	1.11E+01	6.5E-04	6.5E-05
POLYNUCLEAR AROMATIC HYDROCARBONS									
ACENAPHTHENE	4.95E-02	5.03E-02	2.35E-04	3.91E-03	4.14E-03	2.00E+00	2.00E+01	2.1E-03	2.1E-04
ACENAPHTHYLENE	4.23E-02	2.61E-02	2.00E-04	2.03E-03	2.23E-03	2.00E+00	2.00E+01	1.1E-03	1.1E-04
ANTHRACENE	2.06E-01	1.09E-01	9.79E-04	8.47E-03	9.45E-03	2.00E+00	2.00E+01	4.7E-03	4.7E-04
BENZO(A)ANTHRACENE	5.73E-01	4.79E-02	2.72E-03	3.72E-03	6.44E-03	2.00E+00	2.00E+01	3.2E-03	3.2E-04
BENZO(A)PYRENE	6.18E-01	7.96E-02	2.93E-03	6.19E-03	9.12E-03	2.00E+00	2.00E+01	4.6E-03	4.6E-04
BENZO(B)FLUORANTHENE	7.48E-01	2.32E-01	3.55E-03	1.80E-02	2.16E-02	2.00E+00	2.00E+01	1.1E-02	1.1E-03
BENZO(G,H,I)PERYLENE	2.90E-01	9.10E-02	1.37E-03	7.08E-03	8.45E-03	2.00E+00	2.00E+01	4.2E-03	4.2E-04
BENZO(K)FLUORANTHENE	5.43E-01	6.83E-02	2.57E-03	5.31E-03	7.88E-03	2.00E+00	2.00E+01	3.9E-03	3.9E-04
CHRYSENE	5.29E-01	4.57E-02	2.51E-03	3.55E-03	6.06E-03	2.00E+00	2.00E+01	3.0E-03	3.0E-04
DIBENZO(A,H)ANTHRACENE	1.13E-01	1.47E-02	5.35E-04	1.14E-03	1.68E-03	2.00E+00	2.00E+01	8.4E-04	8.4E-05
FLUORANTHENE	1.33E+00	6.67E-01	6.32E-03	5.18E-02	5.81E-02	2.00E+00	2.00E+01	2.9E-02	2.9E-03
FLUORENE	6.29E-02	4.10E-02	2.98E-04	3.18E-03	3.48E-03	2.00E+00	2.00E+01	1.7E-03	1.7E-04
INDENO(1,2,3-CD)PYRENE	2.76E-01	3.03E-02	1.31E-03	2.36E-03	3.67E-03	2.00E+00	2.00E+01	1.8E-03	1.8E-04
PHENANTHRENE	7.32E-01	6.97E-01	3.47E-03	5.42E-02	5.77E-02	2.00E+00	2.00E+01	2.9E-02	2.9E-03
PYRENE	1.10E+00	7.90E-01	5.21E-03	6.14E-02	6.67E-02	2.00E+00	2.00E+01	3.3E-02	3.3E-03
PESTICIDES									
4,4'-DDD	3.88E-02	7.04E-03	1.84E-04	5.47E-04	7.31E-04	2.27E-01	2.70E+00	3.2E-03	2.7E-04
4,4'-DDE	7.78E-02	1.19E-02	3.69E-04	9.24E-04	1.29E-03	2.27E-01	2.70E+00	5.7E-03	4.8E-04
4,4'-DDT	8.02E-02	1.21E-02	3.80E-04	9.44E-04	1.32E-03	2.27E-01	2.70E+00	5.8E-03	4.9E-04
ALDRIN	2.66E-03	1.74E-05	1.26E-05	1.35E-06	1.40E-05	NV	NV	NV	NV
ALPHA-BHC	4.87E-04	1.17E-04	2.31E-06	9.12E-06	1.14E-05	5.60E-01	2.25E+00	2.0E-05	5.1E-06
ALPHA-CHLORDANE	3.53E-01	3.35E-03	1.67E-03	2.61E-04	1.93E-03	2.14E+00	1.07E+01	9.0E-04	1.8E-04
DELTA-BHC	1.57E-03	2.40E-04	7.45E-06	1.87E-05	2.61E-05	5.60E-01	2.25E+00	4.7E-05	1.2E-05
DIELDRIN	2.55E-03	1.05E-03	1.21E-05	8.14E-05	9.35E-05	7.09E-02	8.00E-01	1.3E-03	1.2E-04
ENDOSULFAN II	5.92E-03	1.37E-03	2.81E-05	1.06E-04	1.34E-04	1.00E+01	1.00E+02	1.3E-05	1.3E-06
ENDOSULFAN SULFATE	2.17E-03	6.30E-04	1.03E-05	4.89E-05	5.92E-05	1.00E+01	1.00E+02	5.9E-06	5.9E-07
ENDRIN	5.97E-03	2.22E-04	2.83E-05	1.72E-05	4.55E-05	1.04E-02	1.04E-01	4.4E-03	4.4E-04
ENDRIN ALDEHYDE	2.89E-03	1.07E-04	1.37E-05	8.33E-06	2.20E-05	1.00E-02	1.00E-01	2.2E-03	2.2E-04
ENDRIN KETONE	4.53E-04	1.68E-05	2.15E-06	1.31E-06	3.46E-06	1.00E-02	1.00E-01	3.5E-04	3.5E-05
GAMMA-CHLORDANE	2.81E-01	2.67E-03	1.33E-03	2.08E-04	1.54E-03	2.14E+00	1.07E+01	7.2E-04	1.4E-04
