SITE-SPECIFIC UFP QUALITY ASSURANCE PROJECT PLAN

366-394 WILSON AVENUE SITE

Newark, New Jersey
Block 5038, Lot 97

General Facility Tracking Identification # NJN986663052
Docket No. CERCLA-02-2022-2012

Prepared For:

366-394 Wilson Avenue, LLC
Salomone Brothers, Inc.

Prepared By:

ENVOCARE
ENVIRONMENTAL & FACILITY MANAGEMENT

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Project Number: 150405
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TABLE OF CONTENTS

TABLE 1 - CROSSWALK: UFP-QAPP WORKBOOK TO 2106-G-05 QAPP 1
QAPP WORKSHEET #1 &2: TITLE AND APPROVAL PAGE 2
QAPP WORKSHEET #3 & 5: PROJECT ORGANIZATIONAL AND QAPP DISTRIBUTION **4**
QAPP WORKSHEET #4, 7 & 8: PERSONNEL QUALIFICATION AND SIGN-OFF SHEET 6
QAPP WORKSHEET #6: COMMUNICATION PATHWAYS 7
QAPP WORKSHEET #9: PROJECT PLANNING SESSION SUMMARY 9
QAPP WORKSHEET #10: CONCEPTUAL SITE MODEL **11**
QAPP WORKSHEET #11: PROJECT DATA QUALITY OBJECTIVES **14**
WORKSHEET #12: MEASUREMENT PERFORMANCE CRITERIA *18*
QAPP WORKSHEET #13: SECONDARY DATA CRITERIA AND LIMITATIONS *31*
QAPP WORKSHEET #14 & 16: PROJECT TASKS AND SCHEDULES *32*
QAPP WORKSHEET #15: PROJECT ACTION LIMITS AND LABORATORY-SPECIFIC DETECTION/QUANTITATION LIMITS 35
QAPP WORKSHEET #17 & 18: SAMPLING DESIGN AND RATIONALE/SAMPLING LOCATIONS AND METHODS *46*
QAPP WORKSHEET #19 & 30: SAMPLE CONTAINERS PRESERVATION, PACKAGING AND SHIPPING **51**
QAPP WORKSHEET #20: FIELD QUALITY CONTROL SUMMARY *53*
QAPP WORKSHEET #21 & 22: FIELD SOPs, FIELD EQUIPMENT CALIBRATION MAINTENACE TESTING AND INSPECTION *54*
QAPP WORKSHEET #23 24 & 25: ANALYTICAL SOPs, INSTRUMENT CALIBRATION, MAINTENANCE, TESTING AND INSPECTION *56*
QAPP WORKSHEETS #26 &27: SAMPLE HANDLING CUSTODY, AND DISPOSAL *59*
QAPP WORKSHEET #28 ANALYTICAL QUALITY CONTROL AND CORRECTIVE ACTION *60*
QAPP WORKSHEET #29: PROJECT DOCUMENTS AND RECORDS *77*
QAPP WORKSHEET #31, 32 & 33: ASSESSMENT AND CORRECTIVE RESPONSE *79*
QAPP WORKSHEET #34: DATA VERIFICATION AND VALIDATION INPUTS *81*
QAPP WORKSHEET #35: DATA VERIFICATION PROCEDURES *83*
QAPP WORKSHEET #36: DATA VALIDATION PROCEDURE *84*
QAPP WORKSHEET #37: DATA USABILITY ASSESSMENT *85*

LIST OF FIGURES

Figure 1 Site Plan

Figure 2 Proposed grids

Figure 3 Proposed Waste Classification Locations

Figure 4 Proposed Background Sample Locations

LIST OF APPENDICES

Appendix A	Key Team Members Qualifications
Appendix B	CDM Smith's Pierson Creek Superfund Sampling Results (August 2019)
Appendix C	Salomone Limited Phase II Report (September 2019)
Appendix D	Salomone Supplemental Phase II Report (December 2019)
Appendix E	ENVOCARE Waste Classification Report (July 2020)
Appendix F	CDM Smith's Stockpile Sample Report (November 2020)
Appendix G	Project Action Limits Criteria
Appendix H	Field Sampler Checklist
Appendix I	Sample Chain of Custody
Appendix J	Document Review Tracking Form
Appendix K	Non-Conformance Identification and tracking form
Appendix L	Data Usability Review form
Appendix M	Chemtech Accreditations/ Intent to perform letter/ Signature
Appendix N	Laboratory Reporting Limits/ MDLs
Appendix O	Laboratory Standard Operating Procedures/ Equipment Calibration
Appendix P	Drone SOPs

LIST OF ACRONYMS

AOC	Area of Concern
CAMP	Community Air Monitoring Plan
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLP	Contract Laboratory Program
CRQL	Contract Required Quantitation Limit
DQI	Data Quality Indicator
DQO	Data Quality Objective
EDD	Electronic Data deliverable
USEPA	United States Environmental Protection Agency
ERT	Environmental Response Team
FTL	Field Team Leader
GC/ECD	Gas Chromatography/Electron Capture Detector
GC/MS	Gas Chromatography/Mass Spectrometry
HASP	Health and Safety Plan
LSRP	Licensed Site Remediation Professional
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NELAP	National Environmental Laboratory Accreditation Program
NIST	National Institute of Standards and Technology
OSC	On-Scene Coordinator
OSWER	Office of Solid Waste and Emergency Response
PID	Photo Ionization Detector
PCB	Polychlorinated Biphenyls
PM	Program Manager
PPE	Personal Protective Equipment
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QAM	Quality Assurance Manager
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
RPM	Remedial Project Manager
RWP	Removal Work Plan
SEDD	Staged Electronic Data Deliverable
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SOW	Statement of Work
TAL	Target Analyte List
TBD	To be Determined
TCL	Total Compound List
TCLP	Total Characteristics Leaching Procedure
TSCA	Toxic Substances Control Act
UFP	Uniform Federal Policy
VOA	Volatile Organic Analysis

TABLE 1 - CROSSWALK: UFP-QAPP WORKBOOK TO 2106-G-05 QAPP

2106-G-05 QAPP Guidance Section	Optimized UFP-QAPP Worksheets
Project Management and Objectives	
2.2.1 Title and Approval Page	-#1 & 2 Title and Approval Pages
2.2.3 Distribution List 2.2.4 Project Organization and Schedule	#3 & 5 Project Organization and QAPP Distribution #6 Communication Pathways #14 & 16 Project Tasks & Schedule
2.2.1 Title, and Approval 2.2.7 Special Training Requirements and Certification	#4, 7, 8 Personnel Qualifications and Sign off Sheet
2.2.5 Project Background, Overview, and Intended Use of Data	#9 Project Planning Session Summary #10 Conceptual Site Model (CSM)
2.2.6 Data/ Project Quality Objectives and Measurement Performance Criteria	#11 Project/ Data Quality Objectives #12 Measurement Performance Criteria #15 Project Action Limits and Laboratory Specific Detection/Quantitation Limits
Ch. 3 QAPP Elements for Evaluating Existing Data	#13 Secondary Data Uses and Limitations
Measurement/ Data Acquisition	
2.3.1 Sample Collection Procedure, Experimental Design, and Sampling Tasks	#17 Sampling Design and Rationale #18 Sampling Locations and Methods
2.3.2 Sampling Procedures and Requirements	#18 Sampling Locations and Methods #19 & 30 Sample Containers, Preservation, and Hold Times #21 Field Standard Operating Procedures (SOPs)
2.3.5 QC Requirements	#20 Field Quality Control (QC) Sample Summary #28 Analytical QC and Corrective Action
2.3.6 Instrument/Equipment Testing, Calibration and Maintenance Requirements, Supplies and Consumables	#22 Field Equipment Calibration, Maintenance, Testing and Inspection #23 Analytical SOPs #24 Analytical Instrument Calibration #25 Analytical Instrument and Equipment Maintenance, Testing and Inspection
2.3.3 Sample Handling, Custody Procedures, and Documentation	#26 & 27 Sample Handling, Custody, and Disposal
2.2.8 Document and Records Requirements	#29 Project Documents and Records
Assessment/Oversight	
2.4 Assessment and Data Review check 2.5.5 Report to Management	#31, 32, & 33 Assessments and Corrective Action
Data Review	
2.5.1 Data Verification and Validation Targets and Methods	#34 Data Verification and Validation Inputs #35 Data Verification Procedures #36 Data Validation Procedures
2.5.2 Quantitative and Qualitative Evaluations of Usability 2.5.3 Potential Limitations on Data Interpretation 2.5.4 Reconciliation with Project Requirements	#37 Data Usability Assessment

QAPP WORKSHEET #1 &2: TITLE AND APPROVAL PAGE

1. **Project Identifying Information**

Site name: 366-394 Wilson Avenue
Site Location: 366-394 Wilson Avenue, Newark, NJ. Block 5038, Lot 97
Facility Tracking ID: #NJN986663052

2. **Concurrence and Approval**

Lead Organization – ENVOCARE
Project Manager – Devang Patel LSRP

Signature: Devang Patel Date: 2/24/23

Field Team Leader – Mayur Patel

Signature: Mayur Patel Date: 2/24/23

Quality Assurance Manager – April Clare

Signature: April Clare Date: 2/24/23

Federal Regulatory Agency – US Environmental Protection Agency, Region 2
Remedial Project Manager – Pamela Tames

Signature: _____ Date: _____

On-Scene Coordinator – David Rosoff

Signature: _____ Date: _____

Quality Assurance Officer – Lynn Arabia, CHMM

Signature: _____ Date: _____

Respondent – Salomone Bros, Inc./366-394 Wilson Avenue

President - Joseph Salomone

Signature: _____ Date: 2-24-23

Vice President – Paul Salomone

Signature: _____ Date: 2-24-2023

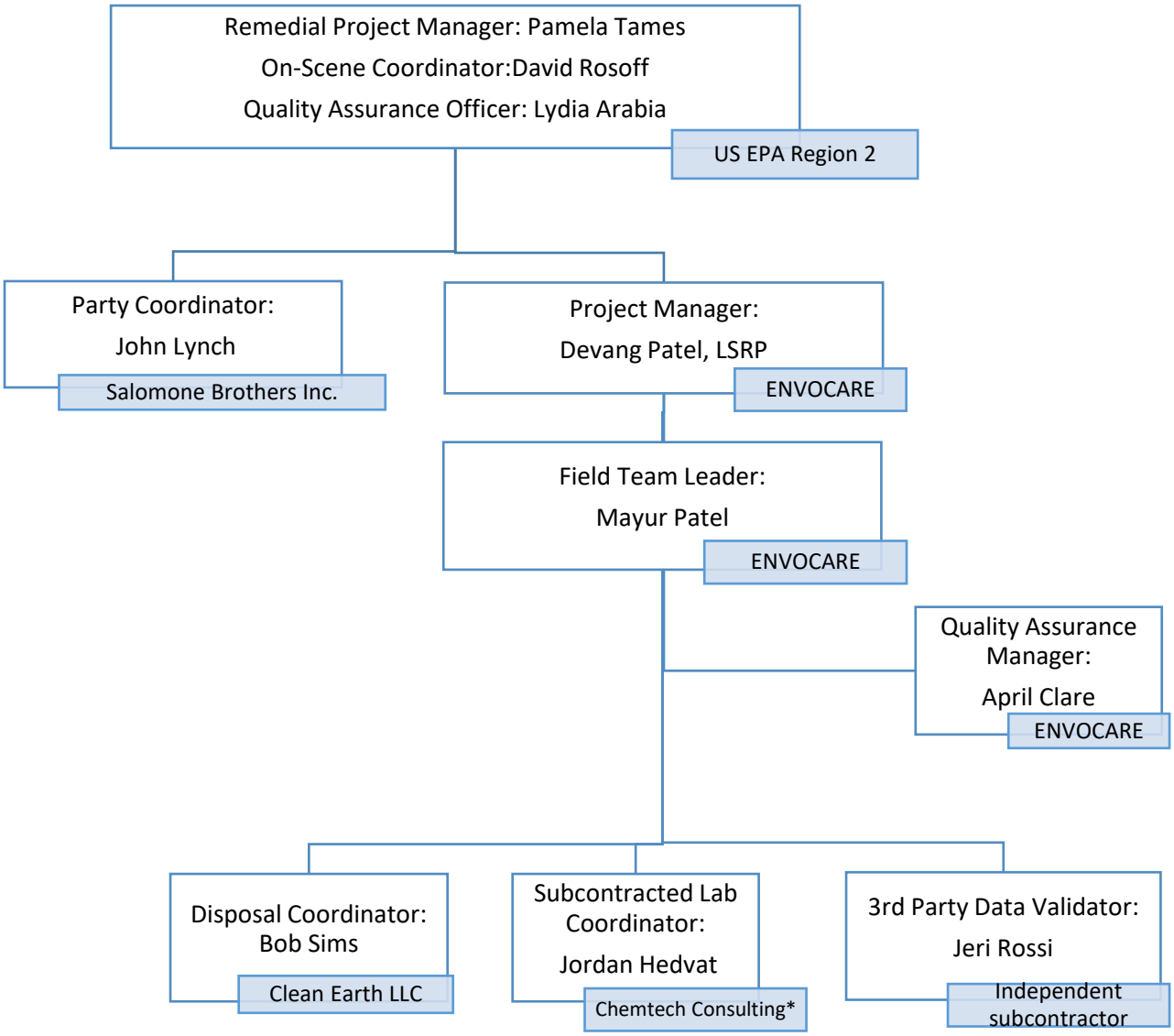
Party Coordinator – John Lynch

Signature: _____ Date: 2-24-2023

3. Plans and reports from previous investigations relevant to this project

- Appendix B CDM Smith's Pierson Creek Superfund Sampling Results (August 2019)
- Appendix C Salomone Limited Phase II Report (September 2019)
- Appendix D Salomone Supplemental Phase II Report (December 2019)
- Appendix E ENVOCARE Waste Classification Report (July 2020)
- Appendix F CDM Smith's Stockpile Sample Report (November 2020)

QAPP WORKSHEET #3 & 5: PROJECT ORGANIZATIONAL AND QAPP DISTRIBUTION



***Use of CLP not required but advised**

Key Project Team				
Project Team	**Organization**	**Title**	**Phone Number**	**Emails**
John Lynch	366-394 Wilson Avenue, LLC	Party Coordinator	973 406-2902	jlynch@salomone.com
Devang R Patel	ENVOCARE	Project Manager	732 253-5740	dpatel@envocarenj.com
Mayur Patel	ENVOCARE	Field Team Leader	732 322-8523	mpatel@envocarenj.com
April Clare	ENVOCARE	Quality Assurance Manager	848 230-5470	aclare@envocarenj.com
Jordan Hedvat	Chemtech Laboratories	Lab Coordinator	908 728-3144	jordan@chemtech.net
Jeri Rossi	Independent Subcontractor	Third Party Data Validator	908 370-3431	richjerirossi513@gmail.com
Bob Sims	Clean Earth LLC	Disposal Coordinator	610 256-4605	bsims@harsco.com
Pamela Tames	U.S. Environmental Protection Agency, Region II	Remedial Project Manager (RPM)	212 637-4255	Tames.Pam@epa.gov
David Rosoff	U.S. Environmental Protection Agency, Region II	On-Site Coordinator (OSC)	732 906-6879	Rosoff.David@epa.gov

QAPP WORKSHEET #4, 7 & 8: PERSONNEL QUALIFICATION AND SIGN-OFF SHEET

signName	Title/Role	Education/Experience	Training/Certification	Signatures
Organization: ENVOCARE				
Devang Patel	Project Manager	Appendix A	Appendix A	Devang Patel
Mayur Patel	Field Team Leader	Appendix A	Appendix A	Mayur Patel
April Clare	Quality Manager	Appendix A	Appendix A	April Clare
Organization: Subcontracted CLP Chemtech Laboratory				
Mohammad Ahmed	Lab Manager	Appendix A	Appendix A	Appendix M
Organization: Subcontracted Independent Third-Party Validator				
Jeri Rossi	Data Validation Specialist	Appendix A	Appendix A	Jeri Rossi

QAPP WORKSHEET #6: COMMUNICATION PATHWAYS

Communication Drivers	Organization	Name	Contact Information	Procedures
Field progress reports	ENVOCARE	Devang Patel Mayur Patel	(732) 253-5740 (732) 322 8523	All technical, QA and decision-making matters regarding the project whenever field activity is being conducted via letter within 5 days (written or electronic)
On-site Health and Safety	ENVOCARE	Mayur Patel	(732) 322 8523	Explain Site hazards, PPE, HASP, stop-work etc.
Field Corrective Actions	ENVOCARE	Devang Patel Mayur Patel	(732) 253-5740 (732) 322 8523	Determine adjustment to field procedures and communicate changes with the field team
Adjustments to QAPP	ENVOCARE EPA OSC	Devang Patel David Rosoff	(732) 253-5740 ((732)-906-6879	ENVOCARE PM and EPA OSC review and communicated necessary changes to site-specific QAPP, which will be revised by ENVOCARE
Interface with Party Coordinator	SBI ENVOCARE	John Lynch Devang Patel	(973) 406-2902 (732) 253-5740	The Project Coordinator will be notified by Envocare PM regarding all technical, QA and decision-making matters regarding the project when changes are made (verbal, written or electronic)
Interface with Regulatory Agency Personnel	EPA OSC ENVOCARE	David Rosoff Devang Patel	(732)-906-6879 (732) 253-5740	The EPA OSC will be notified by Envocare PM regarding all technical, QA and decision-making matters regarding the project when changes are made (verbal, written or electronic)
Submission of Laboratory data (Preliminary results and full packages)	ENVOCARE SBI EPA OSC	Devang Patel John Lynch David Rosoff	(732) 253-5740 (212)-637-4255 (732)-906-6879	ENVOCARE will submit the Lab data via a letter report to EPA OSC and Project Respondent/Coordinator after 4 to 5 weeks after all sampling events
Lab Data Quality Issues (including sample receipt variances)	ENVOCARE Chemtech Consulting Group	Devang Patel Jordan Hedvat	(732) 253-5740 (908) 728-3144	Lab Coordinator will contact ENVOCARE PM to resolve sample receiving discrepancies
Analytical Corrective Actions	ENVOCARE Chemtech Consulting Group Third party data validator	Devang Patel Jordan Hedvat Jeri Rossi	(732) 253-5740 (908) 728-3144 (908) 370-3431	Lab Coordinator will report all project nonconformance issues to ENVOCARE PM in 24 to 48 hours. Laboratory QC variances will be reported by the analytical laboratory to ENVOCARE in the data package. ENVOCARE will in turn document all QC variances in the data validation submittal process. Any QC variances which result in adequate results will be addressed on a case-by-case basis and reported to the USEPA.

Communication Drivers	Organization	Name	Contact Information	Procedures
Data Tracking and Management	ENVOCARE Chemtech Consulting Group Third party data validator EPA OSC	Devang Patel Jordan Hedvat Jeri Rossi David Rosoff	(732) 253-5740 (908) 728-3144 (908) 370-3431 (732)-906-6879	The third-party data validator will review the data package for conformance to the analytical method and analytical technical specifications. Third party data validator will contact client contractor lab to resolve data package errors and missing data elements. Chemtech lab coordinator will contact ENVOCARE PM via email to address any discrepancies. ENVOCARE will address these concerns in the letter report when submitting data to the USEPA OSC.
Data Usability Assessment	ENVOCARE Chemtech Consulting Group EPA OSC	Devang Patel Jordan Hedvat David Rosoff	(732) 253-5740 (908) 728-3144 (732)-906-6879	Non-compliance with procedures by the analytical laboratory may result in invalid analytical data. ENVOCARE will first attempt to resolve the issues with the analytical laboratory, including having samples reanalyzed. In the event the issues cannot be resolved between ENVOCARE and the analytical laboratory, the issues will be reported via email and/or telephone to the USEPA, if necessary.

EPA - Environmental Protection Agency
SBI – Salomone Brothers Inc
OSC – On site Coordinator

QAPP WORKSHEET #9: PROJECT PLANNING SESSION SUMMARY

Date of Planning Session: October 6, 2022
Location: Phone/email
Purpose: Revise Draft Community Air Monitoring Plan, Removal Action Plan, Health and Safety Plan, and Sampling Plan.

Participants:

Name	Organization	Title/Role	Email/Phone
Pamela Tames	USEPA	Remedial Project Manager	Tames.Pam@epa.gov (212) 637 4255
David Rosoff	USEPA	On Scene Coordinator	Rosoff.David@epa.gov (732) 906 6879
Devang Patel	ENVOCARE	Project Manager	dpatel@envocarenj.com 732 253-5740
John Lynch	Salomone Brothers Inc	Party Coordinator	jlynch@salomone.com 973 406-2902
Jim Kelly	Salomone Brothers Inc	Alt. Party Coordinator	jkelly@salomone.com

Notes: Discussion focused on overall plans to be site specific and detailed. Stated that the sampling plan was more geared to a NJDEP SRP site instead of a UFP QAPP. EPA suggested combining the Sampling and Analysis Plan (SAP) with QAPP to fulfill both requirements.

Consensus decision made: Removed sections from the HASP to make it more site specific. Reference all sampling events in the past. Pile sampling should reference the most recent sampling event to characterize the soils for all future sampling events and sampling done will be discussed with the EPA OSC.

Action Items:

Action	Responsible Party	Due Date
Revise Sampling and Analysis Plan/Quality Assurance Project Plan	ENVOCARE	11/5/2022
Revise Health and Safety Plan	ENVOCARE	11/5/2022
Revise Removal Work Plan	ENVOCARE	11/5/2022
Revise Community Air Monitoring Plan	ENVOCARE	11/5/2022

Date of Planning Session: November 2, 2022
Location: Phone
Purpose: Revise Draft Community Air Monitoring Plan, Removal Action Plan, Health and Safety Plan, and Sampling Plan.

Participants:

Name	Organization	Title/Role	Email/Phone
Pamela Tames	USEPA	Remedial Project Manager	Tames.Pam@epa.gov (212) 637 4255
David Rosoff	USEPA	On Scene Coordinator	Rosoff.David@epa.gov (732) 906 6879
Devang Patel	ENVOCARE	Project Manager	dpatel@envocarenj.com 732 253-5740
John Lynch	Salomone Brothers Inc	Party Coordinator	jlynch@salomone.com 973 406-2902
Jim Kelly	Salomone Brothers Inc	Alt. Party Coordinator	jkelly@salomone.com
David Miller	Giordano Halleran & Ciesla	Lawyer	dmiller@ghclaw.com

Notes: Solidified sampling goals and objectives such as soil sampling rationale and sampling locations during all phases of work for removal action plan and sampling Plan. Advised to use NPL site standards as well as EPA RMLs to make sure property soils were not impacted prior to Salomone's drainage project. Updates to health and safety plan's site-specific job safety analysis to include more comprehensive respiratory training and PPE. The sampling plan needed more crossover tables and charts to be a UFP QAPP.

Consensus decision made: Included more samples for all rounds of sampling, provide a range for sampling frequency and background sampling locations that can be discussed with the EPA OSC. All the above changes from the notes section further enforced in all the plans. Extended the deadline on the plans by another 30 days.

Action Items:

Action	Responsible Party	Due Date
Revise Sampling and Analysis Plan/Quality Assurance Project Plan	ENVOCARE	12/5/2022
Revise Health and Safety Plan	ENVOCARE	12/5/2022
Revise Removal Work Plan	ENVOCARE	12/5/2022
Revise Community Air Monitoring Plan	ENVOCARE	12/5/2022

QAPP WORKSHEET #10: CONCEPTUAL SITE MODEL

BACKGROUND INFORMATION/LAND USE

The Site is presently unoccupied; however, it was most recently a scrap metal recycling facility owned and operated by Globe Metals, Inc. The Site occupies 2.392 acres in an industrial area and is bordered by a railroad to the east, a vegetable oil manufacturer to the north, a chemical company to the west, and a commercial trading and hardware store to the south. The Property and surroundings are shown on a Site Plan Map (Figure 1). The Site is improved with an abandoned 2-story structure on the western portion of the subject property and a smaller former building on the southwestern portion of the subject property.

OPERATIONAL HISTORY

The Site was a former scrapyard and smelter under the previous owner. As a part of due diligence activities in connection with a potential purchase of 366-394 Wilson Avenue Property, Salomone Brothers Inc (SBI) conducted excavations and culvert installations in areas adjacent to the undefined, unnamed tributary (UT) of Pierson's Creek.

Stockpile A was generated from the northern portion of the property, while Stockpile B was generated from areas throughout the Property. Stockpile C was generated from the western boundary of the property, as well as a portion of the stream north of the Property.

PREVIOUS INVESTIGATION

CDM performed groundwater sampling of the Globes Metals Well in the unnamed tributary (UT) in December 2019. Soil and sediment samples collected in the UT between Globe and Troy adjacent to the east side of the UT were collected in August 2019 (D1, D2, D3 sediment and SO-01, SO-02 and SO-03 soil). Refer to Appendix B for analytical results.

On September 26, 2019, Salomone Brothers performed their due diligence of the site in a Limited Phase II ESA Site Assessment prior to their drainage activities (drainage activities were completed from September 21, 2019, through September 27, 2019). Activities consisted of advancing four soil borings and soil sampling throughout the property. The initial Phase II investigation in September did not include in-situ soil sampling beneath the main subject building due to accessibility issues caused by flooding, overgrowth, and remnant debris. Refer to Appendix C for site activities and findings.

On December 27, 2019, Salomone Brothers conducted their Supplemental Phase II investigation to further investigate the property based on information obtained from CDM sampling from August 2019. Activities at the subject property involved advancement of twelve soil borings and the collection of eleven soil samples from the soil borings and installation of temporary monitoring wells at three of the soil boring locations plus the collection of three groundwater samples from the wells. Sampling of in-situ soils was completed beneath the main subject building. Their results indicated that in-situ soils including soils beneath the main subject building identified contaminants above the NJDEP Impact to Ground Water Soil

Screening Levels (IGWSSL) and Ground Water Quality Standards (GWQS). Refer to Appendix D for site activities and findings.

On July 10, 2020, ENVOCARE mobilized to conduct soil sampling on the property. Three total soil samples were collected for waste classification determination and disposal facility-specific parameters. The sampling frequencies were based on the facility requirements; Clean Earth Facility requires one soil sample for every 700 cubic yards.

Test pits dug in the soil stockpiles were investigated with the use of a Photoionization Detector (PID) and a Jerome 431X (Jerome) meter to measure volatile organic compounds (VOCs) and vapor mercury (Hg), respectively. Soil sampling done in the western portion of stockpile A identified VOCs of 7 to 9 parts per million (ppm) in the same area as petroleum impacted soil. All other areas of investigation (stockpiles B and C) found VOCs and Hg at 0.0 ppm and 0 milligram per cubic meter (mg/m^3). A soil sample for VOCs was collected from the location with the highest suspected VOC soil contamination (field instrument readings or visual evidence).

The analytical results were evaluated against the NJDEP Residential Direct Contact Soil Remediation Standards and Non-Residential Direct Contact Soil Remediation Standards (RDCSRS and NRDCSRSs), as well as the USEPA Toxicity Characteristic Leaching Procedure (TCLP) regulatory criteria.

The analytical results identified Pesticides (4,4-DDD, Chlordane, cis-Chlordane, Dieldrin, trans-Chlordane), PCBs, Semi Volatile Organics, Metals (arsenic, copper, lead, mercury, nickel, zinc) and 1,4-Dichlorobenzene above the RDCSRS/NRDCSRS standards for one or all the samples. All compounds were reported below the EPA TCLP criteria. Based on the TCLP and Resource Conservation and Recovery Act (RCRA) characteristic analytical results, the stockpile is contaminated but non-hazardous based on chemical characteristics. Refer to Appendix E analytical report.

On November 2, 2020, excavated soil was stockpiled into three (3) distinct soil piles during drainage improvement of the property located at both onsite and offsite area. The stockpiled soil was discovered to contain contaminants as well as general overburden soil from the Property.

CDM Smith followed a sampling protocol based on New Jersey's Fill Material Guidance for SRP Sites (2015) during an investigation in November 2020. Representative soil samples were collected from different locations and depth horizons within each stockpile based on the following criteria: one sample collected every 20 cubic yards (CY) for the first 100 CY of material, and one sample collected every 100 CY for the next 1,000 CY of material. A total of 26 soil samples were collected from all 3 stockpiles: 7 samples from stockpile A, 11 samples from stockpile B, and 8 samples from stockpile C. One duplicate sample was collected from stockpile A for quality control. All samples were analyzed for polychlorinated biphenyls (PCBs), toxicity via Toxicity Characteristic Leaching Procedure (TCLP), reactivity, ignitability, and corrosivity by Katahdin Analytical Services in Scarborough, Maine.

CDM Smith submitted a report to the EPA summarizing the results of November 2020 soil pile sampling, which notes that seven soil samples from stockpile B (northeastern portion of the site, larger of the two piles in this area) detected TCLP lead above the hazardous screening criteria of EPA. The report notes that one soil sample from stockpile C (western portion of the site, near the unnamed tributary) detected TCLP lead above the hazardous screening criteria. The report notes that five soil samples from stockpile A (northeastern portion of the site, smaller of the two piles in this area) detected PCBs in soil at concentrations greater than 50 ppm. Refer to Appendix F for analytical report.

GEOLOGY & HYDROGEOLOGY

Site soil data was obtained from the on-line Web Soil Survey application as reported by the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service. The regional soil type is mapped as Urban Land (UR) Bigapple substratum mostly covered by streets, parking lots, buildings, and other structures of urban areas. The regional subsurface is described as up to 12 inches of material underlain up to 14 inches of gravelly sand. Beneath that is up to 12 inches of loamy sand followed by up to 22 inches of gravelly sandy loam material.

Site lithology generally consists of areas of Urban Land, which are areas with highly disturbed land and impervious cover. Site lithology is assumed to be the same as the regional geology. There may be an area of Rikers loamy sand in the southeastern portion of the property for the first six inches as the Web Soil Survey shows it just outside that corner of the property. The loamy sand is then underlain by gravelly sand.

In addition to fill, other disturbances within and adjacent to the project areas consist of previous cutting and grading associated with parking lot, road, and underground utility construction. Historic fill consisting of brick, ash, asphalt, glass, or other materials may be present at various depth intervals throughout the Property.

POTENTIAL RECEPTORS AND EXPOSURE PATHWAYS

The Unnamed tributary (UT) is the only potential pathways within 200 feet of the Site. No other sensitive receptors such as childcare centers are identified within 200 feet of the Site.

DATA GAPS/UNCERTAINTIES

No data gaps were found for this site.

QAPP WORKSHEET #11: PROJECT DATA QUALITY OBJECTIVES

INTRODUCTION

Envocare Environmental & Facility Management (ENVOCARE) has prepared this Quality Assurance Project Plan (QAPP) on behalf of Salomone Brothers Inc. (SBI) and 366-394 Wilson Ave, L.L.C. for the property located at 366-394 Wilson Avenue, Newark, New Jersey (the Site). This QAPP should be implemented during all future construction operations conducted at the Property. This QAPP outlines all requirements and procedures for the characterization of on-site stockpiled soil materials including the sampling and laboratory analyses of these materials and post-removal sampling.

PROJECT OBJECTIVES AND PROBLEM DEFINITION:

The purpose of the QAPP is to outline procedures for collection of soil samples to characterize soil before and after offsite disposal of onsite soil stockpiles. To meet the United States Environmental Protection Agency (USEPA) sampling requirements for site remediation of the stockpiles this QAPP also includes the field screening procedure to be followed for collection of soil samples, number of samples to be collected from each soil stockpile (Stockpile A, Stockpile B and Stockpile C) area, number of post-removal sampling to be collected just below and outside the limits of the soil stockpiles, the number of background samples to be collected at the Site and the laboratory analyses to be completed for the various samples that will be collected. The Property and surroundings are shown on a Site Location Map (Figure 1). Figure 2 presents site plans and work area locations.

PURPOSE/ DATA QUALITY OBJECTIVES

The two problems requiring DQOs are 1) the concentrations of hazardous materials in the stockpiled soils to be disposed of offsite and 2) the concentrations of hazardous materials remaining in the soil underneath and around the perimeters of the stockpile locations after the soil stockpiles are disposed of offsite. The hazardous material concentrations remaining in the soil underneath and around the perimeters of the stockpiles will be used to determine if further remedial action is needed. Regardless of new soil sample data collected, soils will be disposed of as contaminated soils based on the sampling completed in November 2020 CDM Smith investigation.

The soil stockpiles will be sampled for the number of samples and analytical parameters as described in the Sampling and Analysis Plan. Once the concentrations of hazardous contaminants in the stockpiled soil samples are received, the soil can be divided up into different waste streams, if needed, and decisions as to where the soil can be disposed of offsite can be made. Note that a prior determination will need to be made by the USEPA that the offsite disposal facility(ies) is (are) acceptable under 40 Code of Federal Regulations (CFR) 300.440. If the analytical results meet the disposal criteria for the approved disposal facility for the waste stream, then the stockpiled soil will be transported to that facility. If not, the ENVOCARE project manager, in consultation with the USEPA, will endeavor to determine an alternate disposal facility that can accept the stockpiled soil. If none can be found, as per paragraph 35 in the USEPA Administrative Settlement Agreement and Order on Consent (ASAOC), the stockpiled soil will be placed in roll-offs on the site that are prepared in such a way as to prevent rust, damage, spillage and/or leakage

from the roll-offs. The roll-offs will need to be inspected every month (and every major storm event) for rust, damage, and/or spillage/leakage. As the generated stockpile has not been disturbed and will not be disturbed until the disposal approval. Currently the stockpiles are placed under tarps. New Jersey Department of Transportation (NJDOT) approved container will be utilized on site for the storage of hazardous material and NJDOT regulation will be applied to transport of roll-offs off site.

Also, the concentrations of hazardous materials in the stockpiled soil will be used to determine the specific analyses for the soil below the stockpiles remaining onsite. If a contaminant concentration in the stockpile samples exceeds the NJDEP action levels, then the soil underneath and near the perimeter of the former stockpile locations will be analyzed for that contaminant. The ENVOCARE project manager, in consultation with USEPA OSC, will be the decision maker as to the soil disposal and post stockpile removal soil sampling analyses.

Soil under and around the stockpiles will be sampled and then compared to EPA Removal Management Levels (RMLs) NJDEP Remediation Standards, and background sample results to be taken from the site. In addition, data will be compared to background site samples collected by ENVOCARE. Finally, USEPA OSC will determine if additional remediation is necessary.

Clean Backfill (If Necessary)

NJDEP guidance (Fill Material Guidance for SRP Sites, Version 4, October 2021) will be applied when a clean backfill material is brought to the project site (if necessary). A virgin quarry mined Certified clean backfill will be used to restore the site. The certified clean backfill will come from a NJDEP approved site. The quarry operator will be responsible for providing a certified clean backfill that is acceptable USEPA OSC. Use of backfill will be determined with the USEPA OSC after all sampling events.

DATA REVIEW AND VALIDATION

All analytical data for samples collected at the site will be subjected to a Step I validation (A verification and validation based only on completeness and compliance of sample receipt conditions) Step 2A validation compliance (A verification and validation based on completeness and compliance checks of sample receipt conditions and ONLY sample-related QC results) Step 2B validation comparison(A verification and validation based on completeness and compliance checks of sample receipt conditions and BOTH sample-related and instrument-related QC results) and a Step 3 data usability (A verification and validation based on completeness and compliance checks of sample receipt conditions, both sample-related and instrument-related QC results, AND recalculation checks) as described in *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (OSWER 9200.1-85; EPA 540-R_08-005; January 2009). Data review and validation table presented in QAPP#34.

DATA MANAGEMENT

Data management for the site will be handled as described in QAPP#29.

ASSESSMENT OVERSIGHT

Assessment oversight will be conducted as described in QAPP#31, 32 & 33.

APPLICABILITY OF SOIL REMEDIATION

Applicable soil remediation standards include the EPA Regional Removal Management Levels (RMLs') updated on Nov. 2022; NJDEP Remediation Standards, N.J.A.C. 7:26D, May 17, 2021; and background samples to be implemented for the site. ENVOCARE will follow the stricter standards of the EPA RMLs and NJDEP remediation standards or the background sample results mentioned above for attainment.

Post-removal soil sampling protocol will also be implemented after approval of stockpiles. The ENVOCARE project manager in consultation with USEPA OSC will be the decision maker regarding determining if sufficient soil removal is completed after review of post-excavation soil sample results. Additional excavation will be necessary, if soil sample results do not meet the most stringent of EPA RMLs and NJDEP Remediation Standards or the background sample results. The applicability determination will be done in consultation with USEPA OSC.

DEFINE THE ANALYTIC APPROACH

ENVOCARE will prepare a letter report documenting soil sampling procedures implemented at the Project site. The report will also include, sample location map, sample depth, chain-of-custody forms, laboratory data, all data from field instrumentation, visual observations, summary of soil analytical results. The analytical results will classify the waste into one of five categories defined below.

- **Hazardous Contaminated Soil:**
  - Soils containing concentrations that are Hazardous as defined in 40 CFR Part 261, Identification and Listings of Hazardous Waste.
  - Soils containing PCBs at or above 50 parts per million (ppm) are regulated under the Toxic Substance Control Act (TSCA).
- **Non-Hazardous Contaminated Soil (If Applicable):**
  - Soils exhibiting a distinct petroleum odor or containing visible petroleum products.
  - Soils containing petroleum constituents exceeding NJDEP soil cleanup objectives (SCOs).
- **Non-Hazardous PCB Contaminated (If Applicable):**
  Soils containing PCBs greater than 1.0 ppm and less than 50.0 ppm (>1.0 ppm and <50 ppm) PCBs (on a dry weight basis) as contaminated but below the TSCA thresholds.

APPLICABILITY OF REGULATIONS

ENVOCARE reviewed the previous investigation results provided by EPA consultant CDM Smith. Since stockpiles A, B, and C are planned for disposal, the following NJDEP and EPA guidance and regulations will be applied:

- NJDEP Field Sampling Procedure Manual
- NJDEP Technical Guidance for Site Investigation of Soil, Remedial Investigation of Soil, and Remedial Action Verification Sampling for Soil, Version 1.2, March 2015
- NJDEP Technical Requirements for Site Remediation, N.J.A.C 7:26E
- NJDEP Administrative Requirements for the Remediation of Contaminated Sites (ARRCS) N.J.A.C. 7:26C
- NJDEP Remediation Standards, N.J.A.C. 7:26D, May 17, 2021
- NJDEP Coordination of NJDEP and USEPA PCB Remediation Policies, July 2, 2020
- USEPA Toxic Substances Control Act (TSCA)
- USEPA Resource Conservation and Recovery Act (RCRA)
- USEPA Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
- USEPA Contract laboratory Program Guidance for Field Samplers. EPA-540-R-20-005. November 2020.
- USEPA Environmental Response Team Standard Operating Procedures (ERT SOPs)

The following NJDEP guidance will be applied when a clean backfill material is brought to the project site (if necessary):

- Fill Material Guidance for SRP Sites, Version 4, October 2021

WORKSHEET #12: MEASUREMENT PERFORMANCE CRITERIA

Matrix: **Soil /Leachate**
Analytical Group: **TCLP Leachate /Target Compound List Volatile Organic Compounds (VOCs)**
Method: **SW-846 Method 8260D, SW-846 Method 1311/8260D**
Concentration Level: **Low (mg/kg)/TCLP (mg/L)**

Data Quality Indicator (DQI)	QC Sample or Measurement Performance Activity	Measurement Performance Criteria
Overall Precision	Field Duplicate	50% RPD
Accuracy/Bias (field contamination)	Field Equipment Rinsate Blank	No target analyte concentrations > CRQL
Analytical Accuracy/Bias (laboratory)	DMCs	See Worksheet #28 for list of compound-specific %Rs
Analytical Accuracy/Bias (laboratory)	MS, MSD	See Worksheet #28 for list of compound-specific %Rs
Analytical Precision (laboratory)	MS/MSD	See Worksheet #28 for list of compound-specific RPD values

DMC - Deuterated Monitoring Compound Recovery Limits.
MS - Matrix Spike
MSD - Matrix Spike Duplicate

Matrix: **Soil /Leachate**
Analytical Group: **TCLP Leachate /Target Compound List Semi-Volatile Organic Compounds (SVOCs)**
Analytical Method: **SW-846 Method 8270E, SW-846 Method 1311/8270E**
Concentration Level: **Low (mg/kg)/ TCLP (mg/L)**

Data Quality Indicator (DQI)	QC Sample or Measurement Performance Activity	Measurement Performance Criteria
Overall Precision	Field Duplicate	50% RPD
Accuracy/Bias (field contamination)	Field Equipment Rinsate Blank	No target analyte concentrations > CRQL
Analytical Accuracy/Bias (laboratory)	DMCs	See Worksheet #28 for list of compound-specific %Rs
Analytical Accuracy/Bias (laboratory)	Laboratory Control Sample (LCS)	Project Specific %Rs, refer to Worksheet #28
Analytical Accuracy/Bias (laboratory)	MS, MSD	See Worksheet #28 for list of compound-specific %Rs
Analytical Precision (laboratory)	MS/MSD	See Worksheet #28 for list of compound-specific RPD values

DMC - Deuterated Monitoring Compound
MS - Matrix Spike
MSD - Matrix Spike Duplicate

Matrix: **Soil /Leachate**
Analytical Group: **TCLP Leachate /Target Compound List (TCL) Semi-volatiles – Pesticides**
Analytical Method: **SW-846 Method 8081B, SW-846 Method 1311/8081A**
Concentration Level: **Low (mg/kg)/TCLP (mg/L)**

Data Quality Indicator (DQI)	QC Sample or Measurement Performance Activity	Measurement Performance Criteria
Overall Precision	Field Duplicate	50% RPD
Accuracy/Bias (field contamination)	Field Equipment Rinsate Blank	No target analyte concentrations > CRQL
Analytical Accuracy/Bias (laboratory)	Surrogates	See Worksheet #28 for list of compound-specific %Rs
Analytical Accuracy/Bias (laboratory)	LCS	See Worksheet #28 for list of compound-specific %Rs
Analytical Accuracy/Bias (laboratory)	MS, MSD	See Worksheet #28 for list of compound-specific %Rs
Analytical Precision (laboratory)	MS/MSD	See Worksheet #28 for list of compound-specific RPDs

LCS – Laboratory control samples
MS - Matrix Spike
MSD - Matrix Spike Duplicate

Matrix: **Soil**
Analytical Group: **PCB Aroclors**
Analytical Method: **SW-846 Method 8082A**
Concentration Level: **Low (µg/kg)**

Data Quality Indicator (DQI)	QC Sample or Measurement Performance Activity	Measurement Performance Criteria
Overall Precision	Field Duplicate	50% RPD
Accuracy/Bias (field contamination)	Field Equipment Rinsate Blank	No target analyte concentrations > CRQL
Analytical Accuracy/Bias (laboratory)	Surrogates	See Worksheet #28 for list of compound-specific %Rs
Analytical Accuracy/Bias (laboratory)	LCS	See Worksheet #28 for list of compound-specific %Rs
Analytical Accuracy/Bias (laboratory)	MS, MSD	See Worksheet #28 for list of compound-specific %Rs
Analytical Precision (laboratory)	MS/MSD	See Worksheet #28 for list of compound-specific RPDs

LCS – Laboratory control samples
MS - Matrix Spike
MSD - Matrix Spike Duplicate

Matrix: **Soil /Leachate**
Analytical Group: **TCLP Leachate/ TCL Metals**
Analytical Method: **SW-846 Method 6010/7471/7470**
Concentration Level: **Low (mg/kg)/TCLP (mg/L)**

Data Quality Indicator (DQI)	QC Sample or Measurement Performance Activity	Measurement Performance Criteria
Overall Precision	Field Duplicate	50% RPD
Accuracy/Bias (field contamination)	Field Equipment Rinsate Blank	No target analyte concentrations > CRQL
Analytical Accuracy/Bias (laboratory)	LCS	70-130%R, except Ag and Sb 50-150%R
Analytical Accuracy/Bias (laboratory)	Matrix Spike	75-125%R, exception Ag
Analytical Precision (laboratory)	Sample Duplicate (Laboratory Duplicate)	≤20% RPD if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL

Matrix: **Soil**
Analytical Group: **Reactivity (Cyanide and Sulfide)**
Analytical Method: **SW-846 Methods 7.3, 9012B/9034**
Concentration Level: **Low (mg/kg)**

Data Quality Indicator (DQI)	QC Sample or Measurement Performance Activity	Measurement Performance Criteria
Overall Precision	Field Duplicate	50% RPD
Accuracy/Bias (field contamination)	Field Equipment Rinsate Blank	No target analyte concentrations > CRQL
Analytical Accuracy/Bias (laboratory)	Matrix Spike	75-125%R
Analytical Precision (laboratory)	Sample Duplicate (Laboratory Duplicate)	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL

Matrix: **Soil**
Analytical Group: **Ignitability**
Analytical Method: **SW-846 Method 1030**
Concentration Level: **Low (qualitative data (Celsius))**

Data Quality Indicator (DQI)	QC Sample or Measurement Performance Activity	Measurement Performance Criteria
Overall Precision	Field Duplicate	50% RPD
Accuracy/Bias (field contamination)	Field Equipment Rinsate Blank	No target analyte concentrations > CRQL
Analytical Accuracy/Bias (laboratory)	Matrix Spike (Not required)	75-125%R
Analytical Precision (laboratory)	Sample Duplicate (Laboratory Duplicate)	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL

Matrix: **Soil**
Analytical Group: **Corrosivity**
Analytical Method: **SW-846 Method 9045**
Concentration Level: **Low (s.u.)**

Data Quality Indicator (DQI)	QC Sample or Measurement Performance Activity	Measurement Performance Criteria
Overall Precision	Field Duplicate	50% RPD
Accuracy/Bias (field contamination)	Field Equipment Rinsate Blank	No target analyte concentrations > CRQL
Analytical Accuracy/Bias (laboratory)	Matrix Spike (not required)	75-125%R
Analytical Precision (laboratory)	Sample Duplicate (Laboratory Duplicate)	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL

Matrix: **Soil**
Analytical Group: **Paint Filter**
Analytical Method: **SW-846 Method 9095**
Concentration Level: **Low (qualitative data)**

Data Quality Indicator (DQI)	QC Sample or Measurement Performance Activity	Measurement Performance Criteria
Overall Precision	Field Duplicate	50% RPD
Accuracy/Bias (field contamination)	Field Equipment Rinsate Blank	No target analyte concentrations > CRQL
Analytical Accuracy/Bias (laboratory)	Matrix Spike (Not required)	75-125%R
Analytical Precision (laboratory)	Sample Duplicate (Laboratory Duplicate)	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL

Matrix: **Soil**
Analytical Group: **NJDEP EPH**
Analytical Method: **NJDEP Method**
Concentration Level: **Low (mg/kg)**

Data Quality Indicator (DQI)	QC Sample or Measurement Performance Activity*	Measurement Performance Criteria
Overall Precision	Field Duplicate	50% RPD
Accuracy/Bias (field contamination)	Field Equipment Rinsate Blank	No target analyte concentrations > CRQL
Analytical Accuracy/Bias (laboratory)	Matrix Spike	75-125%R
Analytical Precision (laboratory)	Sample Duplicate (Laboratory Duplicate)	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL

Matrix: **Soil /Leachate**
Analytical Group: **TCLP Herbicide/ Chlorinated Herbicide**
Analytical Method: **SW-846 Method 8151A, SW-846 Method 1311/8151A**
Concentration Level: **Low (mg/kg)**

Data Quality Indicator (DQI)	QC Sample or Measurement Performance Activity	Measurement Performance Criteria
Overall Precision	Field Duplicate	50% RPD
Accuracy/Bias (field contamination)	Field Equipment Rinsate Blank	No target analyte concentrations > CRQL
Analytical Accuracy/Bias (laboratory)	Matrix Spike	75-125%R
Analytical Precision (laboratory)	Sample Duplicate (Laboratory Duplicate)	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL

Matrix: **Soil/ Leachate**
Analytical Group: **TCLP Leachate/ Mercury**
Analytical Method: **SW-846 Method 1311 7470/7471**
Concentration Level: **Low (mg/kg)/ TCLP (mg/L)**

Data Quality Indicator (DQI)	QC Sample or Measurement Performance Activity	Measurement Performance Criteria
Overall Precision	Field Duplicate	50% RPD
Accuracy/Bias (field contamination)	Field Equipment Rinsate Blank	No target analyte concentrations > CRQL
Analytical Accuracy/Bias (laboratory)	Matrix Spike	75-125%R
Analytical Precision (laboratory)	Sample Duplicate (Laboratory Duplicate)	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL

Matrix: **Soil**
Analytical Group: **Cyanide**
Analytical Method: **SW-846 Method 9012B**
Concentration Level: **Low (mg/kg)**

Data Quality Indicator (DQI)	QC Sample or Measurement Performance Activity	Measurement Performance Criteria
Overall Precision	Field Duplicate	50% RPD
Accuracy/Bias (field contamination)	Field Equipment Rinsate Blank	No target analyte concentrations > CRQL
Analytical Accuracy/Bias (laboratory)	Matrix Spike	75-125%R
Analytical Precision (laboratory)	Sample Duplicate (Laboratory Duplicate)	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL

QAPP WORKSHEET #13: SECONDARY DATA CRITERIA AND LIMITATIONS

Data Type	Data Source (Originating Organization, Report Title, and Date)	Data Uses Relative to Current Project	Factors Affecting the Reliability of Data and Limitations on Data Use
Historical and Current Site Use and Investigations QAPP#11	Historical Records, Previous Investigations/Reports, Visual Site Reconnaissance (provided in Appendix B -F)	Previous sampling results indicate areas where elevated concentrations of Site-related contaminants existed and inform where supplemental sampling should occur	None

QAPP WORKSHEET #14 & 16: PROJECT TASKS AND SCHEDULES

Project Schedule					
Activity	**Responsible Party**	**Planned Start Date**	**Planned Completion Date**	**Deliverable(s)**	**Deliverable due date**
Stockpile Survey and Volume Stockpile Soil Volume Verification	ENVOCARE	TBD	1-2 days	Meeting Notes	Within 10 days from completion
Stockpile Sampling	ENVOCARE	TBD	2-3 days	Field Notes	Within 10 days from completion
Letter Report Documenting Stockpile Sample Results	ENVOCARE	TBD	2-3 weeks	Report of Analyses/Data Package	Within 10 days from receipt of full data package from the lab (45 days from date of authorization)
Soil Disposal Removal	ENVOCARE	TBD	1-2 weeks	Field Notes	After 60-70 days from date of authorization
Post-removal sampling	ENVOCARE	TBD	2-3 days	Field Notes	Within 10 days from completion and after removal of stockpile
Background Sampling	ENVOCARE	TBD	2-3 days	Field Notes	Within 10 days from completion and after removal of stockpile
Laboratory analysis and reporting	ENVOCARE/ Chemtech	TBD	3-4 weeks	Report of Analyses/Data Package, Project-Specific Summary Table	Within 25 days after **any** sampling event (90-100 days from date of authorization)
Data Validation	Third Party Data Validator	TBD	3-4 weeks	Letter Report	Within 25 days after receipt of full data package from the laboratory.
Final Removal Action Completion Report	ENVOCARE	TBD	3-4 weeks	Project-Specific Report	Within 30 days after receipt of soil analytical results (120-150 days from date of authorization)

FIELD LOGBOOKS

All field-sampling activities will be recorded in bound, sequentially paginated field logbooks and on pre-printed field-log sheets. All sample collection shall include, at a minimum, the following information:

- Project name
- Date and time
- Sampling and other personnel present
- Sample location
- Sample identification number
- Sample depth interval
- Soil descriptions
- Photographs
- Weather observations
- Any deviations from the plans
- Other relevant project-specific site or sample information

Entries will be made in permanent ink, with corrections crossed out with a single line, dated, and initialized. Field books will be signed at the bottom of each page by personnel making entries on that page. Completed field forms will also be signed by sampling personnel.

Field records will be checked for completeness at the end of each day of sampling by the members of the field sampling team. The check of field record completeness will ensure that all requirements for field activities have been fulfilled, complete records exist for each field activity, and that the procedures specified in the plans were implemented. Field documentation will ensure sample integrity and provide sufficient technical information to recreate each field event.

PHOTOGRAPHS

Photographs will be taken at the sampling locations and at other areas of interest on the site or sampling area. They will serve to validate information entered in the field logbook.

LABELING

All samples collected will be labeled in a clear and precise way for proper identification in the field and for tracking in the laboratory. The samples will have pre-assigned, identifiable, and unique numbers. At a minimum, the sample labels will contain the following information:

- Waste Classification Sample Numbers:

Stockpile ID_Sample ID_Date: Stockpile NameWC_S1_Year_Month_Day

- Post Removal Samples Numbers:

Location ID_Sample ID_Date: Stockpile NamePR_S1_Year_Month_Day

- Background Samples Numbers:

Location ID Sample ID Date: Stockpile NameBG_S1_Year_Month_Day

TECHNICAL SYSTEMS AUDIT

Technical systems audits, which focus on the quality control in environmental measurement and data collection, are typically performed prior to the beginning of a project by ENVOCARE's project manager

and staff members. The visual audit addresses an examination of records, sampling and measurements procedures, support systems, equipment and facilities, and maintenance and repair records.

FIELD VARIANCE

As conditions in the field may vary, it may become necessary to implement minor modifications to sampling as presented in this plan. When appropriate, the QA Office will be notified, and a verbal approval will be obtained before implementing the changes. Modifications to the approved plan will be documented in the sampling project report. Field variances will require approval by party coordinator and/or the regulatory agency.

QAPP WORKSHEET #15: PROJECT ACTION LIMITS AND LABORATORY-SPECIFIC DETECTION/QUANTITATION LIMITS

Matrix: Soil /Leachate
Analytical Group: Target Analyte List Volatile Organic Compounds (VOCs)/TCLP VOCs
Analytical Method: SW-846 Method 8260D, SW-846 Method 1311/8260D
Concentration Level: Low

Analyte	CAS Number	Project Action Limits	Laboratory Reporting Limits
Dichlorodifluoromethane	75-71-8	Refer to Appendix G	Refer to Appendix N
Chloromethane	74-87-3		
Vinyl Chloride	75-01-4		
Bromomethane	74-83-9		
Chloroethane	75-00-3		
Trichlorofluoromethane	75-69-4		
1,1-Dichloroethene	75-35-4		
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		
Acetone	67-64-1		
Carbon Disulfide	75-15-0		
Methyl Acetate	79-20-9		
Methylene Chloride	75-09-2		
trans-1,2-Dichloroethene	156-60-5		
Methyl tert-Butyl Ether	1634-04-4		
1,1-Dichloroethane	75-34-3		
cis-1,2-Dichloroethene	156-59-2		
2-Butanone	78-93-3		
Bromochloromethane	74-97-5		
Chloroform	67-66-3		
1,1,1-Trichloroethane	71-55-6		
Cyclohexane	110-82-7		
Carbon Tetrachloride	56-23-5		
Benzene	71-43-2		
1,2-Dichloroethane	107-06-2		
Trichloroethene	79-01-6		
Methylcyclohexane	108-87-2		
1,2-Dichloropropane	78-87-5		

Analyte	CAS Number	Project Action Limits	Laboratory Reporting Limits
Bromodichloromethane	75-27-4	Refer to Appendix G	Refer to Appendix N
cis-1,3-Dichloropropene	10061-01-5		
4-Methyl-2-Pentanone	108-10-1		
Toluene	108-88-3		
trans-1,3-Dichloropropene	10061-02-6		
1,1,2-Trichloroethane	79-00-5		
Tetrachloroethene	127-18-4		
2-Hexanone	591-78-6		
Dibromochloromethane	124-48-1		
1,2-Dibromoethane	106-93-4		
Chlorobenzene	108-90-7		
Ethylbenzene	100-41-4		
o-Xylene	95-47-6		
m,p-Xylene	179601-23-1		
Styrene	100-42-5		
Bromoform	75-25-2		
Isopropylbenzene	98-82-8		
1,2,3-Trichloropropane	96-18-4		
1,1,2,2-Tetrachloroethane	79-34-5		
1,3-Dichlorobenzene	541-73-1		
1,4-Dichlorobenzene	106-46-7		
1,2-Dichlorobenzene	95-50-1		
1,2-Dibromo-3-chloropropane	96-12-8		
1,2,4-Trimethylbenzene	95-63-6		
1,3,5-Trimethylbenzene	108-67-8		
1,2,4-Trichlorobenzene	120-82-1		
1,2,3-Trichlorobenzene	87-61-6		

Matrix: Soil /Leachate
Analytical Group: Target Analyte List Semi-Volatile Organic Compounds/TCLP SVOCs
Analytical Method: SW-846 Method 8270E, SW-846 Method 1311/8270E
Concentration Level: Low

Analyte	CAS Number	Project Action Limits*	Laboratory Reporting Limits
1,4-Dioxane	123-91-1	Refer to Appendix G	Refer to Appendix N
Benzaldehyde	100-52-7		
Phenol	108-95-2		
Bis(2-Chloroethyl) ether	111-44-4		
2-Chlorophenol	95-57-8		
2-Methylphenol (o-cresol)	95-48-7		
2,2'-oxybis(1-Chloropropane)	108-60-1		
Acetophenone	98-86-2		
4-Methylphenol (p-cresol)	106-44-5		
N-Nitroso-di-n-propylamine	621-64-7		
Hexachloroethane	67-72-1		
Nitrobenzene	98-95-3		
Isophorone	78-59-1		
2-Nitrophenol	88-75-5		
2,4-Dimethylphenol	105-67-9		
Bis(2-Chloroethoxy)methane	111-91-1		
2,4-Dichlorophenol	120-83-2		
Naphthalene	91-20-3		
4-Chloroaniline	106-47-8		
Hexachlorobutadiene	87-68-3		
Caprolactam	105-60-2		
4-Chloro-3-methylphenol	59-50-7		
1-Methylnaphthalene	90-12-0		
2-Methylnaphthalene	91-57-6		

*Background PAL to be determined. Discussed in QAPP #17 & 18

Analyte	CAS Number	Project Action Limits*	Laboratory Reporting Limits
Hexachlorocyclopentadiene	77-47-4	Refer to Appendix G	Refer to Appendix N
2,4,6-Trichlorophenol	88-06-2		
2,4,5-Trichlorophenol	95-95-4		
1,1'-Biphenyl	92-52-4		
2-Chloronaphthalene	91-58-7		
2-Nitroaniline	88-74-4		
Dimethylphthalate	131-11-3		
2,6-Dinitrotoluene	606-20-2		
Acenaphthylene	208-96-8		
3-Nitroaniline	99-09-2		
Acenaphthene	83-32-9		
2,4-Dinitrophenol	51-28-5		
4-Nitrophenol	100-02-7		
Dibenzofuran	132-64-9		
2,4-Dinitrotoluene	121-14-2		
Diethylphthalate	84-66-2		
Fluorene	86-73-7		
4-Chlorophenyl-phenyl ether	7005-72-3		
4-Nitroaniline	100-01-6		
4,6-Dinitro-2-methylphenol	534-52-1		
N-Nitrosodiphenylamine	86-30-6		
1,2,4,5-Tetrachlorobenzene	95-94-3		
4-Bromophenyl-phenylether	101-55-3		
Hexachlorobenzene	118-74-1		

*Background PAL to be determined. Discussed in QAPP #17 & 18

Analyte	CAS Number	Project Action Limits*	Laboratory Reporting Limits
Atrazine	1912-24-9	Refer to Appendix G	Refer to Appendix N
Pentachlorophenol	87-86-5		
Phenanthrene	85-01-8		
Anthracene	120-12-7		
Carbazole	86-74-8		
Di-n-butylphthalate	84-74-2		
Fluoranthene	206-44-0		
Pyrene	129-00-0		
Butylbenzylphthalate	85-68-7		
3,3'-Dichlorobenzidine	91-94-1		
Benzo(a)anthracene	56-55-3		
Chrysene	218-01-9		
bis(2-Ethylhexyl)phthalate	117-81-7		
Di-n-octylphthalate	117-84-0		
Benzo(b)fluoranthene	205-99-2		
Benzo(k)fluoranthene	207-08-9		
Benzo(a)pyrene	50-32-8		
Indeno(1,2,3-cd)pyrene	193-39-5		
Dibenzo(a,h)anthracene	53-70-3		
Benzo(g,h,i)perylene	191-24-2		
2,3,4,6-Tetrachlorophenol	58-90-2		

*Background PAL to be determined. Discussed in QAPP #17 & 18

Matrix: Soil/ leachate
Analytical Group: Target Analyte List Pesticides /TCLP Pesticide
Analytical Method: SW-846 Method 8081B, SW-846 Method 1311/8081A
Concentration Level: Low

Analyte	CAS Number	Project Action Limits*	Laboratory Reporting Limits
alpha-BHC	319-84-6	Refer to Appendix G	Refer to Appendix N
beta-BHC	319-85-7		
delta-BHC	319-86-8		
gamma-BHC (Lindane)	58-89-9		
Heptachlor	76-44-8		
Aldrin	309-00-2		
Heptachlor epoxide	1024-57-3		
Endosulfan I	959-98-8		
Dieldrin	60-57-1		
4,4'-DDE	72-55-9		
Endrin	72-20-8		
Endosulfan II	33213-65-9		
4,4'-DDD	72-54-8		
Endosulfan sulfate	1031-07-8		
4,4'-DDT	50-29-3		
Methoxychlor	72-43-5		
Endrin ketone	53494-70-5		
Endrin aldehyde	7421-93-4		
cis-Chlordane (alpha-Chlordane)	5103-71-9		
trans-Chlordane (gamma-Chlordane)	5103-74-2		
Toxaphene	8001-35-2		

*Background PAL to be determined. Discussed in QAPP #17 & 18

Matrix: Soil
Analytical Group: TCL Aroclors (PCBs)
Analytical Method: SW-846 Method 8082A
Concentration Level: Low

Analyte	CAS Number	Project Action Limits*	Laboratory Reporting Limits
Aroclor-1016	12674-11-2	Refer to Appendix G	Refer to Appendix N
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		
Aroclor-1262	37324-23-5		
Aroclor-1268	11100-14-4		

*Background PAL to be determined. Discussed in QAPP #17 & 18

Matrix: Soil / Leachate
Analytical Group: Target Analyte List Herbicide/TCLP Herbicide
Analytical Method: SW-846 Method 8151A, SW-846 Method 1311/8151A
Concentration Level: Low

Analyte	CAS Number	Project Action Limits*	Laboratory Reporting Limits
2,4,5-TP (Silvex)	93-72-1	Refer to Appendix G	Refer to Appendix N
2,4-D	94-75-7		

*Background PAL to be determined. Discussed in QAPP #17 & 18

Matrix: Soil / Leachate
Analytical Group: NJEPH
Analytical Method: NJEPH Method
Concentration Level: Low

Analyte	CAS Number	Project Action Limits*	Laboratory Reporting Limits
Total EPH	NA	Refer to Appendix G	Refer to Appendix N

*Background PAL to be determined. Discussed in QAPP #17 & 18

Matrix: Soil
Analytical Group: Target Analyte List Inorganics – Metals
Analytical Method: SW 846 Method 6010
Concentration Level: Low

Analyte	CAS Number	Project Action Limits*	Laboratory Reporting Limits
Aluminum	7429-90-5	Refer to Appendix G	Refer to Appendix N
Antimony	7440-36-0		
Arsenic	7440-38-2		
Barium	7440-39-3		
Beryllium	7440-41-7		
Cadmium	7440-43-9		
Calcium	7440-70-2		
Chromium	7440-47-3		
Cobalt	7440-48-4		
Copper	7440-50-8		
Iron	7439-89-6		
Lead	7439-92-1		
Magnesium	7439-95-4		
Manganese	7439-96-5		
Nickel	7440-02-0		
Potassium	7440-09-7		
Selenium	7782-49-2		
Silver	7440-22-4		
Sodium	7440-23-5		
Thallium	7440-28-0		
Vanadium	7440-62-2		
Zinc	7440-66-6		

*Background PAL to be determined. Discussed in QAPP #17 & 18

Matrix: Leachate
Analytical Group: TCLP Metals
Analytical Method: SW-846 Method 1311/6010D
Concentration Level: Low

Analyte	CAS Number	Project Action Limit*	Laboratory Reporting Limits
Arsenic	7440-38-2	Refer to Appendix G	Refer to Appendix N
Barium	7440-39-3		
Cadmium	7440-43-9		
Lead	7439-92-1		
Mercury	7439-97-6		
Selenium	7782-49-2		
Silver	7440-22-4		
Ignitability	NA		
Corrosivity	NA		
Cyanide Reactivity	NA		
Sulfide Reactivity	NA		
Paint Filter	PFLT		

*Background PAL to be determined. Discussed in QAPP #17 & 18

Matrix: Soil
Analytical Group: TAL Mercury & Cyanide (Spectrophotometry)/TCLP Mercury & Cyanide
Analytical Method: SW-846 Methods 7471/9012B
Concentration Level: Low

Analyte	CAS Number	Project Action Limit*	Laboratory Reporting Limits
Cyanide	57-12-5	Refer to Appendix G	Refer to Appendix N
Mercury	7439-97-6		

*Background PAL to be determined. Discussed in QAPP #17 & 18

QAPP WORKSHEET #17 & 18: SAMPLING DESIGN AND RATIONALE/SAMPLING LOCATIONS AND METHODS

Prior to the field mobilizations, each field team member will review all project plans and participate in a field planning meeting. The meeting will be conducted by the project manager, the USEPA OSC, and by all field staff and QA staff. Any new field personnel will receive a comparable briefing if they do not attend the initial field planning meeting and/or tailgate kick off meeting. A field planning meeting may be held in the field instead of an office setting if this is more convenient for the personnel involved. Supplemental meetings may be conducted as required by any changes in site conditions or to review field operational procedures. A field sampler checklist is provided in Appendix H. Sample labeling is presented in QAPP#14 & 16

WASTE CLASS SOIL SAMPLING RATIONALE

Using ERT SOP #2001(ERT-PROC-2001-20), the waste characterization soil samples will be collected from the stockpiles as individual grabs, samples collected from each stockpile will then be composited and submitted to the analytical laboratory for analysis of Full TCLP (minus TCLP VOCs), RCRA Characteristics. Waste characterization soil samples will be collected specified by requirements of the soil disposal facility (Clean Earth of Kearny). Previous Site investigative reports, project planning between the USEPA, SBI and Envocare, and visual evidence will determine field screening used to bias to the highest soil contamination and field screening results.

Disposable equipment such as PPE, macro cores for soil borings and disposable sterile sampling scoop will be used for all sampling events. Decontamination includes the use of Alconox© and rinse of DI water. Refer to QAPP #26 & 27 and the Health and Safety Plan (HASP) for more information on decontamination and disposal of site-specific equipment.

Using grid sampling discussed in the section below, one soil sample from each grid within stockpile will be analyzed for TCL/TAL to identify compound of concern that may be present above the project action limits but reported below hazardous levels. Based on the results of previous investigation, CDM Smith's sampling of the piles in November 2020 indicated that piles B and C yielded hazardous contaminant concentrations for lead and that the results for pile A yielded PCB concentrations indicative of Toxic Substances Control Act (TSCA) waste. It is expected that the contaminant concentrations identified during the next round of waste classification soil sampling of the piles will be very similar to CDM Smith's sampling of the piles, ENVOCARE recommends disposal of stockpiles as hazardous waste.

The waste classification soil samples collected by CDM Smith from stockpile A through C confirms the stockpile material exceeded hazardous waste criteria published by the EPA. However, CDM Smith only did partial analysis requirements of the soil disposal facility. The supplement soil sampling proposed as part of this SAP will be utilized in conjunction with CDM Smith 2020 data to meet the full disposal facility acceptance criteria. All stockpile soil will be disposed of based on CDM Smith Classification of the

stockpiles. The waste characterization soil samples will be collected from the stockpiles as outlined in waste characterization sampling table below.

All soil sample results will be submitted to USEPA OSC in a form of a letter report with the proposed disposal facility details for authorization to proceed.

Waste Characterization Sampling						
Stockpile ID	Estimated Volume	Sample Matrix	Sample Method/ Type***	Depth (ft BGS)*	Estimate Number of Samples**	Proposed Laboratory Analysis
Stockpile A	300 cubic yards	Soil	Composite/ disposable sterile sampling scoop	2-5	3-5	Full TCLP (minus TCLP VOCs), Full TCL/TAL, RCRA Characteristics, Paint Filter,
		Soil	Grab/ disposable sterile sampling scoop	2-5	3-5	TCL VOCs, TCLP VO, EPH
Stockpile B	700 cubic yards	Soil	Composite/ disposable sterile sampling scoop	2-5	7-9	Full TCLP (minus TCLP VOCs), Full TCL/TAL, RCRA Characteristics, Paint Filter
		Soil	Grab/ disposable sterile sampling scoop	2-5	7-9	TCL VOCs, TCLP VO, EPH
Stockpile C	200 cubic yards	Soil	Composite/ disposable sterile sampling scoop	2-5	2-4	Full TCLP (minus TCLP VOCs), Full TCL/TAL, RCRA Characteristics, Paint Filter
		Soil	Grab/ disposable sterile sampling scoop	2-5	2-4	TCL VOCs, TCLP VO, EPH

*Samples taken will be beneath any DGA or stone found on site

**Number of samples provided is the number of composited samples to be submitted to the laboratory, not the number of grabs to be collected from the pile.

*** Sampling method based on ERT SOP#2001

TCL – Target Compound List
TAL – Target Analyte List
RCRA – Resources Conservation and Recovery Act
CN – Cyanide by EPA Method 9012B
VO/VOCs – Volatile Organic Compounds
TCLP -Toxicity Characteristic Leaching Procedure

Grid Sampling

The soil sampling methodology planned to address the question of potential impacts from pre-disposal soil characterization, and post removal soil characterization. The proposed plan is to collect one grab sample per grid. If one grab sample in the grids came back as hazardous and other grab samples in the grid did not, the stockpile will still be disposed as a Hazardous waste since CDM Smith 2020 data exceeded EPA

hazardous waste criteria. Figure 3 presents the proposed grids. These grids will be adjusted based on the drone survey.

The drone survey will be used to collect accurate GPS data and aerial photos to create 3D maps and models for estimating the volume of the stockpiles onsite and track site progress. Stockpile surveys can calculate how much material still needs to be removed using drone data software. Drone Survey checklist included in Appendix P

NJDEP guidance provides for one soil sample per 900 square feet (ft^2) to demonstrate remediation compliance plus one soil sample every 30 linear feet. To make sure enough soil samples were taken to verify we have no impact on the property, ENVOCARE recommends increasing sampling frequency to one soil sample per 400 ft^2 of stockpile material. One soil sample per 30 linear feet will be collected. Sampling frequency will remain the same and the square footage will be changed based on the area, volume of stockpile and field conditions.

Since previous soil sampling results reported PCBs concentration above hazardous levels (50 mg/kg), and lead concentrations were reported above the TCLP criteria published by the EPA and no new materials were introduced, one soil sample per every 100 cubic yards is proposed. The soil samples will be taken from areas identified to have significantly higher PID reading and/or is exhibiting unusual odor or visual appearance, using an excavator to assist on getting to sample collection depth from the suspected contaminated soil and using hand auger to collect samples. This information will be used to determine the post-removal soil analysis. ENVOCARE will coordinate sample locations and frequency of soil sample with USEPA OSC.

The Project Coordinator, representative of the respondent, and USEPA will be notified if soil is discovered that appears to contain unknown contaminants or soil that varies significantly from the type of contamination identified in the Administrative Settlement Agreement and Order on Consent for Removal Action (ASAOC).

POST REMOVAL SOIL SAMPLING RATIONALE

Following removal of the soil piles, post-removal soil sampling will be completed using grab sampling methods under and just outside the limits of the piles. It is anticipated that surface soil sampling will be completed beneath and just outside of the former soil piles following their removal (i.e., sample collection 0-6 inches below ground surface). Sampling locations will be selected based on professional judgment and in consultation with the USEPA OSC. If any material other than native soils are encountered during post-removal soil sampling (e.g., stone or dense grade aggregate (DGA)), this material will not be sampled, and native soils located directly beneath such material would be sampled (e.g., 0.5 - 1.0 feet below ground surface).

The sample will be preserved immediately (4 degrees Celsius and/or with appropriate reagent as detailed in QAPP#19 & 30), properly labeled, packaged for transportation as per Contract Laboratory Protocols

(CLP). Information such as sample number, location, collection time and sample description should be recorded in the field logbook. Associated paperwork (e.g., Chain of Custody forms, Sample Analysis Request forms) should then be completed and should stay with the sample cooler. The sample cooler should be packaged in a manner that will allow the appropriate storage temperature to be maintained during shipment to the lab.

Using grid sample methodology section discussed above, approximately 5-7 post-removal soil samples per pile will be collected from underneath and around the soil piles and compared to project action limits to determine cleanup objectives are met. Final decisions regarding the number of post-removal soil samples will be determined in the field depending on field conditions and excavated perimeter/area of stockpile by the ENVOCARE project manager in consultation with the USEPA OSC. Prior to the onset of post-removal sampling, an onsite meeting will be held between the ENVOCARE project manager and the USEPA OSC to establish a framework for the decisions that are to be made during subsequent post-removal sampling and communicated with relevant key project team members. Refer to Post Removal Sampling below.

Post Removal Sampling						
Stockpile ID	Estimated Area	Sample Matrix	Sample Method/ Type	Depth (ft BGS)	Estimated Number of Samples	Proposed Laboratory Analysis
Stockpile A	1,500 Ft^2	Soil	Grab/ disposable sterile sampling scoop	0.5 - 1	5 – 7*	PCBs, Lead, Mercury and additional analysis based on the Full TCL/TAL stockpile soil sample results
Stockpile B	1,000 Ft^2	Soil	Grab/ disposable sterile sampling scoop	0.5 - 1	5 – 7*	PCBs, Lead, Mercury and additional analysis based on the Full TCL/TAL stockpile soil sample results
Stockpile C	1,000 Ft^2	Soil	Grab/ disposable sterile sampling scoop	0.5 - 1	5 – 7*	PCBs, Lead, Mercury and additional analysis based on the Full TCL/TAL stockpile soil sample results

*Number of Samples estimated, additional samples added based on field conditions and communication with USEPA OSC

BACKGROUND SOIL SAMPLING RATIONALE

The NJDEP typically requires 9 or more soil samples to establish the background contaminants of concern concentrations. A total of 10 to 14 samples are proposed outside the stockpiled area to establish background conditions. If any stone or DGA is encountered during background soil sampling, this material will not be sampled, and native soils located beneath such material would be sampled (e.g., 0.5 - 1.0 feet below ground surface). Locations, depth and field screening were selected based on ENVOCARE's discussion with the SBI respondents regarding previous site activities and consultation with the USEPA OSC. Background sample standards will be developed after background samples have been collected as

discussed with the EPA OSC in project planning sessions. The background standard will most likely require use of statistical based analysis such as ProUCL or other statistically analysis to be determined with the USEPA; refer to steps 3 and 4 on QAPP #37. and be chosen based on the vicinity to the stockpiles on the property. Refer to Figure 4 for proposed background sample locations and methodology.

Background Soil Sampling				
Sample Matrix	Sample Method/ Type	Depth (ft BGS)	Estimated Number of Samples	Proposed Lab Analysis
Soil	Grab/ disposable sterile sampling scoop	0.5-1	10-14*	PCBs, Lead, Mercury and additional compounds will be added based on the Full TCL/TAL stockpile soil sample results (exceeding Project Action Limits)

*Additional Soil samples collected as part of the initial assessments done by Salomone Brothers and USEPA contractor presented in QAPP#10 will be used to develop background contaminants of concern concentrations. All samples collected prior to site disturbance as part of background studies will be tabulated and discussed with USEPA OSC for compliance attainment.

QAPP WORKSHEET #19 & 30: SAMPLE CONTAINERS PRESERVATION, PACKAGING AND SHIPPING

SAMPLE PRESERVATION

All samples will be collected according to the Field Sampling SOP(ERT-PROC-2001-20) and will be placed in laboratory provided bottles with the appropriate preservatives where required. Samples will be maintained at the recommended temperature requirements of (4 +/-2 degrees Celsius) and will be analyzed within the required holding time. The laboratory will perform the appropriate QA/QC verification as per the method to ensure that requirements, sample handling, preservation and holding times are met. The project parameters and method of shipment provided in Worksheet #26 & 27. Lab accreditation provided in Appendix M.

The following laboratories will provide the analyses indicated:

Lab Name/Location/Contact	Sample Matrix	Parameters
Chemtech Consulting Group (CLP) 284 Sheffield Street Mountainside, New Jersey 07092 POC: Jordan Hedvat Tel: 908 728-3144	Soil	Full TCLP (minus TCLP VOCs), Full TCL/TAL, RCRA Characteristics, Paint Filter TCL VOCs, TCLP VO, PCB, Lead, Hg

PACKAGING AND SHIPPING

All sample containers will be placed in a strong-outside shipping container (cooler). The following outlines the packaging procedures that will be followed for low concentration samples.

- Pre-frozen ice packs are used.
- The bottom of the cooler will be lined with bubble wrap to prevent breakage during shipment.
- Check caps for tightness and mark on the outside of the sample bottles with indelible ink.
- Wrap all glass sample containers in bubble wrap to prevent breakage.
- Seal all sample containers in heavy duty plastic zip-lock bags. Write the sample numbers on the outside of the plastic bags with indelible ink.
- Place samples in a sturdy cooler(s) lined with a large plastic trash bag. Enclose the appropriate COC(s) in a zip-lock plastic bag affixed to the underside of the cooler lid.
- Fill empty space in the cooler with bubble wrap or Styrofoam peanuts to prevent movement and breakage during shipment. Vermiculite should also be placed in the cooler to absorb spills if they occur.
- Ice used to cool samples will be double sealed in two zip lock plastic bags and placed on top and around the samples to chill them to the correct temperature.
- Each ice chest will be securely taped shut with fiberglass strapping tape, and custody seals will be affixed to the front, right and back of each cooler.

Matrix	Analytical Group	Method/SOP Reference	Containers (number, size, and type)	Preservation Requirements (Chemical, temperature, light protected)	Holding Time following Validated Time of Sample Receipt (VTSR)	Data Package Turnaround Time (Reviewed internally by lab)
Waste Class Characterization						
Soil	TCL VOCs Percent Moisture	SW-846 Method 8260D	(3) 5-gram Encore samplers or (1) 4 oz. clear glass jar	Cool to 4°C	Immediately keep on ice at 4°C; 24 hours to analysis; if preserved upon receipt at lab, 14 days to analysis	7 days preliminary data, 21 days validated data
	TCL SVOCs	SW-846 Method 8270E	(1) 8 oz. clear glass jar w/ Teflon lined cap	Cool to 4°C	14 days for extraction, 40 days to analysis	7 days preliminary data, 21 days validated data
	TCL Pesticides/PCBs	SW-846 Method 8081B/8082A	Included with TCL SVOCs	Cool to 4°C	14 days for extraction, 40 days to analysis	7 days preliminary data, 21 days validated data
	TCL Herbicide	SW-846 Method 8151A	Included with TCL SVOCs	Cool to 4°C	14 days	72 days preliminary data, 21 days validated data
	NJEPH	NJEPH	(1) 4 or 8 oz. clear glass jar w/ Teflon lined cap	Cool to 4°C	14 days	7 days preliminary data, 21 days validated data
	TAL Metals (includes Mercury)	SW-846 Method 6010/7471/7470	(1) 8 oz. clear glass jar w/ Teflon lined cap	Cool to 4°C	180 days (Metals), 28 days (Hg)	7 days preliminary data, 21 days validated data
	Cyanide	SW-846 9012B	(1) 8 oz. clear glass jar w/ Teflon lined cap	Cool to 4°C	14 days	7 days preliminary data, 21 days validated data
	TCLP VOCs	SW-846 Method 1311/8260D	(1) 4 oz. clear glass jar or 25-gram EnCore samplers	Cool to 4°C	14 days to TCLP extraction, 14 days to analysis	7 days preliminary data, 21 days validated data
	TCLP SVOCs	SW-846 Method 1311/8270E	(1) 8 oz. clear glass jar w/ Teflon lined cap	Cool to 4°C	14 days to TCLP extraction, 7 days to preparative extraction, 40 days to analysis	7 days preliminary data, 21 days validated data
	TCLP Pesticide	SW-846 Method 1311/8081A	Included with TCL SVOCs	Cool to 4°C	14 days to TCLP extraction, 7 days to preparative extraction, 40 days to analysis	7 days preliminary data, 21 days validated data
	TCLP Herbicide	SW-846 Method 1311/8151A	Included with TCL SVOCs	Cool to 4°C	14 days to TCLP extraction, 7 days to preparative extraction, 40 days to analysis	7 days preliminary data, 21 days validated data
	TCLP Metals	SW-846 Method 1311/6010D	(1) 8 oz. clear glass jar w/ Teflon lined cap	Cool to 4°C	180 days to TCLP extraction, 180 days to analysis	72 days preliminary data, 21 days validated data
	TCLP Mercury	SW-846 Method 1311/7470/7471	Included with TCLP Metals	Cool to 4°C	28 days to TCLP extraction, 28 days to analysis	72 days preliminary data, 21 days validated data
	Corrosivity	SW-846 Method 9045	(1) 8 oz. clear glass jar w/ Teflon lined cap	Cool to 4°C	15 minutes or ASAP (with flag)	7 days preliminary data, 21 days validated data
	Ignitability	SW-846 Method 1030	Included with Corrosivity	Cool to 4°C	None	7 days preliminary data, 21 days validated data
	Reactive Cyanide	SW-846 9012B	Included with Corrosivity	Cool to 4°C	14 days	7 days preliminary data, 21 days validated data
	Reactive Sulfide	SW-846 9034	Included with Corrosivity	Cool to 4°C	14 days	7 days preliminary data, 21 days validated data
	Paint Filter	SW-846 Method 9095	(1) 8 oz. clear glass jar w/ Teflon lined cap	Cool to 4°C	None	7 days preliminary data, 21 days validated data

QAPP WORKSHEET #20: FIELD QUALITY CONTROL SUMMARY

Field Quality Control Samples								
Matrix	**Analyte/Analytical Parameters**	**Field Samples**	**Field Duplicates**	**Matrix Spike**	**Matrix Spike Duplicate**	**Equipment /Rinsate Blanks[2]**	**Trip Blanks[1]**	**Total # Analyses**
Soil	TCL VOCs	12-18	1 per 20	1 per 20	1 per 20	1 per day	1 per day	17-23
Soil	TCL SVOCs	12-18	1 per 20	1 per 20	1 per 20	1 per day	none	17-23
Soil	TCL Pesticides/PCBs*	37-51	1 per 20	1 per 20	1 per 20	1 per day	none	42-56
Soil	TCL Herbicide	12-18	1 per 20	1 per 20	1 per 20	1 per day	none	17-23
Soil	NJEPH	12-18	1 per 20	1 per 20	1 per 20	1 per day	none	17-23
Soil	TAL Metals*	37-51	1 per 20	1 per 20	1 per 20	1 per day	none	42-56
Soil	TCLP VOCs	12-18	1 per 20	1 per 20	1 per 20	1 per day	1 per day	17-23
Soil	TCLP SVOCs	12-18	1 per 20	1 per 20	1 per 20	1 per day	none	17-23
Soil	TCLP Pesticides	12-18	1 per 20	1 per 20	1 per 20	1 per day	none	17-23
Soil	TCLP Herbicides	12-18	1 per 20	1 per 20	1 per 20	1 per day	none	17-23
Soil	TCLP Metals	12-18	1 per 20	1 per 20	1 per 20	1 per day	none	17-23
Soil	TCLP Mercury	12-18	1 per 20	1 per 20	1 per 20	1 per day	none	17-23
Soil	Corrosivity	12-18	1 per 20	n/a	n/a	1 per day	none	17-23
Soil	Ignitability	12-18	1 per 20	n/a	n/a	1 per day	none	17-23
Soil	Reactive Cyanide	12-18	1 per 20	1 per 20	1 per 20	1 per day	none	17-23
Soil	Reactive Sulfide	12-18	1 per 20	1 per 20	1 per 20	1 per day	none	17-23
Soil	Paint Filter	12-18	1 per 20	n/a	n/a	1 per day	none	17-23
Soil	Total Cyanide	12-18	1 per 20	1 per 20	1 per 20	1 per day	none	17-23

*Includes post removal and background samples

1: A trip blank is a sample of analyte-free media collected in the same type of container used for the analytical test. It is meant to remain unopened and to accompany the sample containers throughout the sampling and shipping process. Chapter 2.6.1.2.1 of NJDEP's Field Sampling Procedures Manual discusses trip blanks for VOCs only.

