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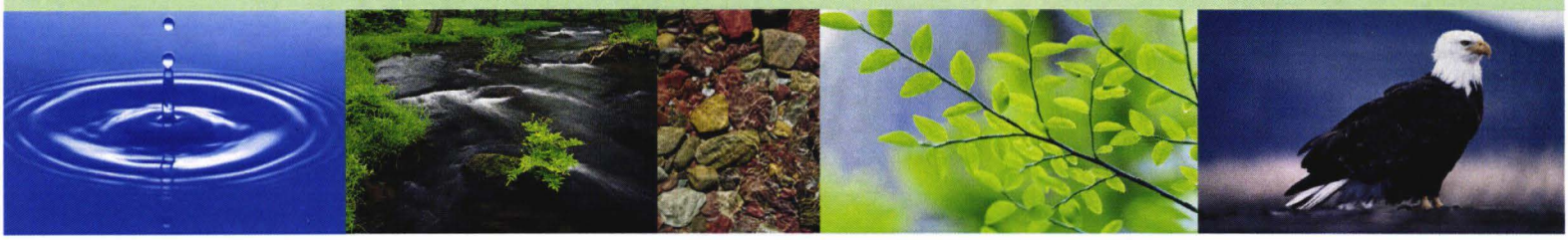
RCRA ADDENDUM 5 TO THE QUALITY ASSURANCE PROJECT PLAN FOR INTERIM MEASURES SOLID WASTE MANAGEMENT UNIT 9 (SWMU 9) PESTICIDE CONTROL AREA
NSA CRANE IN
2/1/2010
TETRA TECH

3

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-04-D-0055



Resource Conservation and Recovery Act Addendum No. 5 to the Quality Assurance Project Plan for Interim Measures at SWMU 9 - Pesticide Control Area

Naval Support Activity Crane
Crane, Indiana

Contract Task Order 0467

February 2010

NAVFAC
Naval Facilities Engineering Command
Midwest
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Building 1A, Code EV
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TETRA TECH NUS, Inc.

REVISION 2
FEBRUARY 2010

RESOURCE CONSERVATION AND RECOVERY ACT QUALITY ASSURANCE PROJECT PLAN ADDENDUM NO. 5 FOR INTERIM MEASURES AT SWMU 9 - PESTICIDE CONTROL AREA

NAVAL SUPPORT ACTIVITY CRANE
CRANE, INDIANA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Naval Facilities Engineering Command
Midwest
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Building IA, Code EV
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CONTRACT NUMBER N62467-04-D-0055
CONTRACT TASK ORDER 0467

FEBRUARY 2010

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ACRONYMS

%R	Percent Recovery
bgs	Below Ground Surface
CAAA	Crane Army Ammunition Activity
CFR	Code of Federal Regulations
CLEAN IV	Comprehensive Long-Term Environmental Action Navy
COC	Chemical of Concern
CTO	Contract Task Order
cy	Cubic Yard
DQI	Data Quality Indicator
DQO	Data Quality Objective
DRO	Diesel Range Organics
EDD	Electronic Data Deliverable
EDE	Electronic Data Exchange
EI	Environmental Indicator
EMAC	Environmental Multi-Award Contractor
Empirical	Empirical Laboratories, LLC
ERSM	Environmental Restoration Site Manager
FOL	Field Operations Leader
FTMR	Field Task Modification Request
GRO	Gasoline Range Organics
HASP	Health and Safety Plan
HI	Hazard Index
HSM	Health and Safety Manager
ICP	Inductively Coupled Plasma
IDEM	Indiana Department of Environmental Management
IDW	Investigation-Derived Waste
IM	Interim Measure
IMWP	Interim Measures Work Plan
LDR	Land Disposal Restriction
LES/TolTest JV	Lakeshore Engineering Services and TolTest, Inc. Joint Venture
MCS	Media Cleanup Standard
MDL	Method Detection Limit
mg/kg	Milligram Per Kilogram
Microbac	Microbac Laboratories, Inc.
MS	Matrix Spike
MSD	Matrix Spike Duplicate

NAFVAC MW	Naval Facilities Engineering Command Midwest
Navy	United States Navy
NFESC	Naval Facilities Engineering Services Command
NSA	Naval Support Activity
OGTSL	Old Gun Tub Storage Lot
OICC	Officer in Charge of Construction
OPR	Old Pistol Range
ORR	Old Rifle Range
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
PM	Project Manager
ppb	Parts-Per-Billion
PPE	Personal Protective Equipment
ppm	Parts-Per-Million
ProgMan	Program Manager
PTA	Pyrotechnic Test Area
QA	Quality Assurance
QAM	Quality Assurance Manager
QAO	QA Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Information System
RFI	Facility Investigation
RPD	Relative Percent Difference
RPM	Remedial Project Manager
sf	Square Feet
SI	Site Investigation
SOP	Standard Operating Procedure
SOW	Statement of Work
SSO	Site Safety Officer
SWMU	Solid Waste Management Unit
Tetra Tech	Tetra Tech NUS, Inc.
TPH	Total Petroleum Hydrocarbons
TSCA	Toxic Substances Control Act
TV	Target Value
U.S. EPA	United States Environmental Protection Agency

1.0 PROJECT DESCRIPTION

Naval Support Activity (NSA) Crane prepared a Quality Assurance Project Plan (QAPP) [Tetra Tech NUS, Inc. (Tetra Tech), 2004] for a Phase III Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at the following Solid Waste Management Units (SWMUs):

- SWMU 8, Building 106 Pond
- SWMU 15, Roads and Grounds Area

That QAPP also governed data collection for completion of the United States Environmental Protection Agency (U.S. EPA) Region 5 Resource Conservation and Recovery Information System (RCRIS) code Environmental Indicator (EI) Form (Form CA725) for the following sites:

- SWMU 18, Load and Fill Area Buildings
- SWMU 19, Pyrotechnic Test Area (PTA)
- SWMU 20, Crane Army Ammunition Activity (CAAA) Quality Assurance (QA) / Quality Control (QC) Test Area
- Old Gun Tub Storage Lot (OGTSL)

That QAPP was approved by U.S. EPA Region 5, and the required field work was conducted in accordance with the QAPP.

QAPP Addendum No. 1, dated November 2006, was approved by U.S. EPA Region 5. QAPP Addendum No. 1 was developed to include Interim Measures (IMs) Work Plans (IMWPs) to govern IMs conducted at the following Crane sites:

- Old Pistol Range (OPR) and Old Rifle Range (ORR) at SWMU 7
- SWMU 8, Building 106 Pond Area
- SWMU 13, Mine Fill B
- SWMU 17, PCB Pole Yard

The focus of the IMWPs was excavation of contaminated soil and sediment and other IMs that were designed to reduce or eliminate the extent and magnitude of contamination at each of these four sites.

QAPP Addendum No. 2 was developed to govern the sampling and analyses of surface soils to provide data on potentially site-related organic and inorganic chemical concentrations at UXO 5 and UXO 7. QAPP Addendum No. 2, dated August 2007 was submitted to U.S. EPA Region 5.

QAPP Addendum No. 3 was developed for the collection and analysis of surface and subsurface soil samples at SWMU 9 (Pesticide Control Area) to complete delineation of pesticide contamination and to determine whether herbicide contamination was present. The information collected was provided in a report and used as follows:

- Refined the extent of pesticide contamination requiring remediation.
- Established whether herbicide contamination is present at concentrations requiring remediation.
- Provided data for determining whether the soils contain listed hazardous wastes.
- Provided data for determining whether the RCRA Land Disposal Restriction (LDR) requirements are met.

QAPP Addendum No. 4 was developed to govern sampling and analyses for the purposes of remediation and waste disposal of materials removed from SWMU 9. Addendum No. 4 was developed to achieve the following objectives:

- Confirm that cleanup goals have been met.
- Provide data on residual contaminant concentrations in soils.

It was a supplement to the approved IMWP (Tetra Tech, 2008), which designates an Environmental Multi-Award Contractor (EMAC) as responsible for removal and disposal activities and Tetra Tech as responsible for remediation design and verification sampling.

1.1 DESCRIPTION OF QAPP ADDENDUM NO. 5

This QAPP Addendum No. 5 continues the objectives outlined for Addendum No. 4, which have not yet been achieved. This Addendum No. 5 provides updated information to reflect the Navy's selection of a new EMAC Contractor for soil excavation activities at SWMU 9.

This Addendum was prepared for the NSA Crane facility, located in Crane, Indiana, through the Naval Facilities Engineering Command Midwest (NAFVAC MW) under Contract Task Order (CTO) 0467 for the Comprehensive Long-Term Environmental Action Navy (CLEAN) IV, Contract Number N62467-04-D-0055. For any work to be conducted under this Addendum that is unique to this project, the appropriate

information is presented in this document or references are provided to other documents containing the required information.

Site physical conditions are summarized in the IMWP (Tetra Tech, 2008) and Technical Memorandum (Tetra Tech, 2009) for SWMU 9. A copy of the Technical Memorandum is presented in Appendix E of this QAPP. Descriptions of the IM to be conducted, except details of verification sampling and analyses and waste disposal sampling and analyses, are described in the Technical Memorandum. Additional details of the IM are provided in the IMWP. Therefore, only very brief descriptions of the sites are provided below.

1.2 SCOPES OF WORK

Soil Excavations

Following excavation in the fall of 2008, the results of verification sampling indicated that excavation has been completed adjacent to Building 150, and more excavation is required adjacent to former Building 55 and at the former Fire Fighting Training Area. In the summer of 2009, Tetra Tech performed pre-excavation sampling to estimate the extent of additional excavation. SWMU 9 planned soil excavation areas are identified and described in the Technical Memorandum (Appendix E).

Pesticides are the only COC at the former Building 55 Area; DRO are no longer considered COC in this area. Analytical results from the previous verification sampling and analysis (from September and October 2008) contained only one sample with DRO above the MCS; pesticides were also detected in that sample. Twenty-seven (27) pre-excavation samples collected from the former Building 55 Area were also analyzed for DRO; none of these samples contained DRO above the MCS. Therefore, DRO were removed as a COC for the former Building 55 Area. The soil excavation located at the former Building 55 area includes approximately 260 cubic yards of soil (including the 6 inch thick concrete material of the former Building 55 foundation).

Polychlorinated Biphenyls (PCBs) are the only COC at the former Fire Fighting Training Area; soil excavation in this area will include approximately 705 cubic yards of PCB contaminated soil.

Volume calculations are provided in the Technical Memorandum (Appendix E) and summarized below:

Excavation Area	Total Excavation Volume (cy)	Material Disposition	Volume (cy)
Former Building 55 Area	260	Dispose offsite as special waste (less than TCLP)	36
		Dispose offsite as hazardous waste (less than LDR)	70
		Dispose offsite as hazardous waste (greater than LDR)	95

		Stockpile onsite for use as clean backfill	59
Former Fire Training Area	705	Dispose offsite as non-TSCA regulated waste	491
		Dispose offsite as TSCA regulated waste	179
		Stockpile onsite for use as clean backfill	35

Sediment that accumulates in the erosion and sediment control devices (see Section 4.0 of the IMWP) prior to verification that all contaminated soil has been removed from the associated surface soil excavation areas will be disposed off-site along with the excavated contaminated surface soil. Following verification of contaminant removal, sediment that accumulates in the erosion and sediment control devices will be placed in the excavation as backfill material or spread across the disturbed ground surface of the associated soil excavation area.

Verification Sampling

Sample collection and analysis, handling of verification sampling derived waste, and decontamination procedures will be consistent with those described in the approved QAPP for SWMUs 8, 15, 18, 19, and 20 and the Old Gun Tub Storage Lot (Tetra Tech, 2004). The rationale for using this QAPP as the source QAPP is that it was prepared for similar field activities and analytical methods at NSA Crane and was approved by EPA Region 5, which is also the lead regulatory agency for the SWMU 9 activities.

Following soil excavation, samples will be collected from the soil remaining on the excavation floors and sidewalls to verify that residual PCB and pesticide concentrations in the exposed soils are acceptable. The COC media cleanup goals for achieving acceptable human health risks in soil at SWMU 9 are listed in the following table:

Contaminant Group	COCs	Media Cleanup Standards
PCBs	Total PCBs (surface soil)	1 ppm(1)
	Total PCBs (subsurface soil)	25 ppm(1)
Pesticides	4,4'-DDD	24,300 ppb(3)
	4,4'-DDE	17,150 ppb(3)
	4,4'-DDT	3,600 ppb(2)
	Dieldrin	300 ppb(3)
	Heptaclor	1,050 ppb(3)
	Alpha-chlordane	3,500 ppb(2)
	Gamma-chlordane	3,500 ppb(2)

1 Toxic Substances Control Act (TSCA) high occupancy areas standard of 1 part per million (ppm) [40 Code of Federal Regulations (CFR)

761.61(a)(4)(i)(A)] and low occupancy areas standard of 25 ppm [40 CFR 761.61(a)(4)(i)(A)].

2 Risk-based concentration for residential exposures to soil based on a target hazard index (HI) of 0.1.

3 Risk based concentration for residential exposure to soil based on a 1E-05 cancer risk level.

2,4-D - dichlorophenoxyacetic acid
2,4,5,-T - trichlorophenoxyatetic acid
2,4,5-TP - trichlorophenoxypropionic acid
DDD - dichlorodiphenyldichloroethane
DDE - dichlorodiphenyldichloroethylene
DDT - dichlorodiphenyltrichloroethane
ppb - parts per billion
ppm - parts per million

Following completion of soil removal, Tetra Tech will also collect samples from beneath EMAC Lakeshore Engineering Services and TolTest, Inc. Joint Venture (LES/TolTest JV) support facilities (decontamination pads, materials storage areas, and temporary access roads), if needed, to verify that soils below these facilities were not inadvertently contaminated during remediation activities. Details on the samples to be collected by Tetra Tech, including descriptions of the sampling plan designs, are provided in Section 3.0 of this QAPP.

Waste Characterization

In addition to the samples collected by Tetra Tech, LES/TolTest JV will collect some additional waste characterization samples to satisfy the selected disposal facility permit requirements. Details about the samples to be collected, including descriptions of the sampling plan designs, are provided in Section 3.0 of this QAPP.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

This section describes the project management, organization, and responsibilities of key personnel for IMs designed to remove contamination described in Section 1.0 at NSA Crane SWMU 9.

Tetra Tech, on behalf of the United States Navy (Navy), is responsible for the preparation for this document and for verification sampling and analyses. The remedial contractor is responsible for implementing the IMs for the contamination removal and associated waste disposal. This will include waste sampling and analyses.

The subcontracted laboratory for SWMU 9 is responsible for analyzing all verification samples in accordance with the analytical methods and additional requirements specified in this document. It also will be the responsibility of the analytical laboratory to properly dispose of unused sample aliquots.

2.1 MANAGEMENT

The roles and responsibilities described in this section are identified separately for Tetra Tech and Lakeshore Engineering Services and TolTest, Inc. Joint Venture (LES/TolTest JV). Individual key persons responsible for work to be conducted under this QAPP Addendum No. 5 are identified in Figure 2-1. Corresponding addresses and telephone numbers of key personnel are listed by organization in Table 2-1.

Tetra Tech and LES/TolTest JV will report directly to Naval Facilities Engineering Command, Midwest (NAVFAC MW). Tetra Tech and LES/TolTest JV will maintain open channels of communication during field activities to facilitate resolution of problems as efficiently as possible. Personnel from the Navy will be actively involved and will coordinate with Tetra Tech and LES/TolTest JV personnel as necessary. Responsibilities for program management, project management, field operations, and laboratory operations are discussed in the following sections, as appropriate. It is intended that the individuals named will assume the designated responsibilities to the extent that the specific person is available to perform the stated activities.

2.1.1 U.S. EPA Oversight

The U.S. EPA Region 5 Project Manager (PM), Peter Ramanauskas, will oversee the implementation of corrective measures at SWMU 9. He will also represent U.S. EPA's interests and will provide input from this perspective and lend general historical and technical assistance to NSA Crane field activities.

2.1.2 Navy Project Manager

The Navy Remedial Project Manager (RPM), Mr. Howard Hickey, acts as the focal representative for the United States Navy, providing management, technical direction, and oversight for all NSA Crane project activities performed by contractors (e.g., Tetra Tech and LES/TolTest JV) and their subcontractors. The Navy RPM is responsible for ensuring that LES/TolTest JV and their subcontractors receive a copy of this QAPP Addendum No. 5. In matters such as facilitation of site access, oversight, etc., the Navy RPM is assisted by the NSA Environmental Restoration Site Manager (ERSM), Mr. Tom Brent.

2.1.3 Tetra Tech Program and Project Management

Tetra Tech Program Manager

The Tetra Tech CLEAN Program Manager (ProgMan), Mr. John Trepanowski, provides operations, technical, and administrative leadership to oversee and support quality policies. The ProgMan assigns project PMs and oversees their performance. The ProgMan also ensures the availability of technical and support resources for program operations, and maintains consistency in procedures and projects among CTO assignments. In these matters, the ProgMan is assisted by the PM.

Tetra Tech Project Manager

The Tetra Tech PM, Mr. Tony Klimek, has overall responsibility for ensuring that the project meets U.S. EPA objectives and Navy and Tetra Tech quality standards associated with IM oversight, sample collection, sample analyses, and data interpretation to determine whether IMs are completed satisfactorily. The PM is responsible for the preparation and distribution of this QAPP Addendum, at the direction of the Navy RPM, to all parties (except LES/TolTest JV and their subcontractors) connected with the project. The Navy RPM is responsible for distributing the QAPP Addendum to LES/TolTest JV and LES/TolTest JV subcontractors. The PM will report to the Navy RPM and is responsible for technical QC and project oversight. Additional responsibilities of the PM are as follows:

- Ensuring timely resolution of project-related technical, quality, and safety questions associated with Tetra Tech operations.

- Functioning as the primary Tetra Tech interface with the Navy RPM, the NSA Crane ERSM, Tetra Tech field and office personnel, and laboratory and LES/TolTest JV points-of-contact.

- Ensuring that Tetra Tech health and safety issues related to this project are communicated effectively to all personnel and off-site laboratories.

- Monitoring and evaluating all Tetra Tech subcontractor performance.
- Coordinating and overseeing work performed by Tetra Tech field and office technical staff (including data validation, data interpretation, and report preparation).
- Coordinating and overseeing maintenance of all Tetra Tech project records.
- Coordinating and overseeing review of Tetra Tech project deliverables.
- Preparing and issuing final Tetra Tech deliverables to the Navy.
- Approving the implementation of corrective actions associated with the Tetra Tech portion of project quality.

Tetra Tech Project Chemist

The Tetra Tech Project Chemist, Mr. Edward Sedlmyer, has overall responsibility for ensuring that the project meets laboratory performance objectives. The Project Chemist is responsible for the technical preparation of laboratory statements of work (SOWs) and work releases. PMs of all subcontractor laboratories conducting verification sample analyses will report to the Tetra Tech Project Chemist. The Project Chemist will report to the Tetra Tech PM. Additional responsibilities of the Project Chemist are as follows:

- Providing technical advice to the Tetra Tech team on matters of project chemistry.
- Monitoring and evaluating subcontractor laboratory performance.
- Ensuring timely resolution of laboratory-related technical, quality, or other issues affecting project goals.
- Functioning as the primary interface with all subcontracted laboratories and the PM.
- Coordinating and overseeing work performed by all subcontracted laboratories.
- Coordinating and overseeing review of laboratory deliverables.
- Recommending appropriate laboratory corrective actions.

Tetra Tech Health and Safety Manager

The Tetra Tech Health and Safety Manager (HSM), Mr. Matt Soltis, is responsible for the following:

- Providing technical advice to the PM on matters of health and safety
- Overseeing the development and review of the Health and Safety Plan (HASP)
- Conducting health and safety audits
- Preparing health and safety reports for management

Each field event will have the support of a health and safety officer that will be assigned by the HSM.

2.1.4 EMAC Project Management

LES/TolTest JV Project Manager

LES/TolTest JV has overall responsibility for ensuring that the SWMU 9 project meets U.S. EPA objectives and Navy and LES/TolTest JV quality standards to ensure that the remediation is completed satisfactorily. The LES/TolTest JV PM, Mr. Brian Morgan, will report to the Navy RPM and is responsible for technical QC and project oversight. Additional responsibilities of the LES/TolTest JV PM are as follows:

- Ensuring timely resolution of project-related technical, quality, and safety associated with LES/TolTest JV operations.

- Functioning as the primary LES/TolTest JV interface with the Navy RPM, the NSA Crane ERSM, Tetra Tech field personnel, and waste disposal facility points of contact.

- Ensuring that LES/TolTest JV health and safety issues related to this project are communicated effectively to all personnel and off-site laboratories.

- Monitoring and evaluating all LES/TolTest JV subcontractor performance.

- Coordinating and overseeing work performed by LES/TolTest JV field staff (including excavation, waste segregation, sludge dewatering, and sampling to determine hazardous status of wastes prior to disposal).

- Coordinating and overseeing maintenance of all LES/TolTest JV project records.

- Coordinating and overseeing review of LES/TolTest JV project deliverables.

- Preparing and issuing final LES/TolTest JV deliverables to the Navy.

- Approving the implementation of corrective actions associated with the SWMU-specific LES/TolTest JV portion of project quality.

LES/TolTest JV Field Operations Leader

The LES/TolTest JV Field Operations Leader (FOL), Mr. Wayne Moore, has overall responsibility for ensuring that the SWMU 9 IM meet objectives from the standpoint of adequate removal of contaminated media and appropriate disposal of wastes. The LES/TolTest JV FOL will have autonomy with regard to deciding how best to implement the field portion of the IM, but completion of the IM will be determined by Tetra Tech on behalf of the Navy through verification sampling and analysis. The LES/TolTest JV FOL will report to the LES/TolTest JV PM. Additional responsibilities of the LES/TolTest JV FOL are as follows:

- Providing technical advice to the field team on matters of remediation goals and implementation of IMWP.

- Ensuring that wastes are sampled representatively to determine their status for waste disposal.

- Ensuring timely resolution of technical, quality, or other issues affecting project goals.

- Functioning as the primary interface with all SWMU-specific LES/TolTest JV subcontractors and the LES/TolTest JV PM.

- Recommending appropriate field corrective actions.

LES/TolTest JV Health and Safety Manager

The LES/TolTest JV HSM is responsible for the following:

- Providing technical advice to the LES/TolTest JV PM on matters of health and safety.
- Overseeing the development and review of the HASP.
- Conducting health and safety audits.
- Preparing health and safety reports for management.

2.2 QUALITY ASSURANCE

This section identifies the QA responsibilities for the QAPP Addendum No. 5. Responsibilities of U.S. EPA, Tetra Tech, LES/TolTest JV, and the analytical laboratories are discussed.

2.2.1 U.S. EPA

The U.S. EPA chemist, Mr. Allen Debus, has the responsibility to review and approve chemistry aspects of the QAPP Addendum No. 5 and to provide overall QA support and review. Additional responsibilities may include the following:

- Coordinating external performance and system audits of the contracted laboratory
- Reviewing and evaluating analytical field and laboratory procedures

2.2.2 Tetra Tech QA Manager

The Tetra Tech Quality Assurance Manager (QAM), Dr. Tom Johnston, is responsible for overall QA for the Tetra Tech portion of the project. He reports directly to the Tetra Tech ProgMan. He acts on behalf of the United States Navy for project QA. The QAM is responsible for the following:

- Developing, maintaining, and monitoring QA policies and procedures.
- Providing training to Tetra Tech staff in QA/QC policies and procedures.
- Conducting systems and performance audits to monitor compliance with environmental regulations, contractual requirements, QAPP requirements, and corporate policies and procedures.
- Auditing project records.
- Monitoring subcontractor quality controls and records.
- Assisting in the development of corrective action plans and ensuring correction of nonconformances reported in internal or external audits.
- Ensuring that this QAPP Addendum meets Tetra Tech, Navy, and U.S. EPA requirements.

- Overseeing the responsibilities of the Tetra Tech Project QA/QC Advisor.

- Preparing QA reports for management.

2.2.3 Tetra Tech Project QA Advisor

The Tetra Tech Project QA Advisor, Ms. Kelly Carper, supports the PM in preparing and reviewing the QAPP and in conducting data assessments. The Project QA Advisor communicates directly with the QAM on matters of QA/QC.

2.2.4 Waste Characterization and Verification Sample Laboratory Responsibilities

The subcontracted laboratories are responsible for analyzing all samples in accordance with the analytical methods and additional requirements specified in this QAPP Addendum No. 5. It will also be the analytical laboratories' responsibilities to properly dispose of unused sample aliquots. Responsibilities of key laboratory personnel are outlined in the following paragraphs.

Laboratory Project Manager

The Laboratory PM (verification samples) will interface directly with the Tetra Tech Project Chemist and Tetra Tech PM, and the Laboratory PM (waste characterization samples) will interface directly with the LES/TolTest JV PM. The Laboratory PMs will perform the following tasks:

- Ensure that method and project-specific requirements are properly communicated and understood by laboratory personnel.

- Ensure that all laboratory resources are available on an as-required basis.

- Ensure compliance with analytical and project QA requirements.

- Review data packages for completeness, clarity, and compliance with project requirements.

- Inform the Tetra Tech PM or LES/TolTest JV PM, as applicable, of project status and any sample receipt or analytical problems.

- Oversee the preparation and approval of final analytical reports before submittal to Tetra Tech.

Laboratory Quality Assurance Officer

The Laboratory QA Officer (QAO) will report directly to the Laboratory Operations Manager. The Laboratory QAO will be independent of laboratory production management to ensure that laboratory quality performance is assessed without schedule and cost considerations. Responsibilities of the Laboratory QAO include the following:

- Defining appropriate laboratory QA procedures and monitoring overall laboratory QA.
- Stopping work if a condition adverse to the quality of work is encountered, if QA or QC procedures are not followed, or if analytical out-of-control events are encountered that have not been corrected.
- Approving and maintaining document control of all QA documents and SOPs.
- Performing and/or implementing internal system and performance audits and verifying completion of corrective actions cited in audits.
- Directing laboratory participation in laboratory accreditation and certification programs.

Laboratory Sample Custodian

The Laboratory Sample Custodian will report to the Laboratory Operations Manager. Responsibilities of the Laboratory Sample Custodian include the following:

- Receiving and inspecting the incoming sample containers.
- Recording the conditions of the incoming sample containers.
- Signing appropriate documents.
- Verifying chain-of-custody records.
- Notifying the Laboratory PM of sample receipt and inspection.
- Assigning a unique identification number and customer number and entering each into the sample receiving log.
- With the help of the Laboratory PM, initiating transfer of the samples to appropriate lab sections.
- Controlling and monitoring access/storage of samples and extracts.

Laboratory Technical Staff

The laboratory technical staff will be responsible for sample analyses based on the analytical methods and requirements specified in this QAPP Addendum No. 5.

2.3 FIELD INVESTIGATION

Tetra Tech will be responsible for all field sampling and analysis activities related to confirming that the IM is completed satisfactorily. LES/TolTest JV will be responsible for all field sampling and analysis activities directly related to characterization of the remediation wastes for disposal. The Tetra Tech and LES/TolTest JV field teams will be organized according to the activities planned. Field team members will be selected based on the type and extent of effort required. All team members will be appropriately skilled and trained for the tasks they are assigned to perform

2.3.1 Field Operations Leaders

The Tetra Tech and LES/TolTest JV FOLs are responsible for coordinating all on-site personnel and for providing technical assistance, when required. The LES/TolTest JV FOL, or designee, will coordinate and lead all excavation and waste removal operations. The LES/TolTest JV FOL has authority to complete the field work in the most efficient manner while adhering to the requirements of this QAPP Addendum No. 5 and the HASP. The Tetra Tech FOL will conduct verification sampling activities. The Tetra Tech and LES/TolTest JV FOLs will ensure the availability and maintenance of all sampling materials and equipment pertinent to their function. The Tetra Tech FOL is responsible for completing all sampling, field, and chain-of-custody documentation, will assume custody of all samples sent to the verification sampling laboratory, and will ensure the proper handling and shipping of samples. The Tetra Tech FOL will report directly to the Tetra Tech PM but will have authority to guide field operations to efficiently conclude the scheduled work. Specific Tetra Tech and LES/TolTest JV FOL responsibilities include the following:

- Ensuring that all health and safety requirements unique to the SWMU 9 IM are implemented.
- Functioning as the on-site communications link between field staff members, Site Safety Officer (SSO), the NSA Crane ERSM, and the Tetra Tech PM or LES/TolTest JV PM.
- Alerting off-site analytical laboratories of any special health and safety hazards associated with environmental samples.
- Overseeing the mobilization and demobilization of all field equipment and subcontractors.

- Coordinating and managing the field technical staff.
- Adhering to the work schedules provided by the Tetra Tech PM and LES/TolTest JV PM, as applicable.
- Ensuring the proper maintenance of site logbooks, field logbooks, and field recordkeeping.
- Initiating field task modification requests (field change orders) when necessary.
- Identifying and resolving problems in the field, resolving difficulties via consultation with the NSA Crane ERSM, implementing and documenting corrective action procedures, and providing communication between the field team and project management.

2.3.2 Site QA/QC Advisor

The FOLs (or designees) will act as the Site QA/QC Advisors and will be responsible for ensuring adherence to all QA/QC requirements as defined in this QAPP Addendum No. 5. Strict adherence to these procedures is critical to the collection of acceptable and representative data. The following is a summary of the Site QA/QC Advisor's responsibilities:

- Ensuring that field QC samples are collected at the proper frequencies.
- Ensuring that additional volumes of sample are supplied to the analytical laboratories with the proper frequency to accommodate laboratory QA/QC analyses.
- Ensuring that measuring and test equipment are calibrated, used, and maintained in accordance with applicable procedures and technical standards.
- Acting as liaison between site personnel, laboratory personnel, and the QAM.
- Managing bottleware shipments and overseeing field preservation.

2.3.3 Site Safety Officer

The FOL (or designee) will also serve as the SSO. The duties of the Tetra Tech SSO are detailed in the Tetra Tech HASP; the duties of the LES/TolTest JV SSO are detailed in the applicable LES/TolTest JV

HASP. The SSOs have stop-work authority, which can be executed upon the determination of an imminent safety hazard.

2.3.4 Technical Staff

The technical staff for this project will be drawn from pools of qualified personnel. All of the designated team members will be experienced professionals who possess the degree of specialization and technical competence required to effectively and efficiently perform the required work.

Field staff members are responsible for complying with field-related requirements as presented in this QAPP Addendum and the HASP.

2.4 SPECIAL TRAINING REQUIREMENTS AND CERTIFICATIONS

All field personnel will have appropriate training to conduct the field activities to which they are assigned. Additionally, each site worker will be required to have completed a 40-hour course (and 8-hour refresher, if applicable) in Health and Safety Training as described under Occupational Safety and Health Administration (OSHA), 29 CFR 1910.120(b)(4).

TABLE 2-1

KEY PROJECT PERSONNEL
SWMU 9 QAPP ADDENDUM NO. 5
NAMES, PHONE NUMBERS, AND ADDRESSES
NSA CRANE
CRANE, INDIANA
PAGE 1 OF 2

PERSON / TITLE / ORGANIZATION	ADDRESS	TELEPHONE
Peter Ramanauskas U.S. EPA Region 5 Oversight	EPA Region 5 77 West Jackson Blvd. Chicago, Illinois 60604	Phone: (312) 886-7890 FAX: (312) 353-4788
Howard Hickey Remedial Project Manager U.S. Navy NAVFAC SE	Department of the Navy Building 1A, Code 45313 201 Decatur Avenue Great Lakes, IL 60080	Phone: (847) 688-5999 FAX: (847) 688-2319
Tom Brent Environmental Restoration Site Manager NSA Crane	NSA Crane Code 0592-TB B-3260 300 Highway 361 Crane, Indiana 47522-5009	Phone: (812) 854-6160 FAX: (812) 854-4177
Debbie Dills Officer in Charge of Construction NSA Crane	NAVFAC MW PWD Crane Naval Support Activity Building 2516 Code PRCR22 300 Highway 361 Crane, Indiana 47522-5009	Phone (812) 854-3234 FAX: (812) 854-3800
John Trepanowski Program Manager Tetra Tech	Tetra Tech 234 Mall Boulevard, Suite 260 King of Prussia, Pennsylvania 19406	Phone: (610) 491-9688 FAX: (610) 491-9645
Kelly Carper Quality Assurance Advisor Tetra Tech	Tetra Tech 661 Andersen Drive Pittsburgh, Pennsylvania 15220-2745	Phone: (412) 921-7273 FAX: (412) 921-4040
Matthew Soltis Health and Safety Manager Tetra Tech	Tetra Tech 661 Andersen Drive Pittsburgh, Pennsylvania 15220-2745	Phone: (412) 921-8912 FAX: (412) 921-4040
Tony Klimek Project Manager Tetra Tech	Tetra Tech 250 W. Court Street, Suite 200W Cincinnati, Ohio 45202-1072	Phone: (513) 557-5057 FAX: (513) 251-0200
George Ten Eyck Field Operations Leader Tetra Tech	Tetra Tech 250 W. Court Street, Suite 200W Cincinnati, Ohio 45202-1072	Phone: (513) 557-5043 FAX: (513) 251-0200
Joseph Samchuck Data Validation Manager Tetra Tech	Tetra Tech 661 Andersen Drive Pittsburgh, Pennsylvania 15220-2745	Phone: (412) 921-8510 FAX: (412) 921-4040
Edward Sedlmyer Project Chemist Tetra Tech	Tetra Tech 661 Andersen Drive Pittsburgh, Pennsylvania 15220-2745	Phone: (412) 921-8704 FAX: (412) 921-4040

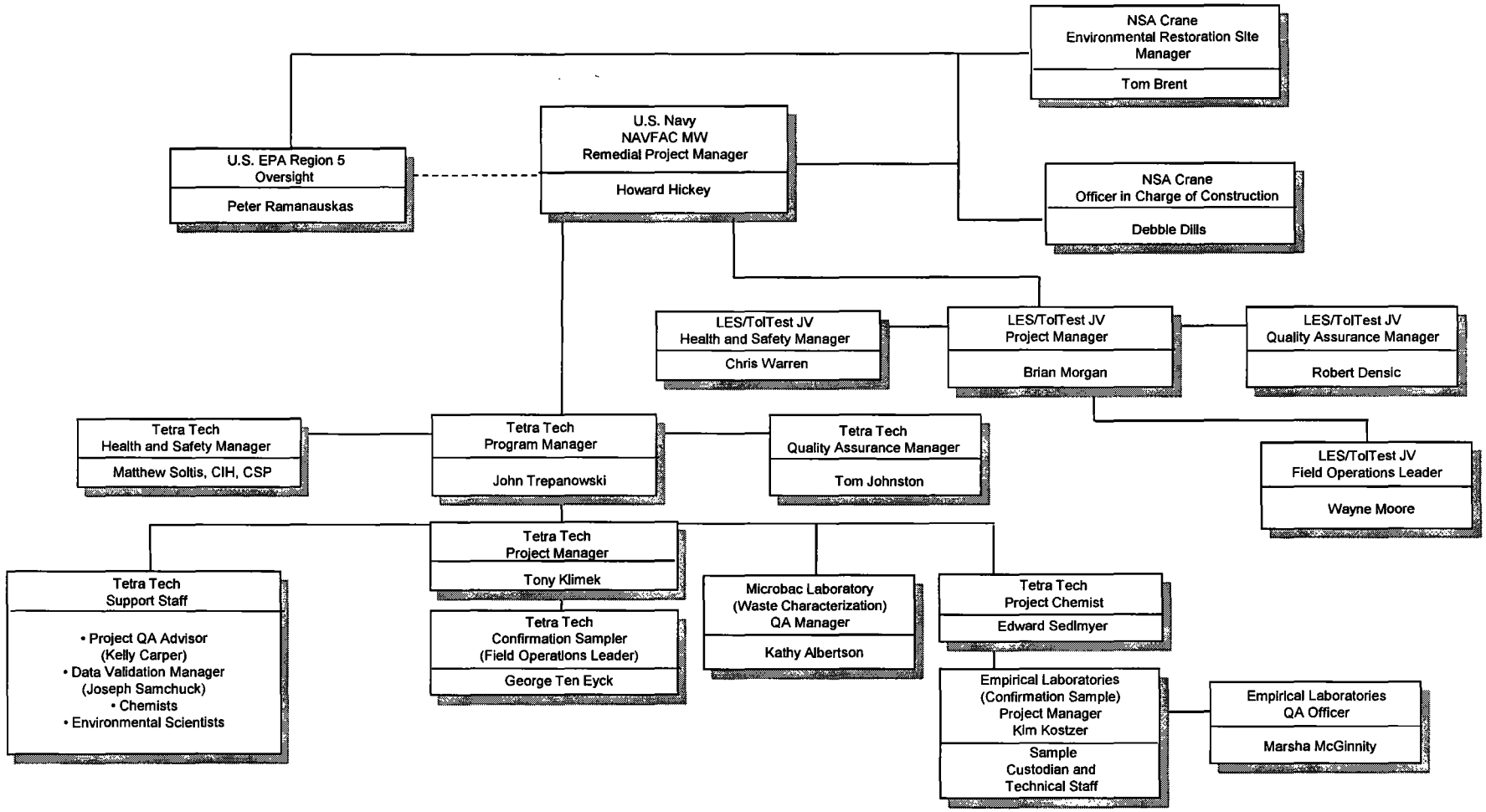
TABLE 2-1

KEY PROJECT PERSONNEL
SWMU 9 QAPP ADDENDUM NO. 5
NAMES, PHONE NUMBERS, AND ADDRESSES
NSA CRANE
CRANE, INDIANA
PAGE 2 OF 2

PERSON / TITLE / ORGANIZATION	ADDRESS	TELEPHONE
Tom Johnston Quality Assurance Manager Tetra Tech	Tetra Tech 661 Andersen Drive Pittsburgh, Pennsylvania 15220-2745	Phone: (412) 921-8615 FAX: (412) 921-4040
Kim Kostzer Project Manager Empirical Laboratories, LLC	Empirical Laboratories, LLC 621 Mainstream Drive, Suite 270 Nashville, Tennessee 37228	Phone: (615) 345-1113 FAX: (615) 846-5426
Marsha McGinnity Lab QA Manager Empirical Laboratories, LLC	Empirical Laboratories, LLC 621 Mainstream Drive, Suite 270 Nashville, Tennessee 37228	Phone: (615) 345-1113 FAX: (615) 846-5426
Brian Morgan Project Manager LES/TolTest JV	LES/TolTest JV 508 West Elnora Odon, Indiana 47562	Phone: (419) 794-3500 FAX: (812) 636-7572
Wayne Moore Field Operations Leader LES/TolTest JV	LES/TolTest JV 508 West Elnora Odon, Indiana 47562	Phone: (812) 636-8501 FAX: (812) 636-7572
Chris Warren Health and Safety Manager LES/TolTest JV	LES/TolTest JV 1480 Ford Street Maumee, Ohio 43537	Phone: (419) 794-3500 FAX: (419) 794-3905
Robert Densic Quality Assurance Manager LES/TolTest JV	LES/TolTest JV 1480 Ford Street Maumee, Ohio 43537	Phone: (419) 794-3500 FAX: (419) 794-3905
Kathy Albertson Laboratory Project Manager Microbac Laboratories, Inc.	Microbac Laboratories, Inc. 158 Starlite Drive Marietta, Ohio 45750	Phone: (800) 373-4071 FAX: (740) 373-4835

FIGURE 2-1

PROJECT ORGANIZATION CHART
SWMU 9 QAPP ADDENDUM NO. 5
NSA CRANE
CRANE, INDIANA



LES/TolTest JV – Lakeshore Engineering Services and TolTest, Inc. Joint Venture

February 2010

3.0 FIELD OPERATIONS - SAMPLING AND ANALYSIS

3.1 GENERAL APPROACH

This section describes sampling locations, methods, and rationales for the sampling activities to be conducted in support of the IM at SWMU 9. Because this QAPP Addendum No. 5 is based on the existing SWMU 8 and 15 QAPP (Tetra Tech, 2004), the requirements regarding field operations as presented in Tetra Tech (2004) will be met during the remediation at SWMU 9, in the event information contained in this QAPP Addendum No. 5 conflicts with the original QAPP, this QAPP Addendum No. 5 shall take precedence.

The equipment and procedures to be used for collecting, handling, preserving, recording, logging, and shipping samples to an analytical laboratory are presented in this QAPP Addendum No. 5. Corresponding Standard Operating Procedures (SOPs) can be found in Appendices A and B. Soil sampling will generally be performed using trowels and buckets.

Prior to any field activities, the Tetra Tech PM and the LES/TolTest JV PM will ensure that all field personnel read and understand this QAPP Addendum No. 5 and associated HASPs. Tetra Tech and LES/TolTest JV will each have organization-specific HASPs. Each worker or visitor to the site must sign an acknowledgment that he or she has read and understands the HASPs, as applicable.

The FOLs will ensure that all required field equipment for non-health-and-safety-related operations is available and operational, and the SSOs will ensure that all health-and-safety-related equipment is available and operational.

3.2 SAMPLE IDENTIFICATION SYSTEM

Verification Sampling

All samples collected for fixed-base laboratory analyses will be properly labeled with an adhesive-backed sample label affixed to each sample container in accordance with SOP CTO467-01 (Appendix A). The sample labels will include the following information: project name, project location, sample tracking number, sampling date, sampling time, type of analysis required, matrix type, preservative, initials of sampler, and name of the analytical laboratory to which the sample will be submitted.

Surface and subsurface soil composite verification samples will be composited from multiple aliquots (grab samples) collected to represent a specific area of an excavation floor or sidewall for the PCB and

pesticide analyses. Composite samples will be formed by blending the aliquots together (blending is described in Section 3.5) and the composite samples will be labeled in accordance with SOP CTO467-02 (Appendix A).

Individual aliquots will be labeled as "A," "B," "C," or "D" to indicate sequential aliquots collected for compositing. The locations where the aliquots are acquired will be noted in the field log using a simple, hand-draw diagram. Aqueous wastewater samples collected to determine disposal requirements will be individual grab samples.

The sampling time recorded on the chain-of-custody form, labels, and tags for duplicate samples will be 0000 so that the samples are "blind" to the laboratory. Notes detailing the sample number, time, date, and type will be recorded on the sample log sheets and will document the location of the duplicate sample (sample log sheets are not provided to the laboratory). Samples to be used as matrix spike (MS) and matrix spike duplicate (MSD) samples must be identified on the field documentation and chain-of-custody forms (see SOP CTO467-03 in Appendix A).

Waste Characterization Sampling

The same sample numbering system developed for verification sampling will also be used for the waste characterization sampling.

3.3 SAMPLE CUSTODY PROCEDURES

Verification Sampling

Sample custody will be in accordance with CTO467-03 (Appendix A).

Waste Characterization Sampling

Sample custody will be in accordance with SOP 08-16 (Appendix B).

3.4 FIELD INSTRUMENT CALIBRATION PROCEDURES AND FREQUENCIES

Verification Sampling

Field instruments such as PCB test kits will be used to guide field activities and provide general information to identify verification sampling locations. Fixed-base laboratory analyses will be the definitive data for verification sampling decisions.

Field instrument calibration requirements are specific to the instruments and chemical test kits. These requirements are governed by SOPs in Appendix A or, in the case of PCB test kits, the calibration or standardization instructions that accompany each test kit. Accurately following instructions in each PCB test kit will ensure the QC requirement are satisfied.

Waste Characterization Sampling

Due to the nature of waste characterization sampling, field instruments are not expected to be used. However, if they are used the instruments will be calibrated daily in accordance with the manufacturer's instructions to ensure proper operation and maintenance. Calibration records will be maintained in a logbook. Malfunctioning instruments will be replaced, as necessary. Spare parts for equipment will be kept on site whenever possible.

3.5 SAMPLING LOCATIONS, ANALYSES, AND RATIONALES

Verification Sampling

This section presents sampling rationales, locations, QA/QC samples to be collected, and analyses to be performed for the verification sampling and analytical program. Twenty-four hour and other short turnaround times will be requested for fixed-base laboratory analyses to minimize excavation equipment and field personnel downtime while samples are analyzed. Field instruments and test kits will be used to guide the field activities, but fixed-base laboratory analyses will be considered the definitive data for determining whether IMs have been completed satisfactorily.

The overall rationale for verification sampling is to ensure that remedial measures have been extensive enough that surface and subsurface soils that are contaminated at concentrations above the media cleanup standard (MCS) have been removed from SWMU 9. Verification samples collected from excavations will be collected as surface soils at the exposed surface, but they will not represent surface soil depths when compared to the original ground elevations at the same locations. Limited depth information will be preserved in the sample numbers to convey to data users the depths bgs represented by the samples. However, continued excavation in a particular area may expose a yet deeper soil surface. The continued excavation at a particular location will be encoded in sample numbers (see SOP CTO467-02 in Appendix A), but it may be necessary to consult the field notes to estimate the depth below original ground elevation represented by any particular sample. This is not anticipated to be a problem because the goal of this project is to excavate until clean material is encountered, in which case the unacceptably contaminated material is assumed to have been removed.

If QC sampling and analysis is required by the off-site disposal facility, the facility's requirements for QC sample collection will be followed.

Table 3-1 (solid samples) presents summaries of the sample analyses, container types and volumes, preservation requirements, and holding times for the verification samples to be collected under this QAPP Addendum No. 5. Table 3-2 presents a list of the compounds that will be reported for each analytical method. The total number of samples to be collected is unknown; however, the samples to be collected are described below and in the IMWPs (Tetra Tech, 2008).

Waste Characterization Sampling

This section presents sampling rationale, locations, and analyses to be performed for the waste characterization sampling and analytical program. The following types of sampling will be conducted: excavated soil waste characterization, wastewater disposal characterization, and clean fill (backfill) characterization. The overall rationale for characterization sampling is to ensure that solid and liquid wastes generated during the IM are properly disposed and that the soil used to backfill the excavations is not contaminated.

Tables 3-3 (soil waste), 3-4 (wastewater), and 3-5 (clean fill) present summaries of the sample analyses, container types and volumes, preservation requirements, and holding times for the waste and clean fill characterization samples to be collected under this QAPP Addendum No. 5.

The remedial contractor (LES/TolTest JV) will utilize the following facilities for disposal of waste material as a hazardous or non-hazardous waste:

Special Waste and <50 ppm PCBs Waste Disposal:

Republic Waste, Inc.
Contact: Janice Peterson
Sycamore Ridge RDF
5621 East Cotton Drive
Pimento, Indiana 47866
Phone: (812)299-9227

TSCA and >50 ppm PCBs Waste Disposal:

Heritage Environmental Services
Contact: Craig Hogarth
Roachdale Landfill Subtitle C – IND980503890
4370 W. Co. Rd. 1275N Roachdale, IN 46172
Phone (765)435-2704

Pesticide (>LDR) Waste Disposal:

EQ-Michigan Disposal, Inc.
49350 North I-94 Service Drive
Belleville, Michigan 48111
EPA ID #. MID 000 724 831

Additional details are provided in Section 3.5.3.

3.5.1 General Sampling Requirements and Considerations

Verification Sampling

This section describes requirements and considerations that apply to verification sampling during IMs to be conducted at SWMU 9.

After excavation by LES/TolTest JV, Tetra Tech will collect verification samples from the sidewalls and floors (bottom) of the excavations to verify that the remaining soil contamination is below the MCS. The requirements for this verification sampling at the former Building 55 Area and the former Fire Fighting Training Area are described on the notes on Figure 8 and Figure 9 in the Technical Memorandum (Appendix E). As described on Note 1, verification samples will be collected from every 25 linear feet of excavated sidewall. As described on Note 2, verification samples will be collected from every 1000 square feet of exposed excavation floor.

Sample collectors have the option to use disposable equipment or reusable equipment for sampling. Disposable sampling equipment will not require decontamination. Reusable sampling equipment must be decontaminated between samples in accordance with SOP CTO467-04 (Appendix A). Decontamination source water blanks, however, will not be collected because contaminant concentrations in the source water are not anticipated to be present at levels that will influence excavation decisions. Furthermore, results from analysis of field blanks are not expected to influence the course of excavation. All sample collection must be recorded in accordance with the sampling procedures (SOP CTO467-05 for soil in Appendix A and Section 3.5.3 of this QAPP Addendum No. 5).

Sample packaging and shipping for off-site laboratory analyses shall be conducted under chain of custody (see SOP CTO467-03 in Appendix A) in accordance with SOP CTO467-06 (Appendix A). One-day quick turnaround analyses shall be requested from the analytical laboratory. The request for quick turnaround analyses must be noted on each chain of custody.

Uniform random numbers were generated on the interval of 0 to 1 with Microsoft Excel® 2003 (11.6560.6568) SP2 and converted to percentages for Table 3-6. This table indicates relative positions

from where verification grab samples and composite samples will be collected in excavations. The use of Table 3-6 is described in Section 3.5.3 for each excavation at SWMU 9. Example sample numbers are presented in the Figure 8 and Figure 9 of the Technical Memorandum (Appendix E) to demonstrate how samples are to be numbered for the first samples to be collected for each environmental medium at SWMU 9.

Waste Characterization Sampling

General field sampling guidelines are provided in LES/TolTest JV SOP 08-3 (Appendix B). Sample collectors have the option to use disposable equipment or reusable equipment for sampling. Disposable sampling equipment will not require decontamination. Reusable sampling equipment must be decontaminated between samples in accordance with LES/TolTest JV SOP 03-3 (Appendix B). Waste characterization samples may be collected from drums, tanks, in-situ soil, surface water, or waste piles. All sample collection must be recorded in accordance with the LES/TolTest JV SOPs (Appendix B). Appendix B also includes additional information on sample containers, decontamination procedures, sample packaging and shipment, and waste transportation and off-site disposal.

3.5.2 Field Instrument Calibration

Verification Sampling

Field instruments such as PCB test kits will be used to guide field activities and provide general information to identify verification sampling locations. Fixed-base laboratory analyses will be the definitive data for verification sampling decisions. Calibration checks of the PCB test kits shall be conducted in accordance with the test kit instructions.

Waste Characterization Sampling

Field instruments are not expected to be used for waste characterization. If they are used, the instruments will be calibrated daily in accordance with the manufacturer's guidelines.

3.5.3 SWMU 9 Sampling and Analysis

3.5.3.1 Soil Verification Sampling and Analysis

Verification samples will be collected from the walls (sides) and floors (bottom) of the interim measures excavations. The requirements for this sampling are described on the notes on Figures 8 and 9 in Appendix E. Verification samples will be collected from every direction and from every 25 linear feet of excavated sidewall, and will be collected from 1000 square feet of exposed excavation floor.

Table 3-6, Sets #1 and #2, present random coordinates for composite soil sample aliquots in terms of the percentage of distance from one end of a rectangular excavation to the other end for both X- and Y-directions. The coordinates in Table 3-6 will be used as follows to identify the locations from which to obtain individual aliquots that will then be combined to form a composite sample:

1. If collecting aliquots from an excavation floor, select Set #1.
2. If collecting aliquots from an excavation wall, select Set #2.
3. Select the next sequential composite sample number in the list of composite samples in Table 3-6 (the first sample selected for work conducted at the SWMU 9 will be Sample 1).

Note 1: The sample numbers in Table 3-6 do not represent the sample numbers to be assigned to the composite samples. The Table 3-6 sample numbers should be viewed as index numbers used to distinguish one set of random coordinates from another.

4. Collect a soil aliquot from each of the four pairs (floors and support facilities) or two pairs (side walls) of indicated X- and Y- coordinates for the selected composite sample.

Note 2: If the end of Table 3-6 is reached for a given set of coordinates (e.g., Sample 20 in Set #1 for excavation floors), return to the beginning of that set in the table and continue again to the end of the set in sequential order for each additional composite sample.

Figure 3-1 shows a schematic diagram of how to measure the coordinates for each of the four (or two) sample aliquots that are to be composited from excavation floors (or side walls).

Excavated areas are not likely to be exactly rectangular. The sample collector will use professional judgment to measure the aliquot coordinates in the actual excavation while keeping as close as possible to the prescribed sampling scheme. After coordinates have been selected, collect the soil aliquots in accordance with SOP CTO467-05 (Appendix A) and composite them as follows:

1. Mix soil aliquots of approximately equal volume (determined by visual observation) in a stainless steel bowl until the mixture is homogeneous in texture and color.

2. Remove stones the size of a small pea or larger, sticks, root fragments, leaves, twigs, or other naturally occurring debris to ensure that the sample represents primarily soil.

Additional details of soil verification sampling and analysis are described in the IMWP (Tetra Tech, 2008) and the Technical Memorandum (Appendix E).

3.5.3.2 Soil Verification PCB Samples

Analyze the composite samples in accordance with the instructions included in the PCB test kit identified in Table 3-1 and the instructions in SOP CTO467-07 (Appendix A). Perform at least one calibration/standardization check daily. Record the total PCB concentration in the field log. QC checks for field analyses shall be conducted at the frequencies indicated in the test kit instructions. The information to be recorded includes but is not limited to the following:

- Analyst's name
- Date/time of analysis
- Test kit identifier, including serial number, if provided
- Reference to corresponding calibration/standardization check
- Sample number
- Measured concentration, including the measurement units

Report the total PCB concentration to LES/TolTest JV and the Navy RPM so a decision can be made concerning the need for continued excavation.

As long as samples are being produced with field PCB concentrations greater than 1 milligrams per kilogram (mg/kg) in surface samples or 25 mg/kg in subsurface samples, 1 of 10 composite samples will be sent for laboratory verification of PCB concentrations (as Aroclors). In this case, surface soil samples are samples collected within 2 feet of original grade as estimated through visual observation and simple field measurement with a tape measure or other suitable measuring device. If any sample at the limit of excavation has a total PCB concentration less than 1 mg/kg (surface soil) or 25 mg/kg (subsurface soil), that sample will be sent for laboratory verification of PCBs as Aroclors. This will ensure that a minimum of 10 percent or more of field analyses and all final results supporting the conclusion to terminate excavation are verified with laboratory results. For any sample that is analyzed in the field and the fixed-base laboratory, both the field and the laboratory analyzed portions will have the same sample number (see CTO467-02 in Appendix A).

3.5.3.3 Soil Waste Characterization

Pre-excavation sampling and analysis results as described in the Technical Memorandum presented in Appendix E and additional confirmatory sampling by LES/TolTest JV will be used to characterize the waste material and ensure that the excavated soil is sent to an appropriate treatment or disposal facility.

All soil waste will be considered hazardous material, and disposed accordingly, unless proven otherwise by laboratory analysis. If the soil waste is classified as non-hazardous by TCLP analyses, LES/TolTest JV may dispose of the soil in a non-hazardous facility which has been approved by the Navy.

At the former Building 55 Area, LES/TolTest JV will initially excavate the soil that is estimated to contain pesticide contamination above LDRs and transport it off-site to an appropriate treatment facility. This excavation will be in accordance the pre-excavation sampling and analysis limits as shown on Figure 6B in Technical Memorandum in Appendix E. LES/TolTest JV will then collect confirmation samples in accordance with LES/TolTest JV SOP 08-3 (see Appendix B) from the boundaries of this initial excavation to confirm that the remaining soil contains contamination below the LDRs. Confirmatory grab samples will be collected from every 25 linear feet of excavated sidewall, with no less than one sample collected from each directionally facing sidewall. Confirmatory grab samples will be collected from every 1000 square feet of exposed excavation floor, with no less than one sample collected from each excavation floor. This confirmatory sampling and the pre-excavation sampling will be used to characterize the remaining soil that will be excavated as shown on Figure 6B that has contamination below the LDRs but is above the media cleanup standard (MCS).

At the former Fire Fighting Training Area, LES/TolTest JV will initially excavate the soil that is estimated to contain PCB contamination above 50 ppm (TSCA waste) and transport it off-site to an appropriate TSCA facility. This excavation will be in accordance the pre-excavation sampling and analysis limits as shown on Figure 7B in Technical Memorandum in Appendix E. LES/TolTest JV will then collect additional confirmation samples in accordance with LES/TolTest JV SOP 08-3 (see Appendix B) from the boundaries of the excavation for analysis to confirm that the remaining soil is not a TSCA waste (less than 50 ppm PCBs). Confirmatory grab samples will be collected from every 25 linear feet of excavated sidewall, with no less than one sample collected from each directionally facing sidewall. Confirmatory grab samples will be collected from every 1000 square feet of exposed excavation floor, with no less than one sample collected from each excavation floor. This confirmatory sampling and the pre-excavation sampling will be used to characterize the remaining soil that will be excavated that was estimated to be above the MCS as shown on Figure 7B.

Information from confirmatory sampling and the pre-excavation sampling will be used to complete the waste profile form. LES/TolTest JV will collect the samples in accordance with LES/TolTest JV SOP 08-3 (see Appendix B). The samples shall be labeled and field records maintained in accordance with LES/TolTest JV SOPs 01-4, and 08-16 (Appendix B).

The sample shipments sent to the following laboratory for testing as previously listed will be in accordance with LES/TolTest JV SOP 08-10 (Appendix B):

Microbac Laboratory
156 Starlite Drive
Marietta, Ohio 45750
(800) 373-4071

3.5.3.4 Wastewater Characterization

Wastewater is characterized as water from excavation dewatering (stormwater and groundwater) and decontamination water. All wastewater collected at SWMU 9 will be containerized and characterized prior to transport and disposal. Wastewater disposal characterization is necessary in order to properly classify the materials being disposed off site and to ensure that all disposals will be conducted in accordance with federal, state, and local regulations.

Water that has drained from the staged soil and sediment and water removed from excavations will be containerized for characterization prior to off-site disposal, and where applicable, managed in accordance with TSCA and RCRA regulations.

All wastewater will be collected in 55-gallon drums or larger vessels depending on the volumes collected. Once a vessel has been filled, a single wastewater sample will be collected by LES/TolTest personnel for analysis of all COCs. During containerized waste sampling, personal protective equipment (PPE) will be worn at all times as specified in the TolTest Site Safety and Health Plan (LES/TolTest, 2008). Collected wastewaters in tanks may include equipment decontamination wash water, storm water accumulation, sediment decontamination rinsate, etc. Samples of containerized wastewaters will be collected as follows:

1. New disposable latex gloves will be used when collecting each liquid sample. Additional new glove changes will be made as conditions warrant.

2. Samples will be collected using a pre-cleaned glass sampling thief, a stainless steel bailer or a sampler capable of taking samples from discrete depths. Samples will be collected from the top, middle and bottom of the liquid volume, as appropriate, if multiple phases are present, or from the approximate mid-depth of liquid depending on the depths if in a single phase. Samples will be

collected in the appropriate pre-cleaned bottles to be supplied by the laboratory. Bottle containers will be chosen, cleaned and quality controlled according to Office of Solid Waste and Emergency Response (OSWER) Directive No. 9240.0-05A entitled "Specifications and Guidance for Obtaining Contaminant-Free Sample Containers," December 1992.

3. All disposable gloves will be collected and contained for proper disposal with other PPE materials.

4. The chain-of-custody procedures will follow those specified in Toltest SOP 08-16 (see Appendix B).

5. Samples packaging and shipping procedures will follow those specified in Toltest SOP 08-10 (see Appendix B)

6. Sample will be submitted to the following laboratory for COC analysis in accordance with the laboratory SOPs (Appendix D):

Microbac Laboratory
156 Starlite Drive
Marietta, Ohio 45750
(800) 373-4071

3.5.3.5 Clean Fill Characterization

Excavation areas will be backfilled to preconstruction grades. The types of backfill material required are common fill and topsoil. Clean fill characterization will be completed prior to receiving any backfill at the site. The backfill material must satisfy the following requirements:

- TPH, diesel range organics (DRO) - Less than 1 ppm
- TPH, gasoline range organics (GRO) - Less than 1 ppm
- Sum of benzene, toluene, ethylbenzene, and xylenes - Less than 1 ppm
- Characteristic waste determination - shall not fail the test for characteristic waste
- Total PCBs - Less than 1 ppm
- 4,4'-DDD - Less than 3.2 ppb
- 4,4'-DDE - Less than 3.2 ppb
- 4,4'-DDT - Less than 3.2 ppb
- Dieldrin - Less than 3.2 ppb
- Heptachlor - Less than 1.5 ppb
- Alpha-chlordane - Less than 1.5 ppb
- Gamma-chlordane - Less than 1.5 ppb

All clean fill characterization samples will be collected as composite samples with a hand-auger and disposable scoops. Composite samples will be collected as five-point composite samples, with effort made to sample from multiple areas and depths to adequately characterize the fill source. For example, if clean fill is in stockpiles, samples will be collected from multiple locations on the piles and from multiple depths within the piles. The exact location of the samples will be based on the sampler's discretion and ability to access depth with hand-digging methods. Volatile samples will be collected as a discrete sample. Sample(s) will be collected in accordance with LES/TolTest JV SOPs (Appendix B).

There will be a minimum of one sample per type of clean fill, and each source area will be characterized in a one-time sampling event. No in-place sampling will be conducted after the fill has been installed at the site. A site history will be obtained from each clean fill source site.

3.6 QUALITY CONTROL REQUIREMENTS

Refer to Tetra Tech (2004) for generic QC requirements. Project-specific requirements are provided in this section.

In addition to instrument- or test kit-specific calibration requirements (see Section 3.4), the following field QA/QC samples will be collected at the indicated frequencies to support verification sampling and analyses.

- In general, duplicate verification samples will be collected at a rate of one for every 20 regular samples and analyzed for the same analytes as the corresponding regular samples.

- When fixed-base laboratory analyses are used, enough additional sample volume will be collected to support MS/MSD sample analyses (organic chemical analyses only). The rate of MS/MSD analysis will be one for every 20 regular samples.

- A temperature blank will be added to each cooler that contain samples which must be kept cooled as a preservation requirement.

Definitions of each of these QC sample types are presented in Tetra Tech (2004). Collection of QC samples will not be required for waste characterization sampling and analyses unless required by the off-site disposal facility.

Equipment rinsate blanks (rinsate blanks) will be collected to ensure that cross-contamination of verification samples and waste disposal samples does not occur. Source water blanks will not be collected because cross-contamination from source water is not a concern.

3.7 DATA REDUCTION, VALIDATION, ASSESSMENT, AND REPORTING

Generic data reduction, validation, assessment, and reporting requirements are provided in Section 8.0 of Tetra Tech (2004). Project-specific instructions are provided below for this project.

3.7.1 Verification Analysis Data

Data from field analyses and other field measurements must be recorded at the time of generation in the field log book or, when provided in the governing SOP, on the SOP-specific data forms. Verification sampling results will be entered into the Tetra Tech electronic database soon enough after the data collection to prevent loss of data and to support the generation of reports to the Navy. The data entry process will make use of a dual entry system whereby two independent data entry clerks enter the data and compare the results. Discrepancies, if detected, will be investigated to determine the correct values, and the correct values will be entered into the database. Non-discrepant results will be considered accurate unless subsequent data review or use indicates otherwise.

The data will be transferred to the Navy in accordance with requirements to be found at the following web site:

https://www.sdirport.com/customer/ttnus/irgateway.nsf/MAINLOADER?OpenFrameSet

The password required to access this site may be obtained through the Navy RPM. The information at this link provides detailed instructions for reporting environmental data. The intent is to standardize reporting formats to improve how environmental data are acquired, managed, and transmitted. The following items are available at this link and the Electronic Data Exchange (EDE) Examples button located at the link:

- SOP
- Electronic Data Deliverable (EDD) spreadsheets and databases
- Electronic data processor
- Example electronic data submittal

3.7.2 Waste Characterization Data

Waste characterization analyses will be provided to the waste disposal facility and NAVFAC MW in the form of hard copies of laboratory data packages as well as data summaries. The data summaries shall identify each sample analyzed, the laboratory conducting the analysis, the results of analysis, and any qualifying notes indicating limitations on data use. At the Navy's discretion, data may also be provided in electronic format in accordance with the specifications identified in Section 3.7.1.

3.8 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

It is anticipated that this investigation could generate the following types of potentially contaminated residues or investigation-derived waste (IDW):

- Personal protective equipment (PPE)
- Equipment decontamination fluids

IDW will be handled as described in CTO467-08 (Appendix A).

3.9 SAFETY

The health and safety activities described in the following sections will ensure that field activities are performed at a high level of safety.

3.9.1 Health and Safety Plan

Separate HASPs will be prepared by Tetra Tech and LES/TolTest JV. These HASPs describe specific health and safety requirements, concerns, and information related to the site activities. These documents will be read and understood by each person working at the site. Each worker or visitor to the site must sign an acknowledgment that he or she has read and understands the HASP.

3.9.2 Health and Safety Training

All workers involved with the site investigations shall have successfully completed the OSHA-mandated 40-hour health and safety training and the current annual 8-hour refresher courses when appropriate.

3.9.3 Medical Approval and Personal Protective Clothing and Equipment

Tetra Tech workers at the site must be part of a medical monitoring program and must be medically approved to perform their duties without physical limitations. Protective clothing and equipment, as specified in the HASP, will be worn while performing site activities.

3.9.4 Safety Meetings

Safety meetings will be held among on-site workers whenever the SSO for each contractor feels it is appropriate. The SSO will discuss safety issues related to activities being performed and will make site workers aware of any new conditions that could potentially affect health or safety.

3.10 PERFORMANCE AND SYSTEM AUDITS

Section 9.1 of the SWMU 8 and 15 QAPP (Tetra Tech, 2004) presents generic requirements for field operations performance and system audits. No special requirements are anticipated for this project.

3.11 INSPECTION AND MAINTENANCE

Sections 10.1 and 10.3 of Tetra Tech (2004) present generic inspection and maintenance requirements to ensure that field consumables and equipment are in proper working order and available when needed. In addition, project-specific requirements are provided below.

Chemical Test Kits - PCBs

The receipt date and the expiration date of receipts (i.e., purchase date plus 1 year) shall be written on the test kit (receipt date) and the reagents (expiration date) on each reagent bottle and the kit if the expiration date is not already indicated. Follow manufacturer instructions for storage and handling of the kits. Do not use kits or kit components past their expiration dates.

3.12 FIELD CORRECTIVE ACTIONS

Field non-conformances or conditions adverse to quality must be identified and corrected as quickly as possible so that work integrity or product quality is not compromised. The need for corrective action may arise based on deviations from project plans and procedures, adverse field conditions, or other unforeseen circumstances. Corrective action needs may become apparent during the performance of daily work tasks or as a consequence of internal or external field audits.

Corrective action may include resampling, re-excavation or other rework and may involve amending previously approved field procedures. Minor modifications to field activities, such as the collection of additional samples, will be initiated at the discretion of the FOL, subject to on-site approval by NSA Crane personnel. Major modifications or situations that affect compliance with or achievement of Data Quality Objectives (DQOs) must be approved and documented via a Field Task Modification Request (FTMR). Approval of the corrective action will be obtained by the United States Navy (in conjunction with IDEM). The Tetra Tech or LES/TolTest JV FOL is responsible for initiating FTMRs. An FTMR will be prepared for all deviations from the project plan documents, as applicable. Copies of all FTMRs will be maintained with the on-site project planning documents and will be placed in the final evidence file.

3.13 QUALITY ASSURANCE REPORTS TO MANAGEMENT

The Tetra Tech FOL will provide the PM with daily verbal field progress reports during the course of the IM. The LES/TolTest JV FOL will provide daily verbal reports to the LES/TolTest JV PM during the course of IM. These reports will explain accomplishments, deviations from the QAPP, and upcoming activities, and will provide a QA summary. The Tetra Tech PM and LES/TolTest JV PM will provide written monthly progress reports to the Navy that address the project budget, schedule, accomplishments, planned activities, and QA/QC issues and intended corrective actions.

TABLE 3-1

SUMMARY OF SAMPLE ANALYSES, CONTAINER TYPES AND VOLUMES, PRESERVATION REQUIREMENTS, AND HOLDING TIMES FOR FIELD ANALYSIS AND LABORATORY CONFIRMATION ANALYSIS OF SOILS SWMU 9 QAPP ADDENDUM NO. 5 NSA CRANE CRANE, INDIANA

Parameter	Analyte/Methodology/ SOP	Sample Container	Container Volume	Preservation	Maximum Holding Time[1]
Field Analyses					
PCBs	RaPID Assay Test Kit (0.5 to 10 ppm) with SDI Sample Extraction Kit	Wide-mouth jar, Teflon-lined plastic cap	8-ounce	NA	Analysis within 14 days
PCBs	SW-846 8082A SOP-211	Wide-mouth jar, Teflon-lined plastic cap	8-ounce	Cool to 4 °C	Extraction within 14 days; analysis within 40 days of extraction.
Pesticides	SW-846 8081A SOP-211	Wide-mouth jar, Teflon-lined plastic cap	8-ounce	Cool to 4 °C	Extraction within 14 days; analysis within 40 days of extraction.

1 All holding times for analysis are from date of collection. Minimum turnaround times will be requested from the laboratory. Miminum turnaround will be based upon the analytical method; however, one-day turnaround from laboratory receipt of samples is preferred.

°C - Degrees Celsius.
PCBs - Polychlorinated biphenyls.
ppm - Parts per million.
SOP - Standard operating procedure.
SW-846 - U.S. EPA, 1986. Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods. SW-846, Third Edition and subsequent updates.

TABLE 3-2

COMPOUND LIST
SWMU 9 QAPP ADDENDUM NO. 5
NSA CRANE
CRANE, INDIANA

PARAMETER	CASRN
ORGANOCHLORINE PESTICIDES (SW-846 METHOD 8081A)	
alpha-chlordane	5103-71-9
4,4'-DDD	72-54-8
4,4'-DDE	72-55-9
4,4'-DDT	50-29-3
Dieldrin	60-57-1
gamma-chlordane	12789-03-6
Heptachlor	76-44-8
POLYCHLORINATED BIPHENYLS (SW-846 METHOD 8082)	
Aroclor-1016	12674-11-2
Aroclor-1221	11104-28-2
Aroclor-1232	11141-16-5
Aroclor-1242	53469-21-9
Aroclor-1248	12672-29-6
Aroclor-1254	11097-69-1
Aroclor-1260	11096-82-5

CASRN - Chemical Abstract Registry Number.
NA - Not applicable
QAPP - Quality Assurance Project Plan.

1 All holding times are from date of collection.

°C – Degrees Celsius.
HCl – Hydrochloric acid.
HNO_3 – Nitric acid.
SOP – Standard Operating Procedure.
SW-846 – U.S. EPA, 1986. Test Methods for Evaluating Solid Wastes, Physical Chemical Methods. Third edition and subsequent updates.