HEPTACHLOR	2.44E-02	2.74E-04	1.16E-04	2.13E-05	1.37E-04	NV	NV	NV	NV
HEPTACHLOR EPOXIDE	8.62E-03	4.29E-04	4.09E-05	3.34E-05	7.42E-05	NV	NV	NV	NV

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.75E-01	kg
Food Ingestion Rate = (If)	1.36E-02	kg/day
Soil Ingestion Rate = (Is)	8.30E-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
Cv = Contaminant concentration in vegetation
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (vegetation)
H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
NV = No Value

APPENDIX G

SHORT-TAILED SHREW - TIER 1 INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical	Max Soil Conc. (mg/kg)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	Hazard Quotients LOAEL
METALS									
ANTIMONY	1.12E+00	1.12E+00	3.58E-03	1.19E-01	1.23E-01	5.90E-02	2.76E+00	2.1E+00	4.5E-02
CADMIUM	1.03E+00	8.48E+00	3.30E-03	9.05E-01	9.08E-01	7.70E-01	6.90E+00	1.2E+00	1.3E-01
COPPER	2.71E+02	1.40E+02	8.67E-01	1.49E+01	1.58E+01	5.60E+00	8.27E+01	2.8E+00	1.9E-01
LEAD	2.63E+02	7.21E+01	8.42E-01	7.70E+00	8.54E+00	4.70E+00	1.86E+02	1.8E+00	4.6E-02
MERCURY	5.98E-01	9.09E-01	1.91E-03	9.70E-02	9.89E-02	3.20E-02	1.60E-01	3.1E+00	6.2E-01
SELENIUM	7.91E-01	7.81E-01	2.53E-03	8.34E-02	8.59E-02	1.43E-01	6.61E-01	6.0E-01	1.3E-01
THALLIUM	1.67E-01	1.67E-01	5.35E-04	1.78E-02	1.84E-02	7.40E-03	7.40E-02	2.5E+00	2.5E-01
VANADIUM	1.89E+01	7.94E-01	6.05E-02	8.47E-02	1.45E-01	4.16E+00	9.44E+00	3.5E-02	1.5E-02
ZINC	1.53E+03	9.48E+02	4.90E+00	1.01E+02	1.06E+02	7.54E+01	2.98E+02	1.4E+00	3.6E-01
SEMIVOLATILES									
BIS(2-ETHYLHEXYL)PHTHALATE	1.49E-01	1.49E-01	4.77E-04	1.59E-02	1.64E-02	1.83E+01	1.83E+02	8.9E-04	8.9E-05
POLYNUCLEAR AROMATIC HYDROCARBONS									
ACENAPHTHENE	2.05E-01	3.01E-01	6.56E-04	3.22E-02	3.28E-02	6.56E+01	3.56E+02	5.0E-04	9.2E-05
ACENAPHTHYLENE	9.81E-02	2.25E+00	3.14E-04	2.40E-01	2.40E-01	6.56E+01	3.56E+02	3.7E-03	6.7E-04
ANTHRACENE	6.06E-01	1.47E+00	1.94E-03	1.56E-01	1.58E-01	6.56E+01	3.56E+02	2.4E-03	4.4E-04
BENZO(A)ANTHRACENE	1.83E+00	2.91E+00	5.86E-03	3.10E-01	3.16E-01	6.15E-01	3.84E+01	5.1E-01	8.2E-03
BENZO(A)PYRENE	1.46E+00	1.94E+00	4.67E-03	2.07E-01	2.12E-01	6.15E-01	3.84E+01	3.4E-01	5.5E-03
BENZO(B)FLUORANTHENE	2.26E+00	5.88E+00	7.23E-03	6.27E-01	6.34E-01	6.15E-01	3.84E+01	1.0E+00	1.7E-02
BENZO(G,H,I)PERYLENE	7.11E-01	2.09E+00	2.28E-03	2.23E-01	2.25E-01	6.15E-01	3.84E+01	3.7E-01	5.9E-03
BENZO(K)FLUORANTHENE	2.28E+00	5.93E+00	7.30E-03	6.32E-01	6.40E-01	6.15E-01	3.84E+01	1.0E+00	1.7E-02
CHRYSENE	1.53E+00	3.50E+00	4.90E-03	3.74E-01	3.79E-01	6.15E-01	3.84E+01	6.2E-01	9.9E-03
DIBENZO(A,H)ANTHRACENE	2.87E-01	6.63E-01	9.19E-04	7.07E-02	7.17E-02	6.15E-01	3.84E+01	1.2E-01	1.9E-03
FLUORANTHENE	4.29E+00	1.30E+01	1.37E-02	1.39E+00	1.41E+00	6.56E+01	3.56E+02	2.1E-02	3.9E-03