2: a blank consisting of analyte-free media which has been used to rinse the sampling equipment.

QAPP WORKSHEET #21 & 22: FIELD SOPs, FIELD EQUIPMENT CALIBRATION MAINTENACE TESTING AND INSPECTION

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Y/N)	Comment
SOP#2001	General Field Sampling Guidelines; Rev. 1.0, October 2020	EPA's ERT	Site Specific such as excavator, surveying wheel	N	Not applicable
NJDEP Field Sampling Procedure Manual	Ch6. Field Sampling Procedure Manual 2005 Edition	NJDEP SRP	disposable sterile sampling scoop, amberglass jars	N	Background and Post removal samples
SOP #2017	Waste Pile Sampling, Rev. 1.0, December 2018	EPA's ERT	disposable sterile sampling scoop, amberglass jars,	N	Waste characterization
SOP #2002	Sample Documentation, Rev 1.0, October 2020	EPA's ERT	Field Logbook	N	Not applicable
SOP #2008, ERT-PROC-2136-21-R1	General Air Monitoring and Sampling Guidelines, Rev 1.0, October 2020	EPA's ERT	Dusttrak, Aeroqual, MultiRae Lite, Jerome (431X Vapor Mercury Analyzer	N	Community Air monitoring
None	Appendix P Drone checklist	Envocare	Drone	N	Not applicable

- Reference ERT SOPs: https://response.epa.gov/site/doc_list.aspx?site_id=2107

Field Equipment	Calibration Activity	Maintenance Activity	Testing/ Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
Honeywell MultiRae Lite	Prior to each day use	Charge battery when low	Field Screening to establish background	Charge battery at least daily	For data accuracy zero and span calibrations are done	Charge battery when low or replace battery if it does not hold charge	Field Staff	SOP #2008
Jerome (431X Vapor Mercury Analyzer	Factory-calibrated by Manufacturer	Charge battery when low	Calibration instructions and kit will be provided by manufacturer	Charge battery at least daily	For data accuracy calibration data sheet will be provided by manufacturer	Charge battery when low or replace battery if it does not hold charge	Equipment Vendor, Field Staff	ERT-PROC-2136-21-R1
Dusttrak	Factory-calibrated by Manufacturer	Charge battery when low	Calibration instructions and kit will be provided by manufacturer	Charge battery at least daily	For data accuracy calibration data sheet will be provided by manufacturer	Charge battery when low or replace battery if it does not hold charge	Equipment Vendor, Field Staff	SOP #2008
Aeroqual	Factory-calibrated by Manufacturer	Charge battery when low	Calibration instructions and kit will be provided by manufacturer	Charge battery at least daily	For data accuracy calibration data sheet will be provided by manufacturer	Charge battery when low or replace battery if it does not hold charge	Equipment Vendor, Field Staff	SOP #2008
Drone	Prior to each day use	Charge battery when low	Field Screening to establish background	Charge battery at least daily	Refer to Appendix P Drone survey checklist	Charge battery when low or replace battery if it does not hold charge	Field Staff	Appendix P

QAPP WORKSHEET #23 24 & 25: ANALYTICAL SOPs, INSTRUMENT CALIBRATION, MAINTENANCE, TESTING AND INSPECTION

Reference Number	Title, Revision Date, and/or Number and URL (if available)	Definitive or Screening Data	Analytical Group	Instrument	Modified for Project Work? (Y/N) *
M8260D-SWGCMSVOA/ M1311-TCLP	Refer to Appendix O	Definitive	TCL VOCs/ TCLP VOCs	Low/Medium Concentrations of Volatile Organic Compounds Analysis	N
M8270E-BNA/ M1311-TCLP	Refer to Appendix O	Definitive	TCL SVOCs/ TCLP SVOCs	Semivolatile Organic Compounds Analysis	N
M8081B-Pesticide/ M1311-TCLP	Refer to Appendix O	Definitive	TCL Pesticides/ TCLP Pesticides	Pesticides Analysis	N
M8082A-PCB	Refer to Appendix O	Definitive	TCL PCBs	Aroclors Analysis	N
M6020B-Metals ICPMS/ M1311-TCLP	Refer to Appendix O	Definitive	TCL Metals/TCLP Metals	Inductively Coupled Plasma – Atomic Emission Spectroscopy Metals Analysis	N
M7471B-Mercury/ M1311-TCLP	Refer to Appendix O	Definitive	Mercury/ TCLP Mercury	Cold Vapor Mercury Analysis	N
M8151A-Herbicide /M1311-TCLP	Refer to Appendix O	Definitive	TCL Herbicide/ TCLP Herbicides	Herbicide Analysis	N
MNJDEP-EPH	Refer to Appendix O	Definitive	NJEPH	NJEPH Analysis	N
M9045D-pH	Refer to Appendix O	Definitive	Corrosivity	Corrosivity Analysis	N
M1030-Ignitability	Refer to Appendix O	Definitive	Ignitability	Ignitability Analysis	N
M9012B-Total	Refer to Appendix O	Definitive	Total/ Reactive Cyanide	Total/ Reactive Cyanide Analysis	N
M9034/SM4500 S F-Sulfide	Refer to Appendix O	Definitive	Reactive Sulfide	Reactive Sulfide Analysis	N
M9095B-Free Liquids	Refer to Appendix O	Definitive	Paint Filter	Paint Filter Analysis	N

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
GC	Appendix O	Appendix O	Appendix O	Appendix O	Laboratory GC Technician	Refer to VOCs reference analysis
GC/MS	Appendix O	Appendix O	Appendix O	Appendix O	Laboratory GC/MS Technician	Refer to VOCs reference analysis
GC/ECD	Appendix O	Appendix O	Appendix O	Appendix O	Laboratory GC/ECD Technician	Refer to PCBs reference analysis
ICP-AES	Appendix O	Appendix O	Appendix O	Appendix O	Laboratory ICP-AES Technician	Refer to Metals reference analysis
CVAA (Mercury)	Appendix O	Appendix O	Appendix O	Appendix O	Laboratory CVAA Technician	Refer to mercury reference analysis
Automated Spectrometer (Cyanide)	Appendix O	Appendix O	Appendix O	Appendix O	Laboratory Automated Spectrometer Technician	Refer to Cyanide reference analysis

Instrument/ Equipment	Maintenance Activity	Testing/Inspection Activity	Frequency	Acceptance Criteria	Corrective Action (CA)	Responsible Person for CA	SOP Reference[1]
GC	See Appendix O; as per instrument manufacturer's recommendations	See Appendix O; as per instrument manufacturer's recommendations	See Appendix O; as per instrument manufacturer's recommendations	Acceptable re-calibration; see Appendix O	Inspect system, correct issue, re-calibrate, re-analyze samples as necessary	Laboratory GC Technician	Refer to VOCs reference analysis
GC/MS	See Appendix O; as per instrument manufacturer's recommendations	See Appendix O; as per instrument manufacturer's recommendations	See Appendix O; as per instrument manufacturer's recommendations	Acceptable re-calibration; see Appendix O	Inspect system, correct issue, re-calibrate, re-analyze samples as necessary	Laboratory GC/MS Technician	Refer to VOCs reference analysis
GC/ECD	See Appendix O; as per instrument manufacturer's recommendations	See Appendix O; as per instrument manufacturer's recommendations	See Appendix O; as per instrument manufacturer's recommendations	Acceptable re-calibration; see Appendix O	Inspect system, correct issue, re-calibrate, re-analyze samples as necessary	Laboratory GC/ECD Technician	Refer to PCBs reference analysis
ICP-AES	See Appendix O; as per instrument manufacturer's recommendations	See Appendix O; as per instrument manufacturer's recommendations	See Appendix O; as per instrument manufacturer's recommendations	Acceptable re-calibration; see Appendix O	Inspect system, correct issue, re-calibrate, re-analyze samples as necessary	Laboratory ICP-AES Technician	Refer to Metals reference analysis
CVAA (Mercury)	See Appendix O; as per instrument manufacturer's recommendations	See Appendix O; as per instrument manufacturer's recommendations	See Appendix O; as per instrument manufacturer's recommendations	Acceptable re-calibration; see Appendix O	Inspect system, correct issue, re-calibrate, re-analyze samples as necessary	Laboratory CVAA Technician	Refer to mercury reference analysis
Spectro-photometer	See Appendix O; as per instrument manufacturer's recommendations	See Appendix O; as per instrument manufacturer's recommendations	See Appendix O; as per instrument manufacturer's recommendations	Acceptable re-calibration; see Appendix O	Inspect system, correct issue, re-calibrate, re-analyze samples as necessary	Laboratory Spectrophotometer Technician	Refer to Cyanide reference analysis

QAPP WORKSHEETS #26 &27: SAMPLE HANDLING CUSTODY, AND DISPOSAL

SAMPLE CHAIN OF CUSTODY FORMS

Each sample container shall be labeled to document project location, contractor name, sample location, sample depth, date, and time of sampling. A chain-of-custody form will accompany the samples. The chain of custody will include sample ID, number of sample containers, analysis required and type of contaminants if known at the time of sampling. Appendix I presents a sample chain of custody.

Following SOP#2002, All sample coolers will be arranged for pick up from the ENVOCARE office under chain of custody seal or pick up at site by laboratory. Mayur Patel of ENVOCARE will be the point of contact responsible for sample handling/custody in the field.

DISPOSAL OF RESIDUAL MATERIAL

During the course of environmental sample collection is being performed, the sampling personnel will generate various types of potentially contaminated investigation-derived waste (IDW) that may include the following:

- Used PPE and disposable equipment will be bagged and placed in a drum and shipped with hazardous stockpile soil. PPE material will be sampled for hazardous waste classification prior to shipping to the non-hazardous waste at the municipal landfill if approved by the USEPA OSC.
- All decontamination liquid generated during the project (e.g. sampling apparatuses, excavation equipment) will be drummed and disposed of at the USEPA approved disposal facility (CENJ). Decontamination liquid will be sampled for hazardous waste classification prior to shipping to a state/federally approved facility. Any IDW shipped from the Site to an off-site facility will be done so in accordance with applicable regulations and requirements, and in compliance with Section 121(d)(3) of CERCLA, 42 U.S.C. § 9621(d)(3), 40 C.F.R. § 300.440, USEPA's "Guide to Management of Investigation Derived Waste," OSWER 9345.3-03FS (April 2012).

The USEPA's National Contingency Plan (NCP) requires that management of IDW generated during sampling comply with all applicable or relevant and appropriate requirements (ARARs) to the extent practicable. The sampling plan will follow the *Management of Investigation Derived Waste* (LSASDPROC-202-R4; May 2020) and *Guide to Management of Investigation-Derived Wastes* (Office of Solid Waste and Emergency Response Publication No.9345.3-03FS; April 2012)., which provides the guidance for the management of IDW. In addition, other legal and practical considerations that may affect the handling of IDW will be considered.

QAPP WORKSHEET #28 ANALYTICAL QUALITY CONTROL AND CORRECTIVE ACTION

Matrix	Soil / Leachate
Analytical Group	TCL VOCs / TCLP VOCs
Analytical Method/SOP Reference	SW846 8260 / SW846 1311 (TCLP Leachate)

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Measurement Performance Criteria
Field Duplicate	1 per 20 samples	None	None for laboratory. Project personnel will assess duplicate results, notify PM and address in data usability.	Project Personnel	RPD < 50%
Field Equipment Rinsate Blank	1 per day	No analyte > CRQL*	Verify results. Flag outliers. Check decontamination procedures.	Laboratory Analyst / Project Personnel	No analyte > CRQL*
Temperature Blank	1 per cooler	0 to 6 degrees C	Laboratory will inform ENVOCARE PM and note in data narrative. Project personnel will check packing procedure and increase coolant.	Laboratory Analyst / Project Personnel	≤ 6 degrees C
Method Blank	1 per 12 hours	No analyte > CRQL*	Suspend analysis until source investigated/ rectified; reanalyze.	Laboratory GC/MS Technician	No analyte > CRQL*
Instrument Blank	After a sample exceeds calibration range or maximum contamination criteria	No target analyte > CRQL; no non-target analyte > 4x CRQL of target analyte	Suspend analysis until source investigated/ rectified; reanalyze affected samples.	Laboratory GC/MS Technician	No target analyte > CRQL; no non-target analyte > 4x CRQL of target analyte
Storage Blank	1 per SDG	No analyte > CRQL*	Investigate source of contamination, reanalyze.	Laboratory GC/MS Technician	No analyte > CRQL*

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits		Corrective Action	Person(s) Responsible for Corrective Action	Measurement Performance Criteria	
Deuterated Monitoring Compounds	All samples	Vinyl chloride-d3	30-150%R	Check calculations and instruments, reanalyze affected samples; up to 3 DMCs per sample may fail to meet necessary limits	Laboratory GC/MS Technician	Vinyl chloride-d3	30-150%R
		Chloroethane-d5	30-150%R			Chloroethane-d5	30-150%R
		1,1-Dichloroethene-d2	45-110%R			1,1-Dichloroethene-d2	45-110%R
		2-Butanone-d5	20-135%R			2-Butanone-d5	20-135%R
		Chloroform-d	40-150%R			Chloroform-d	40-150%R
		1,2-Dichloroethane-d4	70-130%R			1,2-Dichloroethane-d4	70-130%R
		Benzene-d6	20-135%R			Benzene-d6	20-135%R
		1,2-Dichloropropane-d6	70-120%R			1,2-Dichloropropane-d6	70-120%R
		Toluene-d8	30-130%R			Toluene-d8	30-130%R
		trans-1,3-Dichloropropene-d4	30-135%R			trans-1,3-Dichloropropene-d4	30-135%R
		2-Hexanone-d5	20-135%R			2-Hexanone-d5	20-135%R
		1,1,2,2-Tetrachloroethane-d2	45-120%R			1,1,2,2-Tetrachloroethane-d2	45-120%R
		1,2-Dichlorobenzene-d4	75-120%R			1,2-Dichlorobenzene-d4	75-120%R
Internal Standards	All samples	The EICP area for each of the internal standards in the sample must be within the range of 50–200% of its response in the most recent opening CCV standard analysis or in the ICV standard analysis in the analytical sequence. The RT shift for each of the internal standards in the sample must be within ±10 seconds of its RT in the most recent opening CCV standard analysis or in the ICV standard analysis in the analytical sequence.		Check calculations/ instruments, reanalyzeaffected samples.	Laboratory GC/MS Technician	The EICP area for each of the internal standards in the sample must be within the range of 50–200% of its response in the most recent opening CCV standard analysis or in the ICV standard analysis in the analytical sequence. The RT shift for each of the internal standards in the sample must be within ±10 seconds of its RT in the most recent opening CCV standard analysis or in the ICV standard analysis in the analytical sequence.	
Matrix Spike, Matrix Spike Duplicate	1 per 20 samples or less, if requested	1,1-Dichloroethene	59-172%R	Reanalyze; flag outliers	Laboratory GC/MS Technician	1,1-Dichloroethene	59-172%R
		Trichloroethene	62-137%R			Trichloroethene	62-137%R
		Benzene	66-142%R			Benzene	66-142%R
		Toluene	59-139%R			Toluene	59-139%R
		Chlorobenzene	60-133%R			Chlorobenzene	60-133%R
Matrix Spike/ Matrix Spike Duplicate	1 per 20 samples or less, if requested	1,1-Dichloroethene	0-22%RPD	Reanalyze; flag outliers	Laboratory GC/MS Technician	1,1-Dichloroethene	0-22%RPD
		Trichloroethene	0-24%RPD			Trichloroethene	0-24%RPD
		Benzene	0-21%RPD			Benzene	0-21%RPD
		Toluene	0-21%RPD			Toluene	0-21%RPD
		Chlorobenzene	0-21%RPD			Chlorobenzene	0-21%RPD

* Except for methylene chloride, 2-butanone, and acetone, which must be less than to 2 times the CRQL

Matrix	Soil / Leachate
Analytical Group	TCL SVOCs / TCLP SVOCs
Analytical Method/SOP Reference	SW846 8270 / SW846 1311 (TCLP Leachate)

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits		Corrective Action	Person(s) Responsible for Corrective Action	Measurement Performance Criteria	
Field Duplicate	1 per 20 samples	None		None for laboratory. Project personnel will assess duplicate results, notify PM and address in data usability.	Project Personnel	RPD < 50%	
Field Equipment Rinsate Blank	1 1 per day	No analyte >CRQL		Verify results. Flag outliers. Check decontamination procedures.	Laboratory Analyst / Project Personnel	No analyte >CRQL	
Temperature Blank	1 per cooler	0 to 6 degrees C		Laboratory will inform ENVOCARE PM and note in data narrative. Project personnel will check packing procedure and increase coolant.	Laboratory Analyst / Project Personnel	≤ 6 degrees C	
Method Blank	1 per 20 samples orless whenever samples are extracted	No analyte >CRQL*		Suspend analysis source recertified and reanalyzed	Laboratory GC/MS Technician	No analyte > CRQL	
Deuterated Monitoring Compounds(DMC)	All samples	1,4-Dioxane-d8**	15-120%R	Check calculationsand instruments, reanalyze affected samples; up to 4 DMCs may fail to meet recovery limits but %Rs must be >0	Laboratory GC/MS Technician	1,4-Dioxane-d8**	15-120%R
		Phenol-d5	10-130%R			Phenol-d5	10-130%R
		Bis(2-chloroethyl)ether-d8	10-150%R			Bis(2-chloroethyl)ether-d8	10-150%R
		2-Chlorophenol-d4	15-120%R			2-Chlorophenol-d4	15-120%R
		4-Methylphenol-d8	10-140%R			4-Methylphenol-d8	10-140%R
		4-Chloroaniline-d4**	1-145%R			4-Chloroaniline-d4**	1-145%R
		Nitrobenzene-d5	10-135%R			Nitrobenzene-d5	10-135%R
		2-Nitrophenol-d4	10-120%R			2-Nitrophenol-d4	10-120%R

* except for bis (2-Ethylhexyl) phthalate which can be up to 5 times the CRQL

** advisory limits

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits		Corrective Action	Person(s) Responsible for Corrective Action	Measurement Performance Criteria	
Deuterated Monitoring Compounds (cont'd)	All samples	2,4-Dichlorophenol-d3	10-140%R	Check calculationsand instruments, reanalyze affectedsamples; up to 4 DMCs may fail to meet recovery limits	Laboratory GC/MS Technician	2,4-Dichlorophenol-d3	10-140%R
		Dimethylphthalate-d6	10-145%R			Dimethylphthalate-d6	10-145%R
		Acenaphthylene-d8	15-120%R			Acenaphthylene-d8	15-120%R
		4-Nitrophenol-d4	10-150%R			4-Nitrophenol-d4	10-150%R
		Fluorene-d10	20-140%R			Fluorene-d10	20-140%R
		4,6-Dinitro-2-methylphenol-d2	10-130%R			4,6-Dinitro-2-methylphenol-d2	10-130%R
		Anthracene-d10	10-150%R			Anthracene-d10	10-150%R
		Pyrene-d10	10-130%R			Pyrene-d10	10-130%R
		Benzo(a)pyrene-d12	10-140%R			Benzo(a)pyrene-d12	10-140%R
Internal Standards	All samples	The EICP area for each of the internal standards in the sample must be within the range of 50–200% of its response in the most recent opening CCV standard analysis or in the ICV standard analysis in the analytical sequence. The RT shift for each of the internal standards in the sample must be within ±30 seconds of its RT in the most recent opening CCV standard analysis or in the ICV standard analysis in the analytical sequence.		Check calculations and instruments, reanalyze affected samples	Laboratory GC/MS Technician	The EICP area for each of the internal standards in the sample must be within the range of 50–200% of its response in the most recent opening CCV standard analysis or in the ICV standard analysis in the analytical sequence. The RT shift for each of the internal standards in the sample must be within ±30 seconds of its RT in the most recent opening CCV standard analysis or in the ICV standard analysis in the analytical sequence.	

* except for bis (2-Ethylhexyl) phthalate which can be up to 5 times the CRQL

** advisory limits

EICP: Enzyme-Induced carbonate precipitation

ICV-Initial calibration verification

CCV- Continuing calibration verification

RT- Retention time

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits		Corrective Action	Person(s) Responsible for Corrective Action	Measurement Performance Criteria	
LCS	1 per 20 samples	No specified %R limits. Must meet internal standards acceptance criteria and DMC %Rs. Will be lab derived acceptance limits. Refer to Appendix G		Reanalyze. If LCS still fails criteria, re-extract and re-analyze all associated samples.	Laboratory GC/MS Technician	Project Specific %Rs. Must meet internal standards acceptance criteria and DMC %R. Will be lab derived acceptance limits. Refer to Appendix G	
Matrix Spike, Matrix Spike Duplicate	1 per 20 samples or less, if requested	Phenol	26-90%R	Reanalyze; flag outliers	Laboratory GC/MS Technician	Phenol	26-90%R
		2-Chlorophenol	25-102%R			2-Chlorophenol	25-102%R
		N-Nitroso-di-n-propylamine	41-126%R			N-Nitroso-di-n-propylamine	41-126%R
		4-Chloro-3-methylphenol	26-103%R			4-Chloro-3-methylphenol	26-103%R
		Acenaphthene	31-137%R			Acenaphthene	31-137%R
		4-Nitrophenol	11-114%R			4-Nitrophenol	11-114%R
		2,4-Dinitrotoluene	28-89%R			2,4-Dinitrotoluene	28-89%R
		Pentachlorophenol	17-109%R			Pentachlorophenol	17-109%R
		Pyrene	35-142%R			Pyrene	35-142%R
		1,4-Dioxane	15-120%R			1,4-Dioxane	15-120%R
Matrix Spike / Matrix Spike Duplicate	1 per 20 samples or less, if requested	Phenol	0-35%RPD	Reanalyze; flag outliers	Laboratory GC/MS Technician	Phenol	0-35%RPD
		2-Chlorophenol	0-50%RPD			2-Chlorophenol	0-50%RPD
		N-Nitroso-di-n-propylamine	0-38%RPD			N-Nitroso-di-n-propylamine	0-38%RPD
		4-Chloro-3-methylphenol	0-33%RPD			4-Chloro-3-methylphenol	0-33%RPD
		Acenaphthene	0-19%RPD			Acenaphthene	0-19%RPD
		4-Nitrophenol	0-50%RPD			4-Nitrophenol	0-50%RPD
		2,4-Dinitrotoluene	0-47%RPD			2,4-Dinitrotoluene	0-47%RPD
		Pentachlorophenol	0-47%RPD			Pentachlorophenol	0-47%RPD
		Pyrene	0-36%RPD			Pyrene	0-36%RPD
		1,4-Dioxane	0-50%RPD			1,4-Dioxane	0-50%RPD

Matrix	Soil / Leachate
Analytical Group	TCL Pesticides / TCLP Pesticides
Analytical Method/SOP Reference	SW846 8081 / SW846 1311 (TCLP Leachate)

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits		Corrective Action	Person(s) Responsible for Corrective Action	Measurement Performance Criteria	
Field Duplicate	1 per 20samples	None		None for laboratory. Project personnel will assess duplicate results, notify PM and address in data usability.	Project Personnel	RPD < 50%	
Field Equipment Rinsate Blank	1 per day	No analyte > CRQL		Verify results; reanalyze. Flag outliers. Project personnel will check decontamination procedures.	Laboratory Analyst / Project Personnel	No analyte > CRQL	
Temperature Blank	1 per cooler	0 to 6°C		Laboratory will inform ENVOCARE PM and note in data narrative. Project personnel will check packing procedure and increase coolant.	Laboratory Analyst / Project Personnel	≤ 6 degrees C	
Instrument Blank	First analysis in a 12-hour sequence must be an instrument blank	No analyte > CRQL		Suspend analysis; acceptable instrument blank must be analyzed before any additional sample analysis. All samples analyzed after the last acceptable instrument blank shall be reinjected with a valid analytical sequence and reported.	Laboratory GC/ECD Technician	No analyte > CRQL	
Method Blank	1 per 20 samples or less whenever samples extracted	No analyte > CRQL		Suspend analysis; re-extractand reanalyze affected samples.	Laboratory GC/ECD Technician	No analyte > CRQL	
Surrogate	All samples	Tetrachloro-m-xylene	30–150 %R	Check calculations and instruments, reanalyzed affected samples.	Laboratory GC/ECD Technician	Tetrachloro-m-xylene	30-150 %R
		Decachlorobiphenyl	30–150 %R			Decachlorobiphenyl	30–150 %R

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits		Corrective Action	Person(s) Responsible for Corrective Action	Measurement Performance Criteria	
LCS	1 per 20 samples	gamma-BHC	50-120%R	Check calculations and instruments, reanalyze affected samples.	Laboratory GC/ECD Technician	gamma-BHC	50-120%R
		Heptachlor epoxide	50-150%R			Heptachlor epoxide	50-150%R
		Dieldrin	30-130%R			Dieldrin	30-130%R
		4,4'-DDE	50-150%R			4,4'-DDE	50-150%R
		Endrin	50-120%R			Endrin	50-120%R
		Endrin sulfate	50-120%R			Endrin sulfate	50-120%R
		trans-Chlordane	30-130%R			trans-Chlordane	30-130%R
Matrix Spike, Matrix Spike Duplicate	1 per 20samples	gamma-BHC(Lindane)	46-127 %R	Reanalyze; flag outliers (advisory).	Laboratory GC/ECD Technician	gamma-BHC(Lindane)	46-127 %R
		Heptachlor	35-130 %R			Heptachlor	35-130 %R
		Aldrin	34-132 %R			Aldrin	34-132 %R
		Dieldrin	31-134 %R			Dieldrin	31-134 %R
		Endrin	42-139 %R			Endrin	42-139 %R
		4,4'-DDT	23-134 %R			4,4'-DDT	23-134 %R
Matrix Spike / Matrix Spike Duplicate	1 per 20samples	gamma-BHC	0-50 %RPD	Reanalyze; flag outliers (advisory).	Laboratory GC/ECD Technician	gamma-BHC	0-50 %RPD
		Heptachlor	0-31 %RPD			Heptachlor	0-31 %RPD
		Aldrin	0-43 %RPD			Aldrin	0-43 %RPD
		Dieldrin	0-38 %RPD			Dieldrin	0-38 %RPD
		Endrin	0-45 %RPD			Endrin	0-45 %RPD
		4,4'-DDT	0-50 %RPD			4,4'-DDT	0-50 %RPD

Matrix	Soil
Analytical Group	TCL PCBs
Analytical Method/SOP Reference	EPA Method 8082

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits		Corrective Action	Person(s) Responsible for Corrective Action	Measurement Performance Criteria	
Field Duplicate	1 per 20 samples	None		None for laboratory. Project personnel will assess duplicate results, notify PM and address in data usability.	Project Personnel	RPD < 50%	
Field Equipment Rinsate Blank	1 per day	No analyte > CRQL		Verify results; re-analyze. Flag outliers. Check decontaminationprocedures.	Laboratory Analyst / Project Personnel	No analyte > CRQL	
Temperature Blank	1 per cooler	0 to 6 degrees C		Laboratory will inform ENVOCARE PM and note in data narrative. Project personnel will check packing procedure and increase coolant.	Laboratory Analyst / Project Personnel	≤ 6 degrees C	
Instrument Blank	First analysis in a 12-hour sequence must be an instrument blank	No analyte > CRQL		Suspend analysis; acceptable instrument blank must be analyzed before any additional sample analysis. All samples analyzed after the last acceptable instrument blank shall be reinjected with a valid analytical sequence and reported.	Laboratory GC/ECD Technician	No analyte > CRQL	
Method Blank	1 per ≤20 samples or whenever samples extracted	No analyte > CRQL		Suspend analysis; re-extract and reanalyze affected samples.	Laboratory GC/ECD Technician	No analyte > CRQL	
Surrogates	All samples	Tetracholoro-m-xylene	30-150 %R	Check calculations and instruments, reanalyze affected samples.	Laboratory GC/ECD Technician	Tetracholoro-m-xylene	30-150 %R
		Decachlorobiphenyl	30-150 %R			Decachlorobiphenyl	30-150 %R
LCS	1 per ≤20 samples	Aroclor-1016	50-150 %R	Check calculations and instruments, reanalyze affected samples.	Laboratory GC/ECD Technician	Aroclor-1016	50-150 %R
		Aroclor-1260	50-150 %R			Aroclor-1260	50-150 %R
Matrix Spike, Matrix Spike Duplicate	1 per 20 samples	Aroclor-1016	29-135 %R	Reanalyze; flag outliers	Laboratory GC/ECD Technician	Aroclor-1016	29-135 %R
		Aroclor-1260	29-135 %R			Aroclor-1260	29-135 %R
Matrix Spike / Matrix Spike Duplicate	1 per 20 samples	Aroclor-1016	0-15 %RPD	Reanalyze; flag outliers	Laboratory GC/ECD Technician	Aroclor-1016	0-15 %RPD
		Aroclor-1260	0-20 %RPD			Aroclor-1260	0-20 %RPD

Matrix	Soil / Leachate
Analytical Group	TAL Metals / TCLP Metals
Analytical Method/SOP Reference	SW 846 6020, / SW846 1311, SW 846 6020,

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Measurement Performance Criteria
Field Duplicate	1 per 20 samples	None	None for laboratory. Project personnel will assess duplicate results, notify PM and address in data usability.	Project Personnel	RPD < 50%
Field Equipment Rinsate Blank	1 per day	No analyte > CRQL	Verify results; re-analyze. Flag outliers. Project personnel will check decontamination procedures.	Laboratory Analyst / Project Personnel	No analyte > CRQL
Temperature Blank	1 per cooler	0 to 6 degrees C	Laboratory will inform ENVOCARE PM and note in data narrative. Project personnel will check packing procedure and increase coolant.	Laboratory Analyst / Project Personnel	≤ 6 degrees C
Preparation Blank	1 per 20 samples	Absolute value of results ≤ CRQL	ICP-AES to determine which samples will need to be re-prepared and reanalyzed.	Laboratory ICP Technician	Absolute value of results ≤ CRQL
Interference Check Sample	Beginning of each run	±15% of true value or within ±1 times CRQL of true value, whichever is greater	Check calculations and instruments; recalibrate, and reanalyze affected samples	Laboratory ICP Technician	±15% of true value or within ±1 times CRQL of true value, whichever is greater
LCS	1 per 20 samples	70-130%R, except Ag and Sb 50-150%R	Suspend analysis until source rectified; re-digest and reanalyze affected samples	Laboratory ICP Technician	70-130%R, except Ag and Sb 50-150%R
Matrix Spike	1 per 20 samples	75-125%R (exception Ag)*	Flag outliers; perform Post-Digestion Spike for analytes not meeting criteria.	Laboratory ICP Technician	75-125%R (exception Ag)
Post-Digestion Spike	After any analyte (except Ag) fails matrix spike %R	75-125%R	Flag outliers.	Laboratory ICP Technician	75-125%R
Laboratory Duplicate	1 per 20 samples	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL/or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated, if original and duplicate < CRQL	Flag outliers.	Laboratory ICP Technician	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL/or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated, if original and duplicate < CRQL
Serial Dilution	Each batch per matrix	% Difference < 20% for results >50x MDL	Flag outliers.	Laboratory ICP Technician	% Difference < 20% for results >50x MDL

* except when the sample concentration is greater than 4 times the spike concentration, then disregard the recoveries; no data validation action taken.

Matrix	Soil
Analytical Group	Mercury/TCLP Mercury
Analytical Method/SOP Reference	SW 846 7470/ SW 846 1311,7470

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Measurement Performance Criteria
Field Duplicate	1 per 20 samples	None	None for laboratory. Project personnel will assess duplicate results, notify PM and address in data usability.	Project Personnel	RPD < 50%
Field Equipment Rinsate Blank	1 per day	No analyte > CRQL	Verify results; re-analyze. Flag outliers. Project personnel will check decontamination procedures.	Laboratory Analyst / Project Personnel	No analyte > CRQL
Temperature Blank	1 per cooler	0 to 6 degrees C	Laboratory will inform ENVOCARE PM and note in data narrative. Project personnel will check packing procedure and increase coolant.	Laboratory Analyst / Project Personnel	≤ 6 degrees C
Preparation Blank	1 per ≤20 samples	No analyte > CRQL	Determine which samples will need to be re-prepared and reanalyzed.	Laboratory Analyst	No analyte > CRQL
Matrix Spike	1 per ≤20 samples	75–125%R*	Flag outliers.	Laboratory Analyst	75–125%R
Laboratory Duplicate	1 per 20 samples	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL	Flag outliers.	Laboratory Analyst	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL

* except when the sample concentration is greater than 4 times the spike concentration, then disregard the recoveries; no data validation action taken.

Matrix	Soil
Analytical Group	Total Cyanide
Analytical Method/SOP Reference	EPA method 9010C

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Measurement Performance Criteria
Field Duplicate	1 per 20 samples	None	None for laboratory. Project personnel will assess duplicate results, notify PM and address in data usability.	Project Personnel	RPD < 50%
Field Equipment Rinsate Blank	1 per day	No analyte > CRQL	Verify results; re-analyze. Flag outliers. Project personnel will check decontamination procedures.	Laboratory Analyst / Project Personnel	No analyte > CRQL
Temperature Blank	1 per cooler	0 to 6 degrees C	Laboratory will inform ENVOCARE PM and note in data narrative. Project personnel will check packing procedure and increase coolant.	Laboratory Analyst / Project Personnel	≤ 6 degrees C
Preparation Blank	1 per ≤ 20 samples	No analyte > CRQL	Determine which samples will need to be re-prepared and reanalyzed.	Laboratory Analyst	No analyte > CRQL
Matrix Spike	1 per ≤ 20 samples	75–125%R*	Flag outliers; perform Post-Distillation Spike if analyte does not meet criteria.	Laboratory Analyst	75–125%R
Post-Distillation Spike	After analyte fails matrix spike %R	75 – 125 %R	Flag outliers.	Laboratory Analyst	75 – 125 %R
Laboratory Duplicate	1 per 20 samples	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL	Flag outliers.	Laboratory Analyst	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL

* except when the sample concentration is greater than 4 times the spike concentration, then disregard the recoveries; no data validation action taken.

Matrix	Soil
Analytical Group	TCL Herbicide/ TCLP Herbicide
Analytical Method/SOP Reference	SW 846 8151/SW 846 1311 8151

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Measurement Performance Criteria
Field Duplicate	1 per 20 samples	None	None for laboratory. Project personnel will assess duplicate results, notify PM and address in data usability.	Project Personnel	RPD < 50%
Field Equipment Rinsate Blank	1 per day	No analyte > CRQL	Verify results; re-analyze. Flag outliers. Project personnel will check decontamination procedures.	Laboratory Analyst / Project Personnel	No analyte > CRQL
Temperature Blank	1 per cooler	0 to 6 degrees C	Laboratory will inform ENVOCARE PM and note in data narrative. Project personnel will check packing procedure and increase coolant.	Laboratory Analyst / Project Personnel	≤ 6 degrees C
Preparation Blank	1 per ≤ 20 samples	No analyte > CRQL	Determine which samples will need to be re-prepared and reanalyzed.	Laboratory Analyst	No analyte > CRQL
Matrix Spike	1 per ≤ 20 samples	75–125%R*	Flag outliers; perform Post-Distillation Spike if analyte does not meet criteria.	Laboratory Analyst	75–125%R
Post-Distillation Spike	After analyte fails matrix spike %R	75 – 125 %R	Flag outliers.	Laboratory Analyst	75 – 125 %R
Laboratory Duplicate	1 per 20 samples	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL	Flag outliers.	Laboratory Analyst	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL

Matrix	Soil
Analytical Group	NJEPH
Analytical Method/SOP Reference	NJEPH Method

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Measurement Performance Criteria
Field Duplicate	1 per 20 samples	None	None for laboratory. Project personnel will assess duplicate results, notify PM and address in data usability.	Project Personnel	RPD < 50%
Field Equipment Rinsate Blank	1 per day	No analyte > CRQL	Verify results; re-analyze. Flag outliers. Project personnel will check decontamination procedures.	Laboratory Analyst / Project Personnel	No analyte > CRQL
Temperature Blank	1 per cooler	0 to 6 degrees C	Laboratory will inform ENVOCARE PM and note in data narrative. Project personnel will check packing procedure and increase coolant.	Laboratory Analyst / Project Personnel	≤ 6 degrees C
Preparation Blank	1 per ≤20 samples	No analyte > CRQL	Determine which samples will need to be re-prepared and reanalyzed.	Laboratory Analyst	No analyte > CRQL
Matrix Spike	1 per ≤20 samples	75–125%R*	Flag outliers.	Laboratory Analyst	75–125%R
Laboratory Duplicate	1 per 20 samples	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL	Flag outliers.	Laboratory Analyst	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL

Matrix	Soil
Analytical Group	Corrosivity
Analytical Method/SOP Reference	SW 846 9045

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Measurement Performance Criteria
Field Duplicate	1 per 20 samples	None	None for laboratory. Project personnel will assess duplicate results, notify PM and address in data usability.	Project Personnel	RPD < 50%
Field Equipment Rinsate Blank	1 per day	No analyte > CRQL	Verify results; re-analyze. Flag outliers. Project personnel will check decontamination procedures.	Laboratory Analyst / Project Personnel	No analyte > CRQL
Temperature Blank	1 per cooler	0 to 6 degrees C	Laboratory will inform ENVOCARE PM and note in data narrative. Project personnel will check packing procedure and increase coolant.	Laboratory Analyst / Project Personnel	≤ 6 degrees C
Preparation Blank	1 per ≤20 samples	No analyte > CRQL	Determine which samples will need to be re-prepared and reanalyzed.	Laboratory Analyst	No analyte > CRQL
Matrix Spike	none	75–125%R*	Flag outliers.	Laboratory Analyst	75–125%R
Laboratory Duplicate	none	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL	Flag outliers.	Laboratory Analyst	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL

Matrix	Soil
Analytical Group	Ignitability
Analytical Method/SOP Reference	SW 846 1030

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Measurement Performance Criteria
Field Duplicate	1 per 20 samples	None	None for laboratory. Project personnel will assess duplicate results, notify PM and address in data usability.	Project Personnel	RPD < 50%
Field Equipment Rinsate Blank	1 per day	No analyte > CRQL	Verify results; re-analyze. Flag outliers. Project personnel will check decontamination procedures.	Laboratory Analyst / Project Personnel	No analyte > CRQL
Temperature Blank	1 per cooler	0 to 6 degrees C	Laboratory will inform ENVOCARE PM and note in data narrative. Project personnel will check packing procedure and increase coolant.	Laboratory Analyst / Project Personnel	≤ 6 degrees C
Preparation Blank	1 per ≤20 samples	No analyte > CRQL	Determine which samples will need to be re-prepared and reanalyzed.	Laboratory Analyst	No analyte > CRQL
Matrix Spike	none	75–125%R*	Flag outliers.	Laboratory Analyst	75–125%R
Laboratory Duplicate	none	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL	Flag outliers.	Laboratory Analyst	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL

Matrix	Soil
Analytical Group	Reactive Cyanide & Reactive Sulfide
Analytical Method/SOP Reference	SW 846 7.3

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Measurement Performance Criteria
Field Duplicate	1 per 20 samples	None	None for laboratory. Project personnel will assess duplicate results, notify PM and address in data usability.	Project Personnel	RPD < 50%
Field Equipment Rinsate Blank	1 per day	No analyte > CRQL	Verify results; re-analyze. Flag outliers. Project personnel will check decontamination procedures.	Laboratory Analyst / Project Personnel	No analyte > CRQL
Temperature Blank	1 per cooler	0 to 6 degrees C	Laboratory will inform ENVOCARE PM and note in data narrative. Project personnel will check packing procedure and increase coolant.	Laboratory Analyst / Project Personnel	≤ 6 degrees C
Preparation Blank	1 per ≤20 samples	No analyte > CRQL	Determine which samples will need to be re-prepared and reanalyzed.	Laboratory Analyst	No analyte > CRQL
Matrix Spike	1 per ≤20 samples	75–125%R*	Flag outliers.	Laboratory Analyst	75–125%R
Laboratory Duplicate	1 per 20 samples	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL	Flag outliers.	Laboratory Analyst	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL

Matrix	Soil
Analytical Group	Paint Filter
Analytical Method/SOP Reference	SW 846 9095

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Measurement Performance Criteria
Field Duplicate	1 per 20 samples	None	None for laboratory. Project personnel will assess duplicate results, notify PM and address in data usability.	Project Personnel	RPD < 50%
Field Equipment Rinsate Blank	1 per day	No analyte > CRQL	Verify results; re-analyze. Flag outliers. Project personnel will check decontamination procedures.	Laboratory Analyst / Project Personnel	No analyte > CRQL
Temperature Blank	1 per cooler	0 to 6 degrees C	Laboratory will inform ENVOCARE PM and note in data narrative. Project personnel will check packing procedure and increase coolant.	Laboratory Analyst / Project Personnel	≤ 6 degrees C
Preparation Blank	1 per ≤20 samples	No analyte > CRQL	Determine which samples will need to be re-prepared and reanalyzed.	Laboratory Analyst	No analyte > CRQL
Matrix Spike	none	75–125%R*	Flag outliers.	Laboratory Analyst	75–125%R
Laboratory Duplicate	none	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL	Flag outliers.	Laboratory Analyst	≤20% RPD, if original and duplicate ≥5x CRQL; =CRQL, if either original or duplicate <5x CRQL or if one result is <5x CRQL and the other >5x CRQL; RPD not calculated if original and duplicate < CRQL

QAPP WORKSHEET #29: PROJECT DOCUMENTS AND RECORDS

Project documentation is produced, controlled, and maintained to verify conformance to the requirements of the EPA and NJDEP. ENVOCARE document review tracking form in Appendix J.

Sample Collection and Field Records			
Record	**Generation**	**Verification**	**Storage Location**
Field Logbook or Data Collection Sheets	Field Team Leader/Field Personnel	Project Manager	Project File
Chain of Custody Forms	Field Team Leader/Field Personnel	Project Manager	Project File
Custody Seals	Field Team Leader/Field Personnel	Project Manager	Project File
Daily QC Reports	Field Team Leader	Project Manager	Project File
Deviations	Field Team Leader/Field Personnel	Project Manager	Project File
Corrective Action Reports	Field Team Leader/Field Personnel	Project Manager	Project File
Correspondence	Field Team Leader	Project Manager	Project File
Field Sample Results/Measurement	Field Team Leader/Field Personnel	Project Manager	Project File
Tailgate Safety Meeting Items	Field Team Leader	Project Manager	Project File

Project Assessments			
Record	**Generation**	**Verification**	**Storage Location**
Data Verification Checklists	Third party Data Validator/Chemist/ Quality manager	Project Manager	Project File
Data Validation Report	Third party Data Validator/Chemist/ Quality Manager	Project Manager	Project File
Technical system Audit	Field Staff/Field Team Leader	Project Manager	Project File
Data Usability Assessment Report	Field Team Leader	Project Manager	Project File
Corrective Action Report	Chemist/ Field Team Leader/ Quality Manager	Project Manager	Project File
Correspondence	Chemist/Field Team Leader/ Quality Manager	Project Manager	Project File

Laboratory Records			
Record	**Generation**	**Verification**	**Storage Location/Archival**
Sample Receipt, Custody, and Checklist	Laboratory Sample Receiving	Laboratory PM/Delegated QAM	Laboratory Data Package and Project File
Equipment Calibration Logs	Laboratory Technician	Laboratory PM/Delegated QAM	Laboratory Data Package and Project File
Standard Traceability Logs	Laboratory Technician	Laboratory PM/Delegated QAM	Laboratory Data Package and Project File
Sample Prep Logs	Laboratory Technician	Laboratory PM/Delegated QAM	Laboratory Data Package and Project File
Run Logs	Laboratory Technician	Laboratory PM/Delegated QAM	Laboratory Data Package and Project File
Equipment Maintenance, Testing, and Inspection Logs	Laboratory Technician/ Laboratory QA Manager	Laboratory PM/Delegated QAM	Laboratory File
Corrective Action Reports	Laboratory QA Manager	Laboratory PM/Delegated QAM	Laboratory File and Project File
Laboratory Analytical Results	Laboratory Technician/ Laboratory QA Manager	Laboratory PM/Delegated QAM	Laboratory Data Package and Project File
Laboratory QC Samples, Standards, and Checks	Laboratory Technician/ Laboratory QA Manager	Laboratory PM/Delegated QAM	Laboratory Data Package and Project File
Instrument Results (raw data) for Primary Samples, Standards, QC Checks, and QC Samples	Laboratory Technician/ Laboratory QA Manager	Laboratory PM/Delegated QAM	Laboratory Data Package and Project File

PM-Project Manager
QAM-Quality Assurance Manager

Laboratory Data Deliverables[1]					
Record[1]	**VOCs**	**SVOCs**	**PCBs**	**Pesticides**	**Metals, Hg, CN**
Narrative	Y	Y	Y	Y	Y
Chain of Custody	Y	Y	Y	Y	Y
Summary Results	Y	Y	Y	Y	Y
QC Results	Y	Y	Y	Y	Y
Chromatograms or raw data	Y	Y	Y	Y	Y
Tentatively Identified Compounds	Y	Y	NA	NA	NA

Y-Yes
NA-Not available

QAPP WORKSHEET #31, 32 & 33: ASSESSMENT AND CORRECTIVE RESPONSE

Project managers, the Quality Assurance Manager, or ENVOCARE staff members are responsible for assessing the quality of the work done under their own auspices. There are several ways this can be done, as appropriate to the specific project and the budget. Examples include:

- Observation of the work in progress by senior staff.
- A field audit by qualified ENVOCARE staff.
- Data validation of selected data sets, using ENVOCARE or contractor staff.
- LSRP Board may conduct an independent audit of the LSRP.

Assessment					
Assessment Type	**Responsible Party & Organization**	**Number/Frequency**	**Estimated Dates**	**Assessment Deliverable**	**Deliverable due date**
Readiness Review	Project Manager	One per sampling event	TBD	Memo	24 hours following assessment
Field Sampling	ENVOCARE & USEPA	One per sampling event	TBD	Memo	24 hours following assessment

TBD- to be determined.

If a nonconformance is identified during project work or audit activities, the project personnel must take the appropriate steps to implement and document the following:

- The nature and scope of the problem.
- Where possible, the root causes of the problem.
- The programmatic impact.
- Required corrective actions.
- The individual responsible for corrective action.
- Actions needed to prevent recurrence.
- The time frame for corrective actions to be implemented and completed.
- The method of assessing and verifying the effectiveness of the corrective action.
- The corrective actions should be taken as quickly as possible, and all corrective actions are to be recorded and reported.
- A non-conformance identification and tracking form included in Appendix K

Assessment Response and Corrective Action					
Assessment Type	**Responsibility for responding to assessment findings**	**Assessment Response Documentation**	**Timeframe for Response**	**Responsibility for Implementing Corrective Action**	**Responsible for monitoring Corrective Action implementation**
Readiness Review	Project Manager	Readiness Review Corrective Action Response	24 hours from receipt of Readiness Review Memo	As directed by PM	LSRP
Field Sampling	Field Task Leader	Field Sampling Corrective Action Response	24 hours from receipt of Memo	As directed by Field Task Leader	LSRP

QAPP WORKSHEET #34: DATA VERIFICATION AND VALIDATION INPUTS

Data Elements for Data Review Process				
Item	**Step I - Data Verification**	**Step IIa - Data Validation Compliance**	**Step IIb - Data Validation Comparison**	**Step III -Data Usability**
Planning Documents				
Evidence of approval of QAPP	X			Use outputs from previous steps
Identification of personnel	X			
Laboratory name	X			
Methods (sampling & analytical)	X	X	X	
Performance requirements (including QC criteria)	X	X	X	
Project quality objectives	X		X	
Reporting forms	X	X		
Sampling plans – locations, maps grids, sample ID numbers	X	X		
Site identification	X			
SOPs (sampling & analytical)	X	X		
Staff training & certification	X			
List of project-specific analytes	X	X		
Analytical Data Package				
Case narrative	X	X	X	Use outputs from previous steps
Internal lab chain of custody	X	X		
Sample condition upon receipt, & storage records	X	X		
Sample chronology (time of receipt, extraction/digestion, analysis)	X	X		
Identification of QC samples (sampling /lab)	X	X		
Associated PE sample results	X	X	X	
Communication Logs	X	X		
Copies of lab notebook, records, prep sheets	X	X		
Corrective action reports	X	X		
Definition of laboratory qualifiers	X	X	X	
Documentation of corrective action results	X	X	X	
Documentation of individual QC results (e.g., spike, duplicate)	X	X	X	
Documentation of laboratory method deviations	X	X	X	
Electronic data deliverables	X	X		
Instrument calibration reports	X	X	X	
Laboratory name	X	X		
Laboratory sample identification no.	X	X		
QC sample raw data	X	X	X	
QC summary report	X	X	X	

Data elements for Data Review Process				
Item	**Step I - Data Verification**	**Step IIa - Data Validation Compliance**	**Step IIb - Data Validation Comparison**	**Step III -Data Usability**
Data Elements for Data Review Process				
Raw data	X	X	X	Use outputs from previous steps
Reporting forms, completed with actual results	X	X	X	
Signatures for laboratory sign-off (e.g., laboratory QA manager)	X	X		
Standards traceability records (to trace standard source form NIST, for example)	X	X	X	
Sampling Documents				
Chain of custody	X	X		Use outputs from previous steps
Communication logs	X	X		
Corrective action reports	X	X	X	
Documentation of corrective action results	X	X	X	
Documentation of deviation from methods	X	X	X	
Documentation of internal QA review	X	X	X	
Electronic data deliverables	X	X		
Identification of QC samples	X	X	X	
Meteorological data from field (e.g., wind, temperature)	X	X		
Sampling instrument decontamination records	X	X		
Sampling instrument calibration logs	X	X		
Sampling location and plan	X	X		
Sampling notes & drilling logs	X	X		
Sampling report (from field team leader to project manager describing sampling activities)	X	X	X	
External Reports				
External audit report	X	X	X	Use outputs from previous steps
External PT sample results	X	X		
Laboratory assessment	X	X		
Laboratory QA plan	X	X		
MDL study information	X	X	X	
NELAP accreditation	X	X		

QAPP WORKSHEET #35: DATA VERIFICATION PROCEDURES

Data Verification Procedures			
Records Reviewed	**Requirement Documents**	**Process Description**	**Responsible Person, Organization**
Field logbook	SAP/QAPP	Verify that records are present and complete for each day of field activities. Verify that all planned samples including field QC samples were collected and that sample collection locations are documented. Verify that meteorological data were provided for each day of field activities. Verify that changes/exceptions are documented and were reported in accordance with requirements. Verify that any required field monitoring was performed, and results are documented.	At conclusion of field activities, the field documentation will be reviewed daily by the field lead- Project Manager/Field Team Leader
Chain-of-custody forms	SAP/QAPP	Verify the completeness of chain-of-custody records. Examine entries for consistency with the field logbook. Check that appropriate methods and sample preservation have been recorded. Verify that the required volume of sample has been collected and that sufficient sample volume is available for QC samples (e.g., MS/MSD). Verify that all required signatures and dates are present. Check for transcription errors.	At conclusion of field activities, the field documentation will be reviewed daily by the field lead– Project Manager/Field Team Leader
Laboratory Deliverable	SAP/QAPP	Verify that the laboratory deliverable contains all records specified in the QAPP. Check sample receipt records to ensure sample condition upon receipt was noted, and any missing/broken sample containers were noted and reported according to plan. Compare the data package with the CoCs to verify that results were provided for all collected samples. EDDs will only be submitted for post removal and background sampling as specified in QAPP#36.	Before release – Lab Manager Upon receipt – ENVOCARE Project Manager
Audit Reports, Corrective Action Reports	SAP/QAPP	Verify that all planned audits were conducted. Examine audit reports. For any deficiencies noted, verify that corrective action was implemented according to plan.	Project Manager + QAM

SAP-Sampling and Analysis Plan
QAPP- Quality Assurance Project Plan
QAM-Quality Assurance Manager

QAPP WORKSHEET #36: DATA VALIDATION PROCEDURE

Data validation only needed for post removal and background sampling to fulfill DQO (QAPP #11). Additional analysis can be discussed if more samples are needed with USEPA OSC and ENVOCARE.

Third Party Data Validator: Jeri Rossi

Analytical Group/ Method**	Data Deliverable Requirements	Analytical Specifications	MPC	Percent of Data Packages to be Validated	Percent of Raw Data Reviewed	Percent of Results to be Recalculated	Validation Procedure*	Validation Code	Electronic Validation Program/Version
Lead	SEDD Stage 3	SEDD Stage 3	Worksheets 12, 24, 28	100%	100%	10%	SOP# QA-HWSS-A-005 Revision No.: 0 Date: 04/01/22	Validated Manually (VM)	Electronic Data Exchange and Evaluation System (EXES)
Mercury	SEDD Stage 3	SEDD Stage 3	Worksheets 12, 24, 28	100%	100%	10%	SOP# QA-HWSS-A-007 Revision No.: 0 Date: 04/01/22	Validated Manually (VM)	Electronic Data Exchange and Evaluation System (EXES)
TCL PCBs	SEDD Stage 4	SEDD Stage 4	Worksheets 12, 24, 28	100%	100%	10%	SOP# QA-HWSS-A-006 Revision No.: 0 Date: 04/01/22	Validated Manually (VM)	Electronic Data Exchange and Evaluation System (EXES)

SEDD-Staged Electronic Data Deliverable
MPC- Measurement Performance Criteria
*Reference: https://www.epa.gov/quality/region-2-quality-assurance-guidance-and-standard-operating-procedures

QAPP WORKSHEET #37: DATA USABILITY ASSESSMENT

The personnel responsible for participating in the data usability assessment are as follows:

- Project Manager: Devang Patel, LSRP
- Quality Manager: April Clare
- Field Task Leader: Mayur Patel
- Client Subcontractor Lab: Jordan Hedvat
- Data Validation Specialist: Jeri Rossi
- EPA OSC: David Rosoff

The Quality Assurance review will be conducted at the conclusion of each data collection and sampling effort phase to support the determination of additional sampling requirements. Data Usability Review Form in Appendix L. ENVOCARE team members shall:

Step 1	**Review the project's objectives and sampling design** Review the key outputs defined during systematic planning (i.e., Data Quality Objectives) to make sure they are still applicable. Review the sampling design for consistency with stated objectives. This provides the context for interpreting the data in subsequent steps.
Step 2	**Review the data verification and data validation outputs** Perform a review of the accuracy, precision, representativeness, and completeness of analytical results based on criteria specified in the analytical methods used. Review available QA reports, including the data verification and data validation reports. Perform basic calculations and summarize the data (using graphs, maps, tables, etc.). Look for patterns, trends, and anomalies (i.e., unexpected results). Review deviations from planned activities (e.g., number and locations of samples, holding time exceedances, damaged samples, and SOP deviations) and determine their impacts on the data usability. Evaluate implications of unacceptable QC sample results.
Step 3	**Verify the assumptions of the selected statistical method** Verify whether underlying assumptions for selected statistical methods are valid. Common assumptions include the distributional form of the data, independence of the data, dispersion characteristics, homogeneity, etc. Depending on the robustness of the statistical method, minor deviations from assumptions usually are not critical to statistical analysis and data interpretation. If serious deviations from assumptions are discovered, then another statistical method may need to be selected.
Step 4	**Implement the statistical method** Implement the specified statistical procedures for analyzing the data and review underlying assumptions. Consider the consequences for selecting the incorrect alternative; for estimation projects (e.g., establishing a boundary for surface soil contamination), consider the tolerance for uncertainty in measurements.
Step 5	**Document data usability and draw conclusions** Determine if the data can be used as intended, considering implications of deviations. Discuss data quality indicators. Assess the performance of the sampling design and identify limitations on data use. Update the conceptual site model and document conclusions. Prepare the data usability summary report which can be in the form of text and/or a table.

N
W E
S

0 20 40 60

Scale in Feet

1:550

Legend

- Site Location
- Property Boundary
- Pile Location
- Proposed Tributary Restoration

NOTES:
1. PARCEL DATA OBTAINED FROM NEW JERSEY GEOGRAPHIC INFORMATION NETWORK (NJGIN)
2. PARCEL DATA IS NOT FROM A LICENSED SURVEYOR...AERIAL AND PROPERTY LINE MAY NOT ALIGN
3. SERVICE LAYER CREDITS: COPYRIGHT NEARMAP

1 " = 160 miles

Figure 1

Site Location Map

366-394 Wilson Avenue
(Block: 5038, Lot: 97)
Newark, New Jersey

Project No: 150405
Date: July 2020
Drawn By: K. Starkes
Checked By: DP

ENVOCARE
ENVIRONMENTAL & FACILITY MANAGEMENT

N
W E
S

0 20 40 60

Scale in Feet

1:500

Legend

- Site Location
- Property Boundary
- Pile Location

NOTES:
1. PARCEL DATA OBTAINED FROM NEW JERSEY GEOGRAPHIC INFORMATION NETWORK (NJGIN)
2. PARCEL DATA IS NOT FROM A LICENSED SURVEYOR...AERIAL AND PROPERTY LINE MAY NOT ALIGN
3. SERVICE LAYER CREDITS: COPYRIGHT NEARMAP

1 " = 160 miles

Figure 2
Grid Mapping

366-394 Wilson Avenue
(Block: 5038, Lot: 97)
Newark, New Jersey

Project No: 150405

Date: July 2020

Drawn By: K. Starkes

Checked By: DP

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ENVIRONMENTAL & FACILITY MANAGEMENT

N
W E
S

0 20 40 60

Scale in Feet

1:500

Legend

- Site Location
- Property Boundary
- Pile Location
- Proposed Sample Location

NOTES:
1. PARCEL DATA OBTAINED FROM NEW JERSEY GEOGRAPHIC INFORMATION NETWORK (NJGIN)
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3. SERVICE LAYER CREDITS: COPYRIGHT NEARMAP

1 " = 160 miles

Figure 3
Proposed Sample Location

366-394 Wilson Avenue
(Block: 5038, Lot: 97)
Newark, New Jersey

Project No: 150405

Date: July 2020

Drawn By: K. Starkes

Checked By: DP

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N
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0 20 40 60
Scale in Feet

Legend

- Site Location
- Property Boundary
- Pile Location
- Proposed Background Locations
- Proposed Sectioning of Background locations

NOTES:
1. PARCEL DATA OBTAINED FROM NEW JERSEY GEOGRAPHIC INFORMATION NETWORK (NJGIN)
2. PARCEL DATA IS NOT FROM A LICENSED SURVEYOR. .AERIAL AND PROPERTY LINE MAY NOT ALIGN
3. SERVICE LAYER CREDITS: COPYRIGHT NEARMAP

1 " = 160 miles

Figure 4

Proposed Background Location Map

366-394 Wilson Avenue
(Block: 5038, Lot: 97)
Newark, New Jersey

Project No: 150405

Date: July 2020

Drawn By: K. Starkes

Checked By: DP

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Appendix A

Key Team Members Qualification

DEVANG PATEL, LSRP

PRESIDENT AND SR. ENVIRONMENTAL PROJECT MANAGER

Over 23-year track record of innovation and success leading large-scale environmental remediation projects

Expert, detail-oriented Sr. Project Manager with demonstrated effectiveness coordinating and supervising all phases (Phase I/II & Remedial Actions) of environmental site investigations, remediation planning, and project execution for both public and private sector clients within the construction, vibration and noise monitoring, manufacturing, petroleum, chemical development, scientific research, and legal industries. Highly adept in planning all phases of complex remediation initiatives within established budgets and timeframes. Deep knowledge of State and Federal regulations and OSHA requirements; SRRA / Licensed Site Remediation Professional. Knowledge and working experience within Tri-states.

CORE COMPETENCIES:

- Project Management & UST/AST Design
- Regulatory Compliance & Monitoring
- Health & Safety (includes noise monitoring)
- Portfolio & Construction Management
- Industrial Remediation Strategies
- Complex Environmental Cleanups
- Grant Management & Support
- Life Cycle Cost Estimates

PROFESSIONAL EXPERIENCE

ENVOCARE ENVIRONMENTAL & FACILITY MANAGEMENT, SOMERSET, NEW JERSEY
PRESIDENT AND SR. ENVIRONMENTAL PROJECT MANAGER, 4/2015 – PRESENT

Responsible for office management, sales, project management, resources management, Licensed Site Remediation Professional (LSRP) Services, and Business development and client management. Training employees, third parties LSRP services, negotiating remediation scope of work with insurance companies and ISRA site owner. Establishing remediation trust funds, development of a life cycle lost and development of remediation cost estimates for sites with UST grants. The LSRP oversight services includes site scope of work (SOW) review, phase I, preliminary assessment, receptor evaluations (RE), vapor intrusion (VI) evaluations, LANPL, Site Investigation and Remedial Investigation Report reviews, development of classification exception areas (CEA) and deed notices for sites going through the remedial process, biennial certifications, and issuance of a response action outcome (RAO).

Key Projects:

- **ISRA Compliance and Remediation Oversights:** Managing various ISRA remediation projects with complex in-situ remediation.
- **ISRA Progress Waiver:** During sale of business, ISRA progress waiver was requested and approved by the NJDEP within 5 weeks. The subject facility provides power to local business and utility companies.
- **LSRP Oversight:** Managed complex remediation projects and provided technical review of ongoing remediations for various sites. Currently involved in complex petroleum and chlorinated VOCs remediations located in Richmond, VA, Moonachie, NJ and Pleasantville, NJ
- **PFOA, PFAA and PFOS:** Managing three complex PFOA compaginated soil and groundwater investigation remediation projects. One site with the immediate environmental conditions (IECs).
- **Groundwater Remediation:** Implementation of interim remedial measures to reduce petroleum hydrocarbon concentrations within overburden aquifer. After remedial activities, a soil only RAO was

Continued...

issued. GW still going through monitoring natural attenuation process. Once the Remedial Action permit is approved, a restricted use response action outcome will be issued. In addition, currently managing chlorinated site under the LSRP program that requires in-situ remediation. The active groundwater remedial action workplan submitted to the NJDEP for the permit approval.

- **TSCA Regulated Cleanup:** Managing PCBs contaminated soil remediation oversight in Bronx Zoo and Con Edison site located in Queens.
- **UST Oversight:** Site investigation and remedial action oversight services are being performed at a site containing seven underground storage tanks. Free product found within the UST excavation was removed and UST areas restored, currently groundwater investigation and other RI activities are being implemented.
- **Brownfield Redevelopment:** Implemented remedial action workplan for the residential development at the former industrial site. Development of vapor intrusion investigation and mitigation plan. Waste disposal approvals and LSRP services.
- **Emergency Responses:** ENVOCARE provided emergency response while hazmat team performing cleanup and after. The scope of work included, soil and surface water sampling, NJDEP reporting, notifications. Subsequently, excavation oversight, reporting to NJDEP and Response Action Outcome.
- **Mold Investigation & Remediation:** ENVOCARE investigated mold at the medical and industrial offices. After cleanup samples were collected to demonstrate the compliance with the indoor air health requirements. Industrial hygiene staff conducts the inspection and collects samples as necessary. ENVOCARE and its staff provides documents and recommendations to the Client as per the OSHA requirement.
- **Vibration and Noise Monitoring:** The vibration and noise monitoring oversight are performed nearby houses during pile driving and construction activities. Pre and post inspections to confirm nearby residences are not impacted from overall activities
- **Childcare:** ENVOCARE provides LSRP services to childcare centers to meet the NJDEP and DOH requirements. The overall scope of work is conducted by LSRP as required by the NJDEP.

ENVIRONMENTAL ALLIANCE, INC., EDISON, NEW JERSEY
NJ OPERATIONAL MANAGER, 7/2012 – 4/2015

Responsible for office management, sales, project management, resources management, Licensed Site Remediation Professional Services, as well as Business development and client management. Training employees and management of overall office growth. Providing LSRP services to over 75 projects. The LSRP services include scope of work development, remedial selection, oversight and technical consultation with the NJDEP for the projects when varying from "The Rules".

Key Projects:

- **Groundwater Remediation:** Implemented Bio-Remedial Action to mitigate groundwater impacted by chlorinated volatile organic compounds (VOCs). The industrial sites are located in Morristown, Paterson and Englewood.
- **ISRA Progress Waiver:** Provided ISRA Progress Oversite Servers for sites that are subject to ISRA site. Due to comingled plume present at the Site, the cleanup responsibilities were successfully transferred and LSRP was able to close the case, avoiding expensive remediation.

Continued...

- **Soil Remediation Oversight:** Various sites going through remediation oversight required LSRP services. Helped clients meet the mandatory timeframe, established remediation trust funds. Installation of remediation wells for the Interim Remedial Measures.
- **Emergency Response Management (ERM):** ERM services were provided at gas station site located in Paterson, NJ. Over five feet of LNAPL removed using various remedial options, receptors monitoring and remedial investigation oversight. The LNAPL recovery was completed within 6 months.

CONESTOGA-ROVERS & ASSOCIATES, INC., EDISON, NEW JERSEY

SR. PROJECT MANAGER, 04/2005 – 7/2012

Interface with diverse range of clients of established environmental health consulting and engineering firm, including private developers, chemical facilities, architects, and law firms, to create environmental solutions to manage and remediate ~40 petroleum hydrocarbon-contaminated UST sites. Provided technical consulting, conducted Preliminary Assessment (Phase I) and Phase II assessments / ISRA classifications, coordinated and directed remediation projects, selected project team members, conducted field investigations, and delivered compliance / regulatory support. Compiled receptor evaluations, performed audits, and alerted clients to potential permit requirements. Supervised on-site remediation activities to ensure work compliance with ISRA, UST, RCRA, CAA, OSHA, and HSWM regulations. Diligently handled all reporting, including SRRA remediation documents, DEED notices, and bi-annual Classification Exception Area (CEA) certifications. Cultivated open lines of communication with new and prospective clients to generate referrals and garner interest in environmental management services.

Key Projects:

- **Groundwater Remediation:** Implemented Interim Remedial Action (IRA) to mitigate groundwater impacted by chlorinated volatile organic compounds (VOCs), treating impacted groundwater via in situ chemical oxidation (ISCO) with potassium and sodium permanganate, emulsified vegetable oil, and lactate and zero-valent iron (feO). The ISCO was applied to manufacturing sites located in Morris and Passaic Counties of New Jersey.
- **Laboratory Facility Decommissioning:** Planned and guided decommissioning of laboratories and manufacturing plants, successfully minimizing client exposure to ISRA liabilities.
- **Vapor Barrier System:** Led the design of integrated vapor barrier and passive organic vapor collection system for large warehouse.
- **FUSRAP Sites:** Provided oversight services and waste management services on behalf of the Client.
- **Emergency Response Management (ERM):** Joined the Emergency Response Management Inc. to extend ERM solutions to clients in the petroleum distribution, terminal, pipeline, and [illegible] sectors.

Continued....

PMK GROUP, KENILWORTH, NEW JERSEY

SR. PROJECT MANAGER, 2/1998 – 2/2005

Tasked with coordinating and managing ~ 70 UST / AST design and construction projects. Supervised all phases of UST removal and remediation; interpreted laboratory findings, implemented remedial action plans, and reported results to regulator. Worked closely with clients to identify requirements, established scope of work (SOW), and prepared bids. As Project Manager, assisted clients in selecting contractors; skillfully recommended cost control measures to create favorable, competitive pricing strategies while minimizing risk of over-budgeting. Closely

tracked subcontractor invoices and changed order requests. Ensured compliance of public and private clients with all governing local, state, and federal regulations during project phases. Compiled and reviewed PAR, SIR, RIW, RAW, and RAR. Marketed company services to prospective clients at public meetings and business development seminars.

Key Projects:

- **Construction Management:** Led small construction projects, reviewed design specifications, managed contractors' work, facilitated change orders, and implemented quality controls for key clients.
- **Property Redevelopment:** Utilized EPA Triad approach to expedite redevelopment of dilapidated properties, providing technical guidance on behalf of New Jersey School Construction Corporation.
- **Grant Consulting:** Instrumental in helping public sector clients to secure HDSRF grants and UST loans, providing technical support key to the creation of community Brownfields Development Areas.
- **County & Municipal UST Portfolio Management:** Provided UST portfolio management services for Passaic and Essex counties, Township of Irvington, Hillside, City of Elizabeth, City of Plainfield, Bloomfield, Union Township and many more municipalities.

MDS ENVIRONMENTAL, PARSIPPANY, NEW JERSEY

STAFF ENGINEER, 9/1995 – 2/1998

Leveraged expertise in EPA Superfund site investigation to coordinate and execute all aspects of large-scale environmental health and safety inspections at New York and New Jersey EPA Superfund locations. Directed TSCA / RCRA waster removal, UST removals, and backfilling operations. Trained staff in regulatory policies, technical requirements, and health and safety protocols; supervised subcontractors' health and safety programs and audited safety and training records. Performed daily tool box health and safety briefings; facilitated monthly safety meetings. Meticulously maintained MSDS and employee training records. Conducted comprehensive soil and groundwater investigations, supervised contractors' work and managed school construction projects, and monitored contractors' health and safety activities / protocols.

Key Projects:

- **Environmental Health & Safety Programs:** Designed and implemented air monitoring programs to safeguard employees working in hazardous sites including tunnels (Brooklyn Water Tunnel #3, CSO, Port Authority Bridges, and TBTA tunnels), lead-contaminated areas within Trenton State Prison, a waste water treatment plant, ACM containing areas, and confined spaces.
- **EPA Superfund Sites:** Performed site investigation and remedial investigation at the various superfund sites, reviewing contractors' work, meeting with clients, and documenting project progress and budget.
- **Newark International Airport (now Liberty International Airport):** Participated in preparation of Environmental Impact Statement for exertion of Runway 4LR and Taxiway.

ROBERT B. BALTER COMPANY, FAIRFAX, VIRGINIA

FIELD ENGINEER, 9/1993 – 9/1995

Continued...

Concurrent with graduate education, conducted geotechnical and environmental investigations. Supervised construction of landfill cell and cap; performed laboratory testing of soil and building materials.

Key Projects:

- **Site Inspections:** Completed numerous inspections of sites to include a waste water treatment system, airport expansion projects, sanitary landfill, motor vehicle inspection stations, storm water detention system, recreation facilities, and retail stores.
- **Construction Management:** Conducted geotechnical, concrete, and fire-proofing inspections at diverse construction sites.
- **Landfill Construction:** Conducted inspection of landfill constructions and closures; reviewed technical specifications of projects and provided responses.
- **Regan International Airport:** Geotechnical, fireproofing and rebar inspection of new control towner. Coring of taxiway for asphalt bulk density testing.
- **Dallas International Airport:** Geotechnical, concrete inspections for QA/QC purposes.

****

Prior experience as Machine Operator (1993) for PFI Pharmaceuticals, Edison, N.J. and as Production Engineer for Shaw Wallace & Co., India (1990-1991).

EDUCATION AND CREDENTIALS

Master of Science in Environmental Engineering (1995)
JOHN HOPKINS UNIVERSITY, Baltimore, Maryland

Bachelor of Science in Chemical Engineering (1990)
HARCOURT BUTLER TECHNOLOGIES INSTITUTE, Kanpur, India

Certifications & Affiliations

NJDEP Licensed Site Remediation Professional (LSRP)
NJDEP UST Installation, Closure and Subsurface Evaluator
DOHS - Chemical-terrorism Vulnerability Information (CVI) Authorized
State of Maryland, Engineer in Training (EIT)
Unregulated Heating Oil Tank Program (UHOT)
Member, Licensed Site Remediation Professionals Association (LSRPA)

Professional Development:

40-Hour OSHA Training as per 29 CFR 1910.120(e) ~ 8-Hour OSHA Refresher Training as per 29 CFR 1910.120(e) ~ US HAZCOM Training as per 29 CFR 1010.1200(h) and new uniform Hazardous Waste Manifest ~ Fall Protection ~ Lock-Out / Tag-Out Procedure ~ Confined Space Training ~ 10 Hours OSHA ~ 30 Hours OSHA Construction

ENVOCARE
ENVIRONMENTAL & FACILITY MANAGEMENT

1527 Route 27, Suite 105, Somerset, New Jersey 08873
T (732) 253 5740 |F (732) 317 1043 | envocarenj.com

Professional Profile
M. PATEL
ENVIRONMENTAL PROJECT MANAGER

PROFESSIONAL EXPERIENCE:
Environmental and Industrial Hygiene compliance and Remedial Investigation experience serving clients in New Jersey, New York. Mr. Patel specializes in Environmental Due Diligence including Preliminary Assessments, Site Investigations, Remedial Investigations, Remedial Actions, Waste Characterization and Industry Hygiene projects.

Conducted all aspects of Phase I Environmental Site Assessment, Site Investigation, Remedial Investigation, Remedial Action and Project Management. Conducted soil and groundwater sampling using industry standard equipment including: PID meter, Hand Auger, Hand-held multi-parameter water meter and calibration equipment, laboratory supplied equipment. Preparing letters for offsite access & various reports. Both hazardous and non-hazardous material soil disposal management. Peer Technical Review of Phase I Environmental Site Assessment Projects using ASTM Standard 1527.
Preparation of site-specific Health and Safety Plan (HASP), industry hygiene surveys.

EDUCATION
Bachelor of Science in Environmental Science
Bachelor of Science in Biological
RUTGERS UNIVERSITY, NEW BRUNSWICK, NEW JERSEY

CERTIFICATIONS
40-Hour OSHA Hazwoper Training as per 29 CFR 1910.120(e)
8-Hour OSHA Hazwoper Refresher Training as per 29 CFR 1910.120(e)
10-Hour OSHA Construction Training
TWIC Card
Hydrogen Sulfide Training
Community Noise Enforcement Certification
ACM Training –NY/NJ Certification
NYS DOH, ACM refresher

EXPERIENCE

ENVOCARE ENVIRONMENTAL & FACILITY MANAGEMENT Somerset, NJ
Environmental Scientist, 2016-Present

Responsible for project quality assurance and peer review, data collection and interpretation, and due diligence. Making determinations on Recognized Environmental Conditions (RECs) and Areas of Concern (AOCs). Evaluating and applying local, state and federal air regulations to project scope of work. Working with clients, subcontractors, and regulatory agency officials. Working with senior project management on Discharge Permit, Remedial Investigations, Vapor Intrusion (VI) evaluations, LNAPL reporting, Site Investigation and Preliminary Assessment reporting. Conduct potable water sampling as per the NJDEP guidelines.

Also, responsible for project management and communications with the Client, preparation of various phases of reports and forms required by the NJDEP. Primary laboratory contact, managing all forms of laboratory data (paper, EDDs, PDF reports, Chains of Custody, and all other analysis-based requests), data validation.

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Preparation of site specific Health and Safety Plan (HASP), industry hygiene surveys associated with construction and non-construction sites. The surveys included mold, air quality (dust and odors) and noise monitoring.

Projects:

Manufacturing Operations in Linden, NJ – Mold and air quality surveys
Edison Job Corps Center in Edison, NJ - Noise survey, Drinking water sampling
Redevelopment in New Brunswick, NJ – Dust monitoring
United Lacquer in Linden, NJ – ISRA investigation and remedial action oversight
Former Exxon Station in Jersey City, NJ – Hazardous Waste Management
Guenther Mill Urban Redevelopment Project in Dover, NJ – ISRA investigation and remedial action oversight
Bound Brook Cleaners in Bound Brook, NJ – Chlorinated Solvent Remediation Oversight
Phase I Environmental Site Assessments (ASTM 1527-13)/Preliminary Assessment at various sites
Former Performance Industry Site located in Trenton, NJ – ISRA Site Investigation
Randolph Township DPW, NJ – Former UST Investigation
Exxon Branded Gas Station UST Closure Oversight
Former Duffy Fuel, Newark, NJ – Soil Excavation Oversight and Groundwater Investigation

SGS ACCUTEST, Dayton, New Jersey
Project Manager, 2013 – 2016

Responsible for working with clients to develop site specific requirements with QAPP's. As needed working with clients to verify the regulatory requirements being met and providing quotes for analytical cost estimate. Provided support to head Health & Safety Manager with routine OSHA and client reporting requirements.

Acting as a liaison between client and laboratory by working with clients to determine the analytical needs and logistic work needed for field sampling events. Verifying the information provided on the chain of custody with previously known information associated with the project. If required helping clients interpret the laboratory data package. Working on sites with major litigation implications.

BUREAU VERITAS, Edison, New Jersey
Consultant, 2013 – 2014

Supporting senior project managers with various industrial hygiene projects including field sampling, report writing. Supply and equipment management. Majority of the work was performed involved industry hygiene surveys private clients from petrochemical, medical, and commercial properties in tristate area. Applied city, state, and federal regulations based on the project. The surveys included mold, legionnaires, asbestos, chemical and noise monitoring.

ACCUTEST, Dayton, New Jersey
Laboratory Technician, 2011 – 2013
Analyzed various environmental samples using EPA, ASTM and SW846 methodologies as outlined in SOP's including digestion and analysis for wet chemistry and microbiological parameters.

APRIL CLARE, PG, MS

Kendall Park, NJ 08824 • 848-230-5470 • aclare499p@gmail.com • https://www.linkedin.com/in/april-clare-pg

TASK MANAGER/ASSOCIATE PROJECT MANAGER

Licensed Professional Geologist and Licensed Subsurface Investigator who executes processes involved with remedial investigations. Demonstrated success in areas of task/project management, database management, data analytics, and quality assurance for environmental site assessments and site investigations. Worked collaboratively with remediation engineers and database programmers to identify solutions to complex problems. Evaluated data and delivers reports in accordance with governmental agency guidelines and achieves outcomes aligned with NJ Department of Environmental Protection (NJDEP) regulations. Recognized for expediting the implementation of improved processes that yield results across an organization. Served as office quality coordinator and eastern region quality coordinator.

Ground Water & Soil Remediation
Site & Remedial Investigations
Remedial Action/NJPDES Permits
Ground Water & Soil Sampling
Water Quality Permitting & Compliance
Underground Storage Tank Investigation
SI/RI/RAO/Permits Report Reviewer
Sediment Sampling
Quality Assurance Programs
Data Management - DKQP Review
Database Management

PROFESSIONAL EXPERIENCE

TRC Environmental Corporation | New Providence, NJ — Mar 2003-Jan 2021

Engineering and construction management firm serving environmental, power, oil and gas, and infrastructure markets.

GEOLOGIST/TASK MANAGER/ASSOCIATE PROJECT MANAGER

Planned and/or conducted site and remedial investigations of soil and ground water including well installations, ground water, surface water, sediment, and soil sampling, and ground water pumping tests. Monitored natural attenuation studies and subsurface evaluations on underground storage tank (UST) closures.

- Prepared and/or reviewed permit renewal applications, remedial action permit forms, CEAs, Deed Notices, biennial reviews and certifications, preliminary assessment, site and remedial investigation reports, and quarterly and semi-annual monitoring and/or remediation progress reports.
- Facilitated use of a proprietary database to customize reporting; **conducted data reviews and evaluation,** significantly reduced time to identify errors, producing more accurate reports for submission and meet NJDEP requirements.
- Supervised electronic data submissions (EDS) to NJDEP, trained employees to create EDS files, and informed employees of EDS requirement changes on a timely basis.
- Acted as the Engineering, Construction Remediation (ECR), Eastern Region Quality Coordinator leading communication and training initiatives. Collaborated with Regional ECR Quality Coordinators to create, maintain, and update enterprise-wide quality procedures.
- Oversaw QA/QC and use of field laboratory equipment and data; supervised recertification of field data laboratory.