TABLE 3-3

SUMMARY OF SAMPLE ANALYSES, CONTAINER TYPES AND VOLUMES, PRESERVATION REQUIREMENTS, AND HOLDING TIMES FOR SOIL WASTE CHARACTERIZATION
SWMU 9 QAPP ADDENDUM NO. 5
NSA CRANE
CRANE, INDIANA

Parameter	Analytical Method/SOP	Sample Container	Preservation	Maximum Holding Time[1]
TCLP Metals	SW-846 1311/6010B/6020/7471A SOP TCLP01/SOP ME600E/SOP ME600F/SOP ME405/SOP ME700	8- or 32-ounce glass	Cool to 4 °C; HNO_3 to pH<2 (after extraction)	Extraction within 14 days; analysis within 40 days of extraction.
TCLP Volatiles	SW-846 1311/8260A/8260B SOP TCLP01/SOP MSV01	8- or 32-ounce glass	Cool to 4 °C; HCl to pH<2 (after extraction)	Analysis within 14 days.
TCLP Semivolatiles	SW-846 1311/8015/8270 SOP TCLP01/SOP GCS03/SOP MSS01	8- or 32-ounce glass	Cool to 4 °C	Extraction within 14 days; analysis within 40 days of extraction.
TCLP Pesticides and PCBs	SW-846 1311/8081A/8081B/8082/ 8082A SOP TCLP01/SOP GCS09/SOP GCS10	8- or 32-ounce glass	Cool to 4 °C	Extraction within 14 days; analysis within 40 days of extraction.
Characteristic Waste Determination – Ignitability, Corrosivity, Reactivity	SW-846 1010A/9040C/9045D/Section 7.3 SOP K1010/SOP K1501/SOP K7332	8- or 32-ounce glass	Cool to 4 °C	As soon as possible.

1 All holding times are from date of collection.

°C – Degrees Celsius.
HCl – Hydrochloric acid.
HNO_3 – Nitric acid.
SOP – Standard Operating Procedure.
SW-846 – U.S. EPA, 1986. Test Methods for Evaluating Solid Wastes, Physical Chemical Methods. Third edition and subsequent updates.

TABLE 3-4

SUMMARY OF SAMPLE ANALYSES, CONTAINER TYPES AND VOLUMES, PRESERVATION REQUIREMENTS, AND HOLDING TIMES FOR WASTEWATER CHARACTERIZATION
SWMU 9 QAPP ADDENDUM NO. 5
NSA CRANE
CRANE, INDIANA

Parameter	Analytical Method/SOP	Sample Container	Preservation	Maximum Holding Time[1]
Total Volatiles	SW-846 8260B SOP MSV01	40-ml VOA vial	Cool to 4 °C; HCl to pH<2	Analysis within 14 days.
Total PCBs	SW-846 8082/8082A SOP GCS10	1-L amber glass	Cool to 4 °C	Extraction within 14 days; analysis within 40 days of extraction.
Total Semivolatiles	SW-846 8015/8270 SOP GCS03/SOP MSS01	1-L amber glass	Cool to 4 °C	Extraction within 14 days; analysis within 40 days of extraction.
Total RCRA 8 Heavy Metals	SW-846 6010B/6020/7470A SOP ME600E/SOP ME600F/SOP ME404/SOP ME700	500-mL plastic	Cool to 4 °C; HNO_3 to pH<2	Extraction within 14 days; analysis within 40 days of extraction.
Characteristic Waste Determination – Ignitability, Corrosivity, Reactivity	SW-846 1010A/9040C/9045D/Section 7.3 SOP K1010/SOP K1501/SOP K7332	1-L amber glass	Cool to 4 °C	As soon as possible.

1 All holding times are from date of collection.

°C – Degrees Celsius.
HCl – Hydrochloric acid.
HNO_3 – Nitric acid.
L – Liter.
SOP – Standard Operating Procedure.

TABLE 3-5

SUMMARY OF SAMPLE ANALYSES, CONTAINER TYPES AND VOLUMES, PRESERVATION REQUIREMENTS, AND HOLDING TIMES FOR CLEAN FILL CHARACTERIZATION
SWMU 9 QAPP ADDENDUM NO. 5
NSA CRANE
CRANE, INDIANA

Parameter	Analytical Method/SOP	Sample Container	Preservation	Maximum Holding Time[1]
TPH – DRO, GRO	SW-846 8015B SOP GCV05	8- or 32-ounce glass	Cool to 4 °C	Extraction within 7 days; analysis within 40 days of extraction.
Total benzene, toluene, ethylbenzene, and xylenes	SW-846 8260B SOP MSV01	40-mL VOA vials	Cool to 4 °C	Analysis within 14 days.
Total PCBs	SW-846 8082A SOP GCS10	8- or 32-ounce glass	Cool to 4 °C	Extraction within 14 days; analysis within 40 days of extraction.
Pesticides – 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, dieldrin, heptachlor, alpha- and gamma-chlordane	SW-846 – 8081A SOP GCS09	8- or 32-ounce glass	Cool to 4 °C	Extraction within 14 days; analysis within 40 days of extraction.
TCLP Metals	SW-846 1311/6010B/6020/7471A SOP TCLP01/SOP ME600E/SOP ME600F/SOP ME405/SOP ME700	8- or 32-ounce glass	Cool to 4 °C; HNO_3 to pH<2 (after extraction)	Extraction within 14 days; analysis within 40 days of extraction.
TCLP Volatiles	SW-846 1311/8260B SOP TCLP01/SOP MSV01	8- or 32-ounce glass	Cool to 4 °C; HCl to pH<2 (after extraction)	Analysis within 14 days.
TCLP Semivolatiles	SW-846 1311/8015/8270 SOP TCLP01/SOP GCS03/SOP MSS01	8- or 32-ounce glass	Cool to 4 °C	Extraction within 14 days; analysis within 40 days of extraction.

TABLE 3-5

SUMMARY OF SAMPLE ANALYSES, CONTAINER TYPES AND VOLUMES, PRESERVATION REQUIREMENTS, AND HOLDING TIMES FOR CLEAN FILL CHARACTERIZATION
SWMU 9 QAPP ADDENDUM NO. 5
NSA CRANE
CRANE, INDIANA

TCLP Pesticides and Herbicides	SW-846 1311/8081B/ 8082A SOP TCLP01/SOP GCS09/SOP GCS10	8- or 32-ounce glass	Cool to 4 °C	Extraction within 14 days; analysis within 40 days of extraction.
Characteristic Waste Determination – Ignitability, Corrosivity, Reactivity	SW-846 1010A/9040C/9045D/Section 7.3 SOP K1010/SOP K1501/SOP K7332	8- or 32-ounce glass	Cool to 4 °C	As soon as possible.

1 All holding times are from date of collection.

°C – Degrees Celsius.
DRO – Diesel range organics.
GRO – Gasoline range organics.
HCl – Hydrochloric acid.
HNO_3 – Nitric acid.
mL – Milliliter.
SOP – Standard Operating Procedure.
SW-846 – U.S. EPA, 1986. Test Methods for Evaluating Solid Wastes, Physical Chemical Methods. Third edition and subsequent updates.
TPH – Total petroleum hydrocarbons.
VOA – Volatile organic analysis.

TABLE 3-6

EXCAVATION FLOOR AND SIDEWALL SAMPLES
SWMU 9 QAPP ADDENDUM NO. 5
NSA CRANE
CRANE, INDIANA
PAGE 1 OF 2

Set #1 - Excavation Floor and Interim Measures Support Facility Composite Samples for SWMU 9

Sample Rotation	Grid Location		Sample Rotation	Grid Location		Sample Rotation	Grid Location		Sample Rotation	Grid Location	
	X %	Y %		X %	Y %		X %	Y %		X %	Y %
Sample Series 1	93	85	Sample Series 6	21	79	Sample Series 11	48	66	Sample Series 16	33	24
	74	6		21	21		23	67		20	75
	94	5		75	24		80	72		59	69
	35	30		58	50		67	36		88	2
Sample Series 2	89	38	Sample Series 7	65	46	Sample Series 12	57	62	Sample Series 17	57	72
	22	87		48	31		91	80		67	30
	98	52		60	3		37	22		17	81
	15	47		74	96		11	41		25	39
Sample Series 3	15	48	Sample Series 8	55	1	Sample Series 13	87	89	Sample Series 18	30	84
	92	63		31	27		87	87		89	93
	49	1		22	56		65	3		59	83
	52	88		42	83		85	35		43	99
Sample Series 4	97	13	Sample Series 9	5	85	Sample Series 14	39	71	Sample Series 19	22	39
	31	32		84	38		100	46		9	78
	28	2		93	20		87	31		91	15
	3	70		51	22		56	36		36	11
Sample Series 5	53	9	Sample Series 10	10	48	Sample Series 15	14	36	Sample Series 20	83	100
	53	82		94	91		73	51		13	74
	77	11		81	89		30	29		13	1
	95	3		39	72		89	83		40	58

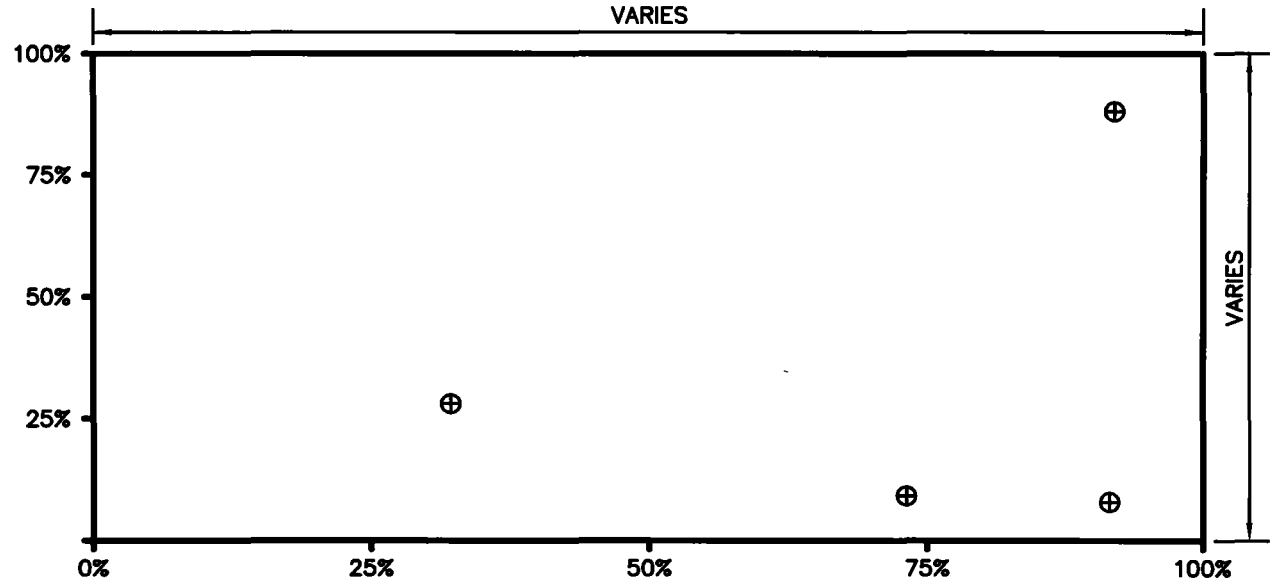
TABLE 3-6

EXCAVATION FLOOR AND SIDEWALL SAMPLES
SWMU 9 QAPP ADDENDUM NO. 5
NSA CRANE
CRANE, INDIANA

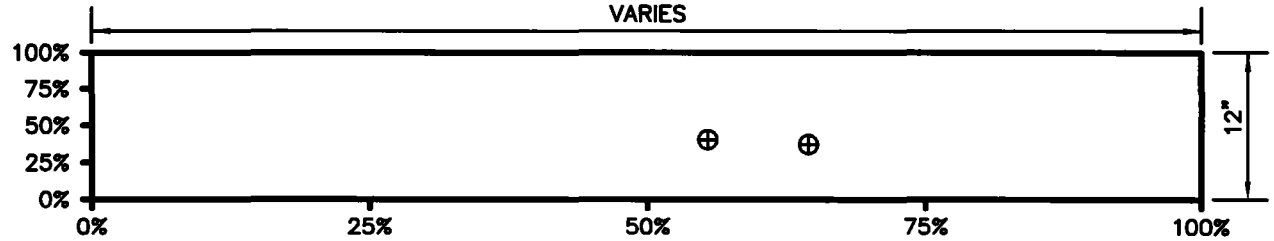
Set #2 - Excavation Wall / Bank Composite Samples for SWMU 9

Sample Rotation	Grid Location		Sample Rotation	Grid Location		Sample Rotation	Grid Location		Sample Rotation	Grid Location	
	X %	Y %		X %	Y %		X %	Y %		X %	Y %
Sample Series 1	5	85	Sample Series 6	49	20	Sample Series 11	99	1	Sample Series 16	40	11
	69	36		58	29		43	98		30	64
Sample Series 2	62	45	Sample Series 7	19	44	Sample Series 12	62	49	Sample Series 17	98	78
	56	46		27	53		44	30		78	4
Sample Series 3	34	60	Sample Series 8	53	7	Sample Series 13	50	38	Sample Series 18	25	71
	70	5		93	29		59	29		70	19
Sample Series 4	21	93	Sample Series 9	23	45	Sample Series 14	45	24	Sample Series 19	4	49
	95	6		52	95		92	2		37	11
Sample Series 5	100	29	Sample Series 10	32	49	Sample Series 15	66	86	Sample Series 20	76	32
	91	21		48	66		71	34		29	70

ACAD:0352CP09.dwg 11/16/07 MF PIT



TYPICAL SWMU 9 EXCAVATION FLOOR
LOCATION REPRESENTS SAMPLE SERIES 1, SET 1, ON TABLE 3-6



TYPICAL SWMU 9 EXCAVATION SIDEWALL
LOCATION REPRESENTS SAMPLE SERIES 2, SET 2, ON TABLE 3-6

LEGEND:

⊕ ALIQUOT SAMPLE LOCATION

0% PERCENT DISTANCE ALONG EXPOSED SURFACE

DRAWN BY MF	DATE 11/16/07	SWMU 9 EXCAVATION SAMPLE LOCATIONS EXAMPLE INTERIM MEASURES QAPP ADDENDUM NO. 4 NSWC CRANE CRANE, INDIANA	CONTRACT NO. 0467
CHECKED BY	DATE		OWNER NO.
REVISED BY	DATE		APPROVED BY / DATE
SCALE NONE		NAVFAC	DRAWING NO. FIGURE 3-1 / REV. 0

FORM CADD NO. SDIV-AH.DWG – REV 1 – 9/10/98

4.0 LABORATORY OPERATIONS AND DATA REDUCTION, REVIEW, AND MANAGEMENT

4.1 SAMPLE CUSTODY PROCEDURES

Samples will be labeled and shipped to the analytical laboratory in accordance with Section 3.0 of this document. Laboratory-specific custody procedures are governed by Section 4.0 of the SWMUs 8 and 15 QAPP (Tetra Tech, 2004).

4.2 LABORATORY INSTRUMENT CALIBRATION PROCEDURES AND FREQUENCIES

Refer to Section 5.2 of the SWMUs 8 and 15 QAPP (Tetra Tech, 2004) for laboratory calibration requirements. Only requirements for PCB (as Aroclors) and pesticides analyses will be applicable.

4.3 LABORATORY ANALYTICAL AND MEASUREMENT PROCEDURES

4.3.1 Verification Sample Analyses

The laboratory analyses of verification samples will be performed by Empirical Laboratories, LLC. Empirical Laboratories has successfully completed the laboratory evaluation process required as part of the Naval Facilities Engineering Services Command (NFESC) QA Program and described in the Navy Installation Restoration Laboratory Quality Assurance Guide (NFESC, 1996). Table 3-1 provides a summary of the laboratory analytical methods and associated laboratory SOPs to be used during this investigation. Laboratory SOPs are included in Appendix C.

4.3.2 Waste Characterization Analyses

The laboratory analysis of waste characterization samples will be performed by Microbac Laboratories, Inc. Tables 3-3 through 3-5 provide a summary of the laboratory analytical methods and associated laboratory SOPs to be used for waste soil characterization, wastewater characterization, and clean fill characterization, respectively. Laboratory SOPs are included in Appendix D.

4.3.3 List of Project Target Compounds and Detection Limits

A list of the laboratory target analytes and laboratory-specific target values (TVs) for organic compounds and reporting limits (RLs) for all applicable analytes is provided in Table 1-5 of the SWMUs 8 and 15 QAPP (Tetra Tech, 2004). Table 3-1 of this QAPP Addendum No. 5 identifies the analyses to be

conducted. The analytical fractions (i.e., pesticides and PCBs) correspond to the same entries in Table 1-5 of Tetra Tech (2004).

4.4 LABORATORY QUALITY CONTROL CHECKS

Descriptions of various data quality indicators and the types of laboratory QC samples used to measure or verify data quality indicators (DQIs) are presented in Sections 7.0 through 7.5 of SWMUs 8 and 15 QAPP (Tetra Tech, 2004). Requirements for laboratory QC checks are presented in Section 7.8 of Tetra Tech (2004).

4.5 DATA REDUCTION, VALIDATION, ASSESSMENT, AND REPORTING

Refer to Section 8.0 of the SWMUs 8 and 15 QAPP (Tetra Tech, 2004) for laboratory-specific requirements. Section 8.0 of Tetra Tech (2004) also identifies requirements for reconciling data against DQOs.

4.6 LABORATORY PERFORMANCE AND SYSTEM AUDITS

4.6.1 Verification Analyses

Laboratory performance and system audit requirements are presented in Section 9.2 of the SWMUs 8 and 15 QAPP (Tetra Tech, 2004) for verification analyses.

4.6.2 Waste Characterization

4.6.2.1 Laboratory Performance and Systems Audits

This section presents the responsibilities, frequencies, and procedures associated with internal and external laboratory performance and system audits.

4.6.2.1.1 Internal Laboratory Audits

Internal Laboratory Audit Responsibilities

The Quality Assurance Director or appropriate designee of the laboratory performs routine internal audits of the laboratory. LES/TolTest JV has no responsibility for such audits. Performance and system audits of laboratories are coordinated through Microbac's Quality Assurance Director.

Internal Laboratory Audit Frequency

Internal audits are performed approximately annually at the laboratory. In addition, each laboratory department analyzes blind performance evaluation (PE) samples as described in their applicable SOPs and QA plans.

Internal Laboratory Audit Procedures

Internal systems audits are conducted to detect any problems in sample flow, analytical procedures, or documentation and to ensure adherence to laboratory SOPs. The internal audit procedures for Microbac Laboratories are presented in applicable laboratory SOPs or the QA Plan.

4.6.2.1.2 External Laboratory Audits

External Laboratory Audit Responsibilities

IDEM and U.S. EPA Region 5 may perform external audits at their discretion.

The laboratory is also involved in various other external audits and performance evaluation studies throughout the year, as required, to maintain certifications and approvals by other regulatory agencies or programs.

External Laboratory Audit Frequency

IDEM or U.S. EPA Region 5 may conduct an external laboratory audit prior to or during sampling and analysis activities.

Overview of the External Laboratory Audit Process

External audit procedures are at the discretion of IDEM and U.S. EPA Region 5. External laboratory audits may include (but are not limited to) review of laboratory analytical procedures, laboratory on-site audits, and submission of PE samples to the laboratory for analysis.

4.7 LABORATORY INSTRUMENT PREVENTIVE MAINTENANCE

Proper maintenance of laboratory instruments and equipment is essential. Depending on manufacturers' recommendations, maintenance intervals are established for each instrument. All instruments will be labeled with a model number and serial number, and a maintenance logbook will be maintained for each instrument. Personnel will be alert to the maintenance status of the equipment they are using at all times.

4.7.1 Verification Analysis

Refer to Section 10.2 of Tetra Tech (2004) for specific preventive maintenance requirements related to verification sampling.

4.7.2 Waste Characterization

Proper maintenance of laboratory instruments and equipment is essential. Depending on manufacturers' recommendations, maintenance intervals are established for each instrument. All instruments are labeled with a model number and serial number, and a maintenance logbook is maintained for each instrument. Personnel will be alert to the maintenance status of the equipment they are using at all times.

The use of manufacture-recommended grades or better of supporting supplies and reagents is also a form of preventive maintenance. For example, gases used in the inductively coupled plasma (ICP) instruments will be of sufficient quality to minimize fouling of the instrument. The routine use of other supporting supplies from reputable manufacturers will help prevent unnecessary periods of instrument downtime.

4.8 LABORATORY CORRECTIVE ACTION

In general, laboratory corrective actions are warranted whenever an out-of-control event or potential out-of-control event is noted. The specific corrective action taken depends on the specific analysis and the nature of the event. Generally, the following occurrences alert laboratory personnel that corrective action may be necessary:

- QC data are outside established warning or control limits
- Method blank analyses yield concentrations of target analytes greater than acceptable levels
- Undesirable trends are detected in spike percent recoveries (%Rs) or in duplicate Relative Percent Differences (RPDs)
- There is an unexplained change in compound detection capability

- Inquiries concerning data quality are received

- Deficiencies are detected by laboratory QA staff during audits or from performance evaluation (PE) sample test results

4.8.1 Corrective Action Documentation

Specific procedures for laboratory corrective actions are specified in the associated laboratory SOPs. Any corrective action taken above the analyst level that cannot be performed immediately at the instrument will be documented.

Laboratory corrective actions must be documented and included as part of the final evidence file. The Tetra Tech PM will be informed of all major corrective actions that do not bring DQO-related nonconformances into conformance with project DQOs. The Tetra Tech PM will advise all levels of project management in accordance with Section 12.0 of the SWMU 8s and 15 QAPP (Tetra Tech, 2004).

4.8.2 Corrective Action During Data Validation and Data Assessment

The need for corrective action may become apparent during data validation, interpretation, or presentation activities. Rework (i.e., resampling or reanalysis), a change in work procedures, or additional or refresher training are possible corrective actions relevant to data evaluation activities. The Tetra Tech PM will be responsible for approving the implementation of a corrective action and ensuring that it is documented appropriately for all deficiencies except those that are internal to LES/TolTest JV. The LES/TolTest JV PM will be responsible for the latter corrective actions. Analytical data may be qualified during data validation to alert data users of the potential that particular analytical results are potentially deficient relative to expected performance standards. Such validation practices are described in Section 8.0 of the SWMUs 8 and 15 QAPP (Tetra Tech, 2004). When conducting data assessment for project decision making, a number of situation-dependent qualifications of data or decisions are possible. The number of possible situations or conditions precludes enumeration of all possible corrective actions; however, the approach used to identify and impose such qualifications is described in Section 8.0 of Tetra Tech (2004).

4.9 QUALITY ASSURANCE REPORTS TO MANAGEMENT

QA reports to management will be provided in four primary formats during the course of this investigation: data validation reports, reports summarizing accomplishments and QA/QC issues during the field investigation, project-wide progress reports, and laboratory QA reports. The report frequencies, content, preparers, and recipients are summarized in Table 12-1 of the SWMUs 8 and 15 QAPP (Tetra Tech,

2004). In that table, actions associated with the FOL will also apply to the LES/TolTest JV PM, except for data validation, which will not be done on waste characterization samples.

Data validation reports for verification samples will address all major and minor laboratory non-compliances, as well as noted sample matrix effects. In the event that major problems occur with the analytical laboratory (e.g., repeated or extreme holding time exceedances or calibration non-compliances, etc.), the data validation manager will notify the PM, QAM, technical coordinator, and laboratory services coordinator. Such notifications (if necessary) are typically provided via internal memoranda and are placed in the project file. These reports contain a summary of the noncompliance, a synopsis of the impact on individual projects, and recommendations regarding corrective action and compensation adjustments. Corrective actions for major non-compliances are initiated at the program level.

The Tetra Tech FOL will provide the Tetra Tech PM and the LES/TolTest JV FOL will provide the LES/TolTest JV PM with daily verbal field progress reports during the course of the sampling events. These reports will explain accomplishments, deviations from the QAPP, and upcoming activities, and will provide a QA summary. The Tetra Tech PM and LES/TolTest JV PM will provide a monthly progress report to the Navy that addresses the project budget, schedule, accomplishments, planned activities, and QA/QC issues and intended corrective actions.

The analytical laboratory for verification analyses will provide QA reports to Tetra Tech if QC limits are updated or if other significant plan deviations result from unanticipated circumstances. Because method detection limits (MDLs) will be included in the analytical data packages for verification and waste characterization samples, it is not necessary for the laboratories to include updated MDLs in their QA reports unless the updates result in MDLs that exceed cleanup levels or waste acceptance criteria applicable to this project. Cleanup levels are provided in the IMWP (Tetra Tech, 2008) and Sections 1.2.1 and 1.2.2 of this QAPP Addendum No. 5; waste acceptance criteria will be provided by the waste disposal facility.

4.10 FINAL EVIDENCE FILES

Refer to Section 4.3 of the SWMUs 8 and 15 QAPP (Tetra Tech, 2004) for requirements governing the management of project records up to and including final disposition.

5.0 REFERENCES

NFESC (Naval Facilities Engineering Services Center), 1996. Navy Installation Restoration Laboratory Quality Assurance Guide.

Tetra Tech (Tetra Tech NUS, Inc.), 2004. Quality Assurance Project Plan for RCRA Facility Investigation at Building 106 Pond (SWMU 8) Roads and Grounds Area (SWMU 15) and Environmental Indicator Investigation for SWMU 18 (Load and Fill Area Buildings), SWMU 19 (Pyrotechnic Test Area), SWMU 20 (Crane Army Ammunition Activity Quality Assurance/Quality Control Test Area), and the Old Gun Tub Storage Lot. September.

Tetra Tech, 2008. Interim Measures Work Plan for SWMU 9 - Pesticide Control Area Naval Surface Warfare Center Crane Crane, Indiana. September.

APPENDIX A

FIELD STANDARD OPERATING PROCEDURES

APPENDIX A
FIELD SOP TABLE OF CONTENTS

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CTO467-02	Sample Identification Nomenclature
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CTO467-07	Field Analysis of PCB by Test Kit
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STANDARD OPERATING PROCEDURE
NUMBER CTO467-01

SAMPLE LABELING

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the procedures to be used for labeling sample containers. Sample labels are used to document the sample ID, date, time, analysis to be performed, preservative, matrix, sampler, and the analytical laboratory. A sample label will be attached to each sample container. The label for each container will contain identical information.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

Writing utensil
Disposable medical-grade gloves (e.g. latex, nitrile)
Sample logsheets
Required sample containers: All sample containers for analysis by fix-based laboratories will be supplied and deemed certified clean by the laboratory.
Preprinted sample labels
Chain-of-custody records
Sealable polyethylene bags
Heavy-duty cooler
Ice

3.0 PROCEDURES

3.1 The following information will be electronically printed on each sample label during field activities.

- Project number (CTO 0042)
- Project location (NSWC Crane)
- Sample ID
- Preservative
- Analysis to be performed
- Matrix type

- Laboratory name

3.2 Fill in appropriate information on the electronic Sample Collection Log Form which will automatically update the Chain-of-Custody Form upon submitting the information.

3.3 Select the containers that are appropriate for a given sample. Print the associated sample label and affix to the sample container.

3.4 Fill the appropriate containers with sample material. Securely close the container lids without overtightening.

3.5 Check to determine if the information printed on the label is correct.

3.6 Place the sample container in a ziplock plastic bag and place in a cooler containing ice.

Example of a sample label is attached at the end of this SOP.

4.0 ATTACHMENTS

1. Sample Label

ATTACHMENT 1
SAMPLE LABEL

Tetra Tech NUS, Inc. 661 Andersen Drive Pittsburgh, 15220 (412)921-7090	**Project:** **Location:** **CTO:**	
Sample No:		**Matrix:**
Date:	**Time:**	**Preserve:**
Analysis:		
Sampled by:	**Laboratory**	

STANDARD OPERATING PROCEDURE
NUMBER CTO467-02

SAMPLE IDENTIFICATION NOMENCLATURE

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to establish a consistent sample nomenclature system that will facilitate subsequent data management at the Naval Surface Warfare Center (NSWC). The sample nomenclature system has been devised such that the following objectives can be attained.

- Sorting of data by site, location, or matrix
- Maintenance of consistency (field, laboratory, and database sample numbers)
- Accommodation of all project-specific requirements
- Accommodation of laboratory sample number length constraints
- Ease of sample identification

The NSWC Crane Environmental Protection Department must approve any deviations from this procedure.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

Pen with indelible ink
Sample container labels

3.0 SAMPLE IDENTIFICATION NOMENCLATURE

3.1 Confirmation Samples

All confirmation samples will be properly labeled with a sample label affixed to the sample container. Each sample will be assigned a unique sample tracking number.

3.1.1 Confirmation Sample numbering Scheme

The sample tracking number will consist of a four- or five-segment alpha-numeric code that identifies the sample's associated solid waste management unit (SWMU), sample type, location, and for aqueous samples, where applicable, whether a sample is filtered, and/or the sample round number. For soil and sediment samples, the final four tracking numbers will identify the depth in units of feet below ground surface at which the sample was collected.

The alphanumeric coding to be used is explained in the following diagram and subsequent definitions:

NN	AA	NNNA	NNNN (Soils and Sediment only)
SWMU Number	Matrix	Sample Location Number and Grab or Composite	Sequential depth interval from freshly exposed surface

Character Type:

A = Alpha

N = Numeric

SWMU Number (AN):

09 = SWMU 09

Matrix Code (AA):

SS = Surface Soil Sample

Individual aliquots used to form composite samples will be designated "A", "B", "C", "D", "etc.". Each of the aliquots for a given sample will be recorded in the field log. The number of aliquots combined to form a composite and the locations of the aliquots within the sampled area must be recorded in the "OBSERVATONS/NOTES" section of the Soil and Sediment Sample Log Sheet.

Location Number (NNNA):

Sequential number beginning with "001" for each matrix, followed by a letter indicating grab (G) or composite (C) sample.

Depth Interval:

This code section will be used for soil and sediment samples only.

The depth code is used to note the depth below ground surface (bgs) at which a soil or sediment sample is collected. The first two numbers of the four-number code specify the top interval, and the third and fourth specify the bottom interval in feet bgs of the sample. The depths will be noted in whole numbers only; further detail, if needed, will be recorded on the sample log sheet, boring log, logbook, etc. In certain cases, where a sample may be composite sample, "location" refers to a particular sampling grid represented by a composite sample. Each composite sample will be comprised of aliquots identified as "A", "B", "C", etc. used to identify individual aliquots associated with a particular sample.

3.1.2 Examples of Confirmation Sample Nomenclature

The first composite surface soil sample collected from SWMU 09, sampling location 001, at a depth of 2 feet would be labeled as "09SS001C0002". The individual aliquots making up the composite sample should be described as Aliquots "A", "B", "C", etc. for that particular sample and noted on the sample log sheet.

3.3 Field Quality Assurance/Quality Control (QA/QC) Sample Nomenclature

Field QA/QC samples are described in the IMWP (TtNUS, 2006a through 2006d) and this QAPP Addendum No. 4. They will be designated using a different coding system than the one used for regular field samples.

3.3.1 QC Sample Numbering

The QC code will consist of a three- to four-segment alpha-numeric code that identifies the sample QC type, the date the sample was collected, and the number of this type of QC sample collected on that date.

AA	NNNNNN	NN
QC Type	Date	Sequence Number (per day)

The QC types are identified as:

TB = Trip Blank
FD = Field Duplicate

The sampling time recorded on the Chain-of-Custody Form and labels for duplicate samples will be 0000 so that the samples are "blind" to the laboratory. Notes detailing the sample number, time, date, and type

will be recorded on the sample log sheets and will document the location of the duplicate sample (sample log sheets are not provided to the laboratory).

3.3.2 Examples of Field QA/QC Sample Nomenclature

The first duplicate of the day at SWMU 09 for a surface soil sample collected on October 24, 2007 would be designated as 09FD10240701.

The third duplicate of the day taken at SWMU 09 of a surface soil sample collected on October 27, 2007 would be designated as 09FD10270703.

The first trip blank associated with samples collected on October 12, 2007 would be designated as TB10120701.

STANDARD OPERATING PROCEDURE
NUMBER CTO467-03

SAMPLE CUSTODY AND DOCUMENTATION OF FIELD ACTIVITIES

1.0 PURPOSE

This Standard Operating Procedure (SOP) establishes the procedures for sample custody and documentation of field sampling and field analyses activities.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

The following logbooks, forms, and labels are required.

Site logbook
Field logbook
Sample label
Chain-of-Custody Form
Custody seals
Equipment calibration log
Monitoring Well Inspection Form
Water-Level Measurement Form
Low-Flow Purge Data Sheet
Soil and Sediment Sample Log Sheet
Ground Water Sample Log Sheet
Surface Water Sample Log Sheet

3.0 PROCEDURES

This section describes custody and documentation procedures. All entries made into the logbooks, custody documents, logs, and log sheets described in this SOP must be made in indelible ink (black is preferred). No erasures are permitted. If an incorrect entry is made, the entry will be crossed out with a single strike mark, initialed, and dated. Note: In lieu of the above logs, electronic documentation may be used to store data.

3.1 Site Logbook

The site logbook is a hard-bound, paginated, controlled-distribution record book in which all major on-site activities are documented. At a minimum, the following activities and events will be recorded (daily) in the site logbook:

- All field personnel present
- Arrival/departure of site visitors
- Arrival/departure of equipment
- Start or completion of sampling activities
- Daily on-site activities performed each day
- Sample pickup information
- Health and safety issues
- Weather conditions

The site logbook is initiated at the start of the first on-site activity (e.g., site visit or initial reconnaissance survey). Entries are to be made for every day that on-site activities take place.

The following information must be recorded on the cover of each site logbook:

- Project name
- Project number
- Book number
- Start date
- End date

Information recorded daily in the site logbook need not be duplicated in other field notebooks but must summarize the contents of these other notebooks and refer to specific page locations in these notebooks for detailed information (where applicable). At the completion of each day's entries, the site logbook must be signed and dated by the field operations leader (FOL).

3.2 Field Logbooks

The field logbook is a separate dedicated notebook used by field personnel to document his or her activities in the field. This notebook is hardbound and paginated.

3.3 Sample Labels

Adhesive sample container labels must be completed and applied to every sample container. Information on the label includes the project name, location, sample number, date, time, preservative, analysis, matrix, sampler's initials, and the name of the laboratory performing the analysis.

3.4 Chain-of-Custody Form

The Chain-of-Custody Form (COC) is a multi-part form that is initiated as samples are acquired and accompanies a sample (or group of samples) as it is transferred from person to person. Each COC is numbered. This form must accompany any samples collected for laboratory chemical analysis. A copy of a blank COC form is attached at the end of this SOP.

The FOL or must include the name of the laboratory in the "Remarks" section to ensure that the samples are forwarded to the correct location. If more than one COC is necessary for any cooler, the FOL will indicate "Page __ of __" on each COC. The original (top) signed copy of the COC will be placed inside a large Ziploc-type bag and taped inside the lid of the shipping cooler. Once the samples are received at the laboratory, the sample custodian checks the contents of the cooler(s) against the enclosed COC(s). Any problems are noted on the enclosed COC Form (bottle breakage, discrepancies between the sample labels, COC form, etc.) and will be resolved through communication between the laboratory point-of-contact and the Project Manager (PM). The COC form is signed and retained by the laboratory and becomes part of the sample's corresponding analytical data package.

3.5 Custody Seal

The custody seal is an adhesive-backed label with a number on each seal. It is part of the chain-of-custody process and is used to prevent tampering with samples after they have been collected in the field and sealed in coolers for transit to the laboratory. The custody seals are signed and dated by the samplers and affixed across the opening edges of each cooler (two seals per cooler) containing environmental samples. The laboratory sample custodian will examine the custody seal for evidence of tampering and will notify the TtNUS PM if evidence of tampering is observed.

3.6 Equipment Calibration Log

The Equipment Calibration Log is used to document calibration of measuring equipment used in the field. The Equipment Calibration Log documents that the manufacturer's instructions were followed for calibration of the equipment, including frequency and type of standard or calibration device. An Equipment Calibration Log must be maintained for each electronic measuring device requiring calibration. Entries must be made for each day the equipment is used.

3.7 Soil and Sediment Sample Log Sheet

The Soil and Sediment Sample Log Sheets are used to document the sampling of soils and sediments (see SOP CTO0042-05).

4.0 ATTACHMENTS

1. Chain-of-Custody Record

ATTACHMENT 1
CHAIN-OF-CUSTODY RECORD

CHAIN OF CUSTODY | NUMBER | PAGE ____ OF _____

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER	ADDRESS
		CARRIER/WAYBILL NUMBER	CITY, STATE

STANDARD TAT ☐
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE
PLASTIC (P) or GLASS (G)

PRESERVATIVE
USED

TYPE OF ANALYSIS

DATE YEAR	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No OF CONTAINERS									COMMENTS

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

3/99
FORM NO. TINUS-001

STANDARD OPERATING PROCEDURE
NUMBER CTO467-04

DECONTAMINATION OF FIELD SAMPLING EQUIPMENT

1.0 PURPOSE

This Standard Operating Procedure (SOP) establishes the procedures to be followed when decontaminating non-dedicated field sampling equipment during the field investigations at the NSWC Crane facility.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

Waterproof pens
Non-latex rubber or plastic gloves
Cotton gloves
Field logbook
Potable water
Deionized water
LiquiNox detergent
Brushes, spray bottles, paper towels, etc.
55-gallon drum or other container to collect and transport decontamination fluids

3.0 DECONTAMINATION PROCEDURES

3.1 Don non-latex and/or cotton gloves and decontaminate sampling equipment (in accordance with the following steps) prior to field sampling and between samples.

3.2 Rinse the equipment with potable water. Rinsing may be conducted by spraying with water from a spray bottle or by dipping. Collect the potable water rinsate into a container.

3.3 Wash the equipment with a solution of LiquiNox detergent. Prepare the LiquiNox wash solution in accordance with the instructions on the LiquiNox container. Collect the LiquiNox wash solution into a container. Use brushes or sprays as appropriate for the equipment. If oily residue has accumulated on the sampling equipment, remove the residue with an isopropanol wash and repeat the Liquinox wash.

3.4 Rinse the equipment with potable water. Rinsing may be conducted by spraying with water from a spray bottle or by dipping. Collect the potable water rinsate into a container.

3.5 Rinse the equipment with deionized water. Rinsing may be conducted by spraying with water from a spray bottle or by dipping. Collect the deionized water rinsate into a container.

3.6 Remove excess water by air drying, shaking, or by wiping with paper towels as necessary.

3.7 Document decontamination by recording it in the field logbook.

3.8 Containerized decontamination solutions will be managed in accordance with the procedures described in SOP CTO0042-09 and the QAPP Addendum No. 2.

STANDARD OPERATING PROCEDURE
NUMBER CTO467-05

SOIL AND SEDIMENT SAMPLING

1.0 PURPOSE

This Standard Operating Procedure (SOP) establishes the procedure for collecting surface soil samples using the hand auger technique to support confirmation sampling at SWMU 09 in accordance with the requirements of this QAPP Addendum No. 4.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

The following field forms and equipment are required for sediment sampling.

Disposable medical-grade gloves (e.g., latex, nitrile)

Indelible marker

Plastic storage bags

Shipping containers (containing ice)

Disposable plastic trowels or Stainless steel trowels

Stainless steel mixing bowls

Sample containers: Sample containers are certified clean by the laboratory supplying the containers.

Electronic notebook containing:

- **Soil Sample Log Forms.**
- **Daily Activity Logs.**
- **Chain-of-Custody Form.**
- **Soil Boring Log.**

Electronic label maker

3.0 SAMPLING PROCEDURES

Disposable plastic trowels or stainless steel trowels will be employed to collect soil cores. The sampler will wear clean, disposable, medical-grade gloves.

3.1 Clear the area to be sampled of any surface debris (herbaceous vegetation, twigs, rocks, litter, etc.).

3.2 Use the trowel to dig up and homogenize the soil or sediment in a 10-inch-diameter circular area that is 6 inches deep at each aliquot location. Stir the soil or sediment within the circular area; do not move the soil or sediment outside the circle. Also, do not dig or stir soil or sediment that is deeper than 6 inches below the ground surface.

3.3 For a grab sample, place the soil core in a stainless-steel mixing bowl and homogenize. For a composite sample, place equal amounts of the soil cores in a stainless-steel mixing bowl and homogenize. Place soil sample into laboratory supplied sampling container, print, and affix electronically printed label.

3.4 For samples that are to be submitted for laboratory analysis place the labeled sample container into a plastic storage bag and then place the plastic storage bag holding the sample container into a cooler containing ice.

3.5 Complete required information on the electronic Soil Sample Log Sheet (copy attached at the end of this SOP). Note the location of each aliquot in the "OBSERVATIONS/NOTES" section of the Soil and Sediment Sample Log Sheet. The information will be automatically updated to the Chain-of-Custody (COC) Form.

4.0 ATTACHMENTS

1. Soil and Sediment Sample Log Sheet

ATTACHMENT 1

SOIL AND SEDIMENT SAMPLE LOG SHEET

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: _____
Project No.: _____

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other: _____
[] QA Sample Type: _____

Sample ID No.: _____
Sample Location: _____
Sampled By: _____
C.O.C. No.: _____

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:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings				
(Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

STANDARD OPERATING PROCEDURE
NUMBER CTO467-06

SAMPLE PRESERVATION, PACKAGING, AND SHIPPING

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the procedures for sample preservation, packaging, and shipping to be used in handling aqueous samples, soils, and sediments collected at the NSWC Crane.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

Shipping labels

Custody seals

Chain-of-custody (COC) form(s)

Sample containers with preservatives: All sample containers for analysis by fixed-base laboratories will be supplied, with preservatives added (if required) and deemed certified clean by the laboratory.

Sample shipping containers (coolers): All sample shipping containers are supplied by the laboratory.

Packaging material: Bubble wrap, ZipLoc® bags, strapping tape, etc.

3.0 PROCEDURES FOR SAMPLE PRESERVATION, PACKAGING, AND SHIPPING

3.1 The laboratory provides sample containers with preservative already included (as required) for the analytical parameter for which the sample is to be analyzed. All samples will be held, stored, and shipped at 4°C. This will be accomplished through refrigeration (used to hold samples prior to shipment) and/or ice.

3.2 The sampler shall maintain custody of the samples until the samples are relinquished to another custodian or to the common carrier.

3.3 Check that each sample container is properly labeled, the container lid is securely fastened, and the container is sealed in a ZipLoc® bag.

3.4 If the container is glass, place the sample container into a bubble-out shipping bag and seal the bag using the self-sealing, pressure sensitive tape supplied with the bag.

3.5 Inspect the insulated shipping cooler. Check for any cracks, holes, broken handles, etc. If the cooler has a drain plug, make certain it is sealed shut, both inside and outside of the cooler. If the cooler is questionable for shipping, the cooler must be discarded.

3.6 Put ice into ZipLoc® bags and place a layer of the sealed bags on the bottom of the cooler. Place the sample containers into the shipping cooler on top of the ice in an upright position (containers will be upright, with the exception of the 40-ml vials). Place ZipLoc® bags of ice flat against the sides of the cooler. Continue filling the cooler with samples until the cooler is nearly full and the movement of the sample containers is limited.

3.7 Add a final layer of ice sealed in ZipLoc® bags to the top of the samples just before the cooler is closed and sealed.

3.8 Place the original (top) signed copy of the COC form inside a large ZipLoc® bag. Tape the bag to the inside of the lid of the shipping cooler that contains the samples for VOC analysis.

3.9 Close the cooler and seal the cooler with approximately four wraps of strapping tape at each end of the cooler. Prior to wrapping the last wrap of strapping tape, apply a signed, numbered, and dated custody seal to each side of the cooler (one per side). Cover the custody seal with the last wrap of tape. This will provide a tamper evident custody seal system for the sample shipment.

3.10 Affix a shipping label to the top of the cooler containing samples for VOC analysis, ensuring all of the shipping information is filled in properly. Overnight (e.g., FedEx Priority Overnight) courier services will be used for all sample shipments.

3.11 All samples will be shipped to the laboratory no more than 72 hours after collection. Under no circumstances will sample hold times be exceeded.

STANDARD OPERATING PROCEDURE
NUMBER CTO467-07

FIELD ANALYSIS FOR PCB BY TEST KIT

STRATEGIC DIAGNOSTICS INC.

Sample Extraction Kit User's Guide

Intended Use

This extraction kit is for use with the appropriate immunoassay test kit. Each Sample Extraction kit contains the materials necessary to process twelve (12) soil or wipe samples.

Test Principles

The reagents contained in the Sample Extraction kit have been optimized for fast, efficient removal of compounds from soil or surfaces and convenient preparation of the sample for immunoassay testing at levels of interest to the investigator. The system allows for reliable, convenient and cost effective determinations at the field testing or remediation site.

Performance Characteristics

Precautions

- Treat potentially contaminated samples as hazardous materials.
- Use gloves, proper protective clothing, and methods to contain and handle hazardous material where appropriate.
- Store all kit components at ambient temperature (18°C to 27°C or 64°F to 81°F).
- Do not mix reagents from kits of different lot numbers.
- When testing soil samples, samples obtained from areas adjacent to standing water, surface soils collected during or immediately after rain or snow, or any soils with relatively high amounts of water (≥ 30% by weight) should be dried prior to extraction. Contact technical service for recommended methods.
- Adequate sample number and distribution are the responsibility of the analyst.
- Do not dilute or adulterate test reagents; this may give inaccurate results.
- Cloudy or dark sample extracts may indicate the presence of an interference in your sample. Please contact Technical Support if this occurs.

Materials Provided

- Filter unit bottoms: 12 per kit
- Filter unit tops: 12 per kit
- Wooden spatulas: 12 per kit
- Plastic Weigh Boats: 12 per kit
- Bulb Pipettes: 12 per kit
- Ampule crackers: 12 per kit
- Extraction jars: 12 per kit
  (jars for **soil** extraction contain 3 ball bearings)
- 10 cm x 10 cm Plastic Wipe Templates: 12 per kit (PCB Wipe Kit only)
- Gauze Wipes: 12 per kit
  (PCB Wipe Kit only)
- Protective gloves: 24 per kit
  (PCB Wipe Kit only)
- User's Guide
- Kit Specific Extraction Solution: 12 per kit as described below:

  20 mL of 100% Methanol for use with:

  Ensys PCB Soil/Wipe (Part #7020301/7021301) *
  Ensys Petro Soil (Part #7042301)
  Ensys PAH Soil (Part #7061301) *
  Ensys Penta Soil (Part #7000301) *
  RaPID Assay PCB (Part # A00133/A00134) *
  RaPID Assay PAH (Part # A00156/A00157) *
  RaPID Assay CaPAH (Part # A00200/A00201) *
  RaPID Assay TNT (Part # A00186) *

  10 mL of 100% Methanol for use with:

  Envirogard PAH in Soil (Part #7060600) *
  Envirogard BTEX in Soil (Part #7004000)

Envirogard TPH in Soil (Part # 7042000)
Envirogard DDT in Soil (Part #7310000) *
Envirogard PCB Soil/Wipe *
(Part #7020800/7021600 or #7021500/7021600)

20 mL of 90% Methanol for use in:

Envirogard Chlordane in Soil (Part #7311000)
Envirogard Toxaphene in Soil (Part #7420000)
Envirogard Lindane in Soil (Part #7630000)

10 mL of 75% Methanol for use in:

Rapid Assay BTEX (Part #A00161/A00162)

20 mL of 75% Methanol with Sodium Hydroxide for use in:

Rapid Assay PCP (Part #A00110/A00111)

10 mL of 100% Methanol with Surfactant for use in:

Rapid Assay Cyclodienes (Part #A00216)

*** Indicates extraction solution is also available in bulk (i.e. two 125 mL bottles per kit)**

- Kit specific dilution material (for Ensys and RaPID Assay test kits)
  - For Ensys test kits dilution ampules will be provided based on customer specified detection levels.
  - For Rapid Assay test kits, 12 dilution vials with the appropriate volume of assay diluent (see "Dilute the Sample" section of this User's Guide) will be provided. The kit may also contain fixed volume disposable pipets and tips as appropriate.

Materials Required and Ordered Separately

- 50 mL Combitips® for the Repeater pipettor - for 1.0 mL to 5.0 mL dispensing volumes (if using bulk extraction solution)
- Eppendorf Repeater pipettor (if using bulk extraction solution)
- Portable balance capable of weighing 10 g (for soil samples)
- Electronic timer

NOTE: Order replacement Combitips® separately. See the "Ordering Information" section.

Materials Required but Not Provided

- Protective clothing (e.g., latex gloves)
- Liquid and solid waste containers
- Marking pen

Soil Procedure

Collect/Store the Sample

The following steps explain how to properly collect and store your samples.

1. Collect soil in appropriately sized and labeled containers.
2. Take care to remove excess twigs, organic matter, and rocks or pebbles from the soil sample to be tested.
3. Soils obtained from areas adjacent to standing water, surface soils collected during or immediately after rain or snow, or any soils with relatively high amounts of water ($\geq$ 30% by weight) should be dried before testing. Contact Technical Services for recommended methods.
4. When comparing data from fields and laboratory methods it is important that split samples are obtained from thoroughly homogenized samples.
5. Store soil samples at 4°C (39°F), staying within the EPA recommended holding times for your analyte of interest.

Weigh the Sample

1. Verify digital balance is calibrated correctly by pressing the ON/MEMORY button on the instrument and placing the 100 g weight (in the pocket of the instrument cover) onto the balance. If the instrument does not read 100$\pm$0.1 g, you must recalibrate the instrument as per the manufacturer's instructions provided with your accessory kit.
2. Place an unused plastic weigh boat on the digital balance (provided in the Field Accessory Kit).
3. Press the ON/MEMORY button on the digital balance. The balance will beep and display 0.0.
4. Weigh out 10 $\pm$ 0.1 grams of sample into the weigh boat on the balance using a wooden spatula.

NOTE: If the balance turns off prior to completing the weighing of the sample, use an empty weigh boat to retare the instrument and then continue.

5. Repeat Steps 1-3 for each sample to be tested, using a new weigh boat and wooden spatula for each sample.

Extract the Soil

1. Uncap an extraction jar (containing ball bearings) and place it on a flat surface. Label the extraction jar with the sample identification. Transfer 10 grams of sample from the weigh boat into the appropriately labelled extraction jar, using the same wooden spatula used to weigh the sample. Be careful to get all of your sample into the extraction jar.
2. Open the solvent ampule using the ampule cracker provided in your extraction kit by placing the ampule cracker over the scored neck of the ampule. The ampule cracker is designed to protect your hands from broken glass.
3. Pour the entire contents of one solvent ampule into the extraction jar and immediately recap the extraction jar. Do not leave the jar open or the solvent will evaporate and affect results.
4. Shake the jar vigorously for one full minute.
5. Allow the sample to settle for one minute or until a liquid solvent layer is observed above the sample.

NOTE: If the solvent layer is not observed within 15 minutes, contact Technical Support for assistance. Clay samples are often difficult to extract because they absorb the solvent. In this case, Technical Support may recommend decreasing the soil to solvent ratio. This will affect detection levels and should be discussed in advance

6. Repeat Steps 1-5 for each sample to be tested.

Filter the Extract

1. Insert the bulb pipet into the top (liquid) layer in the extraction jar (being careful not to disturb the lower, solid layer) and draw up some of the sample. Transfer at least ½ bulb capacity into the bottom portion of the filtration unit. **Do not use more than one full bulb.**
2. Press the top portion of the filtration unit (which is the piece with the cap and filter) into the bottom portion (containing the sample) until it snaps together or until the majority of the liquid has passed upward through the filter. Place on a flat surface.
3. Repeat Steps 1-2 for each sample to be tested.

NOTE: Do not store sample in the filtration unit for extended periods of time. The seal on the unit will not sufficiently prevent evaporative losses of the solvent. Evaporation of the solvent will affect results.

Dilute the Sample

I. Envirogard and Ensys test kits – Use the filtered extract as "SAMPLE" in the test kit User's Guide procedure. The Ensys User's Guide describes a sample dilution method based on your individual testing needs.

II. Rapid Assay – Dilute the filtered extract into the appropriate sample diluent as described in the following table:

Kit	Extract Vol. (uL)	Diluent (mL)	*Total Dil. Factor	Test Range (ppm)
PCB	25	25	2000	0.5 to 10 (Aroclor 1254)
PAH	250	12.25	100	0.2 to 5 (phenanthrene)
CaPAH	200	9.8	100	0.01 to 0.5 (Benzo(a)pyrene)
BTEX/ TPH	500	4.5	10	0.9 to 30 (total BTEX)
PCP	50	25	1000	0.1 to 10 (PCP)
TNT	50	25	1000	0.25 to 5 (TNT)
Cyclo-dienes	250	12.25	50	0.1 to 2 (Dieldrin)

***Note: "Total dilution factor" takes the extraction dilution into account as well as the kit dilution (i.e. 10 g soil to 20 mL solvent is a 2x dilution).**

a. Remove a premeasured diluent vial from your extraction kit for each sample to be tested. Label vials with the appropriate sample identification. Vials contain the volume of diluent specified in the preceding table corresponding to your test kit.

b. Using the adjustable volume pipet (for volumes between 100 and 1000 uL) or the tan fixed volume pipet provided in the extraction kit (for 25 or 50 uL volumes) pipet the volume of filtered extract specified

in the table above directly *into* the liquid in the corresponding diluent vial.

c. Screw the cap tightly onto the diluent vial and mix by inverting several times. Repeat steps 1 and 2 for each sample being tested using a new, clean pipet tip for each one.

d. The diluted extract should be used as "Sample" in the test kit User's guide procedure.

Wipe Procedure

Collect/Store the Sample

The following steps explain how to properly collect and store your samples.

1. Collect sample in appropriately sized and labeled containers.
2. Wearing a clean pair of protective gloves provided in the extraction kit, uncap an extraction jar.
3. Open the solvent ampule using the ampule cracker provided in your extraction kit by placing the ampule cracker over the scored neck of the ampule. The ampule cracker is designed to protect your hands from broken glass.
4. Pour the entire contents of one solvent ampule into the extraction jar and immediately recap the extraction jar. Do not leave the jar open or the solvent will evaporate and affect results.
5. Soak a gauze pad in the extraction jar containing solvent. Remove the gauze wipe from the extraction jar carefully squeezing the excess solvent from the pad back into the extraction jar.
6. Hold a clean 10 x 10 plastic template on the surface to be wiped. Wipe the entire exposed area according to proper wipe sampling techniques. The wipe should be damp when finished.
7. Place the wipe back into the same extraction jar used in Step 4 and cap tightly.
8. Remove and discard the gloves.
9. Repeat Steps 1-7 for each sample to be tested.
10. Store samples at 4°C (39°F), staying within the EPA recommended holding times for your analyte of interest.

Extract the Sample

1. Shake the jar vigorously for one full minute.
2. Repeat for each sample to be tested.

Filter the Extract

1. Insert the bulb pipet into the top (liquid) layer in the extraction jar and draw up some of the sample. Transfer at least ½ bulb capacity into the bottom portion of the filtration unit. **Do not use more than one full bulb.**
2. Press the top portion of the filtration unit (which is the piece with the cap and filter) into the bottom portion (containing the sample) until it snaps together. Place on a flat surface.
3. Repeat Steps 1-2 for each sample to be tested.

NOTE: Do not store sample in the filtration unit for extended periods of time. The seal on the unit will not sufficiently prevent evaporative losses of the solvent. Evaporation of the solvent will affect results.

Dilute the Sample

I. Envirogard and Ensys test kits – Use the filtered extract as "SAMPLE" in the test kit User's Guide procedure. The Ensys User's Guide describes a sample dilution method based on your individual testing needs.

II. Rapid Assay – Dilute the filtered extract into the appropriate sample diluent as described below.

Kit	Extract Vol. (uL)	Diluent (mL)	Total Dil. Factor *	Test Range (ppm)
PCB	25	25	2000	5 to 100 ug/100 cm2 (Aroclor 1254)

***Note: "Total dilution factor" takes the extraction dilution into account as well as the kit dilution (i.e. 10 g soil to 20 mL solvent is a 2x dilution).**

a. Remove a premeasured diluent vial from your extraction kit for each sample to be tested. Label vials with the appropriate sample identification. Vials contain the volume of diluent specified in the table above corresponding to your test kit.

b. Using the adjustable volume pipet (for volumes between 100 and 1000 uL) or the tan fixed volume pipet provided in the extraction kit (for 25 or 50 uL

volumes) pipet the volume of filtered extract specified in the table above directly *into* the liquid in the corresponding diluent vial.

c. Screw the cap tightly onto the diluent vial and mix by inverting several times. Repeat steps 1 and 2 for each sample being tested using a new, clean pipet tip for each.

d. The diluted extract should be used as "Sample" in the test kit User's guide procedure.

Limitations of the Procedure.

Sampling error may significantly affect testing reliability. The distribution of contaminants in soils can be extremely heterogeneous. Adequate sample number and distribution are the responsibility of the analyst.

Ordering Information

Description	Catalogue Number
SDI Sample Extraction Kit (with methanol in ampules or bulk)	Contact Customer Support
50 mL Combitip for Repeating Pipette (1 each)	6005600
Portable balance**	A00131
Eppendorf Repeater Pipettor**	A00008
Electronic Timer**	A00015
**** These items are also included in our field accessory kits which are available for rent or purchase.**	

Ordering/Technical Assistance

Should you have any questions regarding this procedure prior to analysis contact Technical Service to avoid costly mistakes.

To Place an Order or Receive Technical Assistance, please call Strategic Diagnostics Inc. at:

Call toll-free **800-544-8881**

Or 302-456-6789 Phone
302-456-6782 Fax
web site: www.sdix.com
e-mail: techservice@sdix.com

General Limited Warranty

SDI's products are manufactured under strict quality control guidelines and are warranted to be free from defects in materials and workmanship. New instruments and related non-expendable items are warranted for one year from date of shipment against defective materials or workmanship under normal use and service.
Warranty obligation is limited to repair or replacement of the defective product or to refund of the purchase price, at the discretion of SDI. Other warranties, express or implied, are disclaimed. SDI's liability under any warranty claim shall not exceed the refund of the purchase price paid by the customer. Under no circumstances shall SDI be liable for special, indirect or consequential damages.

Safety

To receive an MSDS for this product, visit our web site at www.sdix.com.

Rev 10/19/99

Material Safety Data Sheet

PCB Soil 12 Test Kit

MATERIAL IDENTIFICATION

Manufacturer/Distributor:	Strategic Diagnostics Inc. 111 Pencader Drive Newark, DE 19702
Phone Number:	1-(302) 456-6789
Trade Names and Synonyms:	PCB Soil 12 Test Kit (7020301)
NFPA Ratings	Health: 3 Flammability: 3 Reactivity: 1

OSHA HAZARD DETERMINATION

Hazardous Ingredients	CAS Number	Weight Percent
Methanol Methyl alcohol, Wood alcohol	67-56-1	≤ 100
N,N-Dimethylformamide	68-12-2	≤ 26
Sulfuric Acid Oil of Vitriol; Hydrogen Sulfate; Sulphuric acid	7664-93-9	≤ 6

PHYSICAL DATA

Plastic kit containing small amounts of various liquids and powders.

HAZARDOUS REACTIVITY

Instability Stable - Reactivity not expected with the product.

FIRE AND EXPLOSION DATA

Fire and Explosion Hazards Methanol is a fire and explosion hazard. Methanol has a flash point of 50° F. Fire hazard when exposed to heat, flame, or oxidizers. Vapors are explosive. N,N'-Dimethylformamide has a flash point of 58°C.

Extinguishing Media Use alcohol foam, Carbon Dioxide or dry chemical to extinguish fire.

Special Fire Fighting Instructions Firefighters should wear self – contained breathing apparatus and protective clothing.

HEALTH HAZARD INFORMATION

Primary Route(s) of Exposure/Entry: Skin, Eyes and Mouth. Flush skin and eyes with large amounts of water for at least 15 minutes. If inhaled or ingested, seek prompt medical attention.

Signs and Symptoms of Exposure/Medical Conditions Aggravated by Exposure:
Methanol may be harmful, if inhaled or ingested. May be fatal, if sufficient quantity is ingested. If ingested,

induce vomiting immediately. Methanol can also cause headache, nausea, blindness and gastrointestinal disturbance.
N,N – Dimethylformamide may cause irritation to skin, eyes, and mucous membranes. Flush skin and eyes with large amounts of water. The other adverse effects that may occur with this chemical are : headache and nausea.

Eye exposure to concentrated sulfuric acid solution may cause severe damage, often leading blindness. Dilute solutions produce a more transient effect from which recovery may be complete. Exposure to mist may cause eye irritation and lacrimation. Skin contact with sulfuric acid may cause severe irritation and pain, burns and vesiculation.
The toxicological properties of the kit components have not been fully defined. Contact may cause irritation to eyes, skin, and mucous membranes. May cause irritation if inhaled or ingested. Limit exposure to material.

Sulfuric acid is corrosive and may cause severe burning pain in the mouth, throat, and abdomen followed by vomiting and diarrhea. Asphyxia may occur from the swelling of the throat. Perforation of the esophagus and stomach may occur.

Carcinogenicity: None of the components in this material is listed by IARC, NTP, OSHA, or ACGIH as a carcinogen.

Applicable Exposure Limits

Methanol
OSHA/PEL 262 mg/m3
ACGIH /TLV 262 mg/ m3
TXDS: orl-rat LD_{50} 5628 mg/kg
ihl-rat LC_{50} 64000 ppm/4H
orl-mice LD_{50} 7300 mg/kg
skn-rbt LD_{50} 15800 mg/kg

N.N – Dimethylformamide
OSHA/PEL 30 mg/m3 (10 ppm)
ACGIH / TLV 30 mg/m3 (10 ppm)

Sulfuric acid
OSHA/ PEL 1 mg/m^3
ACGTH/TLV 1 mg/m^3

FIRST AID

Inhalation No specific intervention is indicated as the compound is not likely to be hazardous by inhalation. Consult a physician if necessary.

Skin Contact The compound is not likely to be hazardous by skin contact, but may cause irritation. If irritation occurs flush skin with large amounts of water. If irritation persists, contact a physician.

Eye Contact In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

Ingestion The compound is toxic by ingestion. Call a physician.

PROTECTION INFORMATION

General Control Measures and Precautions: Ventilation - Natural ventilation.

Personal Protective Equipment: Respiratory Protection: None required.

Protective Gloves: Are highly recommended.

Eye Protection: Safety glasses are required.

Other Protective Equipment: A lab coat or other long – sleeved garment is required to limit skin exposure. Access to a safety shower and eyewash is required.

SPILL, LEAK AND DISPOSAL INFORMATION

Spill, Leak, or Release Review FIRE AND EXPLOSION HAZARDS and SAFETY PRECAUTIONS before proceeding with clean up.

Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean up. Contain spill and collect in suitable container. Eliminate any ignition sources in the area. Use adequate ventilation.

No special clean up practices are required.

Waste Disposal Dispose of as solid waste in accordance with any applicable federal, state, and local requirements.

SHIPPING INFORMATION

DOT	Proper Shipping Name	Not DOT regulated.
IATA/IMO	Proper Shipping Name	Not restricted.

TITLE III HAZARD CLASSIFICATION

Acute	No
Chronic	No
Fire	No
Reactivity	No
Pressure	No

REGULATORY INFORMATION

OSHA HAZARD DETERMINATION: This material is not known to be hazardous as defined by OSHA's Hazard Communication Standard, 29 CFR 1910.1200

EPA DETERMINATIONS:
COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, & LIABILITY ACT (CERCLA/SUPERFUND), 40 CFR 302 - This material is not known to contain hazardous substances in sufficient quantity to make it subject to CERCLA regulations.

TOXIC SUBSTANCES CONTROL ACT (TSCA), 40 CFR 710
The material is a mixture as defined by TSCA. The chemical ingredients in this material are in the Section 8(b) Chemical Substance Inventory and/or are otherwise in compliance with TSCA. In the case of ingredients obtained from other manufacturers, Strategic Diagnostics, Inc. relies on the assurance of responsible third parties in providing this statement.

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), 40 CFR 261, SUBPARTS C AND D
The material, when discarded or disposed of, is not specifically listed as a hazardous waste in Federal regulations; however, it could be considered hazardous if it meets criteria for being toxic, corrosive, ignitable or reactive according to U.S. EPA definitions (40 CFR 261). This material could also become a hazardous waste if it is mixed with or comes in contact with a listed hazardous waste. If it is a hazardous waste, regulations 40 CFR 262-266 and 268 may apply.

HAZARDOUS MATERIALS TRANSPORTATION REGULATIONS, 49 CFR 171-178 - This material is not known to contain hazardous substances in sufficient quantity to make it subject to the Regulations.

FOREIGN REGULATIONS: CANADIAN HAZARDOUS PRODUCTS ACT (WHMIS)
The material is not a WHMIS Controlled Product.

STATE REGULATIONS:
CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 ("PROPOSITION 65")
The material is not known to contain any ingredients (s) subject to the Act.

PENNSYLVANIA WORKER AND COMMUNITY RIGHT TO KNOW ACT
This material is not known to contain any ingredient(s) subject to the Act. Non-hazardous ingredient(s) information is withheld as trade secret in accordance with Section 11 of the Pennsylvania Worker and Community Right to Know Act.

The above data are based on tests, experience, and other information which Strategic Diagnostics Inc. believes reliable and are supplied for informational purposes only. However, some ingredients may have been purchased or obtained from third-party manufacturers. In these instances, Strategic Diagnostics, Inc., in good faith, relies on information provided by those third parties. Since conditions of use are outside our control, STRATEGIC DIAGNOSTICS INC. DISCLAIMS ANY LIABLITITY FOR DAMAGE OR INJURY WHICH RESULTS FROM USE OF THE ABOVE DATA. NOTHING CONTAINED HEREIN SHALL CONSTITUTE A GUARANTEE, WARRANTY (INCLUDING WARRANTY OF MERCHANTABILITY) OR REPRESENTATION (INCLUDING FREEDOM FROM PATENT LIABILITY) BY STRATEGIC DIAGNOSTICS, INC. WITH RESPECT TO THE DATA, THE MATERIAL DESCRIBED, OR ITS USE FOR ANY SPECIFIC PURPOSE, EVEN IF THAT PURPOSE IS KNOWN TO STRATEGIC DIAGNOSTICS INC.

Responsibility for MSDS:

Strategic Diagnostics Inc.
111 Pencader Drive
Newark, DE 19702
(302) 456-6789

* End of MSDS *

STRATEGIC DIAGNOSTICS INC.

RaPID Assay® PCB Test Kit
A00133/A00134

Intended Use

The RaPID Assay® PCB Test Kit can be used as a quantitative, semi-quantitative or qualitative enzyme immunoassay (EIA) for the analysis of PCB (polychlorinated biphenyl) in water (groundwater, surface water, well water). For applications in other matrices please contact our Technical Service department or refer to the soil application procedure provided. The RaPID Assay® PCB Test Kit allows reliable and rapid screening for PCB (measured and reported as Aroclor 1254), with quantitation between 0.5 and 10 ppb (as Aroclor 1254), in water. The minimum detection level of the kit is 0.2 ppb (as Aroclor 1254.)

Test Principles

The PCB RaPID Assay® kit applies the principles of enzyme linked immunosorbent assay (ELISA) to the determination of PCB and related compounds. The sample to be tested is added, along with an enzyme conjugate, to a disposable test tube, followed by paramagnetic particles with antibodies specific to PCB attached. Both PCB (which may be in the sample) and the enzyme labeled PCB (the enzyme conjugate) compete for antibody binding sites on the magnetic particles. At the end of an incubation period, a magnetic field is applied to hold the paramagnetic particles (with PCB and labeled PCB analog bound to the antibodies on the particles, in proportion to their original concentration) in the tube and allow the unbound reagents to be decanted. After decanting, the particles are washed with Washing Solution.

The presence of PCB is detected by adding the enzyme substrate (hydrogen peroxide) and the chromogen (3,3',5,5' – tetramethylbenzidine). The enzyme labeled PCB analog bound to the PCB antibody catalyzes the conversion of the substrate/chromogen mixture to a colored product. After an incubation period, the reaction is stopped and stabilized by the addition of acid. Since the labeled PCB (conjugate) was in competition with the unlabeled PCB (sample) for the antibody sites, the color developed is inversely proportional to the concentration of PCB in the sample.

NOTE: Color development is inversely proportional to the PCB concentration.

Darker color = lower concentration
Lighter color = higher concentration

The determination of the PCB level in an unknown sample is interpreted relative to the standard curve generated from kit standards after reading with a spectrophotometer.

Performance Characteristics

The PCB RaPID Assay® will detect different PCB Aroclors to different degrees. Refer to the table below for data on several of these. The PCB RaPID Assay® kit provides screening results. As with any analytical technique (GC, HPLC, etc.) positive results requiring some action should be confirmed by an alternative method.

The PCB RaPID Assay® immunoassay test does not differentiate between PCB and other related compounds. The table below shows compounds at the method detection limit (MDL) which is the lowest concentration of the compound, in water, that can be picked up in the assay. The limit of quantitation (LOQ) is an approximate concentration, in water, required to yield a positive result at the lowest standard. **This is the lowest concentration of the compound that can be quantified in the assay.** The IC50 is the concentration required to, inhibit one half of the color produced by the negative control. It is also used to calculate cross-reactivity values to similar compounds.

Compound	MDL (ppb)	LOQ (ppb)	IC50 (ppb)
Aroclor 1254	0.20	0.50	3.6
Aroclor 1260	0.20	0.32	2.3
Aroclor 1248	0.22	0.59	4.22
Aroclor 1242	0.34	1.22	8.8
Aroclor 1262	0.36	0.66	4.74
Aroclor 1232	0.84	2.61	18.76

Aroclor 1268	0.92	3.03	21.80
Aroclor 1016	0.94	3.56	25.60
Aroclor 1221	13.54	22.58	162.60

*The following compounds demonstrated no reactivity in the PCB RaPID Assay® test kit at concentrations up to 10,000 ppb: Biphenyl, 2,5-Dichlorophenol, 2,3,5-Trichlorophenol, Di-n-octyl-phthalate.

The presence of the following substances up to 250 ppm were found to have no significant effect on PCB RaPID Assay® results: copper, nickel, zinc, mercury, manganese, phosphate, sulfate, sulfite, magnesium, calcium, nitrate and thiosulfate. Humic acid up to 25 ppm and iron to 100 ppm were found to have no significant effect. In addition, sodium chloride concentrations up to 1.0 M showed no effect on results.

Precautions

- Training is strongly recommended prior to using the RaPID Assay® test system. Contact Strategic Diagnostics for additional information.
- Treat PCB, solutions that contain PCB, and potentially contaminated samples as hazardous materials.
- Use gloves, proper protective clothing, and methods to contain and handle hazardous material where appropriate.
- Reagents must be added in a consistent manner to the entire rack. A consistent technique is the key to optimal performance. Be sure to treat each tube in an identical manner.
- Water samples should be at a neutral pH prior to analysis. Samples containing gross particulate should be filtered (e.g. 0.2 um Anotop™ 25 Plus, Whatman, Inc.) to remove particles.
- Store all test kit components at 2°C to 8°C (36°F to 46°F). Storage at ambient temperature (18°C to 27°C or 64°F to 81°F) on the day of use is acceptable. *Test tubes require no special storage and may be stored separately to conserve refrigerator space.*
- Allow all reagents to reach ambient temperature (18°C to 27°C or 64°F to 81°F) before beginning the test. This typically requires at <u>least</u> 1 hour to warm from recommended storage conditions.
- Do not freeze test kit components or expose them to temperatures above 100°F (39°C).
- Do not use test kit components after the expiration date.
- Do not use reagents or test tubes from one test kit with reagents or test tubes from a different test kit.
- Do not mix reagents from kits of different lot numbers.
- Use approved methodologies to confirm any positive results.
- Do not under any circumstances attempt to disassemble the base of the magnetic rack. Magnets will be violently attracted to each other.
- Adequate sample number and distribution are the responsibility of the analyst.
- The photometer provided in the accessory kit requires electricity and comes with a 110V adapter. Adapters for 220V are available. Do not attempt to operate with a car adaptor.
- Do not expose color solution to direct sunlight.
- Do not dilute or adulterate test reagents or use samples not called for in the test procedure; this may give inaccurate results.
- Tightly recap the standard vials when not in use to prevent evaporative loss.