FLUORENE	2.54E-01	2.43E+00	8.13E-04	2.59E-01	2.60E-01	6.56E+01	3.56E+02	4.0E-03	7.3E-04
INDENO(1,2,3-CD)PYRENE	6.74E-01	1.93E+00	2.16E-03	2.06E-01	2.08E-01	6.15E-01	3.84E+01	3.4E-01	5.4E-03
PHENANTHRENE	2.37E+00	4.08E+00	7.59E-03	4.35E-01	4.42E-01	6.56E+01	3.56E+02	6.7E-03	1.2E-03
PYRENE	3.19E+00	5.58E+00	1.02E-02	5.96E-01	6.06E-01	6.15E-01	3.84E+01	9.9E-01	1.6E-02
PESTICIDES									
4,4'-DDD	1.95E-01	1.02E+00	6.24E-04	1.09E-01	1.10E-01	1.47E-01	5.56E+00	7.5E-01	2.0E-02
4,4'-DDE	1.97E-01	2.85E+00	6.31E-04	3.04E-01	3.05E-01	1.47E-01	5.56E+00	2.1E+00	5.5E-02
4,4'-DDT	2.82E-01	2.79E+00	9.03E-04	2.97E-01	2.98E-01	1.47E-01	5.56E+00	2.0E+00	5.4E-02
ALDRIN	2.08E-02	6.86E-02	6.66E-05	7.32E-03	7.39E-03	2.00E-01	1.00E+00	3.7E-02	7.4E-03
ALPHA-BHC	1.10E-03	1.10E-03	3.52E-06	1.17E-04	1.21E-04	1.40E-02	1.40E-01	8.6E-03	8.6E-04
ALPHA-CHLORDANE	3.22E+00	1.61E+01	1.03E-02	1.72E+00	1.73E+00	4.58E+00	9.16E+00	3.8E-01	1.9E-01
DELTA-BHC	4.65E-03	4.65E-03	1.49E-05	4.96E-04	5.11E-04	1.40E-02	1.40E-01	3.6E-02	3.6E-03
DIELDRIN	1.66E-02	2.44E-01	5.31E-05	2.60E-02	2.61E-02	1.50E-02	1.27E+00	1.7E+00	2.1E-02
ENDOSULFAN II	5.35E-02	5.35E-02	1.71E-04	5.71E-03	5.88E-03	1.50E-01	1.50E+00	3.9E-02	3.9E-03
ENDOSULFAN SULFATE	1.21E-02	1.21E-02	3.87E-05	1.29E-03	1.33E-03	1.50E-01	1.50E+00	8.9E-03	8.9E-04
ENDRIN	2.26E-02	8.14E-02	7.23E-05	8.68E-03	8.75E-03	9.20E-02	9.20E-01	9.5E-02	9.5E-03
ENDRIN ALDEHYDE	1.95E-02	7.02E-02	6.24E-05	7.49E-03	7.55E-03	9.20E-02	9.20E-01	8.2E-02	8.2E-03
ENDRIN KETONE	1.14E-03	4.10E-03	3.65E-06	4.38E-04	4.42E-04	9.20E-02	9.20E-01	4.8E-03	4.8E-04
GAMMA-CHLORDANE	2.60E+00	1.30E+01	8.32E-03	1.39E+00	1.40E+00	4.58E+00	9.16E+00	3.0E-01	1.5E-01
HEPTACHLOR	2.36E-01	2.36E+00	7.55E-04	2.52E-01	2.53E-01	1.00E-01	1.00E+00	2.5E+00	2.5E-01
HEPTACHLOR EPOXIDE	6.40E-02	1.92E-01	2.05E-04	2.05E-02	2.07E-02	1.00E-01	1.00E+00	2.1E-01	2.1E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.50E-02	kg	Dose (soil) = (Cs * Is)(H)/BW	Conc = Concentration	
Food Ingestion Rate = (If)	1.60E-03	kg/day	Dose (invertebrate) = (Ci * If)(H)/BW	LOAEL = Lowest Observed Adverse Effects Concentration	
Soil Ingestion Rate = (Is)	4.80E-05	kg/day	Ci = Contaminant concentration in invertebrate	NOAEL = No Observed Adverse Effects Concentration	
Home Range = (HR)	Assume 100% on site		Cs = Contaminant concentration in soil		
Contaminated Area = (CA)	Assume equal to home range		Total Dose = Dose (soil) + Dose (invertebrate)		
			H=CA/HR (Assume = to 1)		

APPENDIX G

SHORT-TAILED SHREW - TIER 2, STEP 3A INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical	Average Soil Conc. (mg/kg)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	Hazard Quotients LOAEL
METALS									