PROJECTS

Provided task/project management, quality assurance, and site assessment expertise for Chemical Products Manufacturers, Oil & Gas, Real Estate Developers, and Construction Management companies in Northeastern US.

- **Ground Water Sampling for Chemical Products Manufacturer, Geologist/Associate Project Manager**: Oversaw and conducted quarterly ground water sampling for VOCs, pesticides, PCBs, and metals using regular purging methods for up to 65 wells. Reduced number of wells and frequency of sampling from quarterly to semi-annual, and annual basis.
- **Water Quality Reporting for Chemical Products Manufacturer, Task/Associate Project Manager**: Collaborated with project team to prepare Preliminary Assessment (PA), Remediation in Progress Waiver (RIPW), Baseline Ecological Evaluation (BEE), Site Investigation, Remedial Investigation, and Progress Reports and Remedial Action Outcomes.
- **Site Investigation for Chemical Plant, Geologist/Task Manager/Associate Project Manager**: Prepared boring logs for hydropunch locations. Reviewed and plotted ground water analytical data isoconcentration contours. Collected data for analysis, prepared report tables, and preliminary MNA feasibility calculation sheets.
- **Quality Assurance for Pharmaceutical Plant, Quality Assurance Lead/Task Manager:** Managed preparation and quality of field measurement data and review and entry of laboratory analytical data into database. Generated NJDEP EDS files submitted to the regulatory agency.
- **Soil Sampling for Oil & Gas Company, Geologist**: Conducted multiple soil borings for site assessment prior to sale. Used soil samples and PCB aroclor-specific field screening kit to conduct PCB soil investigation around telephone pole transformer that exploded.
- **Underground Storage Tank (UST) Subsurface Investigation, Geologist**: Performed multiple UST removal investigations and collected post excavation samples.

EDUCATION & CERTIFICATIONS

MASTER OF SCIENCE (MS), Geological Sciences, Rutgers University, New Brunswick, NJ

BACHELOR OF ARTS (BA), Geology with honors, Lafayette College, Easton, PA

BACHELOR OF SCIENCE (BS), Chemistry, Lafayette College, Easton, PA

Licensed Professional Geologist, New York, (#000740)

Licensed Professional Geologist, Pennsylvania, (#PG002827G)

New Jersey Licensed Subsurface Evaluator, (#0010467) - UHOT

RELEVANT SKILLS

Microsoft Office: Word, Excel, PowerPoint, Outlook

Languages: Fluent in English & Intermediate Spanish

Working knowledge of New Jersey Department of Environmental Protection (NJDEP) Regulations:

- NJ Administrative Requirements for the Remediation of Contaminated Sites (ARRCS) NJAC 7:26C
- NJ Technical Requirements for Site Remediation NJAC 7:26E
- NJ Pollution Discharge Elimination System (NJPDES): Discharge to Surface Water (NJPDES-DSW), Discharge to Ground Water (NJPDES-DGW), and Stormwater Permits NJAC 7:14A
- NJ Underground Storage Tanks NJAC 7:14B
- NJDEP Bureau of Water Allocation (NJDEP/BWA) Permits NJAC7:19-2

Trained/mentored junior staff in groundwater investigation and data management and analysis

Worked with subcontractors, clients and regulators to ensure project tasks met deadlines

SPECIALIZED TRAINING

- PG Review Course: A Professional Development Seminar for Practicing Geologists and ASBOG Exam Candidates, Pennsylvania Council of Professional Geologists
- EarthSoft/ESRI - Introduction to EQuIS Enterprise, EDP, and EQuIS Online training classes for TRC Companies
- Effective Groundwater Supply Management, Red Vector
- New Approaches in Remediation of Contaminated Sediments, Northwest Environmental Training Center
- Glacial Deposits of New Jersey, Rutgers University
- Groundwater in Fractured Bedrock, Rutgers University
- Stormwater Management Rules and BMP Manual, Rutgers University
- Environmental Forensics, Rutgers University
- Regulatory Training in Underground Storage Tanks, updated every 3 years
- Practical Applications in Hydrogeology, Rutgers University
- Annual 8-Hour OSHA Refresher Course, Occupational Health and Safety Training Program, 29 CFR 1910. 120
- Site Remediation Basics, Rutgers University
- Management Skills for Supervisors, Rutgers University
- NJDEP Electronic Data Requirements, Aqua Pro-Tech Laboratories and NJDEP
- Assessment and Management of MTBE-Impacted Sites, The National Ground Water Association
- DNAPL Delineation and Remediation, Geotrans, Inc.
- 8 Hour Supervisor for Hazardous Waste Site Worker
- Assessment, Control and Remediation of LNAPL Contaminated Sites, Environmental Systems and Technologies, Inc.
- 40-Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training per 29 CFR 1910.120

NAME: Mohammad Ahmed **POSITION: Laboratory Manager**

Dates: Nov. 2005 - Present

RESPONSIBILITIES: Responsible for all technical efforts of the Laboratory to meet all terms and conditions of CHEMTECH clients. Hands-on experience in the use of modern analytical instrumentation and wet chemical techniques. Currently responsible for the overall technical performance of the laboratory. Review technical and QA/QC requirements during the analysis. Oversee the laboratory operations and compliance with all regulations.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
University of Punjab	1996	2001	***Science***	-----	***BS, 2001***

Professional Experience

Name & Address of Employer: CHEMTECH Mountainside, NJ **Title of Position & Dates:** ***Laboratory Manager Nov. 2005-Present***	**Responsibilities included:** Oversee all technical laboratory performance and compliance with regulations and contracts.
Name & Address of Employer: Naturex **Title of Position & Dates:** ***Senior Chemist Oct.2005-Nov.2006***	**Responsibilities included:** Responsible for SOP prep. and review, method development, perform analysis using different instruments, calibrate and maintain instruments.
Name & Address of Employer: Garden State Laboratories **Title of Position & Dates:** ***Team Leader May 2001-Oct.2005***	**Responsibilities included:** Supervise organic department, oversee sampling projects, produce monthly reports, supervise PT analysis.
Name & Address of Employer: Accutest laboratories **Title of Position & Dates:** ***Senior Chemist Sept..2002-Oct.2003***	**Responsibilities included:** Responsible for laboratory audits, review data, create SOPs, perform organic and inorganic analysis.

Professional Skills

- Hands on experience in a variety of instruments such as GC/MS, ICP, GC, and various Wet chemistry methods.

Computer Skills

- ***MS Office – MS Word, MS Excel***
- Use of Environmental Data Reduction Software – Enviroquant, EISC, LIMS

Jeri L. Rossi

(908) 370-3431; richjerirossi513@gmail.com

Ms. Rossi has over 35 years of experience in the environmental industry and is a Certified Environmental Analytical Chemist through the National Registry of Certified Chemists. Ms. Rossi has extensive experience in the data review process having examined data for a variety of matrices for compliance with state and federal validation guidelines. She has over seven years experience preparing NYSDEC DUSRs and assisting in the preparation of EDDs for submittal. Her background includes sample preparation and analysis, method development, analytical data review and reduction, data validation, and project management. She has prepared and analyzed samples of various matrices in a laboratory setting. Her experience as a quality assurance/quality control (QA/QC) director coupled with her experience as an analyst has provided her with a thorough understanding of the entire laboratory process - six years as Quality Assurance/Quality Control Director for two laboratories as well as over 15 years in the laboratory as both Manager and analyst. She has extensive experience in reviewing data from the perspective of both an analyst and QA/QC Director. As a Project Manager, she has managed all aspects of client projects from coordinating sampling events through reporting results.

Professional Experience:

Sr. Environmental Chemist
Performed validation of analytical data for samples analyzed pursuant to the U.S. EPA Contract Laboratory Program Statement of Work (CLP), U.S. EPA SW-846, and various other EPA methodologies. Thoroughly understands the U.S. EPA Functional Guidelines for data validation, as well as various regional and other agency guidelines. She has performed data validation for numerous projects.
Actively providing data validation and evaluation services for sites located in Connecticut, California, Florida, Pennsylvania, and New Jersey. Activities include coordination of laboratory analyses, data review, comparison of results with historical data to determine trends, and preparation of validation and evaluation reports.

QA/QC Director
Implemented and maintained Quality System for entire laboratory. Strong emphasis placed on meeting State regulations as well as complying with NELAC standards. Performed internal audits on each department to confirm compliance with method requirements and laboratory quality standards. Implemented Corrective Action procedures based on results of internal audits. Reviewed and updated Standard Operating Procedures (SOPs) on an annual basis. Developed and implemented ethics training program. Ensured laboratory compliance with current State and Federal regulations. Evaluated laboratory compound lists and limits against various States' cleanup standards. Reviewed and approved all client QAPPs. Performed technical review of final reports prior to release to client. Resolved all client data inquiries. Maintained excellent relations with clients as well as State agencies through ongoing communication.

Authored technical memorandum delineating the analytical requirements for various agency regulatory programs. Used internally and as a resource for clients, these documents were created to ensure the laboratory analytical process complied with agency requirements.

Assisted with development, installation, and implementation of air analysis at the analytical level. Tasks included a comparative review of laboratory Standard

Education

BS, Environmental Science, Cook College, Rutgers University - New Brunswick, NJ - 1993

Professional Affiliations

NJ LSRPA – member

TNI – The NELAC Institute – member. Mentoring Subcommittee member.

NEMC - National Environmental Monitoring Conference – session chair.

Chair, Environmental Laboratory Advisory Committee (ELAC) 2011.

Secretary, Environmental Laboratory Advisory Committee (ELAC) 2009-2010.

Certifications

Certified Environmental Analytical Chemist with the National Registry of Certified Chemists.

40-Hour OSHA Hazardous Waste Safety Training

Operation Procedures (SOPs) and agency approved methodologies, a review of method detection limits (MDLs), and coordination of the analyst-specific demonstration of capabilities necessary for certification. In addition, assisted with establishing analysis programs, reviewed data packages, and resolved client inquiries.

Reviewed project specific QAPPs to confirm the laboratory's ability to achieve project goals. Verified QC tables, required reporting limits, and parameter lists. Identified QC requirements that could not be met by the lab and confirmed that the laboratory held the necessary certifications. Summarized project QAPP for use internally, identifying any anomalies affecting the sample preparation and analysis.

Prepared and presented technical seminars to clients detailing changes which had the potential to impact project needs. Topics included modifications to analytical methods, technical rules, and NELAC standards.

Chair/Secretary - New Jersey Environmental Laboratory Advisory Committee
Ms. Rossi held the positions of Chair (1yr) and Secretary (2yrs) of the New Jersey ELAC committee. During this time she actively contributed to the development and implementation of the NJ EPH method. She also co-chaired an analytical sub-committee that evaluated and recommended alternate methods for the analysis of 1,4-Dioxane. This effort led to the DEP offering certification for 1,4-Dioxane analysis by Method 8270 using isotopic dilution.

Project Manager
Managed projects for over 25 clients. Reviewed QAPPs to ensure laboratory met project and client needs. Efforts concentrated on coordinating sampling events with the laboratory, serving as technical resource for clients, meeting turn-around times and review and release of technically sound data.

Analyst/Manager
Performed analysis on various matrices for Volatile Organics, Semi-Volatile Organics, Total Petroleum Hydrocarbons and Petroleum Fingerprinting. Managed Volatile Organic and Semi-Volatile Organic departments. Ensured analyses were method compliant and were performed in accordance with project-specific requirements. Developed, implemented and trained laboratory personnel in laboratory-specific Standard Operating Procedures, focusing on good lab practices. Performed routine and non-routine maintenance of analytical instrumentation.

Professional Publications/Presentations:

"Uncertainty Associated with Field and Laboratory Activities"; CIANJ EBC Spring Conference presentation, May 2015.

"Final Data Interpretation/Usability: What's the Next Step?'; NJ LSRPA Fall 2017 Seminar.

"Data Interpretation"; NJ Site Remediation Conference, January 2018.

Jeri L. Rossi

Continuing Education/Specialized Training:

‘New Jersey DEP/Stroud Center Macroinvertebrate Fall Stream School, Rutgers University, October 2016.

“Advanced Petroleum Forensics”, Rutgers University, October 2013.

“Interpretation of Mass Spectra," conducted by Environmental Analytical Consulting, Inc., Edison, New Jersey, March 1990.

Appendix B

CDM Smith's Pierson Creek Superfund Sampling Results

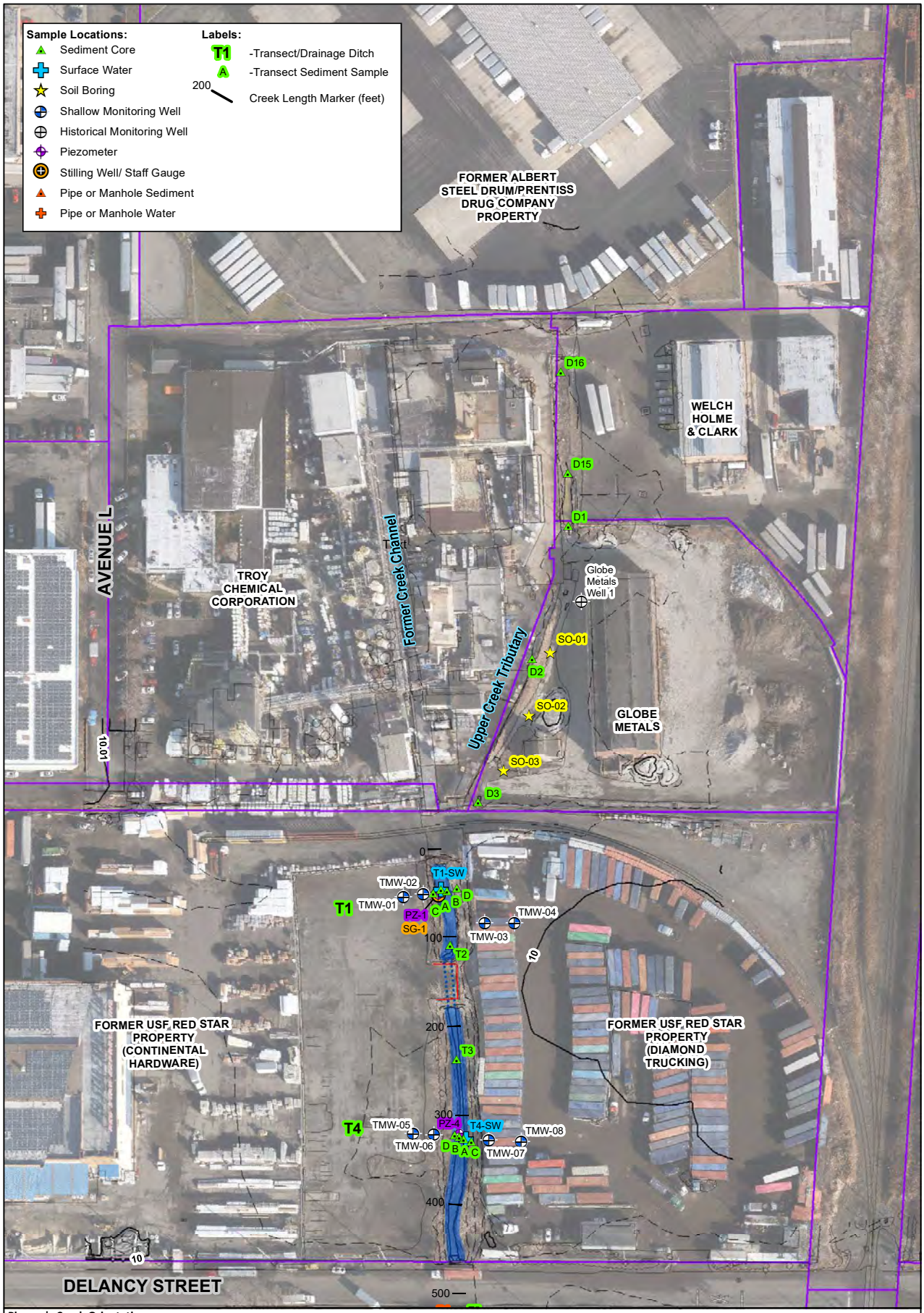


Figure 1-2a
Sampling Locations - Upper Creek
Pierson's Creek Superfund Site
Newark, NJ

CDM Smith

Appendix H-3
Analytical Results for Groundwater
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	GLOBAL METALS		GLOBAL METALS		MW-103		MW-103		MW-103		MW-103		T1-PZ	
				Sample #	GLOBE METALS WELL		LOBE METALS WELL-		MW-103-R1		MW-103-R1-F		MW-103-R2		MW-103-R2-F		T1-PZ-GW	
				Start Depth	1		1		5		5		5		5		5	
				End Depth	11		11		15		15		15		15		6	
				Depth Unit	ft bgs		ft bgs		ft		ft		ft bgs		ft bgs		ft	
				Sample Type	N		N		N		N		N		N		N	
				Parent Sample #														
				Sample Date	12/12/2019		12/12/2019		8/20/2019		8/20/2019		12/9/2019		12/9/2019		8/29/2019	
Method Group	Analyte	CAS #	Units	RI Groundwater Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
001-VOCs-Piers	1,1,1-Trichloroethane	71-55-6	µg/L	**30**	0.5	U			0.5	U			0.5	U			2.7	
001-VOCs-Piers	1,1,2,2-Tetrachloroethane	79-34-5	µg/L	1	0.5	U			1	U			0.5	U			1	U
001-VOCs-Piers	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	µg/L	20000	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	1,1,2-Trichloroethane	79-00-5	µg/L	**3**	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	1,1-Dichloroethane	75-34-3	µg/L	**50**	0.84				0.5	U			0.5	U			5.1	
001-VOCs-Piers	1,1-Dichloroethene	75-35-4	µg/L	**1**	0.5	UJ			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	1,2,3-Trichlorobenzene	87-61-6	µg/L	7	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	1,2,4-Trichlorobenzene	120-82-1	µg/L	9	0.5	U			1	U			0.5	U			1	U
001-VOCs-Piers	1,2-Dibromo-3-chloropropane	96-12-8	µg/L	0.02	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	1,2-Dibromoethane	106-93-4	µg/L	0.03	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	1,2-Dichlorobenzene	95-50-1	µg/L	600	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	1,2-Dichloroethane	107-06-2	µg/L	2	0.58				0.5	U			0.5	U			0.5	U
001-VOCs-Piers	1,2-Dichloropropane	78-87-5	µg/L	1	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	1,3-Dichlorobenzene	541-73-1	µg/L	600	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	1,4-Dichlorobenzene	106-46-7	µg/L	75	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	2-Butanone	78-93-3	µg/L	300	5	U			5	U			5	U			5	UJ
001-VOCs-Piers	2-Hexanone	591-78-6	µg/L	40	5	U			5	U			5	U			5	U
001-VOCs-Piers	4-Methyl-2-pentanone	108-10-1	µg/L	6300	5	U			5	U			5	U			5	U
001-VOCs-Piers	Acetone	67-64-1	µg/L	6000	5	U			5	U			5	U			5	U
001-VOCs-Piers	Benzene	71-43-2	µg/L	**1**	0.5	U			0.5	U			0.5	U			0.57	
001-VOCs-Piers	Bromochloromethane	74-97-5	µg/L	83	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	Bromodichloromethane	75-27-4	µg/L	1	0.5	U			0.5	U			0.5	U			0.5	UL
001-VOCs-Piers	Bromoform	75-25-2	µg/L	4	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	Bromomethane	74-83-9	µg/L	10	0.5	U			1	U			0.5	U			1	UL
001-VOCs-Piers	Carbon Disulfide	75-15-0	µg/L	700	0.5	U			0.5	U			0.5	U			0.5	UL
001-VOCs-Piers	Carbon Tetrachloride	56-23-5	µg/L	1	0.5	U			0.5	U			0.5	U			0.5	UL
001-VOCs-Piers	Chlorobenzene	108-90-7	µg/L	**50**	0.5	U			13	L			7.9				2.7	
001-VOCs-Piers	Chloroethane	75-00-3	µg/L	**5**	0.5	U			0.5	U			0.5	U			1.6	
001-VOCs-Piers	Chloroform	67-66-3	µg/L	**70**	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	Chloromethane	74-87-3	µg/L	190	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	cis-1,2-Dichloroethene	156-59-2	µg/L	**70**	0.47	J-			0.5	U			0.5	U			8.6	
001-VOCs-Piers	cis-1,3-Dichloropropene	10061-01-5	µg/L	1	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	Cyclohexane	110-82-7	µg/L	13000	0.5	U			0.5	U			0.5	U			0.5	UL
001-VOCs-Piers	Dibromochloromethane	124-48-1	µg/L	1	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	Dichlorodifluoromethane	75-71-8	µg/L	1000	0.5	U			0.5	U			0.5	U			0.5	UL

Appendix H-3
Analytical Results for Groundwater
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	GLOBAL METALS		GLOBAL METALS		MW-103		MW-103		MW-103		MW-103		T1-PZ	
				Sample #	GLOBE METALS WELL		LOBE METALS WELL-		MW-103-R1		MW-103-R1-F		MW-103-R2		MW-103-R2-F		T1-PZ-GW	
				Start Depth	1		1		5		5		5		5		5	
				End Depth	11		11		15		15		15		15		6	
				Depth Unit	ft bgs		ft bgs		ft		ft		ft bgs		ft bgs		ft	
				Sample Type	N		N		N		N		N		N		N	
				Parent Sample #														
				Sample Date	12/12/2019		12/12/2019		8/20/2019		8/20/2019		12/9/2019		12/9/2019		8/29/2019	
Method Group	Analyte	CAS #	Units	RI Groundwater Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
001-VOCs-Piers	Ethylbenzene	100-41-4	µg/L	700	0.5	UJ			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	Isopropylbenzene	98-82-8	µg/L	700	0.5	UJ			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	m,p-Xylene	179601-23-1	µg/L		0.5	UJ							0.5	U				
001-VOCs-Piers	M,P-XYLENE (SUM OF ISOMERS)	XYLMP	µg/L	1000					0.5	U							0.5	U
001-VOCs-Piers	Methyl acetate	79-20-9	µg/L	7000	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	Methyl tert-Butyl Ether	1634-04-4	µg/L	70	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	Methylcyclohexane	108-87-2	µg/L	100	0.5	U			0.5	UL			0.5	U			0.5	UL
001-VOCs-Piers	Methylene Chloride	75-09-2	µg/L	**3**	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	o-Xylene	95-47-6	µg/L	1000	0.5	UJ			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	Styrene	100-42-5	µg/L	100	0.5	UJ			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	Tetrachloroethene	127-18-4	µg/L	**1**	0.5	UJ			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	Toluene	108-88-3	µg/L	**600**	0.5	UJ			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	trans-1,2-Dichloroethene	156-60-5	µg/L	**100**	0.5	UJ			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	trans-1,3-Dichloropropene	10061-02-6	µg/L	1	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	Trichloroethene	79-01-6	µg/L	**1**	0.12	J-			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	Trichlorofluoromethane	75-69-4	µg/L	2000	0.5	U			0.5	U			0.5	U			0.5	U
001-VOCs-Piers	Vinyl Chloride	75-01-4	µg/L	**1**	0.19	J			0.5	UJ			0.19	J			**1.8**	J
002-SVOCs-Piers	1,1'-Biphenyl	92-52-4	µg/L	400	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	1,2,4,5-Tetrachlorobenzene	95-94-3	µg/L	**1.7**	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	1,4-Dioxane	123-91-1	µg/L	**0.4**	2	U			1.9	U			2	U			**7.1**	
002-SVOCs-Piers	2,2'-Oxybis(1-chloropropane)	108-60-1	µg/L	300	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	2,3,4,6-Tetrachlorophenol	58-90-2	µg/L	200	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	2,4,5-Trichlorophenol	95-95-4	µg/L	700	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	2,4,6-Trichlorophenol	88-06-2	µg/L	20	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	2,4-Dichlorophenol	120-83-2	µg/L	20	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	2,4-Dimethylphenol	105-67-9	µg/L	100	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	2,4-Dinitrophenol	51-28-5	µg/L	40	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	2,4-Dinitrotoluene	121-14-2	µg/L	0.24	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	2,6-Dinitrotoluene	606-20-2	µg/L	0.049	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	2-Chloronaphthalene	91-58-7	µg/L	600	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	2-Chlorophenol	95-57-8	µg/L	40	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	2-Methylnaphthalene	91-57-6	µg/L	**30**	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	2-Methylphenol	95-48-7	µg/L	50	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	2-Nitroaniline	88-74-4	µg/L	190	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	2-Nitrophenol	88-75-5	µg/L	100	5	U			4.8	U			5.1	U			5.4	U

Appendix H-3
Analytical Results for Groundwater
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	GLOBAL METALS		GLOBAL METALS		MW-103		MW-103		MW-103		MW-103		T1-PZ	
				Sample #	GLOBE METALS WELL		LOBE METALS WELL-		MW-103-R1		MW-103-R1-F		MW-103-R2		MW-103-R2-F		T1-PZ-GW	
				Start Depth	1		1		5		5		5		5		5	
				End Depth	11		11		15		15		15		15		6	
				Depth Unit	ft bgs		ft bgs		ft		ft		ft bgs		ft bgs		ft	
				Sample Type	N		N		N		N		N		N		N	
				Parent Sample #														
				Sample Date	12/12/2019		12/12/2019		8/20/2019		8/20/2019		12/9/2019		12/9/2019		8/29/2019	
Method Group	Analyte	CAS #	Units	RI Groundwater Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
002-SVOCs-Piers	3,3'-Dichlorobenzidine	91-94-1	µg/L	30	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	3-Nitroaniline	99-09-2	µg/L	100	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	4,6-Dinitro-2-methylphenol	534-52-1	µg/L	0.7	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	4-Bromophenyl-phenylether	101-55-3	µg/L	100	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	4-Chloro-3-methylphenol	59-50-7	µg/L	100	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	4-Chloroaniline	106-47-8	µg/L	30	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	4-Chlorophenyl-phenylether	7005-72-3	µg/L	100	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	4-Methylphenol	106-44-5	µg/L	**50**	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	4-Nitroaniline	100-01-6	µg/L	3.8	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	4-Nitrophenol	100-02-7	µg/L	100	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	Acenaphthene	83-32-9	µg/L	**400**	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Acenaphthylene	208-96-8	µg/L	100	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Acetophenone	98-86-2	µg/L	700	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	Anthracene	120-12-7	µg/L	2000	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Atrazine	1912-24-9	µg/L	3	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	Benzaldehyde	100-52-7	µg/L	19	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	Benzo(a)anthracene	56-55-3	µg/L	**0.1**	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Benzo(a)pyrene	50-32-8	µg/L	**0.1**	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Benzo(b)fluoranthene	205-99-2	µg/L	**0.2**	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Benzo(g,h,i)perylene	191-24-2	µg/L	**100**	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Benzo(k)fluoranthene	207-08-9	µg/L	**0.5**	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Bis(2-chloroethoxy)methane	111-91-1	µg/L	59	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Bis(2-chloroethyl)ether	111-44-4	µg/L	7	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	Bis(2-ethylhexyl)phthalate	117-81-7	µg/L	**3**	5	U			4.8	UJ			5.1	U			5.4	UJ
002-SVOCs-Piers	Butylbenzylphthalate	85-68-7	µg/L	**100**	5	U			4.8	UJ			5.1	U			5.4	UJ
002-SVOCs-Piers	Caprolactam	105-60-2	µg/L	4000	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	Carbazole	86-74-8	µg/L	100	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	Chrysene	218-01-9	µg/L	**5**	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Dibenzo(a,h)anthracene	53-70-3	µg/L	0.3	5	U			4.8	UJ			5.1	U			5.4	UJ
002-SVOCs-Piers	Dibenzofuran	132-64-9	µg/L	**7.9**	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Diethylphthalate	84-66-2	µg/L	6000	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Dimethylphthalate	131-11-3	µg/L	100	1.2	J			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Di-n-butylphthalate	84-74-2	µg/L	**700**	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Di-n-octylphthalate	117-84-0	µg/L	**100**	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	Fluoranthene	206-44-0	µg/L	**300**	10	U			9.5	U			10	U			11	U

Appendix H-3
Analytical Results for Groundwater
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	GLOBAL METALS		GLOBAL METALS		MW-103		MW-103		MW-103		MW-103		T1-PZ	
				Sample #	GLOBE METALS WELL		LOBE METALS WELL-		MW-103-R1		MW-103-R1-F		MW-103-R2		MW-103-R2-F		T1-PZ-GW	
				Start Depth	1		1		5		5		5		5		5	
				End Depth	11		11		15		15		15		15		6	
				Depth Unit	ft bgs		ft bgs		ft		ft		ft bgs		ft bgs		ft	
				Sample Type	N		N		N		N		N		N		N	
				Parent Sample #														
				Sample Date	12/12/2019		12/12/2019		8/20/2019		8/20/2019		12/9/2019		12/9/2019		8/29/2019	
Method Group	Analyte	CAS #	Units	RI Groundwater Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
002-SVOCs-Piers	Fluorene	86-73-7	µg/L	300	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Hexachlorobenzene	118-74-1	µg/L	0.02	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Hexachlorobutadiene	87-68-3	µg/L	1	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Hexachlorocyclopentadiene	77-47-4	µg/L	40	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	Hexachloroethane	67-72-1	µg/L	7	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Indeno(1,2,3-cd)pyrene	193-39-5	µg/L	**0.2**	5	U			4.8	UJ			5.1	U			5.4	UJ
002-SVOCs-Piers	Isophorone	78-59-1	µg/L	40	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Naphthalene	91-20-3	µg/L	**300**	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Nitrobenzene	98-95-3	µg/L	6	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	N-Nitroso-di-n-propylamine	621-64-7	µg/L	10	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	N-Nitrosodiphenylamine	86-30-6	µg/L	**10**	3.1	J			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Pentachlorophenol	87-86-5	µg/L	**0.3**	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	Phenanthrene	85-01-8	µg/L	**100**	5	U			4.8	U			5.1	U			5.4	U
002-SVOCs-Piers	Phenol	108-95-2	µg/L	2000	10	U			9.5	U			10	U			11	U
002-SVOCs-Piers	Pyrene	129-00-0	µg/L	**200**	5	U			4.8	U			5.1	U			5.4	U
003-Pest-Piers	4,4'-DDD	72-54-8	µg/L	**0.1**	0.1	U			0.097	U			0.1	U			0.11	U
003-Pest-Piers	4,4'-DDE	72-55-9	µg/L	**0.1**	0.1	U			0.0049	J			0.1	U			0.11	U
003-Pest-Piers	4,4'-DDT	50-29-3	µg/L	**0.1**	0.1	U			0.097	U			0.1	U			0.11	U
003-Pest-Piers	Aldrin	309-00-2	µg/L	**0.04**	0.05	U			0.049	U			0.05	U			0.053	U
003-Pest-Piers	alpha-BHC	319-84-6	µg/L	**0.02**	0.05	U			0.049	U			0.05	U			**0.025**	J
003-Pest-Piers	alpha-Chlordane	5103-71-9	µg/L	**0.5**	0.05	U			0.049	U			0.05	U			0.053	U
003-Pest-Piers	beta-BHC	319-85-7	µg/L	**0.04**	0.05	U			0.049	U			0.05	U			0.053	U
003-Pest-Piers	delta-BHC	319-86-8	µg/L	**5**	0.05	U			0.0026	J			0.05	U			0.053	U
003-Pest-Piers	Dieldrin	60-57-1	µg/L	**0.03**	0.1	U			0.097	U			0.1	U			0.11	U
003-Pest-Piers	Endosulfan I	959-98-8	µg/L	40	0.05	U			0.049	U			0.05	U			0.053	U
003-Pest-Piers	Endosulfan II	33213-65-9	µg/L	40	0.1	U			0.097	U			0.1	U			0.11	UJ
003-Pest-Piers	Endosulfan Sulfate	1031-07-8	µg/L	**40**	0.1	U			0.0037	J			0.1	U			0.11	U
003-Pest-Piers	Endrin	72-20-8	µg/L	**2**	0.1	U			0.097	U			0.1	U			0.11	U
003-Pest-Piers	Endrin aldehyde	7421-93-4	µg/L	100	0.1	U			0.097	U			0.1	U			0.11	U
003-Pest-Piers	Endrin Ketone	53494-70-5	µg/L	100	0.1	U			0.097	U			0.1	U			0.11	U
003-Pest-Piers	gamma-BHC (Lindane)	58-89-9	µg/L	**0.03**	0.05	U			0.049	U			0.05	U			0.053	U
003-Pest-Piers	gamma-Chlordane	5103-74-2	µg/L	**0.5**	0.05	U			0.049	U			0.05	U			0.053	U
003-Pest-Piers	Heptachlor	76-44-8	µg/L	**0.05**	0.05	U			0.049	U			0.05	U			0.053	U
003-Pest-Piers	Heptachlor Epoxide	1024-57-3	µg/L	**0.2**	0.05	U			0.049	U			0.05	U			0.0036	J
003-Pest-Piers	Methoxychlor	72-43-5	µg/L	**40**	0.5	U			0.49	U			0.5	U			0.53	U

Appendix H-3
Analytical Results for Groundwater
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	GLOBAL METALS		GLOBAL METALS		MW-103		MW-103		MW-103		MW-103		T1-PZ	
				Sample #	GLOBE METALS WELL		LOBE METALS WELL-		MW-103-R1		MW-103-R1-F		MW-103-R2		MW-103-R2-F		T1-PZ-GW	
				Start Depth	1		1		5		5		5		5		5	
				End Depth	11		11		15		15		15		15		6	
				Depth Unit	ft bgs		ft bgs		ft		ft		ft bgs		ft bgs		ft	
				Sample Type	N		N		N		N		N		N		N	
				Parent Sample #														
				Sample Date	12/12/2019		12/12/2019		8/20/2019		8/20/2019		12/9/2019		12/9/2019		8/29/2019	
Method Group	Analyte	CAS #	Units	RI Groundwater Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
003-Pest-Piers	Toxaphene	8001-35-2	µg/L	2	5	U			4.9	U			5	U			5.3	U
005-Aroclors-Piers	Aroclor 1016	12674-11-2	µg/L	0.5	1	U			0.97	U			1	U			1.1	U
005-Aroclors-Piers	Aroclor 1221	11104-28-2	µg/L	0.5	1	U			0.97	U			1	U			1.1	U
005-Aroclors-Piers	Aroclor 1232	11141-16-5	µg/L	0.5	1	U			0.97	U			1	U			1.1	U
005-Aroclors-Piers	Aroclor 1242	53469-21-9	µg/L	**0.5**	1	U			0.97	U			1	U			1.1	U
005-Aroclors-Piers	Aroclor 1248	12672-29-6	µg/L	0.5	1	U			0.97	U			1	U			1.1	U
005-Aroclors-Piers	Aroclor 1254	11097-69-1	µg/L	0.5	1	U			0.97	U			1	U			1.1	U
005-Aroclors-Piers	Aroclor 1260	11096-82-5	µg/L	**0.5**	1	U			0.97	U			1	U			1.1	U
005-Aroclors-Piers	Aroclor 1262	37324-23-5	µg/L	0.5	1	U			0.97	U			1	U			1.1	U
005-Aroclors-Piers	Aroclor 1268	11100-14-4	µg/L	0.5	1	U			0.97	U			1	U			1.1	U
005-Aroclors-Piers	Total Aroclors	TARO	µg/L	**0.5**	0	U			0	U			0	U			0	U
011-Inorganics-Piers	Aluminum	7429-90-5	µg/L	**200**	47.6		20	U	**240**		**240**		31.6		20	U	**680**	
011-Inorganics-Piers	Antimony	7440-36-0	µg/L	6	2	U	2	U	20	U	20	U	2	U	2	U	20	U
011-Inorganics-Piers	Arsenic	7440-38-2	µg/L	**3**	**5010**		**5070**		**8.8**		8	U	**4.3**		**3.7**		**46**	
011-Inorganics-Piers	Barium	7440-39-3	µg/L	2000	43.5		43.4		1500		1500		1490		1480		240	
011-Inorganics-Piers	Beryllium	7440-41-7	µg/L	1	1	U	1	U	3	U	3	U	1	U	1	U	3	U
011-Inorganics-Piers	Cadmium	7440-43-9	µg/L	**4**	1	U	1	U	3	U	3	U	1	U	1	U	3	U
011-Inorganics-Piers	Calcium	7440-70-2	µg/L		103000		107000		140000		140000		163000		156000		120000	
011-Inorganics-Piers	Chromium	7440-47-3	µg/L	**70**	1.5	J	1	J	5	U	5	U	4.3		4.9		5	U
011-Inorganics-Piers	Cobalt	7440-48-4	µg/L	100	0.58	J	0.51	J	20	U	20	U	0.45	J	0.47	J	20	U
011-Inorganics-Piers	Copper	7440-50-8	µg/L	1300	1.9	J	0.48	J	10	U	10	U	4.3		0.99	J	12	
011-Inorganics-Piers	Cyanide	57-12-5	µg/L	100	10	U			10	U			10	U			10	U
011-Inorganics-Piers	Iron	7439-89-6	µg/L	**300**	**42000**		**42600**		**3200**		**3100**		**4910**		**5160**		**2300**	
011-Inorganics-Piers	Lead	7439-92-1	µg/L	**5**	3		1	U	8	U	8	U	2.2		1	U	**11**	
011-Inorganics-Piers	Magnesium	7439-95-4	µg/L		18100		18400		15000		15000		18700		19400		140000	
011-Inorganics-Piers	Manganese	7439-96-5	µg/L	**50**	**601**		**611**		**220**		**220**		**317**		**344**		**450**	
011-Inorganics-Piers	Mercury	7439-97-6	µg/L	**2**	0.05	U	0.05	U	0.2	U	0.2	U	0.05	U	0.05	U	0.71	
011-Inorganics-Piers	Nickel	7440-02-0	µg/L	**100**	3.6		3.5		20	U	20	U	22		20.7		20	U
011-Inorganics-Piers	Potassium	7440-09-7	µg/L		17500		17200		17000		17000		14800		15600		57000	
011-Inorganics-Piers	Selenium	7782-49-2	µg/L	40	5	U	5	U	20	U	20	U	5	U	5	U	20	U
011-Inorganics-Piers	Silver	7440-22-4	µg/L	40	1	U	1	U	5	U	5	U	1	U	1	U	5	U
011-Inorganics-Piers	Sodium	7440-23-5	µg/L	**50000**	**104000**		**107000**		**180000**		**180000**		**200000**		**183000**		**1300000**	
011-Inorganics-Piers	Thallium	7440-28-0	µg/L	2	1	U	1	U	20	U	20	U	1	U	1	U	20	U
011-Inorganics-Piers	Vanadium	7440-62-2	µg/L	86	0.66	J	0.59	J	20	U	20	U	5	U	5	U	20	U
011-Inorganics-Piers	Zinc	7440-66-6	µg/L	**2000**	20.4		16.4		20	U	20	U	6.2		1.2	J	57	

Appendix H-3
Analytical Results for Groundwater
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	GLOBAL METALS		GLOBAL METALS		MW-103		MW-103		MW-103		MW-103		T1-PZ	
				Sample #	GLOBE METALS WELL		LOBE METALS WELL-		MW-103-R1		MW-103-R1-F		MW-103-R2		MW-103-R2-F		T1-PZ-GW	
				Start Depth	1		1		5		5		5		5		5	
				End Depth	11		11		15		15		15		15		6	
				Depth Unit	ft bgs		ft bgs		ft		ft		ft bgs		ft bgs		ft	
				Sample Type	N		N		N		N		N		N		N	
				Parent Sample #														
				Sample Date	12/12/2019		12/12/2019		8/20/2019		8/20/2019		12/9/2019		12/9/2019		8/29/2019	
Method Group	Analyte	CAS #	Units	RI Groundwater Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
014-General Chemistry	Alkalinity Bicarbonate	71-52-3	mg/L						750								310	
014-General Chemistry	ALKALINITY, BICARBONATE (AS CACO3)	ALKB	mg/L		220								850					
014-General Chemistry	Ammonia	7664-41-7	mg/L		1.8				2.4				4.2				5.7	
014-General Chemistry	Chloride	16887-00-6	mg/L		140				110				180				3200	
014-General Chemistry	Dissolved Organic Carbon	DOC	mg/L		10				7.2				8.9				9.7	
014-General Chemistry	Nitrate + Nitrite [As N]	NN	mg/L		0.05	U			0.05	U			0.05	U			0.064	
014-General Chemistry	Particulate Organic Carbon	PAROC	µg/L		2500				1100				2900				1600	
014-General Chemistry	Phosphorus	7723-14-0	mg/L		0.16				0.584				0.557				1.31	
014-General Chemistry	Sulfate	14808-79-8	mg/L		250				2.3				1	U			420	
014-General Chemistry	Total Alkalinity	ALK	mg/L		220								850					
014-General Chemistry	Total Dissolved Solids	TDS	mg/L		860				1100				1200				5700	
014-General Chemistry	Total Organic Carbon	TOC	mg/L		9.5				8.6				10				11	
014-General Chemistry	Total Suspended Solids	TSS	mg/L		57				10	U			13				13	

Notes:

1. Results that are greater than the RI groundwater screening criteria are highlighted yellow.

Acronyms:

FD - field duplicate
ft - feet
ft bgs - feet below ground surface
J - estimated
J+ - estimated, biased high
J- estimated, biased low
J-EMPC - estimated maximum possible concentration
mg/L - milligram per liter
N - normal
Q - qualifier
R - rejected
RI - remedial investigation
U - nondetect
UJ - nondetect, estimated
µg/L - microgram per liter

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

						Location	D1		D1		D1		D1		D1		D10	
						Sample #	D1-SE-A		D1-SE-B		D1-SE-C		D1-SE-D		D1-SE-E		D10-SE-A	
						Start Depth	0		0.5		1		2		3		0	
						End Depth	0.5		1		2		3		4		0.5	
						Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
						Sample Type	N		N		N		N		N		N	
						Parent Sample #												
						Sample Date	8/6/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019		7/30/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
001-VOCs-Piers	1,1,1-Trichloroethane	71-55-6	µg/kg	856	200	48	U	28	UJ	12	U	9	UJ	800	U		
001-VOCs-Piers	1,1,2,2-Tetrachloroethane	79-34-5	µg/kg	202	3000	48	UJ		R		R		R	800	U		
001-VOCs-Piers	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	µg/kg	28000000	28000000	48	U	28	UJ	12	U	9	UJ	800	U		
001-VOCs-Piers	1,1,2-Trichloroethane	79-00-5	µg/kg	**570**	6000	48	U	28	U	12	U	9	UJ	800	U		
001-VOCs-Piers	1,1-Dichloroethane	75-34-3	µg/kg	**16000**	24000	48	U	28	UJ	12	U	9	UJ	800	U		
001-VOCs-Piers	1,1-Dichloroethene	75-35-4	µg/kg	**2780**	150000	48	U	28	UJ	12	U	9	UJ	800	U		
001-VOCs-Piers	1,2,3-Trichlorobenzene	87-61-6	µg/kg	930000	930000	48	UJ		R		R		R	800	U		
001-VOCs-Piers	1,2,4-Trichlorobenzene	120-82-1	µg/kg	**4.8**	820000	48	UJ	**78**	J	**10**	J		R	800	U		
001-VOCs-Piers	1,2-Dibromo-3-chloropropane	96-12-8	µg/kg	64	200	48	UJ		R		R		R	800	U		
001-VOCs-Piers	1,2-Dibromoethane	106-93-4	µg/kg	160	40	48	U	28	UJ	12	U	9	UJ	800	U		
001-VOCs-Piers	1,2-Dichlorobenzene	95-50-1	µg/kg	**989**	59000000	7.8	J	**3600**		**3600**		**2300**	J	**1100**			
001-VOCs-Piers	1,2-Dichloroethane	107-06-2	µg/kg	**2000**	3000	48	U	28	U	12	U	9	UJ	800	U		
001-VOCs-Piers	1,2-Dichloropropane	78-87-5	µg/kg	11000	5000	48	U	28	U	12	U	9	UJ	800	U		
001-VOCs-Piers	1,3-Dichlorobenzene	541-73-1	µg/kg	**842**	59000000	48	UJ	**3700**		**1700**		**1200**	J	430	J		
001-VOCs-Piers	1,4-Dichlorobenzene	106-46-7	µg/kg	**110**	13000	17	J	**13000**		**7100**		**4600**	J	**1400**			
001-VOCs-Piers	2-Butanone	78-93-3	µg/kg	190000000	44000000	78	J	1500	J	340	J	410	J	4000	U		
001-VOCs-Piers	2-Hexanone	591-78-6	µg/kg	1300000	1300000	240	U	140	UJ	62	U	45	UJ	4000	U		
001-VOCs-Piers	4-Methyl-2-pentanone	108-10-1	µg/kg	140000000	140000000	240	U	140	U	62	U	45	UJ	4000	U		
001-VOCs-Piers	Acetone	67-64-1	µg/kg	670000000	12000	480		1200	J	620	J	390	J	4000	U		
001-VOCs-Piers	Benzene	71-43-2	µg/kg	**340**	5000	65		**2400**	J	**1000**		**1400**		**1200**			
001-VOCs-Piers	Bromochloromethane	74-97-5	µg/kg	630000	630000	48	U	28	UJ	12	U	9	UJ	800	U		
001-VOCs-Piers	Bromodichloromethane	75-27-4	µg/kg	1300	3000	48	U	28	U	12	U	9	UJ	800	U		
001-VOCs-Piers	Bromoform	75-25-2	µg/kg	1310	280000	48	U	28	UJ	12	U	9	UJ	800	U		
001-VOCs-Piers	Bromomethane	74-83-9	µg/kg	30000	59000	95	U	57	UJ	25	U	18	UJ	1600	U		
001-VOCs-Piers	Carbon Disulfide	75-15-0	µg/kg	3500000	110000000	16	J	18	J	40	J	9	UJ	800	U		
001-VOCs-Piers	Carbon Tetrachloride	56-23-5	µg/kg	7240	4000	48	U	28	UJ	12	U	9	UJ	800	U		
001-VOCs-Piers	Chlorobenzene	108-90-7	µg/kg	**162**	7400000	10	J	**420**	J	**1300**		**1700**		**2700**			
001-VOCs-Piers	Chloroethane	75-00-3	µg/kg	57000000	1100000	95	U	57	UJ	5.3	J	2.5	J	1600	U		
001-VOCs-Piers	Chloroform	67-66-3	µg/kg	**1400**	2000	48	U	28	UJ	12	U	9	UJ	800	U		
001-VOCs-Piers	Chloromethane	74-87-3	µg/kg	460000	12000	95	U	57	UJ	25	U	18	UJ	1600	U		
001-VOCs-Piers	cis-1,2-Dichloroethene	156-59-2	µg/kg	**2300000**	560000	48	U	28	UJ	27	J	6.5	J	800	U		
001-VOCs-Piers	cis-1,3-Dichloropropene	10061-01-5	µg/kg	7.31	7000	48	U	28	U	12	U	9	UJ	800	U		
001-VOCs-Piers	Cyclohexane	110-82-7	µg/kg	27000000	27000000	48	U	1500	J	170	J	240	J	800	U		
001-VOCs-Piers	Dibromochloromethane	124-48-1	µg/kg	39000	8000	48	U	28	UJ	12	U	9	UJ	800	U		
001-VOCs-Piers	Dichlorodifluoromethane	75-71-8	µg/kg	370000	230000000	95	U	57	UJ	25	U	18	UJ	1600	U		
001-VOCs-Piers	Ethylbenzene	100-41-4	µg/kg	**1400**	110000000	12	J	140	J	85	J	62	J	800	U		
001-VOCs-Piers	Isopropylbenzene	98-82-8	µg/kg	9900000	9900000	48	UJ	660	J	610	J	500	J	230	J		
001-VOCs-Piers	M,P-XYLENE (SUM OF ISOMERS)	XYLMP	µg/kg	**120**	170000000	95	U	**370**	J	**410**	J	**230**	J	**360**	J		
001-VOCs-Piers	Methyl acetate	79-20-9	µg/kg	1200000000	14000	48	U	28	U	12	U	9	UJ	620	J		
001-VOCs-Piers	Methyl tert-Butyl Ether	1634-04-4	µg/kg	210000	320000	48	U	28	UJ	12	U	9	UJ	800	U		
001-VOCs-Piers	Methylcyclohexane	108-87-2	µg/kg			48	U	3400		360	J	360	J	800	U		

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

						Location	D1		D1		D1		D1		D1		D10	
						Sample #	D1-SE-A		D1-SE-B		D1-SE-C		D1-SE-D		D1-SE-E		D10-SE-A	
						Start Depth	0		0.5		1		2		3		0	
						End Depth	0.5		1		2		3		4		0.5	
						Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
						Sample Type	N		N		N		N		N		N	
						Parent Sample #												
						Sample Date	8/6/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019		7/30/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
001-VOCs-Piers	Methylene Chloride	75-09-2	µg/kg	1000000	230000		240	U	140	UJ	62	U	45	UJ	4000	U		
001-VOCs-Piers	o-Xylene	95-47-6	µg/kg	**120**	170000000		48	U	**230**	J	**270**	J	**180**	J	**260**	J		
001-VOCs-Piers	Styrene	100-42-5	µg/kg	7070	260000		48	U	8.8	J	3.8	J	2.1	J	800	U		
001-VOCs-Piers	Tetrachloroethene	127-18-4	µg/kg	**450**	1500000		48	U	28	U	12	U	9	UJ	800	U		
001-VOCs-Piers	Toluene	108-88-3	µg/kg	**2500**	91000000		460		310		61	J	30	J	800	U		
001-VOCs-Piers	TOTAL XYLENES	133-02-07	µg/kg															
001-VOCs-Piers	trans-1,2-Dichloroethene	156-60-5	µg/kg	23000000	720000		48	U	28	UJ	9.2	J	4.6	J	800	U		
001-VOCs-Piers	trans-1,3-Dichloropropene	10061-02-6	µg/kg	7.31	7000		48	U	28	U	12	U	9	UJ	800	U		
001-VOCs-Piers	Trichloroethene	79-01-6	µg/kg	**1600**	10000		48	U	28	U	4	J	9	UJ	800	U		
001-VOCs-Piers	Trichlorofluoromethane	75-69-4	µg/kg	350000000	340000000		95	U	57	UJ	25	U	18	UJ	1600	U		
001-VOCs-Piers	Vinyl Chloride	75-01-4	µg/kg	**1700**	2000		95	U	57	UJ	4.4	J	4.5	J	1600	U		
001-VOCs-Piers	Xylenes (TOTAL)	1330-20-7	µg/kg				140	U	600	J	670	J	410	J	620	J		
002-SVOCs-Piers	1,1'-Biphenyl	92-52-4	µg/kg	200000	240000		2000	U	1700	U	780	UJ	610	UJ	380	J	2300	UJ
002-SVOCs-Piers	1,2,4,5-Tetrachlorobenzene	95-94-3	µg/kg	47000	350000		2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	1,4-Dioxane	123-91-1	µg/kg	24000	24000		2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	2,2'-Oxybis(1-chloropropane)	108-60-1	µg/kg	47000000	67000		2000	UJ	1700	UJ	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	2,3,4,6-Tetrachlorophenol	58-90-2	µg/kg	25000000	25000000		2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	2,4,5-Trichlorophenol	95-95-4	µg/kg	3	68000000		5000	U	4200	U	2000	UJ	1500	UJ	1600	UJ	5600	U
002-SVOCs-Piers	2,4,6-Trichlorophenol	88-06-2	µg/kg	6	74000		2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	U
002-SVOCs-Piers	2,4-Dichlorophenol	120-83-2	µg/kg	5	2100000		2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	U
002-SVOCs-Piers	2,4-Dimethylphenol	105-67-9	µg/kg	16000000	14000000		2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	U
002-SVOCs-Piers	2,4-Dinitrophenol	51-28-5	µg/kg	1600000	1400000		5000	U	4200	U	2000	UJ	1500	UJ	1600	UJ	5600	U
002-SVOCs-Piers	2,4-Dinitrotoluene	121-14-2	µg/kg	7400	3000		2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	2,6-Dinitrotoluene	606-20-2	µg/kg	1500	3000		2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	2-Chloronaphthalene	91-58-7	µg/kg	60000000	60000000		2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	2-Chlorophenol	95-57-8	µg/kg	8	2200000		2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	U
002-SVOCs-Piers	2-Methylnaphthalene	91-57-6	µg/kg	**70**	2400000		2000	U	1700	U	780	UJ	610	UJ	**220**	J	2300	UJ
002-SVOCs-Piers	2-Methylphenol	95-48-7	µg/kg	41000000	3400000		2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	U
002-SVOCs-Piers	2-Nitroaniline	88-74-4	µg/kg	8000000	23000000		5000	U	4200	U	2000	UJ	1500	UJ	1600	UJ	5600	UJ
002-SVOCs-Piers	2-Nitrophenol	88-75-5	µg/kg		1600		2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	U
002-SVOCs-Piers	3,3'-Dichlorobenzidine	91-94-1	µg/kg	2060	4000		2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	3-Nitroaniline	99-09-2	µg/kg		3160		5000	U	4200	U	2000	UJ	1500	UJ	1600	UJ	5600	UJ
002-SVOCs-Piers	4,6-Dinitro-2-methylphenol	534-52-1	µg/kg	66000	68000		5000	U	4200	U	2000	UJ	1500	UJ	1600	UJ	5600	U
002-SVOCs-Piers	4-Bromophenyl-phenylether	101-55-3	µg/kg				2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	4-Chloro-3-methylphenol	59-50-7	µg/kg	82000000	82000000		2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	U
002-SVOCs-Piers	4-Chloroaniline	106-47-8	µg/kg	11000	11000		2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	4-Chlorophenyl-phenylether	7005-72-3	µg/kg				2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	4-Nitroaniline	100-01-6	µg/kg	110000	110000		5000	U	4200	U	2000	UJ	1500	UJ	1600	UJ	5600	UJ
002-SVOCs-Piers	4-Nitrophenol	100-02-7	µg/kg		5120		5000	U	4200	U	2000	UJ	1500	UJ	1600	UJ	5600	U
002-SVOCs-Piers	Acenaphthene	83-32-9	µg/kg	**16**	37000000		2000	U	1700	U	**180**	J	610	UJ	**280**	J	2300	UJ
002-SVOCs-Piers	Acenaphthylene	208-96-8	µg/kg	**44**	300000000		2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

						Location	D1		D1		D1		D1		D1		D10	
						Sample #	D1-SE-A		D1-SE-B		D1-SE-C		D1-SE-D		D1-SE-E		D10-SE-A	
						Start Depth	0		0.5		1		2		3		0	
						End Depth	0.5		1		2		3		4		0.5	
						Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
						Sample Type	N		N		N		N		N		N	
						Parent Sample #												
						Sample Date	8/6/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019		7/30/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
002-SVOCs-Piers	Acetophenone	98-86-2	µg/kg	120000000	5000	2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Anthracene	120-12-7	µg/kg	**85**	30000000	2000	U	1700	U	**3600**	J	**3900**	J	**1400**	J	2300	UJ
002-SVOCs-Piers	Atrazine	1912-24-9	µg/kg	10000	2400000	2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Benzaldehyde	100-52-7	µg/kg	820000	68000000	2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Benzo(a)anthracene	56-55-3	µg/kg	**261**	17000	**640**	J	**450**	J	780	UJ	**360**	J	**430**	J	2300	UJ
002-SVOCs-Piers	Benzo(a)pyrene	50-32-8	µg/kg	**430**	2000	**930**	J	**610**	J	780	UJ	290	J	320	J	2300	UJ
002-SVOCs-Piers	Benzo(b)fluoranthene	205-99-2	µg/kg	**1800**	17000	1500	J	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Benzo(g,h,i)perylene	191-24-2	µg/kg	**170**	30000000	**760**	J	1700	U	780	UJ	610	UJ	**210**	J	2300	UJ
002-SVOCs-Piers	Benzo(k)fluoranthene	207-08-9	µg/kg	**240**	170000	**650**	J	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Bis(2-chloroethoxy)methane	111-91-1	µg/kg	2500000	2500000	2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Bis(2-chloroethyl)ether	111-44-4	µg/kg	1000	2000	2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Bis(2-ethylhexyl)phthalate	117-81-7	µg/kg	**182.16**	140000	**21000**		**110000**		**100000**		**47000**		**26000**	J	**1400**	J
002-SVOCs-Piers	Butylbenzylphthalate	85-68-7	µg/kg	**63**	14000000	2000	U	1700	U	780	UJ	610	UJ	**530**	J	2300	UJ
002-SVOCs-Piers	Caprolactam	105-60-2	µg/kg	400000000	340000000	2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Carbazole	86-74-8	µg/kg		96000	2000	U	1700	U	710	J	1200	J	640	UJ	2300	UJ
002-SVOCs-Piers	Chrysene	218-01-9	µg/kg	**384**	1700000	**1000**	J	**860**	J	370	J	**540**	J	**620**	J	2300	UJ
002-SVOCs-Piers	CRESOLS, M & P	MEPH1314	µg/kg			2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	U
002-SVOCs-Piers	Dibenzo(a,h)anthracene	53-70-3	µg/kg	**63**	2000	2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Dibenzofuran	132-64-9	µg/kg	7300	1000000	2000	U	1700	U	780	UJ	270	J	200	J	2300	UJ
002-SVOCs-Piers	Diethylphthalate	84-66-2	µg/kg	6	550000000	2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Dimethylphthalate	131-11-3	µg/kg		734000	2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Di-n-butylphthalate	84-74-2	µg/kg	**110**	68000000	2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Di-n-octylphthalate	117-84-0	µg/kg	8200000	27000000	2000	U	2300		2100	J	1300	J	640	UJ	2300	UJ
002-SVOCs-Piers	Fluoranthene	206-44-0	µg/kg	**600**	24000000	**910**	J	**770**	J	280	J	**650**	J	**640**	J	2300	UJ
002-SVOCs-Piers	Fluorene	86-73-7	µg/kg	**19**	24000000	2000	U	1700	U	780	UJ	**270**	J	**250**	J	2300	UJ
002-SVOCs-Piers	Hexachlorobenzene	118-74-1	µg/kg	**20**	1000	2000	UJ	1700	UJ	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Hexachlorobutadiene	87-68-3	µg/kg	1.3	25000	2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Hexachlorocyclopentadiene	77-47-4	µg/kg	139	110000	2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Hexachloroethane	67-72-1	µg/kg	73	48000	2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	**200**	17000	**790**	J	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Isophorone	78-59-1	µg/kg	2400000	2000000	2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	Naphthalene	91-20-3	µg/kg	**160**	17000	2000	U	1700	U	780	UJ	**220**	J	**230**	J	2300	UJ
002-SVOCs-Piers	Nitrobenzene	98-95-3	µg/kg	22000	14000	2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	N-Nitroso-di-n-propylamine	621-64-7	µg/kg	330	300	2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	UJ
002-SVOCs-Piers	N-Nitrosodiphenylamine	86-30-6	µg/kg	422000	390000	2000	U	1700	U	760	J	950	J	1800	J	2300	UJ
002-SVOCs-Piers	Pentachlorophenol	87-86-5	µg/kg	17	3000	5000	U	4200	U	2000	UJ	1500	UJ	1600	UJ	5600	U
002-SVOCs-Piers	Phenanthrene	85-01-8	µg/kg	**240**	45700	2000	U	**430**	J	**250**	J	**770**	J	**760**	J	2300	UJ
002-SVOCs-Piers	Phenol	108-95-2	µg/kg	**130**	210000000	2000	U	1700	U	780	UJ	610	UJ	640	UJ	2300	U
002-SVOCs-Piers	Pyrene	129-00-0	µg/kg	**665**	18000000	**1300**	J	**1100**	J	**1000**	J	**1300**	J	**1200**	J	2300	UJ
003-Pest-Piers	4,4'-DDD	72-54-8	µg/kg	**2**	13000	**240**		**910**	J	**14000**		**18000**		**18000**		**26**	
003-Pest-Piers	4,4'-DDE	72-55-9	µg/kg	**2.2**	9000	**51**	J	**210**	J	**4400**	J	**5900**	J	**4000**		**6**	J

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

						Location	D1		D1		D1		D1		D1		D10	
						Sample #	D1-SE-A		D1-SE-B		D1-SE-C		D1-SE-D		D1-SE-E		D10-SE-A	
						Start Depth	0		0.5		1		2		3		0	
						End Depth	0.5		1		2		3		4		0.5	
						Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
						Sample Type	N		N		N		N		N		N	
						Parent Sample #												
						Sample Date	8/6/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019		7/30/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
003-Pest-Piers	4,4'-DDT	50-29-3	µg/kg	**1**	8000	**170**	J	**740**	J	**8600**	J	**10000**	J	**6000**	J	**15**	J
003-Pest-Piers	Aldrin	309-00-2	µg/kg	**2**	200	**19**	J	**66**		**1400**	J	**1600**	J	**760**	J	12	U
003-Pest-Piers	alpha-BHC	319-84-6	µg/kg	1360	500	30	U	17	U	24	U	18	U	20	U	35	J
003-Pest-Piers	alpha-Chlordane	5103-71-9	µg/kg	**3.24**	1000000	**72**		**300**		**2900**		**3400**		**2700**		**5.5**	J
003-Pest-Piers	beta-BHC	319-85-7	µg/kg	1300	2000	30	U	17	U	24	U	18	U	20	U	16	
003-Pest-Piers	delta-BHC	319-86-8	µg/kg	**1300**	1300	30	U	17	U	840	J	1300	J	730	J	12	U
003-Pest-Piers	Dieldrin	60-57-1	µg/kg	**1.9**	200	**210**	J	**910**	J	**8500**	J	**7400**	J	**3800**	J	**17**	J
003-Pest-Piers	Endosulfan I	959-98-8	µg/kg	7000000	6800000	30	U	17	U	24	U	18	U	20	U	12	U
003-Pest-Piers	Endosulfan II	33213-65-9	µg/kg	7000000	6800000	59	U	33	U	47	U	36	U	38	U	23	U
003-Pest-Piers	Endosulfan Sulfate	1031-07-8	µg/kg	**0.357**	6800000	59	U	**180**		**1800**		**2200**		**1600**	J	23	U
003-Pest-Piers	Endrin	72-20-8	µg/kg	2.22	340000	59	U	33	U	47	U	36	U	38	U	23	U
003-Pest-Piers	Endrin aldehyde	7421-93-4	µg/kg		1620	34	J	180	J	1600	J	1900	J	1200	J	23	U
003-Pest-Piers	Endrin Ketone	53494-70-5	µg/kg		1620	59	U	33	U	47	U	36	U	1100	J	23	U
003-Pest-Piers	gamma-BHC (Lindane)	58-89-9	µg/kg	**0.32**	2000	30	U	17	U	24	U	18	U	20	U	12	U
003-Pest-Piers	gamma-Chlordane	5103-74-2	µg/kg	**3.24**	1000000	**130**		**560**		**6800**	J	**8200**	J	**6300**	J	**6.2**	J
003-Pest-Piers	Heptachlor	76-44-8	µg/kg	0.3	700	30	U	17	U	24	U	18	U	20	U	12	U
003-Pest-Piers	Heptachlor Epoxide	1024-57-3	µg/kg	**2.47**	300	30	U	17	U	24	U	18	U	20	U	12	U
003-Pest-Piers	Methoxychlor	72-43-5	µg/kg	**29.6**	5700000	300	U	170	U	240	U	180	U	200	U	120	U
003-Pest-Piers	Toxaphene	8001-35-2	µg/kg	536	3000	590	U	330	U	470	U	360	U	380	U	230	U
005-Aroclors-Piers	Aroclor 1016	12674-11-2	µg/kg	7	1000	520	UJ	430	UJ	400	U	1200	U	330	U	120	UJ
005-Aroclors-Piers	Aroclor 1221	11104-28-2	µg/kg	23	1000	520	UJ	430	UJ	400	U	1200	U	330	U	120	UJ
005-Aroclors-Piers	Aroclor 1232	11141-16-5	µg/kg	23	1000	520	UJ	430	UJ	400	U	1200	U	330	U	120	UJ
005-Aroclors-Piers	Aroclor 1242	53469-21-9	µg/kg	**23**	1000	520	UJ	430	UJ	400	U	**42000**		330	U	120	UJ
005-Aroclors-Piers	Aroclor 1248	12672-29-6	µg/kg	**30**	1000	520	UJ	430	UJ	**60000**		1200	U	**53000**		120	UJ
005-Aroclors-Piers	Aroclor 1254	11097-69-1	µg/kg	**60**	1000	**2500**	J	**8100**	J	400	U	**150000**		330	U	120	UJ
005-Aroclors-Piers	Aroclor 1260	11096-82-5	µg/kg	**5**	1000	**1600**	J	**5300**	J	**50000**		**71000**		**46000**		**74**	J
005-Aroclors-Piers	Aroclor 1262	37324-23-5	µg/kg	23	1000	520	UJ	430	UJ	400	U	1200	U	330	U	120	UJ
005-Aroclors-Piers	Aroclor 1268	11100-14-4	µg/kg	23	1000	520	UJ	430	UJ	400	U	1200	U	330	U	120	UJ
005-Aroclors-Piers	Total Aroclors	TARO	µg/kg	**23**	1000	**4100**		**13400**		**110000**		**263000**		**99000**		**74**	
007-Dioxin/Furan-Pier	1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	ng/kg														
007-Dioxin/Furan-Pier	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822-46-9	ng/kg														
007-Dioxin/Furan-Pier	1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	ng/kg														
007-Dioxin/Furan-Pier	1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	ng/kg														
007-Dioxin/Furan-Pier	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6	ng/kg														
007-Dioxin/Furan-Pier	1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	ng/kg														
007-Dioxin/Furan-Pier	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7	ng/kg														
007-Dioxin/Furan-Pier	1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	ng/kg														
007-Dioxin/Furan-Pier	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3	ng/kg														
007-Dioxin/Furan-Pier	1,2,3,7,8-Pentachlorodibenzofuran	57117-41-6	ng/kg														
007-Dioxin/Furan-Pier	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4	ng/kg														
007-Dioxin/Furan-Pier	2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	ng/kg														

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

						Location	D1		D1		D1		D1		D1		D10	
						Sample #	D1-SE-A		D1-SE-B		D1-SE-C		D1-SE-D		D1-SE-E		D10-SE-A	
						Start Depth	0		0.5		1		2		3		0	
						End Depth	0.5		1		2		3		4		0.5	
						Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
						Sample Type	N		N		N		N		N		N	
						Parent Sample #												
						Sample Date	8/6/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019		7/30/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
007-Dioxin/Furan-Pier	2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	ng/kg															
007-Dioxin/Furan-Pier	2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	ng/kg															
007-Dioxin/Furan-Pier	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	ng/kg	**3.6**	22													
007-Dioxin/Furan-Pier	Octachlorodibenzofuran	39001-02-0	ng/kg															
007-Dioxin/Furan-Pier	Octachlorodibenzo-p-dioxin	3268-87-9	ng/kg															
007-Dioxin/Furan-Pier	Total HcCDF	38998-75-3	ng/kg															
007-Dioxin/Furan-Pier	Total HpCDD	37871-00-4	ng/kg															
007-Dioxin/Furan-Pier	Total HxCDD	34465-46-8	ng/kg															
007-Dioxin/Furan-Pier	Total HxCDF	55684-94-1	ng/kg															
007-Dioxin/Furan-Pier	Total PeCDD	36088-22-9	ng/kg															
007-Dioxin/Furan-Pier	Total PeCDF	30402-15-4	ng/kg															
007-Dioxin/Furan-Pier	Total TCDD	41903-57-5	ng/kg															
007-Dioxin/Furan-Pier	Total TCDF	55722-27-5	ng/kg															
007-Dioxin/Furan-Pier	2,3,7,8-TCDD TEQ	TEQ	ng/kg	**3.6**	22													
011-Inorganics-Piers	Aluminum	7429-90-5	mg/kg	**18000**	3900		13500		17500		12900		10400		6880		14600	
011-Inorganics-Piers	Antimony	7440-36-0	mg/kg	**9.3**	450		**10.2**		**16.5**		**21.3**		**53.4**		**12.6**		**10.2**	
011-Inorganics-Piers	Arsenic	7440-38-2	mg/kg	**8.2**	19		**98.6**		**226**		**460**		**407**		**239**		**143**	
011-Inorganics-Piers	Barium	7440-39-3	mg/kg	**48**	59000		**131**		**238**		**601**		**1200**		**214**		**1740**	
011-Inorganics-Piers	Beryllium	7440-41-7	mg/kg	2300	140		0.839		0.973		2.29		5.3		0.854		0.68	
011-Inorganics-Piers	Cadmium	7440-43-9	mg/kg	**1.2**	78		**13.1**		**28.2**		**60.8**		**136**		**11.9**		**4.03**	
011-Inorganics-Piers	Calcium	7440-70-2	mg/kg				6880		7690		12700		7080		4950		14400	
011-Inorganics-Piers	Chromium	7440-47-3	mg/kg	**81**	3600000		**106**		**159**		**214**		**363**		**164**		**82.2**	
011-Inorganics-Piers	Cobalt	7440-48-4	mg/kg	**10**	590		**56.3**		**56.5**		**39.5**		**103**		**12.3**		**27.7**	
011-Inorganics-Piers	Copper	7440-50-8	mg/kg	**34**	45000		**935**		**1250**		**856**		**1330**		**405**		**462**	
011-Inorganics-Piers	Cyanide	57-12-5	mg/kg	**150**	680		5.2	U	6.8	U	7.1		13		5		22	
011-Inorganics-Piers	Iron	7439-89-6	mg/kg	820000	820000		22500		27400		21900		22100		17500		95100	
011-Inorganics-Piers	Lead	7439-92-1	mg/kg	**47**	800		**765**		**1330**		**2460**		**3460**		**647**		**217**	
011-Inorganics-Piers	Magnesium	7439-95-4	mg/kg				5850		6760		5860		2930		2330		10100	
011-Inorganics-Piers	Manganese	7439-96-5	mg/kg	**260**	5900		190		223		227		164		81		**368**	
011-Inorganics-Piers	Mercury	7439-97-6	mg/kg	**0.15**	65		**1270**	J	**1820**	J	**934**	J	**504**	J	**87.1**	J	**2.93**	
011-Inorganics-Piers	Mercury	7439-97-6	ng/g	**150**	65000		**396000**		**1290000**								**2150**	
011-Inorganics-Piers	Methyl Mercury	22967-92-6	ng/g				122		224		506		570		87.4		11.5	
011-Inorganics-Piers	Nickel	7440-02-0	mg/kg	**21**	23000		**260**		**338**		**77.2**		**120**		**24.8**		**84.2**	
011-Inorganics-Piers	Potassium	7440-09-7	mg/kg				1390		1610		1150		1110		590		2790	
011-Inorganics-Piers	Selenium	7782-49-2	mg/kg	**1**	5700		**1.4**	J	**2.26**		**2.13**		**3.64**		**1.76**		**2**	J
011-Inorganics-Piers	Silver	7440-22-4	mg/kg	**1**	5700		**26.7**		**52.7**		**33.6**		**71.9**		**4.95**		**2.32**	
011-Inorganics-Piers	Sodium	7440-23-5	mg/kg				1000		1000		1080		804		806		19200	
011-Inorganics-Piers	Thallium	7440-28-0	mg/kg	12	3		0.16	J	0.25	J	0.475		1.72		0.289		0.19	J
011-Inorganics-Piers	Vanadium	7440-62-2	mg/kg	**57**	1100		**64.6**		**77.4**		**59.4**		**178**		38.7		**74.4**	
011-Inorganics-Piers	Zinc	7440-66-6	mg/kg	**150**	110000		**1090**		**1430**		**916**		**1980**		**294**		**1780**	
014-General Chemistr	Total Organic Carbon	TOC	µg/g				120000		180000		160000		190000		240000		210000	

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

						Location	D1		D1		D1		D1		D1		D10	
						Sample #	D1-SE-A		D1-SE-B		D1-SE-C		D1-SE-D		D1-SE-E		D10-SE-A	
						Start Depth	0		0.5		1		2		3		0	
						End Depth	0.5		1		2		3		4		0.5	
						Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
						Sample Type	N		N		N		N		N		N	
						Parent Sample #												
						Sample Date	8/6/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019		7/30/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
014-General Chemistr	TOTAL SOLIDS	TSOLIDS	%				16 16 16		20 20 20		42 42		54 54		50 50		14 14	
015-Grain Size-Piers	% COARSE SAND >.5 - 1 MM	COARSE SAND	%				0		0		2.02		0.92		8.73		0	
015-Grain Size-Piers	% Coarse Sand >0.5 - 1.0 mm	%COARSESAND	%															
015-Grain Size-Piers	% Fine Sand >.125 - .25 mm	%FINE SAND	%															
015-Grain Size-Piers	% Medium Sand >.25 - .5 mm	%MEDIUM SAND	%															
015-Grain Size-Piers	% MEDIUM SAND >.25 - .5 MM	MEDIUM SAND	%				23.38		15.15		16.18		21.62		19.35		3.5	
015-Grain Size-Piers	0	HYD01	% Passing				8.68		10.03		9.5		7.97		11.42		13.85	
015-Grain Size-Piers	0	HYD02	% Passing				8.68		10.03		9.92		7.73		10.66		12.25	
015-Grain Size-Piers	0	HYD03	% Passing				8.24		7.13		8.14		6.93		6.61		4.04	
015-Grain Size-Piers	0	HYD04	% Passing				6.79		7.13		8.14		6.13		6.61		3.24	
015-Grain Size-Piers	0	HYD05	% Passing				5.33		5.49		6.36		5.09		5.62		3.24	
015-Grain Size-Piers	0	HYD06	% Passing				4.45		4.72		5.53		3.8		3.63		3.24	
015-Grain Size-Piers	0	HYD07	% Passing				4.45		3.85		4.17		3.25		2.33		2.44	
015-Grain Size-Piers	0.75 INCH SIEVE	SIEVE0.75IN	% Passing				100		100		100		100		100		100	
015-Grain Size-Piers	1.5 INCH SIEVE	SIEVE1.5IN	% Passing				100		100		100		100		100		100	
015-Grain Size-Piers	3 INCH SIEVE	SIEVE3IN	% Passing				100		100		100		100		100		100	
015-Grain Size-Piers	Clay	%CLAY	%				5.53		5.36		6.17		4.72		4.52		2.88	
015-Grain Size-Piers	GRAVEL	Gravel	%				0		0		7.28		2.77		8.16		0	
015-Grain Size-Piers	HYDROMETER, READING 1	HYD1-PARTICLE	um				37.01		36.63		37.01		36.37		35.73		35.37	
015-Grain Size-Piers	HYDROMETER, READING 2	HYD2-PARTICLE	um				23.4		23.16		23.26		23.15		22.59		22.62	
015-Grain Size-Piers	HYDROMETER, READING 3	HYD3-PARTICLE	um				13.6		13.6		13.51		13.46		13.46		13.77	

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

						Location	D1		D1		D1		D1		D1		D10	
						Sample #	D1-SE-A		D1-SE-B		D1-SE-C		D1-SE-D		D1-SE-E		D10-SE-A	
						Start Depth	0		0.5		1		2		3		0	
						End Depth	0.5		1		2		3		4		0.5	
						Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
						Sample Type	N		N		N		N		N		N	
						Parent Sample #												
						Sample Date	8/6/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019		7/30/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
015-Grain Size-Piers	HYDROMETER, READING 4	HYD4-PARTICLE	um				9.71		9.61		9.56		9.52		9.52		9.83	
015-Grain Size-Piers	HYDROMETER, READING 5	HYD5-PARTICLE	um				6.76		6.91		6.87		6.84		6.77		6.95	
015-Grain Size-Piers	HYDROMETER, READING 6	HYD6-PARTICLE	um				3.48		3.5		3.48		3.46		3.47		3.48	
015-Grain Size-Piers	HYDROMETER, READING 7	HYD7-PARTICLE	um				1.42		1.42		1.42		1.42		1.42		1.42	
015-Grain Size-Piers	Percent Passing Sieve#10	SIEVE10	% Passing				100		100		90.69		96.3		83.11		100	
015-Grain Size-Piers	Percent Passing Sieve#20	SIEVE20	% Passing				96.66		96.81		86.24		88.91		74.77		99.3	
015-Grain Size-Piers	Percent Passing Sieve#40	SIEVE40	% Passing				76.62		84.85		74.51		74.68		63.76		96.5	
015-Grain Size-Piers	Percent Passing Sieve#60	SIEVE60	% Passing				38.75		69.69		59.14		59.9		51.62		93.71	
015-Grain Size-Piers	Sand Fine	FINE SAND	%				81.29		35.89		39.24		31.6		39.08		13.29	
015-Grain Size-Piers	Sieve 0.25 inch, % passing	SIEVE0.25IN	% Passing				100		100		93.53		98.15		93.93		100	
015-Grain Size-Piers	SIEVE 1 inch, Percent Finer	SIEVE1INCH	% Passing				100		100		100		100		100		100	
015-Grain Size-Piers	SIEVE 2 inch, Percent Finer	SIEVE2INCH	% Passing				100		100		100		100		100		100	
015-Grain Size-Piers	SIEVE NO. 80, PERCENT PASSING	SIEVE80	% Passing				17.6		61.72		49.43		47.33		42.32		92.31	
015-Grain Size-Piers	SIEVE, 0.15 mm, PERCENT PASSING	SIEVEUS100	% Passing				8.69		57.73		43.76		44.19		35.31		90.91	
015-Grain Size-Piers	SIEVE, 4.75 mm, PERCENT PASSING	SIEVEUS4	% Passing				100		100		92.72		97.23		91.84		100	
015-Grain Size-Piers	Sieve-U.S. Std. No. 200 (0.075 mm)	SIEVEUS200	% Passing				-4.68		48.96		35.27		43.08		24.68		83.22	
015-Grain Size-Piers	Silt	%SILT	%															
015-Grain Size-Piers	SILT	445	%				-10.21		43.6		29.1		38.36		20.16		80.34	
017-MerSpec-Piers	MINERAL-BOUND HG	M-G-HG	ng/g				339000										77.6	
017-MerSpec-Piers	ORGANO-COMPLEXED HG	OG-C-HG	ng/g				19400										1410	
017-MerSpec-Piers	STRONGLY COMPLEXED AND ELEMENTAL HG	S-B-HG	ng/g				200000										522	
017-MerSpec-Piers	VOLATILE HG	V-E-HG	ng/g				315	U	262	U							374	U
017-MerSpec-Piers	WATER SOLUBLE HG	W-S-HG	ng/g				4420										48.5	J-
017-MerSpec-Piers	WEAK ACID-SOLUBLE HG	SAS-HG	ng/g				1280										56.5	

Notes:

1. Results that are greater than the RI sediment screening criteria are bolded.

2. Results that are greater than the RI soil screening criteria are highlighted yellow.

Acronyms:

FD - field duplicate

ft bgs - feet below ground surface

J - estimated

J+ - estimated, biased high

J- estimated, biased low

J-EMPC - estimated maximum possible concentration

mg/kg - milligram per kilogram

N - normal

ng/g - nanogram per gram

ng/kg - nanogram per kilogram

Q - qualifier

R - rejected

RI - remedial investigation

U - nondetect

UJ - nondetect, estimated

µg/kg - microgram per kilogram

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

					Location	D16		D16		D2		D2		D2		D2		D3	
					Sample #	D16-SE-A		D16-SE-B		D2-SE-9A		D2-SE-A		D2-SE-E		D2-SE-F		D3-SE-A	
					Start Depth	0		0.5		0		0		3		4		0	
					End Depth	0.5		1		0.5		0.5		4		5		0.5	
					Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
					Sample Type	N		N		FD		N		N		N		N	
					Parent Sample #					D2-SE-A									
					Sample Date	12/12/2019		12/12/2019		8/5/2019		8/5/2019		8/5/2019		8/5/2019		8/6/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
001-VOCs-Piers	1,1,1-Trichloroethane	71-55-6	µg/kg	856	200	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	1,1,2,2-Tetrachloroethane	79-34-5	µg/kg	202	3000	8	UJ	12	U	15	U		R	46000	U	48000	U	26	UJ
001-VOCs-Piers	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	µg/kg	28000000	28000000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	1,1,2-Trichloroethane	79-00-5	µg/kg	**570**	6000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	1,1-Dichloroethane	75-34-3	µg/kg	**16000**	24000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	1,1-Dichloroethene	75-35-4	µg/kg	**2780**	150000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	1,2,3-Trichlorobenzene	87-61-6	µg/kg	930000	930000	8	UJ	12	U	15	U		R	46000	U	10000	J	26	UJ
001-VOCs-Piers	1,2,4-Trichlorobenzene	120-82-1	µg/kg	**4.8**	820000	**9.6**	J	2.8	J	15	U		R	**23000**	J	**47000**	J	26	UJ
001-VOCs-Piers	1,2-Dibromo-3-chloropropane	96-12-8	µg/kg	64	200	8	UJ	12	U	15	U		R	46000	U	48000	U	26	UJ
001-VOCs-Piers	1,2-Dibromoethane	106-93-4	µg/kg	160	40	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	1,2-Dichlorobenzene	95-50-1	µg/kg	**989**	59000000	37	J	8.9	J	15	U		R	**72000**		**100000**		26	UJ
001-VOCs-Piers	1,2-Dichloroethane	107-06-2	µg/kg	**2000**	3000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	1,2-Dichloropropane	78-87-5	µg/kg	11000	5000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	1,3-Dichlorobenzene	541-73-1	µg/kg	**842**	59000000	39	J	7.8	J	15	U		R	46000	U	**6100**	J	26	UJ
001-VOCs-Piers	1,4-Dichlorobenzene	106-46-7	µg/kg	**110**	13000	57	J	13		15	U			**17000**	J	**32000**	J	26	UJ
001-VOCs-Piers	2-Butanone	78-93-3	µg/kg	190000000	44000000	84		79		75	U	45	UJ	230000	U	240000	U	130	U
001-VOCs-Piers	2-Hexanone	591-78-6	µg/kg	1300000	1300000	40	U	62	U	75	U	45	UJ	230000	U	240000	U	130	U
001-VOCs-Piers	4-Methyl-2-pentanone	108-10-1	µg/kg	140000000	140000000	40	U	62	U	75	U	45	UJ	230000	U	240000	U	130	U
001-VOCs-Piers	Acetone	67-64-1	µg/kg	670000000	12000	600		1400		75	U	45	UJ	230000	U	240000	U	250	
001-VOCs-Piers	Benzene	71-43-2	µg/kg	**340**	5000	17		4.4	J	4.4	J	6.8	J	**690000**		**540000**		26	U
001-VOCs-Piers	Bromochloromethane	74-97-5	µg/kg	630000	630000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	Bromodichloromethane	75-27-4	µg/kg	1300	3000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	Bromoform	75-25-2	µg/kg	1310	280000	8	UJ	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	Bromomethane	74-83-9	µg/kg	30000	59000	16	U	25	U	30	U	18	UJ	93000	U	97000	U	53	U
001-VOCs-Piers	Carbon Disulfide	75-15-0	µg/kg	3500000	110000000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	5.3	J
001-VOCs-Piers	Carbon Tetrachloride	56-23-5	µg/kg	7240	4000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	Chlorobenzene	108-90-7	µg/kg	**162**	7400000	11		12	U	15	U	9	UJ	**34000**	J	**37000**	J	26	U
001-VOCs-Piers	Chloroethane	75-00-3	µg/kg	57000000	1100000	16	U	25	U	30	U	18	UJ	93000	U	97000	U	53	U
001-VOCs-Piers	Chloroform	67-66-3	µg/kg	**1400**	2000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	Chloromethane	74-87-3	µg/kg	460000	12000	16	U	25	U	30	U	18	UJ	93000	U	97000	U	53	U
001-VOCs-Piers	cis-1,2-Dichloroethene	156-59-2	µg/kg	**2300000**	560000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	cis-1,3-Dichloropropene	10061-01-5	µg/kg	7.31	7000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	Cyclohexane	110-82-7	µg/kg	27000000	27000000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	Dibromochloromethane	124-48-1	µg/kg	39000	8000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	Dichlorodifluoromethane	75-71-8	µg/kg	370000	230000000	16	U	25	U	30	U	18	UJ	93000	U	97000	U	53	U
001-VOCs-Piers	Ethylbenzene	100-41-4	µg/kg	**1400**	110000000	9.4		1.7	J	15	U	9	UJ	**100000**		**140000**		26	U
001-VOCs-Piers	Isopropylbenzene	98-82-8	µg/kg	9900000	9900000	2.3	J	12	U	15	U		R	37000	J	63000		26	UJ
001-VOCs-Piers	M,P-XYLENE (SUM OF ISOMERS)	XYLMP	µg/kg	**120**	170000000	17	J	25	U	30	U	18	UJ	**230000**		**340000**		53	U
001-VOCs-Piers	Methyl acetate	79-20-9	µg/kg	1200000000	14000	8	UJ	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	Methyl tert-Butyl Ether	1634-04-4	µg/kg	210000	320000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	Methylcyclohexane	108-87-2	µg/kg			8	UJ	12	U	15	U	9	UJ	46000	U	48000	U	26	U

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

					Location	D16		D16		D2		D2		D2		D2		D3	
					Sample #	D16-SE-A		D16-SE-B		D2-SE-9A		D2-SE-A		D2-SE-E		D2-SE-F		D3-SE-A	
					Start Depth	0		0.5		0		0		3		4		0	
					End Depth	0.5		1		0.5		0.5		4		5		0.5	
					Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
					Sample Type	N		N		FD		N		N		N		N	
					Parent Sample #					D2-SE-A									
					Sample Date	12/12/2019		12/12/2019		8/5/2019		8/5/2019		8/5/2019		8/5/2019		8/6/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
001-VOCs-Piers	Methylene Chloride	75-09-2	µg/kg	1000000	230000	40	U	62	U	75	U	45	UJ	230000	U	240000	U	130	U
001-VOCs-Piers	o-Xylene	95-47-6	µg/kg	**120**	170000000	5.9	J	12	U	15	U	9	UJ	**180000**		**240000**		26	U
001-VOCs-Piers	Styrene	100-42-5	µg/kg	7070	260000	8	UJ	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	Tetrachloroethene	127-18-4	µg/kg	**450**	1500000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	Toluene	108-88-3	µg/kg	**2500**	91000000	18		12	U	15	U	28	J	**47000**		**51000**		26	U
001-VOCs-Piers	TOTAL XYLENES	133-02-07	µg/kg																
001-VOCs-Piers	trans-1,2-Dichloroethene	156-60-5	µg/kg	23000000	720000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	trans-1,3-Dichloropropene	10061-02-6	µg/kg	7.31	7000	8	U	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	Trichloroethene	79-01-6	µg/kg	**1600**	10000	1.2	J	12	U	15	U	9	UJ	46000	U	48000	U	26	U
001-VOCs-Piers	Trichlorofluoromethane	75-69-4	µg/kg	350000000	340000000	16	U	25	U	30	U	18	UJ	93000	U	97000	U	53	U
001-VOCs-Piers	Vinyl Chloride	75-01-4	µg/kg	**1700**	2000	16	U	25	U	30	U	18	UJ	93000	U	97000	U	53	U
001-VOCs-Piers	Xylenes (TOTAL)	1330-20-7	µg/kg			23	J	38	U	45	U	27	UJ	420000		580000		80	U
002-SVOCs-Piers	1,1'-Biphenyl	92-52-4	µg/kg	200000	240000	520	U	610	U	1100	U	690	U	15000		6400	J	1300	U
002-SVOCs-Piers	1,2,4,5-Tetrachlorobenzene	95-94-3	µg/kg	47000	350000	520	U	610	U	1100	U	690	U	650	J	7300	U	1300	U
002-SVOCs-Piers	1,4-Dioxane	123-91-1	µg/kg	24000	24000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	2,2'-Oxybis(1-chloropropane)	108-60-1	µg/kg	47000000	67000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	UJ
002-SVOCs-Piers	2,3,4,6-Tetrachlorophenol	58-90-2	µg/kg	25000000	25000000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	2,4,5-Trichlorophenol	95-95-4	µg/kg	3	68000000	1300	U	1500	U	2600	U	1700	U	2400	U	18000	U	3200	U
002-SVOCs-Piers	2,4,6-Trichlorophenol	88-06-2	µg/kg	6	74000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	2,4-Dichlorophenol	120-83-2	µg/kg	5	2100000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	2,4-Dimethylphenol	105-67-9	µg/kg	16000000	14000000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	2,4-Dinitrophenol	51-28-5	µg/kg	1600000	1400000	1300	U	1500	U	2600	U	1700	U	2400	U	18000	U	3200	U
002-SVOCs-Piers	2,4-Dinitrotoluene	121-14-2	µg/kg	7400	3000	520	U	610	U	1100	U	690	U	960	U	7300	U	840	J
002-SVOCs-Piers	2,6-Dinitrotoluene	606-20-2	µg/kg	1500	3000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	2-Chloronaphthalene	91-58-7	µg/kg	60000000	60000000	520	U	610	U	1100	U	690	U	2200		7300	U	1300	U
002-SVOCs-Piers	2-Chlorophenol	95-57-8	µg/kg	8	2200000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	2-Methylnaphthalene	91-57-6	µg/kg	**70**	2400000	520	U	610	U	1100	U	690	U	**17000**		**16000**		1300	U
002-SVOCs-Piers	2-Methylphenol	95-48-7	µg/kg	41000000	3400000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	2-Nitroaniline	88-74-4	µg/kg	8000000	23000000	1300	U	1500	U	2600	U	1700	U	2400	U	18000	U	3200	U
002-SVOCs-Piers	2-Nitrophenol	88-75-5	µg/kg		1600	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	3,3'-Dichlorobenzidine	91-94-1	µg/kg	2060	4000	520	U	610	UJ	1100	UJ	690	UJ	960	UJ	7300	U	1300	U
002-SVOCs-Piers	3-Nitroaniline	99-09-2	µg/kg		3160	1300	U	1500	U	2600	U	1700	U	2400	U	18000	U	3200	U
002-SVOCs-Piers	4,6-Dinitro-2-methylphenol	534-52-1	µg/kg	66000	68000	1300	U	1500	U	2600	U	1700	U	2400	U	18000	U	3200	U
002-SVOCs-Piers	4-Bromophenyl-phenylether	101-55-3	µg/kg			520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	4-Chloro-3-methylphenol	59-50-7	µg/kg	82000000	82000000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	4-Chloroaniline	106-47-8	µg/kg	11000	11000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	4-Chlorophenyl-phenylether	7005-72-3	µg/kg			520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	4-Nitroaniline	100-01-6	µg/kg	110000	110000	1300	U	1500	U	2600	U	1700	U	2400	U	18000	U	3200	U
002-SVOCs-Piers	4-Nitrophenol	100-02-7	µg/kg		5120	1300	U	1500	U	2600	U	1700	U	2400	U	18000	U	3200	U
002-SVOCs-Piers	Acenaphthene	83-32-9	µg/kg	**16**	37000000	520	U	**150**	J	**220**	J	**190**	J	960	U	7300	U	**310**	J
002-SVOCs-Piers	Acenaphthylene	208-96-8	µg/kg	**44**	300000000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

					Location	D16		D16		D2		D2		D2		D2		D3	
					Sample #	D16-SE-A		D16-SE-B		D2-SE-9A		D2-SE-A		D2-SE-E		D2-SE-F		D3-SE-A	
					Start Depth	0		0.5		0		0		3		4		0	
					End Depth	0.5		1		0.5		0.5		4		5		0.5	
					Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
					Sample Type	N		N		FD		N		N		N		N	
					Parent Sample #					D2-SE-A									
					Sample Date	12/12/2019		12/12/2019		8/5/2019		8/5/2019		8/5/2019		8/5/2019		8/6/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
002-SVOCs-Piers	Acetophenone	98-86-2	µg/kg	120000000	5000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	Anthracene	120-12-7	µg/kg	**85**	30000000	520	U	**580**	J	**690**	J	**610**	J	**12000**		**34000**		**640**	J
002-SVOCs-Piers	Atrazine	1912-24-9	µg/kg	10000	2400000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	Benzaldehyde	100-52-7	µg/kg	820000	68000000	520	U	310	J	1100	UJ	690	UJ	960	UJ	7300	U	1300	U
002-SVOCs-Piers	Benzo(a)anthracene	56-55-3	µg/kg	**261**	17000	**660**		**1900**	J	**3700**		**3500**	J	**2600**	J	7300	U	**4700**	
002-SVOCs-Piers	Benzo(a)pyrene	50-32-8	µg/kg	**430**	2000	**820**	J	**2400**	J	**4400**	J	**4300**	J	**2600**	J	7300	U	**6400**	J
002-SVOCs-Piers	Benzo(b)fluoranthene	205-99-2	µg/kg	**1800**	17000	1400	J	**3000**	J	**7700**	J	**7400**	J	**3800**	J	7300	U	**11000**	J
002-SVOCs-Piers	Benzo(g,h,i)perylene	191-24-2	µg/kg	**170**	30000000	**690**	J	**1700**	J	**3200**	J	**3200**	J	**2600**	J	7300	U	**5200**	J
002-SVOCs-Piers	Benzo(k)fluoranthene	207-08-9	µg/kg	**240**	170000	**620**	J	**1200**	J	**2900**	J	**2800**	J	**1500**	J	7300	U	**3600**	J
002-SVOCs-Piers	Bis(2-chloroethoxy)methane	111-91-1	µg/kg	2500000	2500000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	Bis(2-chloroethyl)ether	111-44-4	µg/kg	1000	2000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	Bis(2-ethylhexyl)phthalate	117-81-7	µg/kg	**182.16**	140000	**7300**		**16000**		**6900**		**3500**	J	**520000**		**72000**		**3600**	
002-SVOCs-Piers	Butylbenzylphthalate	85-68-7	µg/kg	**63**	14000000	**1700**		**360**	J	**640**	J	**400**	J	**18000**		**3000**	J	**680**	J
002-SVOCs-Piers	Caprolactam	105-60-2	µg/kg	400000000	340000000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	Carbazole	86-74-8	µg/kg		96000	520	U	610	U	620	J	620	J	960	U	7300	U	610	J
002-SVOCs-Piers	Chrysene	218-01-9	µg/kg	**384**	1700000	**860**		**2300**	J	**4800**		**4500**	J	**4200**	J	7300	U	**7100**	
002-SVOCs-Piers	CRESOLS, M & P	MEPH1314	µg/kg			520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	Dibenzo(a,h)anthracene	53-70-3	µg/kg	**63**	2000	520	UJ	**580**	J	**1300**	J	**1300**	J	**720**	J	7300	U	**1800**	J
002-SVOCs-Piers	Dibenzofuran	132-64-9	µg/kg	7300	1000000	520	U	610	U	1100	U	690	U	1000		7300	U	1300	U
002-SVOCs-Piers	Diethylphthalate	84-66-2	µg/kg	6	550000000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	Dimethylphthalate	131-11-3	µg/kg		734000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	Di-n-butylphthalate	84-74-2	µg/kg	**110**	68000000	520	U	610	U	1100	U	690	U	**4500**		7300	U	1300	U
002-SVOCs-Piers	Di-n-octylphthalate	117-84-0	µg/kg	8200000	27000000	520	UJ	610	UJ	1100	UJ	690	UJ	8400	J	7300	U	1300	UJ
002-SVOCs-Piers	Fluoranthene	206-44-0	µg/kg	**600**	24000000	**1100**		**3000**		**6300**		**5700**		**4900**		**2900**	J	**8600**	
002-SVOCs-Piers	Fluorene	86-73-7	µg/kg	**19**	24000000	520	U	**180**	J	1100	U	**190**	J	**2300**		7300	U	1300	U
002-SVOCs-Piers	Hexachlorobenzene	118-74-1	µg/kg	**20**	1000	520	U	610	U	1100	UJ	690	UJ	960	UJ	7300	UJ	1300	U
002-SVOCs-Piers	Hexachlorobutadiene	87-68-3	µg/kg	1.3	25000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	Hexachlorocyclopentadiene	77-47-4	µg/kg	139	110000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	Hexachloroethane	67-72-1	µg/kg	73	48000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	**200**	17000	**670**	J	**1700**	J	**3100**	J	**3000**	J	**2100**	J	7300	U	**5000**	J
002-SVOCs-Piers	Isophorone	78-59-1	µg/kg	2400000	2000000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	Naphthalene	91-20-3	µg/kg	**160**	17000	520	U	610	U	**290**	J	690	U	**16000**		**26000**		1300	U
002-SVOCs-Piers	Nitrobenzene	98-95-3	µg/kg	22000	14000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	N-Nitroso-di-n-propylamine	621-64-7	µg/kg	330	300	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	N-Nitrosodiphenylamine	86-30-6	µg/kg	422000	390000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	Pentachlorophenol	87-86-5	µg/kg	17	3000	1300	U	1500	U	2600	U	1700	U	2400	U	18000	U	3200	U
002-SVOCs-Piers	Phenanthrene	85-01-8	µg/kg	**240**	45700	**640**		**2600**		**3500**		**3400**		**8000**		**5100**	J	**4000**	
002-SVOCs-Piers	Phenol	108-95-2	µg/kg	**130**	210000000	520	U	610	U	1100	U	690	U	960	U	7300	U	1300	U
002-SVOCs-Piers	Pyrene	129-00-0	µg/kg	**665**	18000000	**2100**		**5300**		**7200**		**7400**	J	**8600**	J	**3300**	J	**11000**	
003-Pest-Piers	4,4'-DDD	72-54-8	µg/kg	**2**	13000	**850**	J	**1900**		**140**	J	**87**	J	**1300**	J	**3700**		**150**	J
003-Pest-Piers	4,4'-DDE	72-55-9	µg/kg	**2.2**	9000	**110**	J	**270**		**18**	J	**10**	J	**1100**	J	**970**	J	**33**	J

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

					Location	D16		D16		D2		D2		D2		D2		D2		D3	
					Sample #	D16-SE-A		D16-SE-B		D2-SE-9A		D2-SE-A		D2-SE-E		D2-SE-F		D3-SE-A			
					Start Depth	0		0.5		0		0		3		4		0			
					End Depth	0.5		1		0.5		0.5		4		5		0.5			
					Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs			
					Sample Type	N		N		FD		N		N		N		N			
					Parent Sample #					D2-SE-A											
					Sample Date	12/12/2019		12/12/2019		8/5/2019		8/5/2019		8/5/2019		8/5/2019		8/6/2019			
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q		
003-Pest-Piers	4,4'-DDT	50-29-3	µg/kg	**1**	8000	**310**	J	**210**	J	63	U	42	U	**1500**	J	2900	U	**160**	J		
003-Pest-Piers	Aldrin	309-00-2	µg/kg	**2**	200	2.9	U	16	U	33	U	21	U	**720**	J	22	U	33	U		
003-Pest-Piers	alpha-BHC	319-84-6	µg/kg	1360	500	2.9	U	16	U	33	U	21	U	29	U	63	J	33	U		
003-Pest-Piers	alpha-Chlordane	5103-71-9	µg/kg	**3.24**	1000000	**140**		**48**		**28**	J	21	U	**1300**	J	**1100**	J	33	U		
003-Pest-Piers	beta-BHC	319-85-7	µg/kg	1300	2000	2.9	U	16	U	33	U	21	U	29	U	140	J	33	U		
003-Pest-Piers	delta-BHC	319-86-8	µg/kg	**1300**	1300	2.9	U	16	U	33	U	5.7	J	29	U	820	J	190	J		
003-Pest-Piers	Dieldrin	60-57-1	µg/kg	**1.9**	200	**580**		**370**	J	**88**	J	**46**	J	**1900**	J	**2400**	J	64	U		
003-Pest-Piers	Endosulfan I	959-98-8	µg/kg	7000000	6800000	7.9		16	U	33	U	21	U	29	U	22	U	33	U		
003-Pest-Piers	Endosulfan II	33213-65-9	µg/kg	7000000	6800000	5.6	U	30	U	63	U	42	U	56	U	43	U	64	U		
003-Pest-Piers	Endosulfan Sulfate	1031-07-8	µg/kg	**0.357**	6800000	5.6	U	30	U	63	U	42	U	56	U	**590**	J	**29**	J		
003-Pest-Piers	Endrin	72-20-8	µg/kg	2.22	340000	5.6	U	30	U	63	U	42	U	56	U	43	U	64	U		
003-Pest-Piers	Endrin aldehyde	7421-93-4	µg/kg		1620	5.6	U	30	U	63	U	42	U	730	J	1000	J	64	U		
003-Pest-Piers	Endrin Ketone	53494-70-5	µg/kg		1620	200	J	98	J	63	U	42	U	56	U	43	U	64	U		
003-Pest-Piers	gamma-BHC (Lindane)	58-89-9	µg/kg	**0.32**	2000	2.9	U	16	U	33	U	21	U	29	U	**320**	J	33	U		
003-Pest-Piers	gamma-Chlordane	5103-74-2	µg/kg	**3.24**	1000000	**230**		**110**		**79**	J	21	U	**1300**		**1800**	J	33	U		
003-Pest-Piers	Heptachlor	76-44-8	µg/kg	0.3	700	2.9	U	16	U	33	U	21	U	29	U	22	U	33	U		
003-Pest-Piers	Heptachlor Epoxide	1024-57-3	µg/kg	**2.47**	300	2.9	U	16	U	33	U	21	U	29	U	22	U	33	U		
003-Pest-Piers	Methoxychlor	72-43-5	µg/kg	**29.6**	5700000	29	U	160	U	330	U	210	U	290	U	220	U	330	U		
003-Pest-Piers	Toxaphene	8001-35-2	µg/kg	536	3000	56	U	300	U	630	U	420	U	560	U	430	U	640	U		
005-Aroclors-Piers	Aroclor 1016	12674-11-2	µg/kg	7	1000	140	U	160	U	270	U	180	U	480	U	370	U	660	U		
005-Aroclors-Piers	Aroclor 1221	11104-28-2	µg/kg	23	1000	140	U	160	U	270	U	180	U	480	U	370	U	660	U		
005-Aroclors-Piers	Aroclor 1232	11141-16-5	µg/kg	23	1000	140	U	160	U	270	U	180	U	480	U	370	U	660	U		
005-Aroclors-Piers	Aroclor 1242	53469-21-9	µg/kg	**23**	1000	**500**		**320**		**880**		180	U	**26000**		**35000**		**13000**			
005-Aroclors-Piers	Aroclor 1248	12672-29-6	µg/kg	**30**	1000	140	U	160	U	270	U	180	U	480	U	370	U	660	U		
005-Aroclors-Piers	Aroclor 1254	11097-69-1	µg/kg	**60**	1000	**6000**		**2600**	J	270	U	180	U	**61000**		**41000**		660	U		
005-Aroclors-Piers	Aroclor 1260	11096-82-5	µg/kg	**5**	1000	**3200**		**1400**		**1400**		**740**		**27000**		**18000**		**1500**			
005-Aroclors-Piers	Aroclor 1262	37324-23-5	µg/kg	23	1000	140	U	160	U	270	U	180	U	480	U	370	U	660	U		
005-Aroclors-Piers	Aroclor 1268	11100-14-4	µg/kg	23	1000	140	U	160	U	270	U	180	U	480	U	370	U	660	U		
005-Aroclors-Piers	Total Aroclors	TARO	µg/kg	**23**	1000	**9700**		**4320**		**2280**		**740**		**114000**		**94000**		**14500**			
007-Dioxin/Furan-Pier	1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	ng/kg																		
007-Dioxin/Furan-Pier	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822-46-9	ng/kg																		
007-Dioxin/Furan-Pier	1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	ng/kg																		
007-Dioxin/Furan-Pier	1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	ng/kg																		
007-Dioxin/Furan-Pier	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6	ng/kg																		
007-Dioxin/Furan-Pier	1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	ng/kg																		
007-Dioxin/Furan-Pier	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7	ng/kg																		
007-Dioxin/Furan-Pier	1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	ng/kg																		
007-Dioxin/Furan-Pier	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3	ng/kg																		
007-Dioxin/Furan-Pier	1,2,3,7,8-Pentachlorodibenzofuran	57117-41-6	ng/kg																		
007-Dioxin/Furan-Pier	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4	ng/kg																		
007-Dioxin/Furan-Pier	2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	ng/kg																		

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

						Location	D16		D16		D2		D2		D2		D2		D3	
						Sample #	D16-SE-A		D16-SE-B		D2-SE-9A		D2-SE-A		D2-SE-E		D2-SE-F		D3-SE-A	
						Start Depth	0		0.5		0		0		3		4		0	
						End Depth	0.5		1		0.5		0.5		4		5		0.5	
						Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
						Sample Type	N		N		FD		N		N		N		N	
						Parent Sample #					D2-SE-A									
						Sample Date	12/12/2019		12/12/2019		8/5/2019		8/5/2019		8/5/2019		8/5/2019		8/6/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
007-Dioxin/Furan-Pier	2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	ng/kg																	
007-Dioxin/Furan-Pier	2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	ng/kg																	
007-Dioxin/Furan-Pier	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	ng/kg	**3.6**	22															
007-Dioxin/Furan-Pier	Octachlorodibenzofuran	39001-02-0	ng/kg																	
007-Dioxin/Furan-Pier	Octachlorodibenzo-p-dioxin	3268-87-9	ng/kg																	
007-Dioxin/Furan-Pier	Total HcCDF	38998-75-3	ng/kg																	
007-Dioxin/Furan-Pier	Total HpCDD	37871-00-4	ng/kg																	
007-Dioxin/Furan-Pier	Total HxCDD	34465-46-8	ng/kg																	
007-Dioxin/Furan-Pier	Total HxCDF	55684-94-1	ng/kg																	
007-Dioxin/Furan-Pier	Total PeCDD	36088-22-9	ng/kg																	
007-Dioxin/Furan-Pier	Total PeCDF	30402-15-4	ng/kg																	
007-Dioxin/Furan-Pier	Total TCDD	41903-57-5	ng/kg																	
007-Dioxin/Furan-Pier	Total TCDF	55722-27-5	ng/kg																	
007-Dioxin/Furan-Pier	2,3,7,8-TCDD TEQ	TEQ	ng/kg	**3.6**	22															
011-Inorganics-Piers	Aluminum	7429-90-5	mg/kg	**18000**	3900		11200		13600		**27700**		**19400**		**36200**		10700		**23100**	
011-Inorganics-Piers	Antimony	7440-36-0	mg/kg	**9.3**	450		1.39	J	1.25	J	2.7		1.61		**23**		**21.4**		**28.6**	
011-Inorganics-Piers	Arsenic	7440-38-2	mg/kg	**8.2**	19		**578**		**638**		**157**	J	**45.4**	J	**1760**		**704**		**455**	
011-Inorganics-Piers	Barium	7440-39-3	mg/kg	**48**	59000		**192**		**232**		**236**		**156**		**955**		**4550**		**481**	
011-Inorganics-Piers	Beryllium	7440-41-7	mg/kg	2300	140		0.669		0.789		1.44		0.981		1.32		0.55		1.2	
011-Inorganics-Piers	Cadmium	7440-43-9	mg/kg	**1.2**	78		**18.7**		**20.4**		**6.47**		**3.8**		**72.4**		**311**		**14.1**	
011-Inorganics-Piers	Calcium	7440-70-2	mg/kg				16600		21400		20200		13900		28200		41500		17400	
011-Inorganics-Piers	Chromium	7440-47-3	mg/kg	**81**	3600000		76.6		**88.9**		**159**		**111**		**351**		**665**		**141**	
011-Inorganics-Piers	Cobalt	7440-48-4	mg/kg	**10**	590		**26**		**22.9**		**83.5**		**53**		**101**		**210**		**38.1**	
011-Inorganics-Piers	Copper	7440-50-8	mg/kg	**34**	45000		**320**		**273**		**1050**		**407**		**1550**		**3890**		**785**	
011-Inorganics-Piers	Cyanide	57-12-5	mg/kg	**150**	680		1.5	U	2.3	U	3.8	U	3.7	U	32		10	J	9.8	
011-Inorganics-Piers	Iron	7439-89-6	mg/kg	820000	820000		25900		29100		62000		39600		63200		28400		59100	
011-Inorganics-Piers	Lead	7439-92-1	mg/kg	**47**	800		**594**	J	**405**	J	**1500**		**918**		**4200**		**31600**		**1260**	
011-Inorganics-Piers	Magnesium	7439-95-4	mg/kg				6120		8040		12900		8220		8350		4810		10700	
011-Inorganics-Piers	Manganese	7439-96-5	mg/kg	**260**	5900		**301**		**356**		**520**		**339**		**763**		**847**		**1280**	
011-Inorganics-Piers	Mercury	7439-97-6	mg/kg	**0.15**	65		**556**	J	**477**	J	**1690**		**681**		**4280**		**3560**		**48.5**	
011-Inorganics-Piers	Mercury	7439-97-6	ng/g	**150**	65000						**521000**		**671000**						**55800**	
011-Inorganics-Piers	Methyl Mercury	22967-92-6	ng/g				69.4		93.1		186		110		6400		12500		9.95	
011-Inorganics-Piers	Nickel	7440-02-0	mg/kg	**21**	23000		**94.1**	J	**61.3**	J	**314**		**130**		**153**		**137**		**336**	
011-Inorganics-Piers	Potassium	7440-09-7	mg/kg				1140		1650		2430		1760		2640		901		2960	
011-Inorganics-Piers	Selenium	7782-49-2	mg/kg	**1**	5700		0.733	J	0.733		**1.42**		0.811	J	**4.5**		**2.1**		**2.1**	
011-Inorganics-Piers	Silver	7440-22-4	mg/kg	**1**	5700		**17.5**	J	**5.8**	J	**17**		**10.5**		**105**		**116**		**13.7**	
011-Inorganics-Piers	Sodium	7440-23-5	mg/kg				1860		1930		1720		1090		2480		846		1790	
011-Inorganics-Piers	Thallium	7440-28-0	mg/kg	12	3		0.14	J	0.199		0.316		0.22		0.569		0.328		0.293	
011-Inorganics-Piers	Vanadium	7440-62-2	mg/kg	**57**	1100		46.1		**58.1**		**123**		**83.9**		**120**		**66.8**		**112**	
011-Inorganics-Piers	Zinc	7440-66-6	mg/kg	**150**	110000		**876**		**697**		**2840**		**1620**		**3320**		**4210**		**3400**	
014-General Chemistr	Total Organic Carbon	TOC	µg/g				64000		62000		120000		56000		150000		150000		130000	

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

						Location	D16		D16		D2		D2		D2		D2		D3	
						Sample #	D16-SE-A		D16-SE-B		D2-SE-9A		D2-SE-A		D2-SE-E		D2-SE-F		D3-SE-A	
						Start Depth	0		0.5		0		0		3		4		0	
						End Depth	0.5		1		0.5		0.5		4		5		0.5	
						Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
						Sample Type	N		N		FD		N		N		N		N	
						Parent Sample #					D2-SE-A									
						Sample Date	12/12/2019		12/12/2019		8/5/2019		8/5/2019		8/5/2019		8/5/2019		8/6/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
014-General Chemistr	TOTAL SOLIDS	TSOLIDS	%				55.9 56		52.1 52		31 31 31		47 47 47		33 33		45 45		26 26 26	
015-Grain Size-Piers	% COARSE SAND >.5 - 1 MM	COARSE SAND	%												0		1.09		0	
015-Grain Size-Piers	% Coarse Sand >0.5 - 1.0 mm	%COARSESAND	%																	
015-Grain Size-Piers	% Fine Sand >.125 - .25 mm	%FINE SAND	%																	
015-Grain Size-Piers	% Medium Sand >.25 - .5 mm	%MEDIUM SAND	%																	
015-Grain Size-Piers	% MEDIUM SAND >.25 - .5 MM	MEDIUM SAND	%												3.25		11.57		13.76	
015-Grain Size-Piers	0	HYD01	% Passing												14.83		16.21		12.44	
015-Grain Size-Piers	0	HYD02	% Passing												13.24		14.64		10.01	
015-Grain Size-Piers	0	HYD03	% Passing												10.86		12.05		9.2	
015-Grain Size-Piers	0	HYD04	% Passing												9.03		11.27		8.14	
015-Grain Size-Piers	0	HYD05	% Passing												7.99		10.24		7.34	
015-Grain Size-Piers	0	HYD06	% Passing												5.37		7.65		4.66	
015-Grain Size-Piers	0	HYD07	% Passing												4.02		5.54		2.48	
015-Grain Size-Piers	0.75 INCH SIEVE	SIEVE0.75IN	% Passing												100		100		100	
015-Grain Size-Piers	1.5 INCH SIEVE	SIEVE1.5IN	% Passing												100		100		100	
015-Grain Size-Piers	3 INCH SIEVE	SIEVE3IN	% Passing												100		100		100	
015-Grain Size-Piers	Clay	%CLAY	%												6.82		8.82		5.69	
015-Grain Size-Piers	GRAVEL	Gravel	%												0		0.87		0	
015-Grain Size-Piers	HYDROMETER, READING 1	HYD1-PARTICLE	um												35.15		34.88		35.77	
015-Grain Size-Piers	HYDROMETER, READING 2	HYD2-PARTICLE	um												22.49		20.29		23.04	
015-Grain Size-Piers	HYDROMETER, READING 3	HYD3-PARTICLE	um												12.71		12.65		13.3	

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

						Location	D16		D16		D2		D2		D2		D2		D3	
						Sample #	D16-SE-A		D16-SE-B		D2-SE-9A		D2-SE-A		D2-SE-E		D2-SE-F		D3-SE-A	
						Start Depth	0		0.5		0		0		3		4		0	
						End Depth	0.5		1		0.5		0.5		4		5		0.5	
						Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
						Sample Type	N		N		FD		N		N		N		N	
						Parent Sample #					D2-SE-A									
						Sample Date	12/12/2019		12/12/2019		8/5/2019		8/5/2019		8/5/2019		8/5/2019		8/6/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
015-Grain Size-Piers	HYDROMETER, READING 4	HYD4-PARTICLE	um												9.41		9.34		9.57	
015-Grain Size-Piers	HYDROMETER, READING 5	HYD5-PARTICLE	um												6.82		6.64		6.76	
015-Grain Size-Piers	HYDROMETER, READING 6	HYD6-PARTICLE	um												3.43		3.4		3.46	
015-Grain Size-Piers	HYDROMETER, READING 7	HYD7-PARTICLE	um												1.41		1.39		1.42	
015-Grain Size-Piers	Percent Passing Sieve#10	SIEVE10	% Passing												100		98.04		100	
015-Grain Size-Piers	Percent Passing Sieve#20	SIEVE20	% Passing												98.82		93.89		95.28	
015-Grain Size-Piers	Percent Passing Sieve#40	SIEVE40	% Passing												96.75		86.46		86.24	
015-Grain Size-Piers	Percent Passing Sieve#60	SIEVE60	% Passing												93.8		80.79		77.98	
015-Grain Size-Piers	Sand Fine	FINE SAND	%												16.55		13.97		29.48	
015-Grain Size-Piers	Sieve 0.25 inch, % passing	SIEVE0.25IN	% Passing												100		99.13		100	
015-Grain Size-Piers	SIEVE 1 inch, Percent Finer	SIEVE1INCH	% Passing												100		100		100	
015-Grain Size-Piers	SIEVE 2 inch, Percent Finer	SIEVE2INCH	% Passing												100		100		100	
015-Grain Size-Piers	SIEVE NO. 80, PERCENT PASSING	SIEVE80	% Passing												90.84		76.86		72.09	
015-Grain Size-Piers	SIEVE, 0.15 mm, PERCENT PASSING	SIEVEUS100	% Passing												88.48		74.68		68.55	
015-Grain Size-Piers	SIEVE, 4.75 mm, PERCENT PASSING	SIEVEUS4	% Passing												100		99.13		100	
015-Grain Size-Piers	Sieve-U.S. Std. No. 200 (0.075 mm)	SIEVEUS200	% Passing												80.2		72.49		56.76	
015-Grain Size-Piers	Silt	%SILT	%																	
015-Grain Size-Piers	SILT	445	%												73.38		63.67		51.07	
017-MerSpec-Piers	MINERAL-BOUND HG	M-G-HG	ng/g								472000		470000						8840	
017-MerSpec-Piers	ORGANO-COMPLEXED HG	OG-C-HG	ng/g								8210	J	13000						4110	
017-MerSpec-Piers	STRONGLY COMPLEXED AND ELEMENTAL HG	S-B-HG	ng/g								322000		455000						48900	
017-MerSpec-Piers	VOLATILE HG	V-E-HG	ng/g								160	U	107	U					190	U
017-MerSpec-Piers	WATER SOLUBLE HG	W-S-HG	ng/g								8800		11800						1950	
017-MerSpec-Piers	WEAK ACID-SOLUBLE HG	SAS-HG	ng/g								8910	J	3840						223	

Notes:

1. Results that are greater than the RI sediment screening criteria are bolded.
2. Results that are greater than the RI soil screening criteria are highlighted yellow.

Acronyms:

FD - field duplicate
ft bgs - feet below ground surface
J - estimated
J+ - estimated, biased high
J- estimated, biased low
J-EMPC - estimated maximum possible concentration
mg/kg - milligram per kilogram
N - normal
ng/g - nanogram per gram
ng/kg - nanogram per kilogram
Q - qualifier
R - rejected
RI - remedial investigation
U - nondetect
UJ - nondetect, estimated
µg/kg - microgram per kilogram

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

					Location	D3		D3		D4		D4		D4		D4		D4	
					Sample #	D3-SE-B		D3-SE-C		D4-SE-A		D4-SE-B		D4-SE-C		D4-SE-D		D4-SE-E	
					Start Depth	0.5		1		0		0.5		1		2		3	
					End Depth	1		2.5		0.5		1		2		3		4	
					Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
					Sample Type	N		N		N		N		N		N		N	
					Parent Sample #														
					Sample Date	8/6/2019		8/6/2019		7/18/2019		7/18/2019		7/18/2019		7/18/2019		7/18/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
001-VOCs-Piers	1,1,1-Trichloroethane	71-55-6	µg/kg	856	200	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	1,1,2,2-Tetrachloroethane	79-34-5	µg/kg	202	3000	11	UJ	11	U	24	UJ	14	UJ	4.5	UJ	16	U	6	UJ
001-VOCs-Piers	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	µg/kg	28000000	28000000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	1,1,2-Trichloroethane	79-00-5	µg/kg	**570**	6000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	1,1-Dichloroethane	75-34-3	µg/kg	**16000**	24000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	1,1-Dichloroethene	75-35-4	µg/kg	**2780**	150000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	1,2,3-Trichlorobenzene	87-61-6	µg/kg	930000	930000	11	UJ	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	1,2,4-Trichlorobenzene	120-82-1	µg/kg	**4.8**	820000	11	UJ	11	U	24	U	14	U	4.5	U	2.6	J	6	U
001-VOCs-Piers	1,2-Dibromo-3-chloropropane	96-12-8	µg/kg	64	200	11	UJ	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	1,2-Dibromoethane	106-93-4	µg/kg	160	40	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	1,2-Dichlorobenzene	95-50-1	µg/kg	**989**	59000000	11	UJ	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	1,2-Dichloroethane	107-06-2	µg/kg	**2000**	3000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	1,2-Dichloropropane	78-87-5	µg/kg	11000	5000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	1,3-Dichlorobenzene	541-73-1	µg/kg	**842**	59000000	11	UJ	11	U	14	J	26		26		2.1	J	6	U
001-VOCs-Piers	1,4-Dichlorobenzene	106-46-7	µg/kg	**110**	13000	11	UJ	11	U	14	J	34		37		2.7	J	6	U
001-VOCs-Piers	2-Butanone	78-93-3	µg/kg	190000000	44000000	55	U	55	U	220		210		45		1400		130	
001-VOCs-Piers	2-Hexanone	591-78-6	µg/kg	1300000	1300000	55	U	55	U	120	U	68	U	22	U	78	U	30	U
001-VOCs-Piers	4-Methyl-2-pentanone	108-10-1	µg/kg	140000000	140000000	55	U	55	U	120	U	68	U	22	U	78	U	30	U
001-VOCs-Piers	Acetone	67-64-1	µg/kg	670000000	12000	110		55	U	550		620		400		770		220	
001-VOCs-Piers	Benzene	71-43-2	µg/kg	**340**	5000	3.1	J	11	U	24	U	14	U	4.5	U	13	J	6	U
001-VOCs-Piers	Bromochloromethane	74-97-5	µg/kg	630000	630000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	Bromodichloromethane	75-27-4	µg/kg	1300	3000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	Bromoform	75-25-2	µg/kg	1310	280000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	Bromomethane	74-83-9	µg/kg	30000	59000	22	U	22	U	47	U	27	U	9	U	31	U	12	U
001-VOCs-Piers	Carbon Disulfide	75-15-0	µg/kg	3500000	110000000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	Carbon Tetrachloride	56-23-5	µg/kg	7240	4000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	Chlorobenzene	108-90-7	µg/kg	**162**	7400000	11	U	11	U	11	J	29		17		1.7	J	6	U
001-VOCs-Piers	Chloroethane	75-00-3	µg/kg	57000000	1100000	22	U	22	U	47	U	27	U	9	U	31	U	12	U
001-VOCs-Piers	Chloroform	67-66-3	µg/kg	**1400**	2000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	Chloromethane	74-87-3	µg/kg	460000	12000	22	U	22	U	47	U	27	U	9	U	31	U	12	U
001-VOCs-Piers	cis-1,2-Dichloroethene	156-59-2	µg/kg	**2300000**	560000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	cis-1,3-Dichloropropene	10061-01-5	µg/kg	7.31	7000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	Cyclohexane	110-82-7	µg/kg	27000000	27000000	11	U	11	U	24	U	14	U	4.5	U	11	J	4.3	J
001-VOCs-Piers	Dibromochloromethane	124-48-1	µg/kg	39000	8000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	Dichlorodifluoromethane	75-71-8	µg/kg	370000	230000000	22	U	22	U	47	U	27	U	9	U	31	U	12	U
001-VOCs-Piers	Ethylbenzene	100-41-4	µg/kg	**1400**	110000000	11	U	11	U	24	U	14	U	4.5	U	2.3	J	6	U
001-VOCs-Piers	Isopropylbenzene	98-82-8	µg/kg	9900000	9900000	11	UJ	11	U	24	UJ	14	UJ	4.5	UJ	16	U	6	UJ
001-VOCs-Piers	M,P-XYLENE (SUM OF ISOMERS)	XYLMP	µg/kg	**120**	170000000	22	U	22	U	47	U	27	U	9	U	31	U	12	U
001-VOCs-Piers	Methyl acetate	79-20-9	µg/kg	1200000000	14000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	Methyl tert-Butyl Ether	1634-04-4	µg/kg	210000	320000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	Methylcyclohexane	108-87-2	µg/kg			11	U	11	U	24	U	14	U	4.5	U	16	U	6	U

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

					Location	D3		D3		D4		D4		D4		D4		D4	
					Sample #	D3-SE-B		D3-SE-C		D4-SE-A		D4-SE-B		D4-SE-C		D4-SE-D		D4-SE-E	
					Start Depth	0.5		1		0		0.5		1		2		3	
					End Depth	1		2.5		0.5		1		2		3		4	
					Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
					Sample Type	N		N		N		N		N		N		N	
					Parent Sample #														
					Sample Date	8/6/2019		8/6/2019		7/18/2019		7/18/2019		7/18/2019		7/18/2019		7/18/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
001-VOCs-Piers	Methylene Chloride	75-09-2	µg/kg	1000000	230000	55	U	55	U	120	UJ	68	UJ	22	UJ	78	U	30	UJ
001-VOCs-Piers	o-Xylene	95-47-6	µg/kg	**120**	170000000	11	U	11	U	24	U	14	U	3	J	11	J	4	J
001-VOCs-Piers	Styrene	100-42-5	µg/kg	7070	260000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	Tetrachloroethene	127-18-4	µg/kg	**450**	1500000	11	U	11	U	24	UJ	14	UJ	4.5	UJ	16	UJ	6	UJ
001-VOCs-Piers	Toluene	108-88-3	µg/kg	**2500**	91000000	32		11	U	24	U	14	J	4.5	U	86		6	U
001-VOCs-Piers	TOTAL XYLENES	133-02-07	µg/kg																
001-VOCs-Piers	trans-1,2-Dichloroethene	156-60-5	µg/kg	23000000	720000	11	U	11	U	24	U	14	U	4.5	U	10	J	6	U
001-VOCs-Piers	trans-1,3-Dichloropropene	10061-02-6	µg/kg	7.31	7000	11	U	11	U	24	U	14	U	4.5	U	16	U	6	U
001-VOCs-Piers	Trichloroethene	79-01-6	µg/kg	**1600**	10000	11	U	11	U	24	U	14	U	4.5	U	2.9	J	6	U
001-VOCs-Piers	Trichlorofluoromethane	75-69-4	µg/kg	350000000	340000000	22	U	22	U	47	U	27	U	9	U	31	U	12	U
001-VOCs-Piers	Vinyl Chloride	75-01-4	µg/kg	**1700**	2000	22	U	22	U	47	U	27	U	9	U	31	U	12	U
001-VOCs-Piers	Xylenes (TOTAL)	1330-20-7	µg/kg			33	U	33	U	70	U	40	U	3	J	11	J	4	J
002-SVOCs-Piers	1,1'-Biphenyl	92-52-4	µg/kg	200000	240000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	1,2,4,5-Tetrachlorobenzene	95-94-3	µg/kg	47000	350000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	1,4-Dioxane	123-91-1	µg/kg	24000	24000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	2,2'-Oxybis(1-chloropropane)	108-60-1	µg/kg	47000000	67000	650	UJ	710	UJ	1300	UJ	1100	UJ	650	UJ	830	UJ	480	UJ
002-SVOCs-Piers	2,3,4,6-Tetrachlorophenol	58-90-2	µg/kg	25000000	25000000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	2,4,5-Trichlorophenol	95-95-4	µg/kg	3	68000000	1600	U	1800	U	3300	U	2800	U	1600	U	2000	U	1200	U
002-SVOCs-Piers	2,4,6-Trichlorophenol	88-06-2	µg/kg	6	74000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	2,4-Dichlorophenol	120-83-2	µg/kg	5	2100000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	2,4-Dimethylphenol	105-67-9	µg/kg	16000000	14000000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	2,4-Dinitrophenol	51-28-5	µg/kg	1600000	1400000	1600	U	1800	U	3300	U	2800	U	1600	U	2000	U	1200	U
002-SVOCs-Piers	2,4-Dinitrotoluene	121-14-2	µg/kg	7400	3000	210	J	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	2,6-Dinitrotoluene	606-20-2	µg/kg	1500	3000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	2-Chloronaphthalene	91-58-7	µg/kg	60000000	60000000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	2-Chlorophenol	95-57-8	µg/kg	8	2200000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	2-Methylnaphthalene	91-57-6	µg/kg	**70**	2400000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	2-Methylphenol	95-48-7	µg/kg	41000000	3400000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	2-Nitroaniline	88-74-4	µg/kg	8000000	23000000	1600	U	1800	U	3300	U	2800	U	1600	U	2000	U	1200	U
002-SVOCs-Piers	2-Nitrophenol	88-75-5	µg/kg		1600	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	3,3'-Dichlorobenzidine	91-94-1	µg/kg	2060	4000	650	UJ	710	UJ	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	3-Nitroaniline	99-09-2	µg/kg		3160	1600	U	1800	U	3300	U	2800	U	1600	U	2000	U	1200	U
002-SVOCs-Piers	4,6-Dinitro-2-methylphenol	534-52-1	µg/kg	66000	68000	1600	U	1800	U	3300	U	2800	U	1600	U	2000	U	1200	U
002-SVOCs-Piers	4-Bromophenyl-phenylether	101-55-3	µg/kg			650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	4-Chloro-3-methylphenol	59-50-7	µg/kg	82000000	82000000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	4-Chloroaniline	106-47-8	µg/kg	11000	11000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	4-Chlorophenyl-phenylether	7005-72-3	µg/kg			650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	4-Nitroaniline	100-01-6	µg/kg	110000	110000	1600	U	1800	U	3300	U	2800	U	1600	U	2000	U	1200	U
002-SVOCs-Piers	4-Nitrophenol	100-02-7	µg/kg		5120	1600	U	1800	U	3300	U	2800	U	1600	U	2000	U	1200	U
002-SVOCs-Piers	Acenaphthene	83-32-9	µg/kg	**16**	37000000	**160**	J	**220**	J	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Acenaphthylene	208-96-8	µg/kg	**44**	300000000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

					Location	D3		D3		D4		D4		D4		D4		D4	
					Sample #	D3-SE-B		D3-SE-C		D4-SE-A		D4-SE-B		D4-SE-C		D4-SE-D		D4-SE-E	
					Start Depth	0.5		1		0		0.5		1		2		3	
					End Depth	1		2.5		0.5		1		2		3		4	
					Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
					Sample Type	N		N		N		N		N		N		N	
					Parent Sample #														
					Sample Date	8/6/2019		8/6/2019		7/18/2019		7/18/2019		7/18/2019		7/18/2019		7/18/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
002-SVOCs-Piers	Acetophenone	98-86-2	µg/kg	120000000	5000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Anthracene	120-12-7	µg/kg	**85**	30000000	**450**	J	**500**	J	1300	U	1100	U	**250**	J	830	U	**130**	J
002-SVOCs-Piers	Atrazine	1912-24-9	µg/kg	10000	2400000	650	U	710	U	1300	UJ	1100	UJ	650	UJ	830	UJ	480	UJ
002-SVOCs-Piers	Benzaldehyde	100-52-7	µg/kg	820000	68000000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Benzo(a)anthracene	56-55-3	µg/kg	**261**	17000	**3500**	J	**3000**	J	**640**	J	**1200**		**1100**		**720**	J	**290**	J
002-SVOCs-Piers	Benzo(a)pyrene	50-32-8	µg/kg	**430**	2000	**5200**	J	**3800**	J	**780**	J	**1400**		**1200**		**670**	J	330	J
002-SVOCs-Piers	Benzo(b)fluoranthene	205-99-2	µg/kg	**1800**	17000	**9600**	J	**6200**	J	1000	J	**2000**		1700		950		300	J
002-SVOCs-Piers	Benzo(g,h,i)perylene	191-24-2	µg/kg	**170**	30000000	**4800**	J	**3100**	J	**590**	J	**1000**	J	**740**		**430**	J	170	J
002-SVOCs-Piers	Benzo(k)fluoranthene	207-08-9	µg/kg	**240**	170000	**3200**	J	**2300**	J	**440**	J	**820**	J	**630**	J	**460**	J	130	J
002-SVOCs-Piers	Bis(2-chloroethoxy)methane	111-91-1	µg/kg	2500000	2500000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Bis(2-chloroethyl)ether	111-44-4	µg/kg	1000	2000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Bis(2-ethylhexyl)phthalate	117-81-7	µg/kg	**182.16**	140000	**3900**	J	**6400**	J	**880**	J	**1100**	J	**820**		**2500**		170	J
002-SVOCs-Piers	Butylbenzylphthalate	85-68-7	µg/kg	**63**	14000000	**700**	J	**1400**	J	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Caprolactam	105-60-2	µg/kg	400000000	340000000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Carbazole	86-74-8	µg/kg		96000	440	J	400	J	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Chrysene	218-01-9	µg/kg	**384**	1700000	**6000**	J	**4200**	J	**910**	J	**1600**		**1500**		**1000**		340	J
002-SVOCs-Piers	CRESOLS, M & P	MEPH1314	µg/kg			650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Dibenzo(a,h)anthracene	53-70-3	µg/kg	**63**	2000	**1600**	J	**1000**	J	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Dibenzofuran	132-64-9	µg/kg	7300	1000000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Diethylphthalate	84-66-2	µg/kg	6	550000000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Dimethylphthalate	131-11-3	µg/kg		734000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Di-n-butylphthalate	84-74-2	µg/kg	**110**	68000000	**210**	J	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Di-n-octylphthalate	117-84-0	µg/kg	8200000	27000000	650	UJ	710	UJ	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Fluoranthene	206-44-0	µg/kg	**600**	24000000	**5800**		**5300**		**1300**	J	**2500**		**3000**		**1800**		490	
002-SVOCs-Piers	Fluorene	86-73-7	µg/kg	**19**	24000000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Hexachlorobenzene	118-74-1	µg/kg	**20**	1000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Hexachlorobutadiene	87-68-3	µg/kg	1.3	25000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Hexachlorocyclopentadiene	77-47-4	µg/kg	139	110000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Hexachloroethane	67-72-1	µg/kg	73	48000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	**200**	17000	**4100**	J	**3000**	J	**750**	J	**1300**		**930**		**540**	J	200	J
002-SVOCs-Piers	Isophorone	78-59-1	µg/kg	2400000	2000000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Naphthalene	91-20-3	µg/kg	**160**	17000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Nitrobenzene	98-95-3	µg/kg	22000	14000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	N-Nitroso-di-n-propylamine	621-64-7	µg/kg	330	300	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	N-Nitrosodiphenylamine	86-30-6	µg/kg	422000	390000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Pentachlorophenol	87-86-5	µg/kg	17	3000	1600	U	1800	U	3300	U	2800	U	1600	U	2000	U	1200	U
002-SVOCs-Piers	Phenanthrene	85-01-8	µg/kg	**240**	45700	**2800**		**2900**		**400**	J	**630**	J	**1400**		**560**	J	140	J
002-SVOCs-Piers	Phenol	108-95-2	µg/kg	**130**	210000000	650	U	710	U	1300	U	1100	U	650	U	830	U	480	U
002-SVOCs-Piers	Pyrene	129-00-0	µg/kg	**665**	18000000	**9000**		**7700**	J	**1100**	J	**2100**		**2200**		**1400**		460	J
003-Pest-Piers	4,4'-DDD	72-54-8	µg/kg	**2**	13000	**97**	J	**200**	J	**74**		**110**		**41**		**6300**		**110**	
003-Pest-Piers	4,4'-DDE	72-55-9	µg/kg	**2.2**	9000	**17**	J	**53**	J	**55**		**83**		**34**		330	U	**15**	

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

					Location	D3		D3		D4		D4		D4		D4		D4	
					Sample #	D3-SE-B		D3-SE-C		D4-SE-A		D4-SE-B		D4-SE-C		D4-SE-D		D4-SE-E	
					Start Depth	0.5		1		0		0.5		1		2		3	
					End Depth	1		2.5		0.5		1		2		3		4	
					Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
					Sample Type	N		N		N		N		N		N		N	
					Parent Sample #														
					Sample Date	8/6/2019		8/6/2019		7/18/2019		7/18/2019		7/18/2019		7/18/2019		7/18/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
003-Pest-Piers	4,4'-DDT	50-29-3	µg/kg	**1**	8000	**120**	J	**240**	J	27	U	22	U	**33**	J	**320**	J	4.9	U
003-Pest-Piers	Aldrin	309-00-2	µg/kg	**2**	200	20	U	**160**	J	14	U	11	U	6.8	U	8.4	U	2.5	U
003-Pest-Piers	alpha-BHC	319-84-6	µg/kg	1360	500	20	U	22	U	14	U	11	U	6.8	U	8.4	U	2.5	U
003-Pest-Piers	alpha-Chlordane	5103-71-9	µg/kg	**3.24**	1000000	**47**	J	**230**	J	14	U	11	U	6.8	U	8.4	U	2.5	U
003-Pest-Piers	beta-BHC	319-85-7	µg/kg	1300	2000	20	U	22	U	14	U	11	U	6.8	U	8.4	U	2.5	U
003-Pest-Piers	delta-BHC	319-86-8	µg/kg	**1300**	1300	62	J	22	U	14	U	30		18	J	130		2.5	U
003-Pest-Piers	Dieldrin	60-57-1	µg/kg	**1.9**	200	**69**	J	**180**	J	27	U	22	U	13	U	16	U	4.9	U
003-Pest-Piers	Endosulfan I	959-98-8	µg/kg	7000000	6800000	20	U	22	U	14	U	11	U	6.8	U	8.4	U	2.5	U
003-Pest-Piers	Endosulfan II	33213-65-9	µg/kg	7000000	6800000	39	U	43	U	27	U	22	U	13	U	16	U	4.9	U
003-Pest-Piers	Endosulfan Sulfate	1031-07-8	µg/kg	**0.357**	6800000	**35**	J	43	U	27	U	22	U	13	U	**76**		**1.9**	J
003-Pest-Piers	Endrin	72-20-8	µg/kg	2.22	340000	39	U	43	U	27	U	22	U	13	U	16	U	4.9	U
003-Pest-Piers	Endrin aldehyde	7421-93-4	µg/kg		1620	39	U	43	U	27	U	22	U	13	U	16	U	4.9	U
003-Pest-Piers	Endrin Ketone	53494-70-5	µg/kg		1620	39	U	43	U	27	U	22	U	13	U	16	U	4.9	U
003-Pest-Piers	gamma-BHC (Lindane)	58-89-9	µg/kg	**0.32**	2000	**14**	J	22	U	14	U	11	U	6.8	U	8.4	U	2.5	U
003-Pest-Piers	gamma-Chlordane	5103-74-2	µg/kg	**3.24**	1000000	**63**	J	**300**	J	14	U	11	U	6.8	U	8.4	U	2.5	U
003-Pest-Piers	Heptachlor	76-44-8	µg/kg	0.3	700	20	U	22	U	14	U	11	U	6.8	U	8.4	U	2.5	U
003-Pest-Piers	Heptachlor Epoxide	1024-57-3	µg/kg	**2.47**	300	20	U	22	U	14	U	11	U	6.8	U	8.4	U	2.5	U
003-Pest-Piers	Methoxychlor	72-43-5	µg/kg	**29.6**	5700000	200	U	220	U	140	U	110	U	68	U	84	U	25	U
003-Pest-Piers	Toxaphene	8001-35-2	µg/kg	536	3000	390	U	430	U	270	U	220	U	130	U	160	U	49	U
005-Aroclors-Piers	Aroclor 1016	12674-11-2	µg/kg	7	1000	330	U	360	U	69	U	56	U	34	U	210	U	25	U
005-Aroclors-Piers	Aroclor 1221	11104-28-2	µg/kg	23	1000	330	U	360	U	69	U	56	U	34	U	210	U	25	U
005-Aroclors-Piers	Aroclor 1232	11141-16-5	µg/kg	23	1000	330	U	360	U	69	U	56	U	34	U	210	U	25	U
005-Aroclors-Piers	Aroclor 1242	53469-21-9	µg/kg	**23**	1000	**3200**		**12000**		69	U	56	U	34	U	210	U	25	U
005-Aroclors-Piers	Aroclor 1248	12672-29-6	µg/kg	**30**	1000	330	U	360	U	**920**		**2300**		**1000**		**14000**		**290**	
005-Aroclors-Piers	Aroclor 1254	11097-69-1	µg/kg	**60**	1000	330	U	360	U	69	U	56	U	34	U	210	U	25	U
005-Aroclors-Piers	Aroclor 1260	11096-82-5	µg/kg	**5**	1000	**1100**		**1300**		**320**		**610**		**260**		**4100**		**71**	
005-Aroclors-Piers	Aroclor 1262	37324-23-5	µg/kg	23	1000	330	U	360	U	69	U	56	U	34	U	210	U	25	U
005-Aroclors-Piers	Aroclor 1268	11100-14-4	µg/kg	23	1000	330	U	360	U	69	U	56	U	34	U	210	U	25	U
005-Aroclors-Piers	Total Aroclors	TARO	µg/kg	**23**	1000	**4300**		**13300**		**1240**		**2910**		**1260**		**18100**		**361**	
007-Dioxin/Furan-Pier	1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	ng/kg																
007-Dioxin/Furan-Pier	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822-46-9	ng/kg																
007-Dioxin/Furan-Pier	1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	ng/kg																
007-Dioxin/Furan-Pier	1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	ng/kg																
007-Dioxin/Furan-Pier	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6	ng/kg																
007-Dioxin/Furan-Pier	1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	ng/kg																
007-Dioxin/Furan-Pier	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7	ng/kg																
007-Dioxin/Furan-Pier	1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	ng/kg																
007-Dioxin/Furan-Pier	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3	ng/kg																
007-Dioxin/Furan-Pier	1,2,3,7,8-Pentachlorodibenzofuran	57117-41-6	ng/kg																
007-Dioxin/Furan-Pier	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4	ng/kg																
007-Dioxin/Furan-Pier	2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	ng/kg																

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

						Location	D3		D3		D4		D4		D4		D4		D4	
						Sample #	D3-SE-B		D3-SE-C		D4-SE-A		D4-SE-B		D4-SE-C		D4-SE-D		D4-SE-E	
						Start Depth	0.5		1		0		0.5		1		2		3	
						End Depth	1		2.5		0.5		1		2		3		4	
						Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
						Sample Type	N		N		N		N		N		N		N	
						Parent Sample #														
						Sample Date	8/6/2019		8/6/2019		7/18/2019		7/18/2019		7/18/2019		7/18/2019		7/18/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
007-Dioxin/Furan-Pier	2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	ng/kg																	
007-Dioxin/Furan-Pier	2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	ng/kg																	
007-Dioxin/Furan-Pier	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	ng/kg	**3.6**	22															
007-Dioxin/Furan-Pier	Octachlorodibenzofuran	39001-02-0	ng/kg																	
007-Dioxin/Furan-Pier	Octachlorodibenzo-p-dioxin	3268-87-9	ng/kg																	
007-Dioxin/Furan-Pier	Total HcCDF	38998-75-3	ng/kg																	
007-Dioxin/Furan-Pier	Total HpCDD	37871-00-4	ng/kg																	
007-Dioxin/Furan-Pier	Total HxCDD	34465-46-8	ng/kg																	
007-Dioxin/Furan-Pier	Total HxCDF	55684-94-1	ng/kg																	
007-Dioxin/Furan-Pier	Total PeCDD	36088-22-9	ng/kg																	
007-Dioxin/Furan-Pier	Total PeCDF	30402-15-4	ng/kg																	
007-Dioxin/Furan-Pier	Total TCDD	41903-57-5	ng/kg																	
007-Dioxin/Furan-Pier	Total TCDF	55722-27-5	ng/kg																	
007-Dioxin/Furan-Pier	2,3,7,8-TCDD TEQ	TEQ	ng/kg	**3.6**	22															
011-Inorganics-Piers	Aluminum	7429-90-5	mg/kg	**18000**	3900		**18700**		**21400**		15100		**21800**		17900		**24900**		7730	
011-Inorganics-Piers	Antimony	7440-36-0	mg/kg	**9.3**	450		**17.7**		**21.6**		4.73	J	5.3	J	2.74	J	6.93	J	0.68	J
011-Inorganics-Piers	Arsenic	7440-38-2	mg/kg	**8.2**	19		**507**		**623**		**18.7**		**24.8**		**13**		**23.6**		**8.22**	
011-Inorganics-Piers	Barium	7440-39-3	mg/kg	**48**	59000		**402**		**509**		**1210**		**1560**		**752**		**1440**		**207**	
011-Inorganics-Piers	Beryllium	7440-41-7	mg/kg	2300	140		0.862		0.919		0.59		0.621		0.634		0.608		0.549	
011-Inorganics-Piers	Cadmium	7440-43-9	mg/kg	**1.2**	78		**9.68**		**32.5**		**6.15**		**10.8**		**5.17**		**13.9**		0.685	
011-Inorganics-Piers	Calcium	7440-70-2	mg/kg				14100		13600		9750		22800		14600		19800		11200	
011-Inorganics-Piers	Chromium	7440-47-3	mg/kg	**81**	3600000		**110**		**201**		52.8		**81.1**		53.4		**252**		41.1	
011-Inorganics-Piers	Cobalt	7440-48-4	mg/kg	**10**	590		**35.4**		**49.1**		**13.3**		**18.7**		**12.6**		**36.6**		7.97	
011-Inorganics-Piers	Copper	7440-50-8	mg/kg	**34**	45000		**503**		**1020**		**505**	J	**1260**	J	**769**	J	**2380**	J	**99.6**	J
011-Inorganics-Piers	Cyanide	57-12-5	mg/kg	**150**	680		4.4		4.4		17	U	14	U	1.7	J	19		2	U
011-Inorganics-Piers	Iron	7439-89-6	mg/kg	820000	820000		49700		51100		107000	J	235000	J	107000	J	120000	J	40600	J
011-Inorganics-Piers	Lead	7439-92-1	mg/kg	**47**	800		**863**		**2520**		**414**		**637**		**342**		**792**		**115**	
011-Inorganics-Piers	Magnesium	7439-95-4	mg/kg				9110		7980		5340		4870		3510		2510		4800	
011-Inorganics-Piers	Manganese	7439-96-5	mg/kg	**260**	5900		**1050**		**850**		**345**	J	**731**	J	**411**	J	**993**	J	**678**	J
011-Inorganics-Piers	Mercury	7439-97-6	mg/kg	**0.15**	65		**154**		**7710**		**0.775**	J	**0.536**	J	**0.285**	J	**57.8**	J	**1.22**	J
011-Inorganics-Piers	Mercury	7439-97-6	ng/g	**150**	65000		**134000**				**4050**		**977**							
011-Inorganics-Piers	Methyl Mercury	22967-92-6	ng/g				14.3		72.5		5.13		5.53		2.83		27.4		0.826	
011-Inorganics-Piers	Nickel	7440-02-0	mg/kg	**21**	23000		**198**		**267**		**272**	J	**668**	J	**433**	J	**1830**	J	**70.1**	J
011-Inorganics-Piers	Potassium	7440-09-7	mg/kg				2420		1960		1730	J	1360	J	1150	J	1130	J	1520	J
011-Inorganics-Piers	Selenium	7782-49-2	mg/kg	**1**	5700		**1.44**		**3.04**		**4.79**		**8.73**		**4.58**		**7.86**		0.625	
011-Inorganics-Piers	Silver	7440-22-4	mg/kg	**1**	5700		**9.28**		**111**		**420**	J	**1220**	J	**757**	J	**1140**	J	**37.2**	J
011-Inorganics-Piers	Sodium	7440-23-5	mg/kg				1720		1170		661		726		349		264		181	
011-Inorganics-Piers	Thallium	7440-28-0	mg/kg	12	3		0.213		0.237		0.21	J	0.24	J	0.164		0.18	J	0.106	
011-Inorganics-Piers	Vanadium	7440-62-2	mg/kg	**57**	1100		**91.2**		**102**		46.3		**57.1**		36.3		**58.1**		22.9	
011-Inorganics-Piers	Zinc	7440-66-6	mg/kg	**150**	110000		**2540**		**3820**		**927**	J	**1220**	J	**550**	J	**1170**	J	142	J
014-General Chemistr	Total Organic Carbon	TOC	µg/g				130000		140000		67000		92000		44000		120000		17000	

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

						Location	D3		D3		D4		D4		D4		D4		D4	
						Sample #	D3-SE-B		D3-SE-C		D4-SE-A		D4-SE-B		D4-SE-C		D4-SE-D		D4-SE-E	
						Start Depth	0.5		1		0		0.5		1		2		3	
						End Depth	1		2.5		0.5		1		2		3		4	
						Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
						Sample Type	N		N		N		N		N		N		N	
						Parent Sample #														
						Sample Date	8/6/2019		8/6/2019		7/18/2019		7/18/2019		7/18/2019		7/18/2019		7/18/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
014-General Chemistr	TOTAL SOLIDS	TSOLIDS	%				50 50 50		46 46		24 24 24		29 29 29		49 49		39 39		67 67	
015-Grain Size-Piers	% COARSE SAND >.5 - 1 MM	COARSE SAND	%				0		0											
015-Grain Size-Piers	% Coarse Sand >0.5 - 1.0 mm	%COARSESAND	%								2.66		6.07		2.62		1.62		0	
015-Grain Size-Piers	% Fine Sand >.125 - .25 mm	%FINE SAND	%								23.49		25.35		21.87		22.36		5.32	
015-Grain Size-Piers	% Medium Sand >.25 - .5 mm	%MEDIUM SAND	%								10.2		11.07		15.09		15.08		1.18	
015-Grain Size-Piers	% MEDIUM SAND >.25 - .5 MM	MEDIUM SAND	%				5.71		2.62											
015-Grain Size-Piers	0	HYD01	% Passing				12.27		19.67		14.56		17.86		14.31		21.71		46.75	
015-Grain Size-Piers	0	HYD02	% Passing				12.27		17.52		12.83		13.72		11.72		19.2		39.57	
015-Grain Size-Piers	0	HYD03	% Passing				10.67		14.31		8.51		7.63		8.26		15.55		27.6	
015-Grain Size-Piers	0	HYD04	% Passing				8.28		10.77		6.78		5.14		6.23		12.74		20.13	
015-Grain Size-Piers	0	HYD05	% Passing				7.23		9.7		4.19		3.19		5.37		10.23		14.25	
015-Grain Size-Piers	0	HYD06	% Passing				5.39		131.43		2.16		1.24		2.16		6.28		8.38	
015-Grain Size-Piers	0	HYD07	% Passing				3.24		2.95		0.99		0.95		2.47		3.77		5.19	
015-Grain Size-Piers	0.75 INCH SIEVE	SIEVE0.75IN	% Passing				100		100		100		100		100		100		100	
015-Grain Size-Piers	1.5 INCH SIEVE	SIEVE1.5IN	% Passing				100		100		100		100		100		100		100	
015-Grain Size-Piers	3 INCH SIEVE	SIEVE3IN	% Passing				100		100		100		100		100		100		100	
015-Grain Size-Piers	Clay	%CLAY	%				6.42		37.92		3.77		2.43		4.25		8.69		13.1	
015-Grain Size-Piers	GRAVEL	Gravel	%				0		0		2.66		6.07		0.66		0		0	
015-Grain Size-Piers	HYDROMETER, READING 1	HYD1-PARTICLE	um				35.77		35.37		34.93		27.63		34.5		32.96		26.28	
015-Grain Size-Piers	HYDROMETER, READING 2	HYD2-PARTICLE	um				22.62		22.62		22.35		21.82		22.31		21.02		17.98	
015-Grain Size-Piers	HYDROMETER, READING 3	HYD3-PARTICLE	um				13.21		13.21		13.14		13.66		12.32		12.5		11.02	

Appendix H-1
Analytical Results for Sediment
Pierson's Creek Superfund Site
Newark, New Jersey

						Location	D3		D3		D4		D4		D4		D4		D4	
						Sample #	D3-SE-B		D3-SE-C		D4-SE-A		D4-SE-B		D4-SE-C		D4-SE-D		D4-SE-E	
						Start Depth	0.5		1		0		0.5		1		2		3	
						End Depth	1		2.5		0.5		1		2		3		4	
						Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
						Sample Type	N		N		N		N		N		N		N	
						Parent Sample #														
						Sample Date	8/6/2019		8/6/2019		7/18/2019		7/18/2019		7/18/2019		7/18/2019		7/18/2019	
Method Group	Analyte	CAS #	Units	RI Sediment Screening Criteria	RI Soil Screening Criteria		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
015-Grain Size-Piers	HYDROMETER, READING 4	HYD4-PARTICLE	um				9.51		9.57		9.39		9.4		9.4		9.07		8.61	
015-Grain Size-Piers	HYDROMETER, READING 5	HYD5-PARTICLE	um				6.76		6.76		6.76		6.76		6.65		6.54		6.33	
015-Grain Size-Piers	HYDROMETER, READING 6	HYD6-PARTICLE	um				3.43		2.25		3.43		3.43		3.43		3.37		3.31	
015-Grain Size-Piers	HYDROMETER, READING 7	HYD7-PARTICLE	um				1.42		1.43		1.41		1.41		1.39		1.39		1.37	
015-Grain Size-Piers	Percent Passing Sieve#10	SIEVE10	% Passing				100		100		94.68		87.86		96.72		98.38		100	
015-Grain Size-Piers	Percent Passing Sieve#20	SIEVE20	% Passing				98.03		99.42		91.58		84.29		91.69		94.34		100	
015-Grain Size-Piers	Percent Passing Sieve#40	SIEVE40	% Passing				94.29		97.38		84.48		76.79		81.63		83.3		98.82	
015-Grain Size-Piers	Percent Passing Sieve#60	SIEVE60	% Passing				90.75		95.06		76.06		67.15		72.01		74.41		97.34	
015-Grain Size-Piers	Sand Fine	FINE SAND	%				12.59		11.34											
015-Grain Size-Piers	Sieve 0.25 inch, % passing	SIEVE0.25IN	% Passing				100		100		100		95.72		100		100		100	
015-Grain Size-Piers	SIEVE 1 inch, Percent Finer	SIEVE1INCH	% Passing				100		100		100		100		100		100		100	
015-Grain Size-Piers	SIEVE 2 inch, Percent Finer	SIEVE2INCH	% Passing				100		100		100		100		100		100		100	
015-Grain Size-Piers	SIEVE NO. 80, PERCENT PASSING	SIEVE80	% Passing				88.39		93.31		71.63		62.16		67.42		70.1		96.45	
015-Grain Size-Piers	SIEVE, 0.15 mm, PERCENT PASSING	SIEVEUS100	% Passing				87.01		92.15		68.97		59.66		65.01		67.68		95.86	
015-Grain Size-Piers	SIEVE, 4.75 mm, PERCENT PASSING	SIEVEUS4	% Passing				100		100		97.34		93.93		99.34		100		100	
015-Grain Size-Piers	Sieve-U.S. Std. No. 200 (0.075 mm)	SIEVEUS200	% Passing				81.7		86.04		60.99		51.45		59.76		60.94		93.5	
015-Grain Size-Piers	Silt	%SILT	%								57.22		49.01		55.51		52.26		80.4	
015-Grain Size-Piers	SILT	445	%				75.28		48.12											
017-MerSpec-Piers	MINERAL-BOUND HG	M-G-HG	ng/g								312									
017-MerSpec-Piers	ORGANO-COMPLEXED HG	OG-C-HG	ng/g								157									
017-MerSpec-Piers	STRONGLY COMPLEXED AND ELEMENTAL HG	S-B-HG	ng/g								1520									
017-MerSpec-Piers	VOLATILE HG	V-E-HG	ng/g				99.5	U			210	U	180	U						
017-MerSpec-Piers	WATER SOLUBLE HG	W-S-HG	ng/g								84.9									
017-MerSpec-Piers	WEAK ACID-SOLUBLE HG	SAS-HG	ng/g								38.2									

Notes:

1. Results that are greater than the RI sediment screening criteria are bolded.
2. Results that are greater than the RI soil screening criteria are highlighted yellow.