Materials Provided

- Antibody Coupled Paramagnetic Particles in buffered saline containing preservative and stabilizers.

  30 test kit: one 20 mL vial
  100 test kit: one 65 mL vial

- Enzyme Conjugate.

  30 test kit: one 10 mL vial
  100 test kit: one 35 mL vial

- Standards

  Three concentrations (0.25, 1.0 and 5.0 ppb) of PCB standards (as Aroclor 1254) in buffered saline

containing preservative and stabilizers are supplied. Each vial contains 4 mL.

- Control

  A concentration (approximately 3 ppb) of PCB (as Aroclor 1254) in buffered saline containing preservative and stabilizers. A 4 mL volume is supplied in one vial.

- Diluent/Zero Standard

  Buffered saline containing preservative and stabilizers without any detectable PCB.

  30 test kit: one 10 mL vial
  100 test kit: one 35 mL vial

- Color Solution containing hydrogen peroxide and 3,3',5,5'-tetramethylbenzidine in an organic base.

  30 test kit: one 20 mL vial
  100 test kit: one 65 mL vial

- Stop Solution containing a solution of 2M sulfuric acid.

  30 test kit: one 20 mL vial
  100 test kit: one 60 mL vial

- Washing Solution containing preserved deionized water.

  30 test kit: one 70 mL vial
  100 test kit: one 250 mL vial

- Polystyrene test tubes

  30 test kit: one 36 tube box
  100 test kit: three 36 tube boxes

- User's Guide

Materials Required and Ordered Separately

See "Ordering Information" for the appropriate catalogue numbers.

Rapid Assay® Accessory Kit

Accessory equipment may be rented or purchased from Strategic Diagnostics. See "Ordering Information" for the appropriate catalogue numbers.

The accessory kit contains the following items:

- Adjustable Volume Pipet
- Eppendorf™ Repeater® Pipettor
- Electronic timer
- Portable balance capable of weighing 10 g (for soil samples)
- Vortex mixer
- Magnetic separation rack
- RPA-I RaPID Analyzer (or equivalent spectrophotometer capable of reading 450 nm in a 1 mL sample size).

Other Items

- 12.5 mL Combitips® for the Repeater pipettor - for 0.25 mL to 1.25 mL dispensing volumes (5)
- Pipet tips for adjustable volume pipet (100-1000 uL)

NOTE: Order replacement Combitips® and pipet tips separately. See the "Ordering Information" section.

Materials Required but Not Provided

- Methanol (HPLC grade or equivalent) – for water analysis
- Protective clothing (e.g., latex gloves)
- Absorbent paper for blotting test tubes
- Liquid and solid waste containers
- Marking pen
- Instructional video (optional)

Suggestions for Pipettor Use

- Practice using both pipettes (adjustable volume and Repeater pipettor) with water and extra tips before you analyze your samples.
- Use a new tip each time you use the Repeater pipettor to pipette a different reagent to avoid reagent cross-contamination. Tips can be rinsed thoroughly, dried completely and reused. By using the same tip to dispense the same reagent each time you can avoid cross contamination.

NOTE: **Repeator tips should be changed periodically (after ~10 uses) since precision deteriorates with use.**

- Draw the desired reagent volume into the Repeater pipettor and dispense one portion of the reagent back into the container to properly engage the ratchet mechanism. If you do not do this, the first volume delivered may be inaccurate.
- To add reagents using the Repeater pipettor, pipette down the side of the test tube just below the rim.
- When adding samples and standard using the positive displacement pipettor, always pipette into the bottom of the tube without touching the sides or bottom of the tube.
- Use a new adjustable volume pipet tip each time you pipette a new unknown.

Assay Procedure

Prior to performing your first Rapid Assay®, please take time to read the package inserts in their entirety and review the videotape if available. **On site training is strongly recommended for new users of this test system.** Please contact your account manager for further information. This procedure is designed for quantitative analysis. For running the kit semi-quantitatively or qualitatively, please contact Technical Support.

Collect/Store the Sample

The following steps explain how to properly collect and store your samples.

1. Water samples should be collected in glass vessels with teflon cap liners). **Immediately upon collection, water samples should be diluted with an equal volume (1:1) of methanol (HPLC grade) to prevent adsorptive losses to the glass containers.** This is a 2x dilution, which must be accounted for when interpreting results. See "Results Interpretation", Section 3a for further details. Use this diluted sample as "sample" in "Perform the Test".

NOTE: This 2x dilution is <u>not</u> required for soil samples.

2. Samples should be collected in appropriately sized and labeled containers.
3. If testing soil samples, follow the SDI Sample Extraction Kit User's Guide or the appropriate technical bulletin to properly collect and store your sample.
4. Samples should be tested as soon as possible after collection. If this is not possible, storage at 4°C (39°F) is recommended to minimize evaporative losses.

Set Up

1. Remove kits from refrigerator. All reagents must be allowed to come to room temperature prior to analysis. Remove reagents from packaging and place at room temperature <u>at least</u> 1 hour prior to testing.
2. Turn on the RPA-1 or other spectrophotometer. The RPA-1 should be warmed up for at least 30 minutes prior to the run.
3. Label five 12.5 mL Combitips "Conjugate", "Particles", "Wash", "Color" and "Stop". In addition, add the name of the compound you are testing for to each Combitip.
4. Remove nine clean blank test tubes for standards and control and one test tube for each sample (if testing in singlicate). Label the test tubes according to contents as follows.

Tube #	Contents
1	Negative control (replicate 1)
2	Negative control (replicate 2)
3	Standard 1 (replicate 1)
4	Standard 1 (replicate 2)
5	Standard 2 (replicate 1)
6	Standard 2 (replicate 2)
7	Standard 3 (replicate 1)
8	Standard 3 (replicate 2)
9	Control
10	Sample 1
11	Etc.

***Label at top of tubes to avoid interference with reading of tubes in photometer**

Sample Extraction, Filtration and Dilution

Filtration may be necessary to remove gross particulate from the water sample. If testing samples at levels higher than standard kit level is desired, contact SDI for special instructions. Water samples should be diluted 1:1 in methanol as described in "Collect/Store the Sample". Please follow the instructions from the SDI Sample Extraction Kit to prepare and dilute the soil extract prior to running the assay.

Perform the Test

1. Separate the upper rack from the magnetic base. Place labeled test tubes into the rack.

2. Add **200 uL** of standards, control or samples to the appropriate tubes using the adjustable volume pipet with the dial set on **0200**. The negative control, standards and control must be run with each batch of samples.

NOTE: Sample should be added to the bottom of the tube by inserting the pipet tip into the tube without touching the sides or the bottom of the tube. Take care not to contact sample with pipette tip once dispensed into bottom of the tube.

3. Using the Repeater Pipettor with the "Conjugate" tip attached and the dial set on **"1"**, add **250 uL** of Enzyme conjugate down the **inside wall** of each tube. (Aim the pipet tip ¼" to ½" below the tube rim or tube wall; deliver liquid gently to avoid splashback.)

4. Thoroughly mix the magnetic particles by swirling (avoid vigorous shaking) and attach the "Particles" tip to the Repeater Pipettor. With the dial set on **"2"** add **500 uL** of magnetic particles to each tube, aiming down the side of the tube as described above. Vortex, mixing each tube 1 to 2 seconds at low speed to minimize foaming. Pipetting of magnetic particles should be kept to 2 minutes or less.

5. Incubate 15 minutes at room temperature.

6. After the incubation, combine the upper rack with the magnetic base and press all tubes into the base; allow 2 minutes for the particles to separate.

7. With the upper rack and magnetic base combined, use a smooth motion to invert the combined rack assembly over a sink and pour out the tube contents.

NOTE: If the rack assembly inadvertently comes apart when lifting to pour out tube contents, re-combine and wait an additional 2 minutes to allow particles to separate.

8. **Keep the rack inverted** and gently blot the test tube rims on several layers of paper towels. It is important to remove as much liquid as possible but **do not bang** the rack or you may dislodge the magnetic particles and affect the results.

9. Set the Repeater Pipettor dial to **"4"** and put on the tip labeled "Wash". Add **1 mL** of Washing Solution down the inside wall of each tube by using the technique described earlier. Vortex tubes for 1-2 seconds. **Wait 2 minutes** and pour out the tube contents as described previously. **Repeat this step one more time.**

NOTE: The number of washes and wash volume are important in ensuring accurate results.

10. Remove the upper rack (with its tubes) from the magnetic base. With the "Color" tip attached to the Repeater Pipet and the dial set to **"2"** add **500 uL** of Color Reagent down the inside wall of each tube as described previously. Vortex 1 to 2 seconds (at low speed).

11. Incubate 20 minutes at room temperature. During this period, add approximately 1 mL of Washing solution to a clean tube for use as an instrument blank for "Results Interpretation".

12. After the incubation, position the Repeater pipettor at Setting **"2"** and use the "Stop" tip to add **500 uL** of Stop solution to all test tubes.

13. Proceed with results interpretation.

WARNING: Stop solution contains 2M sulfuric acid. Handle carefully.

Results Interpretation

1. After addition of Stop Solution to the test tubes, results should be read within 15 minutes.

2. Wipe the outside of all antibody coated tubes prior to photometric analysis to remove fingerprints and smudges.

Photometric Interpretation Using the RPA-I

1. The RPA-I photometer (provided in the Rapid Assay® Accessory kit) can be used to calculate and store calibration curves. It is preprogrammed with various RaPID Assay® protocols. For the PCB RaPID Assay® test kit, parameter settings are as follows:

   Data Reduct: Lin. Regression

Xformation :	Ln/LogitB
Read Mode :	Absorbance
Wavelength :	450 nm
Units :	PPB
# Rgt Blk :	0

Calibrators:

# of Cals :	4
# of Reps :	2

Concentrations:

#1 :	0.00 ppb
#2 :	0.25 ppb
#3 :	1.00 ppb
#4 :	5.00 ppb
Range :	0.10 – 5.00
Correlation :	0.990
Rep. %CV :	10%

NOTE: Prior to analysis the RPA-I User's Manual should be thoroughly reviewed for more detailed operation instructions.

2. Follow the instrument prompts to read the absorbance of all tubes:

Instrument Display	Operator Response
SELECT COMMAND RUN PROTOCOL	Press RUN Scroll using the YES [] or NO [] keys until the desired protocol appears. Then press ENTER
SPL. REPLICATES (1-5)	Press 1 (for analysis of samples in singlicate.) Press ENTER
BLANK TUBE, INSERT TUBE, EVALUATING TUBE, REMOVE TUBE (Beep)	Insert blank tube containing 1mL wash solution. Remove tube
CAL #1, REP. #1, INSERT TUBE, EVALUATING TUBE, REMOVE TUBE (Beep)	Insert Tube #1 Remove tube

Follow prompts to read tubes.

NOTE: Tube order is important. The RPA-I expects to see the standards in ascending order, in duplicate, starting with the negative control.

Following evaluation of all standards, the instrument will display:

PRINTING DATA,	Data will print
PRINTING CURVE	Curve will print only if programmed to print (See RPA1 User's Manual).
CTRL #1 REP #1, INSERT TUBE, EVALUATING TUBE, REMOVE TUBE (Beep)	Insert Control Tube Remove Tube
EDIT CALIBRATORS YES/NO	Press NO (if editing is necessary press YES and refer to the RPA1 User's Manual).
SPL #1 REP#1 INSERT TUBE EVALUATING TUBE REMOVE TUBE (Beep)	Insert first sample tube Remove tube

Continue to follow prompts. After all samples have been read, press STOP.

Expected Results:

- **%CV (coefficient of variation) between standard duplicates of 10% or less.**
- **Absorbance reading for the 0 ppb standard should be between 0.8 and 2.0 for all assays.**
- **Correlation (r) of 0.990 or greater for all assays.**
- **Kit control within range specified on vial.**
- **Absorbance of negative control and standards should be as follows:**

  Negative Control>Std. 1>Std. 2>Std. 3.

3. Concentrations will be indicated for all samples on the RPA-I printout.

   a) The concentration, as indicated on the printout, is multiplied by the appropriate dilution factor (if applicable) introduced in the procedure. The quantitation range of the kit is also multiplied by this factor.

EXAMPLE: Water samples were diluted 2-fold with methanol upon collection (see "Collect/Store the Sample" in this User's Guide). As a result, the concentrations listed on the printout should be multiplied by 2 to determine the sample concentration. The standard concentrations are also multiplied by 2 to give a quantitation range in water for this test kit of 0.5 to 10 ppb.

   b) Samples with an "nd" and no concentration listed have an absorbance greater than the negative control; therefore, no concentration can be computed for these samples. Results must be reported as < 0.5 ppb (or Standard 1 multiplied by the dilution factor.)

   c) Samples with an "nd" next to a listed concentration have an estimated concentration below the minimum detection level of the test kit. Results must be reported as <0.5 ppb (or Standard 1 multiplied by the dilution factor.)

NOTE: Any samples with concentrations determined to be lower than Standard 1 (the limit of quantitation) must be reported as < 0.5 (or Standard 1 multiplied by the dilution factor.) Quantitation is not possible below this standard as this is outside the linear range of the assay.

   d) Similarly, samples with a "hi" next to a listed concentration have an estimated concentration higher than Standard 3 and must be reported as >10 ppb (or Standard 3 multiplied by the dilution factor.)

NOTE: In order to determine the concentration of samples with concentrations greater than Standard 3, they must be subjected to repeat testing using a diluted sample. A ten-fold or greater dilution of the sample is recommended with an appropriate amount of PCB diluent. This additional dilution must then be taken into account when calculating the concentration. Please contact technical support for assistance in performing dilutions.

Photometric Interpretation Using Other Photometers

Other photometers may also be used to interpret results obtained from the RPA-I photometer. It is important that the photometer be able to read absorbance at 450nm and that the instrument can read at a 1 mL fill volume. Absorbances obtained from other spectrophotometers (reading at 450 nm) may be used to manually calculate sample concentrations as outlined below.

1. Calculate the mean absorbance for each of the three standards and the negative control.

2. Determine the standard deviation and %CV (coefficient of variation) of each standard and ensure %CV is less than 10% for each.

3. Calculate the %B/Bo for each standard by dividing the mean absorbance value for the standard by the mean absorbance value for the negative control and multiplying the results by 100.

4. Construct a standard curve by plotting the %B/Bo for each standard on the vertical logit (y) axis versus the corresponding analyte concentration on the horizontal logarithmic (x) axis on the graph paper provided in the test kit. **Graph papers are specific for each method. Use only the graph paper supplied with each kit.**

5. Draw the best straight line through all points. Using the %B/Bo of the sample, the concentration can be interpolated from the standard curve.

6. Multiply results by the appropriate dilution factor (if applicable) introduced in the procedure. For example, if the sample was diluted 10-fold to increase the detection levels of the kit then the results must be multiplied by 10. This dilution also changes the range of the assay (standards) by the same factor.

NOTE: Do not forget to account for the 2x dilution introduced in the "Collect/Store the Sample" procedure for water samples.

Limitations of the Procedure

The Rapid Assay® PCB Test Kit is a screening test **only**. Sampling error may significantly affect testing reliability. Adequate sample number and distribution are the responsibility of the analyst.

Ordering Information

Description	Catalogue Number
Rapid Assay® PCB Kit	A00133/A00134
Rapid Assay® Accessory Kit**	6050100
Adjustable Volume Pipet Tips (100-1000 uL)	A00013
12.5 mL Combitip for Repeating Pipette (1 each)	A00009
PCB Diluent	A00136
PCB Soil Proficiency Sample	A00175
Rapid Assay® Accessory Kit Rental	6997010
**** To obtain part numbers and pricing for individual items in the Accessory Kit contact SDI at the number below.**	

Ordering/Technical Assistance

Should you have any questions regarding this procedure prior to analysis contact Technical Service to avoid costly mistakes.

To Place an Order or Receive Technical Assistance, please call Strategic Diagnostics Inc. at:

Call toll-free **800-544-8881**

Or 302-456-6789 Phone
302-456-6782 Fax
Web site: www.sdix.com
E-mail: techservice@sdix.com

General Limited Warranty

SDI's products are manufactured under strict quality control guidelines and are warranted to be free from defects in materials and workmanship. New instruments and related non-expendable items are warranted for one year from date of shipment against defective materials or workmanship under normal use and service.
Warranty obligation is limited to repair or replacement of the defective product or to refund of the purchase price, at the discretion of SDI. Other warranties, express or implied, are disclaimed. SDI's liability under any warranty claim shall not exceed the refund of the purchase price paid by the customer. Under no circumstances shall SDI be liable for special, indirect or consequential damages.

Safety

To receive an MSDS for this product, visit our web site at www.sdix.com.

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Z00245.1, Rev 4/4/00

Operation of the Repeater Pipet

To Set or Adjust Volume

To determine the pipetting volume, the dial setting (1-5) is multiplied by the minimum pipetting volume of the tip (indicated on the side of the Combitip, e.g. 1~100 uL.)

To Assemble Pipet Tip

Slide filling lever down until it stops. Then raise the locking clamp and insert the tip until it clicks into position. Be sure the tip plunger is fully inserted into the barrel before lowering the locking clamp to affix the tip in place.

To Fill Tip

With tip mounted in position on pipet, immerse end of tip into solution. Slide filling lever upward slowly. Combitip will fill with liquid.

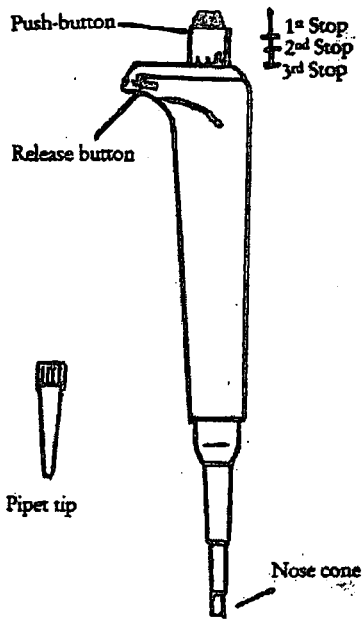
To Dispense Sample

Check the volume selection dial to ensure pipetting volume. Place tip inside test tube so that tip touches the inner wall of tube. Completely depress the pipetting lever to deliver sample. NOTE: Dispense one portion of reagent back into the container to engage the ratchet mechanism and ensure accuracy.

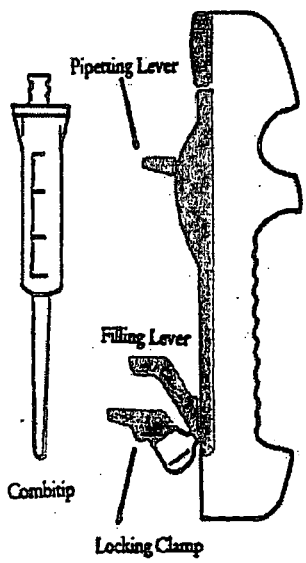
To Eject Tip

Empty tip of any remaining solution into appropriate container by pushing filling lever down. Raise locking clamp upward, and remove the Combitip.

Adjustable Volume Pipet



Repeater Pipet



Operation of the Adjustable Volume Pipet

To Set or Adjust Volume

Press release button on side of pipette and turn the push-button to adjust volume up or down. Volume setting is displayed on top of pipet. See kit instructions for appropriate setting. Pipet will accurately dispense volumes between 100 and 1000 uL.

To Assemble Pipet Tip

Gently push nose cone of pipet firmly into a pipet tip contained in the pipet tip rack.

To Withdraw Sample

Keep pipet almost vertical. With tip mounted in position on pipet, press push-button to 1st stop and hold it. Place tip at bottom of liquid sample and slowly release push-button to withdraw measured sample. Ensure that no air bubbles exist in the pipette tip. If bubbles exist, dispense sample and re-withdraw. Slide tip out along the inside of the vessel.

To Dispense Sample

Wipe any liquid from outside of tip taking care not to touch orifice. Place tip into tube, almost to the bottom, and slowly press push-button to 2nd stop. Hold push-button at 2nd stop when removing tip from tube.

To Eject Tip

Press push-button to 3rd stop. Tip is ejected.

STRATEGIC DIAGNOSTICS INC.

RaPID Assay® PCB In Soil Application

Intended Use

For detection of Polychlorinated Biphenyls (PCB's) (as Aroclor 1254) in soil. For testing in other matrices, please contact our technical support department at 1-800-544-8881.

Materials Required but Not Provided

SDI Sample Extraction Kit
(Part Number: A00137EA/A00137EB)

Procedural Notes and Precautions

- Prepare soil samples for analysis according to the procedure in the SDI Sample Extraction Kit Users Guide.
- After extraction and dilution of samples, follow the immunoassay procedure as described in the Rapid Assay ® PCB Test Kit User's Guide.
- The initial 2x dilution described for water samples in Step 1 of "Collect/Store the Sample" does not need to be performed for soil samples.

Quality Control

A control solution at approximately 3 ppb (as Aroclor 1254) is provided with the PCB RaPID Assay® Kit. It is recommended that it be included in every run and treated in the same manner as unknown samples. If running standard soil procedures an acceptable result should be 2000 times the value stated on the control vial (i.e. 6.0 + or – 1.2 ppm) when the control results are corrected for the dilution factors (see Results section below).

Results Interpretation

Interpret soil sample results as described in the RaPID Assay® PCB Test Kit procedure, accounting for the total dilution factor indicated in the table of the SDI Sample Extraction Kit Users Guide. Alternatively, program the RPA-1 Analyzer as listed below to automatically correct for this dilution factor.

1. The RPA-I photometer (provided in the Rapid Assay® Accessory kit) can be used to calculate and store calibration curves. To obtain soil results from the PCB Rapid Assay® test kit on the RPA-I the following parameter settings are recommended:

Data Reduct:	Lin. Regression
Xformation :	Ln/LogitB
Read Mode :	Absorbance
Wavelength :	450 nm
Units :	PPM
# Rgt Blk :	0

Calibrators:

# of Cals :	4
# of Reps :	2

Concentrations:

#1 :	0.00 PPM
#2 :	0.50 PPM
#3 :	2.00 PPM
#4 :	10.00 PPM
Range :	0.5 – 10.00
Correlation :	0.990
Rep. %CV :	10%

Performance Data

The PCB RaPID Assay® does not differentiate between PCB and other related compounds. The table below shows compounds at the method detection limit (MDL) which is the lowest concentration of the compound in soil that can be picked up in the assay. The limit of

quantitation (LOQ) is an approximate concentration required to yield a positive result at the lowest standard, this is the lowest concentration of the compound in soil that can be quantified in the assay. The IC50 is the concentration in soil required to inhibit one half of the color produced by the negative control. It is also used to calculate cross-reactivity values to similar compounds.

Compound	MDL (ppm)	LOQ (ppm)	IC50 (ppm)
Aroclor 1254	0.20	0.5	3.60
Aroclor 1260	0.20	0.3	2.30
Aroclor 1248	0.22	0.6	4.22
Aroclor 1242	0.34	1.2	8.80
Aroclor 1262	0.36	0.7	4.74
Aroclor 1232	0.84	2.6	18.76
Aroclor 1268	0.92	3.0	21.80
Aroclor 1016	0.94	3.6	25.60
Aroclor 1221	13.54	22.6	162.6

Soil Contaminants

Some contaminants found in soils that also contain PCB's can interfere with the analysis and cause false positives, false negatives or both when the compound is present at elevated concentrations. Interferences were assessed by adding increasing concentrations of some relevant contaminants to blank and PCB spiked soils prior to the extraction procedure. The concentration of the compound shown below produced no evidence of interference in a positive or negative direction in the 500 ppb to 10 ppm detection range of the procedure described above.

soil contaminant	concentration in soil producing no interference
trichloroethylene	100,000 ppm or 10%
gasoline	25,000 ppm or 2.5%
transformer oil	5,000 ppm or 0.5%
1-chloronapthalene	2,000 ppm or 0.2%
1,2,4 trichlorobenzene	1,000 ppm or 0.1%
diesel fuel	1,000 ppm or 0.1%

If additional dilutions of the soil extract are made to detect soil PCB concentrations greater than 10 ppm, these interferences are diminished in direct proportions to the dilution made.

Range of Detection

The PCB RaPID Assay® has a range of detection in soil of 500 ppb to 10 ppm (as Aroclor 1254) when used in conjunction with the SDI Sample Extraction Kit.

Recovery

PCB recoveries will vary depending on soil type, retention mechanism, solvent and extraction apparatus used, length of extraction period and levels of potentially interfering substances in the soil.

STANDARD OPERATING PROCEDURE
NUMBER CTO467-08

MANAGEMENT OF INVESTIGATION-DERIVED WASTE

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes how investigation-derived waste (IDW) will be collected, segregated, classified, and managed during the field investigations at the NSWC Crane facility. The following types of IDW will be generated during this investigation:

- Decontamination solutions
- Personal protective equipment and clothing (PPE)
- Miscellaneous trash and incidental items

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

Health and safety equipment (with PPE)
Decontamination equipment
Field logbook and indelible ink pen
Plastic sheeting and/or tarps
55-gallon drums with sealable lids
IDW labels for drums
Wastewater container tanks
Plastic garbage bags

3.0 PROCEDURES

Management of IDW includes the collection, segregation, temporary storage, classification, final disposal, and documentation of the waste-handling activities if necessary.

3.1 Liquid Wastes

Liquid wastes that will be generated during the site activities include decontamination solutions from sampling equipment. These wastes will be collected and transported to a central location at NSWC

Crane (adjacent to a Crane-designated sanitary sewer manhole). The water will be discharged to the sewer by gravity draining.

3.2 PPE and Incidental Trash

All PPE wastes and incidental trash materials (e.g., wrapping or packing materials from supply cartons, waste paper) will be decontaminated (if contaminated), double bagged, securely tied shut, and placed in a designated waste receptacle at NSWC Crane.

APPENDIX B

LES/TOLTEST JV STANDARD OPERATING PROCEDURES

APPENDIX B

LES/TOLTEST JV SOP TABLE OF CONTENTS

SOP 03-03	Decontamination of Hand Tools and Drilling Equipment
SOP 08-03	Soil Sampling
SOP 08-10	Packaging and Shipment of Field Samples
SOP 08-16	Chain-of-Custody Preparation

STANDARD OPERATING PROCEDURE (SOP) 3-3

STANDARD DECONTAMINATION OF HAND TOOLS AND DRILLING EQUIPMENT

1.0 Purpose

The purpose of this procedure is to provide necessary information for the proper decontamination of drilling equipment and hand tools used in Standard investigations and to ensure that chemical analysis results are reflective of the actual concentrations present at sampling locations.

2.0 Scope

This procedure addresses decontamination of drilling equipment and hand tools only. Drilling equipment and hand tools used in sampling activities must be properly cleaned and decontaminated. This will minimize the potential for cross-contamination between sampling locations and the transfer of contamination off site.

3.0 References

- U.S. Environmental Protection Agency, December 1987, *A Compendium of Superfund Standard Operations Methods,* EPA/540/P-87/001.
- U.S. Environmental Protection Agency, November 1986, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, EPA SW-846, Third Edition.
- U.S. Environmental Protection Agency, September 1986. *Resource Conservation and Recovery Act (RCRA) Ground Monitoring Technical Enforcement Guidance Document,* OSWER-9950.1.

4.0 Definitions

Negative contamination - Occurs when the measured concentration of the analyte is artificially reduced as a result of volatilization, adsorption and related losses.

Positive contamination - Occurs when the measured concentration of the analyte is artificially high due to leaching or the introduction of foreign matter into the sample.

Cross-contamination - Is a type of positive contamination caused by the introduction of a contaminant into a sample during collection or storage.

Detergent - A standard brand of non-phosphate laboratory-grade detergent such as Alconox or Liquinox.

Acid solution - A reagent-grade acid and deionized water.

Solvent - A pesticide-grade solvent.

Potable water - Water that is suitable for drinking.

Deionized analyte-free water - Ion free, organic free water.

5.0 Responsibilities

5.1 Project Manager

The Project Manager is responsible for ensuring that decontamination procedures for all hand tools and drilling equipment are established prior to the actual Standard effort. Standard personnel should be briefed and trained to execute the task.

5.2 Standard Associate

The Standard Associate is responsible for ensuring that project-specific plans and the implementation of Standard investigations are in compliance with this procedure.

6.0 Equipment

- Portable high-pressure steam or hot water generator
- Insulated gloves
- Laboratory-grade non-phosphate detergent
- Potable water
- Deionized water
- Sheet plastic
- Methanol
- Scrub brushes
- Five to 10-gallon bucket

7.0 Procedure

All equipment involved in Standard sampling activities will be decontaminated prior to drilling, excavation and sampling activities. Such equipment includes drilling rigs, backhoes, down-hole tools, augers, and hand tools.

7.1 Steam Cleaning

Prior to drilling or leaving the site, equipment not directly utilized for sampling will be decontaminated at a designated area. This includes drilling rigs, augers, backhoes, hand tools and down-hole tools. The decontamination area will be designed to contain decontamination wastes and waste waters, and can be a lined excavated pit or a bermed concrete or asphalt pad. A shallow, above-surface tank may be used or a pumping system with discharge to a waste tank may be installed.

The location of the decontamination area will be identified in the Project Work Plan. Transport vehicles used on site for personnel and/or equipment will be cleaned prior to leaving the site. Decontamination wastes will be collected and contained for eventual treatment on site and/or disposal at an approved facility in accordance with the project work plan or proposal.

7.2 Equipment Decontamination

Procedure for decontamination of equipment that does not come into contact with the sample medium will include:

1. Cleaning with high-pressure steam or hot water cleaner;
2. Washing with potable water and a non-phosphate laboratory-grade detergent; and
3. Rinsing with potable water.

The drill rig, augers, and all down-hole equipment will be steam cleaned prior to entering the site and will be decontaminated in accordance with this procedure before work is begun. Prior to use on each site, the rig will be decontaminated as described. All down-hole equipment will be decontaminated between each borehole.

8.0 Attachments

None.

STANDARD OPERATING PROCEDURE (SOP) 8-3

SOIL SAMPLING (SURFACE SOILS, HAND AUGER AND GRAB SAMPLING)

TOLTEST, INC.	Procedure No:	Rev. No:	Page No:
)	SOP 8-3	0	1 of 4
	Effective Date: June 1, 2001		
SOIL SAMPLING (SURFACE SOILS, HAND AUGER AND GRAB SAMPLING	Reviewed By:		
	Approved By:		

1.0 Purpose

The purpose of this procedure is to outline the requirements for sampling surface soils, hand auger sampling, and grab sampling of soils. Soil sampling for environmental projects is normally conducted to define soil types and geological characteristics present in the subsurface and to determine the nature and extent of soil contamination. Soil samples are collected at individual sampling locations across the surface area of investigation as well as at various depths within each sample location to characterize conditions and features.

2.0 Scope

Soil sampling is potentially applicable to any hazardous waste site. A variety of sampling techniques is available for collection of soil samples. These include grab sampling, split-spoon sampling, collection of hand augured soil samples, Shelby tube sampling, and continuous coring.

Collection of surface samples may require no special sampling equipment or highly detailed procedures. Samples may be obtained on or in the vicinity of a hazardous waste site and should be representative of the nature of local surface soils or sediment.

3.0 References

- U.S. Environmental Protection Agency (EPA), 1987, *A Compendium of Superfund Field Operation Methods.*

4.0 Definitions

Auger Cuttings - soil brought to the surface by the action of the augers as they are drilled into the ground.

Hazardous Waste Sample - medium to high concentration sample (e.g., source material, sludge, leachate) requiring DOT labelling and off-site laboratory handling as a high hazard sample.

5.0 Responsibilities

5.1 Project Manager

The Project Manager is responsible for overall management of field activities and ensuring that appropriate soil sampling procedures are followed.

5.2 Site Geologist

The Site Geologist directly supervises sampling procedures, classifies soil and rock samples, and directs the packaging and sealing of soil and rock samples for shipment to an off-site laboratory. Such duties may also be performed by the on-site geotechnical engineer or Field Associate as required by an individual project.

6.0 Equipment

The following pieces of equipment may be needed to collect samples:

- Drilling equipment - capable of collecting depth-specific samples
- Stainless steel hand auger, shovel, AMS sampling equipment or post-hole digger
- Teflon® tape
- Teflon® or stainless steel spatula or short, hand-pushed core tube
- Stainless steel bowl or Teflon® mixing bowl
- Organic vapor monitoring device (photoionization detector or organic vapor analyzer)
- Appropriate sampling containers
- Reclosable plastic bags
- Decontamination supplies as specified in TolTest SOP 3-1 and/or the project work plan or sampling plan.
- Field logbook and field sampling forms

7.0 Procedure

The soil sample collection point in the field should be within two feet horizontally of the pre-determined sample location identified in the proposal or work plan. The final location of the sampling point should be defined by surveying or measuring from previously surveyed points following procedures outlined in TolTest SOP 1-6, Site Surveying and Mapping. The accuracy of the soil sampling point location will be determined by the data quality objectives. Sample collection information should be recorded in the field logbook and in the sampling forms.

Surface/air contact may be minimized by placing the sample in an airtight container immediately after collection.

Sampling and sample preparation equipment will be decontaminated in accordance with TolTest SOP 3-3, Decontamination of Manual Sampling and Drilling Equipment, prior to and after each sample is collected unless disposable equipment is used.

If necessary or required, soil sample locations can be permanently identified using a brass surveyor's pin or equivalent permanent marker inscribed with the boring location identification number and placed in a concrete form. Depth-profile sampling must comply with the above requirements. Care must be taken to prevent cross-contamination and misidentification of samples. Vertical depth control tolerances are specified in the TolTest Quality Assurance/Quality Control Manual.

Sampling equipment should be decontaminated by following TolTest SOP 3-1, Decontamination of Ground-Water and Soil Sampling Equipment.

7.1 Surface Soils Sampling Methods

Samples of surface soils should be collected from the ground surface to a depth of approximately six inches. Samples may be collected using a short, hand-pushed core tube or a stainless steel or polyethylene scoop or shovel. Disposable equipment is preferred, especially if the materials are heavily contaminated. Reused sampling equipment must be decontaminated between uses as describe in TolTest SOP 3-1.

7.2 Hand Augered Sampling Methods

Decontaminated equipment will be used to collect the soil sample. A hand auger consists of a sample bucket attached to the bottom of a length of steel pipe that has a crossbar (handle) at the top. A hole is drilled by turning this crossbar at the same time the operator presses the auger into the ground. The hand auger is driven to the desired depth, which is usually within a few feet of the surface.

Hand-augured samples can be collected directly from the auger bucket or from liners placed within the auger bucket. Liners can be two, four, or six inches in length. The liner for volatile organic analyses is sealed with Teflon® tape and plastic end caps, labeled and sent for analysis.

Geologic data must be maintained on the TolTest Soil Boring Log (see SOP 6-3). Hand auger buckets normally are 6 inches in length. As a result, four individual sample intervals can be obtained over a two-foot section of a boring. Samples from these intervals can be analyzed individually or composited as required by the work plan.

Soil samples that are not to be analyzed for volatile organics are placed in a stainless steel bowl and homogenized with a stainless steel spoon or Teflon® spatula. Large pebbles and cobbles should be removed from the sample. The composite samples for chemical analyses are placed in appropriate containers.

Place the samples on ice in a cooler maintained at 4° Celsius (°C).

Note the sample identification, sample location (provide sketch), sampling time, and sampling personnel in the Field Logbook.

After auguring and sampling activities are completed, the borehole will be filled using soil cuttings, granulated bentonite or concrete as specified in the work plan or proposal. The ground surface will be restored to its original condition. Sampling equipment should be decontaminated following TolTest SOP 3-1, Field Decontamination of Groundwater and Soil Sampling Equipment.

7.3 Grab Sampling Methods

Grab samples are usually obtained from auger cuttings as they are brought to the surface by the continuous flight augers during rotary drilling activities. Careful determination of the sample's depth must be made based on the speed of the augers and visual assessment of previous cuttings.

Soil samples that are not to be analyzed for volatile organics are placed in a stainless steel bowl and homogenized with a stainless steel spoon or Teflon® spatula. Large pebbles and cobbles should be removed from the sample. The composite samples for chemical analyses are placed in appropriate containers.

Place the samples on ice in a cooler maintained at 4°C.

Note the sample identification, sample location (provide sketch), sampling time, and sampling personnel in the Field Logbook.

8.0 Attachments

None.

STANDARD OPERATING PROCEDURE (SOP) 8-10

PACKAGING AND SHIPMENT OF FIELD SAMPLES

1.0 Purpose

The purpose of this procedure is to define the requirements necessary to properly package environmental samples and provide the necessary chain-of-custody records used in sample transfers.

2.0 Scope

This procedure applies to the packaging, shipping and documentation of samples being transferred from the field to the laboratory for analysis. Specifically, this document outlines shipping and sample documentation procedures that are in accord with the U.S. Department of Transportation (DOT). This procedure is also applicable to all samples taken from uncontrolled hazardous substance sites for analysis at laboratories away from the site; however, this procedure does not take precedence over region-specific or site-specific requirements for sample transportation and chain-of-custody documentation.

Careful packaging, shipping and documentation are necessary to insure that all samples received are undamaged and authentic. Transportation of environmental samples requires proper selection of shipping method, containerization and container seal materials.

3.0 References

U.S. Department of Transportation, 1983. *Hazardous Materials Regulations,* 49 CFR 171- 177.

4.0 Definitions

Carrier - A person or firm engaged in the transportation of passengers or property.

Chain-of-custody record form - A printed form that accompanies a sample or group of samples as custody of the sample(s) is transferred from one custodian to the subsequent custodian. Attachment 8-10A shows a TolTest chain-of-custody form. The chain-of-custody record form is a controlled document. One copy of the form must be retained in the project file.

Custodian - The person responsible for the custody of samples at a particular time, until custody is transferred to another person (and so documented), who then becomes custodian. A sample is under

your custody if:

- You possess the sample.
- It is in your view after being in your physical possession.
- It was in your physical possession and then you locked it up to prevent tampering.
- You have designated and identified a secure area to store the sample.

Environmental sample - low concentration sample typically collected off site and not requiring DOT hazardous waste labelling as a high hazard sample.

Hazardous waste sample - medium or high concentration sample (e.g., source material, sludge, leachate) requiring DOT labelling and contract lab handling as a high hazard sample.

Hazardous material - A substance or material in a quantity and form which may pose an unreasonable risk to health and safety or property when transported. Defined and regulated by DOT (49 CFR 173.2) and listed in Attachment 8-10B.

Hazardous waste - Any substance listed in 40 CFR Subpart D (261.30 et seq) or 40 CFR otherwise characterized as ignitable, corrosive, reactive, or EP toxic as specified under Subpart C (261.20 et seq) that would be subject to manifest requirements specified in 40 CFR 262. Defined and regulated by the Environmental Protection Agency (EPA).

Marking - Applying the descriptive name, instructions, cautions, weight, or specification marks or combination thereof required to be placed outside containers of hazardous materials.

Packaging - The assembly of one or more containers and any other components necessary to assure compliance with the minimum packaging requirements of 49 CFR 172, including containers (other than freight containers or overpacks), portable tanks, cargo tanks, tank cars, and multi-unit tank car tanks.

Placard - Color-coded, pictorial sign depicting the hazard class symbol and name to be placed on all four sides of a vehicle transporting certain hazardous materials.

Reportable quantity (RQ) - A parenthetical note of the form "(RQ-1000/454)" following an entry in the DOT Hazardous Materials table (49 CFR 172.101) indicates the reportable quantity of the substance in pounds and kilograms. If a spill of that amount or more of the substance occurs during transit or storage, a report must be filed with DOT according to 171.15-17 concerning hazardous material incident reports. If the material spilled is a hazardous waste, a report must always be filed, regardless of the amount, and must include a copy of the manifest. If the RQ notation appears, it must be shown either immediately before or after the proper shipping name on the shipping paper (or manifest). Most shipping papers and manifests will have a column designated "HM" which may be used for this purpose.

Sample - A sample is physical evidence collected from a facility or the environment, which is representative of conditions at the point and time that it was collected.

5.0 Responsibilities

5.1 Project Manager

The Project Manager is responsible for determining that samples are properly packaged and shipped and for determining that the chain-of-custody procedures are implemented from the time the samples are collected to their release to the shippers.

5.2 Field Associate

The Field Associate is responsible for implementing the packaging and shipping requirements and for initiating the chain-of-custody records until they are relinquished to another custodian, to the shipper, or to the carrier.

6.0 Equipment

- Coder
- Teflon® and nylon strapping tape
- Vermiculite or styrofoam packaging materials
- Bubble pack
- Sampling gloves
- Poly-net
- Reclosable plastic bags
- Permanent felt tip marker
- Pen, black permanent ink
- Shipping coolers
- Ice or blue ice

7.0 Procedure

7.1 Sample Packaging and Shipping

Samples collected for shipment from a site should be classified as either environmental or hazardous material (or waste) samples. In general, environmental samples are collected off site (for example, from streams, ponds, or wells) and are not expected to be grossly contaminated with high levels of hazardous materials. On-site samples (for example, soil, water, and materials from drums or bulk storage tanks,

obviously contaminated ponds, lagoons, pools, and leachates from hazardous waste sites) are considered hazardous. A distinction must be made between the two types of samples in order to:

1. Determine the appropriate procedures for transportation of samples. If there is any doubt, a sample should be considered hazardous and shipped accordingly.

2. Protect the health and safety of laboratory personnel receiving the samples. Special precautions are used at laboratories when samples other than environmental samples are received.

7.2 Environmental Samples

7.2.1 Packaging

1. Environmental samples may be packaged following the procedures outlined in Section 7.4 for samples classified as "flammable liquids" or "flammable solids". Requirements for marking, labeling, and shipping papers do not apply. Environmental samples may also be packaged without being placed inside metal cans as required for flammable liquids or solids.

2. Place the sample container, properly identified and with a sealed lid, in a polyethylene bag and seal the bag.

3. Place the sample in a fiberboard container or cooler which has been lined with a large polyethylene bag and contains ice, blue ice packs or frozen bottled water.

4. Pack with enough noncombustible, absorbent, cushioning materials to minimize the possibility of the container breaking.

5. Seal the large polyethylene bag.

6. Seal or close the outside container.

7.2.2 Marking/Labeling

Sample containers must have a completed sample identification and the outside container must be marked "Environmental Sample." The appropriate side of the container must be marked "This End Up" and arrows placed appropriately. No DOT markings or labeling are required.

7.2.3 Shipping Papers

No DOT shipping papers are required. However, the appropriate chain-of-custody forms must be included with the shipment. Core must be taken to obtain and list the correct laboratory address on shipping documents. In addition, the type of shipment method (overnight, second day air, regular mail) must be specified as required by the project.

7.2.4 Transportation

There are no DOT restrictions on mode of transportation.

7.3 Determination of Shipping Classification for Hazardous Material Samples

Samples not determined to be environmental samples, or samples known or expected to contain hazardous materials, must be considered hazardous material samples and transported according to the requirements listed below.

7.3.1 Known Substances

If the substance in the sample is known or can be identified, package, mark label, and ship according to the specific instructions for that material (if it is listed) in the DOT Hazardous Materials Table, 49 CFR 172.101.

The following steps are provided to help in locating a proper shipping name from the Hazardous Materials Table, 48 CFR 172.101.

1. Look first for the chemical or technical name of the material, for example, ethyl alcohol. Note that many chemicals have more than one technical name; for example, perchloroethylene (not listed in 172.101) is also called tetrachloroethylene (listed in 172.101). It may be useful to consult a chemist for all possible technical names a material can have. If your material is not listed by its technical name, then

2. Look for the chemical family name. For example, pentyl alcohol is not listed, but the chemical family name is alcohol, n.o.s. (not otherwise specified). If the chemical family name is not listed, then

3. Look for a generic name based on end use. For example, Paint, n.o.s. or Fireworks, n.o.s. If a generic name based on end use is not listed, then

4. Look for a generic family name based on end use. For example, Drugs, n.o.s. or Cosmetics, n.o.s. Finally if your material is not listed by a generic family name but you suspect or know the material is hazardous because it meets the definition of one or more hazard classes, then

5. You will have to go to the general hazard class for a proper shipping name. For example, Flammable Liquid, n.o.s., or Oxidizer, n.o.s.

7.3.2 Unknown Substances

For samples of hazardous substances of unknown content, select the appropriate transportation category according to the DOT Hazardous Materials Classification (Attachment 8-10B), a priority system of transportation categories.

The correct shipping classification for an unknown sample is selected through a process of elimination, utilizing Attachment 8-10B. Unless known or demonstrated otherwise (through the use of radiation survey instruments), the sample is considered radioactive and appropriate shipping regulations for "radioactive materials" are followed.

If radioactive material is eliminated, the sample is considered to contain "Poison A" materials (Attachment 8-10C), the next classification on the list. DOT defines "Poison A" as extremely dangerous poisonous gases or liquids of such a nature that a very small amount of gas, or vapor of the liquid, mixed with air is dangerous to life. Most Poison A materials are gases or compressed gases and would not be found in drum-type containers. Liquid Poison A would be found only in closed containers; however, all samples taken from closed drums do not have to be shipped as Poison A, which provides for a "worst case" situation. Based upon information available, a judgement must be made whether a sample from a closed container is a Poison A.

If Poison A is eliminated as a shipment category, the next two classifications are "flammable" or "nonflammable" gases. Since very few gas samples are collected, "flammable liquid" would be the next applicable category. With the elimination of radioactive material, Poison A, flammable gas, and nonflammable gas, the sample can be classified as flammable liquid (or solid) and shipped accordingly. These procedures would also suffice for shipping any other samples classified below flammable liquids in the DOT classification table (Attachment 8-10B). For samples containing unknown materials, categories listed below flammable liquids/solids on Attachment 8-10B are generally not used because showing that these materials are not flammable liquids (or solids) requires flashpoint testing, which may be impractical and possibly dangerous at a site. Thus, unless the sample is known to consist of material listed as less hazardous than flammable liquid (or solid) on Attachment 8-10B, it is considered a flammable liquid (or solid) and shipped as such. For any hazardous material shipment, utilize the shipping checklist as a guideline to ensure that all sample-handling requirements are satisfied.

7.4 Packaging and Shipping of Samples Classified as Flammable Liquid (or Solid)

7.4.1 Packaging

Applying the word "flammable" to a sample does not imply that it is in fact flammable. The word prescribes the class of packaging according to DOT regulations.

1. Collect the sample in the prescribed container with a nonmetallic, Teflon®-lined screw cap. To prevent leakage, fill container no more than 90% full. If an air space in the sample container would affect sample integrity, place that container within a second container to meet the 90% requirement.

2. Complete the sample label and identification tag and attach it securely to the sample container.

3. Seal the container and place in a 2-ml thick (or thicker) polyethylene bag, one sample per bag. Position identification tag so that it can be read through the bag. Seal the bag.

4. Place the sealed bag inside the metal can and cushion it with enough noncombustible, absorbent material (for example, vermiculite or diatomaceous earth) between the bottom and sides of the can and bag to prevent breakage and absorb any leakage. Pack one bag per can. Use clips, tape, or other positive means to hold can lid securely, tightly and permanently. Mark the can as indicated in Paragraph 1 of Section 7.4.2, below.

5. Place one or more metal cans (or a single 1-gallon bottle) into a strong outside container, such as a cooler or a DOT-approved fiberboard box. Surround the cans with noncombustible, absorbent cushioning material for stability during transport. Mark containers as indicated in Paragraph 2 of Section 7.4.2.

7.4.2 Marking/Labeling

1. Use abbreviations only where specified. Place the following information, either-hand printed or in label form, on the metal can (or the 1-gallon bottle):

   - Laboratory name and address.
   - "Flammable Liquid, n.o.s. UN1993" or "Flammable Solid, n.o.s. UN1325".

Not otherwise specified (n.o.s.) is not used if the flammable liquid (or solid) is identified. Then the name of the specific material is listed before the category (for example, Acetone, Flammable Liquid), followed by its appropriate UN number found in the DOT hazardous materials table (49 CFR 172.101).

Place all information on the outside shipping container as on the inner can (or bottle), specifically:

- Proper shipping name.

- UN or NA number.
- Proper label(s).
- Addressee and sender.

Place the following labels on the outside container: "Cargo Aircraft Only" and "Flammable Liquid" (or "Flammable Solid"). "Dangerous When Wet" label should be used if the solid has not been exposed to a wet environment. "Laboratory Samples" and "THIS SIDE UP" or "THIS END UP" should also be marked on the top of the outside container, and upward-pointing arrows should be placed on all sides of the container.

7.4.3 Shipping Papers

1. Use abbreviations only where specified. Complete the carrier-provided bill of lading and sign the certification statement (if the carrier does not provide one then use the standard industry form, see Attachment 8-10D). Provide the following information in the order listed (one form may be used for more than one exterior container).

   - "Flammable Liquid, n.o.s. UN1993" or "Flammable Solid, n.o.s. UN1325).
   - "Limited Quantity" (or "Ltd. Qty.")
   - "Cargo Aircraft Only
   - Net weight (wt) or net volume (vol), just before or just after "Flammable Liquid n.o.s." or "Flammable Solid, n.o.s.," by item, if more than one metal can is inside an exterior container
   - "Laboratory Samples" (if applicable)

2. Include the chain-of-custody record, properly executed in the outside container.

3. "Limited Quantity" or "Flammable Liquid, n.o.s." is limited to one pint per inner container. For "Flammable Solid, n.o.s.", the net weight of the inner container plus the sample should not exceed one pound; total package weight should not exceed 25 pounds.

7.4.4 Transportation

1. Transport unknown hazardous substance samples classified as flammable liquids by rented or common carried truck, railroad, or express overnight package services. Do not transport by any passenger-carrying air transport system, even if they have cargo-only aircraft. DOT regulations permit passenger airline company cargo only aircraft, but difficulties with most of these suggest avoiding them. Instead, ship by airline carriers that only carry cargo.

2. For transport by government-owned vehicle, including aircraft, DOT regulations do not apply. However, procedures described above, with the exception of execution of the bill of lading with certification, should still be used.

7.5 Packaging and Shipping Of Samples Classified as Poison "A"

This packaging, marking, labeling, and shipping method provides a worst-case procedure for materials classed as Poison A (49 CFR 173.328). In the absence of reliable data that exclude the possibility of the presence of Poison A chemicals or compounds (see Attachment 8-10C), these procedures must be followed.

7.5.1 Packaging

Applying the word "poisonous" to a sample does not imply that it is, in fact, poisonous, or how poisonous. It describes the class of packaging according to DOT regulations.

1. Collect samples in a polyethylene or glass container with an outer diameter narrower than the valve hole on a DOT specification #3A1800 or #3AA1800 metal cylinder. To prevent leakage, fill the container no more than 90% full. Seal the sample container.

2. Complete the sample label and identification tag and attach it securely to the sample container.

3. Attach a string or flexible wire to the neck of the sample container and lower it into the metal cylinder partially filled with noncombustible, absorbent cushioning material (for example, diatomaceous earth or vermiculite). Place only one container in the metal cylinder. Pack with enough absorbing material between the bottom and sides of the sample container and the metal cylinder to prevent breakage and absorb any leakage. After the cushioning material is in place, drop the end of the string into the cylinder valve hole.

4. Replace the valve, torque to 250 ft-lb (for 1-inch opening), and replace valve protector on the metal cylinder, using Teflon® tape.

5. Mark and label the cylinder as described in Paragraph 1 of Section 8.5.2.

6. Place one or more of the cylinders in a DOT-approved outside container.

7. Mark and label the outside container and complete all shipping papers as described below.

7.5.2 Marking/Labeling

1. Use abbreviations only where specified. Place the following information, either hand-printed or in label form, on the side of the cylinder or on a tag wired to the cylinder valve protector.

- "Poisonous Liquid, n.o.s." or "Poisonous Gas, n.o.s. NA9035".
- Laboratory name and address.
- DOT label "Poisonous Gas" (even if sample is liquid) on the cylinder.

2. Put all information contained on the metal cylinder on the outside container. Print "Laboratory Sample" and "Inside Packages Comply With Prescribed Specifications" on the top and/or front of the outside container. Mark "THIS SIDE UP" on top of the container and place upward-pointing arrows on all four sides.

7.5.3 Shipping Papers

1. Use abbreviations only as specified. Complete a carrier-provided bill of lading and sign the certification statement (if the carrier does not provide one, use a standard industry form, see Attachment 8-10D). Provide the following information in the order listed. One form may be used for more than one exterior container.)
   - "Poisonous Liquid, n.o.s. NA9035."
   - "Limited Quantity" (or "Ltd. Qty.").
   - Net weight (wt) or net volume (vol), just before or after "Poisonous Liquid, n.o.s.", of each cylinder, if more than one is inside the outer container.

2. Include a chain-of-custody record, properly executed, in the container or with the cylinder.

3. Accompany the shipping container to the carrier and, if required, open the outside container(s) for inspection.

7.5.4 Transportation

Transport any unknown hazardous substance samples classified as Poison A only by ground transport or government-owned aircraft. Do not use air cargo, other common-carrier aircraft, or rented aircraft.

7.6 Transport of Investigation and Remediation Wastes

The packaging, marking, labeling, and other shipping requirements will depend on the particular waste to be transported. Examples of wastes which may be generated during the site investigations are decontamination or cleaning solutions, contaminated disposable items, test pit spoils, drilling cuttings or fluids and contaminated monitoring well discharges. Waste materials from remediation include excavation spoils, overpacked drums and discharges from drained lagoons or tanks.

In many cases, wastes generated during site investigations will be disposed of on site. These relatively small volumes of waste will be dealt with as part of the waste to be cleaned up or isolated during remediation. This avenue should be pursued, if feasible, to avoid the inconvenience of transportation and disposal which are disproportionately expensive for small volumes. If such a solution is approved,

materials should be properly bagged, drummed, covered, buried, or otherwise contained at the end of each day. Those materials which must be transported for treatment, storage, or disposal should be packaged, labeled and marked in accordance with applicable regulations.

Many wastes generated during site investigations and remediation activities will probably be adequately handled under the classification "ORM-E" (i.e., other regulated materials, type E). Types of wastes which would normally fall under this classification are contaminated disposable protective clothing and sampling equipment, spent soapy decontamination solutions and rinses, contaminated drilling cuttings or fluids and contaminated soils excavated during site investigations or remediation.

Spent solvents used for decontamination of sampling equipment (e.g., acetone or methanol) should be referenced by the actual product name. Liquids from drums or tanks should be specified as accurately as possible based on results of lab analysis or reliable records. If the liquid is known to be a solvent, organic liquid, or spent distillation bottoms, it should be referenced by its actual or generic name from the Hazardous Materials Table. In cases requiring emergency actions where the identity of a substance is not accurately know, place the substance in one of the general hazard classes in 49 CFR 173.2. The choice of class should be conservative; that is, use the highest priority class based on available information as described in Section 7.3.2.

The following steps for preparing hazardous materials for shipment were extracted from the "Hazardous Materials Transportation Guide for Shippers" published by the U.S. DOT. References are to CFR Title 49:

1. Determine the Proper Shipping Name

   The shipper must determine the proper shipping name of the materials as listed in the Hazardous Materials Table, 172.101, Column (2).

2. Determine the Hazard Class or Classes

   a. Refer to the Table, 172.101, Column (3) and locate the hazard class of the material or follow the steps described in Section 7.3.2 of this Guideline.

   b. If more than one class is shown for the proper shipping name, determine the proper class by definition.

   c. If the material has more than one hazard, classify the material based on the order of hazards in 173.2.

3. Select the Proper Identification Number

   a. Refer to the Table, 172.101, Column (3a) and select the Identification Number (ID) that corresponds to the proper shipping name and hazard class.

   b. Enter the ID Number(s) on the shipping papers and display them, as required, on packaging or placards.

4. Determine the Mode(s) of Transport to Ultimate Destination*

   a. As a shipper, you must assure yourself that the shipment complies with the various modal requirements.

   b. The modal requirements may affect the following:
      (1) Packaging
      (2) Quantity per package
      (3) Marking
      (4) Labeling
      (5) Shipping papers
      (6) Certification

   * For example, truck, rail or air.

5. Select the proper label(s) and apply as required

   Required labels are based on the hazard class of the substance to be shipped. No placards are required on vehicles transporting ORM-E substances or limited quantities of any hazardous materials (e.g., hazardous samples as discussed in Section 8.4).

   a. Refer to the Table, 172.101, Column (4) for required label(s).

   b. For details in labeling refer to:
      (1) Additional Labels, 172.402
      (2) Location of Labels, 172.406
      (3) Packaging (Mixed or Consolidated), 172.404(a) and (b)
      (4) Packages Containing Samples, 172.402(h)
      (5) Radioactive Materials, 172.403
      (6) Authorized Label Modification, 172.405

6. Determine and Select the Proper Packaging

   a. Refer to the Table, 172.101, Column (5a) for exceptions and Column (5b) for authorized Packaging. Consider the following when selecting an authorized container: Quantity per package; Cushioning material, if required; Proper closure and reinforcement.

   b. If packaged by a prior shipper, make sure the packaging is correct and in proper condition for transportation.

7. Mark the Packaging (Including Overpacks)

   a. Apply the required marking (172.300); Proper shipping name and number, when required (172.301); Name and address of Consignee and Consignor (172306).

   b. For details and other required markings, see 172.300 through 172.338.

8. Prepare Shipping Papers

   a. The basic requirements for preparing shipping papers include: proper shipping name; hazard class; ID number; total quantity; shipper's certification.

   b. Make all entries on the shipping papers, using the information required, and in proper sequence 172.202.

   c. For additional requirements, see 172.200 through 172.205.

9. Certification

   a. Each shipper must certify, by printing (manually or mechanically) on the shipping papers, that the materials being offered for shipment are properly classified, described, packaged, marked, and labeled, and are in proper conditions for transportation according to the applicable DOT Regulations (172.204).

10. Loading, Blocking, and Bracing

    When loading hazardous materials into the transport vehicle or freight container, each package must be loaded, blocked, and braced in accordance with the requirements for the mode of transport.

    a. If the shipper loads the freight container or transport vehicle, the shipper is responsible for the proper loading, blocking, and bracing of the materials. The packages must be properly labeled as to the right side up and samples must be packed to avoid damage in case of overturning.

b. If carrier personnel do the loading, the carrier is responsible.

11. Determine the Proper Placard(s)

Each person who offers hazardous materials for transportation must determine that the placarding requirements have been met.

a. For highway, unless the vehicle is already correctly placarded, the shipper must provide the required placard(s) and required identification number(s) (172.506).

b. For rail, if loaded by the shipper, the shipper must placard the rail car if placards are required. (172.508)

c. For air and water shipments, the shipper has the responsibility to apply the proper placards.

12. Hazardous Waste/Hazardous Substance

a. If the material is classed as a hazardous waste or hazardous substance, most of the above steps will be applicable.
b. Pertinent Environmental Protection Agency Regulations are found in the Code of Federal Regulations, Title 40, Part 262.

7.7 Chain-of-Custody Guidelines

The term "chain-of-custody" refers to procedures which ensure that evidence presented in a court of law is what it is represented to be. The chain-of-custody procedures track the evidence from the time and place it is first obtained to the courtroom. These procedures also provide an auditable trail for the evidence as it is moved and/or passes from the custody of one individual to another. In addition, procedures for consistent and detailed records facilitate the admission of evidence under Rule 803(b) of the Federal Rules of Evidence (P.L. 93-575).

Chain-of-custody procedures, record keeping, and documentation are an important part of the overall management control of the samples. Regulatory agencies must be able to provide the chain of possession and custody of any samples that are offered for evidence, or that form the basis of analytical test results introduced as evidence. Written procedures must be available and followed whenever evidence samples are collected, transferred, stored, analyzed, or destroyed.

7.7.1 Sample Identification

The following information shall be written in the sample log book when in-situ measurements or samples for laboratory analysis are collected:

- project code;
- station number;
- location of station;
- date and time of measurement;
- samples used (if any);
- field observations (include date and time);
- level of personnel protection (if required);
- equipment used to make physical measurements and collect samples; and
- calibration data for equipment used.

Measurements and observations shall be recorded using black, waterproof ink

7.7.2 Sample Label

Samples, other than in-situ measurements, are removed and transported from the sample location to a laboratory or other location for analysis. Before removal, however, a sample is often divided into portions, depending upon the analyses to be performed. Each portion is preserved in accordance with the project work plan or proposal. Each sample container is identified by a sample label.

Sample labels are provided by the laboratory or container manufacturer. The sampler fills out the following information on the sample label:

- Project number
- Sample number - The unique sample number identifying this sample
- Date - A six-digit number indicating the month, day, and year of sample collection; e.g., 12/21/95
- Time - A four digit number indicating the 24-hour time of collection (for example: 0954 is 9:54 a.m., and 1629 is 4:29 p.m.)
- Medium - Water, Soil, Sediment, Sludge, Leachate, etc.
- Sample type - Grab or Composite
- Preservation - Type, quantity, and concentration of preservative added
- Analysis - Analyses requested as part of the investigation. Both name and method number must be listed (e.g., BTEX/8020)
- Sampled by - Name of the sampler

- Lab # - The receiving laboratory assigns the lab # to the sample label (this number is not to be used for on-site analyses)

- Remarks - If for contract lab analysis, include the contract lab case of SAS number, and contract lab sample number from the traffic report, SAS Packing List, or Dioxin Shipment Record. Also, pertinent observations of the sampler (e.g., sequence number for sequential samples).

7.7.3 Chain-of Custody Procedures

After collection, separation, identification, and preservation, the sample is maintained under chain-of-custody procedures until it is in the custody of the analytical laboratory and has been stored or disposed.

Field Custody Procedures:

1. Samples are collected as described in the project work plan or proposal. Care must be taken to record precisely the sample location and to ensure that the sample number on the label exactly matches those numbers on the sample log sheet and the chain-of-custody record.

2. The person undertaking the actual sampling in the field is responsible for the care and custody of the samples collected until they are properly transferred or dispatched.

3. When photographs are taken of the sampling as part of the documentation procedure, the name of the photographer, date, time, site location, and site description are entered sequentially in the site logbook as photos are taken. Once developed, the photographic prints shall be serially numbered, corresponding to the logbook descriptions.

4. Sample labels shall be completed for each sample, using waterproof ink unless prohibited by weather conditions, i.e., a logbook notation would explain that a pencil was used to fill out the sample label because a ballpoint pen would not function in freezing weather.

7.7.4 Transfer of Custody and Shipment

Samples are accompanied by the chain-of-custody record form (Attachment 8-10A). When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents sample custody transfer from the sampler, often through another person, to the analyst in the laboratory. The chain-of-custody record is filled out as follows:

1. Enter header information (project number and name, Contract Lab case No. or SAS No.). For each station number, enter date, time, composite/grab, station location, number of containers, analytical parameters.

2. Sign, date, and enter the time under "Relinquished by" entry.

3. Make sure that the person receiving the sample signs for the "Received by" entry, or enter the name of the carrier (e.g., UPS, Federal Express) under "Received by". Receiving laboratory will sign "Received for Laboratory by" on the lower line and enter the date and time.

4. Enter the bill-of-lading or Federal Express airbill number under "Remarks or Reason for Change of Custody", if appropriate.

5. Place the original (top, signed copy) of the chain-of-custody record form in the appropriate sample shipping package. Retain a copy with field records.

6. Shipping containers should be secured to ensure samples have not been disturbed during transport by using nylon strapping tape and EPA custody seals. The custody seals should be placed on the containers so that they cannot be opened without breaking the seal.

7. Complete other carrier-required shipping papers.

   The custody record is completed using black waterproof ink. Any corrections are made by drawing a line through and initialing and dating the change, then entering the correct information. Erasures are not permitted.

   Common carriers will usually not accept responsibility for handling chain-of-custody record forms; this necessitates packing the record in the sample container (enclosed with the other documentation is a plastic zip-lock bag). As long as custody forms are sealed inside the sample container and the custody seals are intact, commercial carriers are not required to sign off on the custody form.

   The laboratory representative who accepts the incoming sample shipment signs and dates the chain-of-custody record, completing the sample transfer process. It is then the laboratory's responsibility to maintain internal log books and custody records throughout sample preparation and analysis.

7.7.5 Receipt for Samples Form

Whenever samples are split with a private party or government agency, a separate Receipt for Samples Record Form (see Attachment 8-10F) is prepared for those samples and marked to indicate with whom the samples are being split. The person relinquishing the samples to the party or agency shall require the signature of a representative of the appropriate party acknowledging receipt of the samples. If a representative is unavailable or refuses to sign, this is noted in the "Received by" space. When appropriate, as in the case where the representative is unavailable, the custody record should contain a statement that the samples were delivered to the designated location at the designated time. This form must be completed and a copy given to the owner, operator, or agent-in-charge even if the offer for split samples is declined. The original is retained by the Project Manager.

8.0 Attachments

8-10A Chain-of-Custody Record Form and Chain-of-Custody Seal

8-10B DOT Hazardous Materials Classification (49 CFR 1732)

8-10C DOT List of Class "A" Poison (49 CFR 172.101) and Hazardous Material Shipping Checklist

8-10D Standard Industry Certification Form

8-10E Sample Label

8-10F Receipt For Samples Form

UNCONTROLLED

STANDARD OPERATING PROCEDURE (SOP) 8-16

CHAIN-OF-CUSTODY PREPARATION

1.0 Purpose

The purpose of this procedure is to establish a standard procedure for preparation of chain-of-custody forms.

The purpose of document control is to assure that all documents for a specific project are accounted for. Chain-of-custody procedures are an integral part of this document control. The purpose of the chain-of-custody form is to assure that the samples collected in the field are being identified properly and the original integrity of a sample is not destroyed by poor collecting and/or handling techniques.

2.0 Scope

This procedure defines the procedures to prepare and complete the chain-of-custody form.

3.0 References

- U.S. Environmental Protection Agency, 1979. *Methods for Chemical Analyses of Water and Wastes,* EPA 600/4-79-020.
- National Well Water Association, 1986. *RCRA Ground-Water Monitoring Technical Guidance Document,* NWWA/EPA Series.

4.0 Definitions

None

5.0 Responsibilities

5.1 Project Manager

The Project Manager is responsible for ensuring that field personnel know the chain-of-custody

procedures.

5.2 Field Associate

The Field Associate is responsible for ensuring the chain-of-custody form is properly prepared.

6.0 Equipment

None

7.0 Procedure

To maintain and document sample possession, chain-of-custody procedures are followed. Using these procedures and documentation gives a reasonable assurance that 1) the sample was handled properly and/or 2) if suspected of being improperly handled, witnesses are available who can disclose the information needed to prove or disprove improper handling. Writing chain-of-custody procedures facilitates the admission of evidence under Rule 803(6) of the Federal Rules of Evidence (P.L. 93-575). Evidentiary foundation is recognized by most courts as fulfilling the requirement of sample identification which shows that the original sample:

1. Was not exchanged with another sample
2. Was not contaminated or tampered with
3. Was the one tested?
4. Was the same sample from which the analytical results are derived?

7.1 Uses of the Chain of Custody Form

Different situations in which the chain-of-custody is used are the following:

- If the person who sampled is transferring the sample(s) to another person; or
- If the laboratory is transferring the sample(s) to another outside laboratory; or
- If the person who sampled is transferring the sample(s) to the laboratory.

7.2 Chain-of-Custody Preparation Procedure

Instructions for preparation of the TolTest, Inc. chain-of-custody form is as follows:

1. Enter the following information in the appropriate sections:
   - TolTest project number or the client's identification number
   - TolTest division or the client's name
   - Purchase order number (not required for TolTest projects)
   - TolTest project manager or the person responsible for the project

- Telephone number where the project manager can be reached
- Turnaround time required in business days (standard is 10 business days)

2. PRINT the sampler's name.

3. Obtain the sampler's signature.

4. Complete the sample information sections. For the type of sample, use the following abbreviations:
   - A = auger cuttings
   - AR = Air rotary cuttings
   - C = composite
   - G = grab
   - S = split-spoon
   - ST = Shelby tube

5. Specify the analysis required and the method number, if known.

6. Note whether preservatives were added to any sample container.

7. Indicate any remarks concerning the samples.

8. Obtain the signature of the person transferring the samples.

8.0 Attachments

8-16A TolTest Chain-of-Custody Form

APPENDIX C

EMPIRICAL LABORATORY
STANDARD OPERATING PROCEDURES

APPENDIX C

EMPIRICAL LABORATORY SOP TABLE OF CONTENTS

SOP 211 Gas Chromatography / Electron Capture Detector (GC/ECD) Organochlorine Pesticides / Polychlorinated Biphenyls (PCB)

SOP 219 Gas Chromatography / Flame Ionization Detector (GC/FID) Nonhalogenated Volatile Organics and Total Petroleum Hydrocarbons (TPH)

NELAP Certification

Performance Evaluation Report 12/17/2009

Performance Evaluation Report 06/23/2009

GAS CHROMATOGRAPHY/ELECTRON CAPTURE DETECTOR (GC/ECD)

ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS (PCB) BY

EPA METHOD 608/608.2 AND

SW846 METHOD 8081A, 8081B/8082, 8082A

SOP NUMBER: SOP-211

REVISION NUMBER: 20

APPROVED BY:

SECTION MANAGER

QUALITY ASSURANCE OFFICER

EFFECTIVE DATE: 04/27/09

Date of Last Review: 04/27/09

GAS CHROMATOGRAPHY/ELECTRON CAPTURE DETECTOR (GC/ECD) ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS (PCB) BY EPA METHOD 608/608.2 AND SW-846 METHOD 8081A, 8081B/8082, 8082A

1.0 SCOPE AND APPLICATION

This Standard Operating Procedure, SOP, (based primarily on SW-846 Methods 8000B/8081A/8082) is used for the analysis of Pesticide/PCB organic compounds in a variety of matrices (soils, sediments, waters, etc.). Methods SW-846 8082, *Federal Register* Method 608/608.2 and CLP Method for Pesticides have also been used in the development of this SOP. The analyses by these various methods are clearly defined in the respective regulatory manuals. A good understanding of these different methods is essential to the performance of each method. The normal laboratory list of analytes with their LCS limits is found attached in the appendix. Other compounds may be analyzed by this SOP as detailed in section 1.0 of SW-846 Methods 8081A, 8081B/8082, 8082A. Any questions left by this SOP should be answered by reading the methods, paying close attention to SW-846 8000B/8081A, 8081B/8082, 8082A, EPA 608/608.2 and CLP. If questions still remain unanswered, check with the Organic Lab Manager, Quality Assurance Officer and/or Technical Director.