ANTIMONY	5.24E-01	5.24E-01	4.19E-04	4.66E-02	4.70E-02	5.90E-02	2.76E+00	8.0E-01	1.7E-02
CADMIUM	5.54E-01	5.18E+00	4.43E-04	4.61E-01	4.61E-01	7.70E-01	6.90E+00	6.0E-01	6.7E-02
COPPER	6.84E+01	3.52E+01	5.48E-02	3.13E+00	3.19E+00	5.60E+00	8.27E+01	5.7E-01	3.9E-02
LEAD	8.56E+01	2.92E+01	6.86E-02	2.60E+00	2.66E+00	4.70E+00	1.86E+02	5.7E-01	1.4E-02
MERCURY	1.77E-01	6.04E-01	1.42E-04	5.37E-02	5.39E-02	3.20E-02	1.60E-01	1.7E+00	3.4E-01
SELENIUM	4.53E-01	5.19E-01	3.63E-04	4.62E-02	4.66E-02	1.43E-01	6.61E-01	3.3E-01	7.0E-02
THALLIUM	1.67E-01	1.67E-01	1.34E-04	1.49E-02	1.50E-02	7.40E-03	7.40E-02	2.0E+00	2.0E-01
VANADIUM	1.27E+01	5.35E-01	1.02E-02	4.76E-02	5.78E-02	4.16E+00	9.44E+00	1.4E-02	6.1E-03
ZINC	3.24E+02	5.70E+02	2.59E-01	5.07E+01	5.09E+01	7.54E+01	2.98E+02	6.8E-01	1.7E-01
SEMIVOLATILES									
BIS(2-ETHYLHEXYL)PHTHALATE	1.49E-01	1.49E-01	1.19E-04	1.33E-02	1.34E-02	1.83E+01	1.83E+02	7.3E-04	7.3E-05
POLYNUCLEAR AROMATIC HYDROCARBONS									
ACENAPHTHENE	4.95E-02	7.28E-02	3.96E-05	6.48E-03	6.52E-03	6.56E+01	3.56E+02	9.9E-05	1.8E-05
ACENAPHTHYLENE	4.23E-02	9.68E-01	3.38E-05	8.61E-02	8.61E-02	6.56E+01	3.56E+02	1.3E-03	2.4E-04
ANTHRACENE	2.06E-01	4.99E-01	1.65E-04	4.44E-02	4.46E-02	6.56E+01	3.56E+02	6.8E-04	1.3E-04
BENZO(A)ANTHRACENE	5.73E-01	9.10E-01	4.59E-04	8.10E-02	8.15E-02	6.15E-01	3.84E+01	1.3E-01	2.1E-03
BENZO(A)PYRENE	6.18E-01	8.22E-01	4.95E-04	7.31E-02	7.36E-02	6.15E-01	3.84E+01	1.2E-01	1.9E-03
BENZO(B)FLUORANTHENE	7.48E-01	1.94E+00	5.99E-04	1.73E-01	1.74E-01	6.15E-01	3.84E+01	2.8E-01	4.5E-03
BENZO(G,H,I)PERYLENE	2.90E-01	8.52E-01	2.32E-04	7.58E-02	7.60E-02	6.15E-01	3.84E+01	1.2E-01	2.0E-03
BENZO(K)FLUORANTHENE	5.43E-01	1.41E+00	4.34E-04	1.26E-01	1.26E-01	6.15E-01	3.84E+01	2.0E-01	3.3E-03
CHRYSENE	5.29E-01	1.21E+00	4.24E-04	1.08E-01	1.08E-01	6.15E-01	3.84E+01	1.8E-01	2.8E-03
DIBENZO(A,H)ANTHRACENE	1.13E-01	2.61E-01	9.04E-05	2.32E-02	2.33E-02	6.15E-01	3.84E+01	3.8E-02	6.1E-04
FLUORANTHENE	1.33E+00	4.05E+00	1.07E-03	3.61E-01	3.62E-01	6.56E+01	3.56E+02	5.5E-03	1.0E-03
FLUORENE	6.29E-02	6.02E-01	5.04E-05	5.36E-02	5.36E-02	6.56E+01	3.56E+02	8.2E-04	1.5E-04
INDENO(1,2,3-CD)PYRENE	2.76E-01	7.89E-01	2.21E-04	7.02E-02	7.04E-02	6.15E-01	3.84E+01	1.1E-01	1.8E-03
PHENANTHRENE	7.32E-01	1.26E+00	5.86E-04	1.12E-01	1.13E-01	6.56E+01	3.56E+02	1.7E-03	3.2E-04
PYRENE	1.10E+00	1.92E+00	8.79E-04	1.71E-01	1.72E-01	6.15E-01	3.84E+01	2.8E-01	4.5E-03
PESTICIDES									
4,4'-DDD	3.88E-02	3.31E-01	3.11E-05	2.95E-02	2.95E-02	1.47E-01	5.56E+00	2.0E-01	5.3E-03
4,4'-DDE	7.78E-02	1.26E+00	6.23E-05	1.12E-01	1.12E-01	1.47E-01	5.56E+00	7.6E-01	2.0E-02
4,4'-DDT	8.02E-02	9.34E-01	6.42E-05	8.31E-02	8.32E-02	1.47E-01	5.56E+00	5.7E-01	1.5E-02
ALDRIN	2.66E-03	8.79E-03	2.13E-06	7.82E-04	7.84E-04	2.00E-01	1.00E+00	3.9E-03	7.8E-04