Acronyms:

FD - field duplicate
ft bgs - feet below ground surface
J - estimated
J+ - estimated, biased high
J- estimated, biased low
J-EMPC - estimated maximum possible concentration
mg/kg - milligram per kilogram
N - normal
ng/g - nanogram per gram
ng/kg - nanogram per kilogram
Q - qualifier
R - rejected
RI - remedial investigation
U - nondetect
UJ - nondetect, estimated
µg/kg - microgram per kilogram

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	PC35		PC36		PC36		PC36		PC5V		PC5V		PC5V		SO-01	
				Sample #	PC35(5-5.5)		PC36(0-0.5)		PC36(3-3.5)		PC36(5-5.5)		PC5V(2.5-3)		PC5V(5-5.5)		PC5V(7-7.5)		SO-01-9B	
				Start Depth	5		0		3		5		2.5		5		7		0.5	
				End Depth	5.5		0.5		3.5		5.5		3		5.5		7.5		1.5	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N		N		FD	
				Parent Sample #															SO-01-B	
				Sample Date	2/22/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		8/7/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
001-VOCs-Piers	1,1,1-Trichloroethane	71-55-6	µg/kg	200	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	1,1,2,2-Tetrachloroethane	79-34-5	µg/kg	3000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U		R
001-VOCs-Piers	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	µg/kg	28000000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	1,1,2-Trichloroethane	79-00-5	µg/kg	6000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	1,1-Dichloroethane	75-34-3	µg/kg	24000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	1,1-Dichloroethene	75-35-4	µg/kg	150000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	1,2,3-Trichlorobenzene	87-61-6	µg/kg	930000	7.4	UJ	6.6	UJ	7.2	UJ	15	U	5.9	UJ	33	UJ	6	U		R
001-VOCs-Piers	1,2,4-Trichlorobenzene	120-82-1	µg/kg	820000	7.4	UJ	6.6	UJ	7.2	UJ	15	U	5.9	UJ	33	UJ	6	U	15	J
001-VOCs-Piers	1,2-Dibromo-3-chloropropane	96-12-8	µg/kg	200	7.4	UJ	6.6	UJ	7.2	UJ	15	U	5.9	UJ	33	UJ	6	U		R
001-VOCs-Piers	1,2-Dibromoethane	106-93-4	µg/kg	40	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	1,2-Dichlorobenzene	95-50-1	µg/kg	59000000	7.4	UJ	6.6	UJ	7.2	UJ	15	U	5.9	UJ	33	UJ	6	U	170	J
001-VOCs-Piers	1,2-Dichloroethane	107-06-2	µg/kg	3000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	1,2-Dichloropropane	78-87-5	µg/kg	5000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	1,3-Dichlorobenzene	541-73-1	µg/kg	59000000	7.4	UJ	6.6	UJ	7.2	UJ	15	U	5.9	UJ	33	UJ	6	U	210	J
001-VOCs-Piers	1,4-Dichlorobenzene	106-46-7	µg/kg	13000	7.4	UJ	6.6	UJ	7.2	UJ	15	U	5.9	UJ	33	UJ	6	U	730	J
001-VOCs-Piers	2-Butanone	78-93-3	µg/kg	44000000	15	U	13	U	12	U	30	U	12	U	65	U	12	U	120	J
001-VOCs-Piers	2-Hexanone	591-78-6	µg/kg	1300000	15	U	13	U	14	UJ	30	U	12	U	65	U	12	U	30	UJ
001-VOCs-Piers	4-Methyl-2-pentanone	108-10-1	µg/kg	140000000	15	U	13	U	14	UJ	30	U	12	U	65	U	12	U	30	UJ
001-VOCs-Piers	Acetone	67-64-1	µg/kg	12000	15	U	13	U	12	U	30	U	12	U	84		36		110	J
001-VOCs-Piers	Benzene	71-43-2	µg/kg	5000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	100	J
001-VOCs-Piers	Bromochloromethane	74-97-5	µg/kg	630000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	Bromodichloromethane	75-27-4	µg/kg	3000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	Bromoform	75-25-2	µg/kg	280000	7.4	UJ	6.6	UJ	7.2	UJ	15	U	5.9	UJ	33	UJ	6	U	6	UJ
001-VOCs-Piers	Bromomethane	74-83-9	µg/kg	59000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U	12	UJ
001-VOCs-Piers	Carbon Disulfide	75-15-0	µg/kg	110000000	7.4	U	6.6	U	6	U	15	UJ	5.9	U	33	U	6	U	2.2	J
001-VOCs-Piers	Carbon Tetrachloride	56-23-5	µg/kg	4000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	Chlorobenzene	108-90-7	µg/kg	7400000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	62	J
001-VOCs-Piers	Chloroethane	75-00-3	µg/kg	1100000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U	12	UJ
001-VOCs-Piers	Chloroform	67-66-3	µg/kg	2000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	Chloromethane	74-87-3	µg/kg	12000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U	7.4	J
001-VOCs-Piers	cis-1,2-Dichloroethene	156-59-2	µg/kg	560000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	cis-1,3-Dichloropropene	10061-01-5	µg/kg	7000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	Cyclohexane	110-82-7	µg/kg	27000000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	72	J
001-VOCs-Piers	Dibromochloromethane	124-48-1	µg/kg	8000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	Dichlorodifluoromethane	75-71-8	µg/kg	230000000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U	12	UJ
001-VOCs-Piers	Ethylbenzene	100-41-4	µg/kg	110000000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	19	J
001-VOCs-Piers	Isopropylbenzene	98-82-8	µg/kg	9900000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	110	J
001-VOCs-Piers	m,p-Xylene	179601-23-1	µg/kg	170000000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U		
001-VOCs-Piers	M,P-XYLENE (SUM OF ISOMERS)	XYLMP	µg/kg	170000000															53	J

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	PC35		PC36		PC36		PC36		PC5V		PC5V		PC5V		SO-01	
				Sample #	PC35(5-5.5)		PC36(0-0.5)		PC36(3-3.5)		PC36(5-5.5)		PC5V(2.5-3)		PC5V(5-5.5)		PC5V(7-7.5)		SO-01-9B	
				Start Depth	5		0		3		5		2.5		5		7		0.5	
				End Depth	5.5		0.5		3.5		5.5		3		5.5		7.5		1.5	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N		N		FD	
				Parent Sample #															SO-01-B	
				Sample Date	2/22/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		8/7/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
001-VOCs-Piers	Methyl acetate	79-20-9	µg/kg	14000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	Methyl tert-Butyl Ether	1634-04-4	µg/kg	320000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	Methylcyclohexane	108-87-2	µg/kg		7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	170	J
001-VOCs-Piers	Methylene Chloride	75-09-2	µg/kg	230000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U	30	UJ
001-VOCs-Piers	o-Xylene	95-47-6	µg/kg	170000000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	34	J
001-VOCs-Piers	Styrene	100-42-5	µg/kg	260000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	1.1	J
001-VOCs-Piers	Tetrachloroethene	127-18-4	µg/kg	1500000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	Toluene	108-88-3	µg/kg	91000000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	39	J
001-VOCs-Piers	trans-1,2-Dichloroethene	156-60-5	µg/kg	720000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	trans-1,3-Dichloropropene	10061-02-6	µg/kg	7000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	6	UJ
001-VOCs-Piers	Trichloroethene	79-01-6	µg/kg	10000	7.4	U	6.6	U	7.2	UJ	15	U	5.9	U	33	U	6	U	1.6	J
001-VOCs-Piers	Trichlorofluoromethane	75-69-4	µg/kg	340000000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U	12	UJ
001-VOCs-Piers	Vinyl Chloride	75-01-4	µg/kg	2000	7.4	U	6.6	U	6	U	15	U	5.9	U	33	U	6	U	12	UJ
001-VOCs-Piers	Xylenes (TOTAL)	1330-20-7	µg/kg																87	J
002-SVOCs-Piers	1,1'-Biphenyl	92-52-4	µg/kg	240000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	1,2,4,5-Tetrachlorobenzene	95-94-3	µg/kg	350000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	1,4-Dioxane	123-91-1	µg/kg	24000	80	U	91	U	76	U	100	U	78	U	79	U	90	U	510	U
002-SVOCs-Piers	2,2'-Oxybis(1-chloropropane)	108-60-1	µg/kg	67000	400	U	450	U	370	U	510	U	380	U	390	U	440	U	510	U
002-SVOCs-Piers	2,3,4,6-Tetrachlorophenol	58-90-2	µg/kg	25000000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	2,4,5-Trichlorophenol	95-95-4	µg/kg	68000000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	1300	U
002-SVOCs-Piers	2,4,6-Trichlorophenol	88-06-2	µg/kg	74000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	2,4-Dichlorophenol	120-83-2	µg/kg	2100000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	2,4-Dimethylphenol	105-67-9	µg/kg	14000000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	2,4-Dinitrophenol	51-28-5	µg/kg	1400000	400	UJ	450	UJ	370	UJ	510	U	380	U	390	U	440	U	1300	U
002-SVOCs-Piers	2,4-Dinitrotoluene	121-14-2	µg/kg	**3000**	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	2,6-Dinitrotoluene	606-20-2	µg/kg	3000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	2-Chloronaphthalene	91-58-7	µg/kg	60000000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	2-Chlorophenol	95-57-8	µg/kg	2200000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	2-Methylnaphthalene	91-57-6	µg/kg	2400000	200	U	230	U	190	U	260	U	200	U	64	J	230	U	510	U
002-SVOCs-Piers	2-Methylphenol	95-48-7	µg/kg	3400000	400	U	450	U	370	U	510	U	380	U	390	U	440	U	510	U
002-SVOCs-Piers	2-Nitroaniline	88-74-4	µg/kg	23000000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	1300	U
002-SVOCs-Piers	2-Nitrophenol	88-75-5	µg/kg	1600	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	3,3'-Dichlorobenzidine	91-94-1	µg/kg	4000	400	U	450	U	370	U	510	U	380	U	390	U	440	U	510	U
002-SVOCs-Piers	3-Nitroaniline	99-09-2	µg/kg	3160	400	U	450	U	370	U	510	U	380	U	390	U	440	U	1300	U
002-SVOCs-Piers	4,6-Dinitro-2-methylphenol	534-52-1	µg/kg	68000	400	UJ	450	U	370	UJ	510	UJ	380	U	390	U	440	U	1300	U
002-SVOCs-Piers	4-Bromophenyl-phenylether	101-55-3	µg/kg		200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	4-Chloro-3-methylphenol	59-50-7	µg/kg	82000000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	4-Chloroaniline	106-47-8	µg/kg	11000	400	U	450	U	370	U	510	U	380	U	390	U	440	U	510	U
002-SVOCs-Piers	4-Chlorophenyl-phenylether	7005-72-3	µg/kg		200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	PC35		PC36		PC36		PC36		PC5V		PC5V		PC5V		SO-01	
				Sample #	PC35(5-5.5)		PC36(0-0.5)		PC36(3-3.5)		PC36(5-5.5)		PC5V(2.5-3)		PC5V(5-5.5)		PC5V(7-7.5)		SO-01-9B	
				Start Depth	5		0		3		5		2.5		5		7		0.5	
				End Depth	5.5		0.5		3.5		5.5		3		5.5		7.5		1.5	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N		N		FD	
				Parent Sample #															SO-01-B	
				Sample Date	2/22/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		8/7/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
002-SVOCs-Piers	4-Methylphenol	106-44-5	µg/kg	340000	400	U	450	U	370	U	510	U	380	U	390	U	440	U		
002-SVOCs-Piers	4-Nitroaniline	100-01-6	µg/kg	110000	400	U	450	U	2600		510	U	380	U	390	U	440	U	1300	U
002-SVOCs-Piers	4-Nitrophenol	100-02-7	µg/kg	5120	400	U	450	U	370	U	510	U	380	U	390	U	440	U	1300	U
002-SVOCs-Piers	Acenaphthene	83-32-9	µg/kg	37000000	220		150	J	190	U	210	J	98	J	150	J	120	J	170	J
002-SVOCs-Piers	Acenaphthylene	208-96-8	µg/kg	300000000	140	J	110	J	210		120	J	130	J	200	U	230	U	510	U
002-SVOCs-Piers	Acetophenone	98-86-2	µg/kg	5000	400	U	450	UJ	80	J	510	U	380	U	390	U	440	U	510	U
002-SVOCs-Piers	Anthracene	120-12-7	µg/kg	30000000	1200		380		220		640		310		340		290		460	J
002-SVOCs-Piers	Atrazine	1912-24-9	µg/kg	2400000	400	U	450	U	370	U	510	U	380	U	390	U	440	U	510	UJ
002-SVOCs-Piers	Benzaldehyde	100-52-7	µg/kg	68000000	400	U	450	U	370	U	510	U	380	U	390	U	440	U	510	U
002-SVOCs-Piers	Benzo(a)anthracene	56-55-3	µg/kg	**17000**	2100		1200		980		1800		1100		740		680		2600	
002-SVOCs-Piers	Benzo(a)pyrene	50-32-8	µg/kg	**2000**	1700		1000		1000		1500		900		580		550		**2500**	
002-SVOCs-Piers	Benzo(b)fluoranthene	205-99-2	µg/kg	**17000**	2200		1200		1300		1900		1200		740		700		3500	
002-SVOCs-Piers	Benzo(g,h,i)perylene	191-24-2	µg/kg	30000000	1100		620		830		960		520		310		290		1400	
002-SVOCs-Piers	Benzo(k)fluoranthene	207-08-9	µg/kg	170000	750		470		380		580		320		250		240		1600	
002-SVOCs-Piers	Bis(2-chloroethoxy)methane	111-91-1	µg/kg	2500000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	Bis(2-chloroethyl)ether	111-44-4	µg/kg	2000	400	U	450	U	370	U	510	U	380	U	390	U	440	U	510	U
002-SVOCs-Piers	Bis(2-ethylhexyl)phthalate	117-81-7	µg/kg	140000	200	U	130	J	190	U	260	U	200	U	200	U	230	U	710	
002-SVOCs-Piers	Butylbenzylphthalate	85-68-7	µg/kg	14000000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	UJ
002-SVOCs-Piers	Caprolactam	105-60-2	µg/kg	340000000	400	U	450	U	370	U	510	U	380	U	390	U	440	U	510	U
002-SVOCs-Piers	Carbazole	86-74-8	µg/kg	96000	550		230	J	84	J	330	J	130	J	150	J	140	J	330	J
002-SVOCs-Piers	Chrysene	218-01-9	µg/kg	1700000	1800		1200		960		1800		970		670		630		2700	
002-SVOCs-Piers	CRESOLS, M & P	MEPH1314	µg/kg																510	U
002-SVOCs-Piers	Dibenzo(a,h)anthracene	53-70-3	µg/kg	**2000**	350		210	J	240		330		210		110	J	100	J	550	
002-SVOCs-Piers	Dibenzofuran	132-64-9	µg/kg	1000000	310		88	J	190	U	140	J	53	J	81	J	62	J	510	U
002-SVOCs-Piers	Diethylphthalate	84-66-2	µg/kg	550000000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	Dimethylphthalate	131-11-3	µg/kg	734000	250		570		230		280		300		430		440		510	U
002-SVOCs-Piers	Di-n-butylphthalate	84-74-2	µg/kg	68000000	200	U	230	U	190	U	180	J	200	U	200	U	230	U	510	U
002-SVOCs-Piers	Di-n-octylphthalate	117-84-0	µg/kg	27000000	400	U	450	U	370	U	510	U	380	U	390	U	440	U	510	U
002-SVOCs-Piers	Fluoranthene	206-44-0	µg/kg	24000000	5600		2600		1900		3700		2100		1700		1900		4200	
002-SVOCs-Piers	Fluorene	86-73-7	µg/kg	24000000	540		110	J	50	J	240	J	82	J	140	J	130	J	220	J
002-SVOCs-Piers	Hexachlorobenzene	118-74-1	µg/kg	**1000**	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	UJ
002-SVOCs-Piers	Hexachlorobutadiene	87-68-3	µg/kg	25000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	Hexachlorocyclopentadiene	77-47-4	µg/kg	110000	400	UJ	450	UJ	370	UJ	510	U	380	U	390	U	440	U	510	U
002-SVOCs-Piers	Hexachloroethane	67-72-1	µg/kg	48000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	17000	1100		660		760		980		590		350		320		1500	
002-SVOCs-Piers	Isophorone	78-59-1	µg/kg	2000000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	Naphthalene	91-20-3	µg/kg	17000	60	J	61	J	190	U	93	J	120	J	68	J	59	J	510	U
002-SVOCs-Piers	Nitrobenzene	98-95-3	µg/kg	14000	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U
002-SVOCs-Piers	N-Nitroso-di-n-propylamine	621-64-7	µg/kg	300	200	U	230	U	190	U	260	U	200	U	200	U	230	U	510	U

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	PC35		PC36		PC36		PC36		PC5V		PC5V		PC5V		SO-01	
				Sample #	PC35(5-5.5)		PC36(0-0.5)		PC36(3-3.5)		PC36(5-5.5)		PC5V(2.5-3)		PC5V(5-5.5)		PC5V(7-7.5)		SO-01-9B	
				Start Depth	5		0		3		5		2.5		5		7		0.5	
				End Depth	5.5		0.5		3.5		5.5		3		5.5		7.5		1.5	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N		N		FD	
				Parent Sample #															SO-01-B	
				Sample Date	2/22/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		8/7/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
002-SVOCs-Piers	N-Nitrosodiphenylamine	86-30-6	µg/kg	390000	200	U	230	U	190	U	260	U	200	U	130	J	150	J	720	
002-SVOCs-Piers	Pentachlorophenol	87-86-5	µg/kg	3000	400	U	450	U	370	U	510	U	380	U	390	U	440	U	1300	U
002-SVOCs-Piers	Phenanthrene	85-01-8	µg/kg	45700	5700		2000		790		3100		1400		1700		1300		2600	
002-SVOCs-Piers	Phenol	108-95-2	µg/kg	210000000	400	U	210	J	370	U	510	U	110	J	160	J	130	J	510	U
002-SVOCs-Piers	Pyrene	129-00-0	µg/kg	18000000	4700		2500		2000		3300		1900		1700		1200		5000	
003-Pest-Piers	4,4'-DDD	72-54-8	µg/kg	13000	4	UJ	4.5	UJ	2.9	J	5.1	UJ	3.8	U	3.9	UJ	4.5	U	4200	
003-Pest-Piers	4,4'-DDE	72-55-9	µg/kg	9000	2.9	J	4.5	UJ	2	J	5.1	UJ	14	J	3.9	UJ	4.5	U	300	J
003-Pest-Piers	4,4'-DDT	50-29-3	µg/kg	**8000**	4.5	NJ	4.5	UJ	3.7	UJ	5.1	UJ	11	J	3.9	UJ	4.5	UJ	210	J
003-Pest-Piers	Aldrin	309-00-2	µg/kg	**200**	2	UJ	2.3	UJ	1.9	U	2.6	UJ	2	U	2	UJ	2.3	U	11	J
003-Pest-Piers	alpha-BHC	319-84-6	µg/kg	500	2	UJ	2.3	UJ	1.9	UJ	2.6	UJ	2	UJ	2	UJ	2.3	UJ	13	U
003-Pest-Piers	alpha-Chlordane	5103-71-9	µg/kg	1000000	2	UJ	2.3	UJ	1.9	U	2.6	UJ	2	U	2	UJ	2.3	U	31	J
003-Pest-Piers	beta-BHC	319-85-7	µg/kg	2000	2	UJ		R	1.9	UJ	2.6	UJ	2	UJ	2	UJ	2.3	UJ	13	U
003-Pest-Piers	delta-BHC	319-86-8	µg/kg	1300	2	UJ	2.3	UJ	1.9	U	2.6	UJ	2	U	2	UJ	2.3	U	13	U
003-Pest-Piers	Dieldrin	60-57-1	µg/kg	**200**	11	NJ	4.5	UJ	3.7	U		R		R	3.9	UJ	4.5	U	25	U
003-Pest-Piers	Endosulfan I	959-98-8	µg/kg	6800000	2	UJ	2.3	UJ	1.9	U	2.6	UJ	2	U	2	UJ	2.3	U	13	U
003-Pest-Piers	Endosulfan II	33213-65-9	µg/kg	6800000	4	UJ	4.5	UJ	3.7	U	5.1	UJ	3.8	U	3.9	UJ	4.5	U	25	U
003-Pest-Piers	Endosulfan Sulfate	1031-07-8	µg/kg	6800000	4	UJ	4.5	UJ	3.7	U	5.1	UJ	3.8	U	3.9	UJ	4.5	U	25	U
003-Pest-Piers	Endrin	72-20-8	µg/kg	340000	4	UJ	4.5	UJ	3.7	UJ	1.8	J-	3.8	UJ	3.9	UJ	0.78	J	25	U
003-Pest-Piers	Endrin aldehyde	7421-93-4	µg/kg	1620	4	UJ	4.5	UJ	3.7	U	5.1	UJ	3.8	U	3.9	UJ	4.5	U	10	J
003-Pest-Piers	Endrin Ketone	53494-70-5	µg/kg	1620	4	UJ	4.5	UJ	3.7	U	5.1	UJ	3.8	U	3.9	UJ	4.5	U	25	U
003-Pest-Piers	gamma-BHC (Lindane)	58-89-9	µg/kg	2000	2	UJ	2.3	UJ	1.9	UJ	2.6	UJ	2	UJ	2	UJ	2.3	UJ	13	U
003-Pest-Piers	gamma-Chlordane	5103-74-2	µg/kg	1000000	2	UJ	2.3	UJ	1.9	U	2.6	UJ	2	U	2	UJ	2.3	U	330	J
003-Pest-Piers	Heptachlor	76-44-8	µg/kg	700	2	UJ	2.3	UJ	1.9	U	2.6	UJ	2	U	2	UJ	2.3	U	13	U
003-Pest-Piers	Heptachlor Epoxide	1024-57-3	µg/kg	300	2	UJ	2.3	J-	1.9	U	2.6	UJ	2	U	2	UJ	2.3	U	13	U
003-Pest-Piers	Methoxychlor	72-43-5	µg/kg	5700000	20	UJ	23	UJ	19	UJ	26	UJ	20	UJ	20	UJ	23	UJ	130	U
003-Pest-Piers	Toxaphene	8001-35-2	µg/kg	3000	200	U	230	UJ	190	U	260	UJ	200	U	200	UJ	230	U	250	U
005-Aroclors-Piers	Aroclor 1016	12674-11-2	µg/kg	1000	40	U	45	UJ	37	U	51	U	38	U	39	U	45	U	130	U
005-Aroclors-Piers	Aroclor 1221	11104-28-2	µg/kg	1000	40	U	45	UJ	37	U	51	U	38	U	39	U	45	U	130	U
005-Aroclors-Piers	Aroclor 1232	11141-16-5	µg/kg	1000	40	U	45	UJ	37	U	51	U	38	U	39	U	45	U	130	U
005-Aroclors-Piers	Aroclor 1242	53469-21-9	µg/kg	**1000**	40	U	45	UJ	37	U	51	U	38	U	39	U	45	U	350	
005-Aroclors-Piers	Aroclor 1248	12672-29-6	µg/kg	**1000**	48		45	UJ	37	U	51	U	38	U	39	U	45	U	130	U
005-Aroclors-Piers	Aroclor 1254	11097-69-1	µg/kg	**1000**	40	U	45	UJ	40		51	U	38	U	39	U	45	U	**1700**	J
005-Aroclors-Piers	Aroclor 1260	11096-82-5	µg/kg	**1000**	40	U	45	UJ	94	J	51	U	38	U	39	U	45	U	440	
005-Aroclors-Piers	Aroclor 1262	37324-23-5	µg/kg	1000	40	U	45	UJ	37	U	51	U	38	U	39	U	45	U	130	U
005-Aroclors-Piers	Aroclor 1268	11100-14-4	µg/kg	1000	40	U	45	UJ	37	U	51	U	38	U	39	U	45	U	130	U
005-Aroclors-Piers	Total Aroclors	TARO	µg/kg	**1000**	48		0	U	134		0	U	0	U	0	U	0	U	**2490**	
011-Inorganics-Piers	Aluminum	7429-90-5	mg/kg	**3900**	**5000**		**6800**		**6200**		**4400**		**6800**		2700		**8900**		**13400**	
011-Inorganics-Piers	Antimony	7440-36-0	mg/kg	**450**	15		2	U	9.3		10		30		2.1		4.1		3.76	J
011-Inorganics-Piers	Arsenic	7440-38-2	mg/kg	**19**	**22**		3.9		17		6.6		17		9		**23**		**290**	

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	PC35		PC36		PC36		PC36		PC5V		PC5V		PC5V		SO-01	
				Sample #	PC35(5-5.5)		PC36(0-0.5)		PC36(3-3.5)		PC36(5-5.5)		PC5V(2.5-3)		PC5V(5-5.5)		PC5V(7-7.5)		SO-01-9B	
				Start Depth	5		0		3		5		2.5		5		7		0.5	
				End Depth	5.5		0.5		3.5		5.5		3		5.5		7.5		1.5	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N		N		FD	
				Parent Sample #															SO-01-B	
				Sample Date	2/22/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		8/7/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
011-Inorganics-Piers	Barium	7440-39-3	mg/kg	59000	440		110		800		850		620		110		250		182	
011-Inorganics-Piers	Beryllium	7440-41-7	mg/kg	140	0.33		0.43		0.38		0.35		0.4		0.25	U	0.56		0.769	
011-Inorganics-Piers	Cadmium	7440-43-9	mg/kg	**78**	3.2		0.99		5.3		5.5		11		0.36		0.71		1.98	
011-Inorganics-Piers	Calcium	7440-70-2	mg/kg		6500		3200		4700		12000		3600		6000		4900		30700	J
011-Inorganics-Piers	Chromium	7440-47-3	mg/kg	3600000	35		21		66		40		93		29		130		71.6	J
011-Inorganics-Piers	Cobalt	7440-48-4	mg/kg	590	11		6.2		7.1		10		7.8		1.7	U	4.1		13	
011-Inorganics-Piers	Copper	7440-50-8	mg/kg	45000	700		79		590		240		650		390		90		191	
011-Inorganics-Piers	Cyanide	57-12-5	mg/kg	680	0.46		0.26		0.57		0.92		0.18		0.42		0.19		2	U
011-Inorganics-Piers	Iron	7439-89-6	mg/kg	820000	24000		16000		20000		24000		37000		12000		23000		20600	
011-Inorganics-Piers	Lead	7439-92-1	mg/kg	**800**	**1600**		170		**2200**		590		**1800**		100		230		421	
011-Inorganics-Piers	Magnesium	7439-95-4	mg/kg		1200		2900		1900		2900		2400		730		2100		7120	
011-Inorganics-Piers	Manganese	7439-96-5	mg/kg	5900	280		420		280		290		480		98		110		366	
011-Inorganics-Piers	Mercury	7439-97-6	mg/kg	**65**	2.1		2.1		1.2		0.43		1.7		0.25		0.24		39.9	J
011-Inorganics-Piers	MethylMercury	22967-92-6	ng/g																11.7	J
011-Inorganics-Piers	Nickel	7440-02-0	mg/kg	23000	780		22		76		45		110		140		34		43	
011-Inorganics-Piers	Potassium	7440-09-7	mg/kg		620		1700		660		540		880		320		740		1420	
011-Inorganics-Piers	Selenium	7782-49-2	mg/kg	5700	1.9	U	2	U	1.9	U	1.8	U	2.6		1.7	U	1.8	U	1.29	
011-Inorganics-Piers	Silver	7440-22-4	mg/kg	5700	12		27		11		1.1		2.9		0.42	U	0.46	U	4.01	
011-Inorganics-Piers	Sodium	7440-23-5	mg/kg		180		99	U	120		110		95		180		520		891	
011-Inorganics-Piers	Thallium	7440-28-0	mg/kg	3	1.9	U	2	U	1.9	U	1.8	U	1.8	U	1.7	U	1.8	U	0.146	
011-Inorganics-Piers	Vanadium	7440-62-2	mg/kg	1100	30		25		68		22		38		8.6		26		40.6	
011-Inorganics-Piers	Zinc	7440-66-6	mg/kg	110000	1600		160		1000		950		980		140		280		388	
014-General Chemistry-Piers	Total Organic Carbon	TOC	µg/g																33000	
014-General Chemistry-Piers	TOTAL SOLIDS	TSOLIDS	%																64 64	
015-Grain Size-Piers	% COARSE SAND >.5 - 1 MM	COARSE SAND	%																	
015-Grain Size-Piers	% Coarse Sand >0.5 - 1.0 mm	%COARSESAND	%																	
015-Grain Size-Piers	% Fine Sand >.125 - .25 mm	%FINE SAND	%																	
015-Grain Size-Piers	% Medium Sand >.25 - .5 mm	%MEDIUM SAND	%																	
015-Grain Size-Piers	% MEDIUM SAND >.25 - .5 MM	MEDIUM SAND	%																	
015-Grain Size-Piers	0	HYD01	% Passing																	
015-Grain Size-Piers	0	HYD02	% Passing																	
015-Grain Size-Piers	0	HYD03	% Passing																	
015-Grain Size-Piers	0	HYD04	% Passing																	
015-Grain Size-Piers	0	HYD05	% Passing																	
015-Grain Size-Piers	0	HYD06	% Passing																	
015-Grain Size-Piers	0	HYD07	% Passing																	
015-Grain Size-Piers	0.75 INCH SIEVE	SIEVE0.75IN	% Passing																	

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	PC35		PC36		PC36		PC36		PC5V		PC5V		PC5V		SO-01	
				Sample #	PC35(5-5.5)		PC36(0-0.5)		PC36(3-3.5)		PC36(5-5.5)		PC5V(2.5-3)		PC5V(5-5.5)		PC5V(7-7.5)		SO-01-9B	
				Start Depth	5		0		3		5		2.5		5		7		0.5	
				End Depth	5.5		0.5		3.5		5.5		3		5.5		7.5		1.5	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N		N		FD	
				Parent Sample #															SO-01-B	
				Sample Date	2/22/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		2/21/2018		8/7/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
015-Grain Size-Piers	1.5 INCH SIEVE	SIEVE1.5IN	% Passing																	
015-Grain Size-Piers	3 INCH SIEVE	SIEVE3IN	% Passing																	
015-Grain Size-Piers	Clay	%CLAY	%																	
015-Grain Size-Piers	GRAVEL	Gravel	%																	
015-Grain Size-Piers	HYDROMETER, READING 1	HYD1-PARTICLE	um																	
015-Grain Size-Piers	HYDROMETER, READING 2	HYD2-PARTICLE	um																	
015-Grain Size-Piers	HYDROMETER, READING 3	HYD3-PARTICLE	um																	
015-Grain Size-Piers	HYDROMETER, READING 4	HYD4-PARTICLE	um																	
015-Grain Size-Piers	HYDROMETER, READING 5	HYD5-PARTICLE	um																	
015-Grain Size-Piers	HYDROMETER, READING 6	HYD6-PARTICLE	um																	
015-Grain Size-Piers	HYDROMETER, READING 7	HYD7-PARTICLE	um																	
015-Grain Size-Piers	Percent Passing Sieve#10	SIEVE10	% Passing																	
015-Grain Size-Piers	Percent Passing Sieve#20	SIEVE20	% Passing																	
015-Grain Size-Piers	Percent Passing Sieve#40	SIEVE40	% Passing																	
015-Grain Size-Piers	Percent Passing Sieve#60	SIEVE60	% Passing																	
015-Grain Size-Piers	Sand Fine	FINE SAND	%																	
015-Grain Size-Piers	Sieve 0.25 inch, % passing	SIEVE0.25IN	% Passing																	
015-Grain Size-Piers	SIEVE 1 inch, Percent Finer	SIEVE1INCH	% Passing																	
015-Grain Size-Piers	SIEVE 2 inch, Percent Finer	SIEVE2INCH	% Passing																	
015-Grain Size-Piers	SIEVE NO. 80, PERCENT PASSING	SIEVE80	% Passing																	
015-Grain Size-Piers	SIEVE, 0.15 mm, PERCENT PASSING	SIEVEUS100	% Passing																	
015-Grain Size-Piers	SIEVE, 4.75 mm, PERCENT PASSING	SIEVEUS4	% Passing																	
015-Grain Size-Piers	Sieve-U.S. Std. No. 200 (0.075 mm)	SIEVEUS200	% Passing																	
015-Grain Size-Piers	Silt	%SILT	%																	
015-Grain Size-Piers	SILT	445	%																	

Notes:

1. Results that are greater than the RI soil screening criteria are highlighted yellow.

Acronyms:

FD - field duplicate
ft bgs - feet below ground surface
J - estimated
J+ - estimated, biased high
J- estimated, biased low
J-EMPC - estimated maximum possible concentration
mg/kg - milligram per kilogram
N - normal
ng/g - nanogram per gram
Q - qualifier
R - rejected
RI - remedial investigation
U - nondetect
UJ - nondetect, estimated
µg/kg - microgram per kilogram

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	SO-01		SO-01		SO-01		SO-02		SO-02		SO-02		SO-02		SO-03	
				Sample #	SO-01-A		SO-01-B		SO-01-C		SO-02-A		SO-02-B		SO-02-C		SO-02-D		SO-03-A	
				Start Depth	0		0.5		1.5		0		0.5		1.5		3		0	
				End Depth	0.5		1.5		3		0.5		1.5		3		4		0.5	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N		N		N	
				Parent Sample #																
				Sample Date	8/7/2019		8/7/2019		8/7/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
001-VOCs-Piers	1,1,1-Trichloroethane	71-55-6	µg/kg	200	22	UJ	5.5	UJ	4.8	U	18	U	4.7	J	7	U	8	U	21	U
001-VOCs-Piers	1,1,2,2-Tetrachloroethane	79-34-5	µg/kg	3000		R		R	4.8	U	18	U	27	UJ	7	U	8	UJ	21	UJ
001-VOCs-Piers	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	µg/kg	28000000	22	UJ	5.5	UJ	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	1,1,2-Trichloroethane	79-00-5	µg/kg	6000	22	UJ	5.5	UJ	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	1,1-Dichloroethane	75-34-3	µg/kg	24000	22	UJ	2.1	J	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	1,1-Dichloroethene	75-35-4	µg/kg	150000	22	UJ	5.5	UJ	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	1,2,3-Trichlorobenzene	87-61-6	µg/kg	930000		R		R	4.8	U	18	U	27	UJ	7	U	4.2	J	21	UJ
001-VOCs-Piers	1,2,4-Trichlorobenzene	120-82-1	µg/kg	820000	96	J	18	J	4.8	U	18	U	27	UJ	7	U	7.3	J	21	UJ
001-VOCs-Piers	1,2-Dibromo-3-chloropropane	96-12-8	µg/kg	200		R		R	4.8	U	18	U	27	UJ	7	U	8	UJ	21	UJ
001-VOCs-Piers	1,2-Dibromoethane	106-93-4	µg/kg	40	22	UJ	5.5	UJ	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	1,2-Dichlorobenzene	95-50-1	µg/kg	59000000	3000	J	740	J	4.8	U	18	U	58	J	7	U	8	UJ	21	UJ
001-VOCs-Piers	1,2-Dichloroethane	107-06-2	µg/kg	3000	22	UJ	5.5	UJ	4.8	U	18	U	27	U	7	U	90		21	U
001-VOCs-Piers	1,2-Dichloropropane	78-87-5	µg/kg	5000	22	UJ	5.5	UJ	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	1,3-Dichlorobenzene	541-73-1	µg/kg	59000000	2000	J	490	J	4.8	U	18	U	6.5	J	7	U	8	UJ	21	UJ
001-VOCs-Piers	1,4-Dichlorobenzene	106-46-7	µg/kg	13000	7800	J	1800	J	4.8	U	18	U	19	J	7	U	2.7	J	21	UJ
001-VOCs-Piers	2-Butanone	78-93-3	µg/kg	44000000	750	J	410	J	24	U	110		290		27	J	40		96	J
001-VOCs-Piers	2-Hexanone	591-78-6	µg/kg	1300000	110	UJ	28	UJ	24	U	90	U	140	U	35	U	40	U	100	U
001-VOCs-Piers	4-Methyl-2-pentanone	108-10-1	µg/kg	140000000	110	UJ	28	UJ	24	U	90	U	140	U	35	U	40	U	100	U
001-VOCs-Piers	Acetone	67-64-1	µg/kg	12000	520	J	530	J	24	U	410		990		110		110		430	
001-VOCs-Piers	Benzene	71-43-2	µg/kg	5000	1100	J	370	J	2.8	J	18	J	73		3.7	J	10		21	U
001-VOCs-Piers	Bromochloromethane	74-97-5	µg/kg	630000	22	UJ	5.5	UJ	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	Bromodichloromethane	75-27-4	µg/kg	3000	22	UJ	5.5	UJ	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	Bromoform	75-25-2	µg/kg	280000	22	UJ	5.5	UJ	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	Bromomethane	74-83-9	µg/kg	59000	44	UJ	11	UJ	9.7	U	36	U	54	U	14	U	16	U	42	U
001-VOCs-Piers	Carbon Disulfide	75-15-0	µg/kg	110000000	24	J	16	J	1.4	J	7.4	J	16	J	7	U	8	U	11	J
001-VOCs-Piers	Carbon Tetrachloride	56-23-5	µg/kg	4000	22	UJ	5.5	UJ	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	Chlorobenzene	108-90-7	µg/kg	7400000	1100	J	390	J	4.8	U	2.6	J	30		7	U	3.4	J	21	U
001-VOCs-Piers	Chloroethane	75-00-3	µg/kg	1100000	44	UJ	3.9	J	9.7	U	36	U	54	U	14	U	16	U	42	U
001-VOCs-Piers	Chloroform	67-66-3	µg/kg	2000	22	UJ	5.5	UJ	4.8	U	18	U	27	U	7	U	1.1	J	21	U
001-VOCs-Piers	Chloromethane	74-87-3	µg/kg	12000	44	UJ	11	UJ	9.7	U	36	U	54	U	14	U	16	U	42	U
001-VOCs-Piers	cis-1,2-Dichloroethene	156-59-2	µg/kg	560000	33	J	17	J	4.8	U	6	J	55		4.9	J	11		21	U
001-VOCs-Piers	cis-1,3-Dichloropropene	10061-01-5	µg/kg	7000	22	UJ	5.5	UJ	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	Cyclohexane	110-82-7	µg/kg	27000000	540	J	200	J	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	Dibromochloromethane	124-48-1	µg/kg	8000	22	UJ	5.5	UJ	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	Dichlorodifluoromethane	75-71-8	µg/kg	230000000	44	UJ	11	UJ	9.7	U	36	U	54	U	14	U	16	U	42	U
001-VOCs-Piers	Ethylbenzene	100-41-4	µg/kg	110000000	280	J	85	J	4.8	U	18	U	16	J	1.5	J	2.7	J	21	U
001-VOCs-Piers	Isopropylbenzene	98-82-8	µg/kg	9900000	1800	J	520	J	4.8	U	18	U	27	UJ	7	U	8	UJ	21	UJ
001-VOCs-Piers	m,p-Xylene	179601-23-1	µg/kg	170000000																
001-VOCs-Piers	M,P-XYLENE (SUM OF ISOMERS)	XYLMP	µg/kg	170000000	1200	J	350	J	9.7	U	36	U	30	J	14	U	4.7	J	42	U

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	SO-01		SO-01		SO-01		SO-02		SO-02		SO-02		SO-02		SO-03	
				Sample #	SO-01-A		SO-01-B		SO-01-C		SO-02-A		SO-02-B		SO-02-C		SO-02-D		SO-03-A	
				Start Depth	0		0.5		1.5		0		0.5		1.5		3		0	
				End Depth	0.5		1.5		3		0.5		1.5		3		4		0.5	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N		N		N	
				Parent Sample #																
				Sample Date	8/7/2019		8/7/2019		8/7/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
001-VOCs-Piers	Methyl acetate	79-20-9	µg/kg	14000	22	UJ	5.5	UJ	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	Methyl tert-Butyl Ether	1634-04-4	µg/kg	320000	22	UJ	5.5	UJ	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	Methylcyclohexane	108-87-2	µg/kg		1400	J	510	J	4.8	U	18	U	27	U	3.5	J	8		21	U
001-VOCs-Piers	Methylene Chloride	75-09-2	µg/kg	230000	110	UJ	28	UJ	24	U	90	U	140	U	35	U	40	U	100	U
001-VOCs-Piers	o-Xylene	95-47-6	µg/kg	170000000	700	J	240	J	4.8	U	18	U	27	U	7	U	2.3	J	21	U
001-VOCs-Piers	Styrene	100-42-5	µg/kg	260000	9.5	J	3.4	J	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	Tetrachloroethene	127-18-4	µg/kg	1500000	22	UJ	5.5	UJ	4.8	U	18	U	33		7	U	3	J	21	U
001-VOCs-Piers	Toluene	108-88-3	µg/kg	91000000	160	J	30	J	14		26		3000		2	J	8		11	J
001-VOCs-Piers	trans-1,2-Dichloroethene	156-60-5	µg/kg	720000	14	J	5.5	J	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	trans-1,3-Dichloropropene	10061-02-6	µg/kg	7000	22	UJ	5.5	UJ	4.8	U	18	U	27	U	7	U	8	U	21	U
001-VOCs-Piers	Trichloroethene	79-01-6	µg/kg	10000	17	J	5.5	UJ	4.8	U	3.7	J	26	J	0.83	J	35		21	U
001-VOCs-Piers	Trichlorofluoromethane	75-69-4	µg/kg	340000000	44	UJ	11	UJ	9.7	U	36	U	54	U	14	U	16	U	42	U
001-VOCs-Piers	Vinyl Chloride	75-01-4	µg/kg	2000	44	UJ	3.1	J	9.7	U	36	U	54	U	5.6	J	16	U	42	U
001-VOCs-Piers	Xylenes (TOTAL)	1330-20-7	µg/kg		1900	J	590	J	14	U	54	U	30	J	21	U	7	J	63	U
002-SVOCs-Piers	1,1'-Biphenyl	92-52-4	µg/kg	240000	1100	U	500	U	160	J	1200	U	1100	U	150	J	160	J	1300	U
002-SVOCs-Piers	1,2,4,5-Tetrachlorobenzene	95-94-3	µg/kg	350000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	1,4-Dioxane	123-91-1	µg/kg	24000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	2,2'-Oxybis(1-chloropropane)	108-60-1	µg/kg	67000	1100	U	500	U	400	U	1200	UJ	1100	UJ	480	UJ	530	UJ	1300	UJ
002-SVOCs-Piers	2,3,4,6-Tetrachlorophenol	58-90-2	µg/kg	25000000	1100	U	500	U	400	U	1200	U	1100	U	230	J	530	U	1300	U
002-SVOCs-Piers	2,4,5-Trichlorophenol	95-95-4	µg/kg	68000000	2700	U	1200	U	1000	U	3000	U	2800	U	1200	U	1300	U	3200	U
002-SVOCs-Piers	2,4,6-Trichlorophenol	88-06-2	µg/kg	74000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	2,4-Dichlorophenol	120-83-2	µg/kg	2100000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	2,4-Dimethylphenol	105-67-9	µg/kg	14000000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	2,4-Dinitrophenol	51-28-5	µg/kg	1400000	2700	U	1200	U	1000	U	3000	U	2800	U	1200	U	1300	U	3200	U
002-SVOCs-Piers	2,4-Dinitrotoluene	121-14-2	µg/kg	**3000**	1100	U	500	U	400	U	1200	U	1100	U	380	J	**1200000**		1300	U
002-SVOCs-Piers	2,6-Dinitrotoluene	606-20-2	µg/kg	3000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	2-Chloronaphthalene	91-58-7	µg/kg	60000000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	2-Chlorophenol	95-57-8	µg/kg	2200000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	2-Methylnaphthalene	91-57-6	µg/kg	2400000	1100	U	500	U	500		1200	U	1100	U	200	J	180	J	1300	U
002-SVOCs-Piers	2-Methylphenol	95-48-7	µg/kg	3400000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	2-Nitroaniline	88-74-4	µg/kg	23000000	2700	U	1200	U	1000	U	3000	U	2800	U	1200	U	1300	U	3200	U
002-SVOCs-Piers	2-Nitrophenol	88-75-5	µg/kg	1600	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	3,3'-Dichlorobenzidine	91-94-1	µg/kg	4000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	UJ	1300	U
002-SVOCs-Piers	3-Nitroaniline	99-09-2	µg/kg	3160	2700	U	1200	U	1000	U	3000	U	2800	U	1200	U	1300	U	3200	U
002-SVOCs-Piers	4,6-Dinitro-2-methylphenol	534-52-1	µg/kg	68000	2700	U	1200	U	1000	U	3000	U	2800	U	1200	U	1300	U	3200	U
002-SVOCs-Piers	4-Bromophenyl-phenylether	101-55-3	µg/kg		1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	4-Chloro-3-methylphenol	59-50-7	µg/kg	82000000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	4-Chloroaniline	106-47-8	µg/kg	11000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	4-Chlorophenyl-phenylether	7005-72-3	µg/kg		1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	SO-01		SO-01		SO-01		SO-02		SO-02		SO-02		SO-02		SO-03	
				Sample #	SO-01-A		SO-01-B		SO-01-C		SO-02-A		SO-02-B		SO-02-C		SO-02-D		SO-03-A	
				Start Depth	0		0.5		1.5		0		0.5		1.5		3		0	
				End Depth	0.5		1.5		3		0.5		1.5		3		4		0.5	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N		N		N	
				Parent Sample #																
				Sample Date	8/7/2019		8/7/2019		8/7/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
002-SVOCs-Piers	4-Methylphenol	106-44-5	µg/kg	340000																
002-SVOCs-Piers	4-Nitroaniline	100-01-6	µg/kg	110000	2700	U	1200	U	1000	U	3000	U	2800	U	1200	U	1300	U	3200	U
002-SVOCs-Piers	4-Nitrophenol	100-02-7	µg/kg	5120	2700	U	1200	U	1000	U	3000	U	2800	U	1200	U	1300	U	3200	U
002-SVOCs-Piers	Acenaphthene	83-32-9	µg/kg	37000000	1100	U	150	J	1600		1200	U	1100	U	350	J	530	U	1300	U
002-SVOCs-Piers	Acenaphthylene	208-96-8	µg/kg	300000000	1100	U	500	U	140	J	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	Acetophenone	98-86-2	µg/kg	5000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	Anthracene	120-12-7	µg/kg	30000000	1100	U	460	J	2900		1200	U	1100	U	580		410	J	1300	U
002-SVOCs-Piers	Atrazine	1912-24-9	µg/kg	2400000	1100	UJ	500	UJ	400	UJ	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	Benzaldehyde	100-52-7	µg/kg	68000000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	Benzo(a)anthracene	56-55-3	µg/kg	**17000**	820	J	2200		7900		1200		1200		2400		3700	J	1900	
002-SVOCs-Piers	Benzo(a)pyrene	50-32-8	µg/kg	**2000**	1100	J	**2300**		**6900**		1500		1300		1900	J	**2900**	J	**2400**	
002-SVOCs-Piers	Benzo(b)fluoranthene	205-99-2	µg/kg	**17000**	1100	UJ	3300		8400		2300		2000		3200	J	4800	J	4000	
002-SVOCs-Piers	Benzo(g,h,i)perylene	191-24-2	µg/kg	30000000	850	J	1300		3100	J	1100	J	980	J	1100	J	1900	J	1500	
002-SVOCs-Piers	Benzo(k)fluoranthene	207-08-9	µg/kg	170000	1100	UJ	1300		3700	J	1000	J	930	J	1400	J	1900	J	1500	
002-SVOCs-Piers	Bis(2-chloroethoxy)methane	111-91-1	µg/kg	2500000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	Bis(2-chloroethyl)ether	111-44-4	µg/kg	2000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	Bis(2-ethylhexyl)phthalate	117-81-7	µg/kg	140000	2400		690		410		4000		3600		1600		1800	J	1900	
002-SVOCs-Piers	Butylbenzylphthalate	85-68-7	µg/kg	14000000	360	J	500	UJ	400	UJ	1400		1100	J	480	U	530	UJ	770	J
002-SVOCs-Piers	Caprolactam	105-60-2	µg/kg	340000000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	Carbazole	86-74-8	µg/kg	96000	1100	U	270	J	1600		1200	U	1100	U	270	J	300	J	1300	U
002-SVOCs-Piers	Chrysene	218-01-9	µg/kg	1700000	1200		2500		8300		1600		1400		2700		4500	J	2600	
002-SVOCs-Piers	CRESOLS, M & P	MEPH1314	µg/kg		1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	Dibenzo(a,h)anthracene	53-70-3	µg/kg	**2000**	1100	UJ	500		1300	J	930	J	670	J	500	J	720	J	1300	U
002-SVOCs-Piers	Dibenzofuran	132-64-9	µg/kg	1000000	1100	U	500	U	1200		1200	U	1100	U	420	J	250	J	1300	U
002-SVOCs-Piers	Diethylphthalate	84-66-2	µg/kg	550000000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	Dimethylphthalate	131-11-3	µg/kg	734000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	Di-n-butylphthalate	84-74-2	µg/kg	68000000	1100	U	500	U	400	U	1200	U	1100	U	300	J	730		1300	U
002-SVOCs-Piers	Di-n-octylphthalate	117-84-0	µg/kg	27000000	1100	UJ	500	U	400	UJ	1200	U	1100	U	480	UJ	530	UJ	1300	U
002-SVOCs-Piers	Fluoranthene	206-44-0	µg/kg	24000000	1400		3600		15000		2000		1700		3700		5700		3500	
002-SVOCs-Piers	Fluorene	86-73-7	µg/kg	24000000	1100	U	180	J	1600		1200	U	1100	U	340	J	530	U	1300	U
002-SVOCs-Piers	Hexachlorobenzene	118-74-1	µg/kg	**1000**	1100	UJ	500	UJ	400	UJ	1200	U	1100	U	260	J	820		1300	U
002-SVOCs-Piers	Hexachlorobutadiene	87-68-3	µg/kg	25000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	Hexachlorocyclopentadiene	77-47-4	µg/kg	110000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	Hexachloroethane	67-72-1	µg/kg	48000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	17000	820	J	1300		3200	J	1100	J	950	J	1100	J	2000	J	1400	
002-SVOCs-Piers	Isophorone	78-59-1	µg/kg	2000000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	Naphthalene	91-20-3	µg/kg	17000	1100	U	160	J	1700		1200	U	1100	U	1300		590		1300	U
002-SVOCs-Piers	Nitrobenzene	98-95-3	µg/kg	14000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	N-Nitroso-di-n-propylamine	621-64-7	µg/kg	300	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	SO-01		SO-01		SO-01		SO-02		SO-02		SO-02		SO-02		SO-03	
				Sample #	SO-01-A		SO-01-B		SO-01-C		SO-02-A		SO-02-B		SO-02-C		SO-02-D		SO-03-A	
				Start Depth	0		0.5		1.5		0		0.5		1.5		3		0	
				End Depth	0.5		1.5		3		0.5		1.5		3		4		0.5	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N		N		N	
				Parent Sample #																
				Sample Date	8/7/2019		8/7/2019		8/7/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
002-SVOCs-Piers	N-Nitrosodiphenylamine	86-30-6	µg/kg	390000	1100	U	650		420		1200	U	1100	U	1100		3400		1300	U
002-SVOCs-Piers	Pentachlorophenol	87-86-5	µg/kg	3000	2700	U	1200	U	1000	U	3000	U	2800	U	1200	U	1300	U	3200	U
002-SVOCs-Piers	Phenanthrene	85-01-8	µg/kg	45700	630	J	2200		13000		1100	J	770	J	2700		2500		1500	
002-SVOCs-Piers	Phenol	108-95-2	µg/kg	210000000	1100	U	500	U	400	U	1200	U	1100	U	480	U	530	U	1300	U
002-SVOCs-Piers	Pyrene	129-00-0	µg/kg	18000000	1900		4200		15000		2300		2000		4300		6900		4100	
003-Pest-Piers	4,4'-DDD	72-54-8	µg/kg	13000	210	J	5500		2100		5600	J	2400	J	12000		660	J	140	J
003-Pest-Piers	4,4'-DDE	72-55-9	µg/kg	9000	55	J	330		120	J	1900	J	900	J	300	J	92	J	14	J
003-Pest-Piers	4,4'-DDT	50-29-3	µg/kg	**8000**	220	J	160	J	110	J	4000	J	1500	J	380	J	130	J	130	J
003-Pest-Piers	Aldrin	309-00-2	µg/kg	**200**	28	U	13	U	10	U	**3100**	J	36	U	46	J	22	J	39	U
003-Pest-Piers	alpha-BHC	319-84-6	µg/kg	500	28	U	13	U	10	U	36	U	36	U	15	U	84	J	39	U
003-Pest-Piers	alpha-Chlordane	5103-71-9	µg/kg	1000000	57		31		15	J	2200		1200	J	66	J	52	J	39	
003-Pest-Piers	beta-BHC	319-85-7	µg/kg	2000	28	U	13	U	10	U	36	U	36	U	15	U	140	J	39	U
003-Pest-Piers	delta-BHC	319-86-8	µg/kg	1300	28	J	5	J	4	J	36	U	36	U	15	U	16	U	39	U
003-Pest-Piers	Dieldrin	60-57-1	µg/kg	**200**	150	J	24	U	20	U	**4700**	J	**2100**	J	29	U	93	J	62	J
003-Pest-Piers	Endosulfan I	959-98-8	µg/kg	6800000	28	U	13	U	10	U	36	U	36	U	15	U	16	U	39	U
003-Pest-Piers	Endosulfan II	33213-65-9	µg/kg	6800000	54	U	24	U	20	U	70	U	69	U	29	U	32	U	76	U
003-Pest-Piers	Endosulfan Sulfate	1031-07-8	µg/kg	6800000	54	U	15	J	14	J	990	J	350	J	29	U	32	U	22	J
003-Pest-Piers	Endrin	72-20-8	µg/kg	340000	54	U	24	U	20	U	70	U	69	U	29	U	32	U	76	U
003-Pest-Piers	Endrin aldehyde	7421-93-4	µg/kg	1620	54	U	24	U	20	U	840	J	430	J	29	U	32	U	76	U
003-Pest-Piers	Endrin Ketone	53494-70-5	µg/kg	1620	130	J	24	U	20	U	70	U	69	U	29	U	32	U	76	U
003-Pest-Piers	gamma-BHC (Lindane)	58-89-9	µg/kg	2000	28	U	13	U	10	U	36	U	36	U	15	U	16	U	39	U
003-Pest-Piers	gamma-Chlordane	5103-74-2	µg/kg	1000000	110	J	440		180	J	3300	J	2300		440	J	120	J	51	J
003-Pest-Piers	Heptachlor	76-44-8	µg/kg	700	28	U	13	U	10	U	36	U	36	U	15	U	16	U	39	U
003-Pest-Piers	Heptachlor Epoxide	1024-57-3	µg/kg	300	28	U	13	U	10	U	36	U	36	U	15	U	16	U	39	U
003-Pest-Piers	Methoxychlor	72-43-5	µg/kg	5700000	280	U	130	U	100	U	360	U	360	U	150	U	300	J	390	U
003-Pest-Piers	Toxaphene	8001-35-2	µg/kg	3000	540	U	240	U	200	U	700	U	690	U	290	U	320	U	760	U
005-Aroclors-Piers	Aroclor 1016	12674-11-2	µg/kg	1000	280	UJ	130	U	100	U	610	U	580	U	250	U	270	U	660	U
005-Aroclors-Piers	Aroclor 1221	11104-28-2	µg/kg	1000	280	UJ	130	U	100	U	610	U	580	U	250	U	270	U	660	U
005-Aroclors-Piers	Aroclor 1232	11141-16-5	µg/kg	1000	280	UJ	130	U	100	U	610	U	580	U	250	U	270	U	660	U
005-Aroclors-Piers	Aroclor 1242	53469-21-9	µg/kg	**1000**	280	UJ	130	U	100	U	610	U	580	U	250	U	270	U	660	U
005-Aroclors-Piers	Aroclor 1248	12672-29-6	µg/kg	**1000**	**2900**	J	130	U	100	U	**100000**		**61000**		**4600**		960		660	U
005-Aroclors-Piers	Aroclor 1254	11097-69-1	µg/kg	**1000**	280	UJ	**1400**	J	680	J	610	U	580	U	250	U	270	U	**1300**	
005-Aroclors-Piers	Aroclor 1260	11096-82-5	µg/kg	**1000**	**1800**	J	130	U	100	U	**17000**		**12000**		**1600**		270	U	980	
005-Aroclors-Piers	Aroclor 1262	37324-23-5	µg/kg	1000	280	UJ	130	U	100	U	610	U	580	U	250	U	270	U	660	U
005-Aroclors-Piers	Aroclor 1268	11100-14-4	µg/kg	1000	280	UJ	130	U	100	U	610	U	580	U	250	U	270	U	660	U
005-Aroclors-Piers	Total Aroclors	TARO	µg/kg	**1000**	**4700**		**1400**		680		**117000**		**73000**		**6200**		960		**2280**	
011-Inorganics-Piers	Aluminum	7429-90-5	mg/kg	**3900**	**25100**		**16800**		**15800**		**21500**		**19000**		3560		3230		**14500**	
011-Inorganics-Piers	Antimony	7440-36-0	mg/kg	**450**	32.1		7.18	J	1.19		76.6	J	39.7	J	18.9	J	20.8	J	11.6	J
011-Inorganics-Piers	Arsenic	7440-38-2	mg/kg	**19**	**3000**		**376**		**82**		**2040**		**1050**		**990**		**261**		**114**	

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	SO-01		SO-01		SO-01		SO-02		SO-02		SO-02		SO-02		SO-03	
				Sample #	SO-01-A		SO-01-B		SO-01-C		SO-02-A		SO-02-B		SO-02-C		SO-02-D		SO-03-A	
				Start Depth	0		0.5		1.5		0		0.5		1.5		3		0	
				End Depth	0.5		1.5		3		0.5		1.5		3		4		0.5	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N		N		N	
				Parent Sample #																
				Sample Date	8/7/2019		8/7/2019		8/7/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
011-Inorganics-Piers	Barium	7440-39-3	mg/kg	59000	251		278		188		1200		504		1920		581		226	
011-Inorganics-Piers	Beryllium	7440-41-7	mg/kg	140	1.45		0.667		0.638		0.981		1.17		0.186		0.161		0.698	
011-Inorganics-Piers	Cadmium	7440-43-9	mg/kg	**78**	25.8		3.34		1.53		41.4		34.7		2.17		0.851		11.7	
011-Inorganics-Piers	Calcium	7440-70-2	mg/kg		12000		15200	J	15900		8780		9610		1460		1220	U	6780	
011-Inorganics-Piers	Chromium	7440-47-3	mg/kg	3600000	354		136	J	60.5		834		619		206		106		84.1	
011-Inorganics-Piers	Cobalt	7440-48-4	mg/kg	590	61.5		14.4		10.3		73.8		84		9.77		3.59		31.9	
011-Inorganics-Piers	Copper	7440-50-8	mg/kg	45000	2700		320		86		1990		2040		630		388		736	
011-Inorganics-Piers	Cyanide	57-12-5	mg/kg	680	5.2	U	2.2	U	1.8	U	6	U	5.6	U	1.9	J	2.8	U	5.2	U
011-Inorganics-Piers	Iron	7439-89-6	mg/kg	820000	64600		23000		18800		49300	J	48500	J	9920	J	40800	J	31700	J
011-Inorganics-Piers	Lead	7439-92-1	mg/kg	**800**	**3040**		667		231		**30700**	J	**9140**	J	**1110**	J	**2020**	J	**826**	J
011-Inorganics-Piers	Magnesium	7439-95-4	mg/kg		10500		6320		3680		4930	J	7240	J	455	J	463	J	5460	J
011-Inorganics-Piers	Manganese	7439-96-5	mg/kg	5900	1030		274		252		527	J	690	J	29.6	J	130	J	337	J
011-Inorganics-Piers	Mercury	7439-97-6	mg/kg	**65**	**1090**		**133**	J	6.97		**2280**		**611**		35		4.93	J	**237**	J
011-Inorganics-Piers	MethylMercury	22967-92-6	ng/g		11.5		1.94	J	3.8		204		46.2		109		8.28	J+	5.95	J+
011-Inorganics-Piers	Nickel	7440-02-0	mg/kg	23000	683		67.2		28.3		243		408		16		52.7		197	
011-Inorganics-Piers	Potassium	7440-09-7	mg/kg		2180		1570		1240		1610	J	1860	J	814	J	918	J	1470	J
011-Inorganics-Piers	Selenium	7782-49-2	mg/kg	5700	3.26		1.25		0.49		4	J	3.1	J	25.4	J	48.6	J	2.09	J
011-Inorganics-Piers	Silver	7440-22-4	mg/kg	5700	72.8		6.9		1.01		165		92.8		2.46		1.21		14.7	
011-Inorganics-Piers	Sodium	7440-23-5	mg/kg		1130		1010		646		986		1180		608		322		1170	
011-Inorganics-Piers	Thallium	7440-28-0	mg/kg	3	0.24	J	0.234		0.183		0.49		0.353		0.481		0.363		0.18	J
011-Inorganics-Piers	Vanadium	7440-62-2	mg/kg	1100	122		52.5		35.2		171	J	153	J	25.5	J	13.7	J	69.3	J
011-Inorganics-Piers	Zinc	7440-66-6	mg/kg	110000	3210		592		337		2040	J	2840	J	69.6	J	151	J	2290	J
014-General Chemistry-Piers	Total Organic Carbon	TOC	µg/g		180000		32000		26000		130000		140000		65000		120000		100000	
014-General Chemistry-Piers	TOTAL SOLIDS	TSOLIDS	%		30 30		66 66		80 80		27 27		28 28		67 67		62 62		26 26	
015-Grain Size-Piers	% COARSE SAND >.5 - 1 MM	COARSE SAND	%		0		11.08		9.39		0		3.37		3.28		11.85		0	
015-Grain Size-Piers	% Coarse Sand >0.5 - 1.0 mm	%COARSESAND	%																	
015-Grain Size-Piers	% Fine Sand >.125 - .25 mm	%FINE SAND	%																	
015-Grain Size-Piers	% Medium Sand >.25 - .5 mm	%MEDIUM SAND	%																	
015-Grain Size-Piers	% MEDIUM SAND >.25 - .5 MM	MEDIUM SAND	%		13.32		17.9		17.04		8.74		17.99		15.68		18.39		5.87	
015-Grain Size-Piers	0	HYD01	% Passing		8.9		10.51		14.79		15.33		18.02		22		16.91		16.54	
015-Grain Size-Piers	0	HYD02	% Passing		8.9		9.76		13.38		13.42		15.44		19.7		14.58		15.33	
015-Grain Size-Piers	0	HYD03	% Passing		7.58		8.26		10.38		9.08		12.19		17.41		10.69		12.93	
015-Grain Size-Piers	0	HYD04	% Passing		7.58		7.31		8.97		9.08		12.19		14.34		9.13		10.52	
015-Grain Size-Piers	0	HYD05	% Passing		5.91		6.56		8.27		9.08		8.94		11.85		7.37		7.79	
015-Grain Size-Piers	0	HYD06	% Passing		2.92		4.66		5.08		4.24		5.69		7.82		4.83		3.87	
015-Grain Size-Piers	0	HYD07	% Passing		1.25		2.96		2.78		-0.1		5.01		4.55		2.29		2.34	
015-Grain Size-Piers	0.75 INCH SIEVE	SIEVE0.75IN	% Passing		100		100		100		100		100		100		100		100	

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	SO-01		SO-01		SO-01		SO-02		SO-02		SO-02		SO-02		SO-03	
				Sample #	SO-01-A		SO-01-B		SO-01-C		SO-02-A		SO-02-B		SO-02-C		SO-02-D		SO-03-A	
				Start Depth	0		0.5		1.5		0		0.5		1.5		3		0	
				End Depth	0.5		1.5		3		0.5		1.5		3		4		0.5	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N		N		N	
				Parent Sample #																
				Sample Date	8/7/2019		8/7/2019		8/7/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019		8/6/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
015-Grain Size-Piers	1.5 INCH SIEVE	SIEVE1.5IN	% Passing		100		100		100		100		100		100		100		100	
015-Grain Size-Piers	3 INCH SIEVE	SIEVE3IN	% Passing		100		100		100		100		100		100		100		100	
015-Grain Size-Piers	Clay	%CLAY	%		4.53		5.51		6.46		5.48		7.96		10.14		6.05		6.57	
015-Grain Size-Piers	GRAVEL	Gravel	%		0		29.12		16.49		0		5.62		9.12		10.13		0	
015-Grain Size-Piers	HYDROMETER, READING 1	HYD1-PARTICLE	um		36.63		35.5		34.05		36.4		36.4		32.73		34.26		35.73	
015-Grain Size-Piers	HYDROMETER, READING 2	HYD2-PARTICLE	um		23.16		22.45		21.79		23.02		23.26		21.23		21.93		22.59	
015-Grain Size-Piers	HYDROMETER, READING 3	HYD3-PARTICLE	um		13.51		13.06		12.49		13.08		13.51		12.36		13.05		13.14	
015-Grain Size-Piers	HYDROMETER, READING 4	HYD4-PARTICLE	um		9.56		9.39		9.22		9.4		9.56		8.95		9.29		9.39	
015-Grain Size-Piers	HYDROMETER, READING 5	HYD5-PARTICLE	um		6.8		6.64		6.57		6.76		6.87		6.49		6.68		6.73	
015-Grain Size-Piers	HYDROMETER, READING 6	HYD6-PARTICLE	um		3.46		3.39		3.39		3.46		3.46		3.33		3.39		3.46	
015-Grain Size-Piers	HYDROMETER, READING 7	HYD7-PARTICLE	um		1.43		1.4		1.4		1.43		1.42		1.39		1.42		1.42	
015-Grain Size-Piers	Percent Passing Sieve#10	SIEVE10	% Passing		100		59.8		74.12		100		91.01		87.6		78.02		100	
015-Grain Size-Piers	Percent Passing Sieve#20	SIEVE20	% Passing		95.01		52.13		66.36		97.38		85.38		81.76		68.67		97.65	
015-Grain Size-Piers	Percent Passing Sieve#40	SIEVE40	% Passing		86.68		41.91		57.08		91.26		73.02		71.92		59.63		94.13	
015-Grain Size-Piers	Percent Passing Sieve#60	SIEVE60	% Passing		78.36		32.53		48.78		84.28		53.9		62.52		52.45		91.2	
015-Grain Size-Piers	Sand Fine	FINE SAND	%		23.31		26.28		22.5		34.94		58.47		25.94		24.01		8.8	
015-Grain Size-Piers	Sieve 0.25 inch, % passing	SIEVE0.25IN	% Passing		100		76.85		88.1		100		100		91.73		94.08		100	
015-Grain Size-Piers	SIEVE 1 inch, Percent Finer	SIEVE1INCH	% Passing		100		100		100		100		100		100		100		100	
015-Grain Size-Piers	SIEVE 2 inch, Percent Finer	SIEVE2INCH	% Passing		100		100		100		100		100		100		100		100	
015-Grain Size-Piers	SIEVE NO. 80, PERCENT PASSING	SIEVE80	% Passing		73.92		26.71		43.97		79.91		39.29		56.96		47.31		90.02	
015-Grain Size-Piers	SIEVE, 0.15 mm, PERCENT PASSING	SIEVEUS100	% Passing		71.7		23.58		41.46		76.41		32.54		54.11		44.19		88.85	
015-Grain Size-Piers	SIEVE, 4.75 mm, PERCENT PASSING	SIEVEUS4	% Passing		100		70.88		83.51		100		94.38		90.88		89.87		100	
015-Grain Size-Piers	Sieve-U.S. Std. No. 200 (0.075 mm)	SIEVEUS200	% Passing		63.37		15.63		34.58		56.32		14.55		45.99		35.62		85.33	
015-Grain Size-Piers	Silt	%SILT	%																	
015-Grain Size-Piers	SILT	445	%		58.84		10.12		28.12		50.84		6.59		35.85		29.57		78.76	

Notes:

1. Results that are greater than the RI soil screening criteria are highlighted yellow.

Acronyms:

FD - field duplicate
ft bgs - feet below ground surface
J - estimated
J+ - estimated, biased high
J- estimated, biased low
J-EMPC - estimated maximum possible concentration
mg/kg - milligram per kilogram
N - normal
ng/g - nanogram per gram
Q - qualifier
R - rejected
RI - remedial investigation
U - nondetect
UJ - nondetect, estimated
µg/kg - microgram per kilogram

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	SO-03		SO-03		SO-03		SO-04		SO-04		SO-04	
				Sample #	SO-03-B		SO-03-C		SO-03-D		SO-04-A		SO-04-B		SO-04-C	
				Start Depth	0.5		1.5		3		0		0.5		1.5	
				End Depth	1.5		3		4		0.5		1.5		3	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N	
				Parent Sample #												
				Sample Date	8/6/2019		8/6/2019		8/6/2019		7/2/2019		7/2/2019		7/2/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
001-VOCs-Piers	1,1,1-Trichloroethane	71-55-6	µg/kg	200	17	UJ	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	1,1,2,2-Tetrachloroethane	79-34-5	µg/kg	3000	17	UJ	8	UJ	6.5	U	6.5	UJ	6	U	8.5	U
001-VOCs-Piers	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	µg/kg	28000000	17	UJ	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	1,1,2-Trichloroethane	79-00-5	µg/kg	6000	17	UJ	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	1,1-Dichloroethane	75-34-3	µg/kg	24000	17	UJ	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	1,1-Dichloroethene	75-35-4	µg/kg	150000	17	UJ	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	1,2,3-Trichlorobenzene	87-61-6	µg/kg	930000	17	UJ	8	UJ	6.5	U	6.5	UJ	6	U	8.5	U
001-VOCs-Piers	1,2,4-Trichlorobenzene	120-82-1	µg/kg	820000	9.5	J	8	UJ	6.5	U	6.5	UJ	6	U	8.5	U
001-VOCs-Piers	1,2-Dibromo-3-chloropropane	96-12-8	µg/kg	200	17	UJ	8	UJ	6.5	U	6.5	UJ	6	U	8.5	U
001-VOCs-Piers	1,2-Dibromoethane	106-93-4	µg/kg	40	17	UJ	8	UJ	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	1,2-Dichlorobenzene	95-50-1	µg/kg	59000000	84	J	2.4	J	6.5	U	6.5	UJ	6	U	8.5	U
001-VOCs-Piers	1,2-Dichloroethane	107-06-2	µg/kg	3000	17	UJ	8	U	6.5	U	6.5	U	6	UJ	8.5	UJ
001-VOCs-Piers	1,2-Dichloropropane	78-87-5	µg/kg	5000	17	UJ	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	1,3-Dichlorobenzene	541-73-1	µg/kg	59000000	41	J	8	UJ	6.5	U	6.5	UJ	6	U	8.5	U
001-VOCs-Piers	1,4-Dichlorobenzene	106-46-7	µg/kg	13000	56	J	8	UJ	6.5	U	6.5	UJ	6	U	8.5	U
001-VOCs-Piers	2-Butanone	78-93-3	µg/kg	44000000	190	J	98	J	28	J	32	U	30	U	42	U
001-VOCs-Piers	2-Hexanone	591-78-6	µg/kg	1300000	85	UJ	40	UJ	32	U	32	U	30	U	42	U
001-VOCs-Piers	4-Methyl-2-pentanone	108-10-1	µg/kg	140000000	85	UJ	40	U	32	U	32	U	30	U	42	U
001-VOCs-Piers	Acetone	67-64-1	µg/kg	12000	610	J	340	J	120		32	U	30	U	42	U
001-VOCs-Piers	Benzene	71-43-2	µg/kg	5000	62	J	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Bromochloromethane	74-97-5	µg/kg	630000	17	UJ	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Bromodichloromethane	75-27-4	µg/kg	3000	17	UJ	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Bromoform	75-25-2	µg/kg	280000	17	UJ	8	UJ	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Bromomethane	74-83-9	µg/kg	59000	34	UJ	16	U	13	U	13	U	12	U	17	U
001-VOCs-Piers	Carbon Disulfide	75-15-0	µg/kg	110000000	17	UJ	6	J	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Carbon Tetrachloride	56-23-5	µg/kg	4000	17	UJ	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Chlorobenzene	108-90-7	µg/kg	7400000	18	J	8	UJ	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Chloroethane	75-00-3	µg/kg	1100000	34	UJ	16	U	13	U	13	U	12	U	17	U
001-VOCs-Piers	Chloroform	67-66-3	µg/kg	2000	17	UJ	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Chloromethane	74-87-3	µg/kg	12000	34	UJ	16	U	13	U	13	U	12	U	17	U
001-VOCs-Piers	cis-1,2-Dichloroethene	156-59-2	µg/kg	560000	9	J	15	J	1.7	J	6.5	U	6	U	8.5	U
001-VOCs-Piers	cis-1,3-Dichloropropene	10061-01-5	µg/kg	7000	17	UJ	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Cyclohexane	110-82-7	µg/kg	27000000	17	UJ	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Dibromochloromethane	124-48-1	µg/kg	8000	17	UJ	8	UJ	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Dichlorodifluoromethane	75-71-8	µg/kg	230000000	34	UJ	16	U	13	U	13	U	12	U	17	U
001-VOCs-Piers	Ethylbenzene	100-41-4	µg/kg	110000000	6.5	J	8	UJ	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Isopropylbenzene	98-82-8	µg/kg	9900000	17	UJ	8	UJ	6.5	U	6.5	UJ	6	U	8.5	U
001-VOCs-Piers	m,p-Xylene	179601-23-1	µg/kg	170000000												
001-VOCs-Piers	M,P-XYLENE (SUM OF ISOMERS)	XYLMP	µg/kg	170000000	6.6	J	16	UJ	13	U	13	U	12	U	17	U

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	SO-03		SO-03		SO-03		SO-04		SO-04		SO-04	
				Sample #	SO-03-B		SO-03-C		SO-03-D		SO-04-A		SO-04-B		SO-04-C	
				Start Depth	0.5		1.5		3		0		0.5		1.5	
				End Depth	1.5		3		4		0.5		1.5		3	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N	
				Parent Sample #												
				Sample Date	8/6/2019		8/6/2019		8/6/2019		7/2/2019		7/2/2019		7/2/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
001-VOCs-Piers	Methyl acetate	79-20-9	µg/kg	14000	17	UJ	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Methyl tert-Butyl Ether	1634-04-4	µg/kg	320000	17	UJ	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Methylcyclohexane	108-87-2	µg/kg		17	UJ	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Methylene Chloride	75-09-2	µg/kg	230000	85	UJ	40	U	32	U	32	U	30	U	42	U
001-VOCs-Piers	o-Xylene	95-47-6	µg/kg	170000000	17	UJ	8	UJ	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Styrene	100-42-5	µg/kg	260000	17	UJ	8	UJ	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Tetrachloroethene	127-18-4	µg/kg	1500000	17	UJ	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Toluene	108-88-3	µg/kg	91000000	100	J	4.5	J	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	trans-1,2-Dichloroethene	156-60-5	µg/kg	720000	2.6	J	2.3	J	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	trans-1,3-Dichloropropene	10061-02-6	µg/kg	7000	17	UJ	8	U	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Trichloroethene	79-01-6	µg/kg	10000	7.7	J	5.9	J	6.5	U	6.5	U	6	U	8.5	U
001-VOCs-Piers	Trichlorofluoromethane	75-69-4	µg/kg	340000000	34	UJ	16	U	13	U	13	U	12	UJ	17	UJ
001-VOCs-Piers	Vinyl Chloride	75-01-4	µg/kg	2000	3.8	J	8.1	J	13	U	13	U	12	U	17	U
001-VOCs-Piers	Xylenes (TOTAL)	1330-20-7	µg/kg		6.6	J	24	UJ	20	U	20	U	18	U	26	U
002-SVOCs-Piers	1,1'-Biphenyl	92-52-4	µg/kg	240000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	1,2,4,5-Tetrachlorobenzene	95-94-3	µg/kg	350000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	1,4-Dioxane	123-91-1	µg/kg	24000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	2,2'-Oxybis(1-chloropropane)	108-60-1	µg/kg	67000	1200	UJ	590	UJ	550	UJ	420	U	410	U	440	U
002-SVOCs-Piers	2,3,4,6-Tetrachlorophenol	58-90-2	µg/kg	25000000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	2,4,5-Trichlorophenol	95-95-4	µg/kg	68000000	3100	U	1500	U	1400	U	1000	U	1000	U	1100	U
002-SVOCs-Piers	2,4,6-Trichlorophenol	88-06-2	µg/kg	74000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	2,4-Dichlorophenol	120-83-2	µg/kg	2100000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	2,4-Dimethylphenol	105-67-9	µg/kg	14000000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	2,4-Dinitrophenol	51-28-5	µg/kg	1400000		R	1500	U	1400	U	1000	U	1000	U	1100	U
002-SVOCs-Piers	2,4-Dinitrotoluene	121-14-2	µg/kg	**3000**	600	J	820		**4200**		420	U	410	U	440	U
002-SVOCs-Piers	2,6-Dinitrotoluene	606-20-2	µg/kg	3000	500	J	590	U	900		420	U	410	U	440	U
002-SVOCs-Piers	2-Chloronaphthalene	91-58-7	µg/kg	60000000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	2-Chlorophenol	95-57-8	µg/kg	2200000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	2-Methylnaphthalene	91-57-6	µg/kg	2400000	1200	U	350	J	200	J	160	J	410	U	440	U
002-SVOCs-Piers	2-Methylphenol	95-48-7	µg/kg	3400000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	2-Nitroaniline	88-74-4	µg/kg	23000000	3100	U	1500	U	1400	U	1000	U	1000	U	1100	U
002-SVOCs-Piers	2-Nitrophenol	88-75-5	µg/kg	1600	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	3,3'-Dichlorobenzidine	91-94-1	µg/kg	4000		R	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	3-Nitroaniline	99-09-2	µg/kg	3160	3100	U	1500	U	1400	U	1000	U	1000	U	1100	U
002-SVOCs-Piers	4,6-Dinitro-2-methylphenol	534-52-1	µg/kg	68000	3100	UJ	1500	U	1400	U	1000	U	1000	U	1100	U
002-SVOCs-Piers	4-Bromophenyl-phenylether	101-55-3	µg/kg		1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	4-Chloro-3-methylphenol	59-50-7	µg/kg	82000000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	4-Chloroaniline	106-47-8	µg/kg	11000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	4-Chlorophenyl-phenylether	7005-72-3	µg/kg		1200	U	590	U	550	U	420	U	410	U	440	U

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	SO-03		SO-03		SO-03		SO-04		SO-04		SO-04	
				Sample #	SO-03-B		SO-03-C		SO-03-D		SO-04-A		SO-04-B		SO-04-C	
				Start Depth	0.5		1.5		3		0		0.5		1.5	
				End Depth	1.5		3		4		0.5		1.5		3	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N	
				Parent Sample #												
				Sample Date	8/6/2019		8/6/2019		8/6/2019		7/2/2019		7/2/2019		7/2/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
002-SVOCs-Piers	4-Methylphenol	106-44-5	µg/kg	340000												
002-SVOCs-Piers	4-Nitroaniline	100-01-6	µg/kg	110000	3100	U	1500	U	1400	U	1000	U	1000	U	1100	U
002-SVOCs-Piers	4-Nitrophenol	100-02-7	µg/kg	5120	3100	U	1500	U	1400	U	1000	U	1000	U	1100	U
002-SVOCs-Piers	Acenaphthene	83-32-9	µg/kg	37000000	1200	U	590	U	550	U	500		210	J	250	J
002-SVOCs-Piers	Acenaphthylene	208-96-8	µg/kg	300000000	1200	U	590	U	550	U	110	J	410	U	440	U
002-SVOCs-Piers	Acetophenone	98-86-2	µg/kg	5000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	Anthracene	120-12-7	µg/kg	30000000	36000		22000		370	J	1400		510		560	
002-SVOCs-Piers	Atrazine	1912-24-9	µg/kg	2400000	1200	UJ	590	U	550	U	420	UJ	410	U	440	UJ
002-SVOCs-Piers	Benzaldehyde	100-52-7	µg/kg	68000000	1200	UJ	590	U	550	UJ	420	UJ	410	UJ	440	UJ
002-SVOCs-Piers	Benzo(a)anthracene	56-55-3	µg/kg	**17000**	2100	J	590	U	1100		6600		1800		2600	
002-SVOCs-Piers	Benzo(a)pyrene	50-32-8	µg/kg	**2000**	**2700**	J	720	J	1100		**6000**		1700	J	**2400**	J
002-SVOCs-Piers	Benzo(b)fluoranthene	205-99-2	µg/kg	**17000**	4200	J	590	UJ	1600		8400		2500	J	3500	J
002-SVOCs-Piers	Benzo(g,h,i)perylene	191-24-2	µg/kg	30000000	2200	J	600	J	640		3200	J	850	J	1500	J
002-SVOCs-Piers	Benzo(k)fluoranthene	207-08-9	µg/kg	170000	1700	J	590	UJ	640		3300	J	1200	J	1400	J
002-SVOCs-Piers	Bis(2-chloroethoxy)methane	111-91-1	µg/kg	2500000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	Bis(2-chloroethyl)ether	111-44-4	µg/kg	2000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	Bis(2-ethylhexyl)phthalate	117-81-7	µg/kg	140000	18000		590	U	440	J	670	U	1400	U	500	
002-SVOCs-Piers	Butylbenzylphthalate	85-68-7	µg/kg	14000000	3200	J	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	Caprolactam	105-60-2	µg/kg	340000000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	Carbazole	86-74-8	µg/kg	96000	1200	U	590	U	550	U	940		250	J	330	J
002-SVOCs-Piers	Chrysene	218-01-9	µg/kg	1700000	3000	J	590	U	1300		7100		2100		3100	
002-SVOCs-Piers	CRESOLS, M & P	MEPH1314	µg/kg		1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	Dibenzo(a,h)anthracene	53-70-3	µg/kg	**2000**	650	J	590	UJ	550	U	1200	J	340	J	520	J
002-SVOCs-Piers	Dibenzofuran	132-64-9	µg/kg	1000000	1200	U	590	U	550	U	310	J	410	U	440	U
002-SVOCs-Piers	Diethylphthalate	84-66-2	µg/kg	550000000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	Dimethylphthalate	131-11-3	µg/kg	734000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	Di-n-butylphthalate	84-74-2	µg/kg	68000000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	Di-n-octylphthalate	117-84-0	µg/kg	27000000	1200	UJ	590	UJ	550	U	420	UJ	410	UJ	440	UJ
002-SVOCs-Piers	Fluoranthene	206-44-0	µg/kg	24000000	3800	J	590	U	1700		12000		2600		3300	
002-SVOCs-Piers	Fluorene	86-73-7	µg/kg	24000000	1200	U	590	U	550	U	580		180	J	210	J
002-SVOCs-Piers	Hexachlorobenzene	118-74-1	µg/kg	**1000**	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	Hexachlorobutadiene	87-68-3	µg/kg	25000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	Hexachlorocyclopentadiene	77-47-4	µg/kg	110000		R	590	U	550	U	420	U	410	UJ	440	U
002-SVOCs-Piers	Hexachloroethane	67-72-1	µg/kg	48000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	17000	1900	J	460	J	580		3500	J	980	J	1400	J
002-SVOCs-Piers	Isophorone	78-59-1	µg/kg	2000000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	Naphthalene	91-20-3	µg/kg	17000	1200	U	220	J	550	U	200	J	410	U	440	U
002-SVOCs-Piers	Nitrobenzene	98-95-3	µg/kg	14000	800	J	240	J	550	U	420	U	410	U	440	U
002-SVOCs-Piers	N-Nitroso-di-n-propylamine	621-64-7	µg/kg	300	1200	U	590	U	550	U	420	U	410	U	440	U

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	SO-03		SO-03		SO-03		SO-04		SO-04		SO-04	
				Sample #	SO-03-B		SO-03-C		SO-03-D		SO-04-A		SO-04-B		SO-04-C	
				Start Depth	0.5		1.5		3		0		0.5		1.5	
				End Depth	1.5		3		4		0.5		1.5		3	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N	
				Parent Sample #												
				Sample Date	8/6/2019		8/6/2019		8/6/2019		7/2/2019		7/2/2019		7/2/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
002-SVOCs-Piers	N-Nitrosodiphenylamine	86-30-6	µg/kg	390000	1200	U	590	U	1400		420	U	410	U	440	U
002-SVOCs-Piers	Pentachlorophenol	87-86-5	µg/kg	3000	3100	U	1500	U	1400	U	1000	U	1000	U	1100	U
002-SVOCs-Piers	Phenanthrene	85-01-8	µg/kg	45700	2000	J	590	U	630		8200		2200		2700	
002-SVOCs-Piers	Phenol	108-95-2	µg/kg	210000000	1200	U	590	U	550	U	420	U	410	U	440	U
002-SVOCs-Piers	Pyrene	129-00-0	µg/kg	18000000	6000		590	U	2400		12000		3800		4900	
003-Pest-Piers	4,4'-DDD	72-54-8	µg/kg	13000	2100		820	J	61	J	120	J	55		24	
003-Pest-Piers	4,4'-DDE	72-55-9	µg/kg	9000	300	J	84	J	33	U	150	J	110		61	
003-Pest-Piers	4,4'-DDT	50-29-3	µg/kg	**8000**	960	J	390	J	33	U	180	J	130	J	65	J
003-Pest-Piers	Aldrin	309-00-2	µg/kg	**200**	**350**	J	73	J	17	U	2.2	U	2.1	U	2.3	U
003-Pest-Piers	alpha-BHC	319-84-6	µg/kg	500	38	U	18	U	17	U	2.2	U	2.1	U	2.3	U
003-Pest-Piers	alpha-Chlordane	5103-71-9	µg/kg	1000000	800	J	91	J	51	J	2.2	U	4.8		2.1	J
003-Pest-Piers	beta-BHC	319-85-7	µg/kg	2000	38	U	18	U	17	U	2.2	U	2.1	U	2.3	U
003-Pest-Piers	delta-BHC	319-86-8	µg/kg	1300	450	J	110	J	17	U	2.2	U	2.1	U	2.3	U
003-Pest-Piers	Dieldrin	60-57-1	µg/kg	**200**	**760**	J	170	J	15	J	4.3	U	81	J	110	
003-Pest-Piers	Endosulfan I	959-98-8	µg/kg	6800000	38	U	18	U	17	U	2.4	J	1.1	J	2.3	U
003-Pest-Piers	Endosulfan II	33213-65-9	µg/kg	6800000	74	U	35	U	33	U	4.3	U	12	J	4.4	U
003-Pest-Piers	Endosulfan Sulfate	1031-07-8	µg/kg	6800000	190	J	35	U	33	U	4.3	U	4	U	4.4	U
003-Pest-Piers	Endrin	72-20-8	µg/kg	340000	74	U	35	U	33	U	4.3	U	4	U	4.4	U
003-Pest-Piers	Endrin aldehyde	7421-93-4	µg/kg	1620	220	J	35	U	33	U	4.3	U	4	U	4.4	U
003-Pest-Piers	Endrin Ketone	53494-70-5	µg/kg	1620	74	U	35	U	33	U	4.3	U	4	U	4.4	U
003-Pest-Piers	gamma-BHC (Lindane)	58-89-9	µg/kg	2000	38	U	18	U	17	U	2.2	U	2.1	U	2.3	U
003-Pest-Piers	gamma-Chlordane	5103-74-2	µg/kg	1000000	1100	J	130	J	20	J	2.2	U	2.1	U	2.3	U
003-Pest-Piers	Heptachlor	76-44-8	µg/kg	700	38	U	18	U	17	U	2.2	U	2.1	U	2.3	U
003-Pest-Piers	Heptachlor Epoxide	1024-57-3	µg/kg	300	38	U	18	U	17	U	2.2	U	4.2		2.3	U
003-Pest-Piers	Methoxychlor	72-43-5	µg/kg	5700000	380	U	180	U	170	U	22	U	21	U	23	U
003-Pest-Piers	Toxaphene	8001-35-2	µg/kg	3000	740	U	350	U	330	U	43	U	40	U	44	U
005-Aroclors-Piers	Aroclor 1016	12674-11-2	µg/kg	1000	630	U	310	U	140	UJ	110	U	100	U	110	UJ
005-Aroclors-Piers	Aroclor 1221	11104-28-2	µg/kg	1000	630	U	310	U	140	UJ	110	U	100	U	110	UJ
005-Aroclors-Piers	Aroclor 1232	11141-16-5	µg/kg	1000	630	U	310	U	140	UJ	110	U	100	U	110	UJ
005-Aroclors-Piers	Aroclor 1242	53469-21-9	µg/kg	**1000**	**49000**		**7100**		140	UJ	110	U	100	U	110	UJ
005-Aroclors-Piers	Aroclor 1248	12672-29-6	µg/kg	**1000**	630	U	310	U	140	UJ	110	U	100	U	110	UJ
005-Aroclors-Piers	Aroclor 1254	11097-69-1	µg/kg	**1000**	**32000**		310	U	140	UJ	110	U	100	U	110	UJ
005-Aroclors-Piers	Aroclor 1260	11096-82-5	µg/kg	**1000**	**12000**		**3300**		140	UJ	**1900**	J	620		240	J
005-Aroclors-Piers	Aroclor 1262	37324-23-5	µg/kg	1000	630	U	310	U	140	UJ	110	U	100	U	110	UJ
005-Aroclors-Piers	Aroclor 1268	11100-14-4	µg/kg	1000	630	U	310	U	140	UJ	110	U	100	U	110	UJ
005-Aroclors-Piers	Total Aroclors	TARO	µg/kg	**1000**	**93000**		**10400**		0	U	**1900**		620		240	
011-Inorganics-Piers	Aluminum	7429-90-5	mg/kg	**3900**	**35700**		**8330**		**5530**		**9540**		**8930**		**12300**	
011-Inorganics-Piers	Antimony	7440-36-0	mg/kg	**450**	55.6	J	46.4		1.58		15.4		9.18		17.8	
011-Inorganics-Piers	Arsenic	7440-38-2	mg/kg	**19**	**651**		**589**		**1280**		**25.4**		**19.2**		17.8	

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	SO-03		SO-03		SO-03		SO-04		SO-04		SO-04	
				Sample #	SO-03-B		SO-03-C		SO-03-D		SO-04-A		SO-04-B		SO-04-C	
				Start Depth	0.5		1.5		3		0		0.5		1.5	
				End Depth	1.5		3		4		0.5		1.5		3	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N	
				Parent Sample #												
				Sample Date	8/6/2019		8/6/2019		8/6/2019		7/2/2019		7/2/2019		7/2/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
011-Inorganics-Piers	Barium	7440-39-3	mg/kg	59000	825	J	339		140		2470		1270		1080	
011-Inorganics-Piers	Beryllium	7440-41-7	mg/kg	140	1.25		0.323		0.358		0.694		0.59		0.747	
011-Inorganics-Piers	Cadmium	7440-43-9	mg/kg	**78**	**100**	J	24.4		2.2		38.8		9.79		8.41	
011-Inorganics-Piers	Calcium	7440-70-2	mg/kg		25200		5620		1800		19700		9520		9990	
011-Inorganics-Piers	Chromium	7440-47-3	mg/kg	3600000	779		527		85.5		279		90.3		105	
011-Inorganics-Piers	Cobalt	7440-48-4	mg/kg	590	126		30.8		5.67		14.9		13		9.4	
011-Inorganics-Piers	Copper	7440-50-8	mg/kg	45000	3040		1760		586		2500		545		662	
011-Inorganics-Piers	Cyanide	57-12-5	mg/kg	680	5.6	UJ	14		1.1	J	0.64	U	1.2	U	1.1	U
011-Inorganics-Piers	Iron	7439-89-6	mg/kg	820000	69600	J	31600		15100		45000		39800		31600	
011-Inorganics-Piers	Lead	7439-92-1	mg/kg	**800**	**7820**	J	**4970**		285		**2980**		**2000**		**1940**	
011-Inorganics-Piers	Magnesium	7439-95-4	mg/kg		9940		1610		797		3920		2470		3110	
011-Inorganics-Piers	Manganese	7439-96-5	mg/kg	5900	1060		211		65.3		584		447		435	
011-Inorganics-Piers	Mercury	7439-97-6	mg/kg	**65**	**7110**	J	**612**	J	21.3	J	8.26		**109**		4.5	
011-Inorganics-Piers	MethylMercury	22967-92-6	ng/g		762	J-	1280		1.48		2.37		2.89	J	6.47	J
011-Inorganics-Piers	Nickel	7440-02-0	mg/kg	23000	345		79.8		18		207		85.7		79.6	
011-Inorganics-Piers	Potassium	7440-09-7	mg/kg		2420		498		1260		1310		1030		971	
011-Inorganics-Piers	Selenium	7782-49-2	mg/kg	5700	6.85		6.06		2.19		696		7.16		12.1	
011-Inorganics-Piers	Silver	7440-22-4	mg/kg	5700	195		69.7		0.818		11.2		13.6		5.68	
011-Inorganics-Piers	Sodium	7440-23-5	mg/kg		1510		381		298		341		216		227	
011-Inorganics-Piers	Thallium	7440-28-0	mg/kg	3	0.502		0.266	U	0.305	U	0.199		0.152		0.173	
011-Inorganics-Piers	Vanadium	7440-62-2	mg/kg	1100	208		91.5		22.1		55.8		34.2		41.3	
011-Inorganics-Piers	Zinc	7440-66-6	mg/kg	110000	7820		1590		480		2880		1510		2420	
014-General Chemistry-Piers	Total Organic Carbon	TOC	µg/g		240000	J	140000		51000		52000		110000		31000	
014-General Chemistry-Piers	TOTAL SOLIDS	TSOLIDS	%		26 26		54 54		60 60		77 77		81 81		74 74	
015-Grain Size-Piers	% COARSE SAND >.5 - 1 MM	COARSE SAND	%		0		10.1		11.53		11.88		11.18		12.33	
015-Grain Size-Piers	% Coarse Sand >0.5 - 1.0 mm	%COARSESAND	%													
015-Grain Size-Piers	% Fine Sand >.125 - .25 mm	%FINE SAND	%													
015-Grain Size-Piers	% Medium Sand >.25 - .5 mm	%MEDIUM SAND	%													
015-Grain Size-Piers	% MEDIUM SAND >.25 - .5 MM	MEDIUM SAND	%		3.68		29.26		18.8		21.88		22.9		25.19	
015-Grain Size-Piers	0	HYD01	% Passing		25.48		6.96		8.64		8.22		14.15		14.5	
015-Grain Size-Piers	0	HYD02	% Passing		20.32		5.43		7.88		7.54		12.86		11.99	
015-Grain Size-Piers	0	HYD03	% Passing		16.44		3.91		6.37		6		10.7		8.85	
015-Grain Size-Piers	0	HYD04	% Passing		13.52		4.15		5.62		5.32		8.98		8.23	
015-Grain Size-Piers	0	HYD05	% Passing		10.94		2.62		5.1		3.96		7.69		6.8	
015-Grain Size-Piers	0	HYD06	% Passing		6.73		1.1		2.6		2.41		5.41		4.74	
015-Grain Size-Piers	0	HYD07	% Passing		2.51		0.86		1.61		0.94		3.07		2.13	
015-Grain Size-Piers	0.75 INCH SIEVE	SIEVE0.75IN	% Passing		100		100		85.47		100		100		100	

Appendix H-2
Analytical Results for Soil
Pierson's Creek Superfund Site
Newark, New Jersey

				Location	SO-03		SO-03		SO-03		SO-04		SO-04		SO-04	
				Sample #	SO-03-B		SO-03-C		SO-03-D		SO-04-A		SO-04-B		SO-04-C	
				Start Depth	0.5		1.5		3		0		0.5		1.5	
				End Depth	1.5		3		4		0.5		1.5		3	
				Depth Unit	ft bgs		ft bgs		ft bgs		ft bgs		ft bgs		ft bgs	
				Sample Type	N		N		N		N		N		N	
				Parent Sample #												
				Sample Date	8/6/2019		8/6/2019		8/6/2019		7/2/2019		7/2/2019		7/2/2019	
Method Group	Analyte	CAS #	Units	RI Soil Screening Criteria	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
015-Grain Size-Piers	1.5 INCH SIEVE	SIEVE1.5IN	% Passing		100		100		100		100		100		100	
015-Grain Size-Piers	3 INCH SIEVE	SIEVE3IN	% Passing		100		100		100		100		100		100	
015-Grain Size-Piers	Clay	%CLAY	%		8.62		2.12		3.81		3.28		6.56		5.49	
015-Grain Size-Piers	GRAVEL	Gravel	%		0		15.15		35.38		27.05		14.89		22.13	
015-Grain Size-Piers	HYDROMETER, READING 1	HYD1-PARTICLE	um		34.67		37.28		36.66		36.17		32.61		34.27	
015-Grain Size-Piers	HYDROMETER, READING 2	HYD2-PARTICLE	um		22.35		23.74		23.43		23.04		20.9		22.2	
015-Grain Size-Piers	HYDROMETER, READING 3	HYD3-PARTICLE	um		13.05		13.85		13.62		13.53		12.49		12.65	
015-Grain Size-Piers	HYDROMETER, READING 4	HYD4-PARTICLE	um		9.35		9.73		9.63		9.57		8.86		9.34	
015-Grain Size-Piers	HYDROMETER, READING 5	HYD5-PARTICLE	um		6.68		6.95		6.84		6.65		6.45		6.58	
015-Grain Size-Piers	HYDROMETER, READING 6	HYD6-PARTICLE	um		3.42		3.5		3.47		3.46		3.32		3.37	
015-Grain Size-Piers	HYDROMETER, READING 7	HYD7-PARTICLE	um		1.42		1.44		1.44		1.41		1.38		1.4	
015-Grain Size-Piers	Percent Passing Sieve#10	SIEVE10	% Passing		100		74.74		53.09		61.07		73.93		65.54	
015-Grain Size-Piers	Percent Passing Sieve#20	SIEVE20	% Passing		98.77		62.37		44.88		51.28		63.01		54.37	
015-Grain Size-Piers	Percent Passing Sieve#40	SIEVE40	% Passing		96.32		45.48		34.3		39.18		51.03		40.35	
015-Grain Size-Piers	Percent Passing Sieve#60	SIEVE60	% Passing		93.25		32.94		26.24		28.08		36.6		26.23	
015-Grain Size-Piers	Sand Fine	FINE SAND	%		15.96		32.23		25.59		27.05		32.89		31.62	
015-Grain Size-Piers	Sieve 0.25 inch, % passing	SIEVE0.25IN	% Passing		100		87.28		70.15		77.24		89.15		83.77	
015-Grain Size-Piers	SIEVE 1 inch, Percent Finer	SIEVE1INCH	% Passing		100		100		100		100		100		100	
015-Grain Size-Piers	SIEVE 2 inch, Percent Finer	SIEVE2INCH	% Passing		100		100		100		100		100		100	
015-Grain Size-Piers	SIEVE NO. 80, PERCENT PASSING	SIEVE80	% Passing		91.41		26.32		18.82		22.58		29.12		19.7	
015-Grain Size-Piers	SIEVE, 0.15 mm, PERCENT PASSING	SIEVEUS100	% Passing		89.57		22.49		15.03		19.39		25.35		16.01	
015-Grain Size-Piers	SIEVE, 4.75 mm, PERCENT PASSING	SIEVEUS4	% Passing		100		84.85		64.62		72.95		85.11		77.87	
015-Grain Size-Piers	Sieve-U.S. Std. No. 200 (0.075 mm)	SIEVEUS200	% Passing		80.36		13.25		8.71		12.13		18.14		8.74	
015-Grain Size-Piers	Silt	%SILT	%													
015-Grain Size-Piers	SILT	445	%		71.74		11.14		4.9		8.86		11.57		3.25	

Notes:

1. Results that are greater than the RI soil screening criteria are highlighted yellow.

Acronyms:

FD - field duplicate
ft bgs - feet below ground surface
J - estimated
J+ - estimated, biased high
J- estimated, biased low
J-EMPC - estimated maximum possible concentration
mg/kg - milligram per kilogram
N - normal
ng/g - nanogram per gram
Q - qualifier
R - rejected
RI - remedial investigation
U - nondetect
UJ - nondetect, estimated
µg/kg - microgram per kilogram

Appendix C

Salomone Limited Phase II Report

October 10, 2019

Joseph Salomone
366-394 Wilson Ave, LLC
17 Demarest Drive
Wayne, NJ 07470

RE: Limited Phase II Environmental Site Assessment
Due Diligence Investigation
Industrial Property
366-394 Wilson Avenue Rear
Newark, NJ 07105

Dear Mr. Salomone:

Environmental and Geotechnical Services (EGS) is providing this summary letter report to document the results of our Limited Phase-II Environmental Site Assessment (ESA) performed at the subject property on September 26, 2019.