2.0 METHOD SUMMARY

After sample preparation using the appropriate extraction technique, the sample is introduced into the GC using direct injection. The analytes are separated in the gas chromatograph by a combination of he temperature program and the capillary column. The analytes are then detected by the ECD. Pesticide analytes are identified and confirmed based on the retention time of known standards. PCB and multi-component pesticide analytes are identified based on pattern recognition. Analytes are quantitated relative to known standards using the external standard method.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

Section 3.0 and tables 3-1 and 3-2 of the Empirical Laboratories, LLC Quality Assurance Manual includes details concerning sample preservation, containers and handling of samples and extracts. All water and soil samples are stored in the appropriate walk-in cooler in sample storage at a temperature of 1°C – 4.4°C. All extracts are stored in the Hobart in Semivolatile laboratory at a temperature of 1°C – 4.4°C. Water samples have a holding time of 7 days from date of sampling to extraction. Soil samples have a holding time of 14 days from date of sampling to extraction (unless otherwise specified for the project). Extracts have a holding time of 40 days from extraction to analysis.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

Section 3.0 of SW-846 Methods 8081A/8082 and Section 4.0 of Methods 8081B/8082A details interferences and potential problems which may be encountered when dealing with pesticide/PCB analyses. Please see sample clean-up SOPs (307, 308, 309, 330, and 334) to evaluate possible clean-up options for any encountered interferences.

5.0. EQUIPMENT AND APPARATUS

5.1 GC's:

5.1.1 Agilent 6890N- complete with temperature programmable gas chromatograph suitable for split/splitless injection.

5.2 Columns:

5.2.1 RTX-CLP (or equivalent): 30 meter x 0.32 mm ID x 0.5 µm film thickness fused silica column.

5.2.2 RTX-CLP II (or equivalent): 30 meters x 0.32 mm ID x 0.5 µm film thickness fused silica column.

5.3 Autosamplers:

5.3.1 Agilent 7683 autosamplers capable of reproducibility from one injection to another, proven by meeting QC and calibration criteria.

5.4 Acquisition Software: HP Chemstation system is interfaced to the GC. The system acquires and stores data throughout the chromatographic program.

5.5 Data Processing Software: Target DB Windows NT data system is interfaced to the HP Chemstation. The system accepts, processes and stores acquired data.

6.0 REAGENTS

6.1 Hexane - pesticide quality or equivalent.

6.2 Stock standards are purchased in mixtures from reputable vendors. The date they are received is noted on the label and recorded in the GC standards logbook. The date they are opened is noted on the label and recorded in the GC standards logbook along with their lot number and vendor and given a sequential number. Each standard that is prepared is recorded in the GC standards logbook and given a sequential number. The following are noted in the logbook: standard makeup, solvent used, date received, date opened, date prepared, expiration date and analyst. Each standard label is completed with the standard number, name, preparation date, expiration date, solvent and analyst initials. All stocks and standards are stored in the refrigerator at a temperature of 1°C-4.4°C from the date they are received/prepared. The refrigerator and freezer temperature is monitored daily with an annually calibrated thermometer and recorded with calibration correction in the GC refrigerator temperature logbook. See the GC standards log book for makeup of intermediate and calibration standards.

6.2.1 The Initial Calibration Verification (ICV) intermediate standard is prepared from the vendor stock standards in the same manner as the Calibration intermediate standards above and is stored in the refrigerator at a temperature of 1°C-4.4°C for up to 6 months. The ICV standard is then prepared at a concentration near the midpoint in the same manner as the Calibration standards above.

7.0 PROCEDURE

The GC/ECD should be primed by injecting a pesticide standard at 100 µg/L and/or PCB standard at 10,000 µg/L, 10 times more concentrated than the mid-level standard. Inject this prior to beginning initial or daily calibration.

7.1 Chromatographic conditions:

7.1.1 ZB MR1/MR2 columns:

GC	ECD3
Purge on	0.50 min.
Injector/Detector temperature	250/350°C
Column flow	@3.4 mL/min
Initial column temperature	100°C for 0.5 minutes
Temperature ramp	15°C/min
Intermediate column temperature	220°C for 5.0 minutes
Second Temperature Ramp	35°C/min
Final Column Temperature	340°C for 2.0 minutes

7.1.2 RTX-CLP/RTX CLPII columns:

GC	ECD4
Purge on	0.50 min.
Injector/Detector temperature	200/330°C
Column flow	@2.4 mL/min
Initial column temperature	110°C for 0.5 minutes
Temperature ramp	15°C/min
Final column temperature	320°C for 2.0 minutes

7.2 Eval Mix – Before pesticide calibration and/or sample analysis, a degradation check standard (evaluation mix) of endrin and 4,4-DDT must be injected. Degradation of either compound must not exceed 15 percent. If 15 percent degradation is exceeded, then corrective action must be taken (GC system maintenance, see SOP-222).

7.3 Calibration - (See SW-846 Method 8000B Section 7.4.2).

7.3.1 Initial Calibration – For single component pesticides and surrogates, a six point calibration is injected and analyzed for each analyte of interest. For Toxaphene and Technical Chlordane a single point standard is analyzed unless they are expected then a five point calibration is injected and analyzed. Injection volume for standards and samples is equal to 2 µL using the same injection technique to introduce both standards and samples (use of auto-injectors makes this a constant). All calibration integrations must be evaluated and any manual integrations are documented by the inclusion of the chromatogram (which includes peak integrations) with the quantitation report. The percent relative standard deviation (RSD) of the calibration factor must be <20% over the working range for each analyte of interest. When the 20% criteria is exceeded for an analyte, a linear calibration may be used if the correlation coefficient (r) is ≥0.995, ≥0.99 for quadratic with 6 points. Otherwise, a new standard curve should be prepared for each analyte that exceeded the criteria.

Initial calibration for Aroclors may be accomplished by using a six-point curve that contains Aroclors 1016 and 1260. The mixture of these two Aroclors contains many of the peaks represented in the other five Aroclor mixtures(1221, 1232, 1242, 1248 & 1254). The curves for Aroclors 1016 and 1260 are used to show the linearity of the detector and can be used to demonstrate that a sample does not contain peaks that represent any one of the Aroclors. The 1016/1260 curve may also be used to quantitate any 1016 or 1260 hits that may be seen in the samples. The analyst has the choice of running a curve for the other five Aroclor mixtures or when the calibration factor for the

curve for 1016/1260 is <20% a single point calibration at the midpoint level concentration can be used for the other Aroclors. The injection procedure for Aroclors is the same as single component pesticides. The percent relative standard deviation (RSD) of the calibration factor must be <20% but this applies to the average of the quantitation peaks. When the 20% criteria is exceeded for an analyte, a linear calibration may be used if the correlation coefficient factor (r) is ≥0.995, ≥0.99 for quadratic with 6 points. Otherwise, a new standard curve should be prepared for each analyte that exceeded the criteria.

7.3.2 Initial Calibration Verification - A second source standard at the midpoint level is used to check the validity of the curve. The standard recovery for all analytes must be between 85 and 115%(**80-120% DOD QSM and 8081B/8082A**). If the second source recovery is above 115%, it is possible that the main standard has deteriorated for that compound. That standard should be remade and reevaluated. If that does not correct the problem, the standard should probably be replaced and a new curve generated. If the second source recovery is below 85%, the second source standard may have deteriorated for that compound. This standard should be remade and reanalyzed. If this does not correct the problem, the standard should be replaced. All calibration integrations must be evaluated and any manual integrations are documented by the inclusion of the chromatogram (which includes peak integrations) with the quantitation report.

7.3.3 Continuing Calibration Verification (CCV) - A mid-level standard must be analyzed every 12 hours (not to exceed 20 samples and cannot exceed 15 percent difference (%D), (**at the beginning and end of sequence and after every 10 field samples, 20%D no average DOD QSM and 8081B/8082A**) from the average calibration factor of the calibration curve. A CCV must also be analyzed at the end of the analysis sequence. If a CCV fails, GC maintenance may be necessary (see SOP-222), reanalysis may be required (for samples analyzed since the last valid CCV) and a corrective action report must be completed. If none of the failed target compounds exceed 30% D and the average of all the %Ds are < 15% then the CCV may be used without any further corrective action. Alternatively, analytes may be flagged depending on their concentration and the status of the analyte in the mid-level standard. No reanalysis is necessary if the analyte is undetected in the samples and recovered high in the CCV. All calibration integrations must be evaluated and any manual integrations are documented by the inclusion of the chromatogram (which includes peak integrations) with the quantitation report. Samples are then quantitated against the initial calibration curve.

7.4 RT Windows - Retention time criteria set forth in SW-846 method 8000B section 7.6 are used to set retention time windows. New in-house retention time windows are established after every major change to the system (new column or temperature program) and at initial calibration using the midpoint standard RTs. If the established retention time window is less than +/-0.03 minutes, the window defaults to +/-0.03 minutes. Retention times are updated with the first CCV of the day or the mid-level standard of the curve if samples are analyzed directly after a curve.

7.5 Laboratory Control Sample (LCS) - The LCS is extracted 1 per extraction batch of up to 20 samples. The LCS is spiked with standards prepared from an alternate vendor or lot number than the calibration standards. See section 8.2 below for criteria and corrective action.

7.6 Method Blank - Method blanks are extracted at a minimum of 1 per extraction batch – up to 20 samples. See section 9.3 below for criteria and corrective action.

7.7 Samples - Prior to using Method 608, SW-846 8081A, 8081B/8082, 8082A or CLP (pesticide method) the samples are prepared for chromatography using the appropriate sample preparation and clean up methods (generally SW-846 methods 3510, 3541, 3640, 3550, 3580, EPA method 608 or CLP).

7.7.1 Example of a sequence run log:

1-Primer A/B Mix-1000 or Primer PCB-10,000
2- EVAL Mix (Pest only)
3- CCV A/B Mix
4- CCV Toxaphene (single point)
5-CCV Chlordane (single point)
6- CCV PCB 1660
7- Method Blank
8-LCS A/B Mix
9-LCS PCB
10-Sample
11-Sample
12-Sample
13-Sample
14-Sample
15-Sample
16-Sample
17-Sample
18-Sample
19-Sample
20-Sample
21-Sample-MS
22-Sample-MSD
23-Sample
24-Sample
25-Sample
26-Sample
27-Sample
28-Sample
29- CCV A/B Mix
30-CCV PCB

7.8 Data Reduction/Evaluation - Each sample analysis sequence is documented in the run logbook for the instrument. After the sample has been analyzed, the data is processed through the Target DB Windows NT data system. Quantitative measurements are performed as described in SW-846 8081A section 7.5.6, and section 11.5.6.1 8081B. Rounding is performed using CLP

odd/even rounding rules. The following must be checked to determine if the sample will need any reanalysis, cleaning or dilution. Formal data evaluation is detailed in SOP-216 (documented using the USACE Analyst Data Review Checklist for USACE projects).

7.8.1 Analyte concentration after rounding to 2 significant figures must be within the range of the calibration curve. If an analyte exceeds the curve, a dilution must be performed and the next sample must be checked for carryover. Any dilution should keep the concentration of the analyte in question within the mid-range to the top half of the curve.

7.8.2 If the sample shows signs of sulfur contamination in the time range where sulfur compounds elute a sulfur cleanup is required [see SOP-307].

7.8.3 If the sample has extraneous peaks eluting in the chromatogram an acid cleanup is required for PCB samples and may be applicable for certain pesticides, (acid clean-up may be required for all PCB samples, check with your supervisor), [see SOP-308].

7.8.4 If the sample has extraneous peaks that are not removed by acid (PCB samples) and is not a sulfur interference, a florisil cleanup is recommended [see SOP-309]. A silica cleanup may also be used [see SOP-331].

7.8.5 Surrogates – Control and warning limits are determined by using all blank spikes in the calculation, (LCSs and method blanks). All limits used are generated in-house or client specified (with the exception that if the in-house limit's highest lower limit would be 90 and the lowest upper limit would be 110 examples: **98**-120 would be **90**-120 or 45-**75** would be 45-**110**). Surrogate standard recovery must be checked to determine if it is within these limits. Two surrogates are added to each sample for pesticides. Only one surrogate, DCB, is added to each PCB sample. Corrective action should be evaluated when any surrogate(s) is outside the action limits for a sample. When only one surrogate for pesticides exceed control limits on the primary and/or confirmation column corrective action may not be required. If both surrogates for pesticides (or DCB for PCB analyses) exceed control limits on the primary and/or confirmation column corrective action is required. A corrective action form should be filled out and given to the organic lab manager when both surrogates for pesticides (or DCB for PCB analyses) are outside the action or warning limits. The organic lab manager will then make suggestions as to what action should be taken, for example: the sample may need to be reanalyzed, reextracted, or flagged on the report for a QC problem. **DOD limits will be used for DOD QSM projects.**

	WATER	SOIL/SEDIMENT	WIPES
Surrogate	In-House	In-House	In-House
TCMX	25-120	30-120	80-143
DCB	25-130	35-140	73-142

7.9 Identification/Quantitation [See SW-846 method 8081A section 7.6 or method 8082 sections 7.7-7.9].

7.9.1 Single peak components are identified by retention time on a primary column

with confirmation by retention time on a secondary or confirmation column. Which column is used for primary/confirmation is determined by the chromatography in the region of the compound. The control limit for percent difference (%D) of compounds that confirmed from the primary column on the confirmation column is 40%. If both columns are equivalent, the highest concentration is reported. If a compound result is >40% difference, it should be flagged with a "P". (**"J" flagged for DOD QSM projects)**

7.9.1.1 Due to coelution of certain compounds confirmation for all analytes may not be achieved. The analyst must use experience and judgment to decide if the compound is there. If a call is made, the data should be flagged appropriately.

7.9.1.2 If a compound is outside of it's window on one column but in the window on the other column, the analyst will need to use their judgment or seek guidance from the organic lab manager or another experienced analyst to decide if the analyte is there.

7.9.2 Multi-peak components (PCB's, Toxaphene and Technical Chlordane) are identified by pattern recognition using an on scale standard chromatogram to compare to an on scale sample chromatogram enabling the analyst to judge whether the sample pattern matches a standard pattern. Confirmation of multi-peak components is required by the method and may be accomplished in several ways. If the sample is from a source known to contain specific Aroclors then this information may be used as a confirmation. Documentation of this approach must meet the requirements outlined in Sec. 7.7.3 of SW-846 Method 8082. Another approach is to use a column of dissimilar stationary phase and compare the pattern to a known Aroclor standard. Finally if the concentration is high enough GC/MS may be used as confirmation.

7.9.2.1 Generally, five unique peaks representing the full range of the multi-peak component are used in the quantitation of the multi-peak components. Note: for USACE projects, five peaks are necessary for the quantitation of multi-peak components.

7.9.2.2 Multi-peak components that still have matrix interference after appropriate sample cleanup steps have been taken may need to be hand calculated using peaks that do not have interference. This should be brought to the organic lab manager's attention.

7.9.2.3 Multi-peak components that exhibit a weathered pattern may need to be hand calculated by the analyst. The analyst will need to use peaks that exhibit the full range of weathering. The number of peaks used to quantitate the multi-peak component will depend on the analyst's judgment of what it will take to achieve the truest concentration of the component. This should be brought to the organic lab manager's attention.

7.9.3 Quantitation – Once a compound has been identified qualitatively, the concentration must then be quantitated. If the RSD of the compound's response factor is 20% or less, then the concentration may be determined using the mean calibration factor, CF, from the initial calibration data. Otherwise, the analyst must use either a calibration curve or a

non-linear calibration model such as polynomial equation for quantitation. Calculations follow in Section 8.0. **Refer to SOP-224 for guidance for manual integrations**

8.0 Calculations:

8.1 Calculate the calibration factor (CF) for each analyte at each concentration as:

$$CF = \frac{\textit{Peak Area (or Height) of the Compound in the Standard}}{\textit{Mass of the Compound Injected (in nanograms)}}$$

8.2 The mean CF is calculated as follows:

$$\overline{CF} = \frac{\sum_{i-1}^{n} CFi}{n}$$

8.3 The standard deviation (SD) and the relative standard deviation (RSD) of the calibration factors for each analyte are calculated as follows:

$$SD = \sqrt{\frac{\sum_{i-1}^{n} (CFi - \overline{CF})^2}{n-1}}$$

$$RSD = \frac{SD}{CF} x\, 100$$

8.4 Calibration verification involves the calculation of the percent drift (linear or quadratic) or the percent difference (average) of the instrument response between the initial calibration and each subsequent analysis of the verification standard. Use the equations below to calculate % Drift or % Difference, depending on the calibration procedure used.

$$\% \text{ Drift} = \frac{(\text{Calculated concentration} - \text{Theoretical concentration}) * 100}{\text{Theoretical Concentration}}$$

where the calculated concentration is determined from the initial calibration and the theoretical concentration is the concentration at which the standard was prepared.

$$\% \text{ Difference} = \frac{(\text{CCV CF} - \text{Average CF}) * 100}{\text{Average CF}}$$

where CCV CF is the calibration factor from the analysis of the verification standard and mean CF is the average calibration factor from the initial calibration. The % difference or % drift calculated for the calibration verification standard must be within ±15% for each analyte before any sample analyses may take place.

8.5 Concentration in water samples is calculated as follows:
[Note: Using the units specified here for these terms will result in a concentration in units of ng/mL, which is equivalent to µg/L.]

$$\text{Concentration } (\mu\text{g/L}) = \frac{(A_x)(V_t)(D)}{(\overline{CF})(V_i)(V_s)}$$

where:

A_x = Area (or height) of the peak for the analyte in the sample.
V_t = Total volume of the concentrated extract (µL).
D = Dilution factor, if the sample was diluted prior to analysis. If no dilution was made, D = 1. The dilution factor is always dimensionless.
V_i = Volume of the extract injected (µL). The nominal injection volume for samples and calibration standards must be the same.
CF = Mean response factor from the initial calibration.
V_s = Volume of the aqueous sample extracted (mL). If units of liters are used for this term, multiply the results by 1000.

The 1000 in the denominator represents the number of µL in 1 mL. If the injection (V_i) is expressed in mL, then the 1000 may be omitted.

8.6 Concentration in non-aqueous samples is calculated as follows:
[Note: Using the units specified here for these terms will result in a concentration in units of ng/g, which is equivalent to µg/kg.]

$$\text{Concentration } (\mu\text{g/kg}) = \frac{(A_x)(V_t)(D)}{(\overline{CF})(V_i)(W_s)}$$

where:

A_x, V_t, D, and CF are the same as for aqueous samples, and
W_s = Weight of sample extracted (g). Either a dry weight or wet weight may be used, depending upon the specific application of the data. If units of kilograms are used for this term multiply the results by 1000.

The 1000 in the denominator represents the number of μL in 1 mL. If the injection (V_i) is expressed in mL, then the 1000 may be omitted.

9.0 QUALITY ASSURANCE/QUALITY CONTROL/CORRECTIVE ACTIONS

9.1 Surrogates - All samples and QC are spiked with surrogates. The surrogate recoveries from method blanks and LCS are charted to generate control limits and charts for diagnostic purposes. 8000B See section 7.8.5 above for criteria and corrective action.

9.2 LCS Sample - The LCS is extracted with every extraction batch - up to 20 samples. To prepare the LCS, a blank is spiked with standards prepared from an alternate vendor or lot number than the calibration standards. The recoveries are charted to generate control charts and limits. See the LCS report form in the appendix for the laboratory generated limits. These limits default to method limits if generated limits are wider. If the LCS compound has a recovery above the upper limit, but the same compound is not detected in any of the batch samples, no corrective action is required. For all other situations, the LCS should be reanalyzed for the failed analytes only or results for that analyte should be flagged. If the second analysis fails, all associated samples should be reextracted/reanalyzed for the failed analytes only. **DOD limits will be used for DOD QSM projects.**

9.3 Method Blanks - The concentration of all method target analytes should be below the MDL **(<RL, common laboratory contaminates; < ½ RL, all other compounds or client/authority specified)** for each method target analyte. If contamination exceeds the requirement, the following corrective actions must be taken. The first step is to assess the effect on the samples. If an analyte is found only in the method blank, but not in any batch samples, no further corrective action may be necessary. Steps should be taken to find/reduce/eliminate the source of this contamination in the method blank. If an analyte is found in the method blank and some, or all, of the other batch samples, then corrective action is required. The source of contamination must be investigated and appropriate action taken and documented to find/reduce/eliminate the source of this contamination. The method blank, and any samples containing the same contaminant, would likely be reextracted/reanalyzed. For the common laboratory contaminants, meeting the above requirements is not practical. Random cases of contamination are difficult to control, however, daily contamination is not acceptable and corrective action is essential. If a contaminant is found in the method blank and the samples, the compound concentration must be flagged with a 'B' on the final report unless the concentration is greater than 5x that found in the method blank.

9.4 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Sample - 1 in 20 samples are spiked for a MS/MSD (for 608 projects, 1 in 10 samples are spiked for MS). For project specified full list MS/MSDs, the LCS standard is used for spiking. Criteria for the MS/MSD are found in Table 5-3 of the Laboratory Quality Assurance Manual. Both the percent recoveries (%R) and relative percent differences (RPDs) are contained in this table (for project specified full list MS/MSDs, the MS/MSD limits are the same as the LCS limits). Samples that do not meet these criteria due to matrix should be evaluated for placing a flag on the final report due to QC problems. The associated LCS results should be used to verify method performance (section 8.4.3 Method 8081A). MS data evaluation must include the consideration of the following factors.

9.4.1 Sample matrix - If the sample is a soil, grab sample or sequentially collected water sample it may affect the %R and RPD of the MS/MSD. Corrective action must be taken in the form of reanalysis if a method problem is indicated.

9.4.2 Original sample concentration - If a spiked compound has a problem and the concentration of that compound in the original sample was more than four times the concentration of the spike, no further corrective action may be necessary other than the generation of a corrective action report to document the problem. In this case, the MS/MSD may be evaluated as sample duplicates.

9.4.3 MS vs. MSD - If a spiked compound has a similar problem in both the MS and MSD and is not traced to a method problem, no further action may be necessary other than the generation of a corrective action report to document the problem.

9.4.4 Non-target Interference - The presence of significant non-target interference should be brought to the immediate attention of your supervisor who should discuss the problem with the client/project manager to determine the action to be taken.

9.4.5 Documentation of capability (DOC) – Each analyst must perform a DOC to demonstrate proficiency with this method. Refer to SOP-413 for guidance.

10.0 HEALTH, SAFETY, WASTE MANAGEMENT AND POLLUTION PREVENTION

10.1 Care should be used in handling all samples. Safety glasses must be worn in the lab at all times. The use of blue nitrile gloves and lab coats is highly recommended.

10.2 Research into expected sample content and concentration should be done in order to be prepared for additional safety considerations. Generally, any samples that need special consideration have applicable notes on the sample logs.

10.3 MSDS sheets are available for all reagents and standards that have been purchased. These are located in the bookshelves across from the Quality Assurance Officers cube.

10.4 Please see Waste Disposal, SOP-210 and SOP-405 for proper disposal of waste coming from this area within our laboratory. Quantity of chemicals purchased should be based on expected usage during its shelf-life and the disposal cost of unused material. Actual reagent preparation volumes should reflect anticipated usage and reagent stability.

11.0 EXAMPLE FORMS

Examples of the water and soil LCS report sheet and the USACE analyst data review checklist are located in the appendix.

12.0 REFERENCES

1. *Test Methods for Evaluating Solid Waste Physical/Chemical Methods, SW-846*; Method 8081A, 8081B, 8082, 8082A

2. USEPA *Code of Federal Requlations, 40, CH 1,PT 136;* Method 608, 608.2; APX-B

3. USEPA *Contract Laboratory Program(CLP) for Organics ILM04.2; ILM04.3*

4. DOD Quality Systems Manual, Ver. 3/4.1

13.0 DEFINITIONS

Refer SOP-431 for a list of definitions.

APPENDIX

FORM 3
WATER PESTICIDE/PCB LAB CONTROL SAMPLE
(In- House)

Lab Name: Empirical Laboratories, LLC Contract:

Lab Code: NA Batch No.: NA SAS No.: NA SDG No.:

Matrix Spike - Client Sample No.: LCS

COMPOUND	SPIKE ADDED (µg/L)	SAMPLE CONCENTRATION (µg/L)	LCS CONCENTRATION (µg/L)	LCS % REC #	QC. LIMITS REC.
Aldrin	0.05000	NA	0.05000	100	25-110
alpha-BHC	0.1000	NA	0.1000	100	45-125
alpha-Chlordane	0.05000	NA	0.05000	100	50-125
beta-BHC	0.05000	NA	0.05000	100	50-130
4,4'-DDD	0.1000	NA	0.1000	100	55-130
4,4'-DDE	0.1000	NA	0.1000	100	45-130
4,4'-DDT	0.1000	NA	0.1000	100	50-140
Dieldrin	0.1000	NA	0.1000	100	55-130
delta-BHC	0.05000	NA	0.05000	100	40-135
Endosulfan I	0.1000	NA	0.1000	100	50-120
Endosulfan II	0.1000	NA	0.1000	100	55-135
Endosulfan sulfate	0.1000	NA	0.1000	100	55-130
Endrin	0.1000	NA	0.1000	100	40-150
Endrin aldehyde	0.1000	NA	0.1000	100	40-130
Endrin ketone	0.1000	NA	0.1000	100	60-130
gamma-BHC (Lindane)	0.1000	NA	0.1000	100	50-130
gamma-Chlordane	0.05000	NA	0.05000	100	50-125
Heptachlor	0.1000	NA	0.1000	100	35-125
Heptachlor epoxide	0.05000	NA	0.05000	100	50-130
Methoxychlor	0.5000	NA	0.5000	100	50-140
PCB-1248	10.00	NA	10.00	100	50-140

Column to be used to flag recovery values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 21 outside limits

COMMENTS: _____

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FORM 3
SOIL PESTICIDE/PCB LAB CONTROL SAMPLE
(In-House)

Lab Name: Empirical Laboratories, LLC Contract:

Lab Code: NA Batch No.: NA SAS No.: NA SDG No.:

Matrix Spike - Client Sample No.: LCS

COMPOUND	SPIKE ADDED (µg/kg)	SAMPLE CONCENTRATION (µg/kg)	LCS CONCENTRATION (µg/kg)	LCS % REC #	QC. LIMITS REC.
Aldrin	5.0000	NA	5.0000	100	30-135
4,4'-DDT	10.000	NA	10.000	100	30-160
Dieldrin	10.000	NA	10.000	100	30-150
Endrin	10.000	NA	10.000	100	35-160
gamma-BHC (Lindane)	10.000	NA	10.000	100	30-145
Heptachlor	10.000	NA	10.000	100	40-150
PCB-1248	1000.0	NA	1000.0	100	50-150

Column to be used to flag recovery values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 7 outside limits

COMMENTS: _____

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ANALYST DATA REVIEW CHECKLIST

Sample Number(s):	
Batch Number(s):	
Method:	**8081/8082**

QA/QC Item	Yes	No	NA	Second Level Review
A. Initial Calibration				
1. Did the evaluation mix pass criteria?				
2. Does the curve consist of at least five Calibration Standards?				
3. Is the low standard near, but above the MDL?				
4. Are the % RSDs within QC limits for all analytes?				
B. Second Source Verification				
1. Was the initial calibration curve verified by a second source calibration standard (ICV) and have criteria been met?				
C. Continuing Calibration				
1. Are the Continuing Calibration Verification (CCV) standards analyzed every 20 samples or every 12 hours and at the end of the sequence?				
2. Are the % differences within QC limits for all analytes?				
D. Sample Analysis				
1. Did the evaluation mix pass criteria?				
2. Are all sample holding times met?				
3. Are all samples with concentrations > the highest standard used for initial calibration diluted and reanalyzed?				
4. For single peak analytes - are all compounds identified on the primary column confirmed on the secondary column?				
5. For multi-peak analytes - does the pattern of the analyte in the sample match the pattern of the standard?				

6. Are surrogate recoveries within QC limits? (one surrogate both columns) _____ _____ _____ _____

ANALYST DATA REVIEW CHECKLIST

E. QC Samples
1. Is the Method Blank extracted at the desired frequency and is its concentration for target analytes less than the MDLs? _____ _____ _____ _____
2. Is the Laboratory Control Sample and its percent recovery within QC limits? _____ _____ _____ _____
3. Is the Matrix Spike/Matrix Spike Duplicate extracted at the desired frequency and is the percent recovery/RPD within QC limits? _____ _____ _____ _____

F. Others
1. Are all nonconformances included and noted? _____ _____ _____ _____
2. Are all calculations checked at the minimum frequency? _____ _____ _____ _____
3. Did analyst initial/date the appropriate printouts and report sheets? _____ _____ _____
4. Are all sample IDs and units checked for transcription errors? _____ _____ _____ _____
5. Are all manual integrations checked by a second reviewer to verify they were performed correctly? _____ _____ _____ _____

Comments on any "No" response:

_____
_____
_____
_____
_____
_____

Analyst: _____ Date: _____

Second-Level Review: _____ Date: _____

GAS CHROMATOGRAPHY/FLAME IONIZATION DETECTOR (GC/FID) NONHALOGENATED VOLATILE ORGANICS AND TOTAL PETROLEUM HYDROCARBONS (TPH)

BY METHOD 8015B/8015C/ TN EPH/GRO

SOP NUMBER: SOP-219

REVISION NUMBER: 11

APPROVED BY:

SECTION MANAGER

QUALITY ASSURANCE MANAGER

EFFECTIVE DATE: 04/27/09

DATE OF LAST REVIEW: 04/27/09

GAS CHROMATOGRAPHY/FLAME IONIZATION DETECTOR (GC/FID) NONHALOGENATED VOLATILE ORGANICS AND TOTAL PETROLEUM HYDROCARBONS (TPH) BY METHOD 8015B,8015C, and TN EPH/GRO

I. SUMMARY

The GC/FID system is used to analyze nonhalogenated Volatile (VO) , TPH and gasoline range organics/diesel range organics (GRO/DRO) compounds. We presently use this method to analyze ethylene glycol, methanol, GRO/DRO and TPH . This SOP will describe the different analyses performed using a temperature programmable gas chromatograph configured with a flame ionization detector (FID). Following are typical reporting limits : DRO - 0.1 mg/L water, 4 mg/KG soil; GRO - 0.1 mg/L water, 5 mg/KG soil**(can go down to 0.02ppm for curve or analyze a 5g sample to achieve 1.0 mg/KG for AFCEE)**; ethylene glycol – 10 mg/L water, methanol – 5.0 mg/L .

II. SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

Section 3.0 and tables 3-1 and 3-2 of the Empirical Laboratories, LLC Quality Assurance Manual include details concerning sample preservation, containers and handling of volatile samples. All water volatile samples are stored in the Hobart in the sample storage room and soils in the soil walkin at a temperature of 1°C – 4.4°C. Water and soil volatile samples have holding times of 14 days from date of sampling (unless otherwise specified for the project). All organic extractable water and soil samples are stored in their respective walk-in coolers at a temperature of 1°C – 4.4°C. All extracts are stored in the Hobart in the Extraction lab at a temperature of 1°C – 4.4°C. Soil samples have a holding time of 14 days, waters 7 days from date of sampling for extraction (unless otherwise specified for the project). Extracts have a holding time of 40 days for analysis.

III. INTERFERENCES AND POTENTIAL PROBLEMS

Section 3.0 of SW-846 Method 8015B and Section 4.0 of Method 8015C details interferences and potential problems which may be encountered when dealing with non-halogenated organic analyses by this method.

IV. INSTRUMENTATION

A. Gas Chromatograph
   1. HP 5890 Series II (temperature programmable).

B. Autosampler and Concentrator
1. HP-7673 injector.
2. OI 4560 Concentrator.
3. Tekmar 3000 Concentrator
4. ARCHON 5100 Autosampler

C. Columns-Capillary columns.

1. RTX-5 - 30 meter x 0.32 mm ID 0.25 μm film thickness fused silica - used for DRO analyses.
2. RTX-502.2- 105 meter x 0.53 mm ID, 3.0 μm film thickness fused silica - used for TN GRO analyses used for other volatile analyses.
3. DB-Wax – 30 meter x 0.53mm ID, 0.5 μm film thickness fused silica- used for Alcohol and Glycol analyses.

D. Data Acquisition and Processing Software.

1. HP Chemstation system is interfaced to the HP-GC for data acquisition and storage.
2. TARGET data system is interfaced to the acquisition systems. The system accepts, processes and stores acquired data.

V. STANDARDS

Stock standards are purchased from Restek, Protocol, Ultra and other vendors depending on their availability. GRO standard mixture contains nine analytes, (C6-C10), and are purchased from the vendors mentioned above. DRO standards come from various sources depending on method and client requirements (see below). (DRO TN Method, C12-C40; DRO 8015 C10-C28). Make certain to verify the state for which the samples are to be analyzed so the appropriate calibration standards are used. The date they are received is noted on the container they are received in. The standards are given a sequential number the day they are opened and this is noted in the GC standards logbook. All stock standards are stored at 4°C + 2°C.

A. Intermediate standards are prepared from the stock standards. Intermediate and working standards are made up using the appropriate solvent or laboratory reagent blank water and noted in the standards logbook, detailing how they were made, solvent (reagent water, methylene chloride, methanol) used, date made, expiration date (six months or sooner from date of preparation if the second source check indicates a drift from the true concentration) and given a sequential number.

Alcohols & Ethylene Glycol

In order to prepare accurate aqueous standards solutions, the following precautions must be observed:

a. Do not inject more than 20 µL of alcoholic standards into 100 mL of water.

b. Use a 25 µL Hamilton 702N microsyringe or equivalent (variations in needle geometry will adversely affect the ability to deliver reproducible volumes of methanolic standards into water).

c. Rapidly inject the alcoholic standard into the filled volumetric flask. Remove the needle as fast as possible after injection.

d. Mix the aqueous standards by inverting the flask three times only.

e. Fill the sample syringe from the standard solution contained in the expanded area of the flask (do not use any solution contained in the neck of the flask).

f. Aqueous standards are not stable and should be discarded after 1 hour unless properly sealed and stored. The aqueous standards can be stored up to 24 hours, if held in sealed vials with zero headspace.

The intermediate standards for alcohols and Ethylene Glycol are prepared by measuring an appropriate volume of neat solution and diluting in a volumetric flask with water. The density of the solution is then used to convert the volume to a weight. See the standard logbook for making specific standards.

TPH-GRO/DRO

GRO

1. A ten component standard, (C_6-C_{10}), from Restek (Wisconsin PVOC mix or equivalent) is used for making the calibration standards and for setting the retention time range. ***For AFCEE projects, and 8015 use a gasoline standard for calibration and quantitation.*** 4-bromofluorobenzene from Restek (30026) is used as the surrogate. Calibration standards must be prepared at a minimum of five concentration levels for each parameter of interest through dilution of the intermediate stock standard in appropriate solvent or laboratory reagent blank water. One of the concentration levels should be near but above the method detection limit (MDL). The remaining concentration levels should correspond to the expected range of concentrations found in the real samples or define the working range of the GC-FID system.

DRO

2. A solution containing even numbered alkanes from C_8 to C_{40} is run to determine the retention times for the appropriate analyses. Calibration standards must be prepared at a minimum of five concentration levels for each parameter of interest through dilution of the intermediate stock standard in the appropriate solvent or laboratory reagent blank water. ***Use a diesel standard for Method 8015 for calibration and quantitation.*** One of the concentration levels should be near but above the method detection limit (MDL). The remaining concentration levels should correspond to the expected range of concentrations found in real samples or define the working range of the GC-FID system.

B. Surrogate standards (see specific analyte analyses (below) for surrogate standard requirement and GC standards prep log book for preparation) are used to monitor the performance of the analytical system, and the effectiveness of the method in dealing with each sample matrix. Quality Control limits are generated annually from the charted recovery data generated. Corrective action is taken when surrogates are out of recovery limits. A corrective action form is filled out within 24 hours and the supervisor is notified immediately. The supervisor will then make suggestions as to what action needs to be taken such as the sample may require re-extraction, re-analysis, or the report flagged for a QC problem.

VI. PROCEDURE

The following information describes the instrument and QC requirements to analyze the compounds that we do by this method. The Volatile Petroleum compounds VPH/GRO, are introduced into the temperature programmable gas chromatograph by transfer from a purge-and-trap concentrator (Method 5030B), boiling point ranges from 60°C-170°C. TPH extractable petroleum hydrocarbons EPH/DRO, boiling point range >170°C, require extraction (see SOP-320, and 322) into methylene chloride followed by direct injection. Alcohols and ethylene glycol are introduced into the GC by direct aqueous injection.

A. Instrumentation

1. Purge and trap conditions

a. Purge: 11 minutes at 30 ° C.
b. Desorb: 2.0 minutes at 250 ° C.
c. Bake: 8 minutes at 260 ° C.

2. GC and GC oven conditions (all temperature programs can be adjusted to better fit the range of analytes requested).
   a. Alcohol (Direct aqueous injection)
      - Flow: Between 8.0 - 10.0 mL / minute.
      - Initial Temperature: 40°C hold for 8.0 minutes.
      - Ramp: 10°C / minute to 200°C.
      - Final Temperature 200°C hold for 1.0 minute.

   b. Ethylene Glycol (Direct aqueous injection)
      - Flow: 8.0 - 10.0 mL / minute.
      - Initial Temperature: 110 ° C hold for 1.0 minute
      - Ramp: 8.0 ° C / minute to 220 ° C.
      - Final Temperature: 220 ° C hold for 1.0 minute.

   c. TPH (GRO/DRO)
      GRO (5ml purge and trap)
      - Initial Temperature: 35 ° C hold for 10.0 minutes.
      - Ramp: 6.0 °C to 180 °C hold for 0.1 minute then ramp 40 ° C / minute to 220 °C.
      - Final Temperature: 220 °C hold for 5.0 minutes.

      DRO (1.0 µL direct injection of extract)
      - Initial Temperature: 45 ° C hold for 1.0 minutes.
      - Ramp: 20 °C / minute to 330 ° C.
      - Final Temperature 330 ° C hold for 15 minutes.

3. Maintenance

   a. Purge and Trap.
      (1) Bake out the transfer line at 125 ° C and bake out the trap.
      (2) Flush out the sample and/or transfer lines with methanol.
      (3) Change the trap.

   b. Gas Chromatograph.
      (1) Clean or deactivate glass injection port insert or replace with a cleaned and deactivated insert.
      (2) Trim the first few inches of the injection port side of the column.
      (3) Remove the column and back-flush according to the manufacture instructions.
      (4) If all else fails to correct the problem, the metal injector body may need to be deactivated or the column replaced.

B. Calibration and Quality Control

1. Refer to SW-846 Method 8000B for proper calibration techniques.

   a. Five point calibration curve must be introduced into the GC and analyzed for each analyte of interest using the appropriate instrument parameters.
   b. The area for GRO and DRO in each calibration point is determined by using a baseline to baseline integration over the appropriate retention time range. Refer to SOP-224 for guidance on manual integration. The calibration factor (CF) for each point is determined by dividing the total area by the concentration of the solution. The percent relative standard deviation of the calibration factor (CF) should be less than 20 percent (25 percent for TN-TPH) over the working range for each analyte of interest. If the percent relative standard deviation (% RSD) of the calibration factor is less than 20 percent over the working range, linearity through the origin can be assumed and the average calibration factor can be used in place of a calibration curve(linear curve corr. $\geq$0.995, quadratic $\geq$0.99 with six points). The curve is then verified using a second source standard(**80-120% criteria**).
   c. The calibration curve must be verified every day through the analysis of a mid-level standard at the beginning and end of the sequence and after every 10 field samples. The percent difference back to the curve must not exceed ± 15 percent (±25 percent for TN-TPH, 20%D for 8015C and DOD QSM Ver. 3) for any analyte of interest. If this criteria is not met corrective action must be taken before sample analyses continues. This might include maintenance of the analytical system (see above) and/or recalibration of each analyte that exceeded this criteria. Mid-level checks must be analyzed every 10 samples for TN-TPH and 10 field samples for DOD.

c. Calculations:

$$\text{Calibration Factor (CF)} = \frac{\text{Total Area within Retention Time Range}}{\text{Mass Injected (in ng)}}$$

Aqueous Sample

$$\text{Concentration} = \frac{(A_x)\,(V_t)\,(D)}{(CF)\,(V_i)\,(V_s)}$$

where:

A_x = Area of the appropriate carbon range of analyte in the sample.
V_t = Total volume of the concentrated extract (µL).

D = Dilution Factor if the sample were diluted prior to analysis. If no dilution was made, D = 1.
CF = Mean calibration factor from the initial calibration (area/ng).
V_i = Volume of extract injected (µL). The injection volume for samples and calibration standards must be the same. For purge and trap analyses V_i, is not applicable and therefore set to 1.
V_s = Volume of the aqueous sample extracted in mL.

Using the units specified here for these terms will result in a concentration in units of ng/mL which is equivalent to µg/L.

Non-aqueous sample

$$\text{Concentration} = \frac{(A_x)\,(V_t)\,(D)}{(CF)\,(V_i)\,(W_s)}$$

where:

A_x, V_t, D, CF, and V_i are the same as for aqueous samples and

W_s = Weight of the sample extracted (g). The wet weight or dry weight may be used, depending upon the specific application of the data.

Using the units specified here for these terms will result in a concentration in units of ng/g which is equivalent to µg/kg.

2. Retention Time (RT) Windows - RT criteria set forth in SW-846 method 8000B section 7.6 are used to set retention time windows. New in-house retention time windows are established after every major change to the system (new column or temperature program) and at initial calibration with midpoint standard. If the established retention time window is less than +/-0.03 minutes, the window defaults to +/-0.03 minutes. Retention times are updated with the first CCV of the day or the mid-level standard of the curve if samples are analyzed directly after a curve.

3. Quality control for this method can be referenced in SW-846 Method 8000B Section 8.0.

   a. A method blank is required every 20 samples or at the frequency required by the client or regulatory agency (1/matrix/batch/20 which ever is at the determined frequency). The contamination level should not exceed the CRDL, or ½ the CRDL for Navy Projects.

   b. An MS/MSD pair are required every 20 samples per matrix.

c. A Laboratory Control Sample (LCS) is required every 20 samples or at the frequency required by the client or regulatory agency. **When analyzing samples for DOD QSM Ver. 3, DOD limits will be used.**

1) TPH TN Method criteria requires LCS/LCSD for GRO and DRO. The recommended control spike for GRO is API PS-6 or other gasolines of similar composition and the DRO control standard spike is a commercial diesel #2. In both cases (GRO and DRO) the required recovery for the LCS is 50-150%. GRO or DRO sample analyses can not proceed until this criteria is met.

2) The other analytes measured by this method do not specify an exact recovery range, but these ranges are developed in-house by charting LCS recoveries see Method 8000B, Section 8.7.

d. Calculate surrogate recovery on all samples, blanks, and spikes. The surrogate recovery is checked to see if it is within the recovery limits established according to the procedure outlined in Method 8000B, Section 8.7.

1) TPH Method criteria for the GRO Surrogate bromofluorobenzene and the DRO Surrogate ortho-terphenyl have set recovery limits (50-150%) specified by the method. These limits must be met in the surrogate control sample (SCS, this is a surrogate spiked in reagent blank water) before sample analyses can proceed.

2) For the other compounds analyzed by this SOP, there are no recommended surrogates. Limits for surrogates, when not stated in the method, are determined by charting their recoveries and determining 3 standard deviation limits as outlined in Method 8000B, Section 8.7.

3) If the surrogate recovery from a sample is outside the required limits the following is required:

a) Check calculations, and/or surrogate solution for error.
b) Recalculate the data and/or re-analyze the extract if any of the above checks reveal a problem.
c) Re-extract and re-analyze the sample if none of the above are a problem or flag the data as "estimated ".

C. Sample analysis will begin after the system performs the various checks just mentioned.

1. A mid-level standard must be run at the beginning and end of the sequence and after every 10 field samples (every 10 samples for TPH) and cannot exceed ±15 percent for 8015B(±25 percent for TN-TPH, 20% for 8015C and DOD) difference from the initial calibration. A mid-level standard must also be analyzed at the end of the analysis sequence. If the mid-level check at the end fails, it is an indicator that GC maintenance is required (see above).

2. The retention times are updated with the first midpoint check of the day or from the midpoint of the calibration curve if analyzed before the samples.

D. Following sample analysis, the data is reduced using the TARGET data system. The following must be checked to see if the samples will require re-analyses or dilution.

1. The analyte concentration must be within the range of the calibration curve. If an analyte exceeds the curve, a dilution must be performed and the next sample must be checked for carryover. Any dilution should keep the concentration of the analyte in question within the top half of the curve.

2. Surrogate standard recovery must be checked to determine if it is within control limits (see above).

E. Any questions left by this SOP should be answered by reading the referenced methods, paying close attention to SW-846 Method 8015B/8015C or the State specific TPH Method. If questions still remain unanswered, check with the Organic Lab Manager, Technical Director or Quality Assurance Officer.

F. Demonstration of Capability (DOC) – Each analyst must perform a DOC to demonstrate proficiency with these methods. See SOP-413 for guidance.

VII. HEALTH AND SAFETY

A. Care should be used in handling all samples.

1. Safety glasses must be worn in the lab at all times. The use of blue nitrile gloves and lab coats is highly recommended.

2. Research into expected sample content and concentration should be done in order to be prepared for additional safety considerations. Generally, any samples that need special consideration have applicable notes on the sample logs.

3. MSDS sheets are available for all reagents and standards that have been purchased. These are located in the bookshelves across from the Quality Assurance Officers cube.

VIII. WASTE MANAGEMENT AND POLLUTION PREVENTION

1. Please see Waste Disposal, SOP-210 and SOP-405 for proper disposal of waste coming from this area within our laboratory.

2. Quantity of chemicals purchased should be based on expected usage during its shelf-life and the disposal cost of unused material. Actual reagent preparation volumes should reflect anticipated usage and reagent stability.

REFERENCES

1. *Test Methods for Evaluating Solid Waste*, SW-846.
2. *Tennessee Method for Determination of Extractable Petroleum Hydrocarbons by GC/FID.*
3. *Tennessee Method for Determination of Gasoline Range Organics.*

DEFINITIONS

°C - degrees centigrade
CF - calibration factor
CRDL - contract required detection limit
%D - percent difference
DOD - Department of Defense
DRO - diesel range organics
EPH - extractable petroleum hydrocarbons
FID - flame ionization detector
GC - gas chromatograph
GRO - gasoline range organics
LCS - laboratory control sample
LCSD - laboratory control sample duplicate
MDL - method detection limit
mg/KG - milligrams per kilogram
mg/L - milligrams per liter
µL - microliter
µm - micrometer
ml - milliliter
mm - millimeter
MS - matrix spike
MSD - matrix spike duplicate
%RSD - percent relative standard deviation
RT - retention time
SOP - standard operating procedure
TPH - total petroleum hydrocarbons
VPH - volatile petroleum hydrocarbons

Refer to SOP-431 for further definitions.

State of New Jersey

JON S. CORZINE
Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Office of Quality Assurance
401 East State Street, 2nd Floor, P.O. Box 424
Trenton, New Jersey 08625
Tel: (609) 292-3950
Fax: (609) 777-1774

Mark Mauriello
Acting Commissioner

December 3, 2009

Randy Ward
Empirical Laboratories, LLC
621 Mainstream Drive, Suite 270
Nashville, TN 37228

Dear Mr. Ward:

Re: Accreditation Status Modification Request
Laboratory Certification ID# TN473

Based on your request for certification for the parameter(s) listed below and a review of your supporting documentation, enclosed is an updated annual certified parameter list (ACPL). This will replace the current ACPL your laboratory holds. Please review it carefully and notify this office immediately if any discrepancies are noted.

Parameter Code	Parameter	Method	Status
SHW06.28010	HMX	SW-846 8330A	Certified
SHW06.28020	RDX	SW-846 8330A	Certified
SHW06.28030	Trinitrobenzene (1,3,5-)	SW-846 8330A	Certified
SHW06.28040	Dinitrobenzene (1,3-)	SW-846 8330A	Certified
SHW06.28050	Tetryl	SW-846 8330A	Certified
SHW06.28060	Nitrobenzene	SW-846 8330A	Certified
SHW06.28070	Trinitrotoluene (2,4,6-)	SW-846 8330A	Certified
SHW06.28080	Dinitrotoluene (4-amino-2,6-)	SW-846 8330A	Certified
SHW06.28090	Dinitrotoluene (2-amino-4,6-)	SW-846 8330A	Certified
SHW06.28100	Dinitrotoluene (2,4-)	SW-846 8330A	Certified
SHW06.28110	Dinitrotoluene (2,6-)	SW-846 8330A	Certified
SHW06.28120	Nitrotoluene (2-)	SW-846 8330A	Certified
SHW06.28130	Nitrotoluene (3-)	SW-846 8330A	Certified
SHW06.28140	Nitrotoluene (4-)	SW-846 8330A	Certified

If this office can be of any further assistance, please call Russell Confer or me at (609) 292-3950.

Sincerely,

Joseph F. Aiello, Chief

Enclosure
C: File

New Jersey Department ironmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 12/01/2009 until 06/30/2010

Laboratory Name: EMPIRICAL LABORATORIES, LLC Laboratory Number: TN473 Activity ID: NLC090006
621 MAINSTREAM DR
STE 270
NASHVILLE, TN 37228

Category: SHW04 -- Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW04.01000	NPW	Acid Digestion/Surface and Groundwater, ICP, FLAA	[SW-846 3005A, Rev. 1, 7/92]	Metals, Total Rec and Dissolved
Certified	Yes	NJ	SHW04.01500	NPW	Acid Digestion/Aqueous Samples, ICP, FLAA	[SW-846 3010A, Rev. 1, 7/92]	Metals, Total
Certified	Yes	NJ	SHW04.33000	NPW	AA, Manual Cold Vapor	[SW-846 7470A, Rev. 1, 9/94]	Mercury - liquid waste

Category: SHW05 -- Organic Parameters, Prep. / Screening

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW05.01000	NPW	Separatory Funnel Extraction	[SW-846 3510C, Rev. 3, 12/96]	Semivolatile organics
Certified	Yes	NJ	SHW05.02000	NPW	Continuous Liquid-Liquid Extraction	[SW-846 3520C, Rev. 3, 12/96]	Semivolatile organics
Certified	Yes	NJ	SHW05.02100	NPW	Solid Phase Extraction (SPE)	[SW-846 3535, Rev. 0, 12/96]	Semivolatile organics
Certified	Yes	NJ	SHW05.07000	NPW	Purge & Trap Aqueous	[SW-846 5030B, Rev. 2, 12/96]	Volatile organics

Category: WPP02 -- Inorg. Parameters, Nutrients and Demands

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP02.01500	NPW	Electrometric or Color Titration	[SM 2320 B]	Alkalinity as CaCO3
Applied	No	NJ	WPP02.02000	NPW	Automated Titration	[EPA 310.2]	Alkalinity as CaCO3
Certified	Yes	NJ	WPP02.03500	NPW	Distillation, Electrode	[SM 4500-NH3 B+D or E (19/20th ed.)]	Ammonia
Certified	Yes	NJ	WPP02.04000	NPW	Automated Phenate	[SM 4500-NH3 B+G (20th ed.)]	Ammonia
Certified	Yes	NJ	WPP02.05000	NPW	Dissolved Oxygen Depletion	[SM 5210 B]	Biochemical oxygen demand
Certified	Yes	NJ	WPP02.09500	NPW	Dissolved Oxygen Depletion, Nitrification Inhibition	[SM 5210 B]	Carbonaceous BOD (CBOD)
Certified	Yes	NJ	WPP02.10500	NPW	Spectrophotometric Manual/Auto	[EPA 410.4]	Chemical oxygen demand
Certified	Yes	NJ	WPP02.12600	NPW	Ion Chromatography	[EPA 300.0]	Chloride
Certified	Yes	NJ	WPP02.15500	NPW	Distillation, Spectrophotometric (Auto)	[EPA 335.4]	Cyanide
Certified	Yes	NJ	WPP02.16000	NPW	Manual Distillation, Titrimetr/Spectro	[SM 4500-CN C,G]	Cyanide - amenable to Cl2
Certified	Yes	NJ	WPP02.18100	NPW	Ion Chromatography	[EPA 300.0]	Fluoride
Certified	Yes	NJ	WPP02.20100	NPW	Ca + Mg Carbonates, ICP	[EPA 200.7]	Hardness - total as CaCO3
Certified	Yes	NJ	WPP02.22500	NPW	Digestion, Distillation, Semiautomated Digestor	[EPA 351.2]	Kjeldahl nitrogen - total

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

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NASHVILLE, TN 37228

Category: WPP02 – Inorg. Parameters, Nutrients and Demands

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP02.24000	NPW	Digestion, ICP	[EPA 200.7]	Magnesium
Certified	Yes	NJ	WPP02.26100	NPW	Ion Chromatography	[EPA 300.0]	Nitrate
Certified	Yes	NJ	WPP02.27000	NPW	Cadmium Reduction, Automated	[EPA 353.2]	Nitrate - nitrite
Certified	Yes	NJ	WPP02.28000	NPW	Spectrophotometric, Manual	[SM 4500-NO2 B]	Nitrite
Certified	Yes	NJ	WPP02.28600	NPW	Ion Chromatography	[EPA 300.0]	Nitrite
Certified	Yes	NJ	WPP02.29100	NPW	Gravimetric, Hexane Extractable Material-LL	[EPA 1664A]	Oil & grease - hem-LL
Certified	Yes	NJ	WPP02.30000	NPW	Combustion or Oxidation	[SM 5310 B, C or D]	Total organic carbon (TOC)
Certified	Yes	NJ	WPP02.31500	NPW	Ascorbic Acid, Manual Single Reagent	[SM 4500-P, E]	Orthophosphate
Certified	Yes	NJ	WPP02.32500	NPW	Manual Distillation, Colorimetric 4AAP	[EPA 420.1]	Phenols
Certified	Yes	NJ	WPP02.33000	NPW	Manual Distillation, Colorimetric Auto	[EPA 420.1 + .2]	Phenols
Certified	Yes	NJ	WPP02.34000	NPW	Persulfate Digestion + Manual	[SM 4500-P B5 + E]	Phosphorus (total)
Certified	Yes	NJ	WPP02.38000	NPW	Gravimetric, 103-105 Degrees C	[SM 2540 B]	Residue - total
Certified	Yes	NJ	WPP02.38500	NPW	Gravimetric, 180 Degrees C	[SM 2540 C]	Residue - filterable (TDS)
Certified	Yes	NJ	WPP02.39000	NPW	Gravimetric, 103-105 Degrees C, Post Washing	[SM 2540 D]	Residue - nonfilterable (TSS)
Certified	Yes	NJ	WPP02.44000	NPW	Digestion, ICP	[EPA 200.7]	Sodium
Certified	Yes	NJ	WPP02.45500	NPW	Wheatstone Bridge	[EPA 120.1]	Specific conductance
Certified	Yes	NJ	WPP02.47100	NPW	Ion Chromatography	[EPA 300.0]	Sulfate
Certified	Yes	NJ	WPP02.47500	NPW	Titrimetric, Iodine	[SM 4500-S E or F]	Sulfides
Certified	Yes	NJ	WPP02.50000	NPW	Nephelometric	[EPA 180.1]	Turbidity

Category: WPP03 – Analyze-Immediately Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP03.09000	NPW	Electrometric	[SM 4500-H B]	pH

Category: WPP04 – Inorganic Parameters, Metals

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP04.02000	NPW	Digestion, ICP	[EPA 200.7]	Aluminum

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Category: WPP04 – Inorganic Parameters, Metals

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP04.04500	NPW	Digestion, ICP	[EPA 200.7]	Antimony
Certified	Yes	NJ	WPP04.05600	NPW	Digestion, ICP	[EPA 200.7]	Arsenic
Certified	Yes	NJ	WPP04.08000	NPW	Digestion, ICP	[EPA 200.7]	Barium
Certified	Yes	NJ	WPP04.11000	NPW	Digestion, ICP	[EPA 200.7]	Beryllium
Certified	Yes	NJ	WPP04.13500	NPW	Digestion, ICP	[EPA 200.7]	Cadmium
Certified	Yes	NJ	WPP04.15000	NPW	0.45u Filter, Colorimetric DPC	[SM 3500-Cr D]	Chromium (VI)
Certified	Yes	NJ	WPP04.18000	NPW	Digestion, ICP	[EPA 200.7]	Chromium
Certified	Yes	NJ	WPP04.19500	NPW	Digestion, ICP	[EPA 200.7]	Cobalt
Certified	Yes	NJ	WPP04.21500	NPW	Digestion, ICP	[EPA 200.7]	Copper
Certified	Yes	NJ	WPP04.26500	NPW	Digestion, ICP	[EPA 200.7]	Iron
Certified	Yes	NJ	WPP04.28000	NPW	Digestion, ICP	[EPA 200.7]	Lead
Certified	Yes	NJ	WPP04.31000	NPW	Digestion, ICP	[EPA 200.7]	Manganese
Certified	Yes	NJ	WPP04.33000	NPW	Manual Cold Vapor	[EPA 245.1]	Mercury
Certified	Yes	NJ	WPP04.35000	NPW	Digestion, ICP	[EPA 200.7]	Molybdenum
Certified	Yes	NJ	WPP04.37500	NPW	Digestion, ICP	[EPA 200.7]	Nickel
Certified	Yes	NJ	WPP04.45500	NPW	Digestion, ICP	[EPA 200.7]	Selenium
Certified	Yes	NJ	WPP04.48000	NPW	Digestion, ICP	[EPA 200.7]	Silver
Certified	Yes	NJ	WPP04.50000	NPW	Digestion, ICP	[EPA 200.7]	Thallium
Certified	Yes	NJ	WPP04.51100	NPW	Digestion, ICP	[EPA 200.7]	Tin
Certified	Yes	NJ	WPP04.54000	NPW	Digestion, ICP	[EPA 200.7]	Vanadium
Certified	Yes	NJ	WPP04.56500	NPW	Digestion, ICP	[EPA 200.7]	Zinc

Category: WPP05 – Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP05.09010	NPW	Extract/GC (ECD)	[EPA 608]	Aldrin
Certified	Yes	NJ	WPP05.09020	NPW	Extract/GC (ECD)	[EPA 608]	Alpha BHC
Certified	Yes	NJ	WPP05.09030	NPW	Extract/GC (ECD)	[EPA 608]	Beta BHC
Certified	Yes	NJ	WPP05.09040	NPW	Extract/GC (ECD)	[EPA 608]	Delta BHC
Certified	Yes	NJ	WPP05.09050	NPW	Extract/GC (ECD)	[EPA 608]	Lindane (gamma BHC)

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Category: WPP05 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP05.09060	NPW	Extract/GC (ECD)	[EPA 608]	Chlordane
Certified	Yes	NJ	WPP05.09070	NPW	Extract/GC (ECD)	[EPA 608]	DDD (4,4'-)
Certified	Yes	NJ	WPP05.09080	NPW	Extract/GC (ECD)	[EPA 608]	DDE (4,4'-)
Certified	Yes	NJ	WPP05.09090	NPW	Extract/GC (ECD)	[EPA 608]	DDT (4,4'-)
Certified	Yes	NJ	WPP05.09100	NPW	Extract/GC (ECD)	[EPA 608]	Dieldrin
Certified	Yes	NJ	WPP05.09110	NPW	Extract/GC (ECD)	[EPA 608]	Endosulfan I
Certified	Yes	NJ	WPP05.09120	NPW	Extract/GC (ECD)	[EPA 608]	Endosulfan II
Certified	Yes	NJ	WPP05.09130	NPW	Extract/GC (ECD)	[EPA 608]	Endosulfan sulfate
Certified	Yes	NJ	WPP05.09140	NPW	Extract/GC (ECD)	[EPA 608]	Endrin
Certified	Yes	NJ	WPP05.09150	NPW	Extract/GC (ECD)	[EPA 608]	Endrin aldehyde
Certified	Yes	NJ	WPP05.09160	NPW	Extract/GC (ECD)	[EPA 608]	Endrin ketone
Certified	Yes	NJ	WPP05.09170	NPW	Extract/GC (ECD)	[EPA 608]	Heptachlor
Certified	Yes	NJ	WPP05.09180	NPW	Extract/GC (ECD)	[EPA 608]	Heptachlor epoxide
Certified	Yes	NJ	WPP05.09190	NPW	Extract/GC (ECD)	[EPA 608]	Methoxychlor
Certified	Yes	NJ	WPP05.09200	NPW	Extract/GC (ECD)	[EPA 608]	Toxaphene
Certified	Yes	NJ	WPP05.11010	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1016
Certified	Yes	NJ	WPP05.11020	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1221
Certified	Yes	NJ	WPP05.11030	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1232
Certified	Yes	NJ	WPP05.11040	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1242
Certified	Yes	NJ	WPP05.11050	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1248
Certified	Yes	NJ	WPP05.11060	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1254
Certified	Yes	NJ	WPP05.11070	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1260

Category: WPP06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP06.02010	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Benzene
Certified	Yes	NJ	WPP06.02020	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Bromodichloromethane
Certified	Yes	NJ	WPP06.02030	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Bromoform
Certified	Yes	NJ	WPP06.02040	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Bromomethane

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STE 270
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Category: WPP06 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP06.02050	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Carbon tetrachloride
Certified	Yes	NJ	WPP06.02060	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chlorobenzene
Certified	Yes	NJ	WPP06.02070	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloroethane
Certified	Yes	NJ	WPP06.02080	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloroethyl vinyl ether (2-)
Certified	Yes	NJ	WPP06.02090	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloroform
Certified	Yes	NJ	WPP06.02100	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloromethane
Certified	Yes	NJ	WPP06.02110	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dibromochloromethane
Certified	Yes	NJ	WPP06.02120	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorobenzene (1,2-)
Certified	Yes	NJ	WPP06.02130	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorobenzene (1,3-)
Certified	Yes	NJ	WPP06.02140	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorobenzene (1,4-)
Certified	Yes	NJ	WPP06.02150	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethane (1,1-)
Certified	Yes	NJ	WPP06.02160	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethane (1,2-)
Certified	Yes	NJ	WPP06.02170	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethene (1,1-)
Certified	Yes	NJ	WPP06.02180	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethene (trans-1,2-)
Certified	Yes	NJ	WPP06.02190	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloropropane (1,2-)
Certified	Yes	NJ	WPP06.02200	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloropropene (cis-1,3-)
Certified	Yes	NJ	WPP06.02210	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloropropene (trans-1,3-)
Certified	Yes	NJ	WPP06.02220	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Ethylbenzene
Certified	Yes	NJ	WPP06.02230	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Methylene chloride (Dichloromethane)
Certified	Yes	NJ	WPP06.02232	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Methyl tert-butyl ether
Certified	Yes	NJ	WPP06.02234	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Tert-butyl alcohol
Certified	Yes	NJ	WPP06.02238	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Styrene
Certified	Yes	NJ	WPP06.02240	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NJ	WPP06.02250	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Tetrachloroethene
Certified	Yes	NJ	WPP06.02260	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Toluene
Certified	Yes	NJ	WPP06.02270	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichloroethane (1,1,1-)
Certified	Yes	NJ	WPP06.02280	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichloroethane (1,1,2-)
Certified	Yes	NJ	WPP06.02290	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichloroethene
Certified	Yes	NJ	WPP06.02300	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichlorofluoromethane
Certified	Yes	NJ	WPP06.02310	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Vinyl chloride
Certified	Yes	NJ	WPP06.02312	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Xylenes (total)
Certified	Yes	NJ	WPP06.03010	NPW	Extract, GC/MS	[EPA 625]	Acenaphthene

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Certified	Yes	NJ	WPP06.03020	NPW	Extract, GC/MS	[EPA 625]	Acenaphthylene
Certified	Yes	NJ	WPP06.03030	NPW	Extract, GC/MS	[EPA 625]	Anthracene
Certified	Yes	NJ	WPP06.03040	NPW	Extract, GC/MS	[EPA 625]	Benzo(a)anthracene
Certified	Yes	NJ	WPP06.03050	NPW	Extract, GC/MS	[EPA 625]	Benzo(b)fluoranthene
Certified	Yes	NJ	WPP06.03060	NPW	Extract, GC/MS	[EPA 625]	Benzo(k)fluoranthene
Certified	Yes	NJ	WPP06.03070	NPW	Extract, GC/MS	[EPA 625]	Benzo(a)pyrene
Certified	Yes	NJ	WPP06.03080	NPW	Extract, GC/MS	[EPA 625]	Benzo(ghi)perylene
Certified	Yes	NJ	WPP06.03090	NPW	Extract, GC/MS	[EPA 625]	Butyl benzyl phthalate
Certified	Yes	NJ	WPP06.03100	NPW	Extract, GC/MS	[EPA 625]	Bis (2-chloroethyl) ether
Certified	Yes	NJ	WPP06.03110	NPW	Extract, GC/MS	[EPA 625]	Bis (2-chloroethoxy) methane
Certified	Yes	NJ	WPP06.03120	NPW	Extract, GC/MS	[EPA 625]	Bis (2-ethylhexyl) phthalate
Certified	Yes	NJ	WPP06.03130	NPW	Extract, GC/MS	[EPA 625]	Bis (2-chloroisopropyl) ether
Certified	Yes	NJ	WPP06.03140	NPW	Extract, GC/MS	[EPA 625]	Bromophenyl-phenyl ether (4-)
Certified	Yes	NJ	WPP06.03150	NPW	Extract, GC/MS	[EPA 625]	Chloronaphthalene (2-)
Certified	Yes	NJ	WPP06.03160	NPW	Extract, GC/MS	[EPA 625]	Chlorophenyl-phenyl ether (4-)
Certified	Yes	NJ	WPP06.03170	NPW	Extract, GC/MS	[EPA 625]	Chrysene
Certified	Yes	NJ	WPP06.03180	NPW	Extract, GC/MS	[EPA 625]	Dibenzo(a,h)anthracene
Certified	Yes	NJ	WPP06.03186	NPW	Extract, GC/MS	[EPA 625]	Dibenzofuran
Certified	Yes	NJ	WPP06.03190	NPW	Extract, GC/MS	[EPA 625]	Di-n-butyl phthalate
Certified	Yes	NJ	WPP06.03230	NPW	Extract, GC/MS	[EPA 625]	Dichlorobenzidine (3,3'-)
Certified	Yes	NJ	WPP06.03240	NPW	Extract, GC/MS	[EPA 625]	Diethyl phthalate
Certified	Yes	NJ	WPP06.03250	NPW	Extract, GC/MS	[EPA 625]	Dimethyl phthalate
Certified	Yes	NJ	WPP06.03260	NPW	Extract, GC/MS	[EPA 625]	Dinitrotoluene (2,4-)
Certified	Yes	NJ	WPP06.03270	NPW	Extract, GC/MS	[EPA 625]	Dinitrotoluene (2,6-)
Certified	Yes	NJ	WPP06.03280	NPW	Extract, GC/MS	[EPA 625]	Di-n-octyl phthalate
Certified	Yes	NJ	WPP06.03290	NPW	Extract, GC/MS	[EPA 625]	Fluoranthene
Certified	Yes	NJ	WPP06.03300	NPW	Extract, GC/MS	[EPA 625]	Fluorene
Certified	Yes	NJ	WPP06.03310	NPW	Extract, GC/MS	[EPA 625]	Hexachlorobenzene
Certified	Yes	NJ	WPP06.03320	NPW	Extract, GC/MS	[EPA 625]	Hexachlorobutadiene (1,3-)
Certified	Yes	NJ	WPP06.03330	NPW	Extract, GC/MS	[EPA 625]	Hexachloroethane
Certified	Yes	NJ	WPP06.03340	NPW	Extract, GC/MS	[EPA 625]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NJ	WPP06.03350	NPW	Extract, GC/MS	[EPA 625]	Isophorone

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

New Jersey Department . /ironmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 12/01/2009 until 06/30/2010

Laboratory Name: EMPIRICAL LABORATORIES, LLC Laboratory Number: TN473 Activity ID: NLC090006
621 MAINSTREAM DR
STE 270
NASHVILLE, TN 37228

Category: WPP06 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP06.03358	NPW	Extract, GC/MS	[EPA 625]	Methylnaphthalene (2-)
Certified	Yes	NJ	WPP06.03360	NPW	Extract, GC/MS	[EPA 625]	Naphthalene
Certified	Yes	NJ	WPP06.03366	NPW	Extract, GC/MS	[EPA 625]	Chloroaniline (4-)
Certified	Yes	NJ	WPP06.03367	NPW	Extract, GC/MS	[EPA 625]	Nitroaniline (2-)
Certified	Yes	NJ	WPP06.03368	NPW	Extract, GC/MS	[EPA 625]	Nitroaniline (3-)
Certified	Yes	NJ	WPP06.03369	NPW	Extract, GC/MS	[EPA 625]	Nitroaniline (4-)
Certified	Yes	NJ	WPP06.03370	NPW	Extract, GC/MS	[EPA 625]	Nitrobenzene
Certified	Yes	NJ	WPP06.03380	NPW	Extract, GC/MS	[EPA 625]	N-Nitroso-di-n-propylamine
Certified	Yes	NJ	WPP06.03390	NPW	Extract, GC/MS	[EPA 625]	Phenanthrene
Certified	Yes	NJ	WPP06.03400	NPW	Extract, GC/MS	[EPA 625]	Pyrene
Certified	Yes	NJ	WPP06.03410	NPW	Extract, GC/MS	[EPA 625]	Trichlorobenzene (1,2,4-)
Certified	Yes	NJ	WPP06.03420	NPW	Extract, GC/MS	[EPA 625]	Methyl phenol (4-chloro-3-)
Certified	Yes	NJ	WPP06.03430	NPW	Extract, GC/MS	[EPA 625]	Chlorophenol (2-)
Certified	Yes	NJ	WPP06.03440	NPW	Extract, GC/MS	[EPA 625]	Dichlorophenol (2,4-)
Certified	Yes	NJ	WPP06.03450	NPW	Extract, GC/MS	[EPA 625]	Dimethylphenol (2,4-)
Certified	Yes	NJ	WPP06.03460	NPW	Extract, GC/MS	[EPA 625]	Dinitrophenol (2,4-)
Certified	Yes	NJ	WPP06.03470	NPW	Extract, GC/MS	[EPA 625]	Dinitrophenol (2-methyl-4,6-)
Certified	Yes	NJ	WPP06.03480	NPW	Extract, GC/MS	[EPA 625]	Nitrophenol (2-)
Certified	Yes	NJ	WPP06.03490	NPW	Extract, GC/MS	[EPA 625]	Nitrophenol (4-)
Certified	Yes	NJ	WPP06.03500	NPW	Extract, GC/MS	[EPA 625]	Pentachlorophenol
Certified	Yes	NJ	WPP06.03510	NPW	Extract, GC/MS	[EPA 625]	Phenol
Certified	Yes	NJ	WPP06.03518	NPW	Extract, GC/MS	[EPA 625]	Trichlorophenol (2,4,5-)
Certified	Yes	NJ	WPP06.03520	NPW	Extract, GC/MS	[EPA 625]	Trichlorophenol (2,4,6-)
Certified	Yes	NJ	WPP06.03530	NPW	Extract, GC/MS	[EPA 625]	Benzoic acid
Certified	Yes	NJ	WPP06.03540	NPW	Extract, GC/MS	[EPA 625]	Methylphenol (4-)
Certified	Yes	NJ	WPP06.03570	NPW	Extract, GC/MS	[EPA 625]	Aniline
Certified	Yes	NJ	WPP06.03580	NPW	Extract, GC/MS	[EPA 625]	Benzidine
Certified	Yes	NJ	WPP06.03590	NPW	Extract, GC/MS	[EPA 625]	Carbazole
Certified	Yes	NJ	WPP06.03610	NPW	Extract, GC/MS	[EPA 625]	Methylphenol (2-)
Certified	Yes	NJ	WPP06.03660	NPW	Extract, GC/MS	[EPA 625]	Hexachlorocyclopentadiene
Certified	Yes	NJ	WPP06.03680	NPW	Extract, GC/MS	[EPA 625]	N-Nitrosodimethylamine
Certified	Yes	NJ	WPP06.03690	NPW	Extract, GC/MS	[EPA 625]	N-Nitrosodiphenylamine