ALPHA-BHC	4.87E-04	4.87E-04	3.90E-07	4.33E-05	4.37E-05	1.40E-02	1.40E-01	3.1E-03	3.1E-04
ALPHA-CHLORDANE	3.53E-01	1.76E+00	2.82E-04	1.57E-01	1.57E-01	4.58E+00	9.16E+00	3.4E-02	1.7E-02
DELTA-BHC	1.57E-03	1.57E-03	1.26E-06	1.40E-04	1.41E-04	1.40E-02	1.40E-01	1.0E-02	1.0E-03
DIELDRIN	2.55E-03	3.75E-02	2.04E-06	3.34E-03	3.34E-03	1.50E-02	1.27E+00	2.2E-01	2.6E-03
ENDOSULFAN II	5.92E-03	5.92E-03	4.74E-06	5.26E-04	5.31E-04	1.50E-01	1.50E+00	3.5E-03	3.5E-04
ENDOSULFAN SULFATE	2.17E-03	2.17E-03	1.74E-06	1.93E-04	1.95E-04	1.50E-01	1.50E+00	1.3E-03	1.3E-04
ENDRIN	5.97E-03	2.15E-02	4.78E-06	1.91E-03	1.92E-03	9.20E-02	9.20E-01	2.1E-02	2.1E-03
ENDRIN ALDEHYDE	2.89E-03	1.04E-02	2.31E-06	9.25E-04	9.27E-04	9.20E-02	9.20E-01	1.0E-02	1.0E-03
ENDRIN KETONE	4.53E-04	1.63E-03	3.63E-07	1.45E-04	1.46E-04	9.20E-02	9.20E-01	1.6E-03	1.6E-04
GAMMA-CHLORDANE	2.81E-01	1.41E+00	2.25E-04	1.25E-01	1.25E-01	4.58E+00	9.16E+00	2.7E-02	1.4E-02
HEPTACHLOR	2.44E-02	2.44E-01	1.96E-05	2.18E-02	2.18E-02	1.00E-01	1.00E+00	2.2E-01	2.2E-02
HEPTACHLOR EPOXIDE	8.62E-03	2.58E-02	6.90E-06	2.30E-03	2.31E-03	1.00E-01	1.00E+00	2.3E-02	2.3E-03

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.61E-02	kg	Dose (soil) = (Cs * Is)(H)/BW	Conc = Concentration
Food Ingestion Rate = (If)	1.43E-03	kg/day	Dose (invertebrate) = (Ci * If)(H)/BW	LOAEL = Lowest Observed Adverse Effects Concentration
Soil Ingestion Rate = (Is)	1.29E-05	kg/day	Ci = Contaminant concentration in invertebrate	NOAEL = No Observed Adverse Effects Concentration
Home Range = (HR)	9.70E-01	acres	Cs = Contaminant concentration in soil	
Contaminated Area = (CA)	Assume equal to home range		Total Dose = Dose (soil) + Dose (invertebrate)	
			H=CA/HR (Assume = to 1)	

APPENDIX G

AMERICAN WOODCOCK - TIER 1 INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical	Max Soil Conc. (mg/kg)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from:		Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients	
			Soil	Invert.				NOAEL	LOAEL
METALS									
ANTIMONY	1.12E+00	1.12E+00	3.68E-02	2.25E-01	2.61E-01	NV	NV	NV	NV
CADMIUM	1.03E+00	8.48E+00	3.39E-02	1.70E+00	1.73E+00	1.47E+00	6.35E+00	1.2E+00	2.7E-01
COPPER	2.71E+02	1.40E+02	8.91E+00	2.80E+01	3.69E+01	4.05E+00	3.49E+01	9.1E+00	1.1E+00
LEAD	2.63E+02	7.21E+01	8.65E+00	1.45E+01	2.31E+01	1.63E+00	4.46E+01	1.4E+01	5.2E-01
MERCURY	5.98E-01	9.09E-01	1.97E-02	1.82E-01	2.02E-01	6.40E-03	6.40E-02	3.2E+01	3.2E+00
SELENIUM	7.91E-01	7.81E-01	2.60E-02	1.57E-01	1.83E-01	2.90E-01	8.19E-01	6.3E-01	2.2E-01
THALLIUM	1.67E-01	1.67E-01	5.49E-03	3.35E-02	3.90E-02	NV	NV	NV	NV
VANADIUM	1.89E+01	7.94E-01	6.21E-01	1.59E-01	7.80E-01	3.44E-01	1.69E+00	2.3E+00	4.6E-01
ZINC	1.53E+03	9.48E+02	5.03E+01	1.90E+02	2.40E+02	6.61E+01	1.71E+02	3.6E+00	1.4E+00