In the course of historical data gathering for the Phase-I ESA, please note that the subject property is not identified as a known contaminated site (KCS) and is not listed with open or active site remediation cases in the New Jersey Department of Environmental Protection Site Remediation Program (SRP). EGS noted two potential areas of concern (discussed in the previous Phase-I report) or Recognized Environmental Conditions (RECs) at the site. The following RECs were further investigated via soil borings and soil sampling.

- REC-1-Historical Precious Metal Recycling and Smelting Operations (4 soil borings)
  REC-2-Historical Ultramarine Manufacturing Operations (4 soil borings)

A total of four (4) soil borings were conducted on site. The soil boring locations are shown on the attached Site Plan.

The following scope of work was recommended by EGS and authorized by 366-394 Wilson Ave, LLC and is beyond the scope of the ASTM Standard E1527-13 (Phase-I ESA). The results of the latest scope of work are discussed in this report. The methodology used in the Phase-II ESA and the results are discussed below.

Limited Phase-II ESA Purpose

On September 26, 2019 EGS conducted a limited Phase II ESA or site investigation ("SI") at the subject property in order to investigate the RECs that were identified in our Phase-I ESA .

Soil Boring Installation

On September 26, 2019 limited SI activities consisted of advancing four (4) soil borings throughout the subject property to address RECs identified during the Phase-I ESA. The September 26, 2019 soil borings were advanced by Salomone Bros., Inc. ("SBI") utilizing a direct-push probe drill rig (AMS PowerProbe model# 9630 VTR). A dual tube macro-core sampler assembly was used to limit potential cross contamination between sampling depths. The stainless steel sampler assembly and probe rods were decontaminated (via usage of alconox and water) in between each soil sample location. Four soil samples were collected from the following soil borings to address REC-1 and REC-2: (N, NE, E and SW). An EGS Geologist performed site assessment and soil sampling. Upon completion of all sampling activities, the boreholes were filled by SBI with soil cuttings and sealed with bentonite. The soil samples were sent to a state-certified laboratory for analysis.

Completed soil boring depths on September 26, 2019 consisted of the following:

- N (REC-1 and REC-2): 8 feet below grade
- NE (REC-1 and REC-2): 10 feet below grade
- E (REC-1 and REC-2): 12 feet below grade
- SW (REC-1 and REC-2): 8 feet below grade

Sample Collection and Handling-Soil Boring Sampling

Soil sampling procedures and sample handling were based on the New Jersey Department of Environmental Protection ("NJDEP") *Field Sampling Procedures Manual* (2005). To prevent cross-contamination, the sampler wore dedicated, disposable, latex gloves and dedicated sampling devices at each sampling point. The soil samples were analyzed for a comprehensive suite of parameters which included United States Environmental Protection Agency (USEPA) target compound list/target analyte list (TCL/TAL) and Category 1 extractable petroleum hydrocarbons (EPH). Each soil sample for volatile organic compound (VOC) analysis was collected in the field using dedicated disposable Encore^{R} samplers, while the aliquots for EPH, semi-volatile organic compounds (SVOCs), target analyte list (TAL) metals, pesticides, polychlorinated biphenyls (PCBs) and cyanide were collected by transferring soil directly into a laboratory-provided glass jars.

The sample containers were labeled, and then temporarily stored in a chilled cooler with ice packs for transport to the laboratory. A chain-of-custody record was initiated and accompanied the sample jars to the laboratory for completion. A state-certified lab, Accredited Analytical Resources, LLC ("AAR") of Carteret, NJ (NJDEP Certification #12007), performed all analytical work.

Site Assessment Activities

September 26, 2019

The soil cores were extensively field-screened using a portable photoionization detector (PID; RKI Instruments model GX-6000) calibrated for isobutylene. No indications of significant contamination (e.g., staining, odors) were noted from the soil borings advanced to address REC-1 and REC-2. No PID readings were recorded from the soil borings advanced on September 26, 2019. The soil samples were collected from the following depth intervals:

Soil sample N: Based on the absence of field indicators of contamination (no PID readings, staining or odors) and to address the "worst case" depth interval with regard to potential contamination, the

uppermost six inches of surficial soils, soil sample N was collected from 0.0-0.5 feet below grade (fbg). This soil sample was collected to address historical site operations and was further located adjacent to the onsite holding tank with force main pit.

Soil sample NE: Based on the absence of field indicators of contamination (no PID readings, staining or odors) and to address the "worst case" depth interval with regard to potential contamination, the uppermost six inches of surficial soils, soil sample NE was collected from 0.0-0.5 fbg.. This soil sample was collected to address historical site operations and was further located in the area of soil piles that were observed in historical aerial photographs.

Soil sample E: Based on the absence of field indicators of contamination (no PID readings, staining or odors) and to address the "worst case" depth interval with regard to potential contamination, the uppermost six inches of surficial soils, soil sample E was collected from 0.0-0.5 fbg. This soil sample was collected to address historical site operations and was further located at the edge of the concrete pad which historically was used to store precious metal in drums and other containers.

Soil sample SW: Based on the absence of field indicators of contamination (no PID readings, staining or odors) and to address the "worst case" depth interval with regard to potential contamination, the uppermost six inches of surficial soils, soil sample SW was collected from 0.0-0.5 fbg. This soil sample was collected to address historical site operations and was further located in the area of appreciable precious metal and other unknown materials observed in historical aerial photographs.

Results-Soil Boring Samples

REC-1 and REC-2 Historical Precious Metal Recycling and Smelting Operations and Historical Ultramarine Manufacturing Operations)

Attachment 1 consists of a site plan depicting the soil boring locations.

The NJDEP has developed procedures to determine the site-specific impact-to-groundwater soil remediation standard (IGWSRS) for certain contaminants using results from a Synthetic Precipitation Leaching Procedure (SPLP) test. The SPLP procedure is an acceptable methodology by the NJDEP in determining alternative cleanup standards for inorganic and low mobility organic compounds, such as benzo(a)pyrene and metals.

Aside from comparing soil contaminant concentrations to residential (direct contact) soil standards (RDCSRS), the NJDEP also requires evaluation of contamination in terms of impact-to-groundwater. In many cases, the NJDEP's default impact-to-groundwater soil screening levels (DIGWSSLs) are more stringent than residential standards. When a contaminant in a sample exceeds its DIGWSSL, the NJDEP allows reevaluation of such contamination and obtaining an alternative or site-specific IGWSRS.

Since the SVOC benzo(a)pyrene and the metals cadmium, lead and mercury were detected above their respective DIGWSSLs in some of the soil samples, SPLP analysis was performed by the lab on vadose zone soil samples N, NE, E and SW. SPLP is a USEPA test method that can be used with soil samples to estimate the site-specific adsorption-desorption potential of a contaminant that may impact groundwater. The procedure consists of a batch equilibrium experiment in which contaminant is partitioned between soil solids and an extracting solution, using a 20:1 ratio of solution to solid. The resulting solution is known as the leachate. Contaminant concentrations in the SPLP leachate are compared to appropriate criteria to determine whether the soil represents an unacceptable leaching threat. This evaluation is facilitated by using the NJDEP's SPLP spreadsheet (calculator) and, if successful, site-specific standards are determined.

For determination of New Jersey IGWSRS, the results from this test are first used to estimate the leachate concentration of a contaminant in soil solution under natural conditions in the field. Then, the estimated field leachate concentration is compared to an appropriate leachate criterion (LC) to determine whether the contaminated soil represents a potential threat to groundwater quality. If the estimated field leachate concentration exceeds the leachate criterion, the NJDEP has developed procedures to determine a site-specific impact to groundwater soil remediation standard (IGWSRS) using results from the SPLP test. The SPLP procedure is an acceptable by the NJDEP in determining cleanup standards for inorganic and low mobility organic compounds, such as benzo(a)pyrene and metals that were detected above their very low DIGWSSLs during the Phase II investigation.

After the lab's SPLP analysis and using the NJDEP's SPLP Spreadsheet (V. 3.1, November 2013), the site-specific IGWSRS for benzo(a)pyrene, cadmium, lead and mercury were determined to be:

- Benzo(a)pyrene (**0.414 ppm**)
- Cadmium (**8 ppm**)
- Lead (**150 ppm**)
- Mercury (**12.4 ppm**)

Based on the above alternative standards, all sampling results for benzo(a)pyrene, cadmium, lead and mercury are in compliance with the respective site-specific IGWSRS. Thus, the impact-to-groundwater pathway has been reevaluated and the alternative standards indicate compliance.

The following is a summation of the additional soil sampling results for this limited Phase-II ESA:

Soil sample N:

- All VOC, EPH, PCB, pesticides, and cyanide concentrations were detected below their respective NJDEP Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS). The following metals were detected above their NJDEP Default Impact-to-Groundwater Soil Screening Levels (DIGWSSLs):
- Aluminum. It should be noted that per NJDEP's Frequently Asked Questions for the Impact-to-Groundwater Pathway in Soil Remediation Standards, aluminum is considered a secondary metal (not a health consideration, but rather an aesthetic consideration, i.e., based on taste, odor or appearance) and the Impact-to-Groundwater Pathway does not have to be addressed unless there is reason to believe that the presence of aluminum is related to a site discharge.
- Manganese. It should be noted that per NJDEP's Frequently Asked Questions for the Impact-to-Groundwater Pathway in Soil Remediation Standards, manganese is considered a secondary metal (not a health consideration, but rather an aesthetic consideration, i.e., based on taste, odor or appearance) and the Impact-to-Groundwater Pathway does not have to be addressed unless there is reason to believe that the presence of manganese is related to a site discharge.
- Silver. It should be noted that per NJDEP's Frequently Asked Questions for the Impact-to-Groundwater Pathway in Soil Remediation Standards, silver is considered a secondary metal (not a health consideration, but rather an aesthetic consideration, i.e., based on taste, odor or appearance) and the Impact-to-Groundwater Pathway does not have to be addressed unless there is reason to believe that the presence of silver is related to a site discharge.

The metals aluminum, manganese, and silver were detected above NJDEP's DIGWSSL. Aluminum, manganese and silver are known to occur at elevated levels in natural soils in New Jersey. (See "*Ambient Levels of Metals in New Jersey Soils*" by Paul F. Sanders, 2003.) The site is considered to be located in the Urban Piedmont region of New Jersey. Based on a review of

such published literature, the concentration of aluminum is lower than the median concentration in the Urban Piedmont region of New Jersey. The concentration of aluminum is also below the 90th percentile concentration in the Urban Piedmont region of New Jersey. Based on a review of such published literature, the concentration of manganese is lower than the median concentration in the Urban Piedmont region of New Jersey. The concentration of manganese is also below the 90th percentile concentration in the Urban Piedmont region of New Jersey. Based on a review of such published literature, the concentration of silver is above the 90th percentile concentration in the Urban Piedmont region of New Jersey.

Soil sample NE:

- All VOC, EPH, PCB, pesticides, and cyanide concentrations were detected below their respective NJDEP RDCSRS and NRDCSRS. The following metals were detected above their NJDEP DIGWSSLs:
- Aluminum and manganese.

The metals aluminum and manganese were detected above NJDEP's DIGWSSL. Based on a review of *Ambient Levels of Metals in New Jersey Soils*" the concentration of aluminum is lower than the median concentration in the Urban Piedmont region of New Jersey. The concentration of aluminum is also below the 90th percentile concentration in the Urban Piedmont region of New Jersey. Based on a review of such published literature, the concentration of manganese is lower than the median concentration in the Urban Piedmont region of New Jersey. The concentration of manganese is also below the 90th percentile concentration in the Urban Piedmont region of New Jersey.

Soil sample E:

- All VOC, EPH, PCB, pesticides, and cyanide concentrations were detected below their respective NJDEP RDCSRS and NRDCSRS. The following metals were detected above their NJDEP DIGWSSLs:

- Aluminum and manganese.

The metals aluminum and manganese were detected above NJDEP's DIGWSSL. Based on a review of *Ambient Levels of Metals in New Jersey Soils*" the concentration of aluminum is lower than the median concentration in the Urban Piedmont region of New Jersey. The concentration of aluminum is also below the 90th percentile concentration in the Urban Piedmont region of New Jersey. Based on a review of such published literature, the concentration of manganese is lower than the median concentration in the Urban Piedmont region of New Jersey. The concentration of manganese is also below the 90th percentile concentration in the Urban Piedmont region of New Jersey.

Soil sample SW:

- All VOC, EPH, PCB, pesticides, and cyanide concentrations were detected below their respective NJDEP RDCSRS and NRDCSRS. The following metals were detected above their NJDEP DIGWSSLs:

- Aluminum, manganese, and silver.

The metals aluminum, manganese and silver were detected above NJDEP's DIGWSSL. Based on a review of *Ambient Levels of Metals in New Jersey Soils*" the concentration of aluminum is lower than the median concentration in the Urban Piedmont region of New Jersey. The concentration of aluminum is also below the 90th percentile concentration in the Urban Piedmont region of New Jersey. Based on a review of such published literature, the concentration of

manganese is lower than the median concentration in the Urban Piedmont region of New Jersey. The concentration of manganese is also below the 90th percentile concentration in the Urban Piedmont region of New Jersey. Based on a review of such published literature, the concentration of silver is above the 90th percentile concentration in the Urban Piedmont region of New Jersey.

Attachment table 2 through attachment table 5 summarizes the sampling results of soil borings N, NE, E, and SW.

Conclusions & Recommendations

- Based on the results of our Limited Phase-II ESA, all VOC, SVOC, pesticides PCBs, metals and cyanide concentrations were detected below their respective NJDEP residential and non-residential direct contact soil remediation standards.
- Certain contaminants exceeded the NJDEP Default Impact-to-Groundwater Soil Screening Levels (DIGWSSLs). These included the metals aluminum, manganese, and silver. However, NJDEP's Frequently Asked Questions for the Impact-to-Groundwater Pathway in Soil Remediation Standards indicates that aluminum, manganese, and silver are considered secondary metals (not a health consideration, but rather an aesthetic consideration, i.e., based on taste, odor or appearance) and the Impact-to-Groundwater Pathway does not have to be addressed unless there is reason to believe that their presence is related to a site discharge. Based on a historical and regulatory review completed during the Phase I ESA, including a review of NJDEP Community Right-to-Know (CRTK) surveys for a former site operator (Globe Metals), aluminum, manganese, and silver were not identified as being used in conjunction with historical onsite operations. Since these metals were not detected above NJDEP residential and non-residential direct contact soil remediation standards and since their presence is not attributed to a site discharge based on a historical and regulatory review, they are considered background contaminants. Therefore no further investigation of the impact-to-groundwater pathway for aluminum, manganese, and silver is recommended.
- Other contaminants that exceeded their respective DIGWSSLs were the SVOC benzo(a)pyrene and the metals cadmium, lead and mercury. However, based on the results of Synthetic Precipitation Leaching Procedure (SPLP) analysis and evaluation of all benzo(a)pyrene, cadmium, lead and mercury concentrations, all concentrations in the four soil samples are in compliance with their site-specific Impact to Ground Water Soil Remediation Standards (IGWSRS). Based on a historical and regulatory review completed during the Phase I ESA, including a review of NJDEP Community Right-to-Know CRTK surveys for a former site operator (Globe Metals), benzo(a)pyrene, cadmium, lead and mercury were not identified as being used in conjunction with the historical onsite operations.
- All contaminant concentrations in the samples collected for the Limited Phase-II ESA are in compliance with their corresponding RDCSRS, NRDCSRS and their site-specific IGWSRS (based on SPLP analysis and evaluation).
- To reiterate the findings from our Phase-I ESA, although groundwater contamination in association with the adjacent Troy Chemical facility has been delineated and does not extend onto the subject property per a NJDEP CEA Fact Sheet and CEA extent map, EGS recommends that the status of the Troy Chemical USEPA/NJDEP case be monitored on a periodic basis in order to determine any potential future impacts to the environmental condition of the subject property.

Sincerely yours,

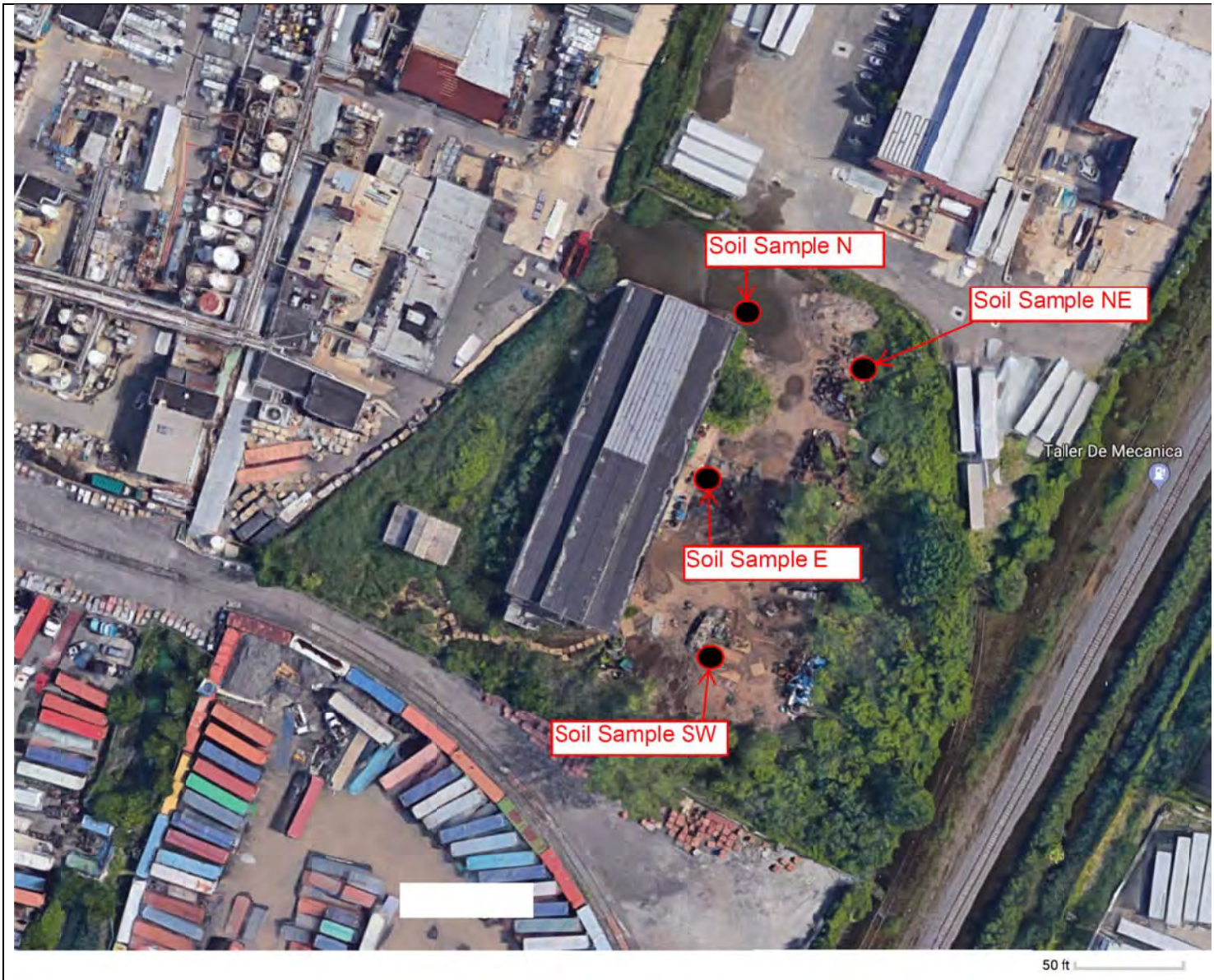
James Kelly
Project Manager

Attachments:

Site Plan: Soil Sample Locations
Tabulations of Phase II Soil Samples
Map Depicting Phase-I REC Locations
Laboratory Reports and Chain-of-Custody Forms
SPLP Spreadsheets

Attachment 1

-Site Plan: Soil Sample Locations



N
W E
S

Industrial Property
366-394 Wilson Avenue Rear
Newark, NJ 07105

Block:	Lot:	Prepared By:	Reviewed By:
5038	97	JK	MA

September 2019 Phase II Sample Location Map

Environmental & Geotechnical Services, LLC
301 Fairfield Rd, Fairfield, NJ 07004

Attachment 2

-Tabulation of Phase II Soil Sample N

Table 2
Lab: Accredited Analytical Resources LLC

Client: ENVIRONMENTAL & GEOTECHNICAL - 366-394 Wilson Ave Rear

CAS#	Compound	IPTGW	NJNRDCSRS	NJRDCSRS	Result Qualifier **Sample No.** **N** **09/26/19**	Result Qualifier **Sample No.** **N** **09/26/19**
EPA Method SW846 8081B/8082A (mg/kg)						
72-54-8	4,4'-DDD	4	13	3	**0.0595** PE	**0.0862** D
72-55-9	4,4'-DDE	18	9	2	**0.0757** PE	**0.113** D
50-29-3	4,4'-DDT	11	8	2	**0.117** PE	**0.175** D
309-00-2	Aldrin	0.2	0.2	0.04	0.000543 U	0.00271 U
319-84-6	alpha-BHC	0.002	0.5	0.1	0.000543 U	0.00271 U
12674-11-2	Aroclor-1016	0.2	1	0.2	0.0137 U	0.0683 U
11104-28-2	Aroclor-1221	0.2	1	0.2	0.0137 U	0.0683 U
11141-16-5	Aroclor-1232	0.2	1	0.2	0.0137 U	0.0683 U
53469-21-9	Aroclor-1242	0.2	1	0.2	0.0137 U	0.0683 U
12672-29-6	Aroclor-1248	0.2	1	0.2	0.0137 U	0.0683 U
11097-69-1	Aroclor-1254	0.2	1	0.2	0.0137 U	0.0683 U
11096-82-5	Aroclor-1260	0.2	1	0.2	0.0137 U	0.0683 U
37324-23-5	Aroclor-1262	0.2	1	0.2	0.0137 U	0.0683 U
11100-14-4	Aroclor-1268	0.2	1	0.2	0.0137 U	0.0683 U
319-85-7	beta-BHC	0.002	2	0.4	0.000543 U	0.00271 U
319-86-8	delta-BHC	NA	NA	NA	0.000543 U	0.00271 U
5566-34-7	Chlordane (alpha and gamma)	0.05	1	0.2	0.041 DE	0.0297 D
60-57-1	Dieldrin	0.003	0.2	0.04	0.00109 U	0.00547 U
959-98-8	Endosulfan I	2	3400	235	0.000543 U	0.00271 U
33213-65-9	Endosulfan II	2	3400	235	0.00109 U	0.00547 U
1031-07-8	Endosulfan sulfate	2	6800	470	0.00109 U	0.00547 U
72-20-8	Endrin	1	340	23	0.00109 U	0.00547 U
7421-93-4	Endrin aldehyde	NA	NA	NA	0.00109 U	0.00547 U
53494-70-5	Endrin ketone	NA	NA	NA	0.00109 U	0.00547 U
58-89-9	gamma-BHC [Lindane]	0.002	2	0.4	0.000543 U	0.00271 U
76-44-8	Heptachlor	0.5	0.7	0.1	0.000543 U	0.00271 U
1024-57-3	Heptachlor Epoxide	0.01	0.3	0.07	0.000543 U	0.00271 U
72-43-5	Methoxychlor	160	5700	390	0.00164 U	0.00822 U
8001-35-2	Toxaphene	0.3	3	0.6	0.0274 U	0.137 U

Extractable Petroleum Hydrocarbons by NJ EPH (mg/kg)						
	Extractable Petroleum Hydrocarbons (E	NA	NA	NA	**241**	
Semivolatile Organic Compounds EPA Method SW846 8270D (mg/kg)						
92-52-4	1,1-Biphenyl	140	240	61	0.0548	U
95-94-3	1,2,4,5-Tetrachlorobenzene	NA	NA	NA	0.0548	U
122-66-7	1,2-Diphenylhydrazine	0.7	2	0.7	0.0548	U
58-90-2	2,3,4,6-Tetrachlorophenol	NA	NA	NA	0.0548	U
95-95-4	2,4,5-Trichlorophenol	68	68000	6100	0.0548	U
88-06-2	2,4,6-Trichlorophenol	0.2	74	19	0.0548	U
120-83-2	2,4-Dichlorophenol	0.2	2100	180	0.0548	U
105-67-9	2,4-Dimethylphenol	1	14000	1200	0.0548	U
51-28-5	2,4-Dinitrophenol	0.3	1400	120	0.0548	U
121-14-2	2,4-Dinitrotoluene	0.1	3	0.7	0.0548	U
606-20-2	2,6-Dinitrotoluene	0.1	3	0.7	0.0548	U
91-58-7	2-Chloronaphthalene	NA	NA	NA	0.0548	U
95-57-8	2-Chlorophenol	0.8	2200	310	0.0548	U
91-57-6	2-Methylnaphthylene	8	2400	230	0.0548	U
95-48-7	2-Methylphenol	NA	3400	310	0.0548	U
88-74-4	2-Nitroaniline	NA	23000	39	0.0548	U
88-75-5	2-Nitrophenol	NA	NA	NA	0.0548	U
106-44-5	3 & 4-Methylphenol	NA	340	31	0.0548	U
91-94-1	3,3'-Dichlorobenzidine	0.2	4	1	0.137	U
99-09-2	3-Nitroaniline	NA	NA	NA	0.0548	U
534-52-1	4,6-Dinitro-2-methylphenol	0.3	68	6	0.0548	U
101-55-3	4-Bromophenyl-phenylether	NA	NA	NA	0.0548	U
59-50-7	4-Chloro-3-methylphenol	NA	NA	NA	0.0548	U
106-47-8	4-Chloroaniline	NA	NA	NA	0.0548	U
7005-72-3	4-Chlorophenyl-phenylether	NA	NA	NA	0.0548	U
100-01-6	4-Nitroaniline	NA	NA	NA	0.0548	U
100-02-7	4-Nitrophenol	NA	NA	NA	0.0548	U
83-32-9	Acenaphthene	110	37000	3400	0.0548	U
208-96-8	Acenaphthylene	NA	300000	NA	0.0548	U
98-86-2	Acetophenone	3	5	2	0.0548	U
120-12-7	Anthracene	2400	30000	17000	0.0548	U
1912-24-9	Atrazine	0.2	2400	210	0.0548	U
103-33-3	Azobenzene	0.7	2	0.7	0.0548	U

100-52-7	Benzaldehyde	NA	68000	6100	0.0548 U
92-87-5	Benzidine	0.7	0.7	0.7	0.137 U
56-55-3	Benzo[a]anthracene	0.8	17	5	**0.258**
50-32-8	Benzo[a]pyrene	0.2	2	0.5	**0.319**
205-99-2	Benzo[b]fluoranthene	2	17	5	**0.578**
191-24-2	Benzo[ghi]perylene	NA	30000	380000	**0.166**
207-08-9	Benzo[k]fluoranthene	25	170	45	**0.253**
111-91-1	bis(2-chloroethoxy)methane	NA	NA	NA	0.0548 U
111-44-4	bis(2-chloroethyl)ether	0.2	2	0.4	0.0548 U
39638-32-9	bis(2-chloroisopropyl)ether	5	67	23	0.0548 U
117-81-7	bis(2-ethylhexyl)phthalate	1200	140	35	**0.285**
85-68-7	Butylbenzylphthalate	230	14000	1200	0.0548 U
105-60-2	Caprolactam	12	340000	31000	0.0548 U
86-74-8	Carbazole	NA	96	24	0.0548 U
218-01-9	Chrysene	80	1700	450	**0.334**
53-70-3	Dibenzo(a,h)anthracene	0.8	2	0.5	0.0548 U
132-64-9	Dibenzofuran	NA	NA	NA	0.0548 U
84-66-2	Diethyl phthalate	88	550000	49000	0.0548 U
131-11-3	Dimethylphthalate	NA	NA	NA	0.0548 U
84-74-2	Di-n-butyl phthalate	760	68000	6100	0.0548 U
117-84-0	Di-n-octyl phthalate	3300	27000	2400	0.0548 U
206-44-0	Fluoranthene	1300	24000	2300	**0.439**
86-73-7	Fluorene	170	24000	2300	0.0548 U
118-74-1	Hexachlorobenzene	0.2	1	0.3	0.0548 U
87-68-3	Hexachlorobutadiene	0.9	25	6	0.0548 U
77-47-4	Hexachlorocyclopentadiene	320	110	45	0.0548 U
67-72-1	Hexachloroethane	0.2	48	12	0.0548 U
193-39-5	Indeno(1,2,3-cd)pyrene	7	17	5	**0.143**
78-59-1	Isophorone	0.2	2000	510	0.0548 U
91-20-3	Naphthalene	25	17	6	0.0548 U
98-95-3	Nitrobenzene	0.2	14	5	0.0548 U
62-75-9	N-Nitrosodimethylamine	0.7	0.7	0.7	0.0548 U
621-64-7	N-Nitroso-di-n-propylamine	0.2	0.3	0.2	0.0548 U
86-30-6	N-Nitrosodiphenylamine	0.4	390	99	0.0548 U
87-86-5	Pentachlorophenol	0.3	3	0.9	0.0548 U

85-01-8	Phenanthrene	NA	300000	NA	**0.255**	
108-95-2	Phenol	8	210000	18000	0.0548	U
129-00-0	Pyrene	840	18000	1700	**0.697**	
	TIC Summary	NA	NA	NA	9.125	
Total Mercury by SW846 7471B (mg/kg)						
7439-97-6	Mercury	0.1	65	23	**12.4**	D
Total Metals by EPA Method SW846 6010D (mg/kg)						
7429-90-5	Aluminum	6000	NA	78000	**7110**	D
7440-36-0	Antimony	6	450	31	2.21	U
7440-38-2	Arsenic	19	19	19	**18.0**	
7440-39-3	Barium	2100	59000	16000	**117**	
7440-41-7	Beryllium	0.7	140	16	**0.515**	
7440-43-9	Cadmium	2	78	78	**8.00**	
7440-70-2	Calcium	NA	NA	NA	**9370**	D
7440-47-3	Chromium	NA	NA	NA	**23.6**	
7440-48-4	Cobalt	90	590	1600	**8.38**	
7440-50-8	Copper	11000	45000	3100	**140**	
7439-89-6	Iron	NA	NA	NA	**20100**	D
7439-92-1	Lead	90	800	400	**149**	
7439-95-4	Magnesium	NA	NA	NA	**3020**	D
7439-96-5	Manganese	65	5900	11000	**200**	
7440-02-0	Nickel	48	23000	1600	**42.8**	
7440-09-7	Potassium	NA	NA	NA	**747**	
7782-49-2	Selenium	11	5700	390	**2.29**	
7440-22-4	Silver	1	5700	390	**2.41**	
7440-23-5	Sodium	NA	NA	NA	**225**	
7440-28-0	Thallium	3	NA	NA	1.65	U
7440-62-2	Vanadium	NA	1100	78	**32.3**	
7440-66-6	Zinc	930	110000	23000	**696**	D
Volatile Organic Compounds EPA Method SW846 8260C (mg/kg)						
71-55-6	1,1,1-Trichloroethane	0.3	NA	160000	0.00150	U
79-34-5	1,1,2,2-Tetrachloroethane	0.007	3	1	0.00150	U
79-00-5	1,1,2-Trichloroethane	0.02	6	2	0.00150	U
75-34-3	1,1-Dichloroethane	0.2	24	8	0.00150	U
75-35-4	1,1-Dichloroethene	0.008	150	11	0.00150	U

87-61-6	1,2,3-Trichlorobenzene	NA	NA	NA	0.00150 U
120-82-1	1,2,4-Trichlorobenzene	0.7	820	73	0.00150 U
96-12-8	1,2-Dibromo-3-chloropropane	0.005	0.2	0.08	0.00150 U
106-93-4	1,2-Dibromoethane	0.005	0.04	0.008	0.00150 U
95-50-1	1,2-Dichlorobenzene	17	59000	5300	0.00150 U
107-06-2	1,2-Dichloroethane	0.005	3	0.9	0.00150 U
78-87-5	1,2-Dichloropropane	0.005	5	2	0.00150 U
541-73-1	1,3-Dichlorobenzene	19	59000	5300	0.00150 U
106-46-7	1,4-Dichlorobenzene	2	13	5	0.00150 U
78-93-3	2-Butanone	0.9	44000	3100	0.00150 U
591-78-6	2-Hexanone	NA	NA	NA	0.00150 U
108-10-1	4-Methyl-2-pentanone	NA	NA	NA	0.00150 U
67-64-1	Acetone	19	NA	70000	0.00150 U
107-02-8	Acrolein	0.5	1	0.5	0.00899 U
107-13-1	Acrylonitrile	0.5	3	0.9	0.00300 U
71-43-2	Benzene	0.005	5	2	0.00150 U
74-97-5	Bromochloromethane	NA	NA	NA	0.00150 U
75-27-4	Bromodichloromethane	0.005	3	1	0.00150 U
75-25-2	Bromoform	0.03	280	81	0.00150 U
74-83-9	Bromomethane	0.04	59	25	0.00150 U
75-15-0	Carbon disulfide	6	110000	7800	0.00150 U
56-23-5	Carbon Tetrachloride	0.005	4	2	0.00150 U
108-90-7	Chlorobenzene	0.6	7400	510	0.00150 U
75-00-3	Chloroethane	NA	1100	220	0.00150 U
67-66-3	Chloroform	0.4	2	0.6	0.00150 U
74-87-3	Chloromethane	NA	12	4	0.00150 U
156-59-4	cis-1,2-Dichloroethene	0.3	560	230	0.00150 U
10061-01-5	cis-1,3-Dichloropropene	0.0025	3.5	1	0.00150 U
110-82-7	Cyclohexane	NA	NA	NA	0.00150 U
124-48-1	Dibromochloromethane	0.005	8	3	0.00150 U
75-71-8	Dichlorodifluoromethane	39	230000	490	0.00150 U
100-41-4	Ethylbenzene	13	110000	7800	0.00150 U
76-13-1	Freon 113	NA	NA	NA	0.00150 U
98-82-8	Isopropylbenzene	NA	NA	NA	0.00150 U
108-38-3/106	m,p-Xylenes	9.5	85000	6000	0.00300 U
79-20-9	Methyl Acetate	22	NA	78000	0.00150 U

1634-04-4	Methyl tert-Butyl Ether	0.2	320	110	0.00300 U	
108-87-2	Methylcyclohexane	NA	NA	NA	0.00150 U	
75-09-2	Methylene Chloride	0.01	230	46	0.00150 U	
95-47-6	o-Xylene	9.5	85000	6000	0.00300 U	
100-42-5	Styrene	3	260	90	0.00150 U	
75-65-0	t-Butyl alcohol	0.3	11000	1400	0.00749 U	
127-18-4	Tetrachloroethene	0.005	1500	43	0.00150 U	
108-88-3	Toluene	7	91000	6300	0.00150 U	
156-60-5	trans-1,2-Dichloroethene	0.6	720	300	0.00150 U	
10061-02-6	trans-1,3-Dichloropropene	0.0025	3.5	1	0.00150 U	
79-01-6	Trichloroethene	0.01	10	3	0.00150 U	
75-69-4	Trichlorofluoromethane	34	340000	23000	0.00150 U	
75-01-4	Vinyl chloride	0.005	2	0.7	0.00150 U	
	TIC Summary	NA	NA	NA	0.00946	
Wet Chemistry (%)						
	Percent Solids	NA	NA	NA	**91.2**	
Wet Chemistry (mg/kg)						
	Cyanide (total)	20	680	47	1.10 U	

IPTGW = NJDEP Default Impact to Ground Water Soil Screening Level
NJNRDCSRS = NJDEP Non-Rsidential Direct Contact Soil Remediation Standards
NJRDCSRS = NJDEP Residential Direct Contact Soil Remediation Standards

Qualifiers:

E - Concentration exceeds highest calibration standard
B - Indicates compound found in associated blank
D - Indicates result is based on a dilution
H - Alternate peak selection upon analytical review
J - Indicates estimated value for TICs and all results when detected below the RL
U - Indicates compound analyzed for but not detected
P - Greater than 25% diff between 2 GC columns
VC - The container(s) provided by the client for soil volatiles do not meet the requirements of EPA SW846-5035A. Results reported below 200 ug/kg may be biased low due to samples not being collected according to EPA SW846 5035A requirements.

mg/kg - parts per million

Regulatory limits listed in this document have been obtained from the latest version of the regulations cited and are used for advisory purposes only. Accredited Analytical assumes no responsibility for errors in regulatory documents or changes to criteria detailed in later versions of the referenced regulation. It is the responsibility of the user to verify these limits before using or reporting any data.

Attachment 3

-Tabulation of Phase II Soil Sample NE

Table 3
Lab: Accredited Analytical Resources LLC

Client: ENVIRONMENTAL & GEOTECHNICAL - 366-394 Wilson Ave Rear

CAS#	Compound	IPTGW	NJNRDCSRS	NJRDCSRS	Result Qualifier **Sample No.** **NE** **09/26/19**
EPA Method SW846 8081B/8082A (mg/kg)					
72-54-8	4,4'-DDD	4	13	3	**0.00231**
72-55-9	4,4'-DDE	18	9	2	**0.00385** P
50-29-3	4,4'-DDT	11	8	2	**0.0136** P
309-00-2	Aldrin	0.2	0.2	0.04	0.000519 U
319-84-6	alpha-BHC	0.002	0.5	0.1	0.000519 U
5103-71-9	alpha-Chlordane	0.025	0.5	0.1	**0.00288** P
12674-11-2	Aroclor-1016	0.2	1	0.2	0.0131 U
11104-28-2	Aroclor-1221	0.2	1	0.2	0.0131 U
11141-16-5	Aroclor-1232	0.2	1	0.2	0.0131 U
53469-21-9	Aroclor-1242	0.2	1	0.2	0.0131 U
12672-29-6	Aroclor-1248	0.2	1	0.2	0.0131 U
11097-69-1	Aroclor-1254	0.2	1	0.2	0.0131 U
11096-82-5	Aroclor-1260	0.2	1	0.2	0.0131 U
37324-23-5	Aroclor-1262	0.2	1	0.2	0.0131 U
11100-14-4	Aroclor-1268	0.2	1	0.2	0.0131 U
319-85-7	beta-BHC	0.002	2	0.4	0.000519 U
319-86-8	delta-BHC	NA	NA	NA	0.000519 U
60-57-1	Dieldrin	0.003	0.2	0.04	0.00105 U
959-98-8	Endosulfan I	2	3400	235	0.000519 U
33213-65-9	Endosulfan II	2	3400	235	0.00105 U
1031-07-8	Endosulfan sulfate	2	6800	470	0.00105 U
72-20-8	Endrin	1	340	23	0.00105 U
7421-93-4	Endrin aldehyde	NA	NA	NA	0.00105 U
53494-70-5	Endrin ketone	NA	NA	NA	0.00105 U
58-89-9	gamma-BHC [Lindane]	0.002	2	0.4	0.000519 U
5566-34-7	gamma-Chlordane	0.025	0.5	0.1	**0.00210**
76-44-8	Heptachlor	0.5	0.7	0.1	0.000519 U
1024-57-3	Heptachlor Epoxide	0.01	0.3	0.07	0.000519 U
72-43-5	Methoxychlor	160	5700	390	0.00157 U

8001-35-2	Toxaphene	0.3	3	0.6	0.0262	U
Extractable Petroleum Hydrocarbons by NJ EPH (mg/kg)						
	Extractable Petroleum Hydrocarbons (E	NA	NA	NA	**148**	
Semivolatile Organic Compounds EPA Method SW846 8270D (mg/kg)						
92-52-4	1,1-Biphenyl	140	240	61	0.0524	U
95-94-3	1,2,4,5-Tetrachlorobenzene	NA	NA	NA	0.0524	U
122-66-7	1,2-Diphenylhydrazine	0.7	2	0.7	0.0524	U
58-90-2	2,3,4,6-Tetrachlorophenol	NA	NA	NA	0.0524	U
95-95-4	2,4,5-Trichlorophenol	68	68000	6100	0.0524	U
88-06-2	2,4,6-Trichlorophenol	0.2	74	19	0.0524	U
120-83-2	2,4-Dichlorophenol	0.2	2100	180	0.0524	U
105-67-9	2,4-Dimethylphenol	1	14000	1200	0.0524	U
51-28-5	2,4-Dinitrophenol	0.3	1400	120	0.0524	U
121-14-2	2,4-Dinitrotoluene	0.1	3	0.7	0.0524	U
606-20-2	2,6-Dinitrotoluene	0.1	3	0.7	0.0524	U
91-58-7	2-Chloronaphthalene	NA	NA	NA	0.0524	U
95-57-8	2-Chlorophenol	0.8	2200	310	0.0524	U
91-57-6	2-Methylnaphthylene	8	2400	230	0.0524	U
95-48-7	2-Methylphenol	NA	3400	310	0.0524	U
88-74-4	2-Nitroaniline	NA	23000	39	0.0524	U
88-75-5	2-Nitrophenol	NA	NA	NA	0.0524	U
106-44-5	3 & 4-Methylphenol	NA	340	31	0.0524	U
91-94-1	3,3'-Dichlorobenzidine	0.2	4	1	0.131	U
99-09-2	3-Nitroaniline	NA	NA	NA	0.0524	U
534-52-1	4,6-Dinitro-2-methylphenol	0.3	68	6	0.0524	U
101-55-3	4-Bromophenyl-phenylether	NA	NA	NA	0.0524	U
59-50-7	4-Chloro-3-methylphenol	NA	NA	NA	0.0524	U
106-47-8	4-Chloroaniline	NA	NA	NA	0.0524	U
7005-72-3	4-Chlorophenyl-phenylether	NA	NA	NA	0.0524	U
100-01-6	4-Nitroaniline	NA	NA	NA	0.0524	U
100-02-7	4-Nitrophenol	NA	NA	NA	0.0524	U
83-32-9	Acenaphthene	110	37000	3400	0.0524	U
208-96-8	Acenaphthylene	NA	300000	NA	0.0524	U
98-86-2	Acetophenone	3	5	2	0.0524	U
120-12-7	Anthracene	2400	30000	17000	0.0524	U
1912-24-9	Atrazine	0.2	2400	210	0.0524	U

103-33-3	Azobenzene	0.7	2	0.7	0.0524	U
100-52-7	Benzaldehyde	NA	68000	6100	0.0524	U
92-87-5	Benzidine	0.7	0.7	0.7	0.131	U
56-55-3	Benzo[a]anthracene	0.8	17	5	**0.227**	
50-32-8	Benzo[a]pyrene	0.2	2	0.5	**0.322**	
205-99-2	Benzo[b]fluoranthene	2	17	5	**0.603**	
191-24-2	Benzo[ghi]perylene	NA	30000	380000	**0.211**	
207-08-9	Benzo[k]fluoranthene	25	170	45	**0.176**	
111-91-1	bis(2-chloroethoxy)methane	NA	NA	NA	0.0524	U
111-44-4	bis(2-chloroethyl)ether	0.2	2	0.4	0.0524	U
39638-32-9	bis(2-chloroisopropyl)ether	5	67	23	0.0524	U
117-81-7	bis(2-ethylhexyl)phthalate	1200	140	35	**0.945**	
85-68-7	Butylbenzylphthalate	230	14000	1200	0.0524	U
105-60-2	Caprolactam	12	340000	31000	0.0524	U
86-74-8	Carbazole	NA	96	24	0.0524	U
218-01-9	Chrysene	80	1700	450	**0.290**	
53-70-3	Dibenzo(a,h)anthracene	0.8	2	0.5	0.0524	U
132-64-9	Dibenzofuran	NA	NA	NA	0.0524	U
84-66-2	Diethyl phthalate	88	550000	49000	0.0524	U
131-11-3	Dimethylphthalate	NA	NA	NA	0.0524	U
84-74-2	Di-n-butyl phthalate	760	68000	6100	0.0524	U
117-84-0	Di-n-octyl phthalate	3300	27000	2400	0.0524	U
206-44-0	Fluoranthene	1300	24000	2300	**0.300**	
86-73-7	Fluorene	170	24000	2300	0.0524	U
118-74-1	Hexachlorobenzene	0.2	1	0.3	0.0524	U
87-68-3	Hexachlorobutadiene	0.9	25	6	0.0524	U
77-47-4	Hexachlorocyclopentadiene	320	110	45	0.0524	U
67-72-1	Hexachloroethane	0.2	48	12	0.0524	U
193-39-5	Indeno(1,2,3-cd)pyrene	7	17	5	**0.176**	
78-59-1	Isophorone	0.2	2000	510	0.0524	U
91-20-3	Naphthalene	25	17	6	0.0524	U
98-95-3	Nitrobenzene	0.2	14	5	0.0524	U
62-75-9	N-Nitrosodimethylamine	0.7	0.7	0.7	0.0524	U
621-64-7	N-Nitroso-di-n-propylamine	0.2	0.3	0.2	0.0524	U
86-30-6	N-Nitrosodiphenylamine	0.4	390	99	0.0524	U
87-86-5	Pentachlorophenol	0.3	3	0.9	0.0524	U

85-01-8	Phenanthrene	NA	300000	NA	**0.131**	
108-95-2	Phenol	8	210000	18000	0.0524	U
129-00-0	Pyrene	840	18000	1700	**0.825**	
	TIC Summary	NA	NA	NA	5.059	
Total Mercury by SW846 7471B (mg/kg)						
7439-97-6	Mercury	0.1	65	23	**0.709**	
Total Metals by EPA Method SW846 6010D (mg/kg)						
7429-90-5	Aluminum	6000	NA	78000	**9110**	D
7440-36-0	Antimony	6	450	31	2.10	U
7440-38-2	Arsenic	19	19	19	**6.15**	
7440-39-3	Barium	2100	59000	16000	**93.3**	
7440-41-7	Beryllium	0.7	140	16	**0.325**	
7440-43-9	Cadmium	2	78	78	**1.39**	
7440-70-2	Calcium	NA	NA	NA	**5180**	D
7440-47-3	Chromium	NA	NA	NA	**30.7**	
7440-48-4	Cobalt	90	590	1600	**6.18**	
7440-50-8	Copper	11000	45000	3100	**71.8**	
7439-89-6	Iron	NA	NA	NA	**27600**	D
7439-92-1	Lead	90	800	400	**82.7**	
7439-95-4	Magnesium	NA	NA	NA	**3580**	D
7439-96-5	Manganese	65	5900	11000	**197**	
7440-02-0	Nickel	48	23000	1600	**18.7**	
7440-09-7	Potassium	NA	NA	NA	**590**	
7782-49-2	Selenium	11	5700	390	2.10	U
7440-22-4	Silver	1	5700	390	**0.270**	
7440-23-5	Sodium	NA	NA	NA	**299**	
7440-28-0	Thallium	3	NA	NA	1.57	U
7440-62-2	Vanadium	NA	1100	78	**38.3**	
7440-66-6	Zinc	930	110000	23000	**201**	
Volatile Organic Compounds EPA Method SW846 8260C (mg/kg)						
71-55-6	1,1,1-Trichloroethane	0.3	NA	160000	0.00114	U
79-34-5	1,1,2,2-Tetrachloroethane	0.007	3	1	0.00114	U
79-00-5	1,1,2-Trichloroethane	0.02	6	2	0.00114	U
75-34-3	1,1-Dichloroethane	0.2	24	8	0.00114	U
75-35-4	1,1-Dichloroethene	0.008	150	11	0.00114	U

87-61-6	1,2,3-Trichlorobenzene	NA	NA	NA	0.00114	U
120-82-1	1,2,4-Trichlorobenzene	0.7	820	73	0.00114	U
96-12-8	1,2-Dibromo-3-chloropropane	0.005	0.2	0.08	0.00114	U
106-93-4	1,2-Dibromoethane	0.005	0.04	0.008	0.00114	U
95-50-1	1,2-Dichlorobenzene	17	59000	5300	0.00114	U
107-06-2	1,2-Dichloroethane	0.005	3	0.9	0.00114	U
78-87-5	1,2-Dichloropropane	0.005	5	2	0.00114	U
541-73-1	1,3-Dichlorobenzene	19	59000	5300	0.00114	U
106-46-7	1,4-Dichlorobenzene	2	13	5	0.00114	U
78-93-3	2-Butanone	0.9	44000	3100	0.00114	U
591-78-6	2-Hexanone	NA	NA	NA	0.00114	U
108-10-1	4-Methyl-2-pentanone	NA	NA	NA	0.00114	U
67-64-1	Acetone	19	NA	70000	0.00114	U
107-02-8	Acrolein	0.5	1	0.5	0.00687	U
107-13-1	Acrylonitrile	0.5	3	0.9	0.00229	U
71-43-2	Benzene	0.005	5	2	0.00114	U
74-97-5	Bromochloromethane	NA	NA	NA	0.00114	U
75-27-4	Bromodichloromethane	0.005	3	1	0.00114	U
75-25-2	Bromoform	0.03	280	81	0.00114	U
74-83-9	Bromomethane	0.04	59	25	0.00114	U
75-15-0	Carbon disulfide	6	110000	7800	0.00114	U
56-23-5	Carbon Tetrachloride	0.005	4	2	0.00114	U
108-90-7	Chlorobenzene	0.6	7400	510	0.00114	U
75-00-3	Chloroethane	NA	1100	220	0.00114	U
67-66-3	Chloroform	0.4	2	0.6	0.00114	U
74-87-3	Chloromethane	NA	12	4	0.00114	U
156-59-4	cis-1,2-Dichloroethene	0.3	560	230	0.00114	U
10061-01-5	cis-1,3-Dichloropropene	0.0025	3.5	1	0.00114	U
110-82-7	Cyclohexane	NA	NA	NA	0.00114	U
124-48-1	Dibromochloromethane	0.005	8	3	0.00114	U
75-71-8	Dichlorodifluoromethane	39	230000	490	0.00114	U
100-41-4	Ethylbenzene	13	110000	7800	0.00114	U
76-13-1	Freon 113	NA	NA	NA	0.00114	U
98-82-8	Isopropylbenzene	NA	NA	NA	0.00114	U
108-38-3/106	m,p-Xylenes	9.5	85000	6000	0.00229	U
79-20-9	Methyl Acetate	22	NA	78000	0.00114	U

1634-04-4	Methyl tert-Butyl Ether	0.2	320	110	0.00229 U
108-87-2	Methylcyclohexane	NA	NA	NA	0.00114 U
75-09-2	Methylene Chloride	0.01	230	46	0.00114 U
95-47-6	o-Xylene	9.5	85000	6000	0.00229 U
100-42-5	Styrene	3	260	90	0.00114 U
75-65-0	t-Butyl alcohol	0.3	11000	1400	0.00572 U
127-18-4	Tetrachloroethene	0.005	1500	43	0.00114 U
108-88-3	Toluene	7	91000	6300	0.00114 U
156-60-5	trans-1,2-Dichloroethene	0.6	720	300	0.00114 U
10061-02-6	trans-1,3-Dichloropropene	0.0025	3.5	1	0.00114 U
79-01-6	Trichloroethene	0.01	10	3	0.00114 U
75-69-4	Trichlorofluoromethane	34	340000	23000	0.00114 U
75-01-4	Vinyl chloride	0.005	2	0.7	0.00114 U
	TIC Summary	NA	NA	NA	0.0083
Wet Chemistry (%)					
	Percent Solids	NA	NA	NA	**95.4**
Wet Chemistry (mg/kg)					
	Cyanide (total)	20	680	47	1.05 U

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B - Indicates compound found in associated blank
D - Indicates result is based on a dilution
H - Alternate peak selection upon analytical review
J - Indicates estimated value for TICs and all results when detected below the RL
U - Indicates compound analyzed for but not detected
P - Greater than 25% diff between 2 GC columns
VC - The container(s) provided by the client for soil volatiles do not meet the requirements of EPA SW846-5035A. Results reported below 200 ug/kg may be biased low due to samples not being collected according to EPA SW846 5035A requirements.

mg/kg - parts per million

Regulatory limits listed in this document have been obtained from the latest version of the regulations cited and are used for advisory purposes only. Accredited Analytical assumes no responsibility for errors in regulatory documents or changes to criteria detailed in later versions of the referenced regulation. It is the responsibility of the user to verify these limits before using or reporting any data.

Attachment 4

-Tabulation of Phase II Soil Sample E

Table 4
Lab: Accredited Analytical Resources LLC

Client: ENVIRONMENTAL & GEOTECHNICAL - 366-394 Wilson Ave Rear

CAS#	Compound	IPTGW	NJNRDCSRS	NJRDCSRS	Result Qualifier **Sample No.** E 09/26/19
EPA Method SW846 8081B/8082A (mg/kg)					
72-54-8	4,4'-DDD	4	13	3	**0.00400**
72-55-9	4,4'-DDE	18	9	2	**0.00496** P
50-29-3	4,4'-DDT	11	8	2	**0.0171** P
309-00-2	Aldrin	0.2	0.2	0.04	0.000528 U
319-84-6	alpha-BHC	0.002	0.5	0.1	0.000528 U
5103-71-9	alpha-Chlordane	0.025	0.5	0.1	**0.00235** P
12674-11-2	Aroclor-1016	0.2	1	0.2	0.0133 U
11104-28-2	Aroclor-1221	0.2	1	0.2	0.0133 U
11141-16-5	Aroclor-1232	0.2	1	0.2	0.0133 U
53469-21-9	Aroclor-1242	0.2	1	0.2	0.0133 U
12672-29-6	Aroclor-1248	0.2	1	0.2	0.0133 U
11097-69-1	Aroclor-1254	0.2	1	0.2	0.0133 U
11096-82-5	Aroclor-1260	0.2	1	0.2	0.0133 U
37324-23-5	Aroclor-1262	0.2	1	0.2	0.0133 U
11100-14-4	Aroclor-1268	0.2	1	0.2	0.0133 U
319-85-7	beta-BHC	0.002	2	0.4	0.000528 U
319-86-8	delta-BHC	NA	NA	NA	0.000528 U
60-57-1	Dieldrin	0.003	0.2	0.04	0.00106 U
959-98-8	Endosulfan I	2	3400	235	0.000528 U
33213-65-9	Endosulfan II	2	3400	235	0.00106 U
1031-07-8	Endosulfan sulfate	2	6800	470	0.00106 U
72-20-8	Endrin	1	340	23	0.00106 U
7421-93-4	Endrin aldehyde	NA	NA	NA	0.00106 U
53494-70-5	Endrin ketone	NA	NA	NA	0.00106 U
58-89-9	gamma-BHC [Lindane]	0.002	2	0.4	0.000528 U
5566-34-7	gamma-Chlordane	0.025	0.5	0.1	**0.00216**
76-44-8	Heptachlor	0.5	0.7	0.1	0.000528 U
1024-57-3	Heptachlor Epoxide	0.01	0.3	0.07	0.000528 U
72-43-5	Methoxychlor	160	5700	390	0.00160 U

8001-35-2	Toxaphene	0.3	3	0.6	0.0267	U
Extractable Petroleum Hydrocarbons by NJ EPH (mg/kg)						
	Extractable Petroleum Hydrocarbons (E	NA	NA	NA	**225**	
Semivolatile Organic Compounds EPA Method SW846 8270D (mg/kg)						
92-52-4	1,1-Biphenyl	140	240	61	0.0533	U
95-94-3	1,2,4,5-Tetrachlorobenzene	NA	NA	NA	0.0533	U
122-66-7	1,2-Diphenylhydrazine	0.7	2	0.7	0.0533	U
58-90-2	2,3,4,6-Tetrachlorophenol	NA	NA	NA	0.0533	U
95-95-4	2,4,5-Trichlorophenol	68	68000	6100	0.0533	U
88-06-2	2,4,6-Trichlorophenol	0.2	74	19	0.0533	U
120-83-2	2,4-Dichlorophenol	0.2	2100	180	0.0533	U
105-67-9	2,4-Dimethylphenol	1	14000	1200	0.0533	U
51-28-5	2,4-Dinitrophenol	0.3	1400	120	0.0533	U
121-14-2	2,4-Dinitrotoluene	0.1	3	0.7	0.0533	U
606-20-2	2,6-Dinitrotoluene	0.1	3	0.7	0.0533	U
91-58-7	2-Chloronaphthalene	NA	NA	NA	0.0533	U
95-57-8	2-Chlorophenol	0.8	2200	310	0.0533	U
91-57-6	2-Methylnaphthylene	8	2400	230	0.0533	U
95-48-7	2-Methylphenol	NA	3400	310	0.0533	U
88-74-4	2-Nitroaniline	NA	23000	39	0.0533	U
88-75-5	2-Nitrophenol	NA	NA	NA	0.0533	U
106-44-5	3 & 4-Methylphenol	NA	340	31	0.0533	U
91-94-1	3,3'-Dichlorobenzidine	0.2	4	1	0.133	U
99-09-2	3-Nitroaniline	NA	NA	NA	0.0533	U
534-52-1	4,6-Dinitro-2-methylphenol	0.3	68	6	0.0533	U
101-55-3	4-Bromophenyl-phenylether	NA	NA	NA	0.0533	U
59-50-7	4-Chloro-3-methylphenol	NA	NA	NA	0.0533	U
106-47-8	4-Chloroaniline	NA	NA	NA	0.0533	U
7005-72-3	4-Chlorophenyl-phenylether	NA	NA	NA	0.0533	U
100-01-6	4-Nitroaniline	NA	NA	NA	0.0533	U
100-02-7	4-Nitrophenol	NA	NA	NA	0.0533	U
83-32-9	Acenaphthene	110	37000	3400	0.0533	U
208-96-8	Acenaphthylene	NA	300000	NA	0.0533	U
98-86-2	Acetophenone	3	5	2	0.0533	U
120-12-7	Anthracene	2400	30000	17000	0.0533	U
1912-24-9	Atrazine	0.2	2400	210	0.0533	U

103-33-3	Azobenzene	0.7	2	0.7	0.0533	U
100-52-7	Benzaldehyde	NA	68000	6100	**0.0912**	J
92-87-5	Benzidine	0.7	0.7	0.7	0.133	U
56-55-3	Benzo[a]anthracene	0.8	17	5	**0.274**	
50-32-8	Benzo[a]pyrene	0.2	2	0.5	**0.311**	
205-99-2	Benzo[b]fluoranthene	2	17	5	**0.629**	
191-24-2	Benzo[ghi]perylene	NA	30000	380000	0.0533	U
207-08-9	Benzo[k]fluoranthene	25	170	45	**0.250**	
111-91-1	bis(2-chloroethoxy)methane	NA	NA	NA	0.0533	U
111-44-4	bis(2-chloroethyl)ether	0.2	2	0.4	0.0533	U
39638-32-9	bis(2-chloroisopropyl)ether	5	67	23	0.0533	U
117-81-7	bis(2-ethylhexyl)phthalate	1200	140	35	**0.507**	
85-68-7	Butylbenzylphthalate	230	14000	1200	**0.0555**	J
105-60-2	Caprolactam	12	340000	31000	0.0533	U
86-74-8	Carbazole	NA	96	24	0.0533	U
218-01-9	Chrysene	80	1700	450	**0.326**	
53-70-3	Dibenzo(a,h)anthracene	0.8	2	0.5	0.0533	U
132-64-9	Dibenzofuran	NA	NA	NA	0.0533	U
84-66-2	Diethyl phthalate	88	550000	49000	0.0533	U
131-11-3	Dimethylphthalate	NA	NA	NA	0.0533	U
84-74-2	Di-n-butyl phthalate	760	68000	6100	0.0533	U
117-84-0	Di-n-octyl phthalate	3300	27000	2400	**0.0875**	J
206-44-0	Fluoranthene	1300	24000	2300	**0.432**	
86-73-7	Fluorene	170	24000	2300	0.0533	U
118-74-1	Hexachlorobenzene	0.2	1	0.3	0.0533	U
87-68-3	Hexachlorobutadiene	0.9	25	6	0.0533	U
77-47-4	Hexachlorocyclopentadiene	320	110	45	0.0533	U
67-72-1	Hexachloroethane	0.2	48	12	0.0533	U
193-39-5	Indeno(1,2,3-cd)pyrene	7	17	5	**0.160**	
78-59-1	Isophorone	0.2	2000	510	0.0533	U
91-20-3	Naphthalene	25	17	6	0.0533	U
98-95-3	Nitrobenzene	0.2	14	5	0.0533	U
62-75-9	N-Nitrosodimethylamine	0.7	0.7	0.7	0.0533	U
621-64-7	N-Nitroso-di-n-propylamine	0.2	0.3	0.2	0.0533	U
86-30-6	N-Nitrosodiphenylamine	0.4	390	99	0.0533	U
87-86-5	Pentachlorophenol	0.3	3	0.9	0.0533	U

85-01-8	Phenanthrene	NA	300000	NA	**0.183**	
108-95-2	Phenol	8	210000	18000	0.0533	U
129-00-0	Pyrene	840	18000	1700	**0.859**	
	TIC Summary	NA	NA	NA	20.47	
Total Mercury by SW846 7471B (mg/kg)						
7439-97-6	Mercury	0.1	65	23	**0.924**	
Total Metals by EPA Method SW846 6010D (mg/kg)						
7429-90-5	Aluminum	6000	NA	78000	**7010**	D
7440-36-0	Antimony	6	450	31	2.23	U
7440-38-2	Arsenic	19	19	19	**5.17**	
7440-39-3	Barium	2100	59000	16000	**102**	
7440-41-7	Beryllium	0.7	140	16	0.279	U
7440-43-9	Cadmium	2	78	78	**1.33**	
7440-70-2	Calcium	NA	NA	NA	**6290**	D
7440-47-3	Chromium	NA	NA	NA	**26.8**	
7440-48-4	Cobalt	90	590	1600	**7.10**	
7440-50-8	Copper	11000	45000	3100	**77.3**	
7439-89-6	Iron	NA	NA	NA	**20300**	D
7439-92-1	Lead	90	800	400	**78.0**	
7439-95-4	Magnesium	NA	NA	NA	**4040**	D
7439-96-5	Manganese	65	5900	11000	**206**	
7440-02-0	Nickel	48	23000	1600	**27.6**	
7440-09-7	Potassium	NA	NA	NA	**603**	
7782-49-2	Selenium	11	5700	390	2.23	U
7440-22-4	Silver	1	5700	390	**0.299**	
7440-23-5	Sodium	NA	NA	NA	**294**	
7440-28-0	Thallium	3	NA	NA	1.68	U
7440-62-2	Vanadium	NA	1100	78	**37.5**	
7440-66-6	Zinc	930	110000	23000	**168**	
Volatile Organic Compounds EPA Method SW846 8260C (mg/kg)						
71-55-6	1,1,1-Trichloroethane	0.3	NA	290	0.00107	U
79-34-5	1,1,2,2-Tetrachloroethane	0.007	3	1	0.00107	U
79-00-5	1,1,2-Trichloroethane	0.02	6	2	0.00107	U
75-34-3	1,1-Dichloroethane	0.2	24	8	0.00107	U
75-35-4	1,1-Dichloroethene	0.008	150	11	0.00107	U

87-61-6	1,2,3-Trichlorobenzene	NA	NA	NA	0.00107	U
120-82-1	1,2,4-Trichlorobenzene	0.7	820	73	0.00107	U
96-12-8	1,2-Dibromo-3-chloropropane	0.005	0.2	0.08	0.00107	U
106-93-4	1,2-Dibromoethane	0.005	0.04	0.008	0.00107	U
95-50-1	1,2-Dichlorobenzene	17	59000	5300	0.00107	U
107-06-2	1,2-Dichloroethane	0.005	3	0.9	0.00107	U
78-87-5	1,2-Dichloropropane	0.005	5	2	0.00107	U
541-73-1	1,3-Dichlorobenzene	19	59000	5300	0.00107	U
106-46-7	1,4-Dichlorobenzene	2	13	5	0.00107	U
78-93-3	2-Butanone	0.9	44000	3100	0.00107	U
591-78-6	2-Hexanone	NA	NA	NA	0.00107	U
108-10-1	4-Methyl-2-pentanone	NA	NA	NA	0.00107	U
67-64-1	Acetone	19	NA	70000	0.00107	U
107-02-8	Acrolein	0.5	1	0.5	0.00640	U
107-13-1	Acrylonitrile	0.5	3	0.9	0.00213	U
71-43-2	Benzene	0.005	5	2	0.00107	U
74-97-5	Bromochloromethane	NA	NA	NA	0.00107	U
75-27-4	Bromodichloromethane	0.005	3	1	0.00107	U
75-25-2	Bromoform	0.03	280	81	0.00107	U
74-83-9	Bromomethane	0.04	59	25	0.00107	U
75-15-0	Carbon disulfide	6	110000	7800	0.00107	U
56-23-5	Carbon Tetrachloride	0.005	4	2	0.00107	U
108-90-7	Chlorobenzene	0.6	7400	510	0.00107	U
75-00-3	Chloroethane	NA	1100	220	0.00107	U
67-66-3	Chloroform	0.4	2	0.6	0.00107	U
74-87-3	Chloromethane	NA	12	4	0.00107	U
156-59-4	cis-1,2-Dichloroethene	0.3	560	230	0.00107	U
10061-01-5	cis-1,3-Dichloropropene	0.0025	3.5	1	0.00107	U
110-82-7	Cyclohexane	NA	NA	NA	0.00107	U
124-48-1	Dibromochloromethane	0.005	8	3	0.00107	U
75-71-8	Dichlorodifluoromethane	39	230000	490	0.00107	U
100-41-4	Ethylbenzene	13	110000	7800	0.00107	U
76-13-1	Freon 113	NA	NA	NA	0.00107	U
98-82-8	Isopropylbenzene	NA	NA	NA	0.00107	U
108-38-3/106	m,p-Xylenes	9.5	85000	6000	0.00213	U
79-20-9	Methyl Acetate	22	NA	78000	0.00107	U

1634-04-4	Methyl tert-Butyl Ether	0.2	320	110	0.00213 U
108-87-2	Methylcyclohexane	NA	NA	NA	0.00107 U
75-09-2	Methylene Chloride	0.01	230	46	0.00107 U
95-47-6	o-Xylene	9.5	85000	6000	0.00213 U
100-42-5	Styrene	3	260	90	0.00107 U
75-65-0	t-Butyl alcohol	0.3	11000	1400	0.00534 U
127-18-4	Tetrachloroethene	0.005	1500	43	0.00107 U
108-88-3	Toluene	7	91000	6300	0.00107 U
156-60-5	trans-1,2-Dichloroethene	0.6	720	300	0.00107 U
10061-02-6	trans-1,3-Dichloropropene	0.0025	3.5	1	0.00107 U
79-01-6	Trichloroethene	0.01	10	3	0.00107 U
75-69-4	Trichlorofluoromethane	34	340000	23000	0.00107 U
75-01-4	Vinyl chloride	0.005	2	0.7	0.00107 U
	TIC Summary	NA	NA	NA	0.0125
Wet Chemistry (%)					
	Percent Solids	NA	NA	NA	**93.7**
Wet Chemistry (mg/kg)					
	Cyanide (total)	20	680	47	1.07 U

IPTGW = NJDEP Default Impact to Ground Water Soil Screening Level
NJNRDCSRS = NJDEP Non-Rsidential Direct Contact Soil Remediation Standards
NJRDCSRS = NJDEP Residential Direct Contact Soil Remediation Standards

Qualifiers:

E - Concentration exceeds highest calibration standard
B - Indicates compound found in associated blank
D - Indicates result is based on a dilution
H - Alternate peak selection upon analytical review
J - Indicates estimated value for TICs and all results when detected below the RL
U - Indicates compound analyzed for but not detected
P - Greater than 25% diff between 2 GC columns
VC - The container(s) provided by the client for soil volatiles do not meet the requirements of EPA SW846-5035A. Results reported below 200 ug/kg may be biased low due to samples not being collected according to EPA SW846 5035A requirements.

mg/kg - parts per million

Regulatory limits listed in this document have been obtained from the latest version of the regulations cited and are used for advisory purposes only. Accredited Analytical assumes no responsibility for errors in regulatory documents or changes to criteria detailed in later versions of the referenced regulation. It is the responsibility of the user to verify these limits before using or reporting any data.