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New Jersey Department ‹ ,ironmental Protection

National Environmental Laboratory Accreditation Program

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Laboratory Name: EMPIRICAL LABORATORIES, LLC Laboratory Number: TN473 Activity ID: NLC090006
621 MAINSTREAM DR
STE 270
NASHVILLE, TN 37228

Category: WPP06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP06.03720	NPW	Extract, GC/MS	[EPA 625]	Pyridine

Category: WPP08 -- Acute Toxicity Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	WPP08.01010	NPW	Daphnia SPP. Mortality	[EPA 2021.0] [OTHER N.J.A.C. 7:18]	Toxicity - acute, FW organism
Certified	Yes	NJ	WPP08.01020	NPW	Ceriodaphnia Mortality	[EPA 2002.0] [OTHER N.J.A.C. 7:18]	Toxicity - acute, FW organism
Certified	Yes	NJ	WPP08.01030	NPW	Fathead Minnow (FHM) Mortality	[OTHER N.J.A.C. 7:18] [EPA 2000.0]	Toxicity - acute, FW organism
Certified	Yes	NJ	WPP08.01060	NPW	Bannerfish Shiner Mortality	[OTHER N.J.A.C. 7:18] [EPA 2000.0]	Toxicity - acute, FW organism
Certified	Yes	NJ	WPP08.01070	NPW	Mysid Mortality	[EPA 2007.0] [OTHER N.J.A.C. 7:18]	Toxicity - acute, estuary and marine organism
Certified	Yes	NJ	WPP08.01080	NPW	Sheephead Minnow (SHM) Mortality	[EPA 2004.0] [OTHER N.J.A.C. 7:18]	Toxicity - acute, estuary and marine organism
Certified	Yes	NJ	WPP08.01090	NPW	Menidia SPP Mortality	[EPA 2006.0] [OTHER N.J.A.C. 7:18]	Toxicity - acute, estuary and marine organism
Certified	Yes	NJ	WPP08.02010	NPW	FHM Larval Survival & Growth	[EPA 1000.0]	Toxicity - chronic, FW organism
Certified	Yes	NJ	WPP08.02030	NPW	Ceriodaphnia Survival & Reproduction	[EPA 1002.0]	Toxicity - chronic, FW organism
Dropped	No	NJ	WPP08.03060	NPW	Champia Parvula Reproduction	[EPA 1009.0]	Toxicity - chronic, estuary & marine organism

Category: SHW02 -- Characteristics of Hazardous Waste

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW02.01000	NPW, SCM	Pensky Martens	[SW-846 1010A]	Ignitability
Certified	Yes	NJ	SHW02.03000	NPW, SCM	Aqueous Waste, Potentiometric	[SW-846 9040B, Rev. 2, 1/95]	Corrosivity - pH waste, >20% water
Certified	Yes	NJ	SHW02.04000	NPW, SCM	Weight Loss In Acid Media	[SW-846 1110, Rev. 0, 9/86]	Corrosivity toward steel
Certified	Yes	NJ	SHW02.06900	NPW, SCM	TCLP, Toxicity Procedure, ZHE	[SW-846 1311, Rev. 0, 7/92]	Volatile organics
Certified	Yes	NJ	SHW02.07000	NPW, SCM	TCLP, Toxicity Procedure, Shaker	[SW-846 1311, Rev. 0, 7/92]	Metals
Certified	Yes	NJ	SHW02.08000	NPW, SCM	Synthetic PPT Leachate Procedure	[SW-846 1312, Rev. 0, 9/94]	Metals - organics

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New Jersey Department vironmental Protection

National Environmental Laboratory Accreditation Program

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Laboratory Name: EMPIRICAL LABORATORIES, LLC Laboratory Number: TN473 Activity ID: NLC090006
621 MAINSTREAM DR
STE 270
NASHVILLE, TN 37228

Category: SHW04 – Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW04.05000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Aluminum
Certified	Yes	NJ	SHW04.06500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Antimony
Certified	Yes	NJ	SHW04.09000	NPW, SCM	ICP	[SW-846 6010C] [SW-846 6010B]	Arsenic
Certified	Yes	NJ	SHW04.11500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Barium
Certified	Yes	NJ	SHW04.13500	NPW, SCM	ICP	[SW-846 6010C] [SW-846 6010B]	Beryllium
Certified	Yes	NJ	SHW04.15500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Cadmium
Certified	Yes	NJ	SHW04.17500	NPW, SCM	ICP	[SW-846 6010C] [SW-846 6010B]	Calcium
Certified	Yes	NJ	SHW04.18500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Chromium
Certified	Yes	NJ	SHW04.21000	NPW, SCM	Colorimetric	[SW-846 7196A, Rev. 1, 7/92]	Chromium (VI)
Certified	Yes	NJ	SHW04.22500	NPW, SCM	ICP	[SW-846 6010C] [SW-846 6010B]	Cobalt
Certified	Yes	NJ	SHW04.24500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Copper
Certified	Yes	NJ	SHW04.26000	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Iron
Certified	Yes	NJ	SHW04.27500	NPW, SCM	ICP	[SW-846 6010C] [SW-846 6010B]	Lead
Certified	Yes	NJ	SHW04.30500	NPW, SCM	ICP	[SW-846 6010B] [SW-846 6010C]	Magnesium
Certified	Yes	NJ	SHW04.31500	NPW, SCM	ICP	[SW-846 6010C] [SW-846 6010B]	Manganese
Certified	Yes	NJ	SHW04.34000	NPW, SCM	ICP	[SW-846 6010C] [SW-846 6010B]	Molybdenum
Certified	Yes	NJ	SHW04.35500	NPW, SCM	ICP	[SW-846 6010C] [SW-846 6010B]	Nickel
Certified	Yes	NJ	SHW04.38000	NPW, SCM	ICP	[SW-846 6010C] [SW-846 6010B]	Potassium
Certified	Yes	NJ	SHW04.39000	NPW, SCM	ICP	[SW-846 6010C] [SW-846 6010B]	Selenium
Certified	Yes	NJ	SHW04.41000	NPW, SCM	ICP	[SW-846 6010C] [SW-846 6010B]	Silver
Certified	Yes	NJ	SHW04.43000	NPW, SCM	ICP	[SW-846 6010C] [SW-846 6010B]	Sodium
Certified	Yes	NJ	SHW04.45000	NPW, SCM	ICP	[SW-846 6010C] [SW-846 6010B]	Thallium
Certified	Yes	NJ	SHW04.47100	NPW, SCM	ICP	[SW-846 6010C] [SW-846 6010B]	Tin
Certified	Yes	NJ	SHW04.47500	NPW, SCM	ICP	[SW-846 6010C] [SW-846 6010B]	Vanadium
Certified	Yes	NJ	SHW04.49000	NPW, SCM	ICP	[SW-846 6010C] [SW-846 6010B]	Zinc

Category: SHW06 – Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW06.02010	NPW, SCM	Microextraction, GC, ECD	[SW-846 8011, Rev. 0, 7/92]	Dibromoethane (1,2-) (EDB)

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New Jersey Department [illegible] ironmental Protection

National Environmental Laboratory Accreditation Program

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Effective as of 12/01/2009 until 06/30/2010

Laboratory Name: EMPIRICAL LABORATORIES, LLC Laboratory Number: TN473 Activity ID: NLC090006
621 MAINSTREAM DR
STE 270
NASHVILLE, TN 37228

Category: SHW06 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW06.02020	NPW, SCM	Microextraction, GC, ECD	[SW-846 8011, Rev. 0, 7/92]	Dibromo-3-chloropropane (1,2-)
Certified	Yes	NJ	SHW06.04010	NPW, SCM	GC P&T, FID	[SW-846 8015C] [SW-846 8015B]	Gasoline range organic
Certified	Yes	NJ	SHW06.04500	NPW, SCM	Extraction, GC, FID	[SW-846 8015C] [SW-846 8015B]	Diesel range organic
Certified	Yes	NJ	SHW06.04511	NPW, SCM	Extraction, GC, FID	[OTHER FL - PRO]	Petroleum Organics
Certified	Yes	NJ	SHW06.12010	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Aldrin
Certified	Yes	NJ	SHW06.12020	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Alpha BHC
Certified	Yes	NJ	SHW06.12030	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Beta BHC
Certified	Yes	NJ	SHW06.12040	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Delta BHC
Certified	Yes	NJ	SHW06.12050	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Lindane (gamma BHC)
Certified	Yes	NJ	SHW06.12060	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Chlordane (technical)
Certified	Yes	NJ	SHW06.12070	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Chlordane (alpha)
Certified	Yes	NJ	SHW06.12080	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Chlordane (gamma)
Certified	Yes	NJ	SHW06.12090	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	DDD (4,4'-)
Certified	Yes	NJ	SHW06.12100	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	DDE (4,4'-)
Certified	Yes	NJ	SHW06.12110	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	DDT (4,4'-)
Certified	Yes	NJ	SHW06.12120	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Dieldrin
Certified	Yes	NJ	SHW06.12130	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Endosulfan I
Certified	Yes	NJ	SHW06.12140	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Endosulfan II
Certified	Yes	NJ	SHW06.12150	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Endosulfan sulfate
Certified	Yes	NJ	SHW06.12160	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Endrin
Certified	Yes	NJ	SHW06.12170	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Endrin aldehyde
Certified	Yes	NJ	SHW06.12180	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Endrin ketone
Certified	Yes	NJ	SHW06.12190	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Heptachlor
Certified	Yes	NJ	SHW06.12200	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Heptachlor epoxide
Certified	Yes	NJ	SHW06.12210	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Methoxychlor
Certified	Yes	NJ	SHW06.12220	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Toxaphene
Certified	Yes	NJ	SHW06.13110	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082, Rev. 0, 12/96]	PCB 1016
Certified	Yes	NJ	SHW06.13120	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082, Rev. 0, 12/96]	PCB 1221
Certified	Yes	NJ	SHW06.13130	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082, Rev. 0, 12/96]	PCB 1232
Certified	Yes	NJ	SHW06.13140	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082, Rev. 0, 12/96]	PCB 1242
Certified	Yes	NJ	SHW06.13150	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082, Rev. 0, 12/96]	PCB 1248
Certified	Yes	NJ	SHW06.13160	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082, Rev. 0, 12/96]	PCB 1254

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621 MAINSTREAM DR
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Category: SHW06 – Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW06.13170	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082, Rev. 0, 12/96]	PCB 1260
Certified	Yes	NJ	SHW06.23010	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev 1, 9/96]	Dalapon
Certified	Yes	NJ	SHW06.23020	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev 1, 9/96]	Dicamba
Certified	Yes	NJ	SHW06.23021	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev. 1, 9/96]	Dichlorprop
Certified	Yes	NJ	SHW06.23030	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev 1, 9/96]	Dinoseb
Certified	Yes	NJ	SHW06.23040	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev 1, 9/96]	D (2,4-)
Certified	Yes	NJ	SHW06.23050	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev 1, 9/96]	T (2,4,5-)
Certified	Yes	NJ	SHW06.23060	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev 1, 9/96]	TP (2,4,5-) (Silvex)
Certified	Yes	NJ	SHW06.23063	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev. 1, 9/96]	MCPA
Certified	Yes	NJ	SHW06.23064	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev. 1, 9/96]	MCPP
Certified	Yes	NJ	SHW06.28010	NPW, SCM	HPLC, UV Detector	[SW-846 8330A]	HMX
Certified	Yes	NJ	SHW06.28020	NPW, SCM	HPLC, UV Detector	[SW-846 8330A]	RDX
Certified	Yes	NJ	SHW06.28030	NPW, SCM	HPLC, UV Detector	[SW-846 8330A]	Trinitrobenzene (1,3,5-)
Certified	Yes	NJ	SHW06.28040	NPW, SCM	HPLC, UV Detector	[SW-846 8330A]	Dinitrobenzene (1,3-)
Certified	Yes	NJ	SHW06.28050	NPW, SCM	HPLC, UV Detector	[SW-846 8330A]	Tetryl
Certified	Yes	NJ	SHW06.28060	NPW, SCM	HPLC, UV Detector	[SW-846 8330A]	Nitrobenzene
Certified	Yes	NJ	SHW06.28070	NPW, SCM	HPLC, UV Detector	[SW-846 8330A]	Trinitrotoluene (2,4,6-)
Certified	Yes	NJ	SHW06.28080	NPW, SCM	HPLC, UV Detector	[SW-846 8330A]	Dinitrotoluene (4-amino-2,6-)
Certified	Yes	NJ	SHW06.28090	NPW, SCM	HPLC, UV Detector	[SW-846 8330A]	Dinitrotoluene (2-amino-4,6-)
Certified	Yes	NJ	SHW06.28100	NPW, SCM	HPLC, UV Detector	[SW-846 8330A]	Dinitrotoluene (2,4-)
Certified	Yes	NJ	SHW06.28110	NPW, SCM	HPLC, UV Detector	[SW-846 8330A]	Dinitrotoluene (2,6-)
Certified	Yes	NJ	SHW06.28120	NPW, SCM	HPLC, UV Detector	[SW-846 8330A]	Nitrotoluene (2-)
Certified	Yes	NJ	SHW06.28130	NPW, SCM	HPLC, UV Detector	[SW-846 8330A]	Nitrotoluene (3-)
Certified	Yes	NJ	SHW06.28140	NPW, SCM	HPLC, UV Detector	[SW-846 8330A]	Nitrotoluene (4-)
Certified	Yes	NJ	SHW06.29100	NPW, SCM	HPLC, UV Detector	[SW-846 8330A]	Nitroglycerine

Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.04010	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Benzene

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New Jersey Department o. ıronmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 12/01/2009 until 06/30/2010

Laboratory Name: EMPIRICAL LABORATORIES, LLC Laboratory Number: TN473 Activity ID: NLC090006
621 MAINSTREAM DR
STE 270
NASHVILLE, TN 37228

Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.04012	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Butyl benzene (n-)
Certified	Yes	NJ	SHW07.04013	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Sec-butylbenzene
Certified	Yes	NJ	SHW07.04014	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Tert-butylbenzene
Certified	Yes	NJ	SHW07.04020	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Chlorobenzene
Certified	Yes	NJ	SHW07.04030	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichlorobenzene (1,2-)
Certified	Yes	NJ	SHW07.04040	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichlorobenzene (1,3-)
Certified	Yes	NJ	SHW07.04050	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichlorobenzene (1,4-)
Certified	Yes	NJ	SHW07.04060	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Ethylbenzene
Certified	Yes	NJ	SHW07.04065	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Isopropylbenzene
Certified	Yes	NJ	SHW07.04067	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Propylbenzene (n-)
Certified	Yes	NJ	SHW07.04070	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Toluene
Certified	Yes	NJ	SHW07.04071	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Isopropyltoluene (4-)
Certified	Yes	NJ	SHW07.04072	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trichlorobenzene (1,2,3-)
Certified	Yes	NJ	SHW07.04073	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trimethylbenzene (1,2,4-)
Certified	Yes	NJ	SHW07.04074	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trimethylbenzene (1,3,5-)
Certified	Yes	NJ	SHW07.04080	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Xylenes (total)
Certified	Yes	NJ	SHW07.04089	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Bromochloromethane
Certified	Yes	NJ	SHW07.04090	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Bromodichloromethane
Certified	Yes	NJ	SHW07.04100	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Bromoform
Certified	Yes	NJ	SHW07.04110	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Bromomethane
Certified	Yes	NJ	SHW07.04120	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Carbon tetrachloride
Certified	Yes	NJ	SHW07.04130	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Chloroethane
Certified	Yes	NJ	SHW07.04150	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Chloroform
Certified	Yes	NJ	SHW07.04160	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Chloromethane
Certified	Yes	NJ	SHW07.04180	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dibromochloromethane
Certified	Yes	NJ	SHW07.04185	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dibromoethane (1,2-) (EDB)
Certified	Yes	NJ	SHW07.04186	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dibromomethane
Certified	Yes	NJ	SHW07.04187	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dibromo-3-chloropropane (1,2-)
Certified	Yes	NJ	SHW07.04190	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichlorodifluoromethane
Certified	Yes	NJ	SHW07.04200	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloroethane (1,1-)
Certified	Yes	NJ	SHW07.04210	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloroethane (1,2-)
Certified	Yes	NJ	SHW07.04220	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloroethene (1,1-)

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

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Laboratory Name: EMPIRICAL LABORATORIES, LLC Laboratory Number: TN473 Activity ID: NLC090006
621 MAINSTREAM DR
STE 270
NASHVILLE, TN 37228

Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.04230	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloroethene (trans-1,2-)
Certified	Yes	NJ	SHW07.04235	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloroethene (cis-1,2-)
Certified	Yes	NJ	SHW07.04240	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloropropane (1,2-)
Certified	Yes	NJ	SHW07.04241	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloropropane (1,3-)
Dropped	No	NJ	SHW07.04242	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloropropane (2,2-)
Dropped	No	NJ	SHW07.04249	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Dichloropropene (1,1-)
Certified	Yes	NJ	SHW07.04250	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloropropene (cis-1,3-)
Certified	Yes	NJ	SHW07.04255	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloro-2-butene (trans-1,4-)
Certified	Yes	NJ	SHW07.04260	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Methylene chloride (Dichloromethane)
Certified	Yes	NJ	SHW07.04270	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NJ	SHW07.04280	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Tetrachloroethene
Certified	Yes	NJ	SHW07.04290	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trichloroethane (1,1,1-)
Certified	Yes	NJ	SHW07.04300	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trichloroethane (1,1,2-)
Certified	Yes	NJ	SHW07.04310	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trichloroethene
Certified	Yes	NJ	SHW07.04320	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trichlorofluoromethane
Certified	Yes	NJ	SHW07.04322	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trichloro (1,1,2-) trifluoroethane (1,2,2-)
Certified	Yes	NJ	SHW07.04325	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trichloropropane (1,2,3-)
Certified	Yes	NJ	SHW07.04327	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Vinyl acetate
Certified	Yes	NJ	SHW07.04330	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Vinyl chloride
Certified	Yes	NJ	SHW07.04340	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Acetone
Certified	Yes	NJ	SHW07.04350	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Carbon disulfide
Certified	Yes	NJ	SHW07.04360	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Butanone (2-)
Certified	Yes	NJ	SHW07.04367	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Ethyl methacrylate
Certified	Yes	NJ	SHW07.04370	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Hexanone (2-)
Certified	Yes	NJ	SHW07.04371	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Methacrylonitrile
Certified	Yes	NJ	SHW07.04373	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Methyl methacrylate
Certified	Yes	NJ	SHW07.04375	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Methyl iodide
Certified	Yes	NJ	SHW07.04376	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Iso-butyl alcohol
Certified	Yes	NJ	SHW07.04380	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Pentanone (4-methyl-2-)
Certified	Yes	NJ	SHW07.04385	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Propionitrile
Certified	Yes	NJ	SHW07.04390	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Methyl tert-butyl ether
Certified	Yes	NJ	SHW07.04398	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Acetonitrile

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NASHVILLE, TN 37228

Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.04400	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Acrolein
Certified	Yes	NJ	SHW07.04410	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Acrylonitrile
Certified	Yes	NJ	SHW07.04500	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Hexachlorobutadiene (1,3-)
Certified	Yes	NJ	SHW07.04530	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Hexachloroethane
Certified	Yes	NJ	SHW07.04540	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B]	Naphthalene
Certified	Yes	NJ	SHW07.04550	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Styrene
Certified	Yes	NJ	SHW07.04560	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Tetrachloroethane (1,1,1,2-)
Certified	Yes	NJ	SHW07.04570	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trichlorobenzene (1,2,4-)
Certified	Yes	NJ	SHW07.04590	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dioxane (1,4-)
Certified	Yes	NJ	SHW07.04665	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acetophenone
Certified	Yes	NJ	SHW07.04670	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acetylaminofluorene (2-)
Certified	Yes	NJ	SHW07.04675	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Aminobiphenyl (4-)
Certified	Yes	NJ	SHW07.04680	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Aramite
Certified	Yes	NJ	SHW07.04705	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chlorobenzilate
Certified	Yes	NJ	SHW07.04715	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270D] [SW-846 8270C]	Diallate (cis)
Certified	Yes	NJ	SHW07.04720	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270D] [SW-846 8270C]	Diallate (trans)
Certified	Yes	NJ	SHW07.04755	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorophenol (2,6-)
Certified	Yes	NJ	SHW07.04760	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270D] [SW-846 8270C]	Dimethoate
Certified	Yes	NJ	SHW07.04767	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethylaminoazobenzene
Certified	Yes	NJ	SHW07.04770	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270D] [SW-846 8270C]	Dimethylbenz(a)anthracene (7,12-)
Certified	Yes	NJ	SHW07.04775	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethyl benzidine (3,3-)
Certified	Yes	NJ	SHW07.04780	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrobenzene (1,3-)
Certified	Yes	NJ	SHW07.04785	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinoseb
Certified	Yes	NJ	SHW07.04790	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Disulfoton
Certified	Yes	NJ	SHW07.04795	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Famphur
Certified	Yes	NJ	SHW07.04800	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorophene
Certified	Yes	NJ	SHW07.04810	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Isodrin
Certified	Yes	NJ	SHW07.04815	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Isosafrole (cis-)
Certified	Yes	NJ	SHW07.04820	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Isosafrole (trans-)
Certified	Yes	NJ	SHW07.04825	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Kepone
Certified	Yes	NJ	SHW07.04830	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methanesulfonate (Ethyl-)
Certified	Yes	NJ	SHW07.04835	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methanesulfonate (Methyl-)

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Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.04840	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methapyrilene
Certified	Yes	NJ	SHW07.04845	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylcholanthrene (3-)
Certified	Yes	NJ	SHW07.04850	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Napthoquinone (1,4-)
Certified	Yes	NJ	SHW07.04855	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Napththylamine (1-)
Certified	Yes	NJ	SHW07.04860	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Napththylamine (2-)
Certified	Yes	NJ	SHW07.04870	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitroso-di-n-butylamine
Certified	Yes	NJ	SHW07.04875	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosomorpholine
Certified	Yes	NJ	SHW07.04880	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosopiperidine
Certified	Yes	NJ	SHW07.04885	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Parathion
Certified	Yes	NJ	SHW07.04890	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Parathion methyl
Certified	Yes	NJ	SHW07.04895	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachlorobenzene
Certified	Yes	NJ	SHW07.04900	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachloroethane
Certified	Yes	NJ	SHW07.04905	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachloronitrobenzene
Certified	Yes	NJ	SHW07.04910	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenacetin
Certified	Yes	NJ	SHW07.04915	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenylenediamine (1,4-)
Certified	Yes	NJ	SHW07.04920	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenylethylamine (alpha, alpha-Dimethyl)
Certified	Yes	NJ	SHW07.04925	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phorate
Certified	Yes	NJ	SHW07.04930	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phosphorothioate (O,O,O-triethyl)
Certified	Yes	NJ	SHW07.04935	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phosphorothioate (O,O-diethyl-O-2-pyrazinyl) [Thionazin]
Certified	Yes	NJ	SHW07.04940	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Picoline (2-)
Certified	Yes	NJ	SHW07.04945	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pronamide
Certified	Yes	NJ	SHW07.04950	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Quinoline -1-Oxide (4-Nitro)
Certified	Yes	NJ	SHW07.04955	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Safrole
Certified	Yes	NJ	SHW07.04960	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Sulfotepp
Certified	Yes	NJ	SHW07.04975	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270D] [SW-846 8270C]	Tetrachlorobenzene (1,2,4,5-)
Certified	Yes	NJ	SHW07.04980	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Tetrachlorophenol (2,3,4,6-)
Certified	Yes	NJ	SHW07.04985	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Toluidine (2-) (2-Methylaniline)
Certified	Yes	NJ	SHW07.04990	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Toluidine (5-Nitro-2-)
Certified	Yes	NJ	SHW07.04995	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270D] [SW-846 8270C]	Trinitrobenzene (1,3,5-)
Certified	Yes	NJ	SHW07.05004	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270D] [SW-846 8270C]	N-Nitrosodiethylamine
Certified	Yes	NJ	SHW07.05005	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosodimethylamine

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 12/01/2009 until 06/30/2010

Laboratory Name: EMPIRICAL LABORATORIES, LLC Laboratory Number: TN473 Activity ID: NLC090006
621 MAINSTREAM DR
STE 270
NASHVILLE, TN 37228

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.05006	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitroso-di-n-propylamine
Certified	Yes	NJ	SHW07.05010	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosodiphenylamine
Certified	Yes	NJ	SHW07.05011	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosomethylethylamine
Certified	Yes	NJ	SHW07.05012	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	N-Nitrosopyrrolidine
Certified	Yes	NJ	SHW07.05020	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Diphenylamine
Certified	Yes	NJ	SHW07.05030	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Carbazole
Certified	Yes	NJ	SHW07.05040	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorobenzidine (3,3'-)
Certified	Yes	NJ	SHW07.05048	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Aniline
Certified	Yes	NJ	SHW07.05050	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chloraniline (4-)
Certified	Yes	NJ	SHW07.05060	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitroaniline (2-)
Certified	Yes	NJ	SHW07.05062	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitroaniline (3-)
Certified	Yes	NJ	SHW07.05063	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitroaniline (4-)
Certified	Yes	NJ	SHW07.05070	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chloronaphthalene (2-)
Certified	Yes	NJ	SHW07.05080	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorobenzene
Certified	Yes	NJ	SHW07.05090	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorobutadiene (1,3-)
Certified	Yes	NJ	SHW07.05100	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachlorocyclopentadiene
Certified	Yes	NJ	SHW07.05110	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachloroethane
Certified	Yes	NJ	SHW07.05115	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Hexachloropropene
Certified	Yes	NJ	SHW07.05120	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Trichlorobenzene (1,2,4-)
Certified	Yes	NJ	SHW07.05130	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bis (2-chloroethoxy) methane
Certified	Yes	NJ	SHW07.05132	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bis (2-chloroethyl) ether
Certified	Yes	NJ	SHW07.05140	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bis (2-chloroisopropyl) ether
Certified	Yes	NJ	SHW07.05150	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chlorophenyl-phenyl ether (4-)
Certified	Yes	NJ	SHW07.05160	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bromophenyl-phenyl ether (4-)
Certified	Yes	NJ	SHW07.05170	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrotoluene (2,4-)
Certified	Yes	NJ	SHW07.05180	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrotoluene (2,6-)
Certified	Yes	NJ	SHW07.05190	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Isophorone
Certified	Yes	NJ	SHW07.05200	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitrobenzene
Certified	Yes	NJ	SHW07.05210	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Butyl benzyl phthalate
Certified	Yes	NJ	SHW07.05220	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Bis (2-ethylhexyl) phthalate
Certified	Yes	NJ	SHW07.05230	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Diethyl phthalate
Certified	Yes	NJ	SHW07.05240	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dimethyl phthalate

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New Jersey Department . /ironmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 12/01/2009 until 06/30/2010

Laboratory Name: EMPIRICAL LABORATORIES, LLC Laboratory Number: TN473 Activity ID: NLC090006
621 MAINSTREAM DR
STE 270
NASHVILLE, TN 37228

Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.05250	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Di-n-butyl phthalate
Certified	Yes	NJ	SHW07.05260	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Di-n-octyl phthalate
Certified	Yes	NJ	SHW07.05270	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acenaphthene
Certified	Yes	NJ	SHW07.05280	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Anthracene
Certified	Yes	NJ	SHW07.05290	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Acenaphthylene
Certified	Yes	NJ	SHW07.05300	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(a)anthracene
Certified	Yes	NJ	SHW07.05310	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(a)pyrene
Certified	Yes	NJ	SHW07.05320	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(b)fluoranthene
Certified	Yes	NJ	SHW07.05330	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(ghi)perylene
Certified	Yes	NJ	SHW07.05340	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzo(k)fluoranthene
Certified	Yes	NJ	SHW07.05350	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chrysene
Certified	Yes	NJ	SHW07.05360	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dibenzo(a,h)anthracene
Certified	Yes	NJ	SHW07.05370	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Fluoranthene
Certified	Yes	NJ	SHW07.05380	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Fluorene
Certified	Yes	NJ	SHW07.05390	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NJ	SHW07.05400	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylnaphthalene (2-)
Certified	Yes	NJ	SHW07.05410	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Naphthalene
Certified	Yes	NJ	SHW07.05420	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenanthrene
Certified	Yes	NJ	SHW07.05430	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pyrene
Certified	Yes	NJ	SHW07.05440	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methyl phenol (4-chloro-3-)
Certified	Yes	NJ	SHW07.05450	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Chlorophenol (2-)
Certified	Yes	NJ	SHW07.05460	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorophenol (2,4-)
Certified	Yes	NJ	SHW07.05470	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270D] [SW-846 8270C]	Dimethylphenol (2,4-)
Certified	Yes	NJ	SHW07.05480	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrophenol (2,4-)
Certified	Yes	NJ	SHW07.05490	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dinitrophenol (2-methyl-4,6-)
Certified	Yes	NJ	SHW07.05500	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylphenol (2-)
Certified	Yes	NJ	SHW07.05510	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylphenol (4-)
Certified	Yes	NJ	SHW07.05520	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitrophenol (2-)
Certified	Yes	NJ	SHW07.05530	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Nitrophenol (4-)
Certified	Yes	NJ	SHW07.05540	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pentachlorophenol
Certified	Yes	NJ	SHW07.05550	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Phenol
Certified	Yes	NJ	SHW07.05560	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Trichlorophenol (2,4,5-)

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New Jersey Department o. ironmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 12/01/2009 until 06/30/2010

Laboratory Name: EMPIRICAL LABORATORIES, LLC Laboratory Number: TN473 Activity ID: NLC090006
621 MAINSTREAM DR
STE 270
NASHVILLE, TN 37228

Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW07.05570	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Trichlorophenol (2,4,6-)
Certified	Yes	NJ	SHW07.05590	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Methylphenol (3-)
Certified	Yes	NJ	SHW07.05600	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dibenzofuran
Certified	Yes	NJ	SHW07.05691	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorobenzene (1,2-)
Certified	Yes	NJ	SHW07.05692	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorobenzene (1,3-)
Certified	Yes	NJ	SHW07.05700	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Dichlorobenzene (1,4-)
Certified	Yes	NJ	SHW07.05720	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Benzyl alcohol
Certified	Yes	NJ	SHW07.05750	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C] [SW-846 8270D]	Pyridine

Category: SHW09 – Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW09.02000	NPW, SCM	Distillation	[SW-846 9010B, Rev. 2, 12/96]	Cyanide
Certified	Yes	NJ	SHW09.05000	NPW, SCM	Colorimetric, Automated	[SW-846 9012A, Rev. 1, 12/96]	Cyanide
Certified	Yes	NJ	SHW09.13050	NPW, SCM	Ion Chromatography	[SW-846 9056, Rev. 0, 9/94]	Sulfate
Certified	Yes	NJ	SHW09.14000	NPW, SCM	Electrometric	[SW-846 9040B, Rev. 2, 1/95]	pH - waste, >20% water
Certified	Yes	NJ	SHW09.19000	NPW, SCM	Infrared Spectrometry or FID	[SW-846 9060A] [SW-846 9060]	Total organic carbon (TOC)
Certified	Yes	NJ	SHW09.24100	NPW, SCM	Extraction & Gravimetric - LL or SPE	[SW-846 1664A, Rev. 1, 2/99]	Oil & grease - hem
Certified	Yes	NJ	SHW09.29150	NPW, SCM	Ion Chromatography	[SW-846 9056]	Nitrite
Certified	Yes	NJ	SHW09.30150	NPW, SCM	Ion Chromatography	[SW-846 9056, Rev. 0, 12/94]	Nitrate
Certified	Yes	NJ	SHW09.33100	NPW, SCM	Ion Chromatography	[SW-846 9056, Rev. 0, 12/96]	Chloride
Certified	Yes	NJ	SHW09.34150	NPW, SCM	Ion Chromatography	[SW-846 9056, Rev. 0, 12/96]	Fluoride
Certified	Yes	NJ	SHW09.34165	NPW, SCM	LC/MS or LC/MS/MS	[SW-846 6850]	Perchlorate

Category: SHW04 – Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW04.03000	SCM	Acid Digestion, Soil Sediment & Sludge	[SW-846 3050B, Rev. 2, 12/96]	Metals
Certified	Yes	NJ	SHW04.03700	SCM	Chromium VI Digestion	[SW-846 3060A, Rev. 1, 12/96]	Metals

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New Jersey Department .vironmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

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Laboratory Name: EMPIRICAL LABORATORIES, LLC Laboratory Number: TN473 Activity ID: NLC090006
621 MAINSTREAM DR
STE 270
NASHVILLE, TN 37228

Category: SHW04 -- Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW04.33500	SCM	AA, Manual Cold Vapor	[SW-846 7471A] [SW-846 7471B]	Mercury - solid waste

Category: SHW05 -- Organic Parameters, Prep. / Screening

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW05.04000	SCM	Automatic Soxhlet Extraction	[SW-846 3541, Rev. 0, 9/94]	Semivolatile organics
Certified	Yes	NJ	SHW05.05000	SCM	Ultrasonic Extraction	[SW-846 3550B, Rev. 2, 12/96]	Semivolatile organics
Certified	Yes	NJ	SHW05.06000	SCM	Waste Dilution	[SW-846 3580A, Rev. 1, 7/92]	Organics
Certified	Yes	NJ	SHW05.06100	SCM	Waste Dilution, Volatile organics	[SW-846 3585, Rev. 0, 12/96]	Organics
Certified	Yes	NJ	SHW05.07300	SCM	Closed System Purge & Trap	[SW-846 5035L, Rev. 0, 12/96]	Volatile organics - low conc.
Certified	Yes	NJ	SHW05.07310	SCM	Methanol Extract, Closed System P & T	[SW-846 5035H, Rev. 0, 12/96]	Volatile organics - high conc.
Certified	Yes	NJ	SHW05.12000	SCM	Cleanup-Florisil	[SW-846 3620B, Rev. 2, 12/96]	Semivolatile organics
Certified	Yes	NJ	SHW05.13000	SCM	Cleanup-Silica Gel	[SW-846 3630C, Rev. 3, 12/96]	Semivolatile organics
Certified	Yes	NJ	SHW05.14000	SCM	Cleanup-Gel Permeation	[SW-846 3640A, Rev. 1, 9/94]	Semivolatile organics
Certified	Yes	NJ	SHW05.15000	SCM	Cleanup-Acid/Base Partition	[SW-846 3650B, Rev. 2, 12/96]	Semivolatile organics
Certified	Yes	NJ	SHW05.16000	SCM	Cleanup-Sulfur Removal	[SW-846 3660B, Rev. 2, 12/96]	Semivolatile organics
Certified	Yes	NJ	SHW05.17000	SCM	Cleanup-Sulfuric Acid/KMnO4	[SW-846 3665A, Rev. 1, 12/96]	Semivolatile organics

Category: SHW09 -- Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW09.16000	SCM	Mix with Water or Calcium Chloride	[SW-846 9045C, Rev. 3, 1/95]	pH - soil and waste

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New Jersey Department ι .ironmental Protection

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621 MAINSTREAM DR
STE 270
NASHVILLE, TN 37228

Category: SHW09 -- Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW09.29000	SCM	Flow-Through Paint Filter, Observation	[SW-846 9095, Rev. 0, 9/86]	Free liquid

Joseph F. Aiello, Chief

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RCRA - Solids/Hazardous Waste
Performance Evaluation Report
NSI Laboratory Proficiency Testing Program
Study SM-083 - Shipped: 10/21/2009 - Closed: 12/04/2009 - Reports Printed On: 12/17/2009
Participant USEPA Labcode: TN00004

Study Designed and Coordinated by:
NSI Solutions, Inc.
7212 ACC Blvd., Raleigh, NC 27617
A2LA Certificate#: 2432.01
1-800-234-7837

This evaluation report is being submitted to:
Empirical Laboratories
Attention: Randy Ward
621 Mainstream Drive
Suite 270
Nashville, TN, 37228

LabCode and Accreditation Information:

Send Results to: State Only
EPA Lab Code: TN00004
State Lab Code: TN473
Primary Agency: NJ – NJ DEP
Add'l Agencies below Rachel Ellis
401 East State Street2nd Floor
Trenton, NJ 08625
Reports to: AA CA FL IL MA NJ OK TX WA

Participant Information

NSI Lab Code: N06511

This report was submitted by Randy D. Ward, Senior Laboratory Scientist.

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Please contact Mark Hammersla at NSI if you have any questions about this report.
(800) 234-7837 - Mark.Hammersla@NSI-ES.com

This PT report may contain data not covered under A2LA Accreditation. Such data is noted by an asterisk.

SPEI-001 Trace Metals in Soil - Empirical Laboratories - NSI Solutions/SM-083

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Aluminum	10155609	102015	EPA 6010B 2 1996	5740	7230	mg/kg	2610 to 11800	ACCEPT.	11/9/09
Aluminum	10155803	102015	EPA 6010C (11/00)	5740	7230	mg/kg	2610 to 11800	ACCEPT.	11/9/09
ntimony	10155609	102015	EPA 6010B 2 1996	36.0	63.9	mg/kg	6.39 to 172	ACCEPT.	11/9/09
ntimony	10155803	102015	EPA 6010C (11/00)	36.0	63.9	mg/kg	6.39 to 172	ACCEPT.	11/9/09
Arsenic	10155609	102015	EPA 6010B 2 1996	300	296	mg/kg	212 to 380	ACCEPT.	11/9/09
Arsenic	10155803	102015	EPA 6010C (11/00)	300	296	mg/kg	212 to 380	ACCEPT.	11/9/09
Barium	10155609	102015	EPA 6010B 2 1996	801	837	mg/kg	626 to 1050	ACCEPT.	11/9/09

Barium	10155803	102015	EPA 6010C (11/00)	801	837	mg/kg	626 to 1050	ACCEPT.	11/9/09
Beryllium	10155609	102015	EPA 6010B 2 1996	173	178	mg/kg	134 to 222	ACCEPT.	11/9/09
Beryllium	10155803	102015	EPA 6010C (11/00)	173	178	mg/kg	134 to 222	ACCEPT.	11/9/09
Boron	10155609	102015	EPA 6010B 2 1996	90.7	92.2	mg/kg	51.6 to 133	ACCEPT.	11/9/09
Boron	10155803	102015	EPA 6010C (11/00)	90.7	92.2	mg/kg	51.6 to 133	ACCEPT.	11/9/09
Cadmium	10155609	102015	EPA 6010B 2 1996	190	180	mg/kg	132 to 228	ACCEPT.	11/9/09
Cadmium	10155803	102015	EPA 6010C (11/00)	190	180	mg/kg	132 to 228	ACCEPT.	11/9/09
Calcium	10155609	102015	EPA 6010B 2 1996	3270	3430	mg/kg	2420 to 4440	ACCEPT.	11/9/09
Calcium	10155803	102015	EPA 6010C (11/00)	3270	3430	mg/kg	2420 to 4440	ACCEPT.	11/9/09
Chromium	10155609	102015	EPA 6010B 2 1996	308	324	mg/kg	230 to 418	ACCEPT.	11/9/09
Chromium	10155803	102015	EPA 6010C (11/00)	308	324	mg/kg	230 to 418	ACCEPT.	11/9/09
Cobalt	10155609	102015	EPA 6010B 2 1996	185	172	mg/kg	128 to 216	ACCEPT.	11/9/09
Cobalt	10155803	102015	EPA 6010C (11/00)	185	172	mg/kg	128 to 216	ACCEPT.	11/9/09
Copper	10155609	102015	EPA 6010B 2 1996	103	101	mg/kg	75.1 to 127	ACCEPT.	11/9/09
Copper	10155803	102015	EPA 6010C (11/00)	103	101	mg/kg	75.1 to 127	ACCEPT.	11/9/09
Iron	10155609	102015	EPA 6010B 2 1996	3660	4730	mg/kg	473 to 10800	ACCEPT.	11/9/09
Iron	10155803	102015	EPA 6010C (11/00)	3660	4730	mg/kg	473 to 10800	ACCEPT.	11/9/09
Lead	10155609	102015	EPA 6010B 2 1996	271	254	mg/kg	191 to 317	ACCEPT.	11/9/09
Lead	10155803	102015	EPA 6010C (11/00)	271	254	mg/kg	191 to 317	ACCEPT.	11/9/09
Magnesium	10155609	102015	EPA 6010B 2 1996	6790	6250	mg/kg	4560 to 7940	ACCEPT.	11/9/09
Magnesium	10155803	102015	EPA 6010C (11/00)	6790	6250	mg/kg	4560 to 7940	ACCEPT.	11/9/09
Manganese	10155609	102015	EPA 6010B 2 1996	462	505	mg/kg	389 to 621	ACCEPT.	11/9/09
Manganese	10155803	102015	EPA 6010C (11/00)	462	505	mg/kg	389 to 621	ACCEPT.	11/9/09
Mercury	10166208	101010	EPA 7471A 1 1994	15.2	3.23	mg/kg	1.64 to 4.82	NOT ACCEPT.	11/6/09
Mercury	10166402	101010	EPA 7471B (1/98)	15.2	3.23	mg/kg	1.64 to 4.82	NOT ACCEPT.	11/6/09
Molybdenum	10155609	102015	EPA 6010B 2 1996	225	223	mg/kg	160 to 286	ACCEPT.	11/9/09
Molybdenum	10155803	102015	EPA 6010C (11/00)	225	223	mg/kg	160 to 286	ACCEPT.	11/9/09
Nickel	10155609	102015	EPA 6010B 2 1996	92.1	90.9	mg/kg	65.4 to 116	ACCEPT.	11/9/09
Nickel	10155803	102015	EPA 6010C (11/00)	92.1	90.9	mg/kg	65.4 to 116	ACCEPT.	11/9/09
Potassium	10155609	102015	EPA 6010B 2 1996	5290	5430	mg/kg	3620 to 7240	ACCEPT.	11/9/09
Potassium	10155803	102015	EPA 6010C (11/00)	5290	5430	mg/kg	3620 to 7240	ACCEPT.	11/9/09
Selenium	10155609	102015	EPA 6010B 2 1996	364	347	mg/kg	243 to 451	ACCEPT.	11/11/09
Selenium	10155803	102015	EPA 6010C (11/00)	364	347	mg/kg	243 to 451	ACCEPT.	11/11/09
Silver	10155609	102015	EPA 6010B 2 1996	42.3	46.6	mg/kg	30.9 to 62.3	ACCEPT.	11/11/09
Silver	10155803	102015	EPA 6010C (11/00)	42.3	46.6	mg/kg	30.9 to 62.3	ACCEPT.	11/11/09
Sodium	10155609	102015	EPA 6010B 2 1996	5060	5110	mg/kg	3440 to 6780	ACCEPT.	11/9/09
Sodium	10155803	102015	EPA 6010C (11/00)	5060	5110	mg/kg	3440 to 6780	ACCEPT.	11/9/09
Thallium	10155609	102015	EPA 6010B 2 1996	88.8	87.2	mg/kg	57.8 to 117	ACCEPT.	11/9/09
Thallium	10155803	102015	EPA 6010C (11/00)	88.8	87.2	mg/kg	57.8 to 117	ACCEPT.	11/9/09
Tin	10155609	102015	EPA 6010B 2 1996	167	162	mg/kg	97.7 to 226	ACCEPT.	11/11/09
Tin	10155803	102015	EPA 6010C (11/00)	167	162	mg/kg	97.7 to 226	ACCEPT.	11/11/09
Titanium	10155609	102015	EPA 6010B 2 1996	76.7	73.6	mg/kg	7.36 to 158	ACCEPT.	11/9/09
Titanium	10155803	102015	EPA 6010C (11/00)	76.7	73.6	mg/kg	7.36 to 158	ACCEPT.	11/9/09
Vanadium	10155609	102015	EPA 6010B 2 1996	301	320	mg/kg	244 to 396	ACCEPT.	11/11/09
Vanadium	10155803	102015	EPA 6010C (11/00)	301	320	mg/kg	244 to 396	ACCEPT.	11/11/09
Zinc	10155609	102015	EPA 6010B 2 1996	496	465	mg/kg	339 to 591	ACCEPT.	11/9/09
Zinc	10155803	102015	EPA 6010C (11/00)	496	465	mg/kg	339 to 591	ACCEPT.	11/9/09
Lithium	-- Not Reported --								
Silicon	-- Not Reported --								
Strontium	-- Not Reported --								
pH	-- Not Reported --								

SPEI-003 Hexavalent Chromium - Empirical Laboratories - NSI Solutions/SM-083

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Hexavalent Chromium	10162400	401010	EPA 7196A 1 1992	68.5	66.8	mg/kg	10.2 to 123	ACCEPT.	10/29/09

SPEI-011 Explosives - Empirical Laboratories - NSI Solutions/SM-083

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Nitrobenzene	10189807	251020	EPA 8330 0 1994	610	3400	ug/kg	1630 to 5170	NOT ACCEPT.	11/19/09
Nitrobenzene	10190008	251020	EPA 8330A (1/98)	610	3400	ug/kg	1630 to 5170	NOT ACCEPT.	11/19/09
1,3-Dinitrobenzene	10189807	251020	EPA 8330 0 1994	1890	2260	ug/kg	1240 to 3280	ACCEPT.	11/19/09
1,3-Dinitrobenzene	10190008	251020	EPA 8330A (1/98)	1890	2260	ug/kg	1240 to 3280	ACCEPT.	11/19/09
2,4-Dinitrotoluene	10189807	251020	EPA 8330 0 1994	5250	5320	ug/kg	2930 to 7710	ACCEPT.	11/19/09
2,4-Dinitrotoluene	10190008	251020	EPA 8330A (1/98)	5250	5320	ug/kg	2930 to 7710	ACCEPT.	11/19/09
2,6-Dinitrotoluene	10189807	251020	EPA 8330 0 1994	3480	3290	ug/kg	1810 to 4770	ACCEPT.	11/19/09
2,6-Dinitrotoluene	10190008	251020	EPA 8330A (1/98)	3480	3290	ug/kg	1810 to 4770	ACCEPT.	11/19/09
Tetryl	10189807	251020	EPA 8330 0 1994	466	758	ug/kg	0.00 to 1640	ACCEPT.	11/19/09
Tetryl	10190008	251020	EPA 8330A (1/98)	466	758	ug/kg	0.00 to 1640	ACCEPT.	11/19/09
Nitroglycerin	10189807	251020	EPA 8330 0 1994	< 1500	0	ug/kg	0.00 to 0.00	ACCEPT.	11/19/09
Nitroglycerin	10190008	251020	EPA 8330A (1/98)	< 1500	0	ug/kg	0.00 to 0.00	ACCEPT.	11/19/09
1,3,5-Trinitrobenzene	10189807	251020	EPA 8330 0 1994	< 300	0	ug/kg	0.00 to 0.00	ACCEPT.	11/19/09
1,3,5-Trinitrobenzene	10190008	251020	EPA 8330A (1/98)	< 300	0	ug/kg	0.00 to 0.00	ACCEPT.	11/19/09
2-Amino-4,6-dinitrotoluene	10189807	251020	EPA 8330 0 1994	2350	1750	ug/kg	961 to 2540	ACCEPT.	11/19/09
2-Amino-4,6-dinitrotoluene	10190008	251020	EPA 8330A (1/98)	2350	1750	ug/kg	961 to 2540	ACCEPT.	11/19/09
4-Amino-2,6-dinitrotoluene	10189807	251020	EPA 8330 0 1994	< 300	3490	ug/kg	1080 to 5900	NOT ACCEPT.	11/19/09
4-Amino-2,6-dinitrotoluene	10190008	251020	EPA 8330A (1/98)	< 300	3490	ug/kg	1080 to 5900	NOT ACCEPT.	11/19/09
Hexahydro-1,3,5-trinitro-1,3,5,7-tetrazocine	10189807	251020	EPA 8330 0 1994	4320	3590	ug/kg	1570 to 5610	ACCEPT.	11/19/09
Hexahydro-1,3,5-trinitro-1,3,5,7-tetrazocine	10190008	251020	EPA 8330A (1/98)	4320	3590	ug/kg	1570 to 5610	ACCEPT.	11/19/09
2-Nitrotoluene	10189807	251020	EPA 8330 0 1994	1030	4430	ug/kg	2440 to 6420	NOT ACCEPT.	11/19/09
2-Nitrotoluene	10190008	251020	EPA 8330A (1/98)	1030	4430	ug/kg	2440 to 6420	NOT ACCEPT.	11/19/09
3-Nitrotoluene	10189807	251020	EPA 8330 0 1994	5060	11700	ug/kg	6450 to 16900	NOT ACCEPT.	11/19/09
3-Nitrotoluene	10190008	251020	EPA 8330A (1/98)	5060	11700	ug/kg	6450 to 16900	NOT ACCEPT.	11/19/09
'-Nitrotoluene	10189807	251020	EPA 8330 0 1994	5190	8840	ug/kg	4160 to 13500	ACCEPT.	11/19/09
·Nitrotoluene	10190008	251020	EPA 8330A (1/98)	5190	8840	ug/kg	4160 to 13500	ACCEPT.	11/19/09
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	10189807	251020	EPA 8330 0 1994	2200	2500	ug/kg	562 to 4440	ACCEPT.	11/19/09
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	10190008	251020	EPA 8330A (1/98)	2200	2500	ug/kg	562 to 4440	ACCEPT.	11/19/09
Pentaerythritoltetranitrate	10189807	251020	EPA 8330 0 1994	< 1500	0	ug/kg	0.00 to 0.00	ACCEPT.	11/19/09
Pentaerythritoltetranitrate	10190008	251020	EPA 8330A (1/98)	< 1500	0	ug/kg	0.00 to 0.00	ACCEPT.	11/19/09
2,4,6-Trinitrotoluene	10189807	251020	EPA 8330 0 1994	12900	14600	ug/kg	8030 to 21200	ACCEPT.	11/19/09
2,4,6-Trinitrotoluene	10190008	251020	EPA 8330A (1/98)	12900	14600	ug/kg	8030 to 21200	ACCEPT.	11/19/09

SPEI-012 Corrosivity - Empirical Laboratories - NSI Solutions/SM-083

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Corrosivity	10198400	352010	EPA 9045C 3 1995	4.28	4.40	pH units	3.80 to 5.00	ACCEPT.	10/29/09

SPEI-014 Flashpoint - Empirical Laboratories - NSI Solutions/SM-083

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Flash Point	n/a	n/a	EPA 1010A	146	142	oF	125 to 159	ACCEPT.	11/3/09

EI-017 Cyanide - Empirical Laboratories - NSI Solutions/SM-083

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date

Cyanide	10193405	401010	EPA 9012A 1 1996	52.9	53.4	mg/kg	40.2 to 66.6	ACCEPT.	11/2/09

'EO-003 Pesticides in Soil - Empirical Laboratories - NSI Solutions/SM-083

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Aldrin	10178606	152010	EPA 8081A 1 1996	331	297	ug/kg	111 to 483	ACCEPT.	11/23/09
Aldrin	10178800	152010	EPA 8081B (11/00)	331	297	ug/kg	111 to 483	ACCEPT.	11/23/09
delta-BHC	10178606	152010	EPA 8081A 1 1996	231	315	ug/kg	99.6 to 530	ACCEPT.	11/23/09
delta-BHC	10178800	152010	EPA 8081B (11/00)	231	315	ug/kg	99.6 to 530	ACCEPT.	11/23/09
alpha-BHC	10178606	152010	EPA 8081A 1 1996	188	172	ug/kg	59.1 to 285	ACCEPT.	11/23/09
alpha-BHC	10178800	152010	EPA 8081B (11/00)	188	172	ug/kg	59.1 to 285	ACCEPT.	11/23/09
beta-BHC	10178606	152010	EPA 8081A 1 1996	80.2	92.8	ug/kg	14.6 to 171	ACCEPT.	11/23/09
beta-BHC	10178800	152010	EPA 8081B (11/00)	80.2	92.8	ug/kg	14.6 to 171	ACCEPT.	11/23/09
gamma-BHC	10178606	152010	EPA 8081A 1 1996	133	121	ug/kg	32.0 to 210	ACCEPT.	11/23/09
gamma-BHC	10178800	152010	EPA 8081B (11/00)	133	121	ug/kg	32.0 to 210	ACCEPT.	11/23/09
alpha-Chlordane	10178606	152010	EPA 8081A 1 1996	398	353	ug/kg	145 to 561	ACCEPT.	11/23/09
alpha-Chlordane	10178800	152010	EPA 8081B (11/00)	398	353	ug/kg	145 to 561	ACCEPT.	11/23/09
gamma-Chlordane	10178606	152010	EPA 8081A 1 1996	156	147	ug/kg	66.9 to 227	ACCEPT.	11/23/09
gamma-Chlordane	10178800	152010	EPA 8081B (11/00)	156	147	ug/kg	66.9 to 227	ACCEPT.	11/23/09
4,4'-DDD	10178606	152010	EPA 8081A 1 1996	128	215	ug/kg	81.0 to 349	ACCEPT.	11/23/09
4,4'-DDD	10178800	152010	EPA 8081B (11/00)	128	215	ug/kg	81.0 to 349	ACCEPT.	11/23/09
4,4'-DDE	10178606	152010	EPA 8081A 1 1996	228	188	ug/kg	72.1 to 304	ACCEPT.	11/23/09
4,4'-DDE	10178800	152010	EPA 8081B (11/00)	228	188	ug/kg	72.1 to 304	ACCEPT.	11/23/09
4,4'-DDT	10178606	152010	EPA 8081A 1 1996	157	282	ug/kg	84.3 to 480	ACCEPT.	11/23/09
4,4'-DDT	10178800	152010	EPA 8081B (11/00)	157	282	ug/kg	84.3 to 480	ACCEPT.	11/23/09
'ieldrin	10178606	152010	EPA 8081A 1 1996	122	122	ug/kg	41.8 to 202	ACCEPT.	11/23/09
ıeldrin	10178800	152010	EPA 8081B (11/00)	122	122	ug/kg	41.8 to 202	ACCEPT.	11/23/09
Endosulfan I	10178606	152010	EPA 8081A 1 1996	158	144	ug/kg	50.0 to 238	ACCEPT.	11/23/09
Endosulfan I	10178800	152010	EPA 8081B (11/00)	158	144	ug/kg	50.0 to 238	ACCEPT.	11/23/09
Endosulfan II	10178606	152010	EPA 8081A 1 1996	90.7	359	ug/kg	131 to 587	NOT ACCEPT.	11/23/09
Endosulfan II	10178800	152010	EPA 8081B (11/00)	90.7	359	ug/kg	131 to 587	NOT ACCEPT.	11/23/09
Endosulfan sulfate	10178606	152010	EPA 8081A 1 1996	17.5	138	ug/kg	32.7 to 243	NOT ACCEPT.	11/14/09
Endosulfan sulfate	10178800	152010	EPA 8081B (11/00)	17.5	138	ug/kg	32.7 to 243	NOT ACCEPT.	11/14/09
Endrin aldehyde	10178606	152010	EPA 8081A 1 1996	51.7	69.5	ug/kg	6.95 to 148	ACCEPT.	11/14/09
Endrin aldehyde	10178800	152010	EPA 8081B (11/00)	51.7	69.5	ug/kg	6.95 to 148	ACCEPT.	11/14/09
Endrin ketone	10178606	152010	EPA 8081A 1 1996	114	304	ug/kg	96.1 to 512	ACCEPT.	11/23/09
Endrin ketone	10178800	152010	EPA 8081B (11/00)	114	304	ug/kg	96.1 to 512	ACCEPT.	11/23/09
Endrin	10178606	152010	EPA 8081A 1 1996	99.6	176	ug/kg	78.7 to 273	ACCEPT.	11/23/09
Endrin	10178800	152010	EPA 8081B (11/00)	99.6	176	ug/kg	78.7 to 273	ACCEPT.	11/23/09
Heptachlor	10178606	152010	EPA 8081A 1 1996	86.6	71.0	ug/kg	23.0 to 119	ACCEPT.	11/23/09
Heptachlor	10178800	152010	EPA 8081B (11/00)	86.6	71.0	ug/kg	23.0 to 119	ACCEPT.	11/23/09
Heptachlor epoxide	10178606	152010	EPA 8081A 1 1996	162	158	ug/kg	64.2 to 252	ACCEPT.	11/23/09
Heptachlor epoxide	10178800	152010	EPA 8081B (11/00)	162	158	ug/kg	64.2 to 252	ACCEPT.	11/23/09
Methoxyclor	10178606	152010	EPA 8081A 1 1996	< 0.330	72.6	ug/kg	7.26 to 150	NOT ACCEPT.	11/14/09
Methoxyclor	10178800	152010	EPA 8081B (11/00)	< 0.330	72.6	ug/kg	7.26 to 150	NOT ACCEPT.	11/14/09
Hexachlorobenzene	-- Not Reported --								
Hexachlorocyclopentadiene	-- Not Reported --								
Propachlor	-- Not Reported --								
Trifluralin	-- Not Reported --								

SPEO-004 Toxaphene in Soil - Empirical Laboratories - NSI Solutions/SM-083

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date

Toxaphene	10178606	152010	EPA 8081A 1 1996	268	366	ug/kg	36.6 to 894	ACCEPT.	11/25/09
Toxaphene	10178800	152010	EPA 8081B (11/00)	268	366	ug/kg	36.6 to 894	ACCEPT.	11/25/09

ᵓEO-005 PCB in Soil - Empirical Laboratories - NSI Solutions/SM-083

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Arochlor 1016	10179007	152010	EPA 8082 0 1996	< 0.0170	0	mg/kg	0.00 to 0.00	ACCEPT.	11/12/09
Arochlor 1016	10179201	152010	EPA 8082A (11/00)	< 0.0170	0	mg/kg	0.00 to 0.00	ACCEPT.	11/12/09
Arochlor 1221	10179007	152010	EPA 8082 0 1996	< 0.0170	0	mg/kg	0.00 to 0.00	ACCEPT.	11/12/09
Arochlor 1221	10179201	152010	EPA 8082A (11/00)	< 0.0170	0	mg/kg	0.00 to 0.00	ACCEPT.	11/12/09
Arochlor 1232	10179007	152010	EPA 8082 0 1996	< 0.0170	0	mg/kg	0.00 to 0.00	ACCEPT.	11/12/09
Arochlor 1232	10179201	152010	EPA 8082A (11/00)	< 0.0170	0	mg/kg	0.00 to 0.00	ACCEPT.	11/12/09
Arochlor 1242	10179007	152010	EPA 8082 0 1996	11.5	11.1	mg/kg	3.29 to 18.9	ACCEPT.	11/26/09
Arochlor 1242	10179201	152010	EPA 8082A (11/00)	11.5	11.1	mg/kg	3.29 to 18.9	ACCEPT.	11/26/09
Arochlor 1248	10179007	152010	EPA 8082 0 1996	< 0.0170	0	mg/kg	0.00 to 0.00	ACCEPT.	11/12/09
Arochlor 1248	10179201	152010	EPA 8082A (11/00)	< 0.0170	0	mg/kg	0.00 to 0.00	ACCEPT.	11/12/09
Arochlor 1254	10179007	152010	EPA 8082 0 1996	< 0.0170	0	mg/kg	0.00 to 0.00	ACCEPT.	11/12/09
Arochlor 1254	10179201	152010	EPA 8082A (11/00)	< 0.0170	0	mg/kg	0.00 to 0.00	ACCEPT.	11/12/09
Arochlor 1260	10179007	152010	EPA 8082 0 1996	< 0.0170	0	mg/kg	0.00 to 0.00	ACCEPT.	11/12/09
Arochlor 1260	10179201	152010	EPA 8082A (11/00)	< 0.0170	0	mg/kg	0.00 to 0.00	ACCEPT.	11/12/09

SPEO-006 Herbicides in Soil - Empirical Laboratories - NSI Solutions/SM-083

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
.MCPA	10183207	n/a	EPA 8151A (1/98)	< 5000	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
MCPP	10183207	n/a	EPA 8151A (1/98)	< 5000	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
2,4-D	10183207	n/a	EPA 8151A (1/98)	591	463	ug/kg	124 to 802	ACCEPT.	12/1/09
Dalapon	10183207	n/a	EPA 8151A (1/98)	94.3	301	ug/kg	30.1 to 1080	ACCEPT.	12/1/09
2,4-DB	10183207	n/a	EPA 8151A (1/98)	1620	1040	ug/kg	0.00 to 2470	ACCEPT.	12/2/09
Dicamba	10183207	n/a	EPA 8151A (1/98)	563	579	ug/kg	57.9 to 1560	ACCEPT.	12/2/09
Dichloroprop	10183207	n/a	EPA 8151A (1/98)	< 50.0	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
Dinoseb	10183207	n/a	EPA 8151A (1/98)	144	231	ug/kg	0.00 to 747	ACCEPT.	12/1/09
Silvex(2,4,5-TP)	10183207	n/a	EPA 8151A (1/98)	636	525	ug/kg	52.5 to 1090	ACCEPT.	12/2/09
2,4,5-T	10183207	n/a	EPA 8151A (1/98)	834	563	ug/kg	56.3 to 1200	ACCEPT.	12/2/09
4-Nitrophenol	-- Not Reported --								
Pentachlorophenol	-- Not Reported --								
Acifluorfen	-- Not Reported --								
Bentazon	-- Not Reported --								
Chloramben	-- Not Reported --								
DCPA	-- Not Reported --								
3,5-Dichlorobenzoic Acid	-- Not Reported --								
Picloram	-- Not Reported --								

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Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
2-Dichlorobenzene	10185805	151010	EPA 8270C 3 1996	4310	6340	ug/kg	795 to 11900	ACCEPT.	11/11/09
.,2-Dichlorobenzene	10186002	151010	EPA 8270D (1/98)	4310	6340	ug/kg	795 to 11900	ACCEPT.	11/11/09
1,3-Dichlorobenzene	10185805	151010	EPA 8270C 3 1996	3440	5310	ug/kg	721 to 9900	ACCEPT.	11/11/09
1,3-Dichlorobenzene	10186002	151010	EPA 8270D (1/98)	3440	5310	ug/kg	721 to 9900	ACCEPT.	11/11/09

1,4-Dichlorobenzene	10185805	151010	EPA 8270C 3 1996	3440	5180	ug/kg	680 to 9680	ACCEPT.	11/11/09
1,4-Dichlorobenzene	10186002	151010	EPA 8270D (1/98)	3440	5180	ug/kg	680 to 9680	ACCEPT.	11/11/09
Hexachlorobutadiene	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Hexachlorobutadiene	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Hexachloroethane	10185805	151010	EPA 8270C 3 1996	3720	5440	ug/kg	1030 to 9850	ACCEPT.	11/11/09
Hexachloroethane	10186002	151010	EPA 8270D (1/98)	3720	5440	ug/kg	1030 to 9850	ACCEPT.	11/11/09
Naphthalene	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Naphthalene	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Nitrobenzene	10185805	151010	EPA 8270C 3 1996	1560	1920	ug/kg	235 to 3600	ACCEPT.	11/11/09
Nitrobenzene	10186002	151010	EPA 8270D (1/98)	1560	1920	ug/kg	235 to 3600	ACCEPT.	11/11/09
Pyridine	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Pyridine	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
1,2,4-Trichlorobenzene	10185805	151010	EPA 8270C 3 1996	4460	5530	ug/kg	1500 to 9560	ACCEPT.	11/11/09
1,2,4-Trichlorobenzene	10186002	151010	EPA 8270D (1/98)	4460	5530	ug/kg	1500 to 9560	ACCEPT.	11/11/09
Acenaphthene	10185805	151010	EPA 8270C 3 1996	3550	5410	ug/kg	2020 to 8800	ACCEPT.	11/11/09
Acenaphthene	10186002	151010	EPA 8270D (1/98)	3550	5410	ug/kg	2020 to 8800	ACCEPT.	11/11/09
Acenaphthylene	10185805	151010	EPA 8270C 3 1996	4380	6930	ug/kg	2310 to 11500	ACCEPT.	11/11/09
Acenaphthylene	10186002	151010	EPA 8270D (1/98)	4380	6930	ug/kg	2310 to 11500	ACCEPT.	11/11/09
Aniline	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Aniline	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Anthracene	10185805	151010	EPA 8270C 3 1996	2180	3170	ug/kg	990 to 5350	ACCEPT.	11/11/09
Anthracene	10186002	151010	EPA 8270D (1/98)	2180	3170	ug/kg	990 to 5350	ACCEPT.	11/11/09
Benzo(a)anthracene	10185805	151010	EPA 8270C 3 1996	5270	7450	ug/kg	3180 to 11700	ACCEPT.	11/11/09
Benzo(a)anthracene	10186002	151010	EPA 8270D (1/98)	5270	7450	ug/kg	3180 to 11700	ACCEPT.	11/11/09
Benzo(a)pyrene	10185805	151010	EPA 8270C 3 1996	4180	6480	ug/kg	1990 to 11000	ACCEPT.	11/11/09
Benzo(a)pyrene	10186002	151010	EPA 8270D (1/98)	4180	6480	ug/kg	1990 to 11000	ACCEPT.	11/11/09
Benzo(b)fluoranthene	10185805	151010	EPA 8270C 3 1996	3640	5010	ug/kg	1740 to 8280	ACCEPT.	11/11/09
Benzo(b)fluoranthene	10186002	151010	EPA 8270D (1/98)	3640	5010	ug/kg	1740 to 8280	ACCEPT.	11/11/09
Benzo(g,h,i)perylene	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Benzo(g,h,i)perylene	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
enzidine	10185805	151010	EPA 8270C 3 1996	< 3300	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
enzidine	10186002	151010	EPA 8270D (1/98)	< 3300	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Benzo(k)fluoranthene	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Benzo(k)fluoranthene	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Benzoic acid	10185805	151010	EPA 8270C 3 1996	< 3300	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Benzoic acid	10186002	151010	EPA 8270D (1/98)	< 3300	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Benzyl alcohol	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Benzyl alcohol	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
4-Bromophenyl-phenylether	10185805	151010	EPA 8270C 3 1996	2990	4030	ug/kg	1550 to 6510	ACCEPT.	11/11/09
4-Bromophenyl-phenylether	10186002	151010	EPA 8270D (1/98)	2990	4030	ug/kg	1550 to 6510	ACCEPT.	11/11/09
Butyl benzyl phthalate	10185805	151010	EPA 8270C 3 1996	2050	2760	ug/kg	761 to 4760	ACCEPT.	11/11/09
Butyl benzyl phthalate	10186002	151010	EPA 8270D (1/98)	2050	2760	ug/kg	761 to 4760	ACCEPT.	11/11/09
Carbazole	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Carbazole	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
4-Chloro-3-methylphenol	10185805	151010	EPA 8270C 3 1996	4680	6440	ug/kg	2490 to 10400	ACCEPT.	11/11/09
4-Chloro-3-methylphenol	10186002	151010	EPA 8270D (1/98)	4680	6440	ug/kg	2490 to 10400	ACCEPT.	11/11/09
4-Chloroaniline	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
4-Chloroaniline	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Bis(2-chloroethoxy)methane	10185805	151010	EPA 8270C 3 1996	1850	2140	ug/kg	490 to 3790	ACCEPT.	11/11/09
Bis(2-chloroethoxy)methane	10186002	151010	EPA 8270D (1/98)	1850	2140	ug/kg	490 to 3790	ACCEPT.	11/11/09
Bis(2-chloroethyl)ether	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Bis(2-chloroethyl)ether	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Bis(2-chloroisopropyl)ether	10185805	151010	EPA 8270C 3 1996	2080	3350	ug/kg	584 to 6120	ACCEPT.	11/11/09
Bis(2-chloroisopropyl)ether	10186002	151010	EPA 8270D (1/98)	2080	3350	ug/kg	584 to 6120	ACCEPT.	11/11/09
2-Chloronaphthalene	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
2-Chloronaphthalene	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
-Chlorophenol	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Chlorophenol	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
4-Chlorophenyl-phenylether	10185805	151010	EPA 8270C 3 1996	5720	8680	ug/kg	3070 to 14300	ACCEPT.	11/11/09
4-Chlorophenyl-phenylether	10186002	151010	EPA 8270D (1/98)	5720	8680	ug/kg	3070 to 14300	ACCEPT.	11/11/09
Chrysene	10185805	151010	EPA 8270C 3 1996	2540	3780	ug/kg	1380 to 6180	ACCEPT.	11/11/09