SEMIVOLATILES									
BIS(2-ETHYLHEXYL)PHTHALATE	1.49E-01	1.49E-01	4.90E-03	2.99E-02	3.48E-02	1.11E+00	1.11E+01	3.1E-02	3.1E-03
POLYNUCLEAR AROMATIC HYDROCARBONS									
ACENAPHTHENE	2.05E-01	3.01E-01	6.74E-03	6.04E-02	6.71E-02	2.00E+00	2.00E+01	3.4E-02	3.4E-03
ACENAPHTHYLENE	9.81E-02	2.25E+00	3.22E-03	4.50E-01	4.54E-01	2.00E+00	2.00E+01	2.3E-01	2.3E-02
ANTHRACENE	6.06E-01	1.47E+00	1.99E-02	2.94E-01	3.14E-01	2.00E+00	2.00E+01	1.6E-01	1.6E-02
BENZO(A)ANTHRACENE	1.83E+00	2.91E+00	6.02E-02	5.83E-01	6.43E-01	2.00E+00	2.00E+01	3.2E-01	3.2E-02
BENZO(A)PYRENE	1.46E+00	1.94E+00	4.80E-02	3.89E-01	4.37E-01	2.00E+00	2.00E+01	2.2E-01	2.2E-02
BENZO(B)FLUORANTHENE	2.26E+00	5.88E+00	7.43E-02	1.18E+00	1.25E+00	2.00E+00	2.00E+01	6.3E-01	6.3E-02
BENZO(G,H,I)PERYLENE	7.11E-01	2.09E+00	2.34E-02	4.19E-01	4.42E-01	2.00E+00	2.00E+01	2.2E-01	2.2E-02
BENZO(K)FLUORANTHENE	2.28E+00	5.93E+00	7.50E-02	1.19E+00	1.26E+00	2.00E+00	2.00E+01	6.3E-01	6.3E-02
CHRYSENE	1.53E+00	3.50E+00	5.03E-02	7.02E-01	7.53E-01	2.00E+00	2.00E+01	3.8E-01	3.8E-02
DIBENZO(A,H)ANTHRACENE	2.87E-01	6.63E-01	9.43E-03	1.33E-01	1.42E-01	2.00E+00	2.00E+01	7.1E-02	7.1E-03
FLUORANTHENE	4.29E+00	1.30E+01	1.41E-01	2.61E+00	2.76E+00	2.00E+00	2.00E+01	1.4E+00	1.4E-01
FLUORENE	2.54E-01	2.43E+00	8.35E-03	4.87E-01	4.96E-01	2.00E+00	2.00E+01	2.5E-01	2.5E-02
INDENO(1,2,3-CD)PYRENE	6.74E-01	1.93E+00	2.22E-02	3.86E-01	4.09E-01	2.00E+00	2.00E+01	2.0E-01	2.0E-02
PHENANTHRENE	2.37E+00	4.08E+00	7.79E-02	8.17E-01	8.95E-01	2.00E+00	2.00E+01	4.5E-01	4.5E-02
PYRENE	3.19E+00	5.58E+00	1.05E-01	1.12E+00	1.22E+00	2.00E+00	2.00E+01	6.1E-01	6.1E-02
PESTICIDES									
4,4'-DDD	1.95E-01	1.02E+00	6.41E-03	2.05E-01	2.11E-01	2.27E-01	2.70E+00	9.3E-01	7.8E-02
4,4'-DDE	1.97E-01	2.85E+00	6.48E-03	5.71E-01	5.77E-01	2.27E-01	2.70E+00	2.5E+00	2.1E-01
4,4'-DDT	2.82E-01	2.79E+00	9.27E-03	5.59E-01	5.68E-01	2.27E-01	2.70E+00	2.5E+00	2.1E-01
ALDRIN	2.08E-02	6.86E-02	6.84E-04	1.38E-02	1.44E-02	NV	NV	NV	NV
ALPHA-BHC	1.10E-03	1.10E-03	3.62E-05	2.20E-04	2.57E-04	5.60E-01	2.25E+00	4.6E-04	1.1E-04
ALPHA-CHLORDANE	3.22E+00	1.61E+01	1.06E-01	3.23E+00	3.33E+00	2.14E+00	1.07E+01	1.6E+00	3.1E-01
DELTA-BHC	4.65E-03	4.65E-03	1.53E-04	9.32E-04	1.08E-03	5.60E-01	2.25E+00	1.9E-03	4.8E-04
DIELDRIN	1.66E-02	2.44E-01	5.46E-04	4.89E-02	4.95E-02	7.09E-02	8.00E-01	7.0E-01	6.2E-02
ENDOSULFAN II	5.35E-02	5.35E-02	1.76E-03	1.07E-02	1.25E-02	1.00E+01	1.00E+02	1.2E-03	1.2E-04
ENDOSULFAN SULFATE	1.21E-02	1.21E-02	3.98E-04	2.43E-03	2.82E-03	1.00E+01	1.00E+02	2.8E-04	2.8E-05
ENDRIN	2.26E-02	8.14E-02	7.43E-04	1.63E-02	1.71E-02	1.04E-02	1.04E-01	1.6E+00	1.6E-01
ENDRIN ALDEHYDE	1.95E-02	7.02E-02	6.41E-04	1.41E-02	1.47E-02	1.00E-02	1.00E-01	1.5E+00	1.5E-01