Attachment 5

-Tabulation of Phase II Soil Sample SW

Table 5
Lab: Accredited Analytical Resources LLC

Client: ENVIRONMENTAL & GEOTECHNICAL - 366-394 Wilson Ave Rear

CAS#	Compound	IPTGW	NJNRDCSRS	NJRDCSRS	Result Qualifier **Sample No.** SW 09/27/19	Result Qualifier **Sample No.** SW 09/27/19
EPA Method SW846 8081B/8082A (mg/kg)						
72-54-8	4,4'-DDD	4	13	3	**0.0406**	**0.0617** D
72-55-9	4,4'-DDE	18	9	2	**0.0463** PE	**0.0759** D
50-29-3	4,4'-DDT	11	8	2	**0.149** PE	**0.247** D
309-00-2	Aldrin	0.2	0.2	0.04	0.000540 U	0.00540 U
319-84-6	alpha-BHC	0.002	0.5	0.1	0.000540 U	0.00540 U
5103-71-9	alpha-Chlordane	0.025	0.5	0.1	**0.00401** P	0.00540 U
12674-11-2	Aroclor-1016	0.2	1	0.2	0.0136 U	0.136 U
11104-28-2	Aroclor-1221	0.2	1	0.2	0.0136 U	0.136 U
11141-16-5	Aroclor-1232	0.2	1	0.2	0.0136 U	0.136 U
53469-21-9	Aroclor-1242	0.2	1	0.2	0.0136 U	0.136 U
12672-29-6	Aroclor-1248	0.2	1	0.2	0.0136 U	0.136 U
11097-69-1	Aroclor-1254	0.2	1	0.2	0.0136 U	0.136 U
11096-82-5	Aroclor-1260	0.2	1	0.2	0.0136 U	0.136 U
37324-23-5	Aroclor-1262	0.2	1	0.2	0.0136 U	0.136 U
11100-14-4	Aroclor-1268	0.2	1	0.2	0.0136 U	0.136 U
319-85-7	beta-BHC	0.002	2	0.4	0.000540 U	0.00540 U
319-86-8	delta-BHC	NA	NA	NA	0.000540 U	0.00540 U
60-57-1	Dieldrin	0.003	0.2	0.04	0.00109 U	0.0109 U
959-98-8	Endosulfan I	2	3400	235	0.000540 U	0.00540 U
33213-65-9	Endosulfan II	2	3400	235	0.00109 U	0.0109 U
1031-07-8	Endosulfan sulfate	2	6800	470	0.00109 U	0.0109 U
72-20-8	Endrin	1	340	23	0.00109 U	0.0109 U
7421-93-4	Endrin aldehyde	NA	NA	NA	0.00109 U	0.0109 U
53494-70-5	Endrin ketone	NA	NA	NA	0.00109 U	0.0109 U
58-89-9	gamma-BHC [Lindane]	0.002	2	0.4	0.000540 U	0.00540 U
5566-34-7	gamma-Chlordane	0.025	0.5	0.1	**0.00958**	0.00540 U
76-44-8	Heptachlor	0.5	0.7	0.1	0.000540 U	0.00540 U
1024-57-3	Heptachlor Epoxide	0.01	0.3	0.07	0.000540 U	0.00540 U
72-43-5	Methoxychlor	160	5700	390	0.00164 U	0.0164 U

8001-35-2	Toxaphene	0.3	3	0.6	0.0273 U	0.273 U
Extractable Petroleum Hydrocarbons by NJ EPH (mg/kg)						
	Extractable Petroleum Hydrocarbons (E	NA	NA	NA	**354**	
Semivolatile Organic Compounds EPA Method SW846 8270D (mg/kg)						
92-52-4	1,1-Biphenyl	140	240	61	0.0545 U	
95-94-3	1,2,4,5-Tetrachlorobenzene	NA	NA	NA	0.0545 U	
122-66-7	1,2-Diphenylhydrazine	0.7	2	0.7	0.0545 U	
58-90-2	2,3,4,6-Tetrachlorophenol	NA	NA	NA	0.0545 U	
95-95-4	2,4,5-Trichlorophenol	68	68000	6100	0.0545 U	
88-06-2	2,4,6-Trichlorophenol	0.2	74	19	0.0545 U	
120-83-2	2,4-Dichlorophenol	0.2	2100	180	0.0545 U	
105-67-9	2,4-Dimethylphenol	1	14000	1200	0.0545 U	
51-28-5	2,4-Dinitrophenol	0.3	1400	120	0.0545 U	
121-14-2	2,4-Dinitrotoluene	0.1	3	0.7	0.0545 U	
606-20-2	2,6-Dinitrotoluene	0.1	3	0.7	0.0545 U	
91-58-7	2-Chloronaphthalene	NA	NA	NA	0.0545 U	
95-57-8	2-Chlorophenol	0.8	2200	310	0.0545 U	
91-57-6	2-Methylnaphthylene	8	2400	230	0.0545 U	
95-48-7	2-Methylphenol	NA	3400	310	0.0545 U	
88-74-4	2-Nitroaniline	NA	23000	39	0.0545 U	
88-75-5	2-Nitrophenol	NA	NA	NA	0.0545 U	
106-44-5	3 & 4-Methylphenol	NA	340	31	0.0545 U	
91-94-1	3,3'-Dichlorobenzidine	0.2	4	1	0.136 U	
99-09-2	3-Nitroaniline	NA	NA	NA	0.0545 U	
534-52-1	4,6-Dinitro-2-methylphenol	0.3	68	6	0.0545 U	
101-55-3	4-Bromophenyl-phenylether	NA	NA	NA	0.0545 U	
59-50-7	4-Chloro-3-methylphenol	NA	NA	NA	0.0545 U	
106-47-8	4-Chloroaniline	NA	NA	NA	0.0545 U	
7005-72-3	4-Chlorophenyl-phenylether	NA	NA	NA	0.0545 U	
100-01-6	4-Nitroaniline	NA	NA	NA	0.0545 U	
100-02-7	4-Nitrophenol	NA	NA	NA	0.0545 U	
83-32-9	Acenaphthene	110	37000	3400	0.0545 U	
208-96-8	Acenaphthylene	NA	300000	NA	0.0545 U	
98-86-2	Acetophenone	3	5	2	0.0545 U	
120-12-7	Anthracene	2400	30000	17000	**0.0688** J	
1912-24-9	Atrazine	0.2	2400	210	0.0545 U	

103-33-3	Azobenzene	0.7	2	0.7	0.0545	U
100-52-7	Benzaldehyde	NA	68000	6100	**0.118**	J
92-87-5	Benzidine	0.7	0.7	0.7	0.136	U
56-55-3	Benzo[a]anthracene	0.8	17	5	**0.374**	
50-32-8	Benzo[a]pyrene	0.2	2	0.5	**0.414**	
205-99-2	Benzo[b]fluoranthene	2	17	5	**0.761**	
191-24-2	Benzo[ghi]perylene	NA	30000	380000	**0.252**	
207-08-9	Benzo[k]fluoranthene	25	170	45	**0.225**	
111-91-1	bis(2-chloroethoxy)methane	NA	NA	NA	0.0545	U
111-44-4	bis(2-chloroethyl)ether	0.2	2	0.4	0.0545	U
39638-32-9	bis(2-chloroisopropyl)ether	5	67	23	0.0545	U
117-81-7	bis(2-ethylhexyl)phthalate	1200	140	35	**0.328**	
85-68-7	Butylbenzylphthalate	230	14000	1200	**0.0781**	J
105-60-2	Caprolactam	12	340000	31000	0.0545	U
86-74-8	Carbazole	NA	96	24	0.0545	U
218-01-9	Chrysene	80	1700	450	**0.444**	
53-70-3	Dibenzo(a,h)anthracene	0.8	2	0.5	0.0545	U
132-64-9	Dibenzofuran	NA	NA	NA	0.0545	U
84-66-2	Diethyl phthalate	88	550000	49000	0.0545	U
131-11-3	Dimethylphthalate	NA	NA	NA	0.0545	U
84-74-2	Di-n-butyl phthalate	760	68000	6100	0.0545	U
117-84-0	Di-n-octyl phthalate	3300	27000	2400	0.0545	U
206-44-0	Fluoranthene	1300	24000	2300	**0.510**	
86-73-7	Fluorene	170	24000	2300	0.0545	U
118-74-1	Hexachlorobenzene	0.2	1	0.3	0.0545	U
87-68-3	Hexachlorobutadiene	0.9	25	6	0.0545	U
77-47-4	Hexachlorocyclopentadiene	320	110	45	0.0545	U
67-72-1	Hexachloroethane	0.2	48	12	0.0545	U
193-39-5	Indeno(1,2,3-cd)pyrene	7	17	5	**0.209**	
78-59-1	Isophorone	0.2	2000	510	0.0545	U
91-20-3	Naphthalene	25	17	6	0.0545	U
98-95-3	Nitrobenzene	0.2	14	5	0.0545	U
62-75-9	N-Nitrosodimethylamine	0.7	0.7	0.7	0.0545	U
621-64-7	N-Nitroso-di-n-propylamine	0.2	0.3	0.2	0.0545	U
86-30-6	N-Nitrosodiphenylamine	0.4	390	99	0.0545	U
87-86-5	Pentachlorophenol	0.3	3	0.9	0.0545	U

85-01-8	Phenanthrene	NA	300000	NA	**0.322**	
108-95-2	Phenol	8	210000	18000	0.0545	U
129-00-0	Pyrene	840	18000	1700	**1.22**	
	TIC Summary	NA	NA	NA	10.736	
Total Mercury by SW846 7471B (mg/kg)						
7439-97-6	Mercury	0.1	65	23	**3.78**	D
Total Metals by EPA Method SW846 6010D (mg/kg)						
7429-90-5	Aluminum	6000	NA	78000	**6200**	D
7440-36-0	Antimony	6	450	31	2.18	U
7440-38-2	Arsenic	19	19	19	**12.4**	
7440-39-3	Barium	2100	59000	16000	**83.8**	
7440-41-7	Beryllium	0.7	140	16	**0.294**	
7440-43-9	Cadmium	2	78	78	**5.23**	
7440-70-2	Calcium	NA	NA	NA	**6590**	D
7440-47-3	Chromium	NA	NA	NA	**23.9**	
7440-48-4	Cobalt	90	590	1600	**7.61**	
7440-50-8	Copper	11000	45000	3100	**136**	
7439-89-6	Iron	NA	NA	NA	**16600**	D
7439-92-1	Lead	90	800	400	**134**	
7439-95-4	Magnesium	NA	NA	NA	**3080**	D
7439-96-5	Manganese	65	5900	11000	**215**	
7440-02-0	Nickel	48	23000	1600	**31.9**	
7440-09-7	Potassium	NA	NA	NA	**640**	
7782-49-2	Selenium	11	5700	390	2.18	U
7440-22-4	Silver	1	5700	390	**2.23**	
7440-23-5	Sodium	NA	NA	NA	**195**	
7440-28-0	Thallium	3	NA	NA	1.64	U
7440-62-2	Vanadium	NA	1100	78	**29.3**	
7440-66-6	Zinc	930	110000	23000	**408**	D
Volatile Organic Compounds EPA Method SW846 8260C (mg/kg)						
71-55-6	1,1,1-Trichloroethane	0.3	NA	160000	0.00147	U
79-34-5	1,1,2,2-Tetrachloroethane	0.007	3	1	0.00147	U
79-00-5	1,1,2-Trichloroethane	0.02	6	2	0.00147	U
75-34-3	1,1-Dichloroethane	0.2	24	8	0.00147	U
75-35-4	1,1-Dichloroethene	0.008	150	11	0.00147	U

87-61-6	1,2,3-Trichlorobenzene	NA	NA	NA	0.00147	U
120-82-1	1,2,4-Trichlorobenzene	0.7	820	73	0.00147	U
96-12-8	1,2-Dibromo-3-chloropropane	0.005	0.2	0.08	0.00147	U
106-93-4	1,2-Dibromoethane	0.005	0.04	0.008	0.00147	U
95-50-1	1,2-Dichlorobenzene	17	59000	5300	0.00147	U
107-06-2	1,2-Dichloroethane	0.005	3	0.9	0.00147	U
78-87-5	1,2-Dichloropropane	0.005	5	2	0.00147	U
541-73-1	1,3-Dichlorobenzene	19	59000	5300	0.00147	U
106-46-7	1,4-Dichlorobenzene	2	13	5	0.00147	U
78-93-3	2-Butanone	0.9	44000	3100	0.00147	U
591-78-6	2-Hexanone	NA	NA	NA	0.00147	U
108-10-1	4-Methyl-2-pentanone	NA	NA	NA	0.00147	U
67-64-1	Acetone	19	NA	70000	0.00147	U
107-02-8	Acrolein	0.5	1	0.5	0.00883	U
107-13-1	Acrylonitrile	0.5	3	0.9	0.00294	U
71-43-2	Benzene	0.005	5	2	0.00147	U
74-97-5	Bromochloromethane	NA	NA	NA	0.00147	U
75-27-4	Bromodichloromethane	0.005	3	1	0.00147	U
75-25-2	Bromoform	0.03	280	81	0.00147	U
74-83-9	Bromomethane	0.04	59	25	0.00147	U
75-15-0	Carbon disulfide	6	110000	7800	0.00147	U
56-23-5	Carbon Tetrachloride	0.005	4	2	0.00147	U
108-90-7	Chlorobenzene	0.6	7400	510	0.00147	U
75-00-3	Chloroethane	NA	1100	220	0.00147	U
67-66-3	Chloroform	0.4	2	0.6	0.00147	U
74-87-3	Chloromethane	NA	12	4	0.00147	U
156-59-4	cis-1,2-Dichloroethene	0.3	560	230	0.00147	U
10061-01-5	cis-1,3-Dichloropropene	0.0025	3.5	1	0.00147	U
110-82-7	Cyclohexane	NA	NA	NA	0.00147	U
124-48-1	Dibromochloromethane	0.005	8	3	0.00147	U
75-71-8	Dichlorodifluoromethane	39	230000	490	0.00147	U
100-41-4	Ethylbenzene	13	110000	7800	0.00147	U
76-13-1	Freon 113	NA	NA	NA	0.00147	U
98-82-8	Isopropylbenzene	NA	NA	NA	0.00147	U
108-38-3/106	m,p-Xylenes	9.5	85000	6000	0.00294	U
79-20-9	Methyl Acetate	22	NA	78000	0.00147	U

1634-04-4	Methyl tert-Butyl Ether	0.2	320	110	0.00294 U	
108-87-2	Methylcyclohexane	NA	NA	NA	0.00147 U	
75-09-2	Methylene Chloride	0.01	230	46	0.00147 U	
95-47-6	o-Xylene	9.5	85000	6000	0.00294 U	
100-42-5	Styrene	3	260	90	0.00147 U	
75-65-0	t-Butyl alcohol	0.3	11000	1400	0.00736 U	
127-18-4	Tetrachloroethene	0.005	1500	43	0.00147 U	
108-88-3	Toluene	7	91000	6300	0.00147 U	
156-60-5	trans-1,2-Dichloroethene	0.6	720	300	0.00147 U	
10061-02-6	trans-1,3-Dichloropropene	0.0025	3.5	1	0.00147 U	
79-01-6	Trichloroethene	0.01	10	3	0.00147 U	
75-69-4	Trichlorofluoromethane	34	340000	23000	0.00147 U	
75-01-4	Vinyl chloride	0.005	2	0.7	0.00147 U	
	TIC Summary	NA	NA	NA	0.00829	
Wet Chemistry (%)						
	Percent Solids	NA	NA	NA	**91.6**	
Wet Chemistry (mg/kg)						
	Cyanide (total)	20	680	47	1.09 U	

IPTGW = NJDEP Default Impact to Ground Water Soil Screening Level
NJNRDCSRS = NJDEP Non-Rsidential Direct Contact Soil Remediation Standards
NJRDCSRS = NJDEP Residential Direct Contact Soil Remediation Standards

Qualifiers:

E - Concentration exceeds highest calibration standard
B - Indicates compound found in associated blank
D - Indicates result is based on a dilution
H - Alternate peak selection upon analytical review
J - Indicates estimated value for TICs and all results when detected below the RL
U - Indicates compound analyzed for but not detected
P - Greater than 25% diff between 2 GC columns
VC - The container(s) provided by the client for soil volatiles do not meet the requirements of EPA SW846-5035A. Results reported below 200 ug/kg may be biased low due to samples not being collected according to EPA SW846 5035A requirements.

mg/kg - parts per million

Regulatory limits listed in this document have been obtained from the latest version of the regulations cited and are used for advisory purposes only. Accredited Analytical assumes no responsibility for errors in regulatory documents or changes to criteria detailed in later versions of the referenced regulation. It is the responsibility of the user to verify these limits before using or reporting any data.

Attachment 6

-Map Depicting Phase I REC Locations

= Approximate subject property boundary

N

Environmental & Geotechnical Services, LLC

301 Fairfield Road
Fairfield, New Jersey 07004

SITE PLAN

(Subject Property)

Industrial Property

366-394 Wilson Avenue Rear
Newark, NJ 07105

Drawn By	Date Created	Reviewed By	Date Reviewed		
JK	*9/12/2019*	*MA*	*9/12/2019*	Northing: 686059.39 Easting: 590790.49	Block: 5038 Lot: 97

Attachment 7

- Laboratory Reports and Chain-of-Custody Forms

Accredited Analytical Resources, LLC.

10 October 2019 AAR Work Order: 1901594

James Kelly
ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield, NJ 07004

Project: 366-394 Wilson Ave Rear

Enclosed are the results of analyses for samples received by the laboratory on 09/27/2019 13:55. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Daniel Miguel
Technical Director

New Jersey Certification Number: 12007
New York Certification Number: 11109
Pennsylvania Certification Number: 68-02799
CT Certification Number: PH-0219

ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:43

Analytical Report for Samples

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
N	1901594-01	Soil	09/26/2019 13:13	09/27/2019 13:55

Notes and Definitions

* Values outside of QC limits
ND - Indicates compound analyzed for but not detected at or above the MDL
J - Indicates estimated value for TICs and all results when detected below the RL
B - Indicates compound found in associated blank
E - Concentration exceeds highest calibration standard
D - Indicates result is based on a dilution
P - Greater than 25% diff. between 2 GC columns.
MDL - Minimum detection limit
RL - Reporting limit
VC - The container(s) provided by the client for soil volatiles do not meet the requirements of EPA SW846-5035A. Results reported below 200 ug/kg may be biased low due to samples not being collected according to EPA SW846 5035A requirements.

Conformance / Non-Conformance Summary

AAR Work Order:**1901594**

Accredited Analytical Resources, LLC received 1 sample(s) from ENVIRONMENTAL & GEOTECHNICAL (Project: 366-394 Wilson Ave Rear) on 09/27/2019 13:55.

On 10/7/19, the client requested SPLP Benzo(a)pyrene, SPLP Cadmium, SPLP Lead and SPLP Mercury. The results are included in this data package.

All analyses were performed within the required holding time.

Except for the parameters tested AAR makes no representation as to the fitness or quality of the sample (s) taken.

"The laboratory has reviewed the quality assurance and quality control measurements for the sample analyses."

Daniel Miguel
Technical Director

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Methodology Summary

EPA Method SW846 8081B/8082A:
NY 8081B/8082A

Extractable Petroleum Hydrocarbons by NJ EPH:
NJDEP EPH

Semivolatile Organic Compounds EPA Method SW846 8270:
8270D

Semivolatile Organic Compounds in SPLP Extracts by GC/MS:
1312/8270D

SPLP Mercury by SW846 7470:
1312/7470

SPLP Metals by SW846 6010:
1312/6010D

Total Mercury by SW846 7471:
EPA 7471B

Total Metals by EPA Method SW846 6010:
6010D

Volatile Organic Compounds EPA Method SW846 8260:
8260C

Wet Chemistry:
Total Cyanide by EPA 9010C & EPA 9014
Percent Solids by SM 2540 G

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:43

Condition of Samples on Receipt

Temperature °C	6.00
Chain of Custody Filled Out Properly	Yes
Received with Proper Containers	Yes
Received with Proper Volumes	Yes
Received Within Holding Time	Yes
Samples Received with Correct Preservation	Yes
Samples Received On Ice	Yes
Sample Received Via Field Services	Yes
Samples Hand Delivered	No

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:43

Client ID: N

Lab ID: 1901594-01 (Soil)

Accredited Analytical Resources LLC

Volatile Organic Compounds EPA Method SW846 8260C

Sample Prepared by Method:EPA 5035A

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
107-02-8	Acrolein	ND	8.99	15.0	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
107-13-1	Acrylonitrile	ND	3.00	15.0	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
67-64-1	Acetone	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
75-71-8	Dichlorodifluoromethane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
74-87-3	Chloromethane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
75-01-4	Vinyl chloride	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
74-83-9	Bromomethane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
75-00-3	Chloroethane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
75-69-4	Trichlorofluoromethane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
76-13-1	Freon 113	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
75-35-4	1,1-Dichloroethene	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
75-15-0	Carbon disulfide	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
79-20-9	Methyl Acetate	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
75-09-2	Methylene Chloride	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
156-60-5	trans-1,2-Dichloroethene	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
75-34-3	1,1-Dichloroethane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
78-93-3	2-Butanone	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
156-59-4	cis-1,2-Dichloroethene	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
67-66-3	Chloroform	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
74-97-5	Bromochloromethane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
110-82-7	Cyclohexane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
71-55-6	1,1,1-Trichloroethane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
75-65-0	t-Butyl alcohol	ND	7.49	30.0	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
56-23-5	Carbon Tetrachloride	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
107-06-2	1,2-Dichloroethane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
71-43-2	Benzene	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
79-01-6	Trichloroethene	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	

Accredited Analytical Resources LLC

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Daniel Miguel, Technical Director

ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:43

Client ID: N

Lab ID: 1901594-01 (Soil)

Accredited Analytical Resources LLC

Volatile Organic Compounds EPA Method SW846 8260C

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
108-87-2	Methylcyclohexane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
78-87-5	1,2-Dichloropropane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
75-27-4	Bromodichloromethane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
10061-01-5	cis-1,3-Dichloropropene	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
108-88-3	Toluene	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
10061-02-6	trans-1,3-Dichloropropene	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
79-00-5	1,1,2-Trichloroethane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
108-10-1	4-Methyl-2-pentanone	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
106-93-4	1,2-Dibromoethane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
591-78-6	2-Hexanone	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
127-18-4	Tetrachloroethene	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
124-48-1	Dibromochloromethane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
100-41-4	Ethylbenzene	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
108-90-7	Chlorobenzene	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
108-38-3/106-4	m,p-Xylenes	ND	3.00	5.99	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
95-47-6	o-Xylene	ND	3.00	5.99	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
100-42-5	Styrene	ND	1.50	5.99	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
75-25-2	Bromoform	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
98-82-8	Isopropylbenzene	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
541-73-1	1,3-Dichlorobenzene	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
106-46-7	1,4-Dichlorobenzene	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
95-50-1	1,2-Dichlorobenzene	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
120-82-1	1,2,4-Trichlorobenzene	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
87-61-6	1,2,3-Trichlorobenzene	ND	1.50	3.00	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
1634-04-4	Methyl tert-Butyl Ether	ND	3.00	5.99	ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	
NA	**TIC: unknown**	**9.46**			ug/kg dry	1	09/30/19 19:35	09/30/19 19:35/DSM	EPA 8260C	J

Accredited Analytical Resources LLC

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Daniel Miguel, Technical Director

Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:43

Client ID: N

Lab ID: 1901594-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
	Accredited Analytical Resources LLC									
Volatile Organic Compounds EPA Method SW846 8260C										
Surrogate: 1,2-Dichloroethane-d4				*101 %*	*74-146*		*09/30/19 19:35*	*09/30/19 19:35/DSM*	*EPA 8260C*	
Surrogate: Toluene-d8				*94 %*	*70-121*		*09/30/19 19:35*	*09/30/19 19:35/DSM*	*EPA 8260C*	
Surrogate: Bromofluorobenzene				*65 %*	*28-133*		*09/30/19 19:35*	*09/30/19 19:35/DSM*	*EPA 8260C*	
	Sum of Tentatively Identified Compounds	9.46								
Semivolatile Organic Compounds EPA Method SW846 8270D										
Sample Prepared by Method:EPA 3546 GCMS										
62-75-9	N-Nitrosodimethylamine	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
100-52-7	Benzaldehyde	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
108-95-2	Phenol	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
111-44-4	bis(2-chloroethyl)ether	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
95-57-8	2-Chlorophenol	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
95-48-7	2-Methylphenol	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
39638-32-9	bis(2-chloroisopropyl)ether	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
98-86-2	Acetophenone	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
106-44-5	3 & 4-Methylphenol	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
621-64-7	N-Nitroso-di-n-propylamine	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
67-72-1	Hexachloroethane	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
98-95-3	Nitrobenzene	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
78-59-1	Isophorone	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
88-75-5	2-Nitrophenol	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
105-67-9	2,4-Dimethylphenol	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
111-91-1	bis(2-chloroethoxy)methane	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
120-83-2	2,4-Dichlorophenol	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
91-20-3	Naphthalene	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
106-47-8	4-Chloroaniline	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
87-68-3	Hexachlorobutadiene	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
105-60-2	Caprolactam	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:43

Client ID: N

Lab ID: 1901594-01 (Soil)

Accredited Analytical Resources LLC

Semivolatile Organic Compounds EPA Method SW846 8270D

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
59-50-7	4-Chloro-3-methylphenol	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
91-57-6	2-Methylnaphthylene	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
77-47-4	Hexachlorocyclopentadiene	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
88-06-2	2,4,6-Trichlorophenol	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
95-95-4	2,4,5-Trichlorophenol	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
91-58-7	2-Chloronaphthalene	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
92-52-4	1,1-Biphenyl	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
88-74-4	2-Nitroaniline	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
131-11-3	Dimethylphthalate	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
208-96-8	Acenaphthylene	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
99-09-2	3-Nitroaniline	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
83-32-9	Acenaphthene	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
51-28-5	2,4-Dinitrophenol	ND	54.8	275	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
100-02-7	4-Nitrophenol	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
132-64-9	Dibenzofuran	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
606-20-2	2,6-Dinitrotoluene	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
121-14-2	2,4-Dinitrotoluene	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
84-66-2	Diethyl phthalate	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
7005-72-3	4-Chlorophenyl-phenylether	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
86-73-7	Fluorene	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
100-01-6	4-Nitroaniline	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
534-52-1	4,6-Dinitro-2-methylphenol	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
86-74-8	Carbazole	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
86-30-6	N-Nitrosodiphenylamine	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
122-66-7	1,2-Diphenylhydrazine	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
103-33-3	Azobenzene	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:43

Client ID: N

Lab ID: 1901594-01 (Soil)

Accredited Analytical Resources LLC

Semivolatile Organic Compounds EPA Method SW846 8270D

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
101-55-3	4-Bromophenyl-phenylether	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
1912-24-9	Atrazine	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
118-74-1	Hexachlorobenzene	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
87-86-5	Pentachlorophenol	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
85-01-8	**Phenanthrene**	**255**	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
120-12-7	Anthracene	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
84-74-2	Di-n-butyl phthalate	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
206-44-0	**Fluoranthene**	**439**	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
92-87-5	Benzidine	ND	137	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
129-00-0	**Pyrene**	**697**	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
85-68-7	Butylbenzylphthalate	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
91-94-1	3,3'-Dichlorobenzidine	ND	137	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
56-55-3	**Benzo[a]anthracene**	**258**	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
117-81-7	**bis(2-ethylhexyl)phthalate**	**285**	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
218-01-9	**Chrysene**	**334**	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
117-84-0	Di-n-octyl phthalate	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
205-99-2	**Benzo[b]fluoranthene**	**578**	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
207-08-9	**Benzo[k]fluoranthene**	**253**	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
50-32-8	**Benzo[a]pyrene**	**319**	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
193-39-5	**Indeno(1,2,3-cd)pyrene**	**143**	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
53-70-3	Dibenzo(a,h)anthracene	ND	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
191-24-2	**Benzo[ghi]perylene**	**166**	54.8	137	ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	
000629-96-9	**TIC: 1-Eicosanol (CAS) $$ n-Eicosanol**	**319**			ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	J
001454-84-8	**TIC: 1-Nonadecanol $$ Nonadecyl alcol**	**244**			ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	J
000629-97-0	**TIC: Docosane (CAS) $$ n-Docosane $$**	**1880**			ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	J
000112-95-8	**TIC: Eicosane (CAS) $$ n-Eicosane**	**519**			ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	J
000629-94-7	**TIC: Heneicosane (CAS) $$ n-Heneicos**	**599**			ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	J

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Daniel Miguel, Technical Director

ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:43

Client ID: N

Lab ID: 1901594-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
					Accredited Analytical Resources LLC					
Semivolatile Organic Compounds EPA Method SW846 8270D										
000057-10-3	**TIC: Hexadecanoic acid (CAS) $$ Palm**	**604**			ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	J
000638-66-4	**TIC: Octadecanal (CAS) $$ Stearaldehy**	**596**			ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	J
000057-11-4	**TIC: Octadecanoic acid (CAS) $$ Stear**	**382**			ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	J
055282-17-2	**TIC: Tetracosane, 3-ethyl- (CAS) $$ 3-E**	**2000**			ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	J
NA	**TIC: unknown (01)**	**304**			ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	J
NA	**TIC: unknown (02)**	**876**			ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	J
NA	**TIC: unknown (03)**	**434**			ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	J
NA	**TIC: unknown hydrocarbon**	**368**			ug/kg dry	1	10/02/19 05:34	10/02/19 19:44/DSM	EPA 8270D	J
Surrogate: 2-Fluorophenol				*33 %*	*41-102*	*	*10/02/19 05:34*	*10/02/19 19:44/DSM*	*EPA 8270D*	
Surrogate: Phenol-d5				*35 %*	*47-113*	*	*10/02/19 05:34*	*10/02/19 19:44/DSM*	*EPA 8270D*	
Surrogate: Nitrobenzene-d5				*35 %*	*38-100*	*	*10/02/19 05:34*	*10/02/19 19:44/DSM*	*EPA 8270D*	
Surrogate: 2-Fluorobiphenyl				*34 %*	*38-88*	*	*10/02/19 05:34*	*10/02/19 19:44/DSM*	*EPA 8270D*	
Surrogate: 2,4,6-Tribromophenol				*40 %*	*40-129*		*10/02/19 05:34*	*10/02/19 19:44/DSM*	*EPA 8270D*	
Surrogate: Terphenyl-d14				*69 %*	*31-145*		*10/02/19 05:34*	*10/02/19 19:44/DSM*	*EPA 8270D*	
Sum of Tentatively Identified Compounds		9,123.41								
Semivolatile Organic Compounds in SPLP Extracts by GC/MS										
Sample Prepared by Method:EPA 3510C GCMS										
50-32-8	Benzo[a]pyrene	ND	0.0500	0.0500	ug/L	1	10/07/19 11:51	10/07/19 21:18/DSM	EPA 8270D SIM	
EPA Method SW846 8081B/8082A										
Sample Prepared by Method:EPA 3546										
319-84-6	alpha-BHC	ND	0.543	0.543	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
319-85-7	beta-BHC	ND	0.543	0.543	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
319-86-8	delta-BHC	ND	0.543	0.543	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
58-89-9	gamma-BHC [Lindane]	ND	0.543	0.543	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:43

Client ID: N

Lab ID: 1901594-01 (Soil)

Accredited Analytical Resources LLC

EPA Method SW846 8081B/8082A

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
76-44-8	Heptachlor	ND	0.543	0.543	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
309-00-2	Aldrin	ND	0.543	0.543	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
1024-57-3	Heptachlor Epoxide	ND	0.543	0.543	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
959-98-8	Endosulfan I	ND	0.543	0.543	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
60-57-1	Dieldrin	ND	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
72-55-9	**4,4'-DDE**	**75.7**	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	PE
72-20-8	Endrin	ND	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
33213-65-9	Endosulfan II	ND	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
72-54-8	**4,4'-DDD**	**59.5**	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	PE
1031-07-8	Endosulfan sulfate	ND	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
50-29-3	**4,4'-DDT**	**117**	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	PE
72-43-5	Methoxychlor	ND	1.64	5.48	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
53494-70-5	Endrin ketone	ND	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
7421-93-4	Endrin aldehyde	ND	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
5103-71-9	**alpha-Chlordane**	**16.0**	0.543	0.543	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	P
5566-34-7	**gamma-Chlordane**	**25.0**	0.543	0.543	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	E
8001-35-2	Toxaphene	ND	27.4	27.4	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
12674-11-2	Aroclor-1016	ND	13.7	27.4	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
11104-28-2	Aroclor-1221	ND	13.7	27.4	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
11141-16-5	Aroclor-1232	ND	13.7	27.4	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
53469-21-9	Aroclor-1242	ND	13.7	27.4	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
12672-29-6	Aroclor-1248	ND	13.7	27.4	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	

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ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:43

Client ID: N

Lab ID: 1901594-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
					Accredited Analytical Resources LLC					
EPA Method SW846 8081B/8082A										
11097-69-1	Aroclor-1254	ND	13.7	27.4	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
11096-82-5	Aroclor-1260	ND	13.7	27.4	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
37324-23-5	Aroclor-1262	ND	13.7	27.4	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
11100-14-4	Aroclor-1268	ND	13.7	27.4	ug/kg dry	1	10/01/19 05:55	10/01/19 14:36/JAM	EPA 8081B/8082A	
Surrogate: Tetrachloro-m-xylene				*33.5 %*	*27-137*		*10/01/19 05:55*	*10/01/19 14:36/JAM*	*EPA 8081B/8082A*	
Surrogate: Tetrachloro-m-xylene				*36.5 %*	*39-138*	*	*10/01/19 05:55*	*10/01/19 14:36/JAM*	*EPA 8081B/8082A*	
Surrogate: Decachlorobiphenyl				*35.0 %*	*21-150*		*10/01/19 05:55*	*10/01/19 14:36/JAM*	*EPA 8081B/8082A*	
Surrogate: Decachlorobiphenyl				*40.1 %*	*24-171*		*10/01/19 05:55*	*10/01/19 14:36/JAM*	*EPA 8081B/8082A*	
Total Metals by EPA Method SW846 6010D										
Sample Prepared by Method:EPA 3050B										
7429-90-5	**Aluminum**	**7110**	54.3	551	mg/kg dry	50	10/01/19 09:06	10/01/19 17:41/LIT	EPA 6010D	D
7440-36-0	Antimony	ND	0.269	2.21	mg/kg dry	1	10/01/19 09:06	10/01/19 17:36/LIT	EPA 6010D	
7440-38-2	**Arsenic**	**18.0**	0.145	0.551	mg/kg dry	1	10/01/19 09:06	10/01/19 17:36/LIT	EPA 6010D	
7440-39-3	**Barium**	**117**	1.77	11.0	mg/kg dry	1	10/01/19 09:06	10/01/19 17:36/LIT	EPA 6010D	
7440-41-7	**Beryllium**	**0.515**	0.0243	0.276	mg/kg dry	1	10/01/19 09:06	10/01/19 17:36/LIT	EPA 6010D	
7440-43-9	**Cadmium**	**8.00**	0.0265	0.276	mg/kg dry	1	10/01/19 09:06	10/01/19 17:36/LIT	EPA 6010D	
7440-70-2	**Calcium**	**9370**	120	689	mg/kg dry	50	10/01/19 09:06	10/01/19 17:41/LIT	EPA 6010D	D
7440-47-3	**Chromium**	**23.6**	0.155	1.10	mg/kg dry	1	10/01/19 09:06	10/01/19 17:36/LIT	EPA 6010D	
7440-48-4	**Cobalt**	**8.38**	0.297	2.76	mg/kg dry	1	10/01/19 09:06	10/01/19 17:36/LIT	EPA 6010D	
7440-50-8	**Copper**	**140**	0.178	1.65	mg/kg dry	1	10/01/19 09:06	10/01/19 17:36/LIT	EPA 6010D	
7439-89-6	**Iron**	**20100**	77.7	689	mg/kg dry	50	10/01/19 09:06	10/01/19 17:41/LIT	EPA 6010D	D
7439-92-1	**Lead**	**149**	0.0557	0.551	mg/kg dry	1	10/01/19 09:06	10/01/19 17:36/LIT	EPA 6010D	
7439-95-4	**Magnesium**	**3020**	197	1380	mg/kg dry	50	10/01/19 09:06	10/01/19 17:41/LIT	EPA 6010D	D
7439-96-5	**Manganese**	**200**	0.184	1.10	mg/kg dry	1	10/01/19 09:06	10/01/19 17:36/LIT	EPA 6010D	

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ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:43

Client ID: N

Lab ID: 1901594-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
				Accredited Analytical Resources LLC						
Total Metals by EPA Method SW846 6010D										
7440-02-0	**Nickel**	**42.8**	0.271	2.21	mg/kg dry	1	10/01/19 09:06	10/01/19 17:36/LIT	EPA 6010D	
7440-09-7	**Potassium**	**747**	3.31	27.6	mg/kg dry	1	10/01/19 09:06	10/01/19 17:36/LIT	EPA 6010D	
7782-49-2	**Selenium**	**2.29**	0.235	2.21	mg/kg dry	1	10/01/19 09:06	10/01/19 17:36/LIT	EPA 6010D	
7440-22-4	**Silver**	**2.41**	0.0513	0.276	mg/kg dry	1	10/01/19 09:06	10/01/19 17:36/LIT	EPA 6010D	
7440-23-5	**Sodium**	**225**	2.48	27.6	mg/kg dry	1	10/01/19 09:06	10/01/19 17:36/LIT	EPA 6010D	
7440-28-0	Thallium	ND	0.162	1.65	mg/kg dry	1	10/01/19 09:06	10/02/19 13:20/LIT	EPA 6010D	
7440-62-2	**Vanadium**	**32.3**	1.03	2.76	mg/kg dry	1	10/01/19 09:06	10/01/19 17:36/LIT	EPA 6010D	
7440-66-6	**Zinc**	**696**	17.1	165	mg/kg dry	50	10/01/19 09:06	10/01/19 17:41/LIT	EPA 6010D	D
SPLP Metals by SW846 6010D										
Sample Prepared by Method:EPA 3010A										
7440-43-9	**SPLP Cadmium**	**1.00**	0.951	4.00	ug/L	1	10/07/19 09:35	10/07/19 17:00/LIT	1312/6010D	J
7439-92-1	**SPLP Lead**	**41.4**	1.59	5.00	ug/L	1	10/07/19 09:35	10/09/19 11:24/LIT	1312/6010D	
Total Mercury by SW846 7471B										
Sample Prepared by Method:EPA 7471B										
7439-97-6	**Mercury**	**12.4**	0.822	0.822	mg/kg dry	10	10/03/19 08:30	10/03/19 14:56/BFG	EPA 7471B	D
SPLP Mercury by SW846 7470A										
Sample Prepared by Method:EPA 7470A										
7439-97-6	SPLP Mercury	ND	0.0200	0.500	ug/L	1	10/09/19 08:21	10/09/19 15:23/BFG	1312/7470A	
Wet Chemistry										
Sample Prepared by Method:EPA 9010C										
NA	Cyanide (total)	ND	0.0548	1.10	mg/kg dry	1	09/30/19 09:00	09/30/19 15:43/NNM	EPA 9014	
Sample Prepared by Method:Percent Solids										
NA	**Percent Solids**	**91.2**	0.100	0.100	%	1	09/30/19 14:03	10/01/19 08:40/NIN	SM 2540 G	
Extractable Petroleum Hydrocarbons by NJ EPH										

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ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:43

Client ID: N

Lab ID: 1901594-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
	Accredited Analytical Resources LLC									
Extractable Petroleum Hydrocarbons by NJ EPH										
Sample Prepared by Method:EPA 3546										
NA	**Extractable Petroleum Hydrocarbons (I**	**241**	17.5	17.5	mg/kg dry	1	09/30/19 13:35	10/02/19 16:23/MS	NJDEP EPH	
Surrogate: o-Terphenyl				*67.1 %*	*40-140*		*09/30/19 13:35*	*10/02/19 16:23/MS*	*NJDEP EPH*	
Surrogate: 1-Chlorooctadecane				*109 %*	*40-140*		*09/30/19 13:35*	*10/02/19 16:23/MS*	*NJDEP EPH*	

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ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:43

Client ID: N

Lab ID: 1901594-01RE1 (Soil)

Accredited Analytical Resources LLC

Semivolatile Organic Compounds EPA Method SW846 8270D

Sample Prepared by Method:EPA 3546 GCMS

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
62-75-9	N-Nitrosodimethylamine	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
100-52-7	Benzaldehyde	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
108-95-2	Phenol	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
111-44-4	bis(2-chloroethyl)ether	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
95-57-8	2-Chlorophenol	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
95-48-7	2-Methylphenol	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
39638-32-9	bis(2-chloroisopropyl)ether	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
98-86-2	Acetophenone	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
106-44-5	3 & 4-Methylphenol	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
621-64-7	N-Nitroso-di-n-propylamine	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
67-72-1	Hexachloroethane	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
98-95-3	Nitrobenzene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
78-59-1	Isophorone	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
88-75-5	2-Nitrophenol	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
105-67-9	2,4-Dimethylphenol	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
111-91-1	bis(2-chloroethoxy)methane	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
120-83-2	2,4-Dichlorophenol	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
91-20-3	Naphthalene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
106-47-8	4-Chloroaniline	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
87-68-3	Hexachlorobutadiene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
105-60-2	Caprolactam	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
59-50-7	4-Chloro-3-methylphenol	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
91-57-6	2-Methylnaphthylene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
77-47-4	Hexachlorocyclopentadiene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
88-06-2	2,4,6-Trichlorophenol	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
95-95-4	2,4,5-Trichlorophenol	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	

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ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:43

Client ID: N

Lab ID: 1901594-01RE1 (Soil)

Accredited Analytical Resources LLC

Semivolatile Organic Compounds EPA Method SW846 8270D

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
91-58-7	2-Chloronaphthalene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
92-52-4	1,1-Biphenyl	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
88-74-4	2-Nitroaniline	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
131-11-3	Dimethylphthalate	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
208-96-8	Acenaphthylene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
99-09-2	3-Nitroaniline	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
83-32-9	Acenaphthene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
51-28-5	2,4-Dinitrophenol	ND	274	1370	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
100-02-7	4-Nitrophenol	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
132-64-9	Dibenzofuran	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
606-20-2	2,6-Dinitrotoluene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
121-14-2	2,4-Dinitrotoluene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
84-66-2	Diethyl phthalate	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
7005-72-3	4-Chlorophenyl-phenylether	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
86-73-7	Fluorene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
100-01-6	4-Nitroaniline	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
534-52-1	4,6-Dinitro-2-methylphenol	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
86-74-8	Carbazole	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
86-30-6	N-Nitrosodiphenylamine	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
122-66-7	1,2-Diphenylhydrazine	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
103-33-3	Azobenzene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
101-55-3	4-Bromophenyl-phenylether	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
1912-24-9	Atrazine	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
118-74-1	Hexachlorobenzene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
87-86-5	Pentachlorophenol	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
85-01-8	Phenanthrene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
120-12-7	Anthracene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	

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ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:43

Client ID: N

Lab ID: 1901594-01RE1 (Soil)

Accredited Analytical Resources LLC

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
Semivolatile Organic Compounds EPA Method SW846 8270D										
84-74-2	Di-n-butyl phthalate	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
206-44-0	**Fluoranthene**	**482**	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	JD
92-87-5	Benzidine	ND	683	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
129-00-0	**Pyrene**	**450**	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	JD
85-68-7	Butylbenzylphthalate	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
91-94-1	3,3'-Dichlorobenzidine	ND	683	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
56-55-3	**Benzo[a]anthracene**	**282**	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	JD
117-81-7	bis(2-ethylhexyl)phthalate	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
218-01-9	**Chrysene**	**340**	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	JD
117-84-0	Di-n-octyl phthalate	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
205-99-2	**Benzo[b]fluoranthene**	**581**	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	JD
207-08-9	Benzo[k]fluoranthene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
50-32-8	**Benzo[a]pyrene**	**302**	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	JD
193-39-5	Indeno(1,2,3-cd)pyrene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
53-70-3	Dibenzo(a,h)anthracene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
191-24-2	Benzo[ghi]perylene	ND	274	685	ug/kg dry	5	10/02/19 05:34	10/03/19 14:58/DSM	EPA 8270D	
Surrogate: 2-Fluorophenol				*33 %*	*41-102*	*	*10/02/19 05:34*	*10/03/19 14:58/DSM*	*EPA 8270D*	
Surrogate: Phenol-d5				*36 %*	*47-113*	*	*10/02/19 05:34*	*10/03/19 14:58/DSM*	*EPA 8270D*	
Surrogate: Nitrobenzene-d5				*34 %*	*38-100*	*	*10/02/19 05:34*	*10/03/19 14:58/DSM*	*EPA 8270D*	
Surrogate: 2-Fluorobiphenyl				*36 %*	*38-88*	*	*10/02/19 05:34*	*10/03/19 14:58/DSM*	*EPA 8270D*	
Surrogate: 2,4,6-Tribromophenol				*38 %*	*40-129*	*	*10/02/19 05:34*	*10/03/19 14:58/DSM*	*EPA 8270D*	
Surrogate: Terphenyl-d14				*43 %*	*31-145*		*10/02/19 05:34*	*10/03/19 14:58/DSM*	*EPA 8270D*	
EPA Method SW846 8081B/8082A										
Sample Prepared by Method:EPA 3546										
319-84-6	alpha-BHC	ND	2.71	2.71	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
319-85-7	beta-BHC	ND	2.71	2.71	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	

Accredited Analytical Resources LLC

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Daniel Miguel, Technical Director

ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:43

Client ID: N

Lab ID: 1901594-01RE1 (Soil)

Accredited Analytical Resources LLC

EPA Method SW846 8081B/8082A

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
319-86-8	delta-BHC	ND	2.71	2.71	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
58-89-9	gamma-BHC [Lindane]	ND	2.71	2.71	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
76-44-8	Heptachlor	ND	2.71	2.71	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
309-00-2	Aldrin	ND	2.71	2.71	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
1024-57-3	Heptachlor Epoxide	ND	2.71	2.71	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
959-98-8	Endosulfan I	ND	2.71	2.71	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
60-57-1	Dieldrin	ND	5.47	5.47	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
72-55-9	**4,4'-DDE**	**113**	5.47	5.47	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	D
72-20-8	Endrin	ND	5.47	5.47	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
33213-65-9	Endosulfan II	ND	5.47	5.47	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
72-54-8	**4,4'-DDD**	**86.2**	5.47	5.47	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	D
1031-07-8	Endosulfan sulfate	ND	5.47	5.47	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
50-29-3	**4,4'-DDT**	**175**	5.47	5.47	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	D
72-43-5	Methoxychlor	ND	8.22	27.4	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
53494-70-5	Endrin ketone	ND	5.47	5.47	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
7421-93-4	Endrin aldehyde	ND	5.47	5.47	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
5103-71-9	alpha-Chlordane	ND	2.71	2.71	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
5566-34-7	**gamma-Chlordane**	**29.7**	2.71	2.71	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	D
8001-35-2	Toxaphene	ND	137	137	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
12674-11-2	Aroclor-1016	ND	68.3	137	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
11104-28-2	Aroclor-1221	ND	68.3	137	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
11141-16-5	Aroclor-1232	ND	68.3	137	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:43

Client ID: N

Lab ID: 1901594-01RE1 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes

Accredited Analytical Resources LLC

EPA Method SW846 8081B/8082A

53469-21-9	Aroclor-1242	ND	68.3	137	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
12672-29-6	Aroclor-1248	ND	68.3	137	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
11097-69-1	Aroclor-1254	ND	68.3	137	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
11096-82-5	Aroclor-1260	ND	68.3	137	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
37324-23-5	Aroclor-1262	ND	68.3	137	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
11100-14-4	Aroclor-1268	ND	68.3	137	ug/kg dry	5	10/01/19 05:55	10/02/19 16:31/JAM	EPA 8081B/8082A	
Surrogate: Tetrachloro-m-xylene				*43.5 %*	*27-137*		*10/01/19 05:55*	*10/02/19 16:31/JAM*	*EPA 8081B/8082A*	
Surrogate: Tetrachloro-m-xylene				*51.5 %*	*39-138*		*10/01/19 05:55*	*10/02/19 16:31/JAM*	*EPA 8081B/8082A*	
Surrogate: Decachlorobiphenyl				*44.0 %*	*21-150*		*10/01/19 05:55*	*10/02/19 16:31/JAM*	*EPA 8081B/8082A*	
Surrogate: Decachlorobiphenyl				*34.0 %*	*24-171*		*10/01/19 05:55*	*10/02/19 16:31/JAM*	*EPA 8081B/8082A*	

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

SPLP PREPARATION BENCH SHEET

B9J0601

Accredited Analytical Resources LLC

Matrix: Solid **Prepared using: EPA 1312** **Printed: 10/10/2019 3:38:46PM**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	% Moisture	Extraction Comments
1901591-02	SPLP Extraction	10/06/2019 12:51	100	2000	19.80	pH on: 4.83 / pH off: 9.96
1901594-01	SPLP Extraction	10/06/2019 12:51	100	2000	8.80	pH on: 5.86 / pH off: 9.99
1901595-01	SPLP Extraction	10/06/2019 12:51	100	2000	6.30	pH on: 5.38 / pH off: 9.94
1901596-01	SPLP Extraction	10/06/2019 12:51	100	2000	8.40	pH on: 4.98 / pH off: 9.92
1901597-01	SPLP Extraction	10/06/2019 12:51	100	2000	4.60	pH on: 5.46 / pH off: 10.05
B9J0601-BLK1	QC	10/06/2019 12:51	100	2000		

Environmental & Geotechnical Services, LLC
301 Fairfield Rd
Fairfield, NJ 07004
Tel. 973-808-6600 Fax 888-707-7819

CHAIN OF CUSTODY RECORD

SITE NAME: 366-394 Wilson Ave Rear
ADDRESS: 366-394 Wilson Avenue Rear 07105

1001594

EGS Sample ID	Laboratory ID	Sample Matrix	Grab/ Comp.	# of jars	Date/Time Collected	Collected By	Sample Location	Analysis Requested	Method
N	-01	SO	Grab	5	9/26/2019 13:13	JK	See Map	TCL/TAL+30, EPH (Cat 1)	-01

Preservatives used: HCL NaOH H2SO4 HNO3 Na2SO3 Other: Encores

Cooler temp upon receipt: 6°C

Samples received in good condition? ✓ Yes ____ No

Sample matrix code: **GW**=groundwater **SW**=surface water **SR**=stormwater runoff **DW**=drinking water **So**=soil **Sl**=sludge **Se**=sediment **WW**=wastewater **P**=product

Notes: Please include Excel spreadsheet and EDDs.

Turnaround Time: 5 DAY TAT

RUSH (days or hours): 5 Day TAT

Analytical Data Deliverables (encircle):
Full Deliverables (NJAC 7:26E-2.1) — *Reduced Deliverables (NJAC 7:26E-2.1)* — *CLP-I or CLP-II (USEPA)* — *Other (specified below)* ____

Relinquished by (1): Jane Reese	Organization: EGS	Date/Time: 9/27/2019	Request for change(s):
Received by (1): Josh Brown	Organization: AAR	Date/Time: 9/27/19 11:36	
Relinquished by (2): Josh Brown	Organization: AAR	Date/Time: 9/27/19	
Received by (2): Nydia Nieves	Organization: AAR	Date/Time: 9-27-19 13:55	
Relinquished by (3):	Organization:	Date/Time:	Contact Person:
Received by (3):	Organization:	Date/Time:	Lab Case No: Job No:

Accredited Analytical Resources, LLC.

Customer Change Order

Initiator:	Bernie	**Date:**	10-7-19
Client:	EGS	**Phone No.:**	
Contact:	Jim K.	**Fax No.:**	
Work Order No.:	1901594	**E-Mail Address:**	
Date Sampled:	9-26-19	**Demand Date:**	10-10-19
		Holding Time Up on:	10-10-19

Change Order Request:

Analyze sample 01 for SPLP benzo(a)pyrene/Hg/Cd/Pb

Remarks:

Rose, Neceta, Atoy, Betty

Kathy, Nydia

DOC#: QA/QC-5

Bernie O'Gara

From: Jim Kelly [jkelly@eandgservices.com]
Sent: Friday, October 04, 2019 6:57 PM
To: Bernie O'Gara
Cc: (kberkowska@eandgservices.com); ccrum@eandgservices.com; malcala@eandgservices.com; Daniel Miguel
Subject: Re: AAR Case 1901594, EGS, 366-394 Wilson Ave Rear Project Results and Spreadsheet
Attachments: 1901594 RFC 100419.pdf

Hi Bernie,

Sorry for the late notice; however please find attached a request for change for this work order. My e-mail was having issues over the last few hours.

Specifically, as indicated on the attached, please perform SPLP analysis on the following for this sample: **benzo(a)pyrene, mercury, cadmium and lead.**

Please perform the SPLP analysis on a rush turnaround time. Please complete the SPLP analysis ASAP. Per a discussion with Danny earlier today, it was indicated that the SPLP results can be completed and sent to us by next Thursday 10/10/19.

Thanks,

Jim

James Kelly

Project Manager

Environmental and Geotechnical Services, LLC

Direct: 973-417-8599

Office: 973-808-6600

Fax: 888-707-7819

301 Fairfield Rd, Fairfield, NJ 07004

Email: jkelly@eandgservices.com

On Fri, Oct 4, 2019 at 3:19 PM Bernie O'Gara <Bernie@accreditedanalytical.com> wrote:

> Bernie O'Gara

Accredited Analytical Resources, LLC
20 Pershing Ave. Carteret, NJ 07008
Ph. 732.969.6112 | Fx. 732.541.1383

www.accreditedanalytical.com

Environmental & Geotechnical Services, LLC
301 Fairfield Rd
Fairfield, NJ 07004
Tel. 973-808-6600 Fax 888-707-7819

CHAIN OF CUSTODY RECORD

Page 1 of 1

SITE NAME: 366-394 Wilson Ave Rear
ADDRESS: 366-394 Wilson Avenue Rear 07105

1001594

EGS Sample ID	Laboratory ID	Sample Matrix	Grab/ Comp.	# of jars	Date/Time Collected	Collected By	Sample Location	Analysis Requested	Method
N	-01	SO	Grab	5	9/26/2019-13:13	JK	See map	TCL/TAL+30, EPH (Cat 1)	-01

Preservatives used: HCL NaOH H2SO4 HNO3 Na2SO3 Other: Encores

Cooler temp upon receipt: 6°C.

Samples received in good condition? ✓ Yes ____ No

Sample matrix code: **GW**=groundwater **SW**=surface water **SR**=stormwater runoff **DW**=drinking water **So**=soil **Sl**=sludge **Se**=sediment **WW**=wastewater **P**=product

Notes: Please include Excel spreadsheet and EDDs.

Turnaround Time: 5 DAY TAT

RUSH (days or hours): 5 Day TAT

Analytical Data Deliverables (encircle):
Full Deliverables (NJAC 7:26E-2.1) — *Reduced Deliverables (NJAC 7:26E-2.1)* — *CLP-I or CLP-II (USEPA)* — *Other (specified below)* ____

Relinquished by (1): Jane Reed	Organization: EGS	Date/Time: 9/27/2019	Request for change(s): 10/4/19 RFC- Please perform SPLP benzo(a) Pyrene, mercury, cadmium, and lead analysis on this sample.
Received by (1): Josh Brown	Organization: AAR	Date/Time: 9/27/19 11:36	
Relinquished by (2): Josh Brown	Organization: AAR	Date/Time: 9/27/19	
Received by (2): Nydia Nieves	Organization: AAR	Date/Time: 9-27-19 13:55	
Relinquished by (3):	Organization:	Date/Time:	Contact Person:
Received by (3):	Organization:	Date/Time:	Lab Case No: Job No:

Accredited Analytical Resources, LLC.

10 October 2019 AAR Work Order: 1901597

James Kelly
ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield, NJ 07004

Project: 366-394 Wilson Ave Rear

Enclosed are the results of analyses for samples received by the laboratory on 09/27/2019 13:55. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Daniel Miguel
Technical Director

New Jersey Certification Number: 12007
New York Certification Number: 11109
Pennsylvania Certification Number: 68-02799
CT Certification Number: PH-0219

Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 16:00

Analytical Report for Samples

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
NE	1901597-01	Soil	09/26/2019 10:18	09/27/2019 13:55

Notes and Definitions

* Values outside of QC limits
ND - Indicates compound analyzed for but not detected at or above the MDL
J - Indicates estimated value for TICs and all results when detected below the RL
B - Indicates compound found in associated blank
E - Concentration exceeds highest calibration standard
D - Indicates result is based on a dilution
P - Greater than 25% diff. between 2 GC columns.
MDL - Minimum detection limit
RL - Reporting limit
VC - The container(s) provided by the client for soil volatiles do not meet the requirements of EPA SW846-5035A. Results reported below 200 ug/kg may be biased low due to samples not being collected according to EPA SW846 5035A requirements.

Conformance / Non-Conformance Summary

AAR Work Order:**1901597**

Accredited Analytical Resources, LLC received 1 sample(s) from ENVIRONMENTAL & GEOTECHNICAL (Project: 366-394 Wilson Ave Rear) on 09/27/2019 13:55.

On 10/7/19, the client requested SPLP Benzo(a)pyrene, SPLP Cadmium, SPLP Lead and SPLP Mercury. The results are included in this data package.

All analyses were performed within the required holding time.

Except for the parameters tested AAR makes no representation as to the fitness or quality of the sample (s) taken.

"The laboratory has reviewed the quality assurance and quality control measurements for the sample analyses."

Daniel Miguel
Technical Director

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Methodology Summary

EPA Method SW846 8081B/8082A:
NY 8081B/8082A

Extractable Petroleum Hydrocarbons by NJ EPH:
NJDEP EPH

Semivolatile Organic Compounds EPA Method SW846 8270:
8270D

Semivolatile Organic Compounds in SPLP Extracts by GC/MS:
1312/8270D

SPLP Mercury by SW846 7470:
1312/7470

SPLP Metals by SW846 6010:
1312/6010D

Total Mercury by SW846 7471:
EPA 7471B

Total Metals by EPA Method SW846 6010:
6010D

Volatile Organic Compounds EPA Method SW846 8260:
8260C

Wet Chemistry:
Total Cyanide by EPA 9010C & EPA 9014
Percent Solids by SM 2540 G

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 16:00

Condition of Samples on Receipt

Temperature °C	6.00
Chain of Custody Filled Out Properly	Yes
Received with Proper Containers	Yes
Received with Proper Volumes	Yes
Received Within Holding Time	Yes
Samples Received with Correct Preservation	Yes
Samples Received On Ice	Yes
Sample Received Via Field Services	Yes
Samples Hand Delivered	No

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 16:00

Client ID: NE

Lab ID: 1901597-01 (Soil)

Accredited Analytical Resources LLC

Volatile Organic Compounds EPA Method SW846 8260C

Sample Prepared by Method:EPA 5035A

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
107-02-8	Acrolein	ND	6.87	11.4	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
107-13-1	Acrylonitrile	ND	2.29	11.4	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
67-64-1	Acetone	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
75-71-8	Dichlorodifluoromethane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
74-87-3	Chloromethane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
75-01-4	Vinyl chloride	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
74-83-9	Bromomethane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
75-00-3	Chloroethane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
75-69-4	Trichlorofluoromethane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
76-13-1	Freon 113	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
75-35-4	1,1-Dichloroethene	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
75-15-0	Carbon disulfide	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
79-20-9	Methyl Acetate	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
75-09-2	Methylene Chloride	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
156-60-5	trans-1,2-Dichloroethene	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
75-34-3	1,1-Dichloroethane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
78-93-3	2-Butanone	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
156-59-4	cis-1,2-Dichloroethene	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
67-66-3	Chloroform	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
74-97-5	Bromochloromethane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
110-82-7	Cyclohexane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
71-55-6	1,1,1-Trichloroethane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
75-65-0	t-Butyl alcohol	ND	5.72	22.9	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
56-23-5	Carbon Tetrachloride	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
107-06-2	1,2-Dichloroethane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
71-43-2	Benzene	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
79-01-6	Trichloroethene	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 16:00

Client ID: NE

Lab ID: 1901597-01 (Soil)

Accredited Analytical Resources LLC

Volatile Organic Compounds EPA Method SW846 8260C

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
108-87-2	Methylcyclohexane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
78-87-5	1,2-Dichloropropane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
75-27-4	Bromodichloromethane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
10061-01-5	cis-1,3-Dichloropropene	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
108-88-3	Toluene	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
10061-02-6	trans-1,3-Dichloropropene	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
79-00-5	1,1,2-Trichloroethane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
108-10-1	4-Methyl-2-pentanone	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
106-93-4	1,2-Dibromoethane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
591-78-6	2-Hexanone	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
127-18-4	Tetrachloroethene	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
124-48-1	Dibromochloromethane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
100-41-4	Ethylbenzene	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
108-90-7	Chlorobenzene	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
108-38-3/106-4	m,p-Xylenes	ND	2.29	4.58	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
95-47-6	o-Xylene	ND	2.29	4.58	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
100-42-5	Styrene	ND	1.14	4.58	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
75-25-2	Bromoform	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
98-82-8	Isopropylbenzene	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
541-73-1	1,3-Dichlorobenzene	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
106-46-7	1,4-Dichlorobenzene	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
95-50-1	1,2-Dichlorobenzene	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
120-82-1	1,2,4-Trichlorobenzene	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
87-61-6	1,2,3-Trichlorobenzene	ND	1.14	2.29	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
1634-04-4	Methyl tert-Butyl Ether	ND	2.29	4.58	ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	
NA	**TIC: unknown hydrocarbon**	**8.30**			ug/kg dry	1	09/30/19 21:03	09/30/19 21:03/DSM	EPA 8260C	J

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 16:00

Client ID: NE

Lab ID: 1901597-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
	Accredited Analytical Resources LLC									
Volatile Organic Compounds EPA Method SW846 8260C										
Surrogate: 1,2-Dichloroethane-d4				*115 %*	*74-146*		*09/30/19 21:03*	*09/30/19 21:03/DSM*	*EPA 8260C*	
Surrogate: Toluene-d8				*96 %*	*70-121*		*09/30/19 21:03*	*09/30/19 21:03/DSM*	*EPA 8260C*	
Surrogate: Bromofluorobenzene				*72 %*	*28-133*		*09/30/19 21:03*	*09/30/19 21:03/DSM*	*EPA 8260C*	
	Sum of Tentatively Identified Compounds	8.30								
Semivolatile Organic Compounds EPA Method SW846 8270D										
Sample Prepared by Method:EPA 3546 GCMS										
62-75-9	N-Nitrosodimethylamine	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
100-52-7	Benzaldehyde	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
108-95-2	Phenol	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
111-44-4	bis(2-chloroethyl)ether	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
95-57-8	2-Chlorophenol	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
95-48-7	2-Methylphenol	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
39638-32-9	bis(2-chloroisopropyl)ether	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
98-86-2	Acetophenone	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
106-44-5	3 & 4-Methylphenol	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
621-64-7	N-Nitroso-di-n-propylamine	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
67-72-1	Hexachloroethane	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
98-95-3	Nitrobenzene	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
78-59-1	Isophorone	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
88-75-5	2-Nitrophenol	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
105-67-9	2,4-Dimethylphenol	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
111-91-1	bis(2-chloroethoxy)methane	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
120-83-2	2,4-Dichlorophenol	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
91-20-3	Naphthalene	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
106-47-8	4-Chloroaniline	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
87-68-3	Hexachlorobutadiene	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
105-60-2	Caprolactam	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 16:00

Client ID: NE

Lab ID: 1901597-01 (Soil)

Accredited Analytical Resources LLC

Semivolatile Organic Compounds EPA Method SW846 8270D

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
59-50-7	4-Chloro-3-methylphenol	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
91-57-6	2-Methylnaphthylene	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
77-47-4	Hexachlorocyclopentadiene	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
88-06-2	2,4,6-Trichlorophenol	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
95-95-4	2,4,5-Trichlorophenol	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
91-58-7	2-Chloronaphthalene	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
92-52-4	1,1-Biphenyl	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
88-74-4	2-Nitroaniline	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
131-11-3	Dimethylphthalate	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
208-96-8	Acenaphthylene	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
99-09-2	3-Nitroaniline	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
83-32-9	Acenaphthene	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
51-28-5	2,4-Dinitrophenol	ND	52.4	263	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
100-02-7	4-Nitrophenol	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
132-64-9	Dibenzofuran	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
606-20-2	2,6-Dinitrotoluene	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
121-14-2	2,4-Dinitrotoluene	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
84-66-2	Diethyl phthalate	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
7005-72-3	4-Chlorophenyl-phenylether	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
86-73-7	Fluorene	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
100-01-6	4-Nitroaniline	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
534-52-1	4,6-Dinitro-2-methylphenol	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
86-74-8	Carbazole	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
86-30-6	N-Nitrosodiphenylamine	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
122-66-7	1,2-Diphenylhydrazine	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
103-33-3	Azobenzene	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	

Accredited Analytical Resources LLC

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Daniel Miguel, Technical Director

Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 16:00

Client ID: NE

Lab ID: 1901597-01 (Soil)

Accredited Analytical Resources LLC

Semivolatile Organic Compounds EPA Method SW846 8270D

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
101-55-3	4-Bromophenyl-phenylether	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
1912-24-9	Atrazine	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
118-74-1	Hexachlorobenzene	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
87-86-5	Pentachlorophenol	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
85-01-8	**Phenanthrene**	**131**	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
120-12-7	Anthracene	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
84-74-2	Di-n-butyl phthalate	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
206-44-0	**Fluoranthene**	**300**	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
92-87-5	Benzidine	ND	131	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
129-00-0	**Pyrene**	**825**	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
85-68-7	Butylbenzylphthalate	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
91-94-1	3,3'-Dichlorobenzidine	ND	131	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
56-55-3	**Benzo[a]anthracene**	**227**	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
117-81-7	**bis(2-ethylhexyl)phthalate**	**945**	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
218-01-9	**Chrysene**	**290**	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
117-84-0	Di-n-octyl phthalate	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
205-99-2	**Benzo[b]fluoranthene**	**603**	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
207-08-9	**Benzo[k]fluoranthene**	**176**	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
50-32-8	**Benzo[a]pyrene**	**322**	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
193-39-5	**Indeno(1,2,3-cd)pyrene**	**176**	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
53-70-3	Dibenzo(a,h)anthracene	ND	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
191-24-2	**Benzo[ghi]perylene**	**211**	52.4	131	ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	
000000-00-0	**TIC: 1-Hexacosanal**	**1060**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	J
074685-33-9	**TIC: 3-Eicosene, (E)- (CAS)**	**235**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	J
000301-02-0	**TIC: 9-Octadecenamide, (Z)- (CAS) $$**	**781**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	J
000629-97-0	**TIC: Docosane (CAS) $$ n-Docosane $$**	**972**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	J
000544-76-3	**TIC: Hexadecane (CAS) $$ n-Hexadeca**	**1590**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	J

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Daniel Miguel, Technical Director

Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 16:00

Client ID: NE

Lab ID: 1901597-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
	Accredited Analytical Resources LLC									
Semivolatile Organic Compounds EPA Method SW846 8270D										
NA	**TIC: unknown hydrocarbon**	**421**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:56/DSM	EPA 8270D	J
Surrogate: 2-Fluorophenol				*37 %*	*41-102*	*	*10/02/19 05:34*	*10/02/19 21:56/DSM*	*EPA 8270D*	
Surrogate: Phenol-d5				*41 %*	*47-113*	*	*10/02/19 05:34*	*10/02/19 21:56/DSM*	*EPA 8270D*	
Surrogate: Nitrobenzene-d5				*38 %*	*38-100*		*10/02/19 05:34*	*10/02/19 21:56/DSM*	*EPA 8270D*	
Surrogate: 2-Fluorobiphenyl				*39 %*	*38-88*		*10/02/19 05:34*	*10/02/19 21:56/DSM*	*EPA 8270D*	
Surrogate: 2,4,6-Tribromophenol				*45 %*	*40-129*		*10/02/19 05:34*	*10/02/19 21:56/DSM*	*EPA 8270D*	
Surrogate: Terphenyl-d14				*123 %*	*31-145*		*10/02/19 05:34*	*10/02/19 21:56/DSM*	*EPA 8270D*	
Sum of Tentatively Identified Compounds		5,051.91								
Semivolatile Organic Compounds in SPLP Extracts by GC/MS										
Sample Prepared by Method:EPA 3510C GCMS										
50-32-8	Benzo[a]pyrene	ND	0.0500	0.0500	ug/L	1	10/07/19 11:51	10/08/19 13:49/DSM	EPA 8270D SIM	
EPA Method SW846 8081B/8082A										
Sample Prepared by Method:EPA 3546										
319-84-6	alpha-BHC	ND	0.519	0.519	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
319-85-7	beta-BHC	ND	0.519	0.519	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
319-86-8	delta-BHC	ND	0.519	0.519	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
58-89-9	gamma-BHC [Lindane]	ND	0.519	0.519	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
76-44-8	Heptachlor	ND	0.519	0.519	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
309-00-2	Aldrin	ND	0.519	0.519	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
1024-57-3	Heptachlor Epoxide	ND	0.519	0.519	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
959-98-8	Endosulfan I	ND	0.519	0.519	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
60-57-1	Dieldrin	ND	1.05	1.05	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
72-55-9	**4,4'-DDE**	**3.85**	1.05	1.05	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	P

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Daniel Miguel, Technical Director

Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 16:00

Client ID: NE

Lab ID: 1901597-01 (Soil)

Accredited Analytical Resources LLC

EPA Method SW846 8081B/8082A

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
72-20-8	Endrin	ND	1.05	1.05	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
33213-65-9	Endosulfan II	ND	1.05	1.05	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
72-54-8	**4,4'-DDD**	**2.31**	1.05	1.05	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
1031-07-8	Endosulfan sulfate	ND	1.05	1.05	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
50-29-3	**4,4'-DDT**	**13.6**	1.05	1.05	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	P
72-43-5	Methoxychlor	ND	1.57	5.24	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
53494-70-5	Endrin ketone	ND	1.05	1.05	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
7421-93-4	Endrin aldehyde	ND	1.05	1.05	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
5103-71-9	**alpha-Chlordane**	**2.88**	0.519	0.519	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	P
5566-34-7	**gamma-Chlordane**	**2.10**	0.519	0.519	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
8001-35-2	Toxaphene	ND	26.2	26.2	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
12674-11-2	Aroclor-1016	ND	13.1	26.2	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
11104-28-2	Aroclor-1221	ND	13.1	26.2	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
11141-16-5	Aroclor-1232	ND	13.1	26.2	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
53469-21-9	Aroclor-1242	ND	13.1	26.2	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
12672-29-6	Aroclor-1248	ND	13.1	26.2	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
11097-69-1	Aroclor-1254	ND	13.1	26.2	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
11096-82-5	Aroclor-1260	ND	13.1	26.2	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
37324-23-5	Aroclor-1262	ND	13.1	26.2	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
11100-14-4	Aroclor-1268	ND	13.1	26.2	ug/kg dry	1	10/01/19 05:55	10/01/19 15:39/JAM	EPA 8081B/8082A	
Surrogate: Tetrachloro-m-xylene				*42.9 %*	*27-137*		*10/01/19 05:55*	*10/01/19 15:39/JAM*	*EPA 8081B/8082A*	
Surrogate: Tetrachloro-m-xylene				*47.2 %*	*39-138*		*10/01/19 05:55*	*10/01/19 15:39/JAM*	*EPA 8081B/8082A*	

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Daniel Miguel, Technical Director

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ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 16:00

Client ID: NE

Lab ID: 1901597-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
					Accredited Analytical Resources LLC					
EPA Method SW846 8081B/8082A										
Surrogate: Decachlorobiphenyl				*32.8 %*	*21-150*		*10/01/19 05:55*	*10/01/19 15:39/JAM*	*EPA 8081B/8082A*	
Surrogate: Decachlorobiphenyl				*39.2 %*	*24-171*		*10/01/19 05:55*	*10/01/19 15:39/JAM*	*EPA 8081B/8082A*	
Total Metals by EPA Method SW846 6010D										
Sample Prepared by Method:EPA 3050B										
7429-90-5	**Aluminum**	**9110**	51.6	524	mg/kg dry	50	10/01/19 09:06	10/01/19 18:25/LIT	EPA 6010D	D
7440-36-0	Antimony	ND	0.256	2.10	mg/kg dry	1	10/01/19 09:06	10/01/19 18:19/LIT	EPA 6010D	
7440-38-2	**Arsenic**	**6.15**	0.138	0.524	mg/kg dry	1	10/01/19 09:06	10/01/19 18:19/LIT	EPA 6010D	
7440-39-3	**Barium**	**93.3**	1.68	10.5	mg/kg dry	1	10/01/19 09:06	10/01/19 18:19/LIT	EPA 6010D	
7440-41-7	**Beryllium**	**0.325**	0.0231	0.262	mg/kg dry	1	10/01/19 09:06	10/01/19 18:19/LIT	EPA 6010D	
7440-43-9	**Cadmium**	**1.39**	0.0252	0.262	mg/kg dry	1	10/01/19 09:06	10/01/19 18:19/LIT	EPA 6010D	
7440-70-2	**Calcium**	**5180**	115	655	mg/kg dry	50	10/01/19 09:06	10/01/19 18:25/LIT	EPA 6010D	D
7440-47-3	**Chromium**	**30.7**	0.148	1.05	mg/kg dry	1	10/01/19 09:06	10/01/19 18:19/LIT	EPA 6010D	
7440-48-4	**Cobalt**	**6.18**	0.282	2.62	mg/kg dry	1	10/01/19 09:06	10/01/19 18:19/LIT	EPA 6010D	
7440-50-8	**Copper**	**71.8**	0.169	1.57	mg/kg dry	1	10/01/19 09:06	10/01/19 18:19/LIT	EPA 6010D	
7439-89-6	**Iron**	**27600**	73.9	655	mg/kg dry	50	10/01/19 09:06	10/01/19 18:25/LIT	EPA 6010D	D
7439-92-1	**Lead**	**82.7**	0.0529	0.524	mg/kg dry	1	10/01/19 09:06	10/01/19 18:19/LIT	EPA 6010D	
7439-95-4	**Magnesium**	**3580**	188	1310	mg/kg dry	50	10/01/19 09:06	10/01/19 18:25/LIT	EPA 6010D	D
7439-96-5	**Manganese**	**197**	0.175	1.05	mg/kg dry	1	10/01/19 09:06	10/01/19 18:19/LIT	EPA 6010D	
7440-02-0	**Nickel**	**18.7**	0.257	2.10	mg/kg dry	1	10/01/19 09:06	10/01/19 18:19/LIT	EPA 6010D	
7440-09-7	**Potassium**	**590**	3.14	26.2	mg/kg dry	1	10/01/19 09:06	10/01/19 18:19/LIT	EPA 6010D	
7782-49-2	Selenium	ND	0.223	2.10	mg/kg dry	1	10/01/19 09:06	10/01/19 18:19/LIT	EPA 6010D	
7440-22-4	**Silver**	**0.270**	0.0487	0.262	mg/kg dry	1	10/01/19 09:06	10/01/19 18:19/LIT	EPA 6010D	
7440-23-5	**Sodium**	**299**	2.36	26.2	mg/kg dry	1	10/01/19 09:06	10/01/19 18:19/LIT	EPA 6010D	
7440-28-0	Thallium	ND	0.154	1.57	mg/kg dry	1	10/01/19 09:06	10/02/19 13:44/LIT	EPA 6010D	
7440-62-2	**Vanadium**	**38.3**	0.980	2.62	mg/kg dry	1	10/01/19 09:06	10/01/19 18:19/LIT	EPA 6010D	

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ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 16:00

Client ID: NE

Lab ID: 1901597-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
				Accredited Analytical Resources LLC						
Total Metals by EPA Method SW846 6010D										
7440-66-6	**Zinc**	**201**	0.325	3.14	mg/kg dry	1	10/01/19 09:06	10/01/19 18:19/LIT	EPA 6010D	
SPLP Metals by SW846 6010D										
Sample Prepared by Method:EPA 3010A										
7440-43-9	SPLP Cadmium	ND	0.951	4.00	ug/L	1	10/07/19 09:35	10/07/19 17:33/LIT	1312/6010D	
7439-92-1	**SPLP Lead**	**27.1**	1.59	5.00	ug/L	1	10/07/19 09:35	10/09/19 11:54/LIT	1312/6010D	
Total Mercury by SW846 7471B										
Sample Prepared by Method:EPA 7471B										
7439-97-6	**Mercury**	**0.709**	0.0728	0.0728	mg/kg dry	1	10/03/19 08:30	10/03/19 13:46/BFG	EPA 7471B	
SPLP Mercury by SW846 7470A										
Sample Prepared by Method:EPA 7470A										
7439-97-6	SPLP Mercury	ND	0.0200	0.500	ug/L	1	10/09/19 08:21	10/09/19 15:30/BFG	1312/7470A	
Wet Chemistry										
Sample Prepared by Method:EPA 9010C										
NA	Cyanide (total)	ND	0.0524	1.05	mg/kg dry	1	10/03/19 12:09	10/04/19 14:13/NNM	EPA 9014	
Sample Prepared by Method:Percent Solids										
NA	**Percent Solids**	**95.4**	0.100	0.100	%	1	09/30/19 14:03	10/01/19 08:40/NIN	SM 2540 G	
Extractable Petroleum Hydrocarbons by NJ EPH										
Sample Prepared by Method:EPA 3546										
NA	**Extractable Petroleum Hydrocarbons (I**	**148**	16.8	16.8	mg/kg dry	1	10/02/19 08:12	10/02/19 20:25/MS	NJDEP EPH	
Surrogate: o-Terphenyl				*64.6 %*	*40-140*		*10/02/19 08:12*	*10/02/19 20:25/MS*	*NJDEP EPH*	
Surrogate: 1-Chlorooctadecane				*92.8 %*	*40-140*		*10/02/19 08:12*	*10/02/19 20:25/MS*	*NJDEP EPH*	

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ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 16:00

Client ID: NE

Lab ID: 1901597-01RE1 (Soil)

Accredited Analytical Resources LLC

Semivolatile Organic Compounds EPA Method SW846 8270D

Sample Prepared by Method:EPA 3546 GCMS

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
62-75-9	N-Nitrosodimethylamine	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
100-52-7	Benzaldehyde	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
108-95-2	Phenol	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
111-44-4	bis(2-chloroethyl)ether	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
95-57-8	2-Chlorophenol	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
95-48-7	2-Methylphenol	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
39638-32-9	bis(2-chloroisopropyl)ether	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
98-86-2	Acetophenone	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
106-44-5	3 & 4-Methylphenol	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
621-64-7	N-Nitroso-di-n-propylamine	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
67-72-1	Hexachloroethane	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
98-95-3	Nitrobenzene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
78-59-1	Isophorone	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
88-75-5	2-Nitrophenol	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
105-67-9	2,4-Dimethylphenol	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
111-91-1	bis(2-chloroethoxy)methane	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
120-83-2	2,4-Dichlorophenol	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
91-20-3	Naphthalene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
106-47-8	4-Chloroaniline	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
87-68-3	Hexachlorobutadiene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
105-60-2	Caprolactam	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
59-50-7	4-Chloro-3-methylphenol	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
91-57-6	2-Methylnaphthylene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
77-47-4	Hexachlorocyclopentadiene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
88-06-2	2,4,6-Trichlorophenol	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
95-95-4	2,4,5-Trichlorophenol	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 16:00

Client ID: NE

Lab ID: 1901597-01RE1 (Soil)

Accredited Analytical Resources LLC

Semivolatile Organic Compounds EPA Method SW846 8270D

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
91-58-7	2-Chloronaphthalene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
92-52-4	1,1-Biphenyl	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
88-74-4	2-Nitroaniline	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
131-11-3	Dimethylphthalate	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
208-96-8	Acenaphthylene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
99-09-2	3-Nitroaniline	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
83-32-9	Acenaphthene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
51-28-5	2,4-Dinitrophenol	ND	262	1310	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
100-02-7	4-Nitrophenol	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
132-64-9	Dibenzofuran	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
606-20-2	2,6-Dinitrotoluene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
121-14-2	2,4-Dinitrotoluene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
84-66-2	Diethyl phthalate	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
7005-72-3	4-Chlorophenyl-phenylether	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
86-73-7	Fluorene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
100-01-6	4-Nitroaniline	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
534-52-1	4,6-Dinitro-2-methylphenol	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
86-74-8	Carbazole	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
86-30-6	N-Nitrosodiphenylamine	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
122-66-7	1,2-Diphenylhydrazine	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
103-33-3	Azobenzene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
101-55-3	4-Bromophenyl-phenylether	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
1912-24-9	Atrazine	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
118-74-1	Hexachlorobenzene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
87-86-5	Pentachlorophenol	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
85-01-8	Phenanthrene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
120-12-7	Anthracene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 16:00

Client ID: NE

Lab ID: 1901597-01RE1 (Soil)

Accredited Analytical Resources LLC

Semivolatile Organic Compounds EPA Method SW846 8270D

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
84-74-2	Di-n-butyl phthalate	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
206-44-0	**Fluoranthene**	**419**	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	JD
92-87-5	Benzidine	ND	653	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
129-00-0	**Pyrene**	**461**	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	JD
85-68-7	Butylbenzylphthalate	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
91-94-1	3,3'-Dichlorobenzidine	ND	653	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
56-55-3	Benzo[a]anthracene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
117-81-7	**bis(2-ethylhexyl)phthalate**	**542**	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	JD
218-01-9	**Chrysene**	**296**	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	JD
117-84-0	Di-n-octyl phthalate	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
205-99-2	**Benzo[b]fluoranthene**	**587**	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	JD
207-08-9	Benzo[k]fluoranthene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
50-32-8	**Benzo[a]pyrene**	**283**	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	JD
193-39-5	Indeno(1,2,3-cd)pyrene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
53-70-3	Dibenzo(a,h)anthracene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
191-24-2	Benzo[ghi]perylene	ND	262	655	ug/kg dry	5	10/02/19 05:34	10/03/19 17:10/DSM	EPA 8270D	
Surrogate: 2-Fluorophenol				*35 %*	*41-102*	*	*10/02/19 05:34*	*10/03/19 17:10/DSM*	*EPA 8270D*	
Surrogate: Phenol-d5				*40 %*	*47-113*	*	*10/02/19 05:34*	*10/03/19 17:10/DSM*	*EPA 8270D*	
Surrogate: Nitrobenzene-d5				*36 %*	*38-100*	*	*10/02/19 05:34*	*10/03/19 17:10/DSM*	*EPA 8270D*	
Surrogate: 2-Fluorobiphenyl				*39 %*	*38-88*		*10/02/19 05:34*	*10/03/19 17:10/DSM*	*EPA 8270D*	
Surrogate: 2,4,6-Tribromophenol				*46 %*	*40-129*		*10/02/19 05:34*	*10/03/19 17:10/DSM*	*EPA 8270D*	
Surrogate: Terphenyl-d14				*63 %*	*31-145*		*10/02/19 05:34*	*10/03/19 17:10/DSM*	*EPA 8270D*	

Accredited Analytical Resources LLC

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Daniel Miguel, Technical Director

SPLP PREPARATION BENCH SHEET

B9J0601

Accredited Analytical Resources LLC

Matrix: Solid **Prepared using: EPA 1312** **Printed: 10/10/2019 3:38:46PM**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	% Moisture	Extraction Comments
1901591-02	SPLP Extraction	10/06/2019 12:51	100	2000	19.80	pH on: 4.83 / pH off: 9.96
1901594-01	SPLP Extraction	10/06/2019 12:51	100	2000	8.80	pH on: 5.86 / pH off: 9.99
1901595-01	SPLP Extraction	10/06/2019 12:51	100	2000	6.30	pH on: 5.38 / pH off: 9.94
1901596-01	SPLP Extraction	10/06/2019 12:51	100	2000	8.40	pH on: 4.98 / pH off: 9.92
1901597-01	SPLP Extraction	10/06/2019 12:51	100	2000	4.60	pH on: 5.46 / pH off: 10.05
B9J0601-BLK1	QC	10/06/2019 12:51	100	2000		

Environmental & Geotechnical Services, LLC
301 Fairfield Rd
Fairfield, NJ 07004
Tel. 973-808-6600 Fax 888-707-7819

CHAIN OF CUSTODY RECORD

SITE NAME: 366-394 Wilson Ave Rear
ADDRESS: 366-394 Wilson Avenue Rear 07105

1001597

EGS Sample ID	Laboratory ID	Sample Matrix	Grab/ Comp.	# of jars	Date/Time Collected	Collected By	Sample Location	Analysis Requested	Method
NE	-01	So	Grab	5	9/26/2019-10:18	JK	See map	TCL/TAL +30, EPH (Co+1)	

Preservatives used: HCL NaOH H2SO4 HNO3 Na2SO3 Other: Encores

Cooler temp upon receipt:

Samples received in good condition? J Yes _____ No

Sample matrix code: **GW**=groundwater **SW**=surface water **SR**=stormwater runoff **DW**=drinking water **So**=soil **Sl**=sludge **Se**=sediment **WW**=wastewater **P**=product

Notes: Please include Excel spreadsheet and EDDs

Turnaround Time: 5 DAY TAT

RUSH (days or hours): 5 Day TAT

Analytical Data Deliverables (encircle):
Full Deliverables (NJAC 7:26E-2.1) *Reduced Deliverables (NJAC 7:26E-2.1)* *CLP-I or CLP-II (USEPA)* *Other (specified below)* _____

Relinquished by (1): James Wells	Organization: EGS	Date/Time: 9/27/2019	Request for change(s):
Received by (1): Josh Braun	Organization: AAR	Date/Time: 9/27/2019 11:36	
Relinquished by (2): Josh Braun	Organization: AAR	Date/Time: 9/27/2019	
Received by (2): Nydia Nieves	Organization: AAR	Date/Time: 9-27-19 -13:55	
Relinquished by (3):	Organization:	Date/Time:	Contact Person:
Received by (3):	Organization:	Date/Time:	Lab Case No: Job No:

Accredited Analytical Resources, LLC.