Chrysene	10186002	151010	EPA 8270D (1/98)	2540	3780	ug/kg	1380 to 6180	ACCEPT.	11/11/09
Dibenz(a,h)anthracene	10185805	151010	EPA 8270C 3 1996	3550	4400	ug/kg	1560 to 7240	ACCEPT.	11/11/09
Dibenz(a,h)anthracene	10186002	151010	EPA 8270D (1/98)	3550	4400	ug/kg	1560 to 7240	ACCEPT.	11/11/09
Dibenzofuran	10185805	151010	EPA 8270C 3 1996	1360	1900	ug/kg	677 to 3120	ACCEPT.	11/11/09
Dibenzofuran	10186002	151010	EPA 8270D (1/98)	1360	1900	ug/kg	677 to 3120	ACCEPT.	11/11/09
Di-n-butyl phthalate	10185805	151010	EPA 8270C 3 1996	1850	2480	ug/kg	533 to 4430	ACCEPT.	11/11/09
Di-n-butyl phthalate	10186002	151010	EPA 8270D (1/98)	1850	2480	ug/kg	533 to 4430	ACCEPT.	11/11/09
3,3'-Dichlorobenzidine	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
3,3'-Dichlorobenzidine	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
2,4-Dichlorophenol	10185805	151010	EPA 8270C 3 1996	5410	6920	ug/kg	1870 to 12000	ACCEPT.	11/11/09
2,4-Dichlorophenol	10186002	151010	EPA 8270D (1/98)	5410	6920	ug/kg	1870 to 12000	ACCEPT.	11/11/09
2,6-Dichlorophenol	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
2,6-Dichlorophenol	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Diethyl phthalate	10185805	151010	EPA 8270C 3 1996	1930	2620	ug/kg	613 to 4630	ACCEPT.	11/11/09
Diethyl phthalate	10186002	151010	EPA 8270D (1/98)	1930	2620	ug/kg	613 to 4630	ACCEPT.	11/11/09
2,4-Dimethylphenol	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
2,4-Dimethylphenol	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Dimethyl phthalate	10185805	151010	EPA 8270C 3 1996	3740	6020	ug/kg	2250 to 9790	ACCEPT.	11/11/09
Dimethyl phthalate	10186002	151010	EPA 8270D (1/98)	3740	6020	ug/kg	2250 to 9790	ACCEPT.	11/11/09
2,4-Dinitrophenol	10185805	151010	EPA 8270C 3 1996	4380	4060	ug/kg	0.00 to 9310	ACCEPT.	11/11/09
2,4-Dinitrophenol	10186002	151010	EPA 8270D (1/98)	4380	4060	ug/kg	0.00 to 9310	ACCEPT.	11/11/09
2,4-Dinitrotoluene	10185805	151010	EPA 8270C 3 1996	1710	2550	ug/kg	397 to 4700	ACCEPT.	11/11/09
2,4-Dinitrotoluene	10186002	151010	EPA 8270D (1/98)	1710	2550	ug/kg	397 to 4700	ACCEPT.	11/11/09
2,6-Dinitrotoluene	10185805	151010	EPA 8270C 3 1996	2830	3970	ug/kg	1520 to 6420	ACCEPT.	11/11/09
2,6-Dinitrotoluene	10186002	151010	EPA 8270D (1/98)	2830	3970	ug/kg	1520 to 6420	ACCEPT.	11/11/09
Di-n-octyl phthalate	10185805	151010	EPA 8270C 3 1996	5300	7910	ug/kg	1500 to 14300	ACCEPT.	11/11/09
Di-n-octyl phthalate	10186002	151010	EPA 8270D (1/98)	5300	7910	ug/kg	1500 to 14300	ACCEPT.	11/11/09
Bis(2-ethylhexyl)phthalate	10185805	151010	EPA 8270C 3 1996	4190	7110	ug/kg	2310 to 11900	ACCEPT.	11/11/09
Bis(2-ethylhexyl)phthalate	10186002	151010	EPA 8270D (1/98)	4190	7110	ug/kg	2310 to 11900	ACCEPT.	11/11/09
Fluoranthene	10185805	151010	EPA 8270C 3 1996	2480	3280	ug/kg	1320 to 5240	ACCEPT.	11/11/09
Fluoranthene	10186002	151010	EPA 8270D (1/98)	2480	3280	ug/kg	1320 to 5240	ACCEPT.	11/11/09
Fluorene	10185805	151010	EPA 8270C 3 1996	5090	8510	ug/kg	3720 to 13300	ACCEPT.	11/11/09
Fluorene	10186002	151010	EPA 8270D (1/98)	5090	8510	ug/kg	3720 to 13300	ACCEPT.	11/11/09
Hexachlorobenzene	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Hexachlorobenzene	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Hexachlorocyclopentadiene	10185805	151010	EPA 8270C 3 1996	4190	3240	ug/kg	681 to 5800	ACCEPT.	11/11/09
Hexachlorocyclopentadiene	10186002	151010	EPA 8270D (1/98)	4190	3240	ug/kg	681 to 5800	ACCEPT.	11/11/09
Indeno(1,2,3-c,d)pyrene	10185805	151010	EPA 8270C 3 1996	1570	2070	ug/kg	207 to 3970	ACCEPT.	11/11/09
Indeno(1,2,3-c,d)pyrene	10186002	151010	EPA 8270D (1/98)	1570	2070	ug/kg	207 to 3970	ACCEPT.	11/11/09
Isophorone	10185805	151010	EPA 8270C 3 1996	2610	3060	ug/kg	942 to 5180	ACCEPT.	11/11/09
Isophorone	10186002	151010	EPA 8270D (1/98)	2610	3060	ug/kg	942 to 5180	ACCEPT.	11/11/09
2-Methyl-4,6-Dinitrophenol	10185805	151010	EPA 8270C 3 1996	2860	2730	ug/kg	0.00 to 6650	ACCEPT.	11/11/09
2-Methyl-4,6-Dinitrophenol	10186002	151010	EPA 8270D (1/98)	2860	2730	ug/kg	0.00 to 6650	ACCEPT.	11/11/09
2-Methylnaphthalene	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
2-Methylnaphthalene	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
2-Methylphenol	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
2-Methylphenol	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
3-Methylphenol	10185805	151010	EPA 8270C 3 1996	4490	0	ug/kg	0.00 to 0.00	NOT ACCEPT.	11/11/09
3-Methylphenol	10186002	151010	EPA 8270D (1/98)	4490	0	ug/kg	0.00 to 0.00	NOT ACCEPT.	11/11/09
4-Methylphenol	10185805	151010	EPA 8270C 3 1996	4500	6100	ug/kg	1450 to 10700	ACCEPT.	11/11/09
4-Methylphenol	10186002	151010	EPA 8270D (1/98)	4500	6100	ug/kg	1450 to 10700	ACCEPT.	11/11/09
2-Nitroaniline	10185805	151010	EPA 8270C 3 1996	< 1300	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
2-Nitroaniline	10186002	151010	EPA 8270D (1/98)	< 1300	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
3-Nitroaniline	10185805	151010	EPA 8270C 3 1996	< 1300	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
3-Nitroaniline	10186002	151010	EPA 8270D (1/98)	< 1300	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
4-Nitroaniline	10185805	151010	EPA 8270C 3 1996	< 1300	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
4-Nitroaniline	10186002	151010	EPA 8270D (1/98)	< 1300	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
2-Nitrophenol	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
2-Nitrophenol	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
4-Nitrophenol	10185805	151010	EPA 8270C 3 1996	3100	5510	ug/kg	551 to 12000	ACCEPT.	11/11/09
4-Nitrophenol	10186002	151010	EPA 8270D (1/98)	3100	5510	ug/kg	551 to 12000	ACCEPT.	11/11/09

N-Nitrosodimethylamine	10185805	151010	EPA 8270C 3 1996	2480	4090	ug/kg	640 to 7540	ACCEPT.	11/11/09
N-Nitrosodimethylamine	10186002	151010	EPA 8270D (1/98)	2480	4090	ug/kg	640 to 7540	ACCEPT.	11/11/09
N-Nitrosodiphenylamine	10185805	151010	EPA 8270C 3 1996	1260	1330	ug/kg	0.00 to 2920	ACCEPT.	11/11/09
N-Nitrosodiphenylamine	10186002	151010	EPA 8270D (1/98)	1260	1330	ug/kg	0.00 to 2920	ACCEPT.	11/11/09
N-Nitroso-di-n-propylamine	10185805	151010	EPA 8270C 3 1996	1450	1790	ug/kg	179 to 3550	ACCEPT.	11/11/09
N-Nitroso-di-n-propylamine	10186002	151010	EPA 8270D (1/98)	1450	1790	ug/kg	179 to 3550	ACCEPT.	11/11/09
Pentachlorophenol	10185805	151010	EPA 8270C 3 1996	4410	5370	ug/kg	537 to 10600	ACCEPT.	11/11/09
Pentachlorophenol	10186002	151010	EPA 8270D (1/98)	4410	5370	ug/kg	537 to 10600	ACCEPT.	11/11/09
Phenanthrene	10185805	151010	EPA 8270C 3 1996	2100	2830	ug/kg	1060 to 4600	ACCEPT.	11/11/09
Phenanthrene	10186002	151010	EPA 8270D (1/98)	2100	2830	ug/kg	1060 to 4600	ACCEPT.	11/11/09
Phenol	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Phenol	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
Pyrene	10185805	151010	EPA 8270C 3 1996	5070	7350	ug/kg	2840 to 11900	ACCEPT.	11/11/09
Pyrene	10186002	151010	EPA 8270D (1/98)	5070	7350	ug/kg	2840 to 11900	ACCEPT.	11/11/09
1,2,4,5-Tetrachlorobenzene	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
1,2,4,5-Tetrachlorobenzene	10186002	151010	EPA 8270D (1/98)	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	11/11/09
2,3,4,6-Tetrachlorophenol	10185805	151010	EPA 8270C 3 1996	470	0	ug/kg	0.00 to 0.00	NOT ACCEPT.	11/11/09
2,3,4,6-Tetrachlorophenol	10186002	151010	EPA 8270D (1/98)	470	0	ug/kg	0.00 to 0.00	NOT ACCEPT.	11/11/09
2,4,5-Trichlorophenol	10185805	151010	EPA 8270C 3 1996	4000	5310	ug/kg	1170 to 9450	ACCEPT.	11/11/09
2,4,5-Trichlorophenol	10186002	151010	EPA 8270D (1/98)	4000	5310	ug/kg	1170 to 9450	ACCEPT.	11/11/09
2,4,6-Trichlorophenol	10185805	151010	EPA 8270C 3 1996	4020	6090	ug/kg	1820 to 10400	ACCEPT.	11/11/09
2,4,6-Trichlorophenol	10186002	151010	EPA 8270D (1/98)	4020	6090	ug/kg	1820 to 10400	ACCEPT.	11/11/09
2-Amino-1-methylbenzene	-- Not Reported --								
1,2,3-Trichlorobenzene	-- Not Reported --								
1-Chloronaphthalene	-- Not Reported --								
Maleic anhydride	-- Not Reported --								
3+4-Methylphenol	-- Not Reported --								
3-Nitrophenol	-- Not Reported --								
Pentachlorobenzene	-- Not Reported --								
1,2,3,4-Tetrachlorobenzene	-- Not Reported --								
1,2,3,5-Tetrachlorobenzene	-- Not Reported --								
1,3,5-Trichlorobenzene	-- Not Reported --								

SPEO-008H VOCs in Soil - Empirical Laboratories - NSI Solutions/SM-083

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Acetone	10184802	151010	EPA 8260B 2 1996	21600	23200	ug/kg	2320 to 53800	ACCEPT.	12/1/09
Acetonitrile	10184802	151010	EPA 8260B 2 1996	< 500	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
Acrolein	10184802	151010	EPA 8260B 2 1996	< 1000	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
T-amylmethylether (TAME)	10184802	151010	EPA 8260B 2 1996	< 250	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
Benzene	10184802	151010	EPA 8260B 2 1996	2840	2890	ug/kg	2060 to 3760	ACCEPT.	12/1/09
Bromobenzene	10184802	151010	EPA 8260B 2 1996	7480	7780	ug/kg	5980 to 9580	ACCEPT.	12/1/09
Bromodichloromethane	10184802	151010	EPA 8260B 2 1996	8260	8040	ug/kg	5660 to 11200	ACCEPT.	12/1/09
Bromoform	10184802	151010	EPA 8260B 2 1996	4360	4120	ug/kg	2640 to 5630	ACCEPT.	12/1/09
2-Butanone	10184802	151010	EPA 8260B 2 1996	20800	14900	ug/kg	4140 to 22700	ACCEPT.	12/1/09
Carbon disulfide	10184802	151010	EPA 8260B 2 1996	< 250	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
Carbon tetrachloride	10184802	151010	EPA 8260B 2 1996	6210	5810	ug/kg	3660 to 7870	ACCEPT.	12/1/09
Chlorobenzene	10184802	151010	EPA 8260B 2 1996	2250	2570	ug/kg	1860 to 3510	ACCEPT.	12/1/09
Chloroethane	10184802	151010	EPA 8260B 2 1996	6300	6930	ug/kg	990 to 12900	ACCEPT.	12/1/09
2-Chloroethyl vinylether	10184802	151010	EPA 8260B 2 1996	< 500	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
Chloroform	10184802	151010	EPA 8260B 2 1996	< 250	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
1,2-Dibromo-3-chloropropane	10184802	151010	EPA 8260B 2 1996	< 250	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
Dibromochloromethane	10184802	151010	EPA 8260B 2 1996	5860	6630	ug/kg	4380 to 8590	ACCEPT.	12/1/09
2-Dibromoethane	10184802	151010	EPA 8260B 2 1996	4940	5750	ug/kg	4320 to 7180	ACCEPT.	12/1/09
Dibromomethane	10184802	151010	EPA 8260B 2 1996	5550	5610	ug/kg	4200 to 7020	ACCEPT.	12/1/09
1,2-Dichlorobenzene	10184802	151010	EPA 8260B 2 1996	4940	5470	ug/kg	3990 to 7080	ACCEPT.	12/1/09
1,3-Dichlorobenzene	10184802	151010	EPA 8260B 2 1996	5230	5670	ug/kg	4040 to 7430	ACCEPT.	12/1/09
1,4-Dichlorobenzene	10184802	151010	EPA 8260B 2 1996	5140	5610	ug/kg	4090 to 7070	ACCEPT.	12/1/09

Dichlorodifluoromethane	10184802	151010	EPA 8260B 2 1996	< 500	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
1,1-Dichloroethane	10184802	151010	EPA 8260B 2 1996	6270	7000	ug/kg	4620 to 9670	ACCEPT.	12/1/09
1,2-Dichloroethane	10184802	151010	EPA 8260B 2 1996	< 250	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
1,1-Dichloroethylene	10184802	151010	EPA 8260B 2 1996	4260	5120	ug/kg	3020 to 7220	ACCEPT.	12/1/09
cis-1,2-Dichloroethylene	10184802	151010	EPA 8260B 2 1996	7510	7320	ug/kg	5330 to 9310	ACCEPT.	12/1/09
1,2-Dichloropropane	10184802	151010	EPA 8260B 2 1996	3420	3460	ug/kg	2730 to 4190	ACCEPT.	12/1/09
cis-1,3-Dichloropropene	10184802	151010	EPA 8260B 2 1996	5000	5030	ug/kg	3910 to 6150	ACCEPT.	12/1/09
trans-1,3-Dichloropropene	10184802	151010	EPA 8260B 2 1996	2880	3010	ug/kg	2160 to 3860	ACCEPT.	12/1/09
trans-1,2-Dichloroethylene	10184802	151010	EPA 8260B 2 1996	< 250	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
Ethylbenzene	10184802	151010	EPA 8260B 2 1996	2040	2110	ug/kg	1460 to 2930	ACCEPT.	12/1/09
2-Hexanone	10184802	151010	EPA 8260B 2 1996	14340	13800	ug/kg	1950 to 25600	ACCEPT.	12/1/09
Isopropylbenzene	10184802	151010	EPA 8260B 2 1996	4730	4200	ug/kg	2430 to 5970	ACCEPT.	12/1/09
Bromomethane	10184802	151010	EPA 8260B 2 1996	2210	3440	ug/kg	926 to 5950	ACCEPT.	12/1/09
Chloromethane	10184802	151010	EPA 8260B 2 1996	2190	2950	ug/kg	901 to 5000	ACCEPT.	12/1/09
Methylene chloride	10184802	151010	EPA 8260B 2 1996	4740	5970	ug/kg	3260 to 8470	ACCEPT.	12/1/09
4-Methyl-2-pentanone	10184802	151010	EPA 8260B 2 1996	12300	12300	ug/kg	7040 to 16300	ACCEPT.	12/1/09
Methyl-tert-butyl ether (MTBE)	10184802	151010	EPA 8260B 2 1996	4510	5180	ug/kg	3310 to 7050	ACCEPT.	12/1/09
Naphthalene	10184802	151010	EPA 8260B 2 1996	2690	3080	ug/kg	1530 to 4630	ACCEPT.	12/1/09
Styrene	10184802	151010	EPA 8260B 2 1996	8060	8500	ug/kg	6300 to 10700	ACCEPT.	12/1/09
1,1,1,2-Tetrachloroethane	10184802	151010	EPA 8260B 2 1996	6880	7500	ug/kg	5560 to 9460	ACCEPT.	12/1/09
1,1,2,2-Tetrachloroethane	10184802	151010	EPA 8260B 2 1996	2740	3080	ug/kg	1580 to 4420	ACCEPT.	12/1/09
Tetrachloroethylene	10184802	151010	EPA 8260B 2 1996	4900	5390	ug/kg	3510 to 7430	ACCEPT.	12/1/09
Toluene	10184802	151010	EPA 8260B 2 1996	6420	7800	ug/kg	5520 to 10200	ACCEPT.	12/1/09
1,2,4-Trichlorobenzene	10184802	151010	EPA 8260B 2 1996	< 250	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
1,1,1-Trichloroethane	10184802	151010	EPA 8260B 2 1996	6360	6300	ug/kg	4600 to 8130	ACCEPT.	12/1/09
1,1,2-Trichloroethane	10184802	151010	EPA 8260B 2 1996	3040	3760	ug/kg	2640 to 4960	ACCEPT.	12/1/09
Trichloroethene	10184802	151010	EPA 8260B 2 1996	4410	4260	ug/kg	2940 to 5810	ACCEPT.	12/1/09
Trichlorofluoromethane	10184802	151010	EPA 8260B 2 1996	4840	5590	ug/kg	2230 to 8950	ACCEPT.	12/1/09
1,2,3-Trichloropropane	10184802	151010	EPA 8260B 2 1996	3140	3900	ug/kg	1750 to 5910	ACCEPT.	12/1/09
1,2,4-Trimethylbenzene	10184802	151010	EPA 8260B 2 1996	10760	14200	ug/kg	8650 to 19700	ACCEPT.	12/1/09
1,3,5-Trimethylbenzene	10184802	151010	EPA 8260B 2 1996	7860	9300	ug/kg	6380 to 12200	ACCEPT.	12/1/09
Vinyl acetate	10184802	151010	EPA 8260B 2 1996	< 500	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
Vinyl chloride	10184802	151010	EPA 8260B 2 1996	< 250	4580	ug/kg	1900 to 7260	NOT ACCEPT.	12/1/09
Total Xylenes	10184802	151010	EPA 8260B 2 1996	14800	16200	ug/kg	11800 to 21300	ACCEPT.	12/1/09
Di-isopropylether	10184802	151010	EPA 8260B 2 1996	< 250	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
Hexachloroethane	– Not Reported –								

SPEO-008L VOCs in Soil Low Level - Empirical Laboratories - NSI Solutions/SM-083

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Acetone	10184802	151010	EPA 8260B 2 1996	231	178	ug/kg	17.8 to 547	ACCEPT.	12/1/09
Acetonitrile	10184802	151010	EPA 8260B 2 1996	< 10.0	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
Acrolein	10184802	151010	EPA 8260B 2 1996	< 20.0	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
T-amylmethylether (TAME)	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
Benzene	10184802	151010	EPA 8260B 2 1996	115	135	ug/kg	81.3 to 184	ACCEPT.	12/1/09
Bromobenzene	10184802	151010	EPA 8260B 2 1996	70.0	82.5	ug/kg	55.0 to 110	ACCEPT.	12/1/09
Bromodichloromethane	10184802	151010	EPA 8260B 2 1996	59.4	58.5	ug/kg	36.3 to 81.7	ACCEPT.	12/1/09
Bromoform	10184802	151010	EPA 8260B 2 1996	145	153	ug/kg	77.7 to 227	ACCEPT.	12/1/09
2-Butanone	10184802	151010	EPA 8260B 2 1996	307	185	ug/kg	18.5 to 417	ACCEPT.	12/1/09
Carbon disulfide	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
Carbon tetrachloride	10184802	151010	EPA 8260B 2 1996	185	188	ug/kg	91.6 to 277	ACCEPT.	12/1/09
Chlorobenzene	10184802	151010	EPA 8260B 2 1996	142	180	ug/kg	102 to 249	ACCEPT.	12/1/09
Chloroethane	10184802	151010	EPA 8260B 2 1996	87.5	116	ug/kg	54.5 to 177	ACCEPT.	12/1/09
2-Chloroethyl vinylether	10184802	151010	EPA 8260B 2 1996	< 10.0	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
Chloroform	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
1,2-Dibromo-3-chloropropane	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
Dibromochloromethane	10184802	151010	EPA 8260B 2 1996	29.3	32.4	ug/kg	17.7 to 46.5	ACCEPT.	12/1/09
1,2-Dibromoethane	10184802	151010	EPA 8260B 2 1996	93.1	105	ug/kg	67.5 to 142	ACCEPT.	12/1/09

Dibromomethane	10184802	151010	EPA 8260B 2 1996	169	165	ug/kg	116 to 215	ACCEPT.	12/1/09
1,2-Dichlorobenzene	10184802	151010	EPA 8260B 2 1996	63.5	75.5	ug/kg	36.1 to 107	ACCEPT.	12/1/09
1,3-Dichlorobenzene	10184802	151010	EPA 8260B 2 1996	44.0	51.4	ug/kg	18.0 to 76.0	ACCEPT.	12/1/09
1,4-Dichlorobenzene	10184802	151010	EPA 8260B 2 1996	111	138	ug/kg	47.6 to 196	ACCEPT.	12/1/09
ichlorodifluoromethane	10184802	151010	EPA 8260B 2 1996	< 10.0	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
1,1-Dichloroethane	10184802	151010	EPA 8260B 2 1996	116	134	ug/kg	76.1 to 193	ACCEPT.	12/1/09
1,2-Dichloroethane	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
1,1-Dichloroethylene	10184802	151010	EPA 8260B 2 1996	57.2	74.6	ug/kg	38.9 to 110	ACCEPT.	12/1/09
cis-1,2-Dichloroethylene	10184802	151010	EPA 8260B 2 1996	44.5	48.5	ug/kg	33.1 to 63.9	ACCEPT.	12/1/09
1,2-Dichloropropane	10184802	151010	EPA 8260B 2 1996	85.2	82.0	ug/kg	48.2 to 111	ACCEPT.	12/1/09
cis-1,3-Dichloropropene	10184802	151010	EPA 8260B 2 1996	185	192	ug/kg	116 to 268	ACCEPT.	12/1/09
trans-1,3-Dichloropropene	10184802	151010	EPA 8260B 2 1996	120	133	ug/kg	75.1 to 191	ACCEPT.	12/1/09
trans-1,2-Dichloroethylene	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
Ethylbenzene	10184802	151010	EPA 8260B 2 1996	82.7	98.2	ug/kg	54.3 to 141	ACCEPT.	12/1/09
Hexachlorobutadiene	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
2-Hexanone	10184802	151010	EPA 8260B 2 1996	333	228	ug/kg	22.8 to 470	ACCEPT.	12/1/09
Isopropylbenzene	10184802	151010	EPA 8260B 2 1996	58.7	57.9	ug/kg	35.0 to 80.8	ACCEPT.	12/1/09
Bromomethane	10184802	151010	EPA 8260B 2 1996	75.5	112	ug/kg	41.2 to 183	ACCEPT.	12/1/09
Chloromethane	10184802	151010	EPA 8260B 2 1996	40.1	52.6	ug/kg	20.1 to 85.2	ACCEPT.	12/1/09
Methylene chloride	10184802	151010	EPA 8260B 2 1996	23.5	34.5	ug/kg	15.8 to 53.2	ACCEPT.	12/1/09
4-Methyl-2-pentanone	10184802	151010	EPA 8260B 2 1996	279	228	ug/kg	100 to 331	ACCEPT.	12/1/09
Methyl-tert-butyl ether (MTBE)	10184802	151010	EPA 8260B 2 1996	82.8	92.3	ug/kg	38.7 to 140	ACCEPT.	12/1/09
Naphthalene	10184802	151010	EPA 8260B 2 1996	151	186	ug/kg	81.0 to 291	ACCEPT.	12/1/09
Styrene	10184802	151010	EPA 8260B 2 1996	85.3	93.1	ug/kg	68.6 to 118	ACCEPT.	12/1/09
1,1,1,2-Tetrachloroethane	10184802	151010	EPA 8260B 2 1996	96.0	108	ug/kg	70.3 to 147	ACCEPT.	12/1/09
1,1,2,2-Tetrachloroethane	10184802	151010	EPA 8260B 2 1996	40.3	47.9	ug/kg	23.7 to 71.8	ACCEPT.	12/1/09
Tetrachloroethylene	10184802	151010	EPA 8260B 2 1996	95.7	112	ug/kg	11.2 to 356	ACCEPT.	12/1/09
Toluene	10184802	151010	EPA 8260B 2 1996	26.4	28.4	ug/kg	15.7 to 40.5	ACCEPT.	12/1/09
1,2,4-Trichlorobenzene	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
1,1,1-Trichloroethane	10184802	151010	EPA 8260B 2 1996	174	185	ug/kg	106 to 264	ACCEPT.	12/1/09
1,2-Trichloroethane	10184802	151010	EPA 8260B 2 1996	110	129	ug/kg	75.5 to 177	ACCEPT.	12/1/09
richloroethene	10184802	151010	EPA 8260B 2 1996	136	140	ug/kg	72.0 to 200	ACCEPT.	12/1/09
Trichlorofluoromethane	10184802	151010	EPA 8260B 2 1996	98.8	138	ug/kg	76.8 to 199	ACCEPT.	12/1/09
1,2,3-Trichloropropane	10184802	151010	EPA 8260B 2 1996	163	177	ug/kg	66.9 to 287	ACCEPT.	12/1/09
1,2,4-Trimethylbenzene	10184802	151010	EPA 8260B 2 1996	77.5	89.0	ug/kg	53.9 to 124	ACCEPT.	12/1/09
1,3,5-Trimethylbenzene	10184802	151010	EPA 8260B 2 1996	144	190	ug/kg	116 to 264	ACCEPT.	12/1/09
Vinyl acetate	10184802	151010	EPA 8260B 2 1996	< 10.0	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
Vinyl chloride	10184802	151010	EPA 8260B 2 1996	51.1	107	ug/kg	61.4 to 153	NOT ACCEPT.	12/1/09
Total Xylenes	10184802	151010	EPA 8260B 2 1996	293	328	ug/kg	163 to 480	ACCEPT.	12/1/09
Di-isopropylether	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	12/1/09
Hexachloroethane	-- Not Reported --								

SPEO-009 Chlordane in Soil - Empirical Laboratories - NSI Solutions/SM-083

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Chlordane	10178606	152010	EPA 8081A 1 1996	869	722	ug/kg	193 to 1250	ACCEPT.	11/25/09
Chlordane	10178800	152010	EPA 8081B (11/00)	869	722	ug/kg	193 to 1250	ACCEPT.	11/25/09

Scoring: Assigned values and acceptance limits for analytes included under the A2LA Scope of Accreditation are determined according to current NELAC SCM-FOT criteria.

Reviewed/Approved By: MRH-SC Date: 12/18/09

Add'l Agencies:

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RCRA - Solids/Hazardous Waste
Performance Evaluation Report
NSI Laboratory Proficiency Testing Program
Study SM-081 - Shipped: 04/22/2009 - Closed: 06/05/2009 - Reports Printed On: 06/23/2009
Participant USEPA Labcode: TN00004

Study Designed and Coordinated by:
NSI Solutions, Inc.
7212 ACC Blvd., Raleigh, NC 27617
A2LA Certificate#: 2432.01
1-800-234-7837

This evaluation report is being submitted to:
Empirical Laboratories
Attention: Randy Ward
621 Mainstream Drive
Suite 270
Nashville, TN, 37228

LabCode and Accreditation Information:

Send Results to: State Only
EPA Lab Code: TN00004
State Lab Code: TN473
Primary Agency: NJ -- NJ DEP
Add'l Agencies below Rachel Ellis
9 Ewing Street
Trenton, NJ 08625
Reports to: AA AR CA FL IL MA NC NJ OK TX UT WA

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JUN 30 2009
BY:.....

Participant Information

I Lab Code: N06511

This report was submitted by Randy D. Ward, Quality Assurance Officer.

Empirical Laboratories
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615-345-1115

Please contact Mark Hammersla at NSI if you have any questions about this report.
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This PT report may contain data not covered under A2LA Accreditation. Such data is noted by an asterisk.

SPEI-001 Trace Metals in Soil - Empirical Laboratories - NSI Solutions/SM-081

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Aluminum	10155609	102015	EPA 6010B 2 1996	4440	5870	mg/kg	1700 to 10000	ACCEPT.	5/7/09
Antimony	10155609	102015	EPA 6010B 2 1996	120	44.8	mg/kg	4.48 to 128	ACCEPT.	5/7/09
Arsenic	10155609	102015	EPA 6010B 2 1996	90.1	89.9	mg/kg	62.0 to 118	ACCEPT.	5/7/09
ium	10155609	102015	EPA 6010B 2 1996	748	741	mg/kg	554 to 928	ACCEPT.	5/7/09
ryllium	10155609	102015	EPA 6010B 2 1996	108	102	mg/kg	76.1 to 128	ACCEPT.	5/7/09
Cadmium	10155609	102015	EPA 6010B 2 1996	160	150	mg/kg	110 to 190	ACCEPT.	5/7/09
Calcium	10155609	102015	EPA 6010B 2 1996	2940	2940	mg/kg	2030 to 3850	ACCEPT.	5/7/09

Chromium	10155609	102015	EPA 6010B 2 1996	303	295	mg/kg	210 to 380	ACCEPT.	5/7/09
Cobalt	10155609	102015	EPA 6010B 2 1996	150	145	mg/kg	108 to 182	ACCEPT.	5/7/09
Copper	10155609	102015	EPA 6010B 2 1996	232	224	mg/kg	170 to 278	ACCEPT.	5/7/09
Iron	10155609	102015	EPA 6010B 2 1996	6270	7620	mg/kg	762 to 14600	ACCEPT.	5/7/09
.ead	10155609	102015	EPA 6010B 2 1996	63.0	64.1	mg/kg	42.8 to 85.4	ACCEPT.	5/7/09
lagnesium	10155609	102015	EPA 6010B 2 1996	2780	3050	mg/kg	2020 to 4080	ACCEPT.	5/7/09
Manganese	10155609	102015	EPA 6010B 2 1996	819	735	mg/kg	575 to 895	ACCEPT.	5/7/09
Mercury	10166208	101010	EPA 7471A 1 1994	25.9	22.1	mg/kg	11.4 to 32.8	ACCEPT.	5/11/09
Molybdenum	10155609	102015	EPA 6010B 2 1996	76.5	73.8	mg/kg	50.7 to 96.9	ACCEPT.	5/7/09
Nickel	10155609	102015	EPA 6010B 2 1996	359	346	mg/kg	258 to 434	ACCEPT.	5/7/09
Potassium	10155609	102015	EPA 6010B 2 1996	2330	2250	mg/kg	1340 to 3160	ACCEPT.	5/7/09
Selenium	10155609	102015	EPA 6010B 2 1996	17.9	118	mg/kg	78.0 to 158	NOT ACCEPT.	5/7/09
Silver	10155609	102015	EPA 6010B 2 1996	30.2	30.3	mg/kg	19.8 to 40.8	ACCEPT.	5/7/09
Sodium	10155609	102015	EPA 6010B 2 1996	918	899	mg/kg	530 to 1270	ACCEPT.	5/7/09
Thallium	10155609	102015	EPA 6010B 2 1996	217	217	mg/kg	150 to 284	ACCEPT.	5/7/09
Tin	10155609	102015	EPA 6010B 2 1996	95.7	98.0	mg/kg	55.5 to 141	ACCEPT.	5/7/09
Titanium	10155609	102015	EPA 6010B 2 1996	28.0	31.7	mg/kg	3.17 to 68.0	ACCEPT.	5/7/09
Vanadium	10155609	102015	EPA 6010B 2 1996	125	123	mg/kg	84.3 to 162	ACCEPT.	5/7/09
Zinc	10155609	102015	EPA 6010B 2 1996	375	383	mg/kg	277 to 489	ACCEPT.	5/7/09
Boron	-- Not Reported --								
Lithium	-- Not Reported --								
Silicon	-- Not Reported --								
Strontium	-- Not Reported --								
pH	-- Not Reported --								

SPEI-003 Hexavalent Chromium - Empirical Laboratories - NSI Solutions/SM-081

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
,exavalent Chromium	10162400	401010	EPA 7196A 1 1992	58.7	61.2	mg/kg	7.16 to 115	ACCEPT.	5/13/09

SPEI-005 TCLP Metals - Empirical Laboratories - NSI Solutions/SM-081

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Arsenic	10155609	102015	EPA 6010B 2 1996	3.43	4.49	mg/L	2.84 to 6.14	ACCEPT.	5/20/09
Barium	10155609	102015	EPA 6010B 2 1996	0.824	0.718	mg/L	0.238 to 1.20	ACCEPT.	5/20/09
Cadmium	10155609	102015	EPA 6010B 2 1996	3.50	3.82	mg/L	2.08 to 5.56	ACCEPT.	5/20/09
Chromium	10155609	102015	EPA 6010B 2 1996	0.260	0.276	mg/L	0.0276 to 0.756	ACCEPT.	5/20/09
Lead	10155609	102015	EPA 6010B 2 1996	0.353	0.328	mg/L	0.0328 to 0.988	ACCEPT.	5/20/09
Mercury	10166208	101010	EPA 7471A 1 1994	0.0158	0.0135	mg/L	0.0014 to 0.0338	ACCEPT.	5/18/09
Selenium	10155609	102015	EPA 6010B 2 1996	3.16	3.64	mg/L	2.17 to 5.11	ACCEPT.	5/20/09
Silver	10155609	102015	EPA 6010B 2 1996	0.0380	0.0486	mg/L	0.0049 to 0.109	ACCEPT.	5/20/09

SPEI-011 Explosives - Empirical Laboratories - NSI Solutions/SM-081

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Nitrobenzene	10190008	251020	EPA 8330A (1/98)	1890	5500	ug/kg	700 to 10300	ACCEPT.	5/26/09
3-Dinitrobenzene	10190008	251020	EPA 8330A (1/98)	11500	12200	ug/kg	6710 to 17700	ACCEPT.	5/26/09
-Dinitrotoluene	10190008	251020	EPA 8330A (1/98)	3110	2060	ug/kg	635 to 3490	ACCEPT.	5/26/09
,6-Dinitrotoluene	10190008	251020	EPA 8330A (1/98)	6440	6160	ug/kg	3390 to 8930	ACCEPT.	5/26/09
Tetryl	10190008	251020	EPA 8330A (1/98)	2700	3120	ug/kg	1720 to 4520	ACCEPT.	5/26/09
Nitroglycerin	10190008	251020	EPA 8330A (1/98)	< 1500	0	ug/kg	0.00 to 0.00	ACCEPT.	5/26/09

1,3,5-Trinitrobenzene	10190008	251020	EPA 8330A (1/98)	2580	2350	ug/kg	1290 to 3410	ACCEPT.	5/26/09
2-Amino-4,6-dinitrotoluene	10190008	251020	EPA 8330A (1/98)	3840	3320	ug/kg	1830 to 4810	ACCEPT.	5/26/09
4-Amino-2,6-dinitrotoluene	10190008	251020	EPA 8330A (1/98)	< 1500	2110	ug/kg	190 to 4030	ACCEPT.	5/26/09
Hexahydro-1,3,5-trinitro-1,3,5,7-tetrazocine	10190008	251020	EPA 8330A (1/98)	4410	3370	ug/kg	1240 to 5500	ACCEPT.	5/26/09
-Nitrotoluene	10190008	251020	EPA 8330A (1/98)	4100	8360	ug/kg	3350 to 13400	ACCEPT.	5/26/09
Nitrotoluene	10190008	251020	EPA 8330A (1/98)	9980	12500	ug/kg	9410 to 15600	ACCEPT.	5/26/09
4-Nitrotoluene	10190008	251020	EPA 8330A (1/98)	12000	12200	ug/kg	4880 to 19500	ACCEPT.	5/26/09
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	10190008	251020	EPA 8330A (1/98)	7500	6880	ug/kg	4830 to 8930	ACCEPT.	5/26/09
Pentaerythritoltetranitrate	10190008	251020	EPA 8330A (1/98)	7430	7130	ug/kg	2840 to 11400	ACCEPT.	5/26/09
2,4,6-Trinitrotoluene	10190008	251020	EPA 8330A (1/98)	7010	5790	ug/kg	2430 to 9150	ACCEPT.	5/26/09

SPEI-012 Corrosivity - Empirical Laboratories - NSI Solutions/SM-081

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Corrosivity	10198400	352010	EPA 9045C 3 1995	5.94	5.84	pH units	5.24 to 6.44	ACCEPT.	5/5/09

SPEI-014 Flashpoint - Empirical Laboratories - NSI Solutions/SM-081

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Flash Point	n/a	n/a	EPA 1010A	186	187	oF	168 to 206	ACCEPT.	5/5/09

SPEI-017 Cyanide - Empirical Laboratories - NSI Solutions/SM-081

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Cyanide	10193405	401010	EPA 9012A 1 1996	26.0	74.9	mg/kg	7.49 to 168	ACCEPT.	5/12/09

SPEO-003 Pesticides in Soil - Empirical Laboratories - NSI Solutions/SM-081

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Aldrin	10178606	152010	EPA 8081A 1 1996	83.4	78.5	ug/kg	25.3 to 132	ACCEPT.	5/20/09
delta-BHC	10178606	152010	EPA 8081A 1 1996	341	388	ug/kg	126 to 650	ACCEPT.	5/20/09
alpha-BHC	10178606	152010	EPA 8081A 1 1996	270	254	ug/kg	91.8 to 416	ACCEPT.	5/20/09
beta-BHC	10178606	152010	EPA 8081A 1 1996	130	141	ug/kg	28.8 to 253	ACCEPT.	5/20/09
gamma-BHC	10178606	152010	EPA 8081A 1 1996	272	273	ug/kg	94.9 to 451	ACCEPT.	5/20/09
alpha-Chlordane	10178606	152010	EPA 8081A 1 1996	99.0	90.3	ug/kg	34.4 to 146	ACCEPT.	5/20/09
gamma-Chlordane	10178606	152010	EPA 8081A 1 1996	52.7	62.8	ug/kg	22.6 to 103	ACCEPT.	5/20/09
4,4'-DDD	10178606	152010	EPA 8081A 1 1996	140	191	ug/kg	69.3 to 313	ACCEPT.	5/20/09
4,4'-DDE	10178606	152010	EPA 8081A 1 1996	413	405	ug/kg	171 to 639	ACCEPT.	5/20/09
4,4'-DDT	10178606	152010	EPA 8081A 1 1996	235	320	ug/kg	96.7 to 543	ACCEPT.	5/20/09
Dieldrin	10178606	152010	EPA 8081A 1 1996	176	179	ug/kg	69.9 to 288	ACCEPT.	5/20/09
Endosulfan I	10178606	152010	EPA 8081A 1 1996	388	417	ug/kg	174 to 660	ACCEPT.	5/20/09
Endosulfan II	10178606	152010	EPA 8081A 1 1996	18.2	57.4	ug/kg	12.8 to 102	ACCEPT.	5/20/09
Endosulfan sulfate	10178606	152010	EPA 8081A 1 1996	12.1	61.9	ug/kg	10.5 to 113	ACCEPT.	5/20/09
drin aldehyde	10178606	152010	EPA 8081A 1 1996	58.7	148	ug/kg	15.2 to 281	ACCEPT.	5/20/09
drin ketone	10178606	152010	EPA 8081A 1 1996	50.6	125	ug/kg	34.7 to 215	ACCEPT.	5/20/09
Endrin	10178606	152010	EPA 8081A 1 1996	371	385	ug/kg	198 to 572	ACCEPT.	5/20/09
Heptachlor	10178606	152010	EPA 8081A 1 1996	91.3	97.6	ug/kg	33.1 to 162	ACCEPT.	5/20/09

Heptachlor epoxide	10178606	152010	EPA 8081A 1 1996	84.6	83.0	ug/kg	31.8 to 134	ACCEPT.	5/20/09
Methoxyclor	10178606	152010	EPA 8081A 1 1996	50.0	316	ug/kg	42.2 to 590	ACCEPT.	5/20/09
Hexachlorobenzene	-- Not Reported --								
Hexachlorocyclopentadiene	-- Not Reported --								
Propachlor	-- Not Reported --								
rifluralin	-- Not Reported --								

SPEO-004 Toxaphene in Soil - Empirical Laboratories - NSI Solutions/SM-081

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Toxaphene	10178606	152010	EPA 8081A 1 1996	347	733	ug/kg	73.3 to 1680	ACCEPT.	5/15/09

SPEO-005 PCB in Soil - Empirical Laboratories - NSI Solutions/SM-081

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Arochlor 1016	10179007	152010	EPA 8082 0 1996	< 0.0170	<0.2	mg/kg	0.00 to 0.00	ACCEPT.	5/27/09
Arochlor 1221	10179007	152010	EPA 8082 0 1996	< 0.0170	<0.2	mg/kg	0.00 to 0.00	ACCEPT.	5/27/09
Arochlor 1232	10179007	152010	EPA 8082 0 1996	< 0.0170	<0.2	mg/kg	0.00 to 0.00	ACCEPT.	5/27/09
Arochlor 1242	10179007	152010	EPA 8082 0 1996	1.04	1.22	mg/kg	0.122 to 2.40	ACCEPT.	5/27/09
Arochlor 1248	10179007	152010	EPA 8082 0 1996	< 0.0170	<0.2	mg/kg	0.00 to 0.00	ACCEPT.	5/27/09
Arochlor 1254	10179007	152010	EPA 8082 0 1996	< 0.0170	<0.2	mg/kg	0.00 to 0.00	ACCEPT.	5/27/09
Arochlor 1260	10179007	152010	EPA 8082 0 1996	< 0.0170	<0.2	mg/kg	0.00 to 0.00	ACCEPT.	5/27/09

EO-006 Herbicides in Soil - Empirical Laboratories - NSI Solutions/SM-081

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
MCPA	10183207	152010	EPA 8151A (1/98)	< 5000	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
MCPP	10183207	152010	EPA 8151A (1/98)	< 5000	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
2,4-D	10183207	152010	EPA 8151A (1/98)	624	425	ug/kg	42.5 to 1230	ACCEPT.	5/14/09
Dalapon	10183207	152010	EPA 8151A (1/98)	< 125	190	ug/kg	19.0 to 598	ACCEPT.	5/14/09
2,4-DB	10183207	152010	EPA 8151A (1/98)	1270	886	ug/kg	133 to 1640	ACCEPT.	5/14/09
Dicamba	10183207	152010	EPA 8151A (1/98)	105	112	ug/kg	36.7 to 187	ACCEPT.	5/14/09
Dichloroprop	10183207	152010	EPA 8151A (1/98)	< 25.0	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
Dinoseb	10183207	152010	EPA 8151A (1/98)	242	470	ug/kg	0.00 to 1390	ACCEPT.	5/14/09
Silvex(2,4,5-TP)	10183207	152010	EPA 8151A (1/98)	583	209	ug/kg	20.9 to 549	NOT ACCEPT.	5/14/09
2,4,5-T	10183207	152010	EPA 8151A (1/98)	637	547	ug/kg	211 to 883	ACCEPT.	5/14/09
4-Nitrophenol	-- Not Reported --								
Pentachlorophenol	-- Not Reported --								
Acifluorfen	-- Not Reported --								
Bentazon	-- Not Reported --								
Chloramben	-- Not Reported --								
DCPA	-- Not Reported --								
3,5-Dichlorobenzoic Acid	-- Not Reported --								
Picloram	-- Not Reported --								

SPEO-007 BNAs in Soil - Empirical Laboratories - NSI Solutions/SM-081

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date

1,2-Dichlorobenzene	10185805	151010	EPA 8270C 3 1996	1150	1340	ug/kg	134 to 2710	ACCEPT.	5/14/09
1,3-Dichlorobenzene	10185805	151010	EPA 8270C 3 1996	< 330	3380	ug/kg	410 to 6350	NOT ACCEPT.	5/14/09
1,4-Dichlorobenzene	10185805	151010	EPA 8270C 3 1996	2690	0	ug/kg	0.00 to 0.00	NOT ACCEPT.	5/14/09
Hexachlorobutadiene	10185805	151010	EPA 8270C 3 1996	5160	6660	ug/kg	1570 to 11700	ACCEPT.	5/14/09
Hexachloroethane	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
Naphthalene	10185805	151010	EPA 8270C 3 1996	3320	3110	ug/kg	869 to 5350	ACCEPT.	5/14/09
Nitrobenzene	10185805	151010	EPA 8270C 3 1996	5950	6050	ug/kg	1580 to 10500	ACCEPT.	5/14/09
Pyridine	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
1,2,4-Trichlorobenzene	10185805	151010	EPA 8270C 3 1996	2140	2540	ug/kg	583 to 4500	ACCEPT.	5/14/09
Acenaphthene	10185805	151010	EPA 8270C 3 1996	3160	3410	ug/kg	1180 to 5640	ACCEPT.	5/14/09
Acenaphthylene	10185805	151010	EPA 8270C 3 1996	4790	4390	ug/kg	1410 to 7370	ACCEPT.	5/14/09
Aniline	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
Anthracene	10185805	151010	EPA 8270C 3 1996	1560	1570	ug/kg	412 to 2730	ACCEPT.	5/14/09
Benzo(a)anthracene	10185805	151010	EPA 8270C 3 1996	2870	2790	ug/kg	1100 to 4480	ACCEPT.	5/14/09
Benzo(a)pyrene	10185805	151010	EPA 8270C 3 1996	6400	6210	ug/kg	1910 to 10500	ACCEPT.	5/14/09
Benzo(b)fluoranthene	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
Benzo(g,h,i)perylene	10185805	151010	EPA 8270C 3 1996	4070	3320	ug/kg	915 to 5720	ACCEPT.	5/14/09
Benzidine	10185805	151010	EPA 8270C 3 1996	< 1300	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
Benzo(k)fluoranthene	10185805	151010	EPA 8270C 3 1996	2080	2210	ug/kg	752 to 3670	ACCEPT.	5/14/09
Benzoic acid	10185805	151010	EPA 8270C 3 1996	< 1300	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
Benzyl alcohol	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
4-Bromophenyl-phenylether	10185805	151010	EPA 8270C 3 1996	6410	8450	ug/kg	3290 to 13600	ACCEPT.	5/14/09
Butyl benzyl phthalate	10185805	151010	EPA 8270C 3 1996	1580	1720	ug/kg	467 to 2970	ACCEPT.	5/14/09
Carbazole	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
4-Chloro-3-methylphenol	10185805	151010	EPA 8270C 3 1996	8580	7600	ug/kg	3040 to 12200	ACCEPT.	5/14/09
4-Chloroaniline	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
Bis(2-chloroethoxy)methane	10185805	151010	EPA 8270C 3 1996	1420	1520	ug/kg	293 to 2750	ACCEPT.	5/14/09
Bis(2-chloroethyl)ether	10185805	151010	EPA 8270C 3 1996	3630	5380	ug/kg	190 to 10600	ACCEPT.	5/14/09
Bis(2-chloroisopropyl)ether	10185805	151010	EPA 8270C 3 1996	1490	2100	ug/kg	280 to 3920	ACCEPT.	5/14/09
2-Chloronaphthalene	10185805	151010	EPA 8270C 3 1996	4620	4680	ug/kg	1470 to 7890	ACCEPT.	5/14/09
Chlorophenol	10185805	151010	EPA 8270C 3 1996	5880	5160	ug/kg	1290 to 9030	ACCEPT.	5/14/09
Chlorophenyl-phenylether	10185805	151010	EPA 8270C 3 1996	6010	5840	ug/kg	2070 to 9610	ACCEPT.	5/14/09
Chrysene	10185805	151010	EPA 8270C 3 1996	4660	4900	ug/kg	1790 to 8010	ACCEPT.	5/14/09
Dibenz(a,h)anthracene	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
Dibenzofuran	10185805	151010	EPA 8270C 3 1996	8250	8730	ug/kg	3110 to 14300	ACCEPT.	5/14/09
Di-n-butyl phthalate	10185805	151010	EPA 8270C 3 1996	4410	6250	ug/kg	1890 to 10600	ACCEPT.	5/14/09
3,3'-Dichlorobenzidine	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
2,4-Dichlorophenol	10185805	151010	EPA 8270C 3 1996	3300	3280	ug/kg	683 to 5880	ACCEPT.	5/14/09
2,6-Dichlorophenol	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
Diethyl phthalate	10185805	151010	EPA 8270C 3 1996	6430	7810	ug/kg	2260 to 13400	ACCEPT.	5/14/09
2,4-Dimethylphenol	10185805	151010	EPA 8270C 3 1996	6450	5050	ug/kg	400 to 9700	ACCEPT.	5/14/09
Dimethyl phthalate	10185805	151010	EPA 8270C 3 1996	3040	3320	ug/kg	1090 to 5550	ACCEPT.	5/14/09
2,4-Dinitrophenol	10185805	151010	EPA 8270C 3 1996	1890	1380	ug/kg	0.00 to 4710	ACCEPT.	5/14/09
2,4-Dinitrotoluene	10185805	151010	EPA 8270C 3 1996	< 330	2010	ug/kg	218 to 3800	ACCEPT.	5/14/09
2,6-Dinitrotoluene	10185805	151010	EPA 8270C 3 1996	4070	4270	ug/kg	1660 to 6880	ACCEPT.	5/14/09
Di-n-octyl phthalate	10185805	151010	EPA 8270C 3 1996	1890	2260	ug/kg	416 to 4100	ACCEPT.	5/14/09
Bis(2-ethylhexyl)phthalate	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
Fluoranthene	10185805	151010	EPA 8270C 3 1996	6550	8090	ug/kg	3370 to 12800	ACCEPT.	5/14/09
Fluorene	10185805	151010	EPA 8270C 3 1996	3710	3670	ug/kg	1440 to 5900	ACCEPT.	5/14/09
Hexachlorobenzene	10185805	151010	EPA 8270C 3 1996	2020	2110	ug/kg	801 to 3420	ACCEPT.	5/14/09
Hexachlorocyclopentadiene	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
Indeno(1,2,3-c,d)pyrene	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
Isophorone	10185805	151010	EPA 8270C 3 1996	4790	6280	ug/kg	1660 to 10900	ACCEPT.	5/14/09
2-Methyl-4,6-Dinitrophenol	10185805	151010	EPA 8270C 3 1996	3190	2320	ug/kg	0.00 to 5710	ACCEPT.	5/14/09
2-Methylnaphthalene	10185805	151010	EPA 8270C 3 1996	4580	6440	ug/kg	1100 to 11800	ACCEPT.	5/14/09
2-Methylphenol	10185805	151010	EPA 8270C 3 1996	5570	6610	ug/kg	1180 to 12000	ACCEPT.	5/14/09
Methylphenol	10185805	151010	EPA 8270C 3 1996	5440	0	ug/kg	0.00 to 0.00	NOT ACCEPT.	5/14/09
Methylphenol	10185805	151010	EPA 8270C 3 1996	5410	5060	ug/kg	440 to 9680	ACCEPT.	5/14/09
2-Nitroaniline	10185805	151010	EPA 8270C 3 1996	< 1300	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
3-Nitroaniline	10185805	151010	EPA 8270C 3 1996	< 1300	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09

4-Nitroaniline	10185805	151010	EPA 8270C 3 1996	< 1300	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
2-Nitrophenol	10185805	151010	EPA 8270C 3 1996	5840	5250	ug/kg	891 to 9610	ACCEPT.	5/14/09
4-Nitrophenol	10185805	151010	EPA 8270C 3 1996	3970	3030	ug/kg	303 to 6850	ACCEPT.	5/14/09
N-Nitrosodimethylamine	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
N-Nitrosodiphenylamine	10185805	151010	EPA 8270C 3 1996	4270	4920	ug/kg	0.00 to 9960	ACCEPT.	5/14/09
N-Nitroso-di-n-propylamine	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
Pentachlorophenol	10185805	151010	EPA 8270C 3 1996	5240	5250	ug/kg	525 to 10400	ACCEPT.	5/14/09
Phenanthrene	10185805	151010	EPA 8270C 3 1996	4040	4400	ug/kg	1780 to 7020	ACCEPT.	5/14/09
Phenol	10185805	151010	EPA 8270C 3 1996	2260	2270	ug/kg	314 to 4230	ACCEPT.	5/14/09
Pyrene	10185805	151010	EPA 8270C 3 1996	4200	4120	ug/kg	1570 to 6670	ACCEPT.	5/14/09
1,2,4,5-Tetrachlorobenzene	10185805	151010	EPA 8270C 3 1996	< 330	0	ug/kg	0.00 to 0.00	ACCEPT.	5/14/09
2,3,4,6-Tetrachlorophenol	10185805	151010	EPA 8270C 3 1996	360	0	ug/kg	0.00 to 0.00	NOT ACCEPT.	5/14/09
2,4,5-Trichlorophenol	10185805	151010	EPA 8270C 3 1996	2500	2080	ug/kg	393 to 3770	ACCEPT.	5/14/09
2,4,6-Trichlorophenol	10185805	151010	EPA 8270C 3 1996	2490	2300	ug/kg	433 to 4170	ACCEPT.	5/14/09
2-Amino-1-methylbenzene	-- Not Reported --								
1,2,3-Trichlorobenzene	-- Not Reported --								
1-Chloronaphthalene	-- Not Reported --								
Maleic anhydride	-- Not Reported --								
3+4-Methylphenol	-- Not Reported --								
3-Nitrophenol	-- Not Reported --								
Pentachlorobenzene	-- Not Reported --								
1,2,3,4-Tetrachlorobenzene	-- Not Reported --								
1,2,3,5-Tetrachlorobenzene	-- Not Reported --								
1,3,5-Trichlorobenzene	-- Not Reported --								

SPEO-008H VOCs in Soil - Empirical Laboratories - NSI Solutions/SM-081

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Acetone	10184802	151010	EPA 8260B 2 1996	37300	20000	ug/kg	2000 to 70700	ACCEPT.	5/14/09
Acetonitrile	10184802	151010	EPA 8260B 2 1996	< 500	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
Acrolein	10184802	151010	EPA 8260B 2 1996	< 1000	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
T-amylmethylether (TAME)	10184802	151010	EPA 8260B 2 1996	< 250	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
Benzene	10184802	151010	EPA 8260B 2 1996	4520	4530	ug/kg	3230 to 5830	ACCEPT.	5/13/09
Bromobenzene	10184802	151010	EPA 8260B 2 1996	3750	3650	ug/kg	1320 to 5980	ACCEPT.	5/13/09
Bromodichloromethane	10184802	151010	EPA 8260B 2 1996	8160	8060	ug/kg	5280 to 10800	ACCEPT.	5/13/09
Bromoform	10184802	151010	EPA 8260B 2 1996	7130	6910	ug/kg	4610 to 9210	ACCEPT.	5/13/09
2-Butanone	10184802	151010	EPA 8260B 2 1996	36400	16200	ug/kg	1620 to 35500	NOT ACCEPT.	5/14/09
Carbon disulfide	10184802	151010	EPA 8260B 2 1996	< 250	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
Carbon tetrachloride	10184802	151010	EPA 8260B 2 1996	8460	8210	ug/kg	5310 to 11100	ACCEPT.	5/13/09
Chlorobenzene	10184802	151010	EPA 8260B 2 1996	3440	3340	ug/kg	2340 to 4340	ACCEPT.	5/13/09
Chloroethane	10184802	151010	EPA 8260B 2 1996	3120	3690	ug/kg	369 to 7080	ACCEPT.	5/13/09
2-Chloroethyl vinylether	10184802	151010	EPA 8260B 2 1996	< 500	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
Chloroform	10184802	151010	EPA 8260B 2 1996	< 250	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
1,2-Dibromo-3-chloropropane	10184802	151010	EPA 8260B 2 1996	8480	7550	ug/kg	3440 to 11700	ACCEPT.	5/13/09
Dibromochloromethane	10184802	151010	EPA 8260B 2 1996	2730	2480	ug/kg	1610 to 3350	ACCEPT.	5/13/09
1,2-Dibromoethane	10184802	151010	EPA 8260B 2 1996	< 250	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
Dibromomethane	10184802	151010	EPA 8260B 2 1996	7190	6620	ug/kg	4670 to 8570	ACCEPT.	5/13/09
1,2-Dichlorobenzene	10184802	151010	EPA 8260B 2 1996	7670	7470	ug/kg	5430 to 9510	ACCEPT.	5/13/09
1,3-Dichlorobenzene	10184802	151010	EPA 8260B 2 1996	4010	3990	ug/kg	2700 to 5280	ACCEPT.	5/13/09
1,4-Dichlorobenzene	10184802	151010	EPA 8260B 2 1996	2480	2290	ug/kg	1530 to 3050	ACCEPT.	5/13/09
Dichlorodifluoromethane	10184802	151010	EPA 8260B 2 1996	< 500	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
1,1-Dichloroethane	10184802	151010	EPA 8260B 2 1996	6100	6260	ug/kg	4000 to 8520	ACCEPT.	5/13/09
1,2-Dichloroethane	10184802	151010	EPA 8260B 2 1996	8900	8270	ug/kg	6060 to 10500	ACCEPT.	5/13/09
1,1-Dichloroethylene	10184802	151010	EPA 8260B 2 1996	7230	6760	ug/kg	3130 to 10400	ACCEPT.	5/13/09
1,2-Dichloroethylene	10184802	151010	EPA 8260B 2 1996	5360	5270	ug/kg	3160 to 7380	ACCEPT.	5/13/09
1,2-Dichloropropane	10184802	151010	EPA 8260B 2 1996	< 250	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
cis-1,3-Dichloropropene	10184802	151010	EPA 8260B 2 1996	< 250	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
trans-1,3-Dichloropropene	10184802	151010	EPA 8260B 2 1996	2570	2250	ug/kg	1000 to 3500	ACCEPT.	5/13/09

trans-1,2-Dichloroethylene	10184802	151010	EPA 8260B 2 1996	5960	5910	ug/kg	3080 to 8740	ACCEPT.	5/13/09
Ethylbenzene	10184802	151010	EPA 8260B 2 1996	5220	5240	ug/kg	3500 to 6980	ACCEPT.	5/13/09
2-Hexanone	10184802	151010	EPA 8260B 2 1996	26800	14500	ug/kg	3280 to 25700	NOT ACCEPT.	5/14/09
Isopropylbenzene	10184802	151010	EPA 8260B 2 1996	4930	4080	ug/kg	2690 to 5470	ACCEPT.	5/13/09
Bromomethane	10184802	151010	EPA 8260B 2 1996	1570	1160	ug/kg	116 to 3350	ACCEPT.	5/13/09
hloromethane	10184802	151010	EPA 8260B 2 1996	4100	3320	ug/kg	332 to 6320	ACCEPT.	5/13/09
Methylene chloride	10184802	151010	EPA 8260B 2 1996	9220	8960	ug/kg	5150 to 12800	ACCEPT.	5/13/09
4-Methyl-2-pentanone	10184802	151010	EPA 8260B 2 1996	15000	13600	ug/kg	8560 to 18600	ACCEPT.	5/13/09
Methyl-tert-butyl ether (MTBE)	10184802	151010	EPA 8260B 2 1996	5640	5230	ug/kg	3000 to 7460	ACCEPT.	5/13/09
Naphthalene	10184802	151010	EPA 8260B 2 1996	6660	6260	ug/kg	3900 to 8620	ACCEPT.	5/13/09
Styrene	10184802	151010	EPA 8260B 2 1996	6350	5940	ug/kg	3980 to 7900	ACCEPT.	5/13/09
1,1,1,2-Tetrachloroethane	10184802	151010	EPA 8260B 2 1996	3290	3180	ug/kg	2160 to 4200	ACCEPT.	5/13/09
1,1,2,2-Tetrachloroethane	10184802	151010	EPA 8260B 2 1996	4300	4240	ug/kg	2500 to 5980	ACCEPT.	5/13/09
Tetrachloroethylene	10184802	151010	EPA 8260B 2 1996	< 250	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
Toluene	10184802	151010	EPA 8260B 2 1996	2620	2610	ug/kg	1790 to 3430	ACCEPT.	5/13/09
1,2,4-Trichlorobenzene	10184802	151010	EPA 8260B 2 1996	3390	3270	ug/kg	2000 to 4540	ACCEPT.	5/13/09
1,1,1-Trichloroethane	10184802	151010	EPA 8260B 2 1996	7550	7180	ug/kg	5190 to 9170	ACCEPT.	5/13/09
1,1,2-Trichloroethane	10184802	151010	EPA 8260B 2 1996	< 250	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
Trichloroethene	10184802	151010	EPA 8260B 2 1996	7710	7500	ug/kg	5160 to 9840	ACCEPT.	5/13/09
Trichlorofluoromethane	10184802	151010	EPA 8260B 2 1996	5320	5220	ug/kg	1320 to 9120	ACCEPT.	5/13/09
1,2,3-Trichloropropane	10184802	151010	EPA 8260B 2 1996	8520	7660	ug/kg	4210 to 11100	ACCEPT.	5/13/09
1,2,4-Trimethylbenzene	10184802	151010	EPA 8260B 2 1996	13300	12900	ug/kg	8040 to 17800	ACCEPT.	5/14/09
1,3,5-Trimethylbenzene	10184802	151010	EPA 8260B 2 1996	16000	15300	ug/kg	9630 to 21000	ACCEPT.	5/14/09
Vinyl acetate	10184802	151010	EPA 8260B 2 1996	< 500	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
Vinyl chloride	10184802	151010	EPA 8260B 2 1996	2490	4210	ug/kg	640 to 7780	ACCEPT.	5/13/09
Total Xylenes	10184802	151010	EPA 8260B 2 1996	13300	13300	ug/kg	9280 to 17300	ACCEPT.	5/13/09
Di-isopropylether	10184802	151010	EPA 8260B 2 1996	< 250	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
Hexachloroethane	-- Not Reported --								

SPEO-008L VOCs in Soil Low Level - Empirical Laboratories - NSI Solutions/SM-081

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Acetone	10184802	151010	EPA 8260B 2 1996	360	218	ug/kg	21.8 to 593	ACCEPT.	5/13/09
Acetonitrile	10184802	151010	EPA 8260B 2 1996	< 10.0	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
Acrolein	10184802	151010	EPA 8260B 2 1996	< 20.0	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
T-amylmethylether (TAME)	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
Benzene	10184802	151010	EPA 8260B 2 1996	86.6	98.0	ug/kg	58.4 to 134	ACCEPT.	5/13/09
Bromobenzene	10184802	151010	EPA 8260B 2 1996	134	145	ug/kg	83.8 to 206	ACCEPT.	5/13/09
Bromodichloromethane	10184802	151010	EPA 8260B 2 1996	117	125	ug/kg	81.6 to 172	ACCEPT.	5/13/09
Bromoform	10184802	151010	EPA 8260B 2 1996	79.0	84.1	ug/kg	42.2 to 125	ACCEPT.	5/13/09
2-Butanone	10184802	151010	EPA 8260B 2 1996	495	290	ug/kg	29.0 to 668	ACCEPT.	5/13/09
Carbon disulfide	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
Carbon tetrachloride	10184802	151010	EPA 8260B 2 1996	190	185	ug/kg	90.2 to 273	ACCEPT.	5/13/09
Chlorobenzene	10184802	151010	EPA 8260B 2 1996	175	195	ug/kg	111 to 270	ACCEPT.	5/13/09
Chloroethane	10184802	151010	EPA 8260B 2 1996	98.4	108	ug/kg	24.6 to 191	ACCEPT.	5/13/09
2-Chloroethyl vinylether	10184802	151010	EPA 8260B 2 1996	< 10.0	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
Chloroform	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
1,2-Dibromo-3-chloropropane	10184802	151010	EPA 8260B 2 1996	183	184	ug/kg	99.7 to 268	ACCEPT.	5/13/09
Dibromochloromethane	10184802	151010	EPA 8260B 2 1996	185	189	ug/kg	116 to 259	ACCEPT.	5/13/09
1,2-Dibromoethane	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
Dibromomethane	10184802	151010	EPA 8260B 2 1996	91.2	94.1	ug/kg	59.6 to 129	ACCEPT.	5/13/09
1,2-Dichlorobenzene	10184802	151010	EPA 8260B 2 1996	44.6	46.8	ug/kg	22.0 to 66.7	ACCEPT.	5/13/09
1,3-Dichlorobenzene	10184802	151010	EPA 8260B 2 1996	29.2	29.6	ug/kg	9.04 to 43.9	ACCEPT.	5/13/09
1,4-Dichlorobenzene	10184802	151010	EPA 8260B 2 1996	122	138	ug/kg	47.6 to 196	ACCEPT.	5/13/09
hlorodifluoromethane	10184802	151010	EPA 8260B 2 1996	< 10.0	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
1-Dichloroethane	10184802	151010	EPA 8260B 2 1996	68.3	76.1	ug/kg	42.9 to 110	ACCEPT.	5/13/09
1,2-Dichloroethane	10184802	151010	EPA 8260B 2 1996	72.9	76.2	ug/kg	44.6 to 107	ACCEPT.	5/13/09
1,1-Dichloroethylene	10184802	151010	EPA 8260B 2 1996	115	117	ug/kg	82.2 to 152	ACCEPT.	5/13/09

cis-1,2-Dichloroethylene	10184802	151010	EPA 8260B 2 1996	170	183	ug/kg	131 to 235	ACCEPT.	5/13/09
1,2-Dichloropropane	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
cis-1,3-Dichloropropene	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
trans-1,3-Dichloropropene	10184802	151010	EPA 8260B 2 1996	128	132	ug/kg	78.9 to 185	ACCEPT.	5/13/09
trans-1,2-Dichloroethylene	10184802	151010	EPA 8260B 2 1996	87.4	92.4	ug/kg	66.0 to 119	ACCEPT.	5/13/09
thylbenzene	10184802	151010	EPA 8260B 2 1996	114	129	ug/kg	72.0 to 184	ACCEPT.	5/13/09
Hexachlorobutadiene	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
2-Hexanone	10184802	151010	EPA 8260B 2 1996	281	228	ug/kg	22.8 to 453	ACCEPT.	5/13/09
Isopropylbenzene	10184802	151010	EPA 8260B 2 1996	118	109	ug/kg	63.1 to 155	ACCEPT.	5/13/09
Bromomethane	10184802	151010	EPA 8260B 2 1996	168	164	ug/kg	18.8 to 309	ACCEPT.	5/13/09
Chloromethane	10184802	151010	EPA 8260B 2 1996	172	178	ug/kg	51.1 to 305	ACCEPT.	5/13/09
Methylene chloride	10184802	151010	EPA 8260B 2 1996	48.1	53.4	ug/kg	24.7 to 79.9	ACCEPT.	5/13/09
4-Methyl-2-pentanone	10184802	151010	EPA 8260B 2 1996	321	332	ug/kg	148 to 479	ACCEPT.	5/13/09
Methyl-tert-butyl ether (MTBE)	10184802	151010	EPA 8260B 2 1996	139	146	ug/kg	61.6 to 215	ACCEPT.	5/13/09
Naphthalene	10184802	151010	EPA 8260B 2 1996	135	146	ug/kg	77.3 to 215	ACCEPT.	5/13/09
Styrene	10184802	151010	EPA 8260B 2 1996	137	148	ug/kg	95.8 to 200	ACCEPT.	5/13/09
1,1,1,2-Tetrachloroethane	10184802	151010	EPA 8260B 2 1996	120	129	ug/kg	84.2 to 175	ACCEPT.	5/13/09
1,1,2,2-Tetrachloroethane	10184802	151010	EPA 8260B 2 1996	84.6	93.7	ug/kg	48.1 to 137	ACCEPT.	5/13/09
Tetrachloroethylene	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
Toluene	10184802	151010	EPA 8260B 2 1996	103	120	ug/kg	69.0 to 169	ACCEPT.	5/13/09
1,2,4-Trichlorobenzene	10184802	151010	EPA 8260B 2 1996	39.7	44.9	ug/kg	25.8 to 64.0	ACCEPT.	5/13/09
1,1,1-Trichloroethane	10184802	151010	EPA 8260B 2 1996	59.9	58.1	ug/kg	31.5 to 82.6	ACCEPT.	5/13/09
1,1,2-Trichloroethane	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
Trichloroethene	10184802	151010	EPA 8260B 2 1996	79.8	81.0	ug/kg	41.4 to 116	ACCEPT.	5/13/09
Trichlorofluoromethane	10184802	151010	EPA 8260B 2 1996	120	121	ug/kg	51.1 to 191	ACCEPT.	5/13/09
1,2,3-Trichloropropane	10184802	151010	EPA 8260B 2 1996	123	125	ug/kg	44.0 to 206	ACCEPT.	5/13/09
1,2,4-Trimethylbenzene	10184802	151010	EPA 8260B 2 1996	61.0	64.7	ug/kg	35.6 to 93.8	ACCEPT.	5/13/09
1,3,5-Trimethylbenzene	10184802	151010	EPA 8260B 2 1996	71.9	74.9	ug/kg	47.5 to 102	ACCEPT.	5/13/09
Vinyl acetate	10184802	151010	EPA 8260B 2 1996	< 10.0	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
Vinyl chloride	10184802	151010	EPA 8260B 2 1996	137	140	ug/kg	27.8 to 252	ACCEPT.	5/13/09
Total Xylenes	10184802	151010	EPA 8260B 2 1996	171	194	ug/kg	95.3 to 286	ACCEPT.	5/13/09
-isopropylether	10184802	151010	EPA 8260B 2 1996	< 5.00	0	ug/kg	0.00 to 0.00	ACCEPT.	5/13/09
exachloroethane	-- Not Reported --								

SPEO-009 Chlordane in Soil - Empirical Laboratories - NSI Solutions/SM-081

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
Chlordane	10178606	152010	EPA 8081A 1 1996	569	594	ug/kg	157 to 1030	ACCEPT.	5/20/09

SPEO-015 TCLP Semi-VOAs in Soil - Empirical Laboratories - NSI Solutions/SM-081

Analyte	NELAC Method Code	NELAC Tech. Code	Method Description	Reported Value	Assigned Value	Units	Acceptance Limits	Evaluation	Analysis Date
1,4-Dichlorobenzene	10185805	151010	EPA 8270C 3 1996	< 0.0500	0	mg/L	0.00 to 0.00	ACCEPT.	6/3/09
Hexachlorobutadiene	10185805	151010	EPA 8270C 3 1996	< 0.0500	0	mg/L	0.00 to 0.00	ACCEPT.	6/3/09
Hexachloroethane	10185805	151010	EPA 8270C 3 1996	< 0.0500	0	mg/L	0.00 to 0.00	ACCEPT.	6/3/09
Nitrobenzene	10185805	151010	EPA 8270C 3 1996	< 0.0500	0	mg/L	0.00 to 0.00	ACCEPT.	6/3/09
Pyridine	10185805	151010	EPA 8270C 3 1996	0.265	0.986	mg/L	0.0986 to 4.47	ACCEPT.	6/3/09
2,4-Dinitrotoluene	10185805	151010	EPA 8270C 3 1996	< 0.0500	0	mg/L	0.00 to 0.00	ACCEPT.	6/3/09
Hexachlorobenzene	10185805	151010	EPA 8270C 3 1996	< 0.0500	0	mg/L	0.00 to 0.00	ACCEPT.	6/3/09
2-Methylphenol	10185805	151010	EPA 8270C 3 1996	< 0.0500	0	mg/L	0.00 to 0.00	ACCEPT.	6/3/09
Methylphenol	10185805	151010	EPA 8270C 3 1996	2.48	3.65	mg/L	0.365 to 8.06	ACCEPT.	5/22/09
tachlorophenol	10185805	151010	EPA 8270C 3 1996	< 0.200	0	mg/L	0.00 to 0.00	ACCEPT.	6/3/09
,+,5-Trichlorophenol	10185805	151010	EPA 8270C 3 1996	< 0.0500	0	mg/L	0.00 to 0.00	ACCEPT.	6/3/09
2,4,6-Trichlorophenol	10185805	151010	EPA 8270C 3 1996	< 0.0500	0	mg/L	0.00 to 0.00	ACCEPT.	6/3/09

3+4-Methylphenol	-- Not Reported --
Total Cresol	-- Not Reported --
gamma-BHC	-- Not Reported --
Chlordane	-- Not Reported --
Endrin	-- Not Reported --
eptachlor	-- Not Reported --
Heptachlor epoxide	-- Not Reported --
Methoxychlor	-- Not Reported --
Toxaphene (Chlorinated camphene)	-- Not Reported --
2,4-D	-- Not Reported --
Silvex(2,4,5-TP)	-- Not Reported --

Scoring: Assigned values and acceptance limits for analytes included under the A2LA Scope of Accreditation are determined according to current NELAC SCM-FOT criteria.