ENDRIN KETONE	1.14E-03	4.10E-03	3.75E-05	8.23E-04	8.60E-04	1.00E-02	1.00E-01	8.6E-02	8.6E-03
GAMMA-CHLORDANE	2.60E+00	1.30E+01	8.55E-02	2.61E+00	2.69E+00	2.14E+00	1.07E+01	1.3E+00	2.5E-01
HEPTACHLOR	2.36E-01	2.36E+00	7.76E-03	4.73E-01	4.81E-01	NV	NV	NV	NV
HEPTACHLOR EPOXIDE	6.40E-02	1.92E-01	2.10E-03	3.85E-02	4.06E-02	NV	NV	NV	NV

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.34E-01	kg	Dose (soil) = (Cs * Is)(H)/BW
Food Ingestion Rate = (If)	2.69E-02	kg/day	Dose (invertebrate) = (Ci * If)(H)/BW
Soil Ingestion Rate = (Is)	4.41E-03	kg/day	Ci = Contaminant concentration in invertebrate
Home Range = (HR)	Assume 100% on site		Cs = Contaminant concentration in soil
Contaminated Area = (CA)	Assume equal to home range		Total Dose = Dose (soil) + Dose (invertebrate)
			H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
NV = No Value

APPENDIX G

AMERICAN WOODCOCK - TIER 2, STEP 3A INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SITE 12 - HARBOR DREDGE SPOIL AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical	Average Soil Conc. (mg/kg)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from:		Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients	
			Soil	Invert.				NOAEL	LOAEL
METALS									
ANTIMONY	5.24E-01	5.24E-01	4.13E-03	6.45E-02	6.86E-02	NV	NV	NV	NV
CADMIUM	5.54E-01	5.18E+00	4.36E-03	6.38E-01	6.42E-01	1.47E+00	6.35E+00	4.4E-01	1.0E-01
COPPER	6.84E+01	3.52E+01	5.39E-01	4.34E+00	4.88E+00	4.05E+00	3.49E+01	1.2E+00	1.4E-01
LEAD	8.56E+01	2.92E+01	6.75E-01	3.59E+00	4.27E+00	1.63E+00	4.46E+01	2.6E+00	9.6E-02
MERCURY	1.77E-01	6.04E-01	1.40E-03	7.44E-02	7.58E-02	6.40E-03	6.40E-02	1.2E+01	1.2E+00
SELENIUM	4.53E-01	5.19E-01	3.57E-03	6.40E-02	6.75E-02	2.90E-01	8.19E-01	2.3E-01	8.2E-02
THALLIUM	1.67E-01	1.67E-01	1.32E-03	2.06E-02	2.19E-02	NV	NV	NV	NV
VANADIUM	1.27E+01	5.35E-01	1.00E-01	6.59E-02	1.66E-01	3.44E-01	1.69E+00	4.8E-01	9.9E-02
ZINC	3.24E+02	5.70E+02	2.55E+00	7.02E+01	7.27E+01	6.61E+01	1.71E+02	1.1E+00	4.2E-01
SEMIVOLATILES									
BIS(2-ETHYLHEXYL)PHTHALATE	1.49E-01	1.49E-01	1.17E-03	1.84E-02	1.95E-02	1.11E+00	1.11E+01	1.8E-02	1.8E-03
POLYNUCLEAR AROMATIC HYDROCARBONS									
ACENAPHTHENE	4.95E-02	7.28E-02	3.90E-04	8.96E-03	9.35E-03	2.00E+00	2.00E+01	4.7E-03	4.7E-04
ACENAPHTHYLENE	4.23E-02	9.68E-01	3.33E-04	1.19E-01	1.20E-01	2.00E+00	2.00E+01	6.0E-02	6.0E-03
ANTHRACENE	2.06E-01	4.99E-01	1.63E-03	6.15E-02	6.31E-02	2.00E+00	2.00E+01	3.2E-02	3.2E-03
BENZO(A)ANTHRACENE	5.73E-01	9.10E-01	4.51E-03	1.12E-01	1.17E-01	2.00E+00	2.00E+01	5.8E-02	5.8E-03
BENZO(A)PYRENE	6.18E-01	8.22E-01	4.87E-03	1.01E-01	1.06E-01	2.00E+00	2.00E+01	5.3E-02	5.3E-03
BENZO(B)FLUORANTHENE	7.48E-01	1.94E+00	5.89E-03	2.39E-01	2.45E-01	2.00E+00	2.00E+01	1.2E-01	1.2E-02