Customer Change Order

Initiator:	Bernie	**Date:**	10-7-19
Client:	EGS	**Phone No.:**	
Contact:	Jim K.	**Fax No.:**	
Work Order No.:	1901597	**E-Mail Address:**	
Date Sampled:	9-26-19	**Demand Date:**	10-10-19
		Holding Time Up on:	10-10-19

Change Order Request:

Analyze sample 01 for SPLP benzo(a)pyrene/Hg/Cd/Pb

Remarks:

Rose, Neceta, Atoy, Betty

Kathy, Nydia

DOC#: QA/QC-5

Bernie O'Gara

From: Jim Kelly [jkelly@eandgservices.com]
Sent: Friday, October 04, 2019 7:03 PM
To: Bernie O'Gara
Cc: (kberkowska@eandgservices.com); ccrum@eandgservices.com; malcala@eandgservices.com; Daniel Miguel
Subject: Re: AAR Case 1901597, EGS, 366-394 Wilson Ave Rear Project Results and Spreadsheet
Attachments: 1901597 RFC 100419.pdf

Hi Bernie,

Please find attached a request for change for this work order.

Specifically, as indicated on the attached, please perform SPLP analysis on the following for this sample: **benzo(a)pyrene, mercury, cadmium and lead.**

Please perform the SPLP analysis on a rush turnaround time. Please complete the SPLP analysis ASAP. Per a discussion with Danny earlier today, it was indicated that the SPLP results can be completed and sent to us by next Thursday 10/10/19.

Thanks,

Jim

James Kelly

Project Manager

Environmental and Geotechnical Services, LLC

Direct: 973-417-8599

Office: 973-808-6600

Fax: 888-707-7819

301 Fairfield Rd, Fairfield, NJ 07004

Email: jkelly@eandgservices.com

On Fri, Oct 4, 2019 at 3:32 PM Bernie O'Gara <Bernie@accreditedanalytical.com> wrote:

> Bernie O'Gara

Accredited Analytical Resources, LLC
20 Pershing Ave. Carteret, NJ 07008
Ph. 732.969.6112 | Fx. 732.541.1383

www.accreditedanalytical.com

Environmental & Geotechnical Services, LLC
301 Fairfield Rd
Fairfield, NJ 07004
Tel. 973-808-6600 Fax 888-707-7819

CHAIN OF CUSTODY RECORD

SITE NAME: 366-394 Wilson Ave Rear
ADDRESS: 366-394 Wilson Avenue Rear 07105

1001597

EGS Sample ID	Laboratory ID	Sample Matrix	Grab/ Comp.	# of jars	Date/Time Collected	Collected By	Sample Location	Analysis Requested	Method
NE	-01	So	Grab	5	9/26/2019 10:18	JK	See map	TCL/TAL +30, EPH (Co+1)	

Preservatives used: HCL NaOH H2SO4 HNO3 Na2SO3 Other: Encores

Cooler temp upon receipt:

Samples received in good condition? ✓ Yes ____ No

Sample matrix code: GW=groundwater SW=surface water SR=stormwater runoff DW=drinking water So=soil Sl=sludge Se=sediment WW=wastewater P=product

Notes: please include Excel spreadsheet and EDDs

Turnaround Time: 5 DAY TAT

RUSH (days or hours): 5 Day TAT 6%

Analytical Data Deliverables (encircle):
Full Deliverables (NJAC 7:26E-2.1) *Reduced Deliverables (NJAC 7:26E-2.1)* *CLP-I or CLP-II (USEPA)* *Other (specified below)* ____

Relinquished by (1): James Kelly	Organization: EGS	Date/Time: 9/27/2019	Request for change(s): 10/4/19 RFC - Please perform SPLP benzo(a)pyrene, mercury, cadmium, and lead analysis on this sample
Received by (1): Josh Braun	Organization: AAR	Date/Time: 9/27/2019 11:36	
Relinquished by (2): Josh Braun	Organization: AAR	Date/Time: 9/27/2019	
Received by (2): Nydia Nieves	Organization: AAR	Date/Time: 9-27-19 13:55	
Relinquished by (3):	Organization:	Date/Time:	Contact Person:
Received by (3):	Organization:	Date/Time:	Lab Case No: Job No:

Accredited Analytical Resources, LLC.

10 October 2019 AAR Work Order: 1901595

James Kelly
ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield, NJ 07004

Project: 366-394 Wilson Ave Rear

Enclosed are the results of analyses for samples received by the laboratory on 09/27/2019 13:55. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Daniel Miguel
Technical Director

New Jersey Certification Number: 12007
New York Certification Number: 11109
Pennsylvania Certification Number: 68-02799
CT Certification Number: PH-0219

Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:52

Analytical Report for Samples

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
E	1901595-01	Soil	09/26/2019 10:55	09/27/2019 13:55

Notes and Definitions

* Values outside of QC limits
ND - Indicates compound analyzed for but not detected at or above the MDL
J - Indicates estimated value for TICs and all results when detected below the RL
B - Indicates compound found in associated blank
E - Concentration exceeds highest calibration standard
D - Indicates result is based on a dilution
P - Greater than 25% diff. between 2 GC columns.
MDL - Minimum detection limit
RL - Reporting limit
VC - The container(s) provided by the client for soil volatiles do not meet the requirements of EPA SW846-5035A. Results reported below 200 ug/kg may be biased low due to samples not being collected according to EPA SW846 5035A requirements.

Conformance / Non-Conformance Summary

AAR Work Order:**1901595**

Accredited Analytical Resources, LLC received 1 sample(s) from ENVIRONMENTAL & GEOTECHNICAL (Project: 366-394 Wilson Ave Rear) on 09/27/2019 13:55.

On 10/7/19, the client requested SPLP Benzo(a)pyrene, SPLP Cadmium, SPLP Lead and SPLP Mercury. The results are included in this data package.

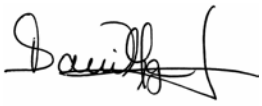
All analyses were performed within the required holding time.

Except for the parameters tested AAR makes no representation as to the fitness or quality of the sample (s) taken.

"The laboratory has reviewed the quality assurance and quality control measurements for the sample analyses."

Daniel Miguel
Technical Director

Accredited Analytical Resources LLC



Daniel Miguel, Technical Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Methodology Summary

EPA Method SW846 8081B/8082A:
NY 8081B/8082A

Extractable Petroleum Hydrocarbons by NJ EPH:
NJDEP EPH

Semivolatile Organic Compounds EPA Method SW846 8270:
8270D

Semivolatile Organic Compounds in SPLP Extracts by GC/MS:
1312/8270D

SPLP Mercury by SW846 7470:
1312/7470

SPLP Metals by SW846 6010:
1312/6010D

Total Mercury by SW846 7471:
EPA 7471B

Total Metals by EPA Method SW846 6010:
6010D

Volatile Organic Compounds EPA Method SW846 8260:
8260C

Wet Chemistry:
Total Cyanide by EPA 9010C & EPA 9014
Percent Solids by SM 2540 G

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:52

Condition of Samples on Receipt

Temperature °C	6.00
Chain of Custody Filled Out Properly	Yes
Received with Proper Containers	Yes
Received with Proper Volumes	Yes
Received Within Holding Time	Yes
Samples Received with Correct Preservation	Yes
Samples Received On Ice	Yes
Sample Received Via Field Services	Yes
Samples Hand Delivered	No

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:52

Client ID: E

Lab ID: 1901595-01 (Soil)

Accredited Analytical Resources LLC

Volatile Organic Compounds EPA Method SW846 8260C

Sample Prepared by Method:EPA 5035A

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
107-02-8	Acrolein	ND	6.40	10.7	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
107-13-1	Acrylonitrile	ND	2.13	10.7	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
67-64-1	Acetone	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
75-71-8	Dichlorodifluoromethane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
74-87-3	Chloromethane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
75-01-4	Vinyl chloride	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
74-83-9	Bromomethane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
75-00-3	Chloroethane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
75-69-4	Trichlorofluoromethane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
76-13-1	Freon 113	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
75-35-4	1,1-Dichloroethene	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
75-15-0	Carbon disulfide	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
79-20-9	Methyl Acetate	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
75-09-2	Methylene Chloride	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
156-60-5	trans-1,2-Dichloroethene	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
75-34-3	1,1-Dichloroethane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
78-93-3	2-Butanone	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
156-59-4	cis-1,2-Dichloroethene	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
67-66-3	Chloroform	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
74-97-5	Bromochloromethane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
110-82-7	Cyclohexane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
71-55-6	1,1,1-Trichloroethane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
75-65-0	t-Butyl alcohol	ND	5.34	21.3	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
56-23-5	Carbon Tetrachloride	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
107-06-2	1,2-Dichloroethane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
71-43-2	Benzene	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
79-01-6	Trichloroethene	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	

Accredited Analytical Resources LLC

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Daniel Miguel, Technical Director

Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:52

Client ID: E

Lab ID: 1901595-01 (Soil)

Accredited Analytical Resources LLC

Volatile Organic Compounds EPA Method SW846 8260C

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
108-87-2	Methylcyclohexane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
78-87-5	1,2-Dichloropropane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
75-27-4	Bromodichloromethane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
10061-01-5	cis-1,3-Dichloropropene	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
108-88-3	Toluene	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
10061-02-6	trans-1,3-Dichloropropene	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
79-00-5	1,1,2-Trichloroethane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
108-10-1	4-Methyl-2-pentanone	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
106-93-4	1,2-Dibromoethane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
591-78-6	2-Hexanone	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
127-18-4	Tetrachloroethene	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
124-48-1	Dibromochloromethane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
100-41-4	Ethylbenzene	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
108-90-7	Chlorobenzene	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
108-38-3/106-4	m,p-Xylenes	ND	2.13	4.27	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
95-47-6	o-Xylene	ND	2.13	4.27	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
100-42-5	Styrene	ND	1.07	4.27	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
75-25-2	Bromoform	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
98-82-8	Isopropylbenzene	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
541-73-1	1,3-Dichlorobenzene	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
106-46-7	1,4-Dichlorobenzene	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
95-50-1	1,2-Dichlorobenzene	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
120-82-1	1,2,4-Trichlorobenzene	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
87-61-6	1,2,3-Trichlorobenzene	ND	1.07	2.13	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
1634-04-4	Methyl tert-Butyl Ether	ND	2.13	4.27	ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	
NA	**TIC: unknown hydrocarbon**	**12.5**			ug/kg dry	1	09/30/19 20:05	09/30/19 20:05/DSM	EPA 8260C	J

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:52

Client ID: E

Lab ID: 1901595-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
	Accredited Analytical Resources LLC									
Volatile Organic Compounds EPA Method SW846 8260C										
Surrogate: 1,2-Dichloroethane-d4				*115 %*	*74-146*		*09/30/19 20:05*	*09/30/19 20:05/DSM*	*EPA 8260C*	
Surrogate: Toluene-d8				*94 %*	*70-121*		*09/30/19 20:05*	*09/30/19 20:05/DSM*	*EPA 8260C*	
Surrogate: Bromofluorobenzene				*76 %*	*28-133*		*09/30/19 20:05*	*09/30/19 20:05/DSM*	*EPA 8260C*	
	Sum of Tentatively Identified Compounds	12.53								
Semivolatile Organic Compounds EPA Method SW846 8270D										
Sample Prepared by Method:EPA 3546 GCMS										
62-75-9	N-Nitrosodimethylamine	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
100-52-7	**Benzaldehyde**	**91.2**	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
108-95-2	Phenol	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
111-44-4	bis(2-chloroethyl)ether	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
95-57-8	2-Chlorophenol	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
95-48-7	2-Methylphenol	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
39638-32-9	bis(2-chloroisopropyl)ether	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
98-86-2	Acetophenone	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
106-44-5	3 & 4-Methylphenol	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
621-64-7	N-Nitroso-di-n-propylamine	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
67-72-1	Hexachloroethane	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
98-95-3	Nitrobenzene	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
78-59-1	Isophorone	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
88-75-5	2-Nitrophenol	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
105-67-9	2,4-Dimethylphenol	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
111-91-1	bis(2-chloroethoxy)methane	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
120-83-2	2,4-Dichlorophenol	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
91-20-3	Naphthalene	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
106-47-8	4-Chloroaniline	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
87-68-3	Hexachlorobutadiene	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
105-60-2	Caprolactam	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	

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ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:52

Client ID: E

Lab ID: 1901595-01 (Soil)

Accredited Analytical Resources LLC

Semivolatile Organic Compounds EPA Method SW846 8270D

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
59-50-7	4-Chloro-3-methylphenol	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
91-57-6	2-Methylnaphthylene	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
77-47-4	Hexachlorocyclopentadiene	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
88-06-2	2,4,6-Trichlorophenol	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
95-95-4	2,4,5-Trichlorophenol	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
91-58-7	2-Chloronaphthalene	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
92-52-4	1,1-Biphenyl	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
88-74-4	2-Nitroaniline	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
131-11-3	Dimethylphthalate	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
208-96-8	Acenaphthylene	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
99-09-2	3-Nitroaniline	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
83-32-9	Acenaphthene	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
51-28-5	2,4-Dinitrophenol	ND	53.3	267	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
100-02-7	4-Nitrophenol	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
132-64-9	Dibenzofuran	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
606-20-2	2,6-Dinitrotoluene	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
121-14-2	2,4-Dinitrotoluene	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
84-66-2	Diethyl phthalate	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
7005-72-3	4-Chlorophenyl-phenylether	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
86-73-7	Fluorene	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
100-01-6	4-Nitroaniline	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
534-52-1	4,6-Dinitro-2-methylphenol	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
86-74-8	Carbazole	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
86-30-6	N-Nitrosodiphenylamine	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
122-66-7	1,2-Diphenylhydrazine	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
103-33-3	Azobenzene	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	

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Daniel Miguel, Technical Director

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Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:52

Client ID: E

Lab ID: 1901595-01 (Soil)

Accredited Analytical Resources LLC

Semivolatile Organic Compounds EPA Method SW846 8270D

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
101-55-3	4-Bromophenyl-phenylether	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
1912-24-9	Atrazine	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
118-74-1	Hexachlorobenzene	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
87-86-5	Pentachlorophenol	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
85-01-8	**Phenanthrene**	**183**	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
120-12-7	Anthracene	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
84-74-2	Di-n-butyl phthalate	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
206-44-0	**Fluoranthene**	**432**	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
92-87-5	Benzidine	ND	133	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
129-00-0	**Pyrene**	**859**	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
85-68-7	**Butylbenzylphthalate**	**55.5**	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
91-94-1	3,3'-Dichlorobenzidine	ND	133	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
56-55-3	**Benzo[a]anthracene**	**274**	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
117-81-7	**bis(2-ethylhexyl)phthalate**	**507**	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
218-01-9	**Chrysene**	**326**	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
117-84-0	**Di-n-octyl phthalate**	**87.5**	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
205-99-2	**Benzo[b]fluoranthene**	**629**	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
207-08-9	**Benzo[k]fluoranthene**	**250**	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
50-32-8	**Benzo[a]pyrene**	**311**	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
193-39-5	**Indeno(1,2,3-cd)pyrene**	**160**	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
53-70-3	Dibenzo(a,h)anthracene	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
191-24-2	Benzo[ghi]perylene	ND	53.3	133	ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	
040710-42-7	**TIC: 1-Hentetracontanol (CAS) $$ N-H**	**589**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
001454-84-8	**TIC: 1-Nonadecanol $$ Nonadecyl alcol**	**371**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
018435-45-5	**TIC: 1-Nonadecene (CAS)**	**970**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
000112-80-1	**TIC: 9-Octadecenoic acid (Z)- (CAS) $$**	**515**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
000297-03-0	**TIC: Cyclotetracosane (CAS)**	**677**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J

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Daniel Miguel, Technical Director

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ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:52

Client ID: E

Lab ID: 1901595-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
					Accredited Analytical Resources LLC					
Semivolatile Organic Compounds EPA Method SW846 8270D										
000593-49-7	**TIC: Heptacosane (CAS) $$ n-Heptacos**	**1570**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
000629-78-7	**TIC: Heptadecane (CAS) $$ n-Heptade**	**4260**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
000630-01-3	**TIC: Hexacosane (CAS) $$ n-Hexacosa**	**731**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
000057-10-3	**TIC: Hexadecanoic acid (CAS) $$ Palm**	**846**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
000630-02-4	**TIC: Octacosane (CAS) $$ n-Octacosan**	**503**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
000057-11-4	**TIC: Octadecanoic acid (CAS) $$ Stear**	**1860**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
074685-36-2	**TIC: Oxacyclotetradecane-2,11-dione, 1**	**529**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
000646-31-1	**TIC: Tetracosane (CAS) $$ n-Tetracosa**	**2860**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
000124-25-4	**TIC: Tetradecanal (CAS) $$ Myristalde**	**1660**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
NA	**TIC: unknown**	**541**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
NA	**TIC: unknown hydrocarbon (01)**	**510**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
NA	**TIC: unknown hydrocarbon (02)**	**1180**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
NA	**TIC: unknown hydrocarbon (03)**	**298**			ug/kg dry	1	10/02/19 05:34	10/02/19 20:28/DSM	EPA 8270D	J
Surrogate: 2-Fluorophenol				*41 %*	*41-102*		*10/02/19 05:34*	*10/02/19 20:28/DSM*	*EPA 8270D*	
Surrogate: Phenol-d5				*45 %*	*47-113*	*	*10/02/19 05:34*	*10/02/19 20:28/DSM*	*EPA 8270D*	
Surrogate: Nitrobenzene-d5				*45 %*	*38-100*		*10/02/19 05:34*	*10/02/19 20:28/DSM*	*EPA 8270D*	
Surrogate: 2-Fluorobiphenyl				*44 %*	*38-88*		*10/02/19 05:34*	*10/02/19 20:28/DSM*	*EPA 8270D*	
Surrogate: 2,4,6-Tribromophenol				*51 %*	*40-129*		*10/02/19 05:34*	*10/02/19 20:28/DSM*	*EPA 8270D*	
Surrogate: Terphenyl-d14				*110 %*	*31-145*		*10/02/19 05:34*	*10/02/19 20:28/DSM*	*EPA 8270D*	
Sum of Tentatively Identified Compounds		20,463.09								
Semivolatile Organic Compounds in SPLP Extracts by GC/MS										
Sample Prepared by Method:EPA 3510C GCMS										
50-32-8	Benzo[a]pyrene	ND	0.0500	0.0500	ug/L	1	10/07/19 11:51	10/07/19 22:03/DSM	EPA 8270D SIM	
EPA Method SW846 8081B/8082A										
Sample Prepared by Method:EPA 3546										

Accredited Analytical Resources LLC

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Daniel Miguel, Technical Director

Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:52

Client ID: E

Lab ID: 1901595-01 (Soil)

Accredited Analytical Resources LLC

EPA Method SW846 8081B/8082A

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
319-84-6	alpha-BHC	ND	0.528	0.528	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
319-85-7	beta-BHC	ND	0.528	0.528	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
319-86-8	delta-BHC	ND	0.528	0.528	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
58-89-9	gamma-BHC [Lindane]	ND	0.528	0.528	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
76-44-8	Heptachlor	ND	0.528	0.528	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
309-00-2	Aldrin	ND	0.528	0.528	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
1024-57-3	Heptachlor Epoxide	ND	0.528	0.528	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
959-98-8	Endosulfan I	ND	0.528	0.528	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
60-57-1	Dieldrin	ND	1.06	1.06	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
72-55-9	**4,4'-DDE**	**4.96**	1.06	1.06	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	P
72-20-8	Endrin	ND	1.06	1.06	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
33213-65-9	Endosulfan II	ND	1.06	1.06	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
72-54-8	**4,4'-DDD**	**4.00**	1.06	1.06	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
1031-07-8	Endosulfan sulfate	ND	1.06	1.06	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
50-29-3	**4,4'-DDT**	**17.1**	1.06	1.06	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	P
72-43-5	Methoxychlor	ND	1.60	5.33	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
53494-70-5	Endrin ketone	ND	1.06	1.06	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
7421-93-4	Endrin aldehyde	ND	1.06	1.06	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
5103-71-9	**alpha-Chlordane**	**2.35**	0.528	0.528	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	P
5566-34-7	**gamma-Chlordane**	**2.16**	0.528	0.528	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
8001-35-2	Toxaphene	ND	26.7	26.7	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
12674-11-2	Aroclor-1016	ND	13.3	26.7	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:52

Client ID: E

Lab ID: 1901595-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
				Accredited Analytical Resources LLC						
EPA Method SW846 8081B/8082A										
11104-28-2	Aroclor-1221	ND	13.3	26.7	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
11141-16-5	Aroclor-1232	ND	13.3	26.7	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
53469-21-9	Aroclor-1242	ND	13.3	26.7	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
12672-29-6	Aroclor-1248	ND	13.3	26.7	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
11097-69-1	Aroclor-1254	ND	13.3	26.7	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
11096-82-5	Aroclor-1260	ND	13.3	26.7	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
37324-23-5	Aroclor-1262	ND	13.3	26.7	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
11100-14-4	Aroclor-1268	ND	13.3	26.7	ug/kg dry	1	10/01/19 05:55	10/01/19 14:57/JAM	EPA 8081B/8082A	
Surrogate: Tetrachloro-m-xylene				*42.2 %*	*27-137*		*10/01/19 05:55*	*10/01/19 14:57/JAM*	*EPA 8081B/8082A*	
Surrogate: Tetrachloro-m-xylene				*48.5 %*	*39-138*		*10/01/19 05:55*	*10/01/19 14:57/JAM*	*EPA 8081B/8082A*	
Surrogate: Decachlorobiphenyl				*39.8 %*	*21-150*		*10/01/19 05:55*	*10/01/19 14:57/JAM*	*EPA 8081B/8082A*	
Surrogate: Decachlorobiphenyl				*59.7 %*	*24-171*		*10/01/19 05:55*	*10/01/19 14:57/JAM*	*EPA 8081B/8082A*	
Total Metals by EPA Method SW846 6010D										
Sample Prepared by Method:EPA 3050B										
7429-90-5	**Aluminum**	**7010**	55.0	558	mg/kg dry	50	10/01/19 09:06	10/02/19 11:20/LIT	EPA 6010D	D
7440-36-0	Antimony	ND	0.273	2.23	mg/kg dry	1	10/01/19 09:06	10/01/19 17:47/LIT	EPA 6010D	
7440-38-2	**Arsenic**	**5.17**	0.147	0.558	mg/kg dry	1	10/01/19 09:06	10/01/19 17:47/LIT	EPA 6010D	
7440-39-3	**Barium**	**102**	1.79	11.2	mg/kg dry	1	10/01/19 09:06	10/01/19 17:47/LIT	EPA 6010D	
7440-41-7	Beryllium	ND	0.0246	0.279	mg/kg dry	1	10/01/19 09:06	10/01/19 17:47/LIT	EPA 6010D	
7440-43-9	**Cadmium**	**1.33**	0.0268	0.279	mg/kg dry	1	10/01/19 09:06	10/01/19 17:47/LIT	EPA 6010D	
7440-70-2	**Calcium**	**6290**	122	698	mg/kg dry	50	10/01/19 09:06	10/02/19 11:20/LIT	EPA 6010D	D
7440-47-3	**Chromium**	**26.8**	0.157	1.12	mg/kg dry	1	10/01/19 09:06	10/01/19 17:47/LIT	EPA 6010D	
7440-48-4	**Cobalt**	**7.10**	0.301	2.79	mg/kg dry	1	10/01/19 09:06	10/01/19 17:47/LIT	EPA 6010D	

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:52

Client ID: E

Lab ID: 1901595-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
				Accredited Analytical Resources LLC						
Total Metals by EPA Method SW846 6010D										
7440-50-8	**Copper**	**77.3**	0.180	1.68	mg/kg dry	1	10/01/19 09:06	10/01/19 17:47/LIT	EPA 6010D	
7439-89-6	**Iron**	**20300**	78.7	698	mg/kg dry	50	10/01/19 09:06	10/02/19 11:20/LIT	EPA 6010D	D
7439-92-1	**Lead**	**78.0**	0.0564	0.558	mg/kg dry	1	10/01/19 09:06	10/01/19 17:47/LIT	EPA 6010D	
7439-95-4	**Magnesium**	**4040**	200	1400	mg/kg dry	50	10/01/19 09:06	10/02/19 11:20/LIT	EPA 6010D	D
7439-96-5	**Manganese**	**206**	0.187	1.12	mg/kg dry	1	10/01/19 09:06	10/01/19 17:47/LIT	EPA 6010D	
7440-02-0	**Nickel**	**27.6**	0.274	2.23	mg/kg dry	1	10/01/19 09:06	10/01/19 17:47/LIT	EPA 6010D	
7440-09-7	**Potassium**	**603**	3.35	27.9	mg/kg dry	1	10/01/19 09:06	10/01/19 17:47/LIT	EPA 6010D	
7782-49-2	Selenium	ND	0.238	2.23	mg/kg dry	1	10/01/19 09:06	10/01/19 17:47/LIT	EPA 6010D	
7440-22-4	**Silver**	**0.299**	0.0519	0.279	mg/kg dry	1	10/01/19 09:06	10/01/19 17:47/LIT	EPA 6010D	
7440-23-5	**Sodium**	**294**	2.51	27.9	mg/kg dry	1	10/01/19 09:06	10/01/19 17:47/LIT	EPA 6010D	
7440-28-0	Thallium	ND	0.164	1.68	mg/kg dry	1	10/01/19 09:06	10/02/19 13:25/LIT	EPA 6010D	
7440-62-2	**Vanadium**	**37.5**	1.04	2.79	mg/kg dry	1	10/01/19 09:06	10/01/19 17:47/LIT	EPA 6010D	
7440-66-6	**Zinc**	**168**	0.347	3.35	mg/kg dry	1	10/01/19 09:06	10/01/19 17:47/LIT	EPA 6010D	
SPLP Metals by SW846 6010D										
Sample Prepared by Method:EPA 3010A										
7440-43-9	SPLP Cadmium	ND	0.951	4.00	ug/L	1	10/07/19 09:35	10/07/19 17:22/LIT	1312/6010D	
7439-92-1	**SPLP Lead**	**36.4**	1.59	5.00	ug/L	1	10/07/19 09:35	10/09/19 11:44/LIT	1312/6010D	
Total Mercury by SW846 7471B										
Sample Prepared by Method:EPA 7471B										
7439-97-6	**Mercury**	**0.924**	0.0770	0.0770	mg/kg dry	1	10/03/19 08:30	10/03/19 13:39/BFG	EPA 7471B	
SPLP Mercury by SW846 7470A										
Sample Prepared by Method:EPA 7470A										
7439-97-6	SPLP Mercury	ND	0.0200	0.500	ug/L	1	10/09/19 08:21	10/09/19 15:12/BFG	1312/7470A	
Wet Chemistry										
Sample Prepared by Method:EPA 9010C										

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:52

Client ID: E

Lab ID: 1901595-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
				Accredited Analytical Resources LLC						
Wet Chemistry										
NA	Cyanide (total)	ND	0.0534	1.07	mg/kg dry	1	09/30/19 09:00	09/30/19 15:43/NNM	EPA 9014	
Sample Prepared by Method:Percent Solids										
NA	**Percent Solids**	**93.7**	0.100	0.100	%	1	09/30/19 14:03	10/01/19 08:40/NIN	SM 2540 G	
Extractable Petroleum Hydrocarbons by NJ EPH										
Sample Prepared by Method:EPA 3546										
NA	**Extractable Petroleum Hydrocarbons (I**	**225**	17.1	17.1	mg/kg dry	1	09/30/19 13:35	10/02/19 03:10/MS	NJDEP EPH	
Surrogate: o-Terphenyl				*92.0 %*	*40-140*		*09/30/19 13:35*	*10/02/19 03:10/MS*	*NJDEP EPH*	
Surrogate: 1-Chlorooctadecane				*126 %*	*40-140*		*09/30/19 13:35*	*10/02/19 03:10/MS*	*NJDEP EPH*	

Accredited Analytical Resources LLC

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Daniel Miguel, Technical Director

SPLP PREPARATION BENCH SHEET

B9J0601

Accredited Analytical Resources LLC

Matrix: Solid **Prepared using: EPA 1312** **Printed: 10/10/2019 3:38:46PM**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	% Moisture	Extraction Comments
1901591-02	SPLP Extraction	10/06/2019 12:51	100	2000	19.80	pH on: 4.83 / pH off: 9.96
1901594-01	SPLP Extraction	10/06/2019 12:51	100	2000	8.80	pH on: 5.86 / pH off: 9.99
1901595-01	SPLP Extraction	10/06/2019 12:51	100	2000	6.30	pH on: 5.38 / pH off: 9.94
1901596-01	SPLP Extraction	10/06/2019 12:51	100	2000	8.40	pH on: 4.98 / pH off: 9.92
1901597-01	SPLP Extraction	10/06/2019 12:51	100	2000	4.60	pH on: 5.46 / pH off: 10.05
B9J0601-BLK1	QC	10/06/2019 12:51	100	2000		

Environmental & Geotechnical Services, LLC
301 Fairfield Rd
Fairfield, NJ 07004
Tel. 973-808-6600 Fax 888-707-7819

CHAIN OF CUSTODY RECORD

SITE NAME: 366-394 Wilson Ave Rear
ADDRESS: 366-394 Wilson Avenue Rear 07105

1931595

EGS Sample ID	Laboratory ID	Sample Matrix	Grab/ Comp.	# of jars	Date/Time Collected	Collected By	Sample Location	Analysis Requested	Method
E	-01	SO	Grab	5	9/26/2019.1055	JK	See Map	TCL/TAL+30, EPH (Co+1)	-01

Preservatives used: HCL NaOH H2SO4 HNO3 Na2SO3 Other: Encores

Cooler temp upon receipt:

Samples received in good condition? ✓ Yes ____ No

Sample matrix code: **GW**=groundwater **SW**=surface water **SR**=stormwater runoff **DW**=drinking water **So**=soil **Sl**=sludge **Se**=sediment **WW**=wastewater **P**=product

Notes: Please include Excel spreadsheet and EDDs

Turnaround Time: 5 DAY TAT

RUSH (days or hours): 5 Day TAT 6g

Analytical Data Deliverables (encircle):
Full Deliverables (NJAC 7:26E-2.1) | *Reduced Deliverables (NJAC 7:26E-2.1)* | *CLP-I or CLP-II (USEPA)* | *Other (specified below)* ____

Relinquished by (1): James Wells	Organization: EGS	Date/Time: 9/27/2019.	Request for change(s):
Received by (1): Josh Brown	Organization: AAR	Date/Time: 9/27/2019 11:36	
Relinquished by (2): Josh Brown	Organization: AAR	Date/Time: 9/27/19	
Received by (2): Nydia Nieves	Organization: AAR	Date/Time: 9-27-19 13:55	
Relinquished by (3):	Organization:	Date/Time:	Contact Person:
Received by (3):	Organization:	Date/Time:	Lab Case No: Job No:

Accredited Analytical Resources, LLC.

Customer Change Order

Initiator:	Bernie	**Date:**	10-7-19
Client:	EGS	**Phone No.:**	
Contact:	Jim K.	**Fax No.:**	
Work Order No.:	1901595	**E-Mail Address:**	
Date Sampled:	9-26-19	**Demand Date:**	10-10-19
		Holding Time Up on:	10-10-19

Change Order Request:

Analyze sample 01 for SPLP benzo(a)pyrene/Hg/Cd/Pb

Remarks:

Rose, Neceta, Atoy, Betty

Kathy, Nydia

DOC#: QA/QC-5

Bernie O'Gara

From: Jim Kelly [jkelly@eandgservices.com]
Sent: Friday, October 04, 2019 7:00 PM
To: Bernie O'Gara
Cc: (kberkowska@eandgservices.com); ccrum@eandgservices.com; malcala@eandgservices.com; Daniel Miguel
Subject: Re: AAR Case 1901595, EGS, 366-394 Wilson Ave Rear Project Results and Spreadsheet
Attachments: 1901595 RFC 100419.pdf

Hi Bernie,

Please find attached a request for change for this work order.

Specifically, as indicated on the attached, please perform SPLP analysis on the following for this sample: **benzo(a)pyrene, mercury, cadmium and lead.**

Please perform the SPLP analysis on a rush turnaround time. Please complete the SPLP analysis ASAP. Per a discussion with Danny earlier today, it was indicated that the SPLP results can be completed and sent to us by next Thursday 10/10/19.

Thanks,

Jim

James Kelly

Project Manager

Environmental and Geotechnical Services, LLC

Direct: 973-417-8599

Office: 973-808-6600

Fax: 888-707-7819

301 Fairfield Rd, Fairfield, NJ 07004

Email: jkelly@eandgservices.com

On Fri, Oct 4, 2019 at 3:23 PM Bernie O'Gara <Bernie@accreditedanalytical.com> wrote:

> Bernie O'Gara

Accredited Analytical Resources, LLC
20 Pershing Ave. Carteret, NJ 07008
Ph. 732.969.6112 | Fx. 732.541.1383

www.accreditedanalytical.com

Environmental & Geotechnical Services, LLC
301 Fairfield Rd
Fairfield, NJ 07004
Tel. 973-808-6600 Fax 888-707-7819

CHAIN OF CUSTODY RECORD

SITE NAME: 366-394 Wilson Ave Rear
ADDRESS: 366-394 Wilson Avenue Rear 07105

1931595

EGS Sample ID	Laboratory ID	Sample Matrix	Grab/ Comp.	# of jars	Date/Time Collected	Collected By	Sample Location	Analysis Requested	Method
E	-01	So	Grab	5	9/26/2019.10:55	JK	See map	TCL/TAL+30, EPH (Co+I)	-01

Preservatives used: HCL NaOH H2SO4 HNO3 Na2SO3 Other: Encores

Cooler temp upon receipt:

Samples received in good condition? ✓ Yes ____ No

Sample matrix code: **GW**=groundwater **SW**=surface water **SR**=stormwater runoff **DW**=drinking water **So**=soil **Sl**=sludge **Se**=sediment **WW**=wastewater **P**=product

Notes: Please include Excel spreadsheet and EDDs

Turnaround Time: 5 DAY TAT

RUSH (days or hours): 5 Day TAT 6?

Analytical Data Deliverables (encircle):
Full Deliverables (NJAC 7:26E-2.1) — *Reduced Deliverables (NJAC 7:26E-2.1)* — *CLP-I or CLP-II (USEPA)* — *Other (specified below)* ____

Relinquished by (1): Jonas Wells	Organization: EGS	Date/Time: 9/27/2019 -	Request for change(s): 10/4/19 RFC- Please perform SPLP benzo(a)pyrene, mercury, cadmium and lead analysis on this sample.
Received by (1): Josh Brown	Organization: AAR	Date/Time: 9/27/2019 11:36	
Relinquished by (2): Josh Brown	Organization: AAR	Date/Time: 9/27/19	
Received by (2): Nydia Nieves -	Organization: AAR -	Date/Time: 9-27-19 13:55	
Relinquished by (3):	Organization:	Date/Time:	Contact Person:
Received by (3):	Organization:	Date/Time:	Lab Case No: Job No:

Accredited Analytical Resources, LLC.

10 October 2019 AAR Work Order: 1901596

James Kelly
ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield, NJ 07004

Project: 366-394 Wilson Ave Rear

Enclosed are the results of analyses for samples received by the laboratory on 09/27/2019 13:55. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Daniel Miguel
Technical Director

New Jersey Certification Number: 12007
New York Certification Number: 11109
Pennsylvania Certification Number: 68-02799
CT Certification Number: PH-0219

ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:56

Analytical Report for Samples

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SW	1901596-01	Soil	09/27/2019 11:47	09/27/2019 13:55

Notes and Definitions

* Values outside of QC limits
ND - Indicates compound analyzed for but not detected at or above the MDL
J - Indicates estimated value for TICs and all results when detected below the RL
B - Indicates compound found in associated blank
E - Concentration exceeds highest calibration standard
D - Indicates result is based on a dilution
P - Greater than 25% diff. between 2 GC columns.
MDL - Minimum detection limit
RL - Reporting limit
VC - The container(s) provided by the client for soil volatiles do not meet the requirements of EPA SW846-5035A. Results reported below 200 ug/kg may be biased low due to samples not being collected according to EPA SW846 5035A requirements.

Conformance / Non-Conformance Summary

AAR Work Order:**1901596**

Accredited Analytical Resources, LLC received 1 sample(s) from ENVIRONMENTAL & GEOTECHNICAL (Project: 366-394 Wilson Ave Rear) on 09/27/2019 13:55.

On 10/7/19, the client requested SPLP Benzo(a)pyrene, SPLP Cadmium, SPLP Lead and SPLP Mercury. The results are included in this data package.

All analyses were performed within the required holding time.

Except for the parameters tested AAR makes no representation as to the fitness or quality of the sample (s) taken.

"The laboratory has reviewed the quality assurance and quality control measurements for the sample analyses."

Daniel Miguel
Technical Director

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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Methodology Summary

EPA Method SW846 8081B/8082A:
NY 8081B/8082A

Extractable Petroleum Hydrocarbons by NJ EPH:
NJDEP EPH

Semivolatile Organic Compounds EPA Method SW846 8270:
8270D

Semivolatile Organic Compounds in SPLP Extracts by GC/MS:
1312/8270D

SPLP Mercury by SW846 7470:
1312/7470

SPLP Metals by SW846 6010:
1312/6010D

Total Mercury by SW846 7471:
EPA 7471B

Total Metals by EPA Method SW846 6010:
6010D

Volatile Organic Compounds EPA Method SW846 8260:
8260C

Wet Chemistry:
Total Cyanide by EPA 9010C & EPA 9014
Percent Solids by SM 2540 G

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:56

Condition of Samples on Receipt

Temperature °C	6.00
Chain of Custody Filled Out Properly	Yes
Received with Proper Containers	Yes
Received with Proper Volumes	Yes
Received Within Holding Time	Yes
Samples Received with Correct Preservation	Yes
Samples Received On Ice	Yes
Sample Received Via Field Services	Yes
Samples Hand Delivered	No

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Daniel Miguel, Technical Director

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ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:56

Client ID: SW

Lab ID: 1901596-01 (Soil)

Accredited Analytical Resources LLC

Volatile Organic Compounds EPA Method SW846 8260C

Sample Prepared by Method:EPA 5035A

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
107-02-8	Acrolein	ND	8.83	14.7	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
107-13-1	Acrylonitrile	ND	2.94	14.7	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
67-64-1	Acetone	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
75-71-8	Dichlorodifluoromethane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
74-87-3	Chloromethane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
75-01-4	Vinyl chloride	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
74-83-9	Bromomethane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
75-00-3	Chloroethane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
75-69-4	Trichlorofluoromethane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
76-13-1	Freon 113	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
75-35-4	1,1-Dichloroethene	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
75-15-0	Carbon disulfide	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
79-20-9	Methyl Acetate	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
75-09-2	Methylene Chloride	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
156-60-5	trans-1,2-Dichloroethene	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
75-34-3	1,1-Dichloroethane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
78-93-3	2-Butanone	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
156-59-4	cis-1,2-Dichloroethene	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
67-66-3	Chloroform	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
74-97-5	Bromochloromethane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
110-82-7	Cyclohexane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
71-55-6	1,1,1-Trichloroethane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
75-65-0	t-Butyl alcohol	ND	7.36	29.4	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
56-23-5	Carbon Tetrachloride	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
107-06-2	1,2-Dichloroethane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
71-43-2	Benzene	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
79-01-6	Trichloroethene	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	

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Daniel Miguel, Technical Director

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ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:56

Client ID: SW

Lab ID: 1901596-01 (Soil)

Accredited Analytical Resources LLC

Volatile Organic Compounds EPA Method SW846 8260C

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
108-87-2	Methylcyclohexane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
78-87-5	1,2-Dichloropropane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
75-27-4	Bromodichloromethane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
10061-01-5	cis-1,3-Dichloropropene	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
108-88-3	Toluene	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
10061-02-6	trans-1,3-Dichloropropene	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
79-00-5	1,1,2-Trichloroethane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
108-10-1	4-Methyl-2-pentanone	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
106-93-4	1,2-Dibromoethane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
591-78-6	2-Hexanone	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
127-18-4	Tetrachloroethene	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
124-48-1	Dibromochloromethane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
100-41-4	Ethylbenzene	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
108-90-7	Chlorobenzene	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
108-38-3/106-4	m,p-Xylenes	ND	2.94	5.89	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
95-47-6	o-Xylene	ND	2.94	5.89	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
100-42-5	Styrene	ND	1.47	5.89	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
75-25-2	Bromoform	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
98-82-8	Isopropylbenzene	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
541-73-1	1,3-Dichlorobenzene	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
106-46-7	1,4-Dichlorobenzene	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
95-50-1	1,2-Dichlorobenzene	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
120-82-1	1,2,4-Trichlorobenzene	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
87-61-6	1,2,3-Trichlorobenzene	ND	1.47	2.94	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
1634-04-4	Methyl tert-Butyl Ether	ND	2.94	5.89	ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	
NA	**TIC: unknown hydrocarbon**	**8.29**			ug/kg dry	1	09/30/19 20:34	09/30/19 20:34/DSM	EPA 8260C	J

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Daniel Miguel, Technical Director

Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:56

Client ID: SW

Lab ID: 1901596-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
	Accredited Analytical Resources LLC									
Volatile Organic Compounds EPA Method SW846 8260C										
Surrogate: 1,2-Dichloroethane-d4				*99 %*	*74-146*		*09/30/19 20:34*	*09/30/19 20:34/DSM*	*EPA 8260C*	
Surrogate: Toluene-d8				*97 %*	*70-121*		*09/30/19 20:34*	*09/30/19 20:34/DSM*	*EPA 8260C*	
Surrogate: Bromofluorobenzene				*63 %*	*28-133*		*09/30/19 20:34*	*09/30/19 20:34/DSM*	*EPA 8260C*	
Sum of Tentatively Identified Compounds		8.29								
Semivolatile Organic Compounds EPA Method SW846 8270D										
Sample Prepared by Method:EPA 3546 GCMS										
62-75-9	N-Nitrosodimethylamine	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
100-52-7	**Benzaldehyde**	**118**	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	J
108-95-2	Phenol	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
111-44-4	bis(2-chloroethyl)ether	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
95-57-8	2-Chlorophenol	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
95-48-7	2-Methylphenol	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
39638-32-9	bis(2-chloroisopropyl)ether	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
98-86-2	Acetophenone	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
106-44-5	3 & 4-Methylphenol	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
621-64-7	N-Nitroso-di-n-propylamine	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
67-72-1	Hexachloroethane	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
98-95-3	Nitrobenzene	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
78-59-1	Isophorone	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
88-75-5	2-Nitrophenol	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
105-67-9	2,4-Dimethylphenol	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
111-91-1	bis(2-chloroethoxy)methane	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
120-83-2	2,4-Dichlorophenol	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
91-20-3	Naphthalene	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
106-47-8	4-Chloroaniline	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
87-68-3	Hexachlorobutadiene	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
105-60-2	Caprolactam	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	

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ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:56

Client ID: SW

Lab ID: 1901596-01 (Soil)

Accredited Analytical Resources LLC

Semivolatile Organic Compounds EPA Method SW846 8270D

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
59-50-7	4-Chloro-3-methylphenol	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
91-57-6	2-Methylnaphthylene	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
77-47-4	Hexachlorocyclopentadiene	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
88-06-2	2,4,6-Trichlorophenol	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
95-95-4	2,4,5-Trichlorophenol	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
91-58-7	2-Chloronaphthalene	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
92-52-4	1,1-Biphenyl	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
88-74-4	2-Nitroaniline	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
131-11-3	Dimethylphthalate	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
208-96-8	Acenaphthylene	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
99-09-2	3-Nitroaniline	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
83-32-9	Acenaphthene	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
51-28-5	2,4-Dinitrophenol	ND	54.5	273	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
100-02-7	4-Nitrophenol	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
132-64-9	Dibenzofuran	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
606-20-2	2,6-Dinitrotoluene	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
121-14-2	2,4-Dinitrotoluene	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
84-66-2	Diethyl phthalate	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
7005-72-3	4-Chlorophenyl-phenylether	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
86-73-7	Fluorene	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
100-01-6	4-Nitroaniline	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
534-52-1	4,6-Dinitro-2-methylphenol	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
86-74-8	Carbazole	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
86-30-6	N-Nitrosodiphenylamine	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
122-66-7	1,2-Diphenylhydrazine	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
103-33-3	Azobenzene	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	

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Daniel Miguel, Technical Director

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ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:56

Client ID: SW

Lab ID: 1901596-01 (Soil)

Accredited Analytical Resources LLC

Semivolatile Organic Compounds EPA Method SW846 8270D

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
101-55-3	4-Bromophenyl-phenylether	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
1912-24-9	Atrazine	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
118-74-1	Hexachlorobenzene	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
87-86-5	Pentachlorophenol	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
85-01-8	**Phenanthrene**	**322**	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
120-12-7	**Anthracene**	**68.8**	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	J
84-74-2	Di-n-butyl phthalate	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
206-44-0	**Fluoranthene**	**510**	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
92-87-5	Benzidine	ND	136	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
129-00-0	**Pyrene**	**1220**	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
85-68-7	**Butylbenzylphthalate**	**78.1**	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	J
91-94-1	3,3'-Dichlorobenzidine	ND	136	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
56-55-3	**Benzo[a]anthracene**	**374**	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
117-81-7	**bis(2-ethylhexyl)phthalate**	**328**	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
218-01-9	**Chrysene**	**444**	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
117-84-0	Di-n-octyl phthalate	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
205-99-2	**Benzo[b]fluoranthene**	**761**	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
207-08-9	**Benzo[k]fluoranthene**	**225**	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
50-32-8	**Benzo[a]pyrene**	**414**	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
193-39-5	**Indeno(1,2,3-cd)pyrene**	**209**	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
53-70-3	Dibenzo(a,h)anthracene	ND	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
191-24-2	**Benzo[ghi]perylene**	**252**	54.5	136	ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	
000112-92-5	**TIC: 1-Octadecanol (CAS) $$ Stenol $$**	**604**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	J
067602-74-8	**TIC: 9-CHLORO-1-AZAPHENOXAN**	**298**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	J
000629-97-0	**TIC: Docosane (CAS) $$ n-Docosane $$**	**3740**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	J
000629-78-7	**TIC: Heptadecane (CAS) $$ n-Heptade**	**2380**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	J
000057-10-3	**TIC: Hexadecanoic acid (CAS) $$ Palm**	**521**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	J

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Daniel Miguel, Technical Director

ENVIRONMENTAL & GEOTECHNICAL
301 Fairfield Road
Fairfield NJ, 07004

Project: 366-394 Wilson Ave Rear
Project Manager: James Kelly

Reported:
10/10/2019 15:56

Client ID: SW

Lab ID: 1901596-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
Accredited Analytical Resources LLC										
Semivolatile Organic Compounds EPA Method SW846 8270D										
000593-45-3	**TIC: Octadecane (CAS) $$ n-Octadecar**	**717**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	J
000057-11-4	**TIC: Octadecanoic acid (CAS) $$ Stear**	**277**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	J
000124-25-4	**TIC: Tetradecanal (CAS) $$ Myristalde**	**784**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	J
NA	**TIC: unknown (01)**	**252**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	J
NA	**TIC: unknown (02)**	**272**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	J
NA	**TIC: unknown (03)**	**414**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	J
NA	**TIC: unknown hydrocarbon**	**477**			ug/kg dry	1	10/02/19 05:34	10/02/19 21:12/DSM	EPA 8270D	J
Surrogate: 2-Fluorophenol				*31 %*	*41-102*	*	*10/02/19 05:34*	*10/02/19 21:12/DSM*	*EPA 8270D*	
Surrogate: Phenol-d5				*35 %*	*47-113*	*	*10/02/19 05:34*	*10/02/19 21:12/DSM*	*EPA 8270D*	
Surrogate: Nitrobenzene-d5				*35 %*	*38-100*	*	*10/02/19 05:34*	*10/02/19 21:12/DSM*	*EPA 8270D*	
Surrogate: 2-Fluorobiphenyl				*33 %*	*38-88*	*	*10/02/19 05:34*	*10/02/19 21:12/DSM*	*EPA 8270D*	
Surrogate: 2,4,6-Tribromophenol				*34 %*	*40-129*	*	*10/02/19 05:34*	*10/02/19 21:12/DSM*	*EPA 8270D*	
Surrogate: Terphenyl-d14				*84 %*	*31-145*		*10/02/19 05:34*	*10/02/19 21:12/DSM*	*EPA 8270D*	
Sum of Tentatively Identified Compounds		10,734.62								
Semivolatile Organic Compounds in SPLP Extracts by GC/MS										
Sample Prepared by Method:EPA 3510C GCMS										
50-32-8	Benzo[a]pyrene	ND	0.0500	0.0500	ug/L	1	10/07/19 11:51	10/07/19 22:48/DSM	EPA 8270D SIM	
EPA Method SW846 8081B/8082A										
Sample Prepared by Method:EPA 3546										
319-84-6	alpha-BHC	ND	0.540	0.540	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
319-85-7	beta-BHC	ND	0.540	0.540	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
319-86-8	delta-BHC	ND	0.540	0.540	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
58-89-9	gamma-BHC [Lindane]	ND	0.540	0.540	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
76-44-8	Heptachlor	ND	0.540	0.540	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	

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ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:56

Client ID: SW

Lab ID: 1901596-01 (Soil)

Accredited Analytical Resources LLC

EPA Method SW846 8081B/8082A

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
309-00-2	Aldrin	ND	0.540	0.540	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
1024-57-3	Heptachlor Epoxide	ND	0.540	0.540	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
959-98-8	Endosulfan I	ND	0.540	0.540	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
60-57-1	Dieldrin	ND	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
72-55-9	**4,4'-DDE**	**46.3**	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	PE
72-20-8	Endrin	ND	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
33213-65-9	Endosulfan II	ND	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
72-54-8	**4,4'-DDD**	**40.6**	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
1031-07-8	Endosulfan sulfate	ND	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
50-29-3	**4,4'-DDT**	**149**	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	PE
72-43-5	Methoxychlor	ND	1.64	5.45	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
53494-70-5	Endrin ketone	ND	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
7421-93-4	Endrin aldehyde	ND	1.09	1.09	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
5103-71-9	**alpha-Chlordane**	**4.01**	0.540	0.540	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	P
5566-34-7	**gamma-Chlordane**	**9.58**	0.540	0.540	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
8001-35-2	Toxaphene	ND	27.3	27.3	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
12674-11-2	Aroclor-1016	ND	13.6	27.3	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
11104-28-2	Aroclor-1221	ND	13.6	27.3	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
11141-16-5	Aroclor-1232	ND	13.6	27.3	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
53469-21-9	Aroclor-1242	ND	13.6	27.3	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
12672-29-6	Aroclor-1248	ND	13.6	27.3	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
11097-69-1	Aroclor-1254	ND	13.6	27.3	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	

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Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:56

Client ID: SW

Lab ID: 1901596-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
					Accredited Analytical Resources LLC					
EPA Method SW846 8081B/8082A										
11096-82-5	Aroclor-1260	ND	13.6	27.3	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
37324-23-5	Aroclor-1262	ND	13.6	27.3	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
11100-14-4	Aroclor-1268	ND	13.6	27.3	ug/kg dry	1	10/01/19 05:55	10/01/19 15:18/JAM	EPA 8081B/8082A	
Surrogate: Tetrachloro-m-xylene				*30.9 %*	*27-137*		*10/01/19 05:55*	*10/01/19 15:18/JAM*	*EPA 8081B/8082A*	
Surrogate: Tetrachloro-m-xylene				*36.0 %*	*39-138*	*	*10/01/19 05:55*	*10/01/19 15:18/JAM*	*EPA 8081B/8082A*	
Surrogate: Decachlorobiphenyl				*35.3 %*	*21-150*		*10/01/19 05:55*	*10/01/19 15:18/JAM*	*EPA 8081B/8082A*	
Surrogate: Decachlorobiphenyl				*39.4 %*	*24-171*		*10/01/19 05:55*	*10/01/19 15:18/JAM*	*EPA 8081B/8082A*	
Total Metals by EPA Method SW846 6010D										
Sample Prepared by Method:EPA 3050B										
7429-90-5	**Aluminum**	**6200**	53.8	546	mg/kg dry	50	10/01/19 09:06	10/01/19 18:03/LIT	EPA 6010D	D
7440-36-0	Antimony	ND	0.266	2.18	mg/kg dry	1	10/01/19 09:06	10/01/19 17:58/LIT	EPA 6010D	
7440-38-2	**Arsenic**	**12.4**	0.144	0.546	mg/kg dry	1	10/01/19 09:06	10/01/19 17:58/LIT	EPA 6010D	
7440-39-3	**Barium**	**83.8**	1.75	10.9	mg/kg dry	1	10/01/19 09:06	10/01/19 17:58/LIT	EPA 6010D	
7440-41-7	**Beryllium**	**0.294**	0.0240	0.273	mg/kg dry	1	10/01/19 09:06	10/01/19 17:58/LIT	EPA 6010D	
7440-43-9	**Cadmium**	**5.23**	0.0262	0.273	mg/kg dry	1	10/01/19 09:06	10/01/19 17:58/LIT	EPA 6010D	
7440-70-2	**Calcium**	**6590**	119	682	mg/kg dry	50	10/01/19 09:06	10/01/19 18:03/LIT	EPA 6010D	D
7440-47-3	**Chromium**	**23.9**	0.154	1.09	mg/kg dry	1	10/01/19 09:06	10/01/19 17:58/LIT	EPA 6010D	
7440-48-4	**Cobalt**	**7.61**	0.294	2.73	mg/kg dry	1	10/01/19 09:06	10/01/19 17:58/LIT	EPA 6010D	
7440-50-8	**Copper**	**136**	0.176	1.64	mg/kg dry	1	10/01/19 09:06	10/01/19 17:58/LIT	EPA 6010D	
7439-89-6	**Iron**	**16600**	77.0	682	mg/kg dry	50	10/01/19 09:06	10/01/19 18:03/LIT	EPA 6010D	D
7439-92-1	**Lead**	**134**	0.0551	0.546	mg/kg dry	1	10/01/19 09:06	10/01/19 17:58/LIT	EPA 6010D	
7439-95-4	**Magnesium**	**3080**	195	1360	mg/kg dry	50	10/01/19 09:06	10/01/19 18:03/LIT	EPA 6010D	D
7439-96-5	**Manganese**	**215**	0.182	1.09	mg/kg dry	1	10/01/19 09:06	10/01/19 17:58/LIT	EPA 6010D	
7440-02-0	**Nickel**	**31.9**	0.268	2.18	mg/kg dry	1	10/01/19 09:06	10/01/19 17:58/LIT	EPA 6010D	

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ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:56

Client ID: SW

Lab ID: 1901596-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
				Accredited Analytical Resources LLC						
Total Metals by EPA Method SW846 6010D										
7440-09-7	**Potassium**	**640**	3.28	27.3	mg/kg dry	1	10/01/19 09:06	10/01/19 17:58/LIT	EPA 6010D	
7782-49-2	Selenium	ND	0.233	2.18	mg/kg dry	1	10/01/19 09:06	10/01/19 17:58/LIT	EPA 6010D	
7440-22-4	**Silver**	**2.23**	0.0508	0.273	mg/kg dry	1	10/01/19 09:06	10/01/19 17:58/LIT	EPA 6010D	
7440-23-5	**Sodium**	**195**	2.46	27.3	mg/kg dry	1	10/01/19 09:06	10/01/19 17:58/LIT	EPA 6010D	
7440-28-0	Thallium	ND	0.160	1.64	mg/kg dry	1	10/01/19 09:06	10/02/19 13:40/LIT	EPA 6010D	
7440-62-2	**Vanadium**	**29.3**	1.02	2.73	mg/kg dry	1	10/01/19 09:06	10/01/19 17:58/LIT	EPA 6010D	
7440-66-6	**Zinc**	**408**	16.9	164	mg/kg dry	50	10/01/19 09:06	10/01/19 18:03/LIT	EPA 6010D	D
SPLP Metals by SW846 6010D										
Sample Prepared by Method:EPA 3010A										
7440-43-9	**SPLP Cadmium**	**1.09**	0.951	4.00	ug/L	1	10/07/19 09:35	10/07/19 17:28/LIT	1312/6010D	J
7439-92-1	**SPLP Lead**	**36.4**	1.59	5.00	ug/L	1	10/07/19 09:35	10/09/19 11:49/LIT	1312/6010D	
Total Mercury by SW846 7471B										
Sample Prepared by Method:EPA 7471B										
7439-97-6	**Mercury**	**3.78**	0.390	0.390	mg/kg dry	5	10/03/19 08:30	10/03/19 14:59/BFG	EPA 7471B	D
SPLP Mercury by SW846 7470A										
Sample Prepared by Method:EPA 7470A										
7439-97-6	SPLP Mercury	ND	0.0200	0.500	ug/L	1	10/09/19 08:21	10/09/19 15:26/BFG	1312/7470A	
Wet Chemistry										
Sample Prepared by Method:EPA 9010C										
NA	Cyanide (total)	ND	0.0546	1.09	mg/kg dry	1	10/03/19 12:09	10/04/19 14:13/NNM	EPA 9014	
Sample Prepared by Method:Percent Solids										
NA	**Percent Solids**	**91.6**	0.100	0.100	%	1	09/30/19 14:03	10/01/19 08:40/NIN	SM 2540 G	
Extractable Petroleum Hydrocarbons by NJ EPH										
Sample Prepared by Method:EPA 3546										

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Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:56

Client ID: SW

Lab ID: 1901596-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
	Accredited Analytical Resources LLC									
Extractable Petroleum Hydrocarbons by NJ EPH										
NA	**Extractable Petroleum Hydrocarbons (I**	**354**	17.5	17.5	mg/kg dry	1	09/30/19 13:35	10/02/19 03:45/MS	NJDEP EPH	
Surrogate: o-Terphenyl				*83.8 %*	*40-140*		*09/30/19 13:35*	*10/02/19 03:45/MS*	*NJDEP EPH*	
Surrogate: 1-Chlorooctadecane				*135 %*	*40-140*		*09/30/19 13:35*	*10/02/19 03:45/MS*	*NJDEP EPH*	

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Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:56

Client ID: SW

Lab ID: 1901596-01RE1 (Soil)

Accredited Analytical Resources LLC

Semivolatile Organic Compounds EPA Method SW846 8270D

Sample Prepared by Method:EPA 3546 GCMS

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
62-75-9	N-Nitrosodimethylamine	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
100-52-7	Benzaldehyde	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
108-95-2	Phenol	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
111-44-4	bis(2-chloroethyl)ether	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
95-57-8	2-Chlorophenol	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
95-48-7	2-Methylphenol	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
39638-32-9	bis(2-chloroisopropyl)ether	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
98-86-2	Acetophenone	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
106-44-5	3 & 4-Methylphenol	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
621-64-7	N-Nitroso-di-n-propylamine	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
67-72-1	Hexachloroethane	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
98-95-3	Nitrobenzene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
78-59-1	Isophorone	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
88-75-5	2-Nitrophenol	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
105-67-9	2,4-Dimethylphenol	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
111-91-1	bis(2-chloroethoxy)methane	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
120-83-2	2,4-Dichlorophenol	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
91-20-3	Naphthalene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
106-47-8	4-Chloroaniline	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
87-68-3	Hexachlorobutadiene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
105-60-2	Caprolactam	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
59-50-7	4-Chloro-3-methylphenol	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
91-57-6	2-Methylnaphthylene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
77-47-4	Hexachlorocyclopentadiene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
88-06-2	2,4,6-Trichlorophenol	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
95-95-4	2,4,5-Trichlorophenol	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	

Accredited Analytical Resources LLC

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Daniel Miguel, Technical Director

Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:56

Client ID: SW

Lab ID: 1901596-01RE1 (Soil)

Accredited Analytical Resources LLC

Semivolatile Organic Compounds EPA Method SW846 8270D

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
91-58-7	2-Chloronaphthalene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
92-52-4	1,1-Biphenyl	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
88-74-4	2-Nitroaniline	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
131-11-3	Dimethylphthalate	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
208-96-8	Acenaphthylene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
99-09-2	3-Nitroaniline	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
83-32-9	Acenaphthene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
51-28-5	2,4-Dinitrophenol	ND	273	1370	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
100-02-7	4-Nitrophenol	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
132-64-9	Dibenzofuran	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
606-20-2	2,6-Dinitrotoluene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
121-14-2	2,4-Dinitrotoluene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
84-66-2	Diethyl phthalate	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
7005-72-3	4-Chlorophenyl-phenylether	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
86-73-7	Fluorene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
100-01-6	4-Nitroaniline	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
534-52-1	4,6-Dinitro-2-methylphenol	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
86-74-8	Carbazole	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
86-30-6	N-Nitrosodiphenylamine	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
122-66-7	1,2-Diphenylhydrazine	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
103-33-3	Azobenzene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
101-55-3	4-Bromophenyl-phenylether	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
1912-24-9	Atrazine	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
118-74-1	Hexachlorobenzene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
87-86-5	Pentachlorophenol	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
85-01-8	**Phenanthrene**	**341**	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	JD
120-12-7	Anthracene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:56

Client ID: SW

Lab ID: 1901596-01RE1 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
					Accredited Analytical Resources LLC					
Semivolatile Organic Compounds EPA Method SW846 8270D										
84-74-2	Di-n-butyl phthalate	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
206-44-0	**Fluoranthene**	**680**	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	JD
92-87-5	Benzidine	ND	680	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
129-00-0	**Pyrene**	**745**	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	D
85-68-7	Butylbenzylphthalate	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
91-94-1	3,3'-Dichlorobenzidine	ND	680	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
56-55-3	**Benzo[a]anthracene**	**379**	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	JD
117-81-7	bis(2-ethylhexyl)phthalate	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
218-01-9	**Chrysene**	**453**	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	JD
117-84-0	Di-n-octyl phthalate	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
205-99-2	**Benzo[b]fluoranthene**	**841**	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	D
207-08-9	Benzo[k]fluoranthene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
50-32-8	**Benzo[a]pyrene**	**407**	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	JD
193-39-5	Indeno(1,2,3-cd)pyrene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
53-70-3	Dibenzo(a,h)anthracene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
191-24-2	Benzo[ghi]perylene	ND	273	682	ug/kg dry	5	10/02/19 05:34	10/03/19 16:26/DSM	EPA 8270D	
Surrogate: 2-Fluorophenol				*30 %*	*41-102*	*	*10/02/19 05:34*	*10/03/19 16:26/DSM*	*EPA 8270D*	
Surrogate: Phenol-d5				*34 %*	*47-113*	*	*10/02/19 05:34*	*10/03/19 16:26/DSM*	*EPA 8270D*	
Surrogate: Nitrobenzene-d5				*33 %*	*38-100*	*	*10/02/19 05:34*	*10/03/19 16:26/DSM*	*EPA 8270D*	
Surrogate: 2-Fluorobiphenyl				*34 %*	*38-88*	*	*10/02/19 05:34*	*10/03/19 16:26/DSM*	*EPA 8270D*	
Surrogate: 2,4,6-Tribromophenol				*34 %*	*40-129*	*	*10/02/19 05:34*	*10/03/19 16:26/DSM*	*EPA 8270D*	
Surrogate: Terphenyl-d14				*45 %*	*31-145*		*10/02/19 05:34*	*10/03/19 16:26/DSM*	*EPA 8270D*	
EPA Method SW846 8081B/8082A										
Sample Prepared by Method:EPA 3546										
319-84-6	alpha-BHC	ND	5.40	5.40	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
319-85-7	beta-BHC	ND	5.40	5.40	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	

Accredited Analytical Resources LLC

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Daniel Miguel, Technical Director

Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:56

Client ID: SW

Lab ID: 1901596-01RE1 (Soil)

Accredited Analytical Resources LLC

EPA Method SW846 8081B/8082A

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
319-86-8	delta-BHC	ND	5.40	5.40	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
58-89-9	gamma-BHC [Lindane]	ND	5.40	5.40	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
76-44-8	Heptachlor	ND	5.40	5.40	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
309-00-2	Aldrin	ND	5.40	5.40	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
1024-57-3	Heptachlor Epoxide	ND	5.40	5.40	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
959-98-8	Endosulfan I	ND	5.40	5.40	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
60-57-1	Dieldrin	ND	10.9	10.9	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
72-55-9	**4,4'-DDE**	**75.9**	10.9	10.9	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	D
72-20-8	Endrin	ND	10.9	10.9	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
33213-65-9	Endosulfan II	ND	10.9	10.9	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
72-54-8	**4,4'-DDD**	**61.7**	10.9	10.9	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	D
1031-07-8	Endosulfan sulfate	ND	10.9	10.9	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
50-29-3	**4,4'-DDT**	**247**	10.9	10.9	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	D
72-43-5	Methoxychlor	ND	16.4	54.5	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
53494-70-5	Endrin ketone	ND	10.9	10.9	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
7421-93-4	Endrin aldehyde	ND	10.9	10.9	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
5103-71-9	alpha-Chlordane	ND	5.40	5.40	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
5566-34-7	gamma-Chlordane	ND	5.40	5.40	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
8001-35-2	Toxaphene	ND	273	273	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
12674-11-2	Aroclor-1016	ND	136	273	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
11104-28-2	Aroclor-1221	ND	136	273	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
11141-16-5	Aroclor-1232	ND	136	273	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	

Accredited Analytical Resources LLC

Daniel Miguel, Technical Director

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Accredited Analytical Resources, LLC.

ENVIRONMENTAL & GEOTECHNICAL		
301 Fairfield Road	Project: 366-394 Wilson Ave Rear	**Reported:**
Fairfield NJ, 07004	Project Manager: James Kelly	10/10/2019 15:56

Client ID: SW

Lab ID: 1901596-01RE1 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
Accredited Analytical Resources LLC										
EPA Method SW846 8081B/8082A										
53469-21-9	Aroclor-1242	ND	136	273	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
12672-29-6	Aroclor-1248	ND	136	273	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
11097-69-1	Aroclor-1254	ND	136	273	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
11096-82-5	Aroclor-1260	ND	136	273	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
37324-23-5	Aroclor-1262	ND	136	273	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
11100-14-4	Aroclor-1268	ND	136	273	ug/kg dry	10	10/01/19 05:55	10/02/19 16:52/JAM	EPA 8081B/8082A	
Surrogate: Tetrachloro-m-xylene				*39.0 %*	*27-137*		*10/01/19 05:55*	*10/02/19 16:52/JAM*	*EPA 8081B/8082A*	
Surrogate: Tetrachloro-m-xylene				*40.0 %*	*39-138*		*10/01/19 05:55*	*10/02/19 16:52/JAM*	*EPA 8081B/8082A*	
Surrogate: Decachlorobiphenyl				*39.0 %*	*21-150*		*10/01/19 05:55*	*10/02/19 16:52/JAM*	*EPA 8081B/8082A*	
Surrogate: Decachlorobiphenyl				*41.0 %*	*24-171*		*10/01/19 05:55*	*10/02/19 16:52/JAM*	*EPA 8081B/8082A*	

Accredited Analytical Resources LLC

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Daniel Miguel, Technical Director

SPLP PREPARATION BENCH SHEET

B9J0601

Accredited Analytical Resources LLC

Matrix: Solid **Prepared using: EPA 1312** **Printed: 10/10/2019 3:38:46PM**

Lab Number	Analysis	Prepared	Initial (g)	Final (mL)	% Moisture	Extraction Comments
1901591-02	SPLP Extraction	10/06/2019 12:51	100	2000	19.80	pH on: 4.83 / pH off: 9.96
1901594-01	SPLP Extraction	10/06/2019 12:51	100	2000	8.80	pH on: 5.86 / pH off: 9.99
1901595-01	SPLP Extraction	10/06/2019 12:51	100	2000	6.30	pH on: 5.38 / pH off: 9.94
1901596-01	SPLP Extraction	10/06/2019 12:51	100	2000	8.40	pH on: 4.98 / pH off: 9.92
1901597-01	SPLP Extraction	10/06/2019 12:51	100	2000	4.60	pH on: 5.46 / pH off: 10.05
B9J0601-BLK1	QC	10/06/2019 12:51	100	2000		

Environmental & Geotechnical Services, LLC
301 Fairfield Rd
Fairfield, NJ 07004
Tel. 973-808-6600 Fax 888-707-7819

CHAIN OF CUSTODY RECORD

SITE NAME: 366-394 Wilson Ave Rear
ADDRESS: 366-394 Wilson Avenue Rear 07105

1001596

EGS Sample ID	Laboratory ID	Sample Matrix	Grab/ Comp.	# of jars	Date/Time Collected	Collected By	Sample Location	Analysis Requested	Method
SW	-01	SO	Grab	5	9/26/2019-11:47	JK	See map	TCL/TAL+30; EPH (Ca+1)	

Preservatives used: HCL NaOH H2SO4 HNO3 Na2SO3 Other: Encores

Cooler temp upon receipt:

Samples received in good condition? ✓ Yes ____ No

Sample matrix code: **GW**=groundwater **SW**=surface water **SR**=stormwater runoff **DW**=drinking water **So**=soil **Sl**=sludge **Se**=sediment **WW**=wastewater **P**=product

Notes: Please include Excel spreadsheet and EDDs.

Turnaround Time: 5 DAY TAT

RUSH (days or hours): 5 Day TAT 6Q

Analytical Data Deliverables (encircle):
Full Deliverables (NJAC 7:26E-2.1) — *Reduced Deliverables (NJAC 7:26E-2.1)* — *CLP-I or CLP-II (USEPA)* — *Other (specified below)* ____

Relinquished by (1): Jmes Kelly	Organization: EGS	Date/Time: 9/27/2019	Request for change(s):
Received by (1): Josh Beam	Organization: AAR	Date/Time: 9/27/19 11:56	
Relinquished by (2): Josh Beam	Organization: AAR	Date/Time: 9/27/19	
Received by (2): Nydia Nieves	Organization: AAR	Date/Time: 9-27-19 13:55	
Relinquished by (3):	Organization:	Date/Time:	Contact Person:
Received by (3):	Organization:	Date/Time:	Lab Case No: Job No:

Accredited Analytical Resources, LLC.

Customer Change Order

Initiator:	Bernie	**Date:**	10-7-19
Client:	EGS	**Phone No.:**	
Contact:	Jim K.	**Fax No.:**	
Work Order No.:	1901596	**E-Mail Address:**	
Date Sampled:	9-26-19	**Demand Date:**	10-10-19
		Holding Time Up on:	10-10-19

Change Order Request:

Analyze sample 01 for SPLP benzo(a)pyrene/Hg/Cd/Pb

Remarks:

Rose, Neceta, Atoy, Betty

Kathy, Nydia

DOC#: QA/QC-5

Bernie O'Gara

From: Jim Kelly [jkelly@eandgservices.com]
Sent: Friday, October 04, 2019 7:02 PM
To: Bernie O'Gara
Cc: (kberkowska@eandgservices.com); ccrum@eandgservices.com; malcala@eandgservices.com; Daniel Miguel
Subject: Re: AAR Case 1901596, EGS, 366-394 Wilson Ave Rear Project Results and Spreadsheet
Attachments: 1901596 RFC 100419.pdf

Hi Bernie,

Please find attached a request for change for this work order.

Specifically, as indicated on the attached, please perform SPLP analysis on the following for this sample: **benzo(a)pyrene, mercury, cadmium and lead.**

Please perform the SPLP analysis on a rush turnaround time. Please complete the SPLP analysis ASAP. Per a discussion with Danny earlier today, it was indicated that the SPLP results can be completed and sent to us by next Thursday 10/10/19.

Thanks,

Jim

James Kelly

Project Manager

Environmental and Geotechnical Services, LLC

Direct: 973-417-8599

Office: 973-808-6600

Fax: 888-707-7819

301 Fairfield Rd, Fairfield, NJ 07004

Email: jkelly@eandgservices.com

On Fri, Oct 4, 2019 at 3:30 PM Bernie O'Gara <Bernie@accreditedanalytical.com> wrote:

> Bernie O'Gara

Accredited Analytical Resources, LLC
20 Pershing Ave. Carteret, NJ 07008
Ph. 732.969.6112 | Fx. 732.541.1383

www.accreditedanalytical.com

Environmental & Geotechnical Services, LLC
301 Fairfield Rd
Fairfield, NJ 07004
Tel. 973-808-6600 Fax 888-707-7819

CHAIN OF CUSTODY RECORD

SITE NAME: 366-394 Wilson Ave Rear
ADDRESS: 366-394 Wilson Avenue Rear 07105

1901596

EGS Sample ID	Laboratory ID	Sample Matrix	Grab/ Comp.	# of jars	Date/Time Collected	Collected By	Sample Location	Analysis Requested	Method
SW	-01	SO	Grab	5	9/26/2019-11:47	JK	See map	TCL/TAL+30, EPH (Ca+1)	

Preservatives used: HCL NaOH H2SO4 HNO3 Na2SO3 Other: Encores

Cooler temp upon receipt:

Samples received in good condition? ✓ Yes ____ No

Sample matrix code: **GW**=groundwater **SW**=surface water **SR**=stormwater runoff **DW**=drinking water **So**=soil **Sl**=sludge **Se**=sediment **WW**=wastewater **P**=product

Notes: Please include Excel spreadsheet and EDDs.

Turnaround Time: 5 DAY TAT

RUSH (days or hours): 5 Day TAT 6Q

Analytical Data Deliverables (encircle):
Full Deliverables (NJAC 7:26E-2.1) — *Reduced Deliverables (NJAC 7:26E-2.1)* — *CLP-I or CLP-II (USEPA)* — *Other (specified below)* ____

Relinquished by (1): Jason Kelly	Organization: EGS	Date/Time: 9/27/2019	Request for change(s): 10/4/19 RFC- Please perform SPLP benzo(a)pyrene, mercury, cadmium, and lead analysis on this sample.
Received by (1): Josh Beam	Organization: AAR	Date/Time: 9/27/19 11:56	
Relinquished by (2): Josh Beam	Organization: AAR	Date/Time: 9/27/19	
Received by (2): Nydia Nieves	Organization: AAR	Date/Time: 9-27-19 17:55	
Relinquished by (3):	Organization:	Date/Time:	Contact Person:
Received by (3):	Organization:	Date/Time:	Lab Case No: Job No:

Attachment 8

- SPLP Spreadsheets

NJDEP SPLP Spreadsheet, V3.1, November 2013

Case name/area of concern:	366-394 Wilson Ave Rear
Case number:	N/A
Sampling date:	9/26/2019
Contaminant:	Benzo(a)pyrene
CAS No:	50-32-8
Water solubility (mg/L)	1.62E-03
Aqueous reporting limit (µg/L):	1.00E-01
Soil reporting limit (mg/kg):	2.00E-01
Health-based GWQC (µg/L)	5.00E-03
DAF (20, or site-specific if approved):	20
Leachate Criterion (µg/L):	1.00E-01
Henry's law constant (dimensionless):	4.63E-05

CALCULATE SITE SPECIFIC IGW STANDARD

Reset Spreadsheet

Print Results

Instructions

CLICK HERE if chemical is not on drop-down list, or to enter alternate GWQC

Print to file

Exit

NOTE:

USE ONE PAGE PER CONTAMINANT, do not leave empty rows between samples
Do not enter samples with soil concentrations at or below the reporting limit
When leachate concentration is non-detect, enter the aqueous reporting limit
Enter site-specific dilution-attenuation factor (DAF) if desired

Data entry cells (do not skip rows)
Optional data entry
Calculated or locked cells
Indicates that Alternative Remediation Standard needs to be recalculated

Sample ID	Soil sample weight (kg)	Leachate Volume (L)	Total Soil Concentration (mg/kg)	SPLP Leachate Concentration (µg/L)	Final pH of Leachate (except VOCs)	Optional data				Kd (L/kg)	% Contaminant in Leachate	Field leachate concentration (µg/L)	Pass or fail?
						Sampling Depth (ft)	Soil Type	Organic Carbon (mg/kg)	Organic Carbon (%)				
E	0.1	2	0.311	0.05	9.94					6200.0	0.32	0.05	PASS
N	0.1	2	0.319	0.05	9.99					6360.0	0.31	0.05	PASS
NE	0.1	2	0.322	0.05	10.05					6420.0	0.31	0.05	PASS
SW	0.1	2	0.414	0.05	9.92					8260.0	0.24	0.05	PASS

SPLP RESULTS for

OPTION 1a: All adjusted leachate concentrations are below the leachate criterion

REMEDIATION STANDARD = 0.414 mg/kg

OPTION 1b: Simple inspection of tabulated results to find highest acceptable standard
EVERYTHING PASSED, OPTION 1b NOT VALID

OPTION 2: Remediation standard using site-specific Kd value
Kd ratio = 1.33, AVERAGING Kds OK
Kd USED FOR CALCULATING STANDARD = 6810. L/kg
result before rounding = 0.681 mg/kg
REMEDIATION STANDARD = 0.4 mg/kg (controlled by maximum soil concentration)

OPTION 3: Remediation standard using linear regression
Number of points = 1
(points were eliminated because leachate concentrations were not above the aqueous reporting limit)
Less than three points with leachate concentrations above the aqueous reporting limit
LINEAR REGRESSION CANNOT BE CONDUCTED

Acenaphth 83-32-9
Acetone (2 67-64-1
Acetophen 98-86-2
Acrolein 107-02-8
Acrylonitril 107-13-1
Aldrin 309-00-2
Aluminum 7429-90-5
Anthracen 120-12-7
Antimony (7440-36-0
Arsenic (to 7440-38-2
Atrazine 1912-24-9
Barium (tot 7440-39-3
Benzene 71-43-2
Benzidine 92-87-5
Benzo(a)a 56-55-3
Benzo(a)p 50-32-8
Benzo(b)fl 205-99-2
Benzo(k)fl 207-08-9
Beryllium 7440-41-7
1,1'-Bipher 92-52-4
Bis(2-chlor 111-44-4
Bis(2-chlor 108-60-1
Bis(2-ethyl 117-81-7
Bromodich 75-27-4
Bromoform 75-25-2
Bromometl 74-83-9
2-Butanon 78-93-3
Butylbenzy 85-68-7
Cadmium 7440-43-9
Caprolacta 105-60-2
Carbon dis 75-15-0
Carbon tet 56-23-5
Chlordane 57-74-9
Chloroben 108-90-7
Chloroform 67-66-3
2-Chloroph 95-57-8
Chrysene 218-01-9
Cobalt (tot 7440-48-4
Copper (to 7440-50-8
Cyanide 57-12-5
4,4'-DDD (72-54-8
4,4'-DDE (72-55-9
4,4'-DDT 50-29-3
Dibenz(a,h 53-70-3
Dibromoch 124-48-1
1,2-Dibrom 96-12-8
1,2-Dibrom 106-93-4
1,2-Dichlor 95-50-1
1,3-Dichlor 541-73-1
1,4-Dichlor 106-46-7
3,3'-Dichlo 91-94-1
Dichlorodif 75-71-8
1,1-Dichlor 75-34-3
1,2-Dichlor 107-06-2
1,1-Dichlor 75-35-4
1,2-Dichlor 156-59-2
1,2-Dichlor 156-60-5
2,4-Dichlor 120-83-2
1,2-Dichlor 78-87-5
1,3-Dichlor 542-75-6
Dieldrin 60-57-1
Diethylphth 84-66-2
2,4-Dimeth 105-67-9
Di-n-butyl p 84-74-2
4,6-Dinitro- 534-52-1
2,4-Dinitro 51-28-5
2,4-Dinitrot 25321-14-6
Di-n-octyl p 117-84-0
1,2-Diphen 122-66-7
Endosulfar 115-29-7
Endosulfar 1031-07-8
Endrin 72-20-8
Ethylbenze 100-41-4
Fluoranthe 206-44-0
Fluorene 86-73-7
alpha-HCH 319-84-6
beta-HCH 319-85-7
Heptachlor 76-44-8
Heptachlor 1024-57-3
Hexachlorc 118-74-1
Hexachlorc 87-68-3
Hexachlorc 77-47-4

Hexachlorc	67-72-1
Indeno(1,2	193-39-5
Isophorone	78-59-1
Lead (total	7439-92-1
Lindane (g	58-89-9
Manganes	7439-96-5
Mercury (tc	7439-97-6
Methoxych	72-43-5
Methyl ace	79-20-9
Methylene	75-09-2
2-Methylna	91-57-6
Methyl tert	1634-04-4
Naphthaler	91-20-3
Nickel (tota	7440-02-0
Nitrobenze	98-95-3
N-Nitrosod	62-75-9
N-Nitrosod	621-64-7
N-Nitrosod	86-30-6
Pentachlor	87-86-5
Phenol	108-95-2
Polychlorin	1336-36-3
Pyrene	129-00-0
Selenium (	7782-49-2
Silver (tota	7440-22-4
Styrene	100-42-5
Tertiary bu	75-65-0
1,1,2,2-Tet	79-34-5
Tetrachlorc	127-18-4
Thallium (t	7440-28-0
Toluene	108-88-3
Toxaphene	8001-35-2
1,2,4-Trich	120-82-1
1,1,1-Trich	71-55-6
1,1,2-Trich	79-00-5
Trichloroet	79-01-6
Trichloroflu	75-69-4
2,4,5-Trich	95-95-4
2,4,6-Trich	88-06-2
Vinyl chlori	75-01-4
Xylenes (tc	1330-20-7
Zinc (total)	7440-66-6

NJDEP SPLP Spreadsheet, V3.1, November 2013

Case name/area of concern:	366-394 Wilson Ave Rear
Case number:	N/A
Sampling date:	9/26/2019

CALCULATE SITE SPECIFIC IGW STANDARD

Reset Spreadsheet

Print Results

Instructions

CLICK HERE if chemical is not on drop-down list, or to enter alternate GWQC

Print to file

Exit

Contaminant:	Cadmium
CAS No:	7440-43-9
Water solubility (mg/L)	NA
Aqueous reporting limit (µg/L):	5.00E-01
Soil reporting limit (mg/kg):	5.00E-01
Health-based GWQC (µg/L)	4.00E+00
DAF (20, or site-specific if approved):	20
Leachate Criterion (µg/L):	8.00E+01
Henry's law constant (dimensionless