Reviewed/Approved By: MRH-8C Date: 6-23-09

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APPENDIX D

MICROBAC LABORATORY
STANDARD OPERATING PROCEDURES

Text for **Appendix D MICROBAC LABORATORY SOP** can be found on the enclosed CD

APPENDIX E

SWMU 9 TECHNICAL MEMORANDUM

TECHNICAL MEMORANDUM

DATE: October 5, 2009

TO: Mr. Tom Brent, NSA Crane

FROM: Tim Smith, Tetra Tech; Pittsburgh, PA
Steve Ruffing, Tetra Tech; Pittsburgh, PA

cc: Mr. Howard Hickey, NAVFAC MW
Mr. John Trepanowski, Tetra Tech
Mr. Ralph Basinski, Tetra Tech
Project File – CTO 467

SUBJECT: NSA Crane
Plan to complete Excavation at SWMU 9

The purpose of this Technical Memorandum is to present the extent of excavation required at Solid Waste Management Unit (SWMU) 9 to complete the goals of the Interim Measures Work Plan (IMWP) that was executed in November and December of 2008. The excavation activities described in this Technical Memorandum address the: 1) areas around former Building 55 where contaminants of concern (COCs) remain at concentrations above the cleanup goals, and 2) area around the former Fire Fighting Training Area where COC remain at concentrations above cleanup goals.

BACKGROUND

In the fall of 2008 an interim removal action was conducted for SWMU 9 located at the Naval Support Activity (NSA) Crane, in Crane, Indiana. The excavation was performed in accordance with specifications identified in the SWMU 9 IMWP, dated September 2008. Excavation was performed at three locations during the removal action. These excavations were conducted:

- Adjacent to Building 150,
- Adjacent to the former Building 55 Area, and
- At the former Fire Fighting Training Area located south of former Building 55.

Section 3 of the IMWP presents the proposed SWMU 9 excavation limits and associated specifications to achieve the goal of removing potential risk to human and ecological receptors.

Following the 2008 excavation, verification samples were collected to verify the removal of all risk causing contaminants. The results of the verification sampling and analysis indicate that excavation has been completed adjacent to Building 150 and more excavation is required adjacent to former Building 55 and at the former Fire Fighting Training Area. The analytical results for the verification sampling are presented in Table 1. The locations of the verification samples and the results that exceed cleanup goals are presented in Figures 1, 2, and 3.

PRE-EXCAVATION SAMPLING

As a result of the verification sampling conducted in the fall of 2008 additional excavation is required within the former Building 55 Area and within the former Fire Fighting Training Area. The purpose of the pre-excavation sampling was to determine the required extent of additional excavation and to establish a row of clean samples to reduce the need for further excavation once the proposed excavation is performed. The pre-excavation samples were collected at the locations identified in Figures 4 and 5 and are summarized in Table 2. At each of the identified locations, samples were collected from the 0 to 2 foot, 2 to 4 foot, and 4 to 6 foot depth intervals. The 0 to 2 foot depth interval was replaced by a 0.5 to 2.0 foot depth interval for samples collected below the Former Building 55 concrete foundation (concrete thickness is 6 inches). These samples were collected in accordance with the United States Environmental Protection Agency (USEPA) approved Quality Assurance Project Plan (QAPP), developed for SWMU 9 titled Resource Conservation and Recovery Act QAPP for SWMUs 8, 9, 15, 18, 19, 20, and the Old Gun Tub Storage Lot and Interim Measures at SWMU 7 (Old Rifle Range), SWMU 8 (Building 106 Pond), SWMU 13 (Mine Fill B), SWMU 17 (PCB Burial/Pole Yard), and SWMU 9 (Pesticide Control Area) dated September 2008 (latest update).

The identified samples were divided into three groups of samples (Group 1, Group 2, and Group 3) and sent to a fixed base laboratory for extraction and analysis preparation. Following extraction and analysis preparation the fixed base laboratory analyzed the Group 1 samples for pesticides and diesel range organic compounds (DRO); holding the remaining samples until results on the Group 1 samples were determined. In the event Group 1 samples contained concentrations of COC above the cleanup goals, the Group 2 samples would be analyzed and likewise for the Group 3 samples. At the completion of the analytical process all of the group 1 samples and all group 2 samples were analyzed. Because of the analytical results of the Group 1 and Group 2 samples, Group 3 samples were not analyzed. Table 2 identifies the samples that were and were not analyzed, Table 3 presents the results of the July 2009 pre-excavation sampling event, and Figures 4 and 5 present the locations where COC were detected at concentrations that exceed the cleanup goals.

EXCAVATION

The soil identified in the following paragraphs will be excavated, characterized, and transported offsite for disposal at a permitted landfill. The excavation, characterization, transportation, and disposal of the identified soil must be performed in accordance with all of the requirements and specifications identified in the September 2008 SWMU 9 IMWP. If in-situ characterization is approved by the selected disposal facility, soil that is excavated from the identified areas can be directly loaded and transported to the disposal facility. Stockpiling soil onsite is only needed if additional characterization or dewatering is required. Excavation will be required to the limits identified in this Technical Memorandum unless expanded due to the results of the verification sampling describe in this Technical Memorandum. Verification samples following the excavation activities will be required at identified locations to confirm the removal of all unacceptable risks to human health and ecological receptors. Actual limits of excavation will depend on the analytical results of the collected verification samples. All excavations and stockpiled soils must be covered while awaiting the analytical results of the verification samples.

Former Building 55 Area – The verification sampling and pre-excavation sampling performed for the former Building 55 area indicates that unacceptable levels of contamination remain in the soil and additional excavation is needed (Table 1 presents the verification samples results, contaminants of concern, and cleanup criteria and Table 3 presents the pre-excavation sampling results). Figure 6a identifies the horizontal and vertical limits of the remaining excavation at the former Building 55 area to achieve acceptable ecological and human health risk criteria. Based on the excavation areas and depths identified in Figure 6a, approximately 260 cubic yards of soil (including the 6 inch thick concrete material of the Former Building 55 foundation) needs to be removed to achieve acceptable risk criteria (excavation calculation attached). A portion of this excavation (59 cubic yards) is suitable for backfilling.

The excavation volume calculation assumes that when backfilling the previous excavation, clean backfill was placed in contact with the remaining contaminated soil. Therefore, the reported volume includes;

- The removal of approximately 1 foot of previously backfilled soil that is currently in contact with the remaining contaminated soil along the previously excavated excavation side walls.
- The removal of approximately 0.5 feet of previously backfilled soil that is currently in contact with the remaining contaminated soil found on the previously exposed excavation floor.

Actual volume of excavation may increase as a result of the verification sampling.

Former Fire Fighting Training Area – The verification sampling and pre-excavation sampling performed for the former Fire Fighting Training Area indicates that unacceptable levels of PCB contamination remain in the soil, and additional excavation is needed. Figure 7 identifies the horizontal and vertical limits of the

remaining excavation at the former Fire Fighting Training Area to achieve acceptable ecological and human health risk criteria. Based on the area and depth identified in Figure 7a, approximately 705 cubic yards of soil needs to be excavated from the former Fire Fighting Training Area to achieve acceptable risk criteria. This volume assumes a 0.5 foot horizontal to 1 foot vertical slope where the excavation is 7 feet in depth (excavation calculation attached). Assuming that during backfilling of the previous excavation, separation geotextile (filter fabric) was used to line the excavation (as reported by the contractor), 35 cubic yards of the reported total excavation volume can be used as backfill material.

DISPOSAL

The excavated soil will be disposed off-site in accordance with the specifications identified in the September 2008 IMWP for SWMU 9.

Former Building 55 Area - Based on historical process it is estimated that the soil removed from the former Building 55 Area will need to be disposed as a listed hazardous waste (hazardous due to process, not concentration). Based on the verification samples and the pre-excavation samples collected from the former Building 55 Area, the excavated soil will be characterized into 4 different waste streams.

- Backfill Material – Clean onsite soil used to backfill the previous excavations.
- Special Waste - Listed hazardous waste with concentrations less than the toxicity characteristic leachate procedure (TCLP) concentrations.
- Hazardous Waste - Listed hazardous waste with concentrations greater than TCLP concentrations and less than land disposal restriction (LDR) concentrations.
- Hazardous Waste - Listed hazardous waste with concentrations greater than LDR concentrations.

Soil requiring treatment prior to land disposal within a hazardous waste landfill (Subtitle C) was determined by comparing the analytical results of the verification and pre-excavation samples with the Indiana Department of Environmental Management (IDEM) Industrial Direct Contact criteria and the Universal Treatment Standards. In order for soil to require treatment before land disposal, the contaminant concentrations must exceed the IDEM Industrial Direct Contact Cleanup criteria and also exceed the Universal Treatment Standards by 10 times. The results of this evaluation determined that some of the additional soil being excavated will need to be treated prior to land disposal. Table 4 presents this land disposal evaluation and Figure 6b identifies the limits of soil requiring treatment.

Former Fire Training Area - In addition, verification and pre-excavation sampling performed at the former Fire Fighting Training Area indicates that the excavated soil will be characterized into 3 different waste streams.

- Backfill Material – Clean onsite soil used to backfill the previous excavations.
- Non-TSCA Waste – Excavated soil with a Total PCB concentration less than the toxic substance control act (TSCA) concentration of 50 mg/kg.
- TSCA Waste – Excavated soil with a Total PCB concentration greater than the TSCA concentration of 50 mg/kg.

Figure 7b identifies the estimated limits of these waste streams.

The following table and the attached calculation summarize the waste types that will be generated during the additional excavation to be performed at SWMU 9.

Excavation Area	Total Excavation Volume (cy)	Material Disposition	Volume (cy)
Former Building 55 Area	260	Dispose offsite as special waste (less than TCLP)	36
		Dispose offsite as hazardous waste (less than LDR)	70
		Dispose offsite as hazardous waste (greater than LDR)	95
		Stockpile onsite for use as clean backfill	59
Former Fire Training Area	705	Dispose offsite as non-TSCA regulated waste	491
		Dispose offsite as TSCA regulated waste	179
		Stockpile onsite for use as clean backfill	35

Volumes reported for Former Building 55 area assumes that concrete will be disposed according to the soil classification below the concrete. Characterization sampling of the concrete would be required if concrete segregation is desired.

VERIFICATION SAMPLING

The purpose of the verification sampling is to verify that the contaminants that remain on site (if any) are at concentrations that do not result in unacceptable risks to human health and ecological receptors. Verification samples will be collected in accordance with the September 2008 IMWP for SWMU 9. Verification samples will be collected at the locations identified on Figure 8 for the former Building 55 Area and where identified on Figure 9 for the Former Fire Fighting Training Area. The expected duration between sample collection and reporting preliminary analytical results is 5 working days. In addition to collecting verification samples from the exposed excavation surfaces, the Navy's representative will also collect verification samples from the limits of support facilities constructed to support excavation activities (decontamination pads, stockpiles, and haul roads) to verify that contamination was not spread during implementation of excavation activities. As indicated in the September 2008 IMWP for SWMU 9, based

on the results of the verification samples the Navy may direct the EMAC Contractor to excavate additional soil.

RESTORATION

Following the verification of contamination removal, the EMAC contractor must backfill the excavations in accordance with the requirements presented in the September 2008 IMWP for SWMU 9. Based on the available data, approximately 871 cubic yards of certified clean backfill material will be needed to restore the SWMU 9 excavation areas. Following Navy approval, the excavation areas will be backfilled and vegetated with a permanent stand of vegetation. Based on the assumption that the soil retained from the excavation to be used as backfill material is used a common fill material and that the former Building 55 concrete foundation material will be replaced with vegetation, backfilling the excavations requires obtaining 765 cubic yards of common fill and 106 cubic yards of topsoil from one or more off-site source(s).

TABLES

1. SWMU Verification Sampling Results
2. Summary of July 2009 Pre-Excavation Sampling
3. July 2009 Pre-Excavation Sampling Results
4. Land Disposal Restriction Evaluation

TABLE 1

SWMU 9 VERIFICATION SAMPLING RESULTS
NSWC CRANE, CRANE, IN
(PAGE 1 OF 6)

Location [1]	Cleanup Goals			09SS001C-W	09SS002C-W	09SS003C-W	09SS004C-W	09SS005C-F	09SS006C-W	09SS007C-W	09SS008C-W
Sample Number				09SS001C0006	09SS002C0006	09SS003C0006	09SS004C0006	09SS005C0006	09SS006C0006	09SS007C0006	09SS008C0006
Sample Depth (ft) [2]	IMWP Cleanup Goal (Ecological) [4]	IDEM Default Residential	IDEM Default Industrial	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date				9/30/2008	9/30/2008	9/30/2008	9/30/2008	9/30/2008	10/2/2008	10/2/2008	10/2/2008
Pesticides/PCBs (ug/kg)											
4,4'-DDD [3]	24300	28000	120000	NA	NA	NA	NA	NA	1200	18 J	580 J
4,4'-DDE [3]	17150	20000	86000	NA	NA	NA	NA	NA	4800	230	2100
4,4'-DDT [3]	3600	20000	86000	NA	NA	NA	NA	NA	17000	1000 J	3200
ALDRIN				NA	NA	NA	NA	NA	6.6 U	0.73 U	7.5 U
ALPHA-BHC				NA	NA	NA	NA	NA	6.6 U	0.73 U	7.5 U
ALPHA-CHLORDANE [3]	3500	9600	38000	NA	NA	NA	NA	NA	390	41	7500
AROCLOR-1016				2200 U	1000 U	2800 U	1100 U	1100 U	NA	NA	NA
AROCLOR-1221				2200 U	1000 U	2800 U	1100 U	1100 U	NA	NA	NA
AROCLOR-1232				2200 U	1000 U	2800 U	1100 U	1100 U	NA	NA	NA
AROCLOR-1242				180000 J	130000	300000 J	47000	75000	NA	NA	NA
AROCLOR-1248				2200 U	1000 U	2800 U	1100 U	1100 U	NA	NA	NA
AROCLOR-1254				2200 U	1000 U	2800 U	1100 U	1100 U	NA	NA	NA
AROCLOR-1260				2200 U	1000 U	2800 U	1100 U	1100 U	NA	NA	NA
TOTAL PCBs Surface [3]	1000			180000	130000	300000	47000	—	NA	NA	NA
TOTAL PCBs Subsurface [3]	25000			—	—	—	—	75000	NA	NA	NA
BETA-BHC				NA	NA	NA	NA	NA	6.6 U	0.73 U	7.5 U
DELTA-BHC				NA	NA	NA	NA	NA	6.6 UJ	0.73 UJ	7.5 UJ
DIELDRIN [3]	300	270	860	NA	NA	NA	NA	NA	14 U	1.6 U	16 U
ENDOSULFAN I				NA	NA	NA	NA	NA	6.6 U	0.73 U	7.5 U
ENDOSULFAN II				NA	NA	NA	NA	NA	14 U	88 R	16 U
ENDOSULFAN SULFATE				NA	NA	NA	NA	NA	14 U	1.6 U	16 U
ENDRIN				NA	NA	NA	NA	NA	14 U	1.6 U	450 J
ENDRIN ALDEHYDE				NA	NA	NA	NA	NA	14 U	780	16 U
ENDRIN KETONE				NA	NA	NA	NA	NA	14 U	1.6 U	16 U
GAMMA-BHC (LINDANE)				NA	NA	NA	NA	NA	6.6 U	0.73 U	7.5 U
GAMMA-CHLORDANE [3]	3500	9600	68000	NA	NA	NA	NA	NA	550 J	37 J	7400
HEPTACHLOR [3]	1050	930	2900	NA	NA	NA	NA	NA	6.6 U	13 J	340
HEPTACHLOR EPOXIDE				NA	NA	NA	NA	NA	6.6 U	17	1100
METHOXYCHLOR				NA	NA	NA	NA	NA	66 UJ	7.3 UJ	75 UJ
TOXAPHENE				NA	NA	NA	NA	NA	870 U	96 U	980 U
Petroleum Hydrocarbons (mg/kg)											
DIESEL RANGE ORGANICS	1600	80	1000	NA	NA	NA	NA	NA	99	180	77

(1) The location identifies the type of sample collected (C indicates composite sample) and location (F indicates excavation floor and W indicated excavation wall).

(2) Sample depth indicates the depth from the surface of exposed soils.

(3) These parameters were identified as the Chemicals of Concern. Cleanup goals are provided for these compounds only.

(4) Cleanup goal for comparison to samples taken form excavation sidewalls that represent soil conditions for the existing surface soil (0 to 2 feet bgs).

(5) One or more chemical concentration exceeds PRG presented in IMWP, however no additional excavtion is needed since results are less than IDEM default valuses and location will be coverd with a minimum of 2 feet of soil.

NA Parameter not analyzed for this sample
U Parameter is not detected at the indicated detection limit
J Indicated result is estimated
— Parameter not analyzed for indicated depth
R Data rejected for use in risk development

Indicates that results exceeds one or more of the appropriate cleanup goals (ecological risk or IDEM Default Industrial).
Indicates that further excavation is required.

TABLE 1

SWMU 9 VERIFICATION SAMPLING RESULTS
NSWC CRANE, CRANE, IN
(PAGE 2 OF 6)

Location [1] Sample Number Sample Depth (ft) [2] Sample Date	Cleanup Goals			09SS009C-W 09SS009C0006 0 - 0.5 10/2/2008	09SS010C-W 09SS010C0006 0 - 0.5 10/2/2008	09SS011C-W 09SS011C0006 0 - 0.5 10/9/2008	09SS012C-W 09SS012C0006 0 - 0.5 10/9/2008	09SS013C-W 09SS013C0006 0 - 0.5 10/9/2008	09SS014C-W 09SS014C0006 0 - 0.5 10/9/2008	09SS015C-W 09SS015C0006 0 - 0.5 10/9/2008	09SS016C-W 09SS016C0006 0 - 0.5 10/9/2008
	IMWP Cleanup Goal (Ecological) [4]	IDEM Default Residential	IDEM Default Industrial								
Pesticides/PCBs (ug/kg)											
4,4'-DDD [3]	24300	28000	120000	24	88	0.16 U	0.16 U	160 J	13 J	7300	720
4,4'-DDE [3]	17150	20000	86000	30 J	150	3.8	1.9 J	170 J	81	8400	6400
4,4'-DDT [3]	3600	20000	86000	21 J	1300	14	6.7	310 J	66	4100000	14000
ALDRIN				0.080 U	12 J	0.073 U	0.077 U	0.082 U	0.075 U	78 U	7.7 U
ALPHA-BHC				0.080 U	0.75 U	0.32 UJ	0.077 U	0.082 U	0.075 U	78 U	7.7 U
ALPHA-CHLORDANE [3]	3500	9600	38000	45	320	0.073 U	1.6	1500	290	4400	500
AROCLOR-1016				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1221				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1232				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1242				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1248				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1254				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1260				NA	NA	NA	NA	NA	NA	NA	NA
TOTAL PCBs Surface [3]	1000			NA	NA	NA	NA	NA	NA	NA	NA
TOTAL PCBs Subsurface [3]	25000			NA	NA	NA	NA	NA	NA	NA	NA
BETA-BHC				0.080 U	0.75 U	0.073 U	0.077 U	0.082 U	0.075 U	78 U	7.7 U
DELTA-BHC				0.080 UJ	0.75 UJ	0.073 U	0.077 U	0.082 U	0.075 U	78 U	7.7 U
DIELDRIN [3]	300	270	860	0.17 U	22 J	0.16 U	0.16 U	25 J	8.1 R	170 U	170 J
ENDOSULFAN I				0.080 U	0.75 U	0.073 U	0.077 U	0.082 U	0.075 U	78 U	7.7 U
ENDOSULFAN II				0.17 U	1.6 U	0.16 U	0.16 U	6.5 R	0.16 U	170 U	17 U
ENDOSULFAN SULFATE				0.17 U	1.6 U	0.16 U	0.16 U	0.18 U	0.16 U	170 U	17 U
ENDRIN				1.4 R	1.6 U	0.16 U	0.16 U	88 J	8.6 J	170 U	17 U
ENDRIN ALDEHYDE				0.17 U	1.6 U	0.16 UJ	0.16 U	49 R	0.16 U	170 U	17 U
ENDRIN KETONE				0.17 U	1.6 U	0.16 U	0.16 U	2.1 J	0.16 U	170 U	17 U
GAMMA-BHC (LINDANE)				0.080 U	0.75 U	0.073 U	0.077 U	0.082 U	0.075 U	320 J	7.7 U
GAMMA-CHLORDANE [3]	3500	9600	68000	37	220	0.073 UJ	1.5 J	1800	280	5000	620
HEPTACHLOR [3]	1050	930	2900	0.080 U	12 J	0.073 U	0.077 U	89 J	0.075 U	380 J	7.7 U
HEPTACHLOR EPOXIDE				2.9	300	0.073 U	0.077 U	22 J	5.9 J	78 U	7.7 U
METHOXYCHLOR				0.80 UJ	7.5 UJ	0.73 U	0.77 U	0.82 U	0.75 U	780 U	77 U
TOXAPHENE				10 U	99 U	9.6 U	10 U	11 U	9.8 U	10000 U	1000 U
Petroleum Hydrocarbons (mg/kg)											
DIESEL RANGE ORGANICS	1600	80	1000	3.0 U	190	16	6.4	18	7.7	1800	280

(1) The location identifies the type of sample collected (C indicates composite sample) and location (F indicates excavation floor and W indicated excavation wall).

(2) Sample depth indicates the depth from the surface of exposed soils.

(3) These parameters were identified as the Chemicals of Concern. Cleanup goals are provided for these compounds only.

(4) Cleanup goal for comparison to samples taken form excavation sidewalls that represent soil conditions for the existing surface soil (0 to 2 feet bgs).

(5) One or more chemical concentration exceeds PRG presented in IMWP, however no additional excavtion is needed since results are less than IDEM default valuses and location will be coverd with a minimum of 2 feet of soil.

NA Parameter not analyzed for this sample
U Parameter is not detected at the indicated detection limit
J Indicated result is estimated
— Parameter not analyzed for indicated depth
R Data rejected for use in risk development

Indicates that results exceeds one or more of the appropriate cleanup goals (ecological risk or IDEM Defa
Indicates that further excavation is required.

TABLE 1

SWMU 9 VERIFICATION SAMPLING RESULTS
NSWC CRANE, CRANE, IN
(PAGE 3 OF 6)

Location [1]	Cleanup Goals			09SS017C-W	09SS018C-W	09SS019C-W	09SS020C-W	09SS021C-W	09SS022C-F [5]	09SS023C-F [5]	09SS024C-F
Sample Number				09SS017C0006	09SS018C0006	09SS019C0006	09SS020C0006	09SS021C0006	09SS022C0006	09SS023C0006	09SS024C0006
Sample Depth (ft) [2]	IMWP Cleanup Goal (Ecological) [4]	IDEM Default Residential	IDEM Default Industrial	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date				10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/10/2008
Pesticides/PCBs (ug/kg)											
4,4'-DDD [3]	24300	28000	120000	390	6.1	110	4.8	36	320	1100	1.9 J
4,4'-DDE [3]	17150	20000	86000	1800	1.7 R	43	1.6 J	46	180	2100	3.4 J
4,4'-DDT [3]	3600	20000	86000	5700	460 J	2500 J	230	530 J	4600 J	9900	50 J
ALDRIN				7 U	0.08 U	0.85 U	0.08 U	0.08 U	0.81 U	7.7 U	0.077 U
ALPHA-BHC				7 U	4.3	0.85 U	0.08 U	0.08 U	0.81 UJ	7.7 U	0.077 U
ALPHA-CHLORDANE [3]	3500	9600	38000	910	1.8	0.85 U	0.88 J	30	140	380	1.2 J
AROCLOR-1016				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1221				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1232				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1242				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1248				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1254				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1260				NA	NA	NA	NA	NA	NA	NA	NA
TOTAL PCBs Surface [3]	1000			NA	NA	NA	NA	NA	NA	NA	NA
TOTAL PCBs Subsurface [3]	25000			NA	NA	NA	NA	NA	NA	NA	NA
BETA-BHC				7 U	0.08 U	0.85 U	0.08 U	0.08 U	0.81 U	7.7 U	0.077 U
DELTA-BHC				7 U	0.08 U	0.85 U	0.08 U	0.08 U	0.81 U	7.7 U	0.077 U
DIELDRIN [3]	300	270	860	200 J	0.17 U	1.8 U	0.17 U	11	19 J	110 J	0.17 U
ENDOSULFAN I				7 U	0.08 U	0.85 U	0.08 U	0.08 U	0.81 U	7.7 U	0.077 U
ENDOSULFAN II				15 U	2.1 R	1.8 U	0.17 U	5	12 J	17 U	0.17 U
ENDOSULFAN SULFATE				15 U	0.17 U	1.8 U	0.17 U	0.17 U	1.7 U	17 U	0.17 U
ENDRIN				41 R	0.17 U	1.8 U	0.17 U	0.17 U	1.7 U	17 U	0.17 U
ENDRIN ALDEHYDE				200 J	11 J	1.8 U	0.17 U	0.17 U	21 J	17 U	0.17 U
ENDRIN KETONE				15 U	0.17 U	1.8 U	0.17 U	0.17 U	1.7 U	17 U	0.17 U
GAMMA-BHC (LINDANE)				7 U	0.08 U	0.85 U	0.08 U	0.08 U	0.81 U	7.7 U	0.077 U
GAMMA-CHLORDANE [3]	3500	9600	68000	880	1.8 R	9.7 R	2.4 J	33	150 R	400	1.2 R
HEPTACHLOR [3]	1050	930	2900	7 U	3.8 J	0.85 U	0.08 U	3.3	13 J	7.7 U	0.077 U
HEPTACHLOR EPOXIDE				7 U	0.08 U	0.85 U	0.08 U	6.7 J	10 J	7.7 U	0.077 U
METHOXYCHLOR				70 U	0.8 U	8.5 U	0.8 U	0.8 U	8.1 U	77 U	0.77 U
TOXAPHENE				910 U	10 U	110 U	10 U	10 U	110 U	1000 U	10 U
Petroleum Hydrocarbons (mg/kg)											
DIESEL RANGE ORGANICS	1600	80	1000	480	32	23	3 U	3.1 U	620 J	16	2.9 U

(1) The location identifies the type of sample collected (C indicates composite sample) and location (F indicates excavation floor and W indicated excavation wall).

(2) Sample depth indicates the depth from the surface of exposed soils.

(3) These parameters were identified as the Chemicals of Concern. Cleanup goals are provided for these compounds only.

(4) Cleanup goal for comparison to samples taken form excavation sidewalls that represent soil conditions for the existing surface soil (0 to 2 feet bgs).

(5) One or more chemical concentration exceeds PRG presented in IMWP, however no additional excavtion is needed since results are less than IDEM default valuses and location will be coverd with a minimum of 2 feet of soil.

NA Parameter not analyzed for this sample
U Parameter is not detected at the indicated detection limit
J Indicated result is estimated
— Parameter not analyzed for indicated depth
R Data rejected for use in risk development

Indicates that results exceeds one or more of the appropriate cleanup goals (ecological risk or IDEM Defa
Indicates that further excavation is required.

TABLE 1

SWMU 9 VERIFICATION SAMPLING RESULTS
NSWC CRANE, CRANE, IN
(PAGE 4 OF 6)

Location [1]	Cleanup Goals			09SS025C-F	09SS026C-F	09SS027C-F [6]	09SS028C-F [5]	09SS029C-W	09SS030C-W	09SS031C-W	09SS032C-F
Sample Number				09SS025C0006	09SS026C0006	09SS027C0006	09SS028C0006	09SS029C0006	09SS030C0006	09SS031C0006	09SS032C0006
Sample Depth (ft) [2]	IMWP Cleanup Goal (Ecological) [4]	IDEM Default Residential	IDEM Default Industrial	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date				10/10/2008	10/10/2008	10/10/2008	10/10/2008	10/10/2008	10/10/2008	10/10/2008	10/10/2008
Pesticides/PCBs (ug/kg)											
4,4'-DDD [3]	24300	28000	120000	1.3 J	18000 J	530	2200 J	55	12	1.3 J	13
4,4'-DDE [3]	17150	20000	86000	0.95 J	1500	26 J	1800	57	300	48	11
4,4'-DDT [3]	3600	20000	86000	39	93000	5100	11000	96 J	380	46 J	35
ALDRIN				0.078 U	150 J	0.86 U	8.4 U	0.15 U	0.077 U	0.073 U	0.079 U
ALPHA-BHC				0.078 U	8.1 U	0.86 U	8.4 U	0.15 U	0.077 U	0.073 U	0.079 U
ALPHA-CHLORDANE [3]	3500	9600	38000	2.2	290	0.86 U	670	32	1.8 J	0.073 U	4.8
AROCLOR-1016				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1221				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1232				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1242				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1248				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1254				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1260				NA	NA	NA	NA	NA	NA	NA	NA
TOTAL PCBs Surface [3]	1000			NA	NA	NA	NA	NA	NA	NA	NA
TOTAL PCBs Subsurface [3]	25000			NA	NA	NA	NA	NA	NA	NA	NA
BETA-BHC				0.078 U	8.1 U	0.86 U	8.4 U	0.15 U	0.077 U	0.073 U	2.1
DELTA-BHC				0.078 U	8.1 U	0.86 U	8.4 U	0.15 U	0.077 U	0.073 U	0.079 U
DIELDRIN [3]	300	270	860	0.17 U	1100	1.8 U	18 U	0.33 U	4.3	0.16 U	48
ENDOSULFAN I				0.078 U	8.1 U	0.86 U	8.4 U	0.15 U	0.077 U	0.073 U	0.079 U
ENDOSULFAN II				0.17 U	17 U	1.8 U	18 U	3.9 R	0.17 U	0.16 U	0.17 U
ENDOSULFAN SULFATE				0.17 U	17 U	1.8 U	18 U	0.33 U	0.17 U	0.16 U	0.17 U
ENDRIN				0.17 U	17 U	1.8 U	18 U	0.33 U	0.17 U	1 R	0.17 U
ENDRIN ALDEHYDE				0.17 U	17 U	1.8 U	18 U	0.33 U	0.17 U	0.16 U	0.17 U
ENDRIN KETONE				0.17 U	17 U	1.8 U	18 U	0.33 U	0.17 U	0.16 U	0.17 U
GAMMA-BHC (LINDANE)				0.078 U	8.1 U	0.86 U	8.4 U	0.15 U	0.077 U	0.073 U	0.079 U
GAMMA-CHLORDANE [3]	3500	9600	68000	1.6 R	380	0.86 U	790	37	0.9 R	0.073 U	2.6 J
HEPTACHLOR [3]	1050	930	2900	0.078 U	8.1 U	0.86 U	8.4 U	1.5 J	0.077 U	0.073 U	0.079 U
HEPTACHLOR EPOXIDE				0.078 U	8.1 U	0.86 U	8.4 U	0.15 U	0.077 U	0.073 U	1.8
METHOXYCHLOR				0.78 U	81 U	8.6 U	84 U	1.5 U	0.77 U	0.73 U	0.79 U
TOXAPHENE				10 U	1100 U	110 U	1100 U	20 U	10 U	9.5 U	10 U
Petroleum Hydrocarbons (mg/kg)											
DIESEL RANGE ORGANICS	1600	80	1000	2.9 U	210	3.4 U	72	19	4.5 J	47	3 U

(1) The location identifies the type of sample collected (C indicates composite sample) and location (F Indicates excavation floor and W indicated excavation wall).

(2) Sample depth indicates the depth from the surface of exposed soils.

(3) These parameters were identified as the Chemicals of Concern. Cleanup goals are provided for these compounds only.

(4) Cleanup goal for comparison to samples taken form excavation sidewalls that represent soil conditions for the existing surface soil (0 to 2 feet bgs).

(5) One or more chemical concentration exceeds PRG presented in IMWP, however no additional excavtion is needed since results are less than IDEM default valuses and location will be coverd with a minimum of 2 feet of soil.

NA Parameter not analyzed for this sample
U Parameter is not detected at the indicated detection limit
J Indicated result is estimated
— Parameter not analyzed for indicated depth
R Data rejected for use in risk development

Indicates that results exceeds one or more of the appropriate cleanup goals (ecological risk or IDEM Defa
Indicates that further excavation is required.

TABLE 1

SWMU 9 VERIFICATION SAMPLING RESULTS
NSWC CRANE, CRANE, IN
(PAGE 5 OF 6)

Location [1]	Cleanup Goals			09SS033C-F	09SS034C-W	09SS035C-W	09SS036C-F	09SS037C-F	09SS038C-W	09SS039C-W	09SS040C-W
Sample Number				09SS033C0006	09SS034C0006	09SS035C0006	09SS036C0006	09SS037C0006	09SS038C0006	09SS039C0006	09SS040C0006
Sample Depth (ft) [2]	IMWP Cleanup Goal (Ecological) [4]	IDEM Default Residential	IDEM Default Industrial	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date				10/10/2008	10/10/2008	10/10/2008	10/10/2008	10/14/2008	10/14/2008	10/14/2008	10/14/2008
Pesticides/PCBs (ug/kg)											
4,4'-DDD [3]	24300	28000	120000	300	0.16 U	190	15	130	0.92 U	9.5 J	4000
4,4'-DDE [3]	17150	20000	86000	270	3	2000	21	370	6.5 J	62 J	3000
4,4'-DDT [3]	3600	20000	86000	2100	10 J	2600	130	220 J	3.4 R	51 J	3300 J
ALDRIN				0.8 U	0.073 U	0.74 U	0.076 U	0.46 U	0.43 U	0.43 UJ	4.5 U
ALPHA-BHC				14 J	0.073 U	0.74 U	0.076 U	0.46 U	0.43 U	0.43 UJ	4.5 U
ALPHA-CHLORDANE [3]	3500	9600	38000	220	0.073 U	28	3.6	440	4 J	54 J	3500
AROCLOR-1016				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1221				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1232				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1242				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1248				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1254				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1260				NA	NA	NA	NA	NA	NA	NA	NA
TOTAL PCBs Surface [3]	1000			NA	NA	NA	NA	NA	NA	NA	NA
TOTAL PCBs Subsurface [3]	25000			NA	NA	NA	NA	NA	NA	NA	NA
BETA-BHC				0.8 U	0.073 U	0.74 U	0.076 U	0.46 U	0.43 U	0.43 UJ	4.5 U
DELTA-BHC				0.8 U	0.073 U	0.74 U	0.076 U	0.46 U	0.43 U	0.43 UJ	4.5 U
DIELDRIN [3]	300	270	860	1.7 U	0.16 U	89	15	0.98 U	0.92 U	0.93 UJ	9.7 U
ENDOSULFAN I				0.8 U	0.073 U	0.74 U	0.076 U	0.46 U	0.43 U	0.43 UJ	4.5 U
ENDOSULFAN II				1.7 U	0.16 U	1.6 U	0.16 U	0.98 U	0.92 U	0.93 UJ	9.7 U
ENDOSULFAN SULFATE				1.7 U	0.16 U	1.6 U	0.16 U	0.98 U	0.92 U	0.93 UJ	9.7 U
ENDRIN				1.7 U	0.16 U	1.6 U	0.16 U	15 J	0.92 U	4.9 J	140 J
ENDRIN ALDEHYDE				1.7 U	0.16 U	1.6 U	0.16 U	0.98 U	0.92 U	6 J	9.7 U
ENDRIN KETONE				1.7 U	0.16 U	1.6 U	0.16 U	0.98 U	0.92 U	0.93 UJ	9.7 U
GAMMA-BHC (LINDANE)				0.8 U	0.073 U	0.74 U	0.076 U	0.46 U	0.43 U	0.43 UJ	4.5 U
GAMMA-CHLORDANE [3]	3500	9600	68000	230	0.073 U	35 R	1.7 R	440	3.2 J	50 J	3500
HEPTACHLOR [3]	1050	930	2900	20 J	0.073 U	0.74 U	0.076 U	5.9 J	0.43 U	0.43 UJ	4.5 U
HEPTACHLOR EPOXIDE				18	0.073 U	0.74 U	1 R	28	0.43 U	0.43 UJ	82 J
METHOXYCHLOR				8 U	0.73 U	7.4 U	0.76 U	4.6 UJ	4.3 U	4.3 UJ	45 U
TOXAPHENE				100 U	9.5 U	97 U	9.9 U	60 U	56 U	56 UJ	590 U
Petroleum Hydrocarbons (mg/kg)											
DIESEL RANGE ORGANICS	1600	80	1000	210	2.8 U	10	2.9 U	140	19 J	190	830

(1) The location identifies the type of sample collected (C indicates composite sample) and location (F indicates excavation floor and W indicated excavation wall).

(2) Sample depth indicates the depth from the surface of exposed soils.

(3) These parameters were identified as the Chemicals of Concern. Cleanup goals are provided for these compounds only.

(4) Cleanup goal for comparison to samples taken form excavation sidewalls that represent soil conditions for the existing surface soil (0 to 2 feet bgs).

(5) One or more chemical concentration exceeds PRG presented in IMWP, however no additional excavtion is needed since results are less than IDEM default valuses and location will be coverd with a minimum of 2 feet of soil.

NA Parameter not analyzed for this sample
U Parameter is not detected at the indicated detection limit
J Indicated result is estimated
— Parameter not analyzed for indicated depth
R Data rejected for use in risk development

Indicates that results exceeds one or more of the appropriate cleanup goals (ecological risk or IDEM Defa
Indicates that further excavation is required.

TABLE 1

SWMU 9 VERIFICATION SAMPLING RESULTS
NSWC CRANE, CRANE, IN
(PAGE 6 OF 6)

Location [1] Sample Number Sample Depth (ft) [2] Sample Date	Cleanup Goals			09SS041C-W 09SS041C0006 0 - 0.5 10/14/2008	09SS043C-W 09SS043C0006 0 - 0.5 10/14/2008	09SS044C-W 09SS044C0006 0 - 0.5 10/14/2008	09SS045C-W 09SS045C0006 0 - 0.5 10/14/2008	09SS046C-W 09SS046C0006 0 - 0.5 10/14/2008	09SS047C-F 09SS047C0006 0 - 0.5 10/14/2008
	IMWP Cleanup Goal (Ecological) [4]	IDEM Default Residential	IDEM Default Industrial						
Pesticides/PCBs (ug/kg)									
4,4'-DDD [3]	24300	28000	120000	1.8 U	NA	NA	NA	NA	NA
4,4'-DDE [3]	17150	20000	86000	1.8 U	NA	NA	NA	NA	NA
4,4'-DDT [3]	3600	20000	86000	260 J	NA	NA	NA	NA	NA
ALDRIN				0.84 U	NA	NA	NA	NA	NA
ALPHA-BHC				0.84 U	NA	NA	NA	NA	NA
ALPHA-CHLORDANE [3]	3500	9600	38000	0.84 U	NA	NA	NA	NA	NA
AROCLOR-1016				NA	NA	NA	NA	NA	NA
AROCLOR-1221				NA	NA	NA	NA	NA	NA
AROCLOR-1232				NA	NA	NA	NA	NA	NA
AROCLOR-1242				NA	NA	NA	NA	NA	NA
AROCLOR-1248				NA	NA	NA	NA	NA	NA
AROCLOR-1254				NA	NA	NA	NA	NA	NA
AROCLOR-1260				NA	NA	NA	NA	NA	NA
TOTAL PCBs Surface [3]	1000			NA	NA	NA	NA	NA	NA
TOTAL PCBs Subsurface [3]	25000			NA	NA	NA	NA	NA	NA
BETA-BHC				0.84 U	NA	NA	NA	NA	NA
DELTA-BHC				0.84 UJ	NA	NA	NA	NA	NA
DIELDRIN [3]	300	270	860	1.8 U	NA	NA	NA	NA	NA
ENDOSULFAN I				0.84 U	NA	NA	NA	NA	NA
ENDOSULFAN II				53 R	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE				1.8 U	NA	NA	NA	NA	NA
ENDRIN				1.8 U	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE				190 J	NA	NA	NA	NA	NA
ENDRIN KETONE				1.8 U	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)				0.84 U	NA	NA	NA	NA	NA
GAMMA-CHLORDANE [3]	3500	9600	68000	26 J	NA	NA	NA	NA	NA
HEPTACHLOR [3]	1050	930	2900	26 J	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE				0.84 U	NA	NA	NA	NA	NA
METHOXYCHLOR				8.4 UJ	NA	NA	NA	NA	NA
TOXAPHENE				110 U	NA	NA	NA	NA	NA
Petroleum Hydrocarbons (mg/kg)									
DIESEL RANGE ORGANICS	1600	80	1000	840	22 J	34	11 J	46	8.6 U

(1) The location identifies the type of sample collected (C indicates composite sample) and location (F indicates excavation floor and W indicated excavation wall).

(2) Sample depth indicates the depth from the surface of exposed soils.

(3) These parameters were identified as the Chemicals of Concern. Cleanup goals are provided for these compounds only.

(4) Cleanup goal for comparison to samples taken form excavation sidewalls that represent soil conditions for the existing surface soil (0 to 2 feet bgs).

(5) One or more chemical concentration exceeds PRG presented in IMWP, however no additional excavtion is needed since results are less than IDEM default valuses and location will be coverd with a minimum of 2 feet of soil.

NA Parameter not analyzed for this sample
U Parameter is not detected at the indicated detection limit
J Indicated result is estimated
--- Parameter not analyzed for indicated depth
R Data rejected for use in risk development

Indicates that results exceeds one or more of the appropriate cleanup goals (ecological risk or IDEM Defa
Indicates that further excavation is required.

TABLE 2

SUMMARY OF SWMU 9 PRE-EXCAVATION SAMPLING
NSWC CRANE, CRANE, IN
(PAGE 1 OF 2)

Sample Location			Sample Depth (ft bgs)	Sample Group	Analysis		
Identification	Northing	Easting			Pesticides	DRO	PCBs
09SB140	1311459.59	3025255.70	0.5 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB141	1311444.64	3025251.81	0.5 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB142	1311430.19	3025247.56	0.5 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB143	1311415.00	3025243.79	0.5 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB144	1311351.83	3025248.88	0 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB145	1311352.44	3025209.31	0 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB146	1311359.05	3025194.48	0 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB147	1311462.26	3025222.53	0 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB148	1311461.29	3025237.96	0 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB149	1311177.30	3025111.51	0 - 2	1			X
			2 - 4				X
			4 - 6				X
09SB150	1311087.96	3025094.43	0 - 2	1			X
			2 - 4				X
			4 - 6				X
09SB151	1311109.48	3025084.84	0 - 2	1			X
			2 - 4				X
			4 - 6				X
09SB152	1311136.14	3025089.75	0 - 2	1			X
			2 - 4				X
			4 - 6				X
09SB153	1311456.67	3025270.76	0.5 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB154	1311442.46	3025266.39	0.5 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB155	1311427.51	3025262.26	0.5 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB156	1311411.96	3025258.01	0.5 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	

TABLE 2

SUMMARY OF SWMU 9 PRE-EXCAVATION SAMPLING
NSWC CRANE, CRANE, IN
(PAGE 2 OF 2)

Sample Location			Sample Depth (ft bgs)	Sample Group	Analysis		
Identification	Northing	Easting			Pesticides	DRO	PCBs
09SB157	1311343.98	3025257.09	0 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB158	1311341.17	3025206.41	0 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB159	1311347.17	3025188.97	0 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB160	1311474.77	3025227.39	0 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB161	1311473.07	3025241.85	0 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB162	1311454.24	3025285.71	0.5 - 2	3	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB163	1311438.69	3025280.97	0.5 - 2	3	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB164	1311424.23	3025277.44	0.5 - 2	3	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB165	1311409.17	3025273.43	0.5 - 2	3	X	X	
			2 - 4		X	X	
			4 - 6		X	X	

X Indicates samples were collected for analysis and analyzed.

X Indicated samples were collected for analysis and not analyzed due to results from previous groups of samples.

TABLE 3

SUMMARY OF PRE-EXCAVATION SAMPLE RESULTS
SWMU 9
NSWC CRANE, CRANE, IN
(PAGE 1 OF 2)

Sample Location	Sample Number	Sample Depth (ft bgs)	DDD (ppb)	DDE (ppb)	DDT (ppb)	Dieldrin (ppb)	Heptachlor (ppb)	Alpha-chlordane (ppb)	Gamma-chlordane (ppb)	DRO (ppm)	PCBs (ppm)
		Parameter	DDD (ppb)	DDE (ppb)	DDT (ppb)	Dieldrin (ppb)	Heptachlor (ppb)	Alpha-chlordane (ppb)	Gamma-chlordane (ppb)	DRO (ppm)	PCBs (ppm)
		PRG	24,300	17,150	3,600	300	1,050	3,500	3,500	1,600	1 or 25 [1]
09SB140	09SB1400002	0.5 2	180DJ	930D	2600D	710U	370U	370U	49DJ	29	NA
	09SB1400204	2 - 4	3.9U	0.74J	1.1J	3.9U	2.0U	2.0U	2.0U	7.1J	NA
	09SB1400406	4 - 6	4.1U	4.1U	4.1U	4.1U	2.1U	2.1U	2.1U	11J	NA
09SB141	09SB1410002	0.5 2	3.8U	3.5J	14	3.8U	1.9U	1.9U	1.4JP	14	NA
	09SB1410204	2 - 4	20U	11J	47	20U	10U	10U	7.2JP	11J	NA
	09SB1410406	4 - 6	4.2U	4.2U	3.2J	4.2U	1.2J	2.2U	2.2U	11J	NA
09SB142	09SB1420002	0.5 2	4200DJP	7700D	55000D	7700U	4000U	3100DJP	2100U	390	NA
	09SB1420204	2 - 4	180000U	25000DJ	350000D	180000U	93000U	93000U	12000DJ	410	NA
	09SB1420406	4 - 6	83DJ	190DJ	1200D	350U	180U	82DJP	74DJ	18	NA
09SB143	09SB1430002	0.5 2	7900DJP	9400DJ	85000D	18000U	9300U	9300U	9300U	100	NA
	09SB1430204	2 - 4	3.9U	4.9	25	3.9U	2.0U	2.0U	2.0U	13	NA
	09SB1430406	4 - 6	4.1U	4.1U	2.7J	4.1U	2.1U	2.1U	2.1U	11J	NA
09SB144	09SB1440002	0 - 2	6.0J	46	98	18U	9.0U	5.2J	6.9J	6.7J	NA
	09SB1440204	2 - 4	4.0U	4.0U	4.0U	4.0U	2.0U	2.0U	2.0U	11J	NA
	09SB1440406	4 - 6	4.2U	4.2U	4.0J	4.2U	0.39J	0.40JP	0.45J	6.0J	NA
09SB145	09SB1450002	0 - 2	330DJ	970DJ	3400D	240DJ	1000U	1500DP	900DJ	19	NA
	09SB1450204	2 - 4	2.6J	3.1J	17	4.0J	2.1U	8.2P	3.1	9.3J	NA
	09SB1450406	4 - 6	3.9U	1.1J	10	3.9U	2.0U	1.8JP	0.97J	12	NA
09SB146	09SB1460002	0 - 2	220	450	320	39J	40U	220	96	4.7J	NA
	09SB1460204	2 - 4	3.9U	3.9U	3.9U	3.9U	2.0U	0.53JP	2.0U	5.5J	NA
	09SB1460406	4 - 6	0.81J	0.68J	7.7	4.1U	2.1U	0.91JP	0.68JP	9.0J	NA
09SB147	09SB1470002	0 - 2	310DJ	1400DJ	2800D	2000U	1000U	2200DP	1500D	37	NA
	09SB1470204	2 - 4	40U	40U	15J	40U	20U	32P	26	25	NA
	09SB1470406	4 - 6	4.2U	4.2U	4.2U	4.2U	2.2U	2.2U	2.2U	14	NA
09SB148	09SB1480002	0 - 2	130DJ	1300D	3400D	730U	370U	590DP	440D	50	NA
	09SB1480204	2 - 4	190U	210	750	190U	180	33J	130P	59	NA
	09SB1480406	4 - 6	3.9U	0.87J	3.7JP	3.9U	2.0U	0.36JP	0.69JP	29	NA
09SB149	09SB1490002	0 - 2	NA	NA	NA	NA	NA	NA	NA	NA	3.3
	09SB1490204	2 - 4	NA	NA	NA	NA	NA	NA	NA	NA	ND
	09SB1490406	4 - 6	NA	NA	NA	NA	NA	NA	NA	NA	ND
09SB150	09SB1500002	0 - 2	NA	NA	NA	NA	NA	NA	NA	NA	ND
	09SB1500204	2 - 4	NA	NA	NA	NA	NA	NA	NA	NA	ND
	09SB1500406	4 - 6	NA	NA	NA	NA	NA	NA	NA	NA	ND
09SB151	09SB1510002	0 - 2	NA	NA	NA	NA	NA	NA	NA	NA	ND
	09SB1510204	2 - 4	NA	NA	NA	NA	NA	NA	NA	NA	ND
	09SB1510406	4 - 6	NA	NA	NA	NA	NA	NA	NA	NA	ND
09SB152	09SB1520002	0 - 2	NA	NA	NA	NA	NA	NA	NA	NA	ND
	09SB1520204	2 - 4	NA	NA	NA	NA	NA	NA	NA	NA	ND
	09SB1520406	4 - 6	NA	NA	NA	NA	NA	NA	NA	NA	ND

TABLE 3

SUMMARY OF PRE-EXCAVATION SAMPLE RESULTS
SWMU 9
NSWC CRANE, CRANE, IN
(PAGE 2 OF 2)

Sample Location	Sample Number	Sample Depth (ft bgs)	DDD (ppb)	DDE (ppb)	DDT (ppb)	Dieldrin (ppb)	Heptachlor (ppb)	Alpha-chlordane (ppb)	Gamma-chlordane (ppb)	DRO (ppm)	PCBs (ppm)
		PRG	24,300	17,150	3,600	300	1,050	3,500	3,500	1,600	1 or 25 [1]
09SB153	09SB1530002	0.5 2	0.66J	4.8	15	3.8U	1.5J	3.5	3.6	NA	NA
	09SB1530204	2 - 4	4.0U	1.1J	4.0U	4.0U	1.1JP	0.24J	2.0U	NA	NA
	09SB1530406	4 - 6	4.1U	4.1U	4.1U	4.1U	2.1U	2.1U	2.1U	NA	NA
09SB154	09SB1540002	0.5 2	3.7U	2.6JP	9.8	3.7U	0.75JP	1.9U	1.6JP	NA	NA
	09SB1540204	2 - 4	4.0U	4.0U	2.4J	4.0U	2.0U	0.93JP	2.0U	NA	NA
	09SB1540406	4 - 6	4.0U	0.89JP	2.7J	4.0U	2.1U	1.2JP	2.1U	NA	NA
09SB155	09SB1550002	0.5 2	32J	250	310	73U	38U	38U	38U	NA	NA
	09SB1550204	2 - 4	4.0U	3.2J	3.4J	4.0U	2.1U	2.1U	2.1U	NA	NA
	09SB1550406	4 - 6	4.1U	4.1U	4.1U	4.1U	2.1U	2.1U	2.1U	NA	NA
09SB156	09SB1560002	0.5 2	0.75J	24	27	3.4U	0.82J	1.4JP	3.9	NA	NA
	09SB1560204	2 - 4	3.9U	1.7J	5.5	3.9U	2.0U	2.0U	1.0JP	NA	NA
	09SB1560406	4 - 6	4.1U	4.1U	2.3J	4.1U	2.1U	2.1U	0.67JP	NA	NA
09SB157	09SB1570002	0 - 2	73J	190	750	170U	89U	46J	47J	NA	NA
	09SB1570204	2 - 4	3.9U	3.9U	1.7J	3.9U	2.0U	2.0U	2.0U	NA	NA
	09SB1570406	4 - 6	4.1U	4.1U	4.1U	4.1U	2.1U	2.1U	2.1U	NA	NA
09SB158	09SB1580002	0 - 2	0.53J	3.8J	3.2J	4.1U	2.4P	2.1U	2.1U	NA	NA
	09SB1580204	2 - 4	4.1U	4.1U	4.1U	4.1U	0.43J	2.1U	2.1U	NA	NA
	09SB1580406	4 - 6	3.8U	1.2J	3.8U	3.8U	2.0U	2.0U	2.0U	NA	NA
09SB159	09SB1590002	0 - 2	1400D	540D	1000D	410U	210U	34DJ	36DJP	NA	NA
	09SB1590204	2 - 4	17DJ	52D	6.3DJ	20U	10U	2.0DJ	1.8DJ	NA	NA
	09SB1590406	4 - 6	0.61J	0.49J	3.8U	3.8U	0.6JP	0.29JP	2.0U	NA	NA
09SB160	09SB1600002	0 - 2	2.2J	29	46	20U	10U	7.1J	9.3J	NA	NA
	09SB1600204	2 - 4	3.8U	2.1J	1.9JP	3.8U	0.46J	0.8JP	0.56J	NA	NA
	09SB1600406	4 - 6	3.8U	3.8U	3.8U	3.8U	2.0U	2.0U	2.0U	NA	NA
09SB161	09SB1610002	0 - 2	9.5	78E	240E	2.3J	3.1	13P	18EP	NA	NA
	09SB1610204	2 - 4	3.8U	1.1J	2.1J	3.8U	2.0U	2.0U	2.0U	NA	NA
	09SB1610406	4 - 6	3.9U	3.9U	3.9U	3.9U	2.0U	2.0U	2.0U	NA	NA

Result exceeds the PRG
Result reported as non-detect. However, the detection limit exceeds the PRG.

Notes

1	PCB PRGs are for surface soil (1 ppm) and for subsurface soil (25 ppm).
E	Parameter is detected at concentrations greater than the equipment detection range - samples requires dilution.
U	Parameter was not detected at the reported detection limit.
P	Difference between the primary and secondary column exceeded the laboratory quality control limit.
D	Results reported is the result of a diluted sample.
J	Result is estimated below the detection limit.
NA	Parameter not analyzed for this sample.
ND	None of the aroclors were detected in these samples; therefore, total PCBs were non-detect.

TABLE 4

SWMU 9 LAND DISPOSAL RESTRICTION EVALUATION
NSWC CRANE, CRANE, IN

Location Sample Number Sample Depth (ft) Sample Date	IDEM Default Industrial	Universal Treatment Standards	10 Times Universal Treatment Standards	09SS006C-W 09SS006C0006 0 - 0.5 10/2/2008	09SS008C-W 09SS008C0006 0 - 0.5 10/2/2008	09SS015C-W 09SS015C0006 0 - 0.5 10/9/2008	09SS016C-W 09SS016C0006 0 - 0.5 10/9/2008	09SS017C-W 09SS017C0006 0 - 0.5 10/9/2008	09SS026C-F 09SS026C0006 0 - 0.5 10/10/2008
Pesticides/PCBs (ug/kg)									
4,4'-DDD (1)	120,000	87	870	1200	580 J	7300	720	390	18000 J
4,4'-DDE (1)	86,000	87	870	4800	2100	8400	6400	1800	1500
4,4'-DDT (1)	86,000	87	870	17000	3200	4100000	14000	5700	93000
ALDRIN	800	66	660	6.6 U	7.5 U	78 U	7.7 U	7 U	150 J
ALPHA-BHC	4,000	66	660	6.6 U	7.5 U	78 U	7.7 U	7 U	8.1 U
ALPHA-CHLORDANE (1)	38,000	260	2600	390	7500	4400	500	910	290
BETA-BHC	12,000	66	660	6.6 U	7.5 U	78 U	7.7 U	7 U	8.1 U
DELTA-BHC	3,400	66	660	6.6 UJ	7.5 UJ	78 U	7.7 U	7 U	8.1 U
DIELDRIN (1)	860	130	1300	14 U	16 U	170 U	170 J	200 J	1100
ENDOSULFAN I	2,500,000	66	660	6.6 U	7.5 U	78 U	7.7 U	7 U	8.1 U
ENDOSULFAN II	2,900,000	130	1300	14 U	16 U	170 U	17 U	15 U	17 U
ENDOSULFAN SULFATE	NC	130	1300	14 U	16 U	170 U	17 U	15 U	17 U
ENDRIN	150,000	130	1300	14 U	450 J	170 U	17 U	41 R	17 U
ENDRIN ALDEHYDE	150,000	130	1300	14 U	16 U	170 U	17 U	200 J	17 U
ENDRIN KETONE	140,000	NA	NA	14 U	16 U	170 U	17 U	15 U	17 U
GAMMA-BHC (LINDANE)	19,000	66	660	6.6 U	7.5 U	320 J	7.7 U	7 U	8.1 U
GAMMA-CHLORDANE (1)	68,000	260	2600	550 J	7400	5000	620	880	380
HEPTACHLOR (1)	2,900	66	660	6.6 U	340	380 J	7.7 U	7 U	8.1 U
HEPTACHLOR EPOXIDE	1,500	66	660	6.6 U	1100	78 U	7.7 U	7 U	8.1 U
METHOXYCHLOR	2,500,000	180	1800	66 UJ	75 UJ	780 U	77 U	70 U	81 U
TOXAPHENE	12,000	2,600	26000	870 U	980 U	10000 U	1000 U	910 U	1100 U

(1) Parameter is a chemical of concern for SWMU 9

Sample Result reported as a detection and exceeds both the IDEM Industrial Default Criteria and the 10 Times Universal Treatment Standards.

TABLE 4

SWMU 9 LAND DISPOSAL RESTRICTION EVALUATION
NSWC CRANE, CRANE, IN

Location Sample Number Sample Depth (ft) Sample Date	IDEM Default Industrial	Universal Treatment Standards	10 Times Universal Treatment Standards	09SB142 09SB1420002 0 - 2 7/9/2009	09SB142 09SB1420204 2 - 4 7/9/2009	09SB143 09SB1430002 0 - 2 7/9/2009
Pesticides/PCBs (ug/kg)						
4,4'-DDD (1)	120,000	87	870	4200 DJP	180000 U	7900 DJP
4,4'-DDE (1)	86,000	87	870	7700 D	25000 DJ	94000 DJ
4,4'-DDT (1)	86,000	87	870	55000 D	350000 D	85000 D
ALDRIN	800	66	660	4000 U	93000 U	9300 U
ALPHA-BHC	4,000	66	660	4000 U	93000 U	9300 U
ALPHA-CHLORDANE (1)	38,000	260	2600	3100 DJP	93000 U	9300 U
BETA-BHC	12,000	66	660	2000 U	47000 U	4700 U
DELTA-BHC	3,400	66	660	4000 U	93000 U	9300 U
DIELDRIN (1)	860	130	1300	7700 U	180000 U	18000 U
ENDOSULFAN I	2,500,000	66	660	4000 U	93000 U	9300 U
ENDOSULFAN II	2,900,000	130	1300	7700 U	180000 U	18000 U
ENDOSULFAN SULFATE	NC	130	1300	7700 U	180000 U	18000 U
ENDRIN	150,000	130	1300	7700 U	180000 U	18000 U
ENDRIN ALDEHYDE	150,000	130	1300	7700 U	180000 U	18000 U
ENDRIN KETONE	140,000	NA	NA	7700 U	180000 U	18000 U
GAMMA-BHC (LINDANE)	19,000	66	660	4000 U	93000 U	9300 U
GAMMA-CHLORDANE (1)	68,000	260	2600	2100 U	12000 DJ	9300 U
HEPTACHLOR (1)	2,900	66	660	4000 U	93000 U	9300 U
HEPTACHLOR EPOXIDE	1,500	66	660	4000 U	93000 U	9300 U
METHOXYCHLOR	2,500,000	180	1800	40000 U	930000 U	93000 U
TOXAPHENE	12,000	2,600	26000	230000 U	5500000 U	550000 U

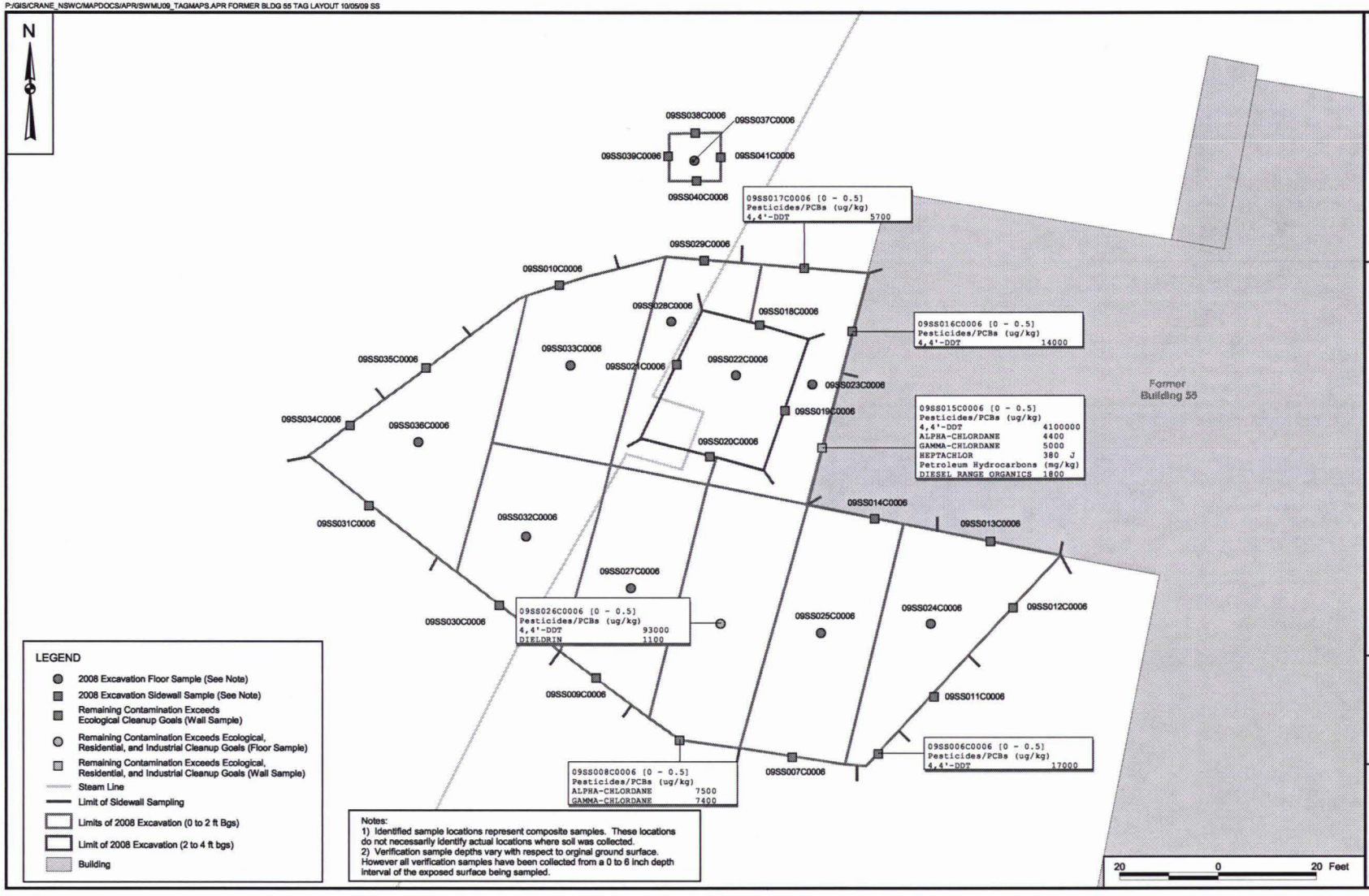
(1) Parameter is a chemical of concern for SWMU 9

Sample Result reported as a detection and exceeds both the IDEM Industrial Default Criteria and the 10 Times Universal Treatment Standards.

FIGURES

- Figure 1 - 2008 Verification Sample Results Exceeding Cleanup Goals For Former Building 55 Area Excavation
- Figure 2 - 2008 Verification Sample Results Exceeding Cleanup Goals For Former Fire Fighting Training Area
- Figure 3 - 2008 Verification Sample Results Exceeding Cleanup Goals For Building 150 Area Excavation
- Figure 4 - Pre-Excavation Sample Locations For Former Building 55 Area
- Figure 5 - Pre-Excavation Sample Locations For Former Fire Fighting Training Area
- Figure 6a - Proposed Excavation For Former Building 55 Area
- Figure 6b – Soil Disposition Map for Former Building 55 Area
- Figure 7a - Proposed Excavation For Former Fire Fighting Training Area
- Figure 7b – Soil Disposition Map for Former Fire Fighting Training Area
- Proposed Verification Sampling Locations for Former Building 55 Area
- Proposed Verification Sampling Locations for Former Fire Fighting Training Area

P:/GIS/CRANE_NSWC/MAPDOCS/APR/SWMU09_TAGMAPS.APR FORMER BLDG 55 TAG LAYOUT 10/05/09 SS



LEGEND

- 2008 Excavation Floor Sample (See Note)
- 2008 Excavation Sidewall Sample (See Note)
- Remaining Contamination Exceeds Ecological Cleanup Goals (Wall Sample)
- Remaining Contamination Exceeds Ecological, Residential, and Industrial Cleanup Goals (Floor Sample)
- Remaining Contamination Exceeds Ecological, Residential, and Industrial Cleanup Goals (Wall Sample)
- Steam Line
- Limit of Sidewall Sampling
- Limits of 2008 Excavation (0 to 2 ft Bgs)
- Limit of 2008 Excavation (2 to 4 ft bgs)
- Building

Notes:
1) Identified sample locations represent composite samples. These locations do not necessarily identify actual locations where soil was collected.
2) Verification sample depths vary with respect to orginal ground surface. However all verification samples have been collected from a 0 to 6 inch depth interval of the exposed surface being sampled.

CONTRACT NO. CTO F271

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

DRAWING NO. FIGURE 1

REV 0

2008 VERIFICATION SAMPLE RESULTS EXCEEDING CLEANUP GOALS FOR FORMER BUILDING 55 AREA EXCAVATION
SWMU 9
NSWC CRANE
CRANE, INDIANA

NAVFAC

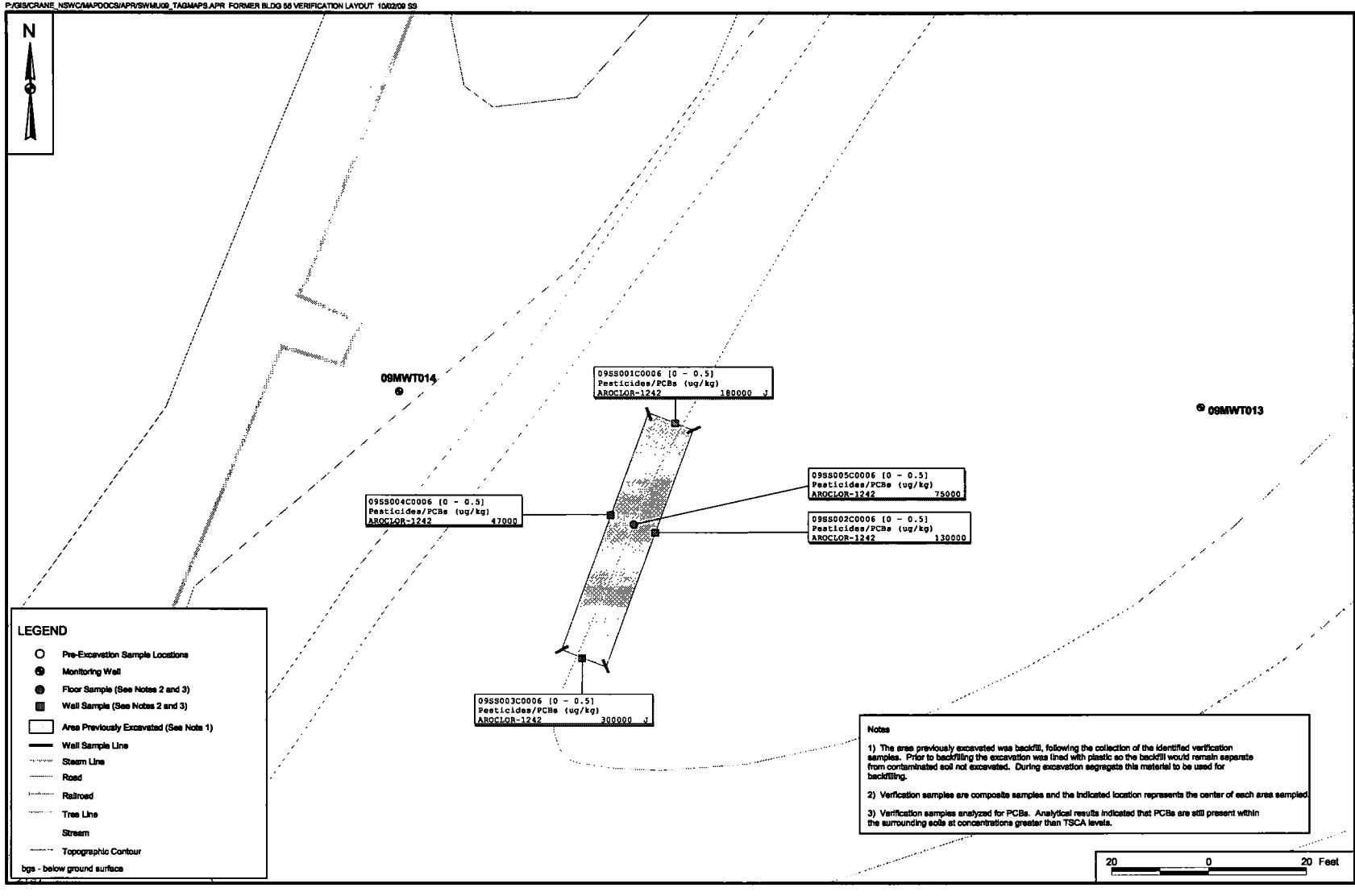
DRAWN BY S. STROZ DATE 03/25/09

CHECKED BY T. SMITH DATE 10/05/09

COST/SCHED-AREA

SCALE AS NOTED

P:/GIS/CRANE_NSWC/MAPDOCS/APR/SWMU09_TAG/MAPS.APR FORMER BLDG 55 VERIFICATION LAYOUT 10/02/09 SS



Notes

1) The area previously excavated was backfill, following the collection of the identified verification samples. Prior to backfilling the excavation was lined with plastic so the backfill would remain separate from contaminated soil not excavated. During excavation segregate this material to be used for backfilling.

2) Verification samples are composite samples and the indicated location represents the center of each area sampled

3) Verification samples analyzed for PCBs. Analytical results indicated that PCBs are still present within the surrounding soils at concentrations greater than TSCA levels.

CONTRACT NO. CTO F271

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

DRAWING NO. FIGURE 2

REV 0

2008 VERIFICATION SAMPLING RESULTS EXCEEDING CLEANUP GOALS FOR FORMER FIRE FIGHTING TRAINING AREA
SWMU 9
NSWC CRANE
CRANE, INDIANA

NAVFAC

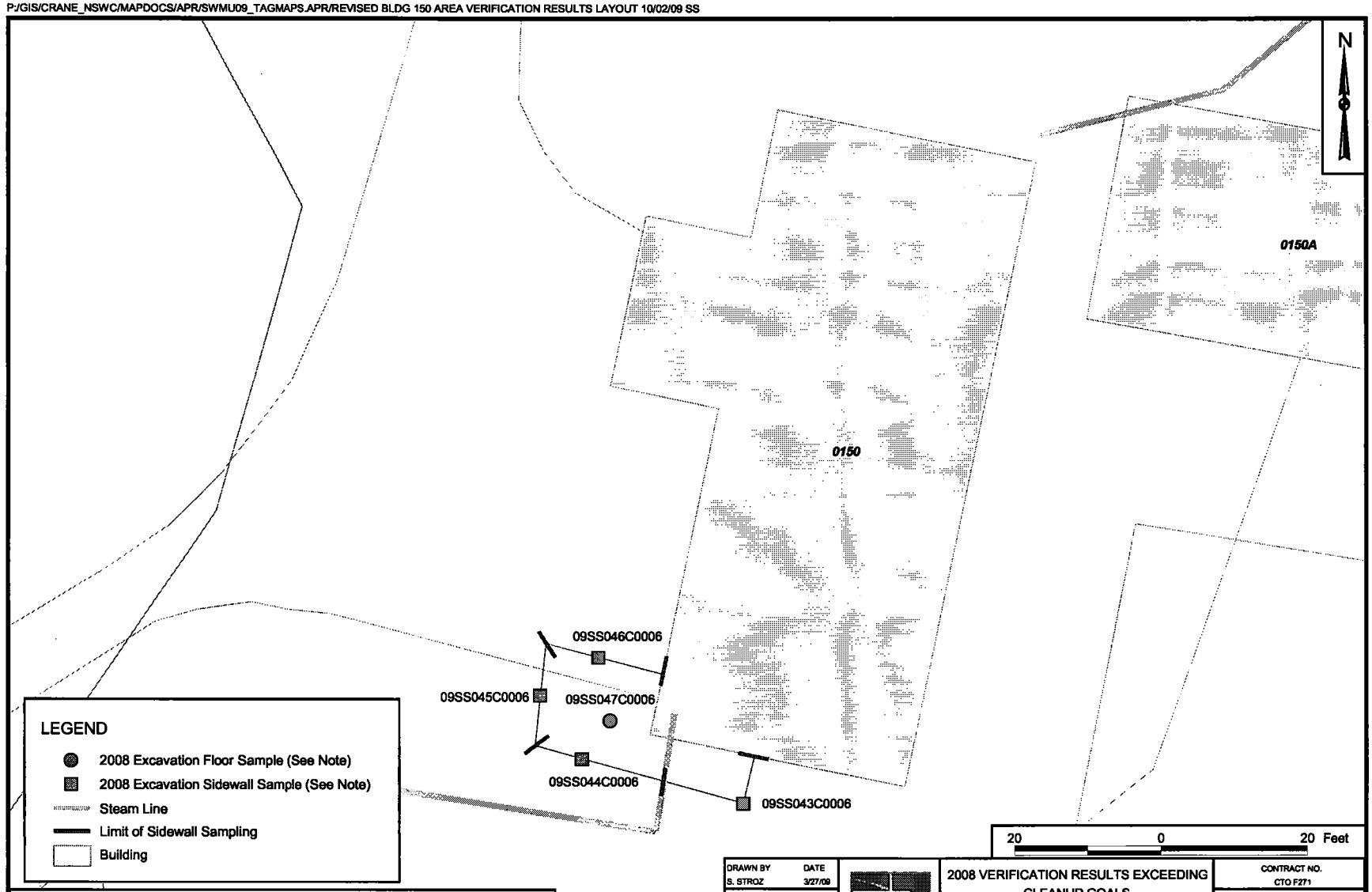
DRAWN BY S. STROZ DATE 02/23/09

CHECKED BY T. SMITH DATE 10/02/09

COST/SCHED-AREA

SCALE AS NOTED

P:/GIS/CRANE_NSWC/MAPDOCS/APR/SWMU09_TAGMAPS.APR/REVISED BLDG 150 AREA VERIFICATION RESULTS LAYOUT 10/02/09 SS



Note:
1) Identified sample locations represent composite samples. These locations do not necessarily identify actual locations where soil was collected.
2) All verification sample results were below cleanup goals.

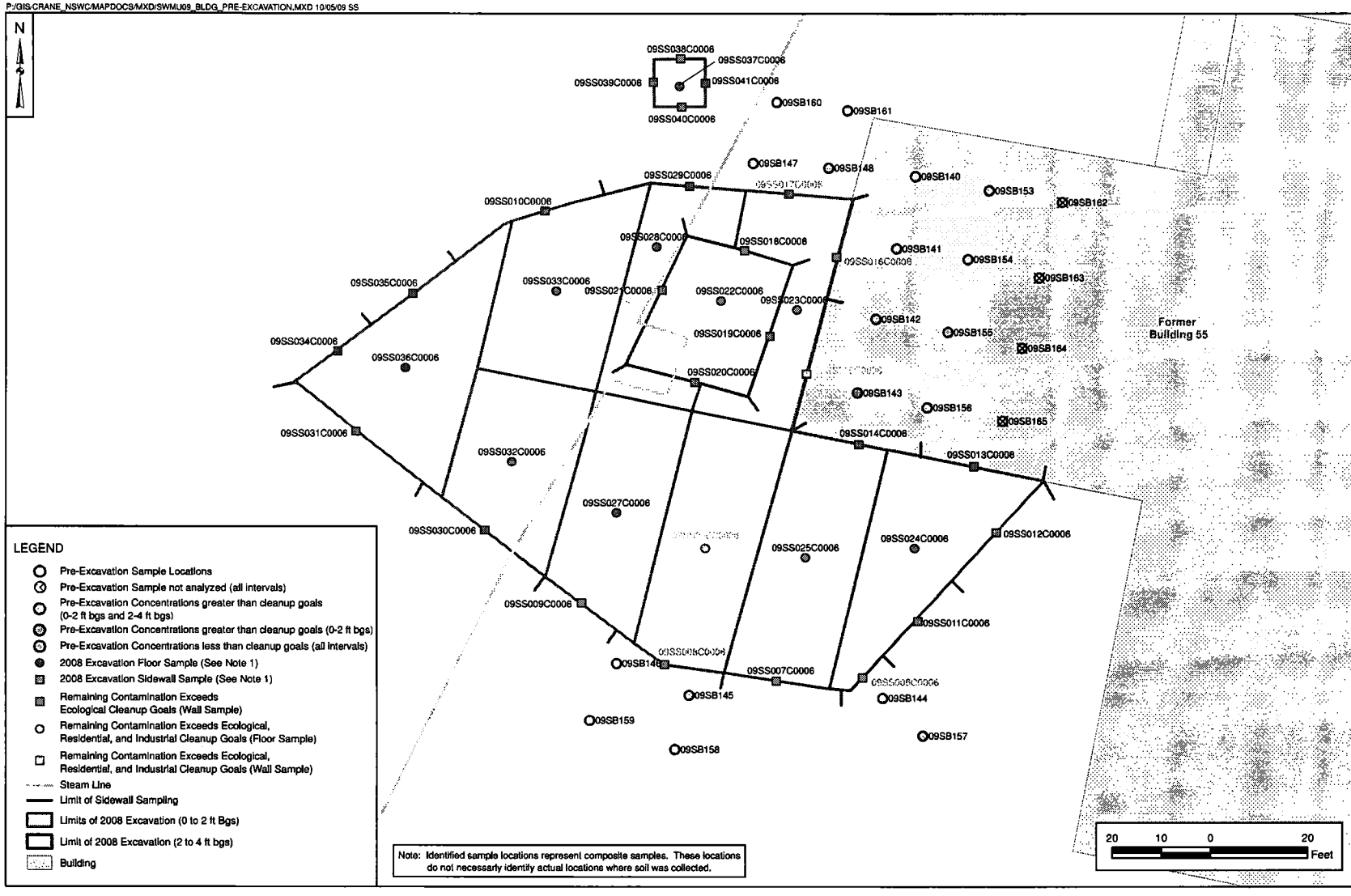
DRAWN BY	DATE
S. STROZ	3/27/09
CHECKED BY	DATE
T. SMITH	10/02/09
COST/SCHED-AREA	
SCALE	AS NOTED

NAVFAC

2008 VERIFICATION RESULTS EXCEEDING CLEANUP GOALS FOR BUILDING 150 AREA EXCAVATION
SWMU 9
NSWC CRANE
CRANE, INDIANA

CONTRACT NO.	
CTO FZ71	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 3	REV. 0

P:/GIS/CRANE_NSWC/MAPDOCS/MXD/SWMU09_BLDG_PRE-EXCAVATION.MXD 10/05/09 SS



CONTRACT NO. CTO F271

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

FIGURE NO. FIGURE 4

REV 0

PRE-EXCAVATION SAMPLE LOCATIONS FOR FORMER BUILDING 55 AREA
SWMU 9
NSWC CRANE
CRANE, INDIANA

NAVFAC

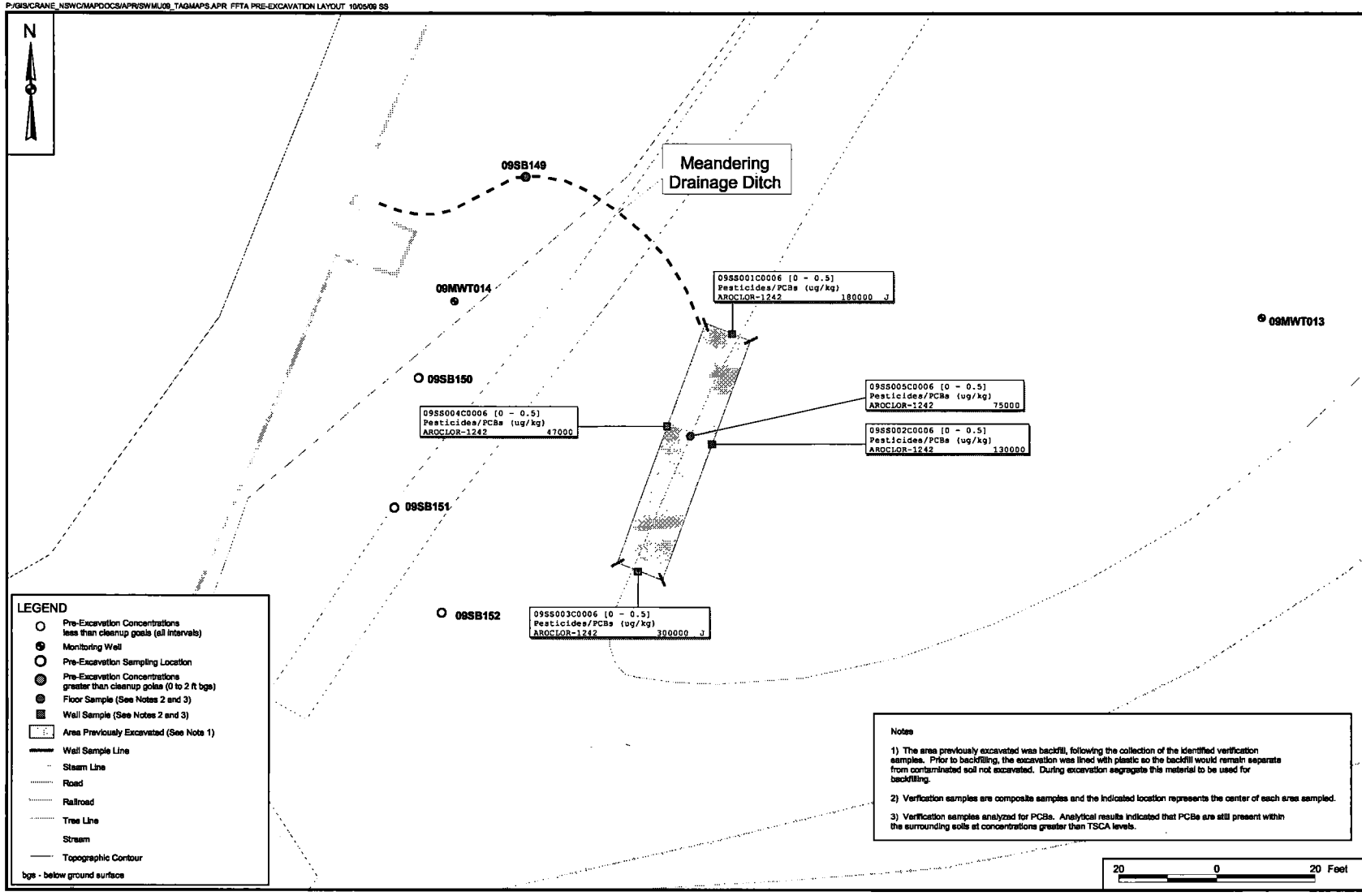
DRAWN BY K. MOORE DATE 8/12/09

CHECKED BY T. SMITH DATE 10/05/09

COST/SCHED-AREA

SCALE AS NOTED

P:/GIS/CRANE_NSWC/MAPDOCS/APR/SWMU09_TAGMAPS.APR FFTA PRE-EXCAVATION LAYOUT 10/05/09 SS



Notes

1) The area previously excavated was backfill, following the collection of the identified verification samples. Prior to backfilling, the excavation was lined with plastic so the backfill would remain separate from contaminated soil not excavated. During excavation segregate this material to be used for backfilling.

2) Verification samples are composite samples and the indicated location represents the center of each area sampled.

3) Verification samples analyzed for PCBs. Analytical results indicated that PCBs are still present within the surrounding soils at concentrations greater than TSCA levels.

CONTRACT NO. CTO F271

APPROVED BY DATE

APPROVED BY DATE

DRAWING NO. FIGURE 5

REV 0

PRE-EXCAVATION SAMPLE LOCATIONS AND RESULTS FOR FORMER FIRE FIGHTING TRAINING AREA
SWMU 9
NSWC CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY S. STROZ DATE 03/23/09

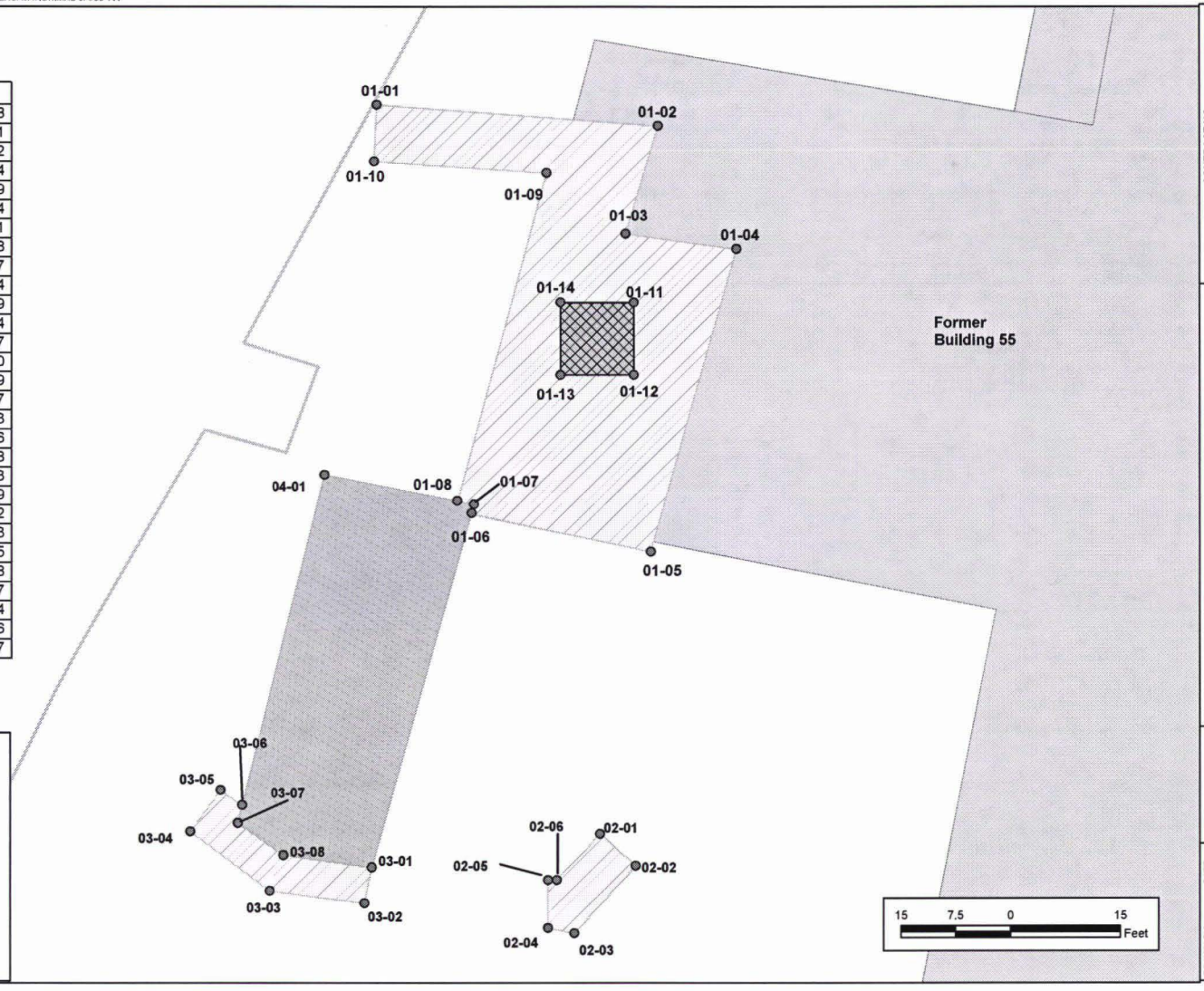
CHECKED BY T. SMITH DATE 10/05/09

COST/SCHED-AREA

SCALE AS NOTED

P:/GIS/CRANE_NSWC/MAPDOCS/MXD/SWMU09_BLDG55_PROPOSED_EXCAVATION.MXD 9/4/09 TW

Node	Northing	Easting
01-01	1,311,462.61	3,025,217.38
01-02	1,311,459.49	3,025,255.51
01-03	1,311,445.11	3,025,250.92
01-04	1,311,442.61	3,025,266.34
01-05	1,311,401.15	3,025,255.09
01-06	1,311,405.83	3,025,230.14
01-07	1,311,407.54	3,025,230.51
01-08	1,311,407.79	3,025,228.18
01-09	1,311,453.25	3,025,240.07
01-10	1,311,454.47	3,025,216.64
01-11	1,311,435.23	3,025,252.69
01-12	1,311,425.31	3,025,252.44
01-13	1,311,425.19	3,025,242.27
01-14	1,311,435.23	3,025,242.40
02-01	1,311,361.59	3,025,247.79
02-02	1,311,357.43	3,025,252.57
02-03	1,311,348.11	3,025,244.23
02-04	1,311,348.85	3,025,240.56
02-05	1,311,355.71	3,025,240.68
02-06	1,311,355.59	3,025,242.03
03-01	1,311,357.43	3,025,216.79
03-02	1,311,352.28	3,025,215.32
03-03	1,311,353.99	3,025,202.33
03-04	1,311,362.20	3,025,191.55
03-05	1,311,367.96	3,025,196.08
03-06	1,311,365.76	3,025,198.77
03-07	1,311,363.18	3,025,198.04
03-08	1,311,358.90	3,025,204.66
04-01	1,311,411.34	3,025,210.17



LEGEND

- Excavation Node Location
- Steam Line
- Proposed Excavation (0 to 2 ft bgs)
- Proposed Excavation (0 to 3 ft bgs)
- Proposed Excavation (0 to 4 ft bgs)
- Building

CONTRACT NO. CTO F271

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

FIGURE NO. FIGURE 6A

REV 1

PROPOSED EXCAVATION
FOR FORMER BUILDING 55 AREA
SWMU 9
NSWC CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY K. MOORE DATE 8/12/09

CHECKED BY T. SMITH DATE 9/4/09

COST/SCHED-AREA

SCALE AS NOTED

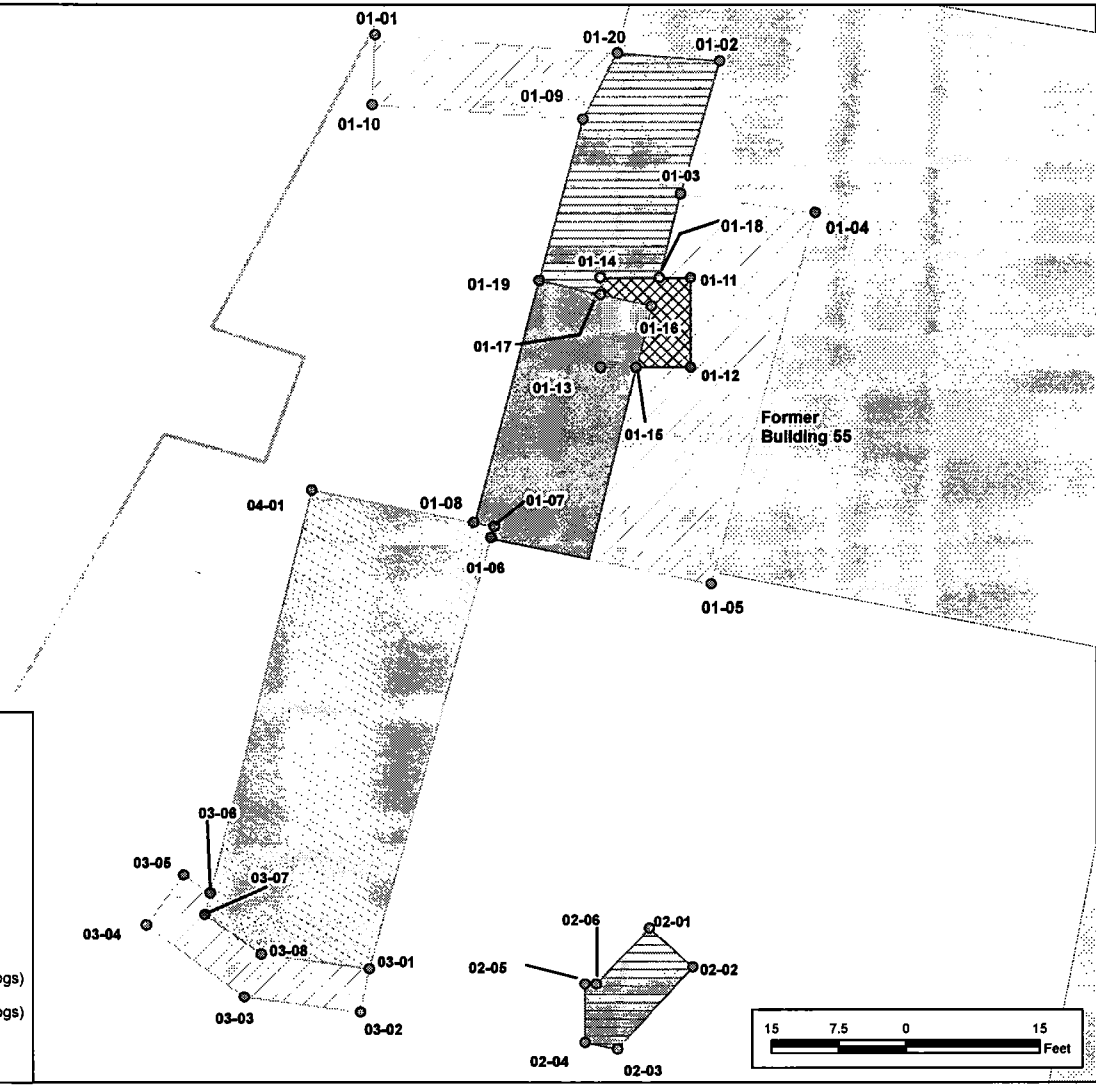
P:/GIS/CRANE_NSWC/MAPDOCS/MXD/SWMU09_BLDG55_SOIL_DISPOSITION.MXD 09/09/09 TW

N

Node	Northing	Easting
01-01	1,311,462.61	3,025,217.38
01-02	1,311,459.49	3,025,255.51
01-03	1,311,445.11	3,025,250.92
01-04	1,311,442.61	3,025,266.34
01-05	1,311,401.15	3,025,255.09
01-06	1,311,405.83	3,025,230.14
01-07	1,311,407.54	3,025,230.51
01-08	1,311,407.79	3,025,228.18
01-09	1,311,453.25	3,025,240.07
01-10	1,311,454.47	3,025,216.64
01-11	1,311,435.23	3,025,252.69
01-12	1,311,425.31	3,025,252.44
01-13	1,311,425.19	3,025,242.27
01-14	1,311,435.23	3,025,242.40
01-15	1,311,425.36	3,025,246.38
01-16	1,311,432.19	3,025,247.75
01-17	1,311,433.55	3,025,242.11
01-18	1,311,435.43	3,025,248.94
01-19	1,311,435.09	3,025,235.97
01-20	1,311,460.52	3,025,244.67
02-01	1,311,361.59	3,025,247.79
02-02	1,311,357.43	3,025,252.57
02-03	1,311,348.11	3,025,244.23
02-04	1,311,348.85	3,025,240.56
02-05	1,311,355.71	3,025,240.68
02-06	1,311,355.59	3,025,242.03
03-01	1,311,357.43	3,025,216.79
03-02	1,311,352.28	3,025,215.32
03-03	1,311,353.99	3,025,202.33
03-04	1,311,362.20	3,025,191.55
03-05	1,311,367.96	3,025,196.08
03-06	1,311,365.76	3,025,198.77
03-07	1,311,363.18	3,025,198.04
03-08	1,311,358.90	3,025,204.66
04-01	1,311,411.34	3,025,210.17

LEGEND

- Excavation Node Location
- Steam Line
- Dispose Soil Off-site as Hazardous Waste Less Than LDR (0 to 2 ft bgs)
- Dispose Soil Off-site as Hazardous Waste Greater Than LDR (1.5 to 3 ft bgs) and Retain Soil for Backfill (0 to 1.5 ft bgs)
- Dispose Soil Off-site as Hazardous Waste Greater Than LDR (2 to 4 ft bgs) and Hazardous Waste Less Than LDR (0 to 2 ft bgs)
- Dispose Soil Off-site as Special Waste Less Than TCLP (0 to 2 ft bgs)
- Dispose Soil Off-site as Hazardous Waste Greater Than LDR (0 to 2 ft bgs)
- Dispose Soil Off-site as Hazardous Waste Greater Than LDR (0 to 4 ft bgs)
- Building



CONTRACT NO. CTO F271

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

FIGURE NO. FIGURE 6B

REV 1

SOIL DISPOSITION MAP
FOR FORMER BUILDING 55 AREA
SWMU 9
NSWC CRANE
CRANE, INDIANA

NAVFAC

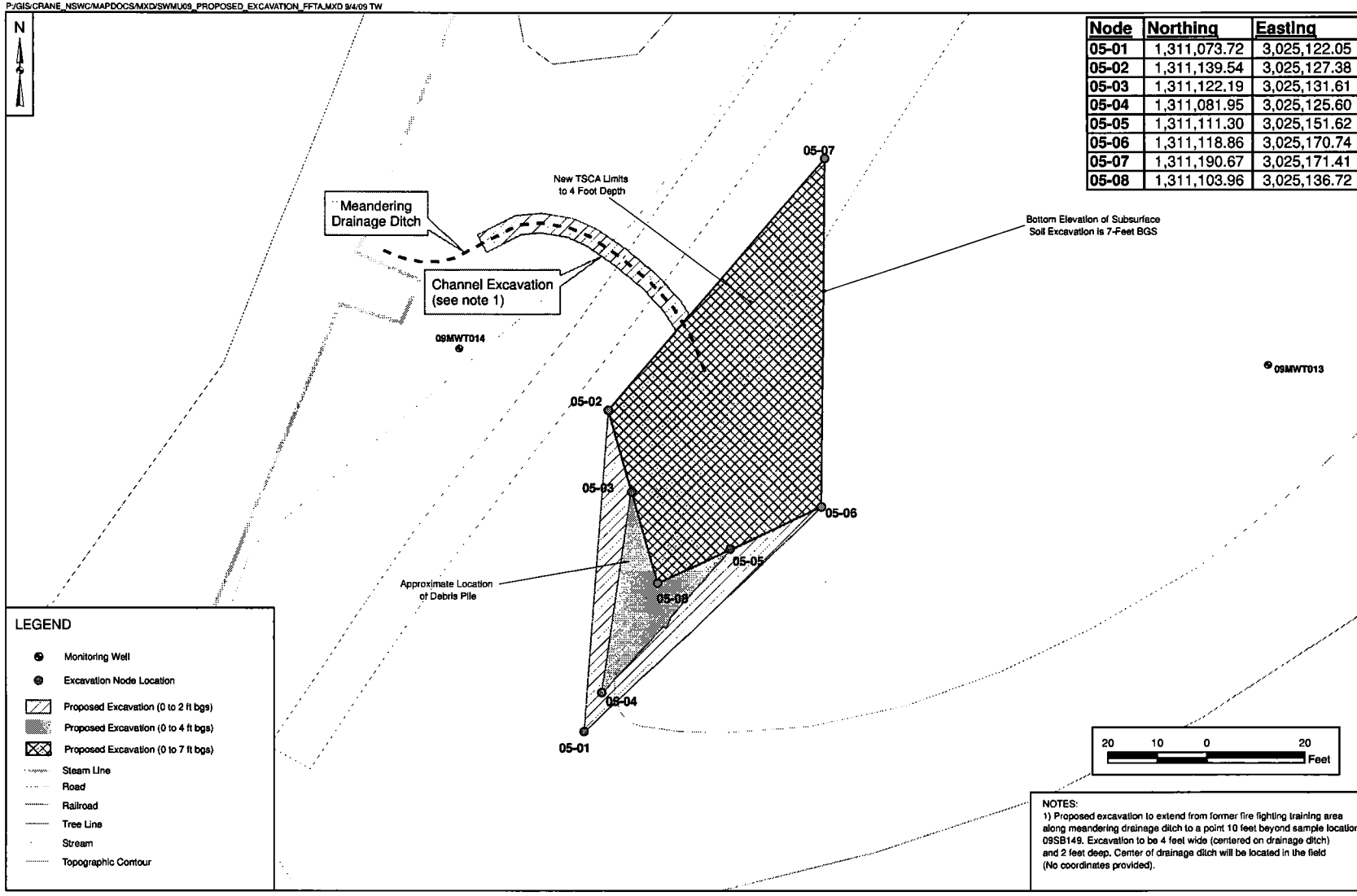
DRAWN BY K. MOORE DATE 08/12/09

CHECKED BY T. SMITH DATE 08/08/09

CG37/SCHED-AREA

SCALE AS NOTED

P:/GIS/CRANE_NSWC/MAPDOCS/MXD/SWMU09_PROPOSED_EXCAVATION_FFTA.MXD 9/4/09 TW



Node	Northing	Easting
05-01	1,311,073.72	3,025,122.05
05-02	1,311,139.54	3,025,127.38
05-03	1,311,122.19	3,025,131.61
05-04	1,311,081.95	3,025,125.60
05-05	1,311,111.30	3,025,151.62
05-06	1,311,118.86	3,025,170.74
05-07	1,311,190.67	3,025,171.41
05-08	1,311,103.96	3,025,136.72

NOTES:
1) Proposed excavation to extend from former fire fighting training area along meandering drainage ditch to a point 10 feet beyond sample location 09SB149. Excavation to be 4 feet wide (centered on drainage ditch) and 2 feet deep. Center of drainage ditch will be located in the field (No coordinates provided).

CONTRACT NO. CTO F271

APPROVED BY — DATE —

APPROVED BY — DATE —

FIGURE NO. FIGURE 7A

REV 1

PROPOSED EXCAVATION
FORMER FIRE FIGHTING TRAINING AREA
SWMU 9
NSWC CRANE
CRANE, INDIANA

NAVFAC

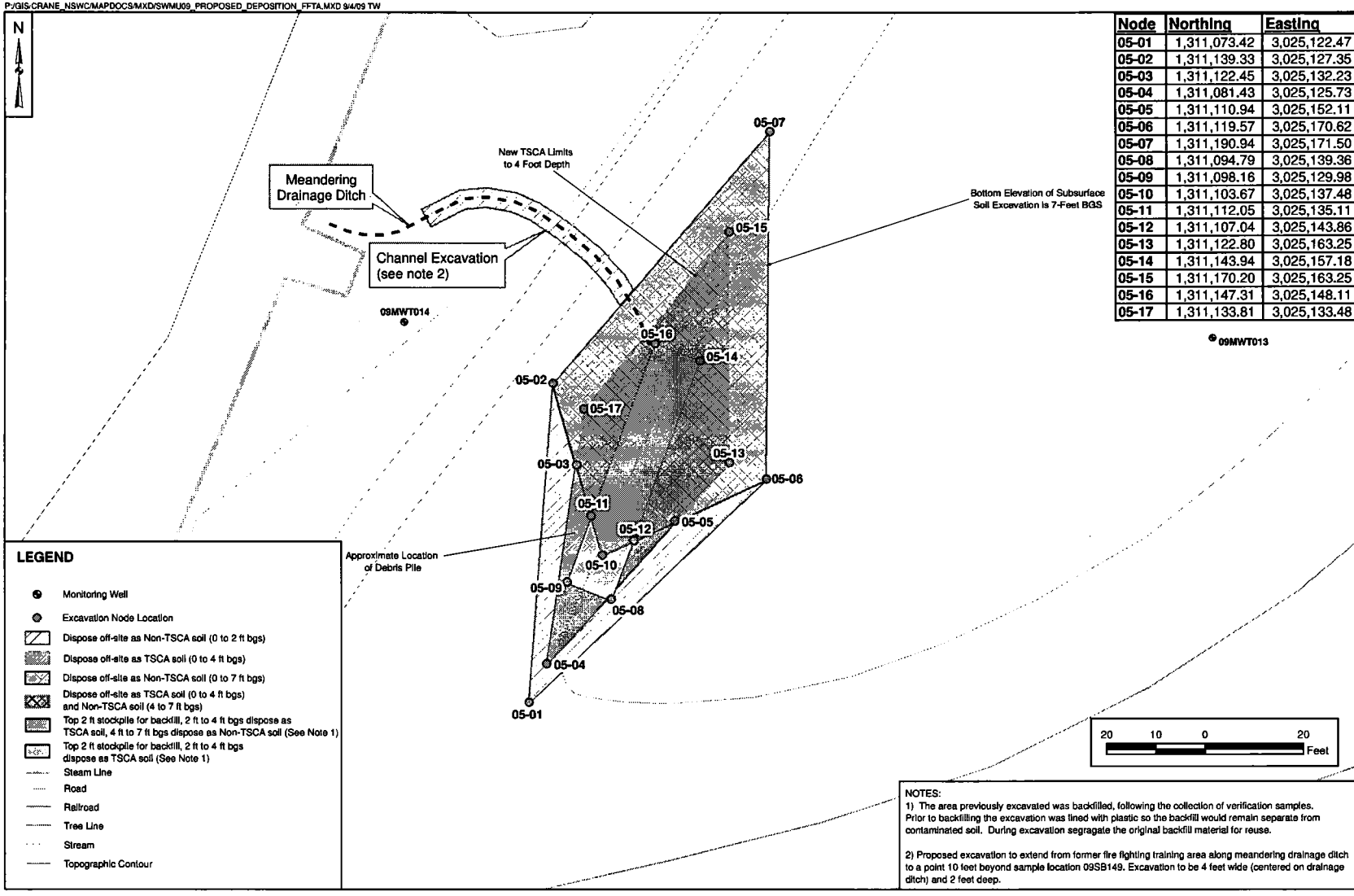
DRAWN BY K. MOORE — DATE 8/12/09

CHECKED BY T. SMITH — DATE 9/4/09

COST/SCHED-AREA

SCALE AS NOTED

P:/GIS/CRANE_NSWC/MAPDOCS/MXD/SWMU09_PROPOSED_DEPOSITION_FFTA.MXD 9/4/09 TW



Node	Northing	Easting
05-01	1,311,073.42	3,025,122.47
05-02	1,311,139.33	3,025,127.35
05-03	1,311,122.45	3,025,132.23
05-04	1,311,081.43	3,025,125.73
05-05	1,311,110.94	3,025,152.11
05-06	1,311,119.57	3,025,170.62
05-07	1,311,190.94	3,025,171.50
05-08	1,311,094.79	3,025,139.36
05-09	1,311,098.16	3,025,129.98
05-10	1,311,103.67	3,025,137.48
05-11	1,311,112.05	3,025,135.11
05-12	1,311,107.04	3,025,143.86
05-13	1,311,122.80	3,025,163.25
05-14	1,311,143.94	3,025,157.18
05-15	1,311,170.20	3,025,163.25
05-16	1,311,147.31	3,025,148.11
05-17	1,311,133.81	3,025,133.48

NOTES:
1) The area previously excavated was backfilled, following the collection of verification samples. Prior to backfilling the excavation was lined with plastic so the backfill would remain separate from contaminated soil. During excavation segragate the original backfill material for reuse.

2) Proposed excavation to extend from former fire fighting training area along meandering drainage ditch to a point 10 feet beyond sample location 09SB149. Excavation to be 4 feet wide (centered on drainage ditch) and 2 feet deep.

CONTRACT NO. CTO F271

APPROVED BY — DATE

APPROVED BY — DATE

FIGURE NO. FIGURE 7B

REV 1

SOIL DISPOSITION MAP
FORMER FIRE FIGHTING TRAINING AREA
SWMU 9
NSWC CRANE
CRANE, INDIANA

NAVFAC

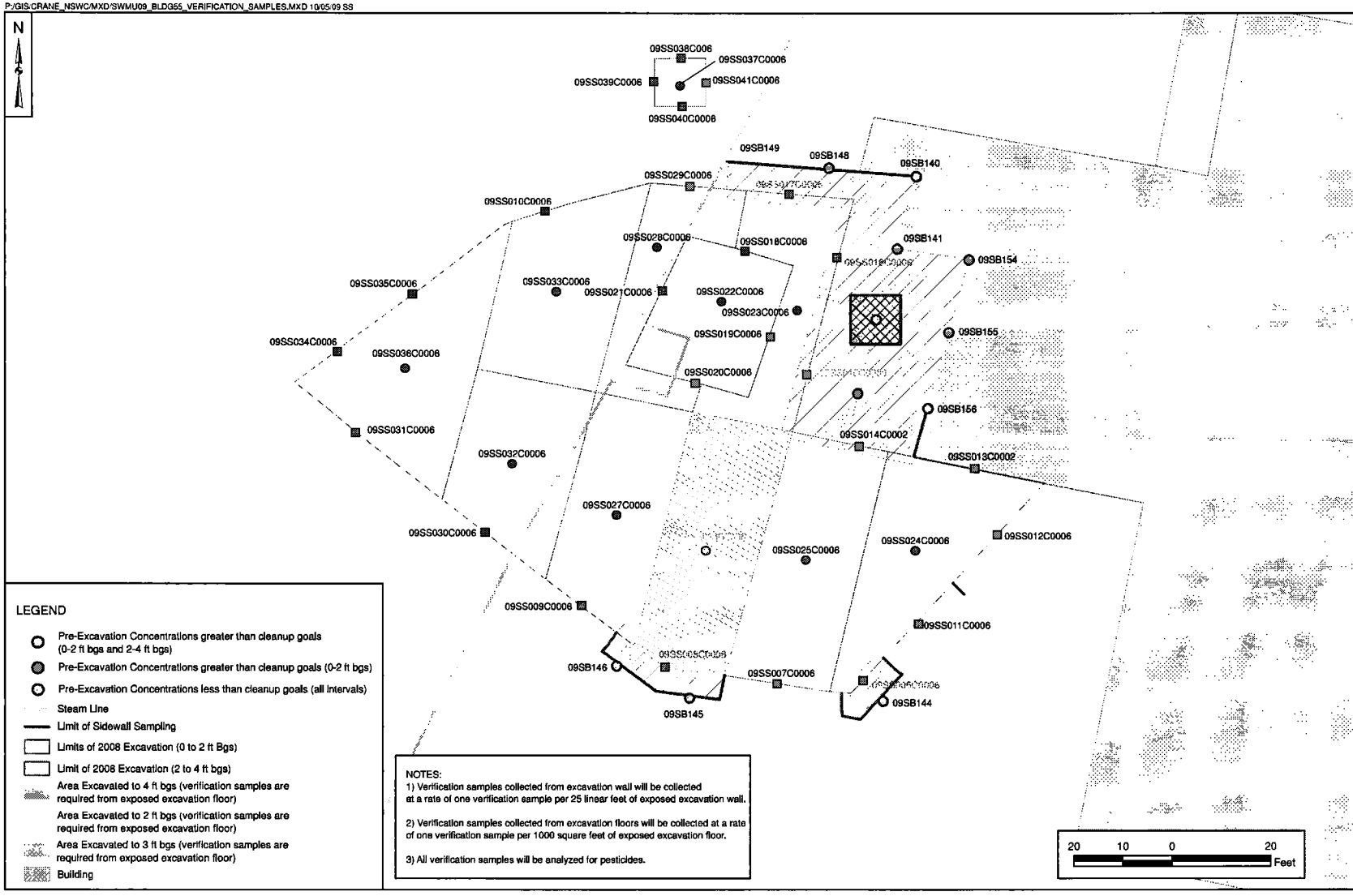
DRAWN BY K. MOORE — DATE 8/12/09

CHECKED BY T. SMITH — DATE 9/4/09

COST/SCHED-AREA

SCALE AS NOTED

P:/GIS/CRANE_NSWC/MXD/SWMU09_BLDG55_VERIFICATION_SAMPLES.MXD 10/05/09 SS



LEGEND

- Pre-Excavation Concentrations greater than cleanup goals (0-2 ft bgs and 2-4 ft bgs)
- Pre-Excavation Concentrations greater than cleanup goals (0-2 ft bgs)
- Pre-Excavation Concentrations less than cleanup goals (all intervals)
- Steam Line
- Limit of Sidewall Sampling
- Limits of 2008 Excavation (0 to 2 ft Bgs)
- Limit of 2008 Excavation (2 to 4 ft bgs)
- Area Excavated to 4 ft bgs (verification samples are required from exposed excavation floor)
- Area Excavated to 2 ft bgs (verification samples are required from exposed excavation floor)
- Area Excavated to 3 ft bgs (verification samples are required from exposed excavation floor)
- Building

NOTES:
1) Verification samples collected from excavation wall will be collected at a rate of one verification sample per 25 linear feet of exposed excavation wall.

2) Verification samples collected from excavation floors will be collected at a rate of one verification sample per 1000 square feet of exposed excavation floor.

3) All verification samples will be analyzed for pesticides.

CONTRACT NO. CTO F271

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

FIGURE NO. FIGURE 8

REV 0

PROPOSED VERIFICATION SAMPLE LOCATIONS
FORMER BUILDING 55 AREA
SWMU 9
NSWC CRANE
CRANE, INDIANA

NAVFAC

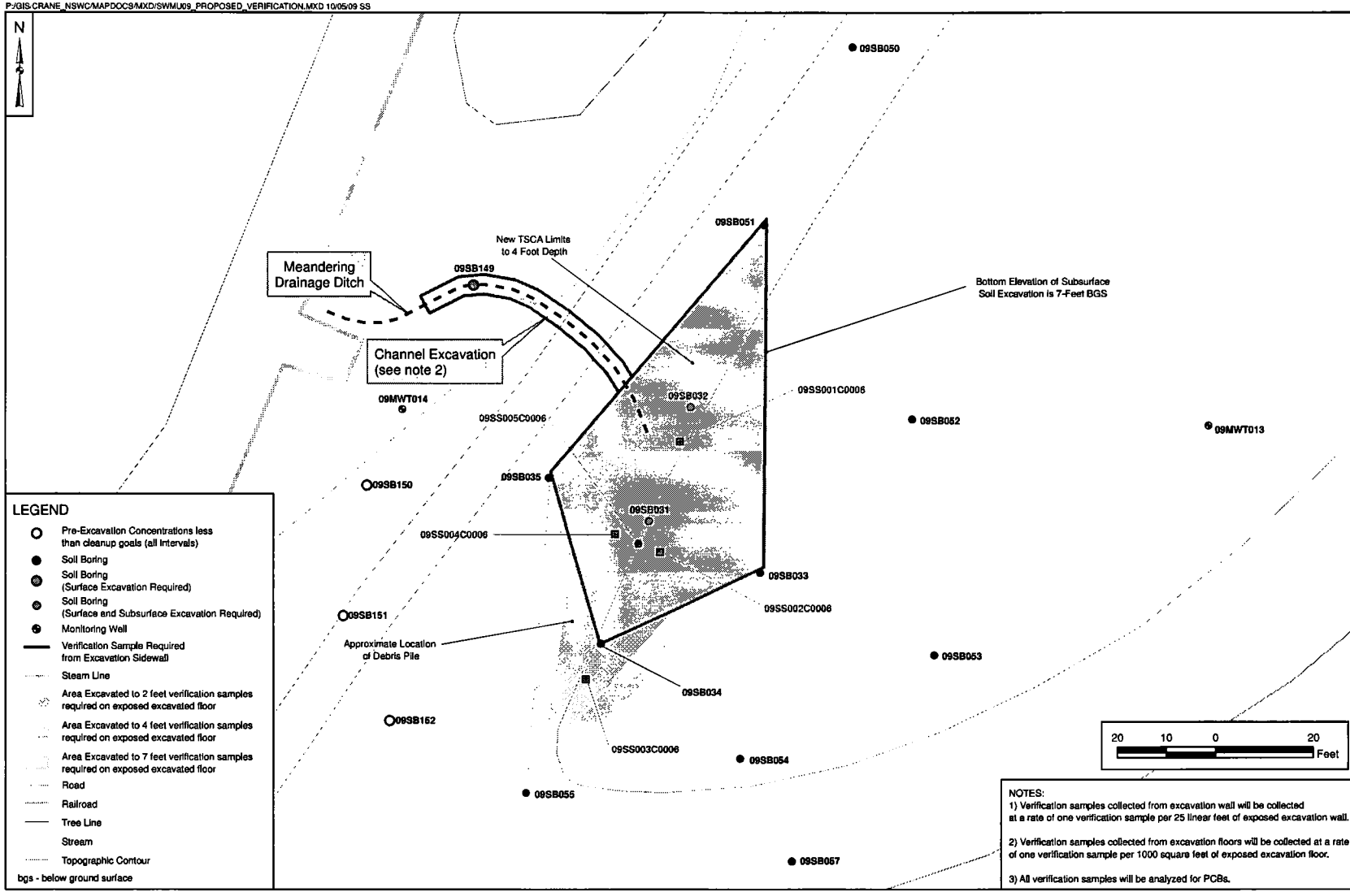
DRAWN BY K. MOORE DATE 8/12/09

CHECKED BY T. SMITH DATE 10/05/09

COST/SCHED-AREA

SCALE AS NOTED

P:/GIS/CRANE_NSWC/MAPDOCS/MXD/SWMU09_PROPOSED_VERIFICATION.MXD 10/05/09 SS



LEGEND

- Pre-Excavation Concentrations less than cleanup goals (all intervals)
- Soil Boring
- Soil Boring (Surface Excavation Required)
- Soil Boring (Surface and Subsurface Excavation Required)
- Monitoring Well
- Verification Sample Required from Excavation Sidewall
- Steam Line
- Area Excavated to 2 feet verification samples required on exposed excavated floor
- Area Excavated to 4 feet verification samples required on exposed excavated floor
- Area Excavated to 7 feet verification samples required on exposed excavated floor
- Road
- Railroad
- Tree Line
- Stream
- Topographic Contour

bgs - below ground surface

NOTES:
1) Verification samples collected from excavation wall will be collected at a rate of one verification sample per 25 linear feet of exposed excavation wall.

2) Verification samples collected from excavation floors will be collected at a rate of one verification sample per 1000 square feet of exposed excavation floor.

3) All verification samples will be analyzed for PCBs.

CONTRACT NO. CTO F271

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

FIGURE NO. FIGURE 9

REV 0

PROPOSED VERIFICATION SAMPLING LOCATIONS FOR FORMER FIRE FIGHTING TRAINING AREA
SWMU 9
NSWC CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY K. MOORE DATE 8/12/09

CHECKED BY T. SMITH DATE 10/05/09

COST/SCHED-AREA

SCALE AS NOTED

VOLUME CALCULATIONS

CLIENT:	NSA CRANE - SWMU 9	JOB NUMBER:	112G01573
SUBJECT:	SWMU 9 - ADDITIONAL EXCAVATION TECHNICAL MEMORANDUM - VOLUME CALCULATION		
BASED ON:	Figures 6A, 6B, 7A, and 7B	DRAWING NUMBER:	
BY: TWS Date: 09-03-09	CHECKED BY: TJR Date: 09/09/09	APPROVED BY:	DATE:

The purpose of this calculation is to determine the volume of soil to be excavated from SWMU 9 (as identified in the SWMU 9 Additional Excavation Technical Memorandum) and to determine the volume associated with the different waste streams generated by the excavation.

Reported areas were measured using a plannimeter.

VOLUME CALCULATIONS FOR FORMER BUILDING 55 AREA:

The volumes associated with the former Building 55 Area of SWMU 9 were calculated assuming no side-sloping of the excavation side walls.

Refer to the figure provided on page 3 of 6 of this calculation.

Location	Area (sf)	Excavation Depth (ft)	Volume (cf)	Volume (cy)
Area 1	83.7	2	167	6.2
Area 2	139.5	2	279	10.3
Area 3	1046.3	3	3139	116.3
Area 4	1503.6	2	3007	111.4
Area 5	100	4	400	14.8
			Total Excavation Volume (cy) =	259

Based on the analytical results from the verification samples collected in 2008 and the pre-excavation samples collected in July 2009 the following is a summary of the waste streams associated with the former Building 55 Area excavation. Refer to the figure provided on page 4 of 6 of this calculation.

Location	Area (sf)	Volume (cy)	Waste Stream
Area 1 (0 to 2 ft)	83.7	6.2	Dispose offsite as special waste (less than TCLP)
Area 2 (0 to 2 ft)	139.5	10.3	Dispose offsite as hazardous waste (less than LDR)
Area 3A (0 to 1.5 ft)	1046.3	58.1	Stockpile onsite for use as backfill material.
Area 3B (1.5 to 3 ft)	1046.3	58.1	Dispose offsite as hazardous waste (greater than LDR)
Area 4A (0 to 2 ft)	353.3	26.2	Dispose offsite as hazardous waste (greater than LDR)
Area 4B (0 to 2 ft)	593.9	44.0	Dispose offsite as hazardous waste (less than LDR)
Area 4C (0 to 2 ft)	342.7	25.4	Dispose offsite as special waste (less than TCLP)
Area 4D (0 to 2 ft)	213.7	15.8	Dispose offsite as hazardous waste (less than LDR)
Area 5A (0 to 4 ft)	43.6	6.5	Dispose offsite as hazardous waste (greater than LDR)
Area 5B (0 to 2 ft)	56.4	4.2	Dispose offsite as special waste (less than TCLP)
Area 5C (2 to 4 ft)	56.4	4.2	Dispose offsite as hazardous waste (greater than LDR)

Total Excavation Volume (cy) =	259

CLIENT:	NSA CRANE - SWMU 9	JOB NUMBER:	112G01573
SUBJECT:	SWMU 9 - ADDITIONAL EXCAVATION TECHNICAL MEMORANDUM - VOLUME CALCULATION		
BASED ON:	Figures 6A, 6B, 7A, and 7B	DRAWING NUMBER:	
BY: TWS Date: 09-03-09	CHECKED BY: TJR Date: 09/09/09	APPROVED BY:	DATE:

VOLUME CALCULATIONS FOR FORMER FIGHTING TRAINING AREA:

The volumes associated with the former Fire Fighting Training Area of SWMU 9 were calculated assuming a 0.5 ft horizontal to 1 ft vertical side-sloping on the excavation side walls that are excavated to 7 feet below ground surface. No side sloping is provided for other excavation depths.

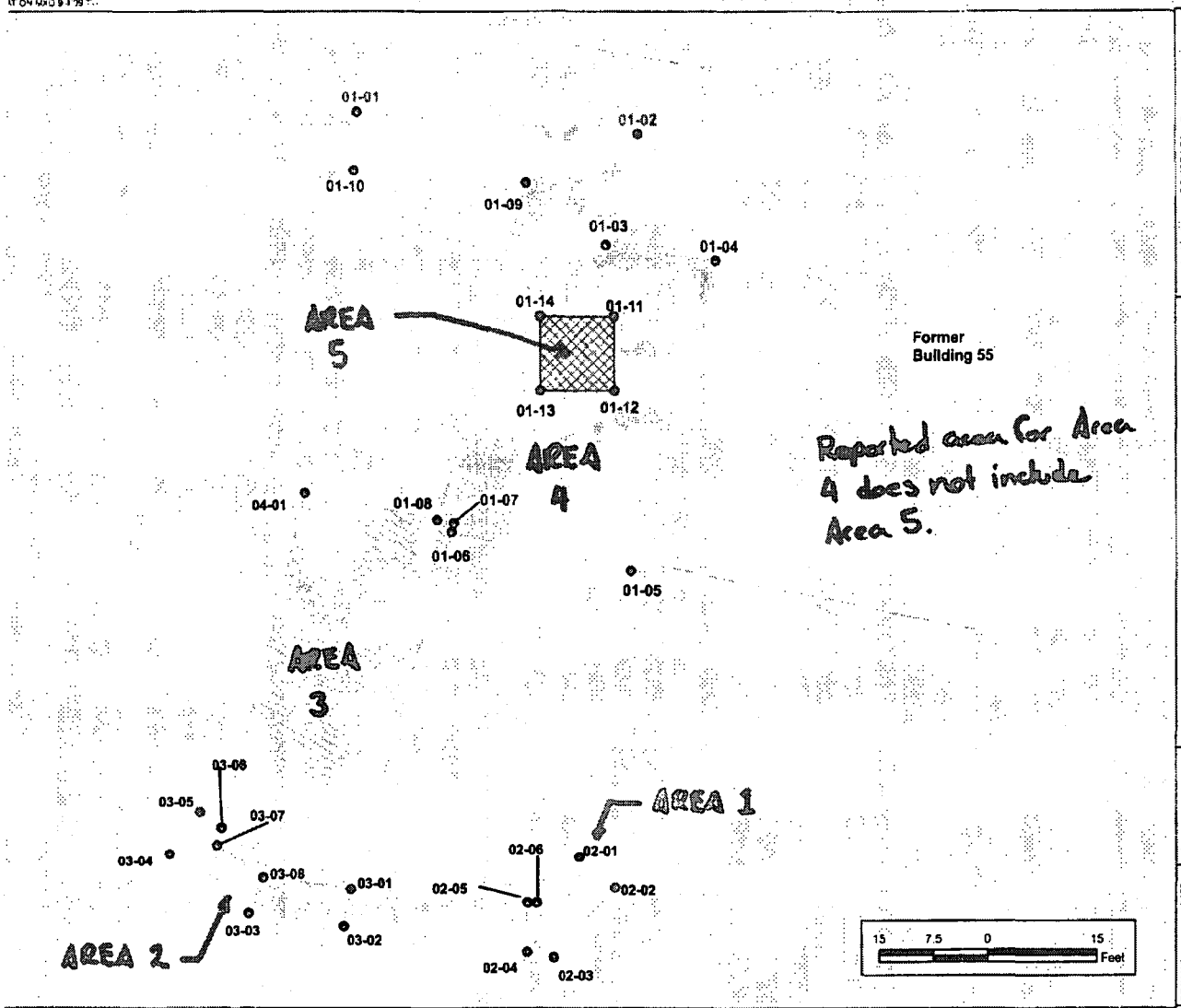
Refer to the figure provided on page 5 of 6 of this calculation.

Location	Area (sf)	Excavation Depth (ft)	Volume (cf)	Volume (cy)
Area 1	378.0	2	756	28.0
Area 2	272.8	4	1091	40.4
Area 3	2441.6	7	17091	633.0
Area 4	48	2	96	3.6
			Total Excavation Volume (cy) =	705

Based on the analytical results from the verification samples collected in 2008 and the pre-excavation samples collected in July 2009 the following is a summary of the waste streams associated with the former Building 55 Area excavation. Refer to the figure provided on page 6 of 6 of this calculation.

Location	Area (sf)	Volume (cy)	Waste Stream
Area 1 (0 to 2 ft)	378.0	28.0	Dispose offsite as Non-TSCA regulated soil
Area 2A (0 to 4 ft)	204.8	30.3	Dispose offsite as TSCA regulated soil
Area 2B (0 to 2 ft)	68.0	5.0	Stockpile onsite for use as backfill material.
Area 2C (2 to 4 ft)	68.0	5.0	Dispose offsite as TSCA regulated soil
Area 3A (0 to 2 ft)	399.9	29.6	Stockpile onsite for use as backfill material.
Area 3B (2 to 4 ft)	399.9	29.6	Dispose offsite as TSCA regulated soil
Area 3C (4 to 7 ft)	399.9	44.4	Dispose offsite as Non-TSCA regulated soil
Area 3D (0 to 4 ft)	771.6	114.3	Dispose offsite as TSCA regulated soil
Area 3E (4 to 7 ft)	771.6	85.7	Dispose offsite as Non-TSCA regulated soil
Area 3F (0 to 7 ft)	1270.1	329.3	Dispose offsite as Non-TSCA regulated soil
Area 4 (0 to 2 ft)	48.0	3.6	Dispose offsite as Non-TSCA regulated soil

Total Excavation Volume (cy) =	705



CONTRACT NO CTO 1271

APPROVED BY DATE

APPROVED BY DATE

FIGURE NO FIGURE 6A

REV 1

PROPOSED EXCAVATION
FOR FORMER BUILDING 55 AREA
SWMU 9
NSWC CRANE
CRANE, INDIANA

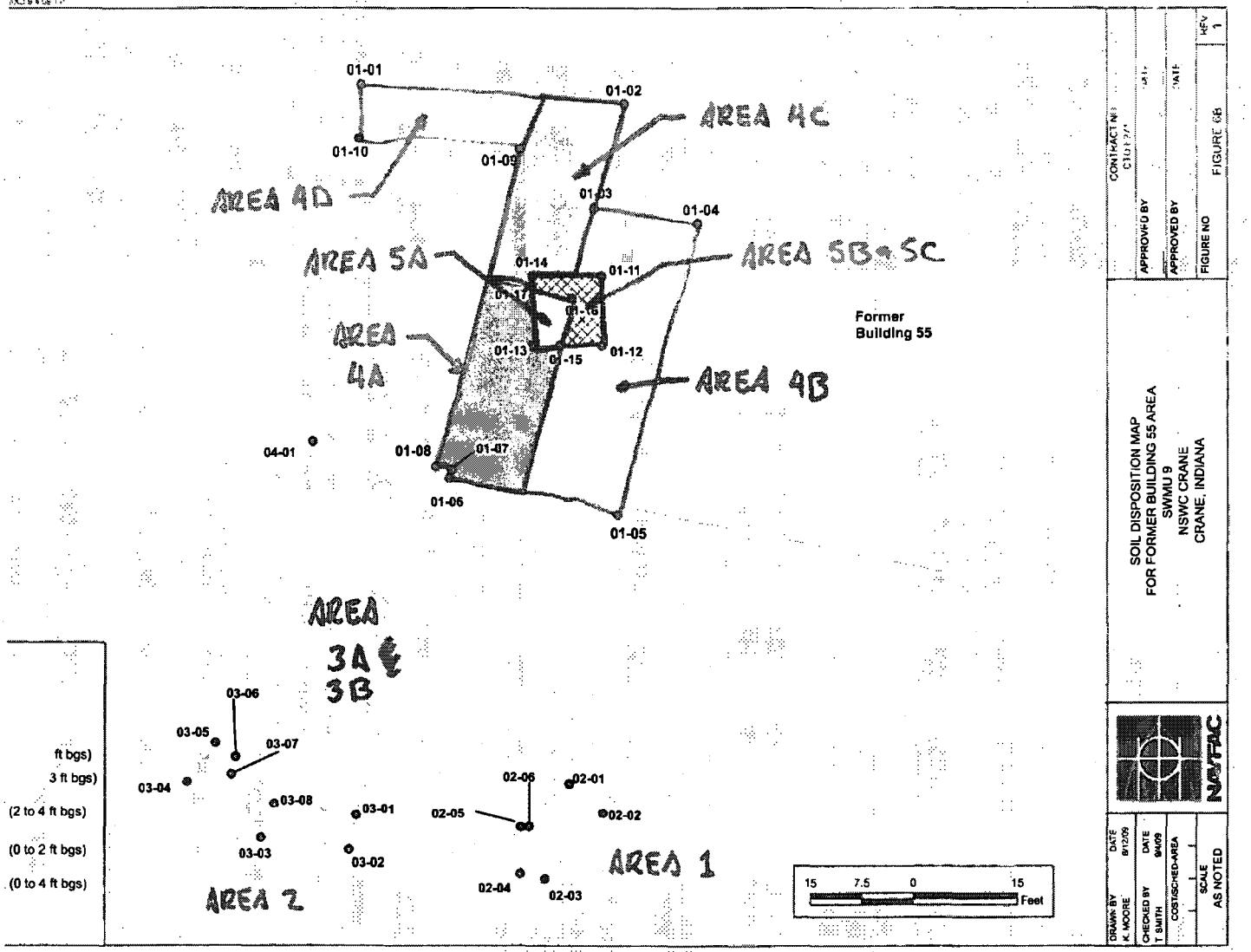
NAVFAC

DRAWN BY K. MOORE DATE 8/12/99

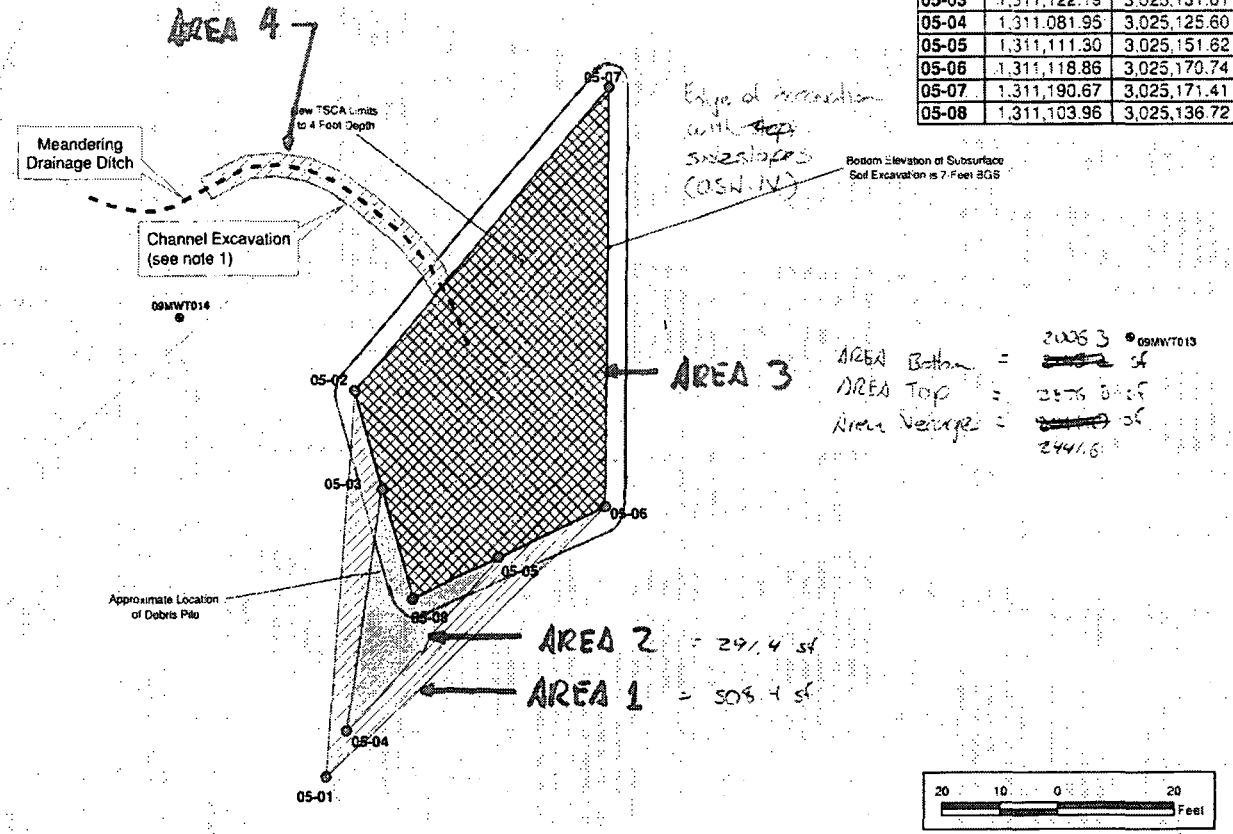
CHECKED BY T. SMITH DATE 9-4-99

COST/SCHED-AREA

SCALE AS NOTED


01-01
01-02
01-10
01-09
01-03
01-04
01-14
01-11
01-17
01-16
01-13
01-15
01-12
01-08
01-07
01-06
01-05
04-01
AREA 4C
AREA 4D
AREA 5A
AREA 5B & 5C
AREA 4A
AREA 4B
Former Building 55
AREA 3A & 3B
03-06
03-05
03-07
03-04
03-08
03-01
03-03
03-02
02-06
02-01
02-05
02-02
02-04
02-03
AREA 1
AREA 2
ft bgs)
3 ft bgs)
(2 to 4 ft bgs)
(0 to 2 ft bgs)
(0 to 4 ft bgs)
15 7.5 0 15
Feet
CONTRACT NO
APPROVED BY
DATE
APPROVED BY
DATE
FIGURE NO
FIGURE 6B
REV 1
SOIL DISPOSITION MAP
FOR FORMER BUILDING 55 AREA
SWMU 9
NSWC CRANE
CRANE, INDIANA
NAVFAC
DRAWN BY K. MOORE
DATE 8/12/09
CHECKED BY T. SMITH
DATE 9/4/09
COST/SCHED-AREA
SCALE AS NOTED

Node	Northing	Easting
05-01	1,311,073.72	3,025,122.05
05-02	1,311,139.54	3,025,127.38
05-03	1,311,122.19	3,025,131.61
05-04	1,311,081.95	3,025,125.60
05-05	1,311,111.30	3,025,151.62
05-06	1,311,118.86	3,025,170.74
05-07	1,311,190.67	3,025,171.41
05-08	1,311,103.96	3,025,136.72



NOTES:
1) Proposed excavation to extend from former fire fighting training area along meandering drainage ditch to a point 10 feet beyond sample location 09SB149. Excavation to be 4 feet wide (centered on drainage ditch) and 2 feet deep. Center of drainage ditch will be located in the field (No coordinates provided).

CONTRACT NO. / DELIVERY ORDER
DATE
APPROVED BY
APPROVED BY
FIGURE NO. FIGURE 7A
REV 1

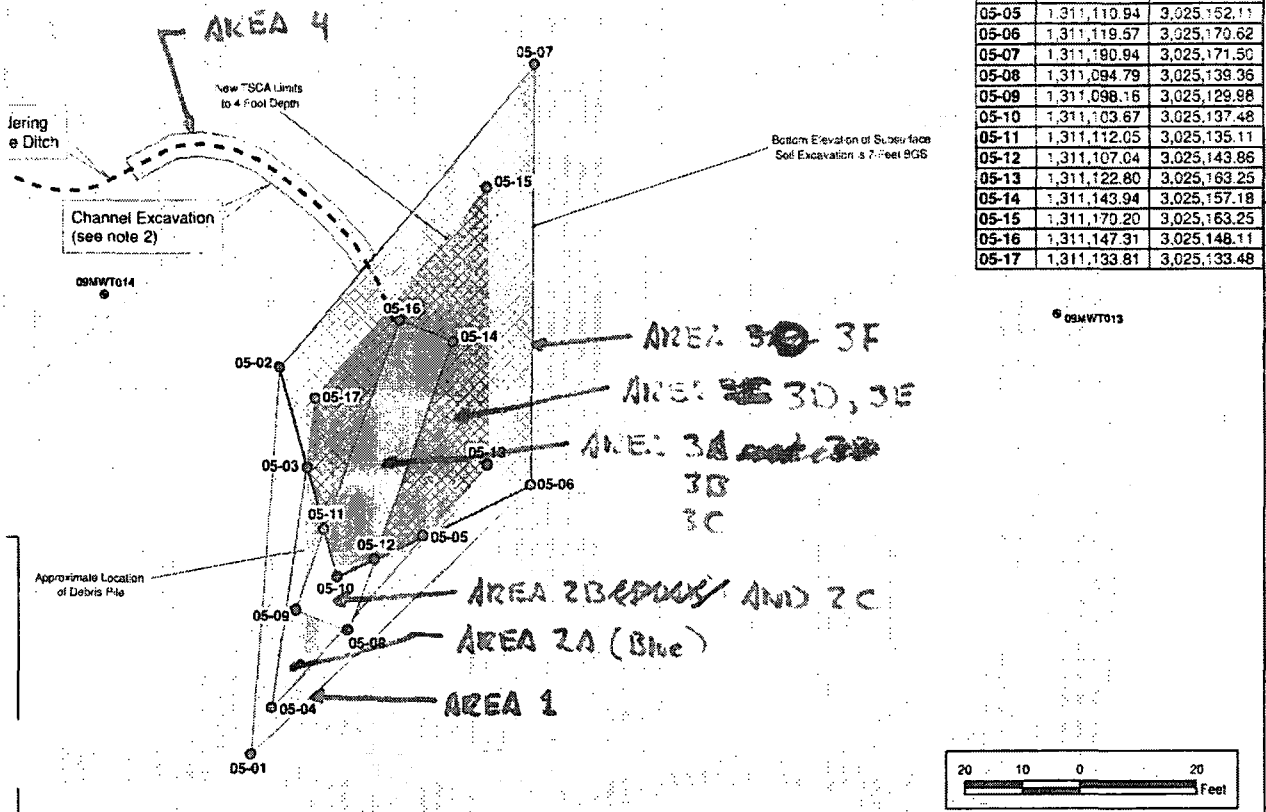
PROPOSED EXCAVATION
FORMER FIRE FIGHTING TRAINING AREA
SWMU 9
NSWC CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY K. MOORE DATE 8/12/09
CHECKED BY T. SMITH DATE 9/4/09
COST SCHED AREA
SCALE AS NOTED

Page 5 of 6

Node	Northing	Easting
05-01	1,311,073.42	3,025,122.47
05-02	1,311,139.33	3,025,127.35
05-03	1,311,122.45	3,025,132.23
05-04	1,311,081.43	3,025,125.73
05-05	1,311,110.94	3,025,152.11
05-06	1,311,119.57	3,025,170.62
05-07	1,311,180.94	3,025,171.50
05-08	1,311,094.79	3,025,139.36
05-09	1,311,098.16	3,025,129.98
05-10	1,311,103.67	3,025,137.48
05-11	1,311,112.05	3,025,135.11
05-12	1,311,107.04	3,025,143.86
05-13	1,311,122.80	3,025,163.25
05-14	1,311,143.94	3,025,157.18
05-15	1,311,170.20	3,025,163.25
05-16	1,311,147.31	3,025,148.11
05-17	1,311,133.81	3,025,133.48



NOTES:
1) The area previously excavated was backfilled, following the collection of the identified verification samples. Prior to backfilling the excavation was lined with plastic so the backfill would remain separate from contaminated soil. During excavation segregate this material for reuse as backfill underlying.

2) Proposed excavation to extend from former fire fighting training area along meandering drainage ditch to a point 10 feet beyond sample location 09SB149. Excavation to be 4 feet wide (centered on drainage ditch) and 2 feet deep.

CONTRACT NO CTO 0171 | DATE | APPROVED BY | DATE | APPROVED BY | FIGURE NO FIGURE 25 | REV 1

SOIL DISPOSITION MAP
FORMER FIRE FIGHTING TRAINING AREA
SWMU 9
NSWC CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY K. MOORE | DATE 8-12-09 | CHECKED BY T. SMITH | DATE 9-4-09 | COST/SCHED-AREA | SCALE AS NOTED