BENZO(G,H,I)PERYLENE	2.90E-01	8.52E-01	2.28E-03	1.05E-01	1.07E-01	2.00E+00	2.00E+01	5.4E-02	5.4E-03
BENZO(K)FLUORANTHENE	5.43E-01	1.41E+00	4.28E-03	1.74E-01	1.78E-01	2.00E+00	2.00E+01	8.9E-02	8.9E-03
CHRYSENE	5.29E-01	1.21E+00	4.17E-03	1.49E-01	1.53E-01	2.00E+00	2.00E+01	7.7E-02	7.7E-03
DIBENZO(A,H)ANTHRACENE	1.13E-01	2.61E-01	8.89E-04	3.21E-02	3.30E-02	2.00E+00	2.00E+01	1.6E-02	1.6E-03
FLUORANTHENE	1.33E+00	4.05E+00	1.05E-02	4.99E-01	5.10E-01	2.00E+00	2.00E+01	2.5E-01	2.5E-02
FLUORENE	6.29E-02	6.02E-01	4.96E-04	7.41E-02	7.46E-02	2.00E+00	2.00E+01	3.7E-02	3.7E-03
INDENO(1,2,3-CD)PYRENE	2.76E-01	7.89E-01	2.17E-03	9.71E-02	9.93E-02	2.00E+00	2.00E+01	5.0E-02	5.0E-03
PHENANTHRENE	7.32E-01	1.26E+00	5.77E-03	1.55E-01	1.61E-01	2.00E+00	2.00E+01	8.0E-02	8.0E-03
PYRENE	1.10E+00	1.92E+00	8.65E-03	2.37E-01	2.45E-01	2.00E+00	2.00E+01	1.2E-01	1.2E-02
PESTICIDES									
4,4'-DDD	3.88E-02	3.31E-01	3.06E-04	4.08E-02	4.11E-02	2.27E-01	2.70E+00	1.8E-01	1.5E-02
4,4'-DDE	7.78E-02	1.26E+00	6.14E-04	1.55E-01	1.56E-01	2.27E-01	2.70E+00	6.9E-01	5.8E-02
4,4'-DDT	8.02E-02	9.34E-01	6.32E-04	1.15E-01	1.16E-01	2.27E-01	2.70E+00	5.1E-01	4.3E-02
ALDRIN	2.66E-03	8.79E-03	2.10E-05	1.08E-03	1.10E-03	NV	NV	NV	NV
ALPHA-BHC	4.87E-04	4.87E-04	3.84E-06	5.99E-05	6.38E-05	5.60E-01	2.25E+00	1.1E-04	2.8E-05
ALPHA-CHLORDANE	3.53E-01	1.76E+00	2.78E-03	2.17E-01	2.20E-01	2.14E+00	1.07E+01	1.0E-01	2.1E-02
DELTA-BHC	1.57E-03	1.57E-03	1.24E-05	1.93E-04	2.06E-04	5.60E-01	2.25E+00	3.7E-04	9.1E-05
DIELDRIN	2.55E-03	3.75E-02	2.01E-05	4.62E-03	4.64E-03	7.09E-02	8.00E-01	6.5E-02	5.8E-03
ENDOSULFAN II	5.92E-03	5.92E-03	4.66E-05	7.29E-04	7.75E-04	1.00E+01	1.00E+02	7.8E-05	7.8E-06
ENDOSULFAN SULFATE	2.17E-03	2.17E-03	1.71E-05	2.67E-04	2.85E-04	1.00E+01	1.00E+02	2.8E-05	2.8E-06
ENDRIN	5.97E-03	2.15E-02	4.71E-05	2.65E-03	2.70E-03	1.04E-02	1.04E-01	2.6E-01	2.6E-02
ENDRIN ALDEHYDE	2.89E-03	1.04E-02	2.28E-05	1.28E-03	1.30E-03	1.00E-02	1.00E-01	1.3E-01	1.3E-02
ENDRIN KETONE	4.53E-04	1.63E-03	3.57E-06	2.01E-04	2.05E-04	1.00E-02	1.00E-01	2.0E-02	2.0E-03
GAMMA-CHLORDANE	2.81E-01	1.41E+00	2.22E-03	1.73E-01	1.76E-01	2.14E+00	1.07E+01	8.2E-02	1.6E-02
HEPTACHLOR	2.44E-02	2.44E-01	1.93E-04	3.01E-02	3.03E-02	NV	NV	NV	NV
HEPTACHLOR EPOXIDE	8.62E-03	2.58E-02	6.79E-05	3.18E-03	3.25E-03	NV	NV	NV	NV

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.73E-01	kg	Dose (soil) = (Cs * Is)(H)/BW
Food Ingestion Rate = (If)	2.13E-02	kg/day	Dose (invertebrate) = (Ci * If)(H)/BW
Soil Ingestion Rate = (Is)	1.36E-03	kg/day	Ci = Contaminant concentration in invertebrate
Home Range = (HR)	6.10E+01	acres	Cs = Contaminant concentration in soil
Contaminated Area = (CA)	Assume equal to home range		Total Dose = Dose (soil) + Dose (invertebrate)
			H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
NV = No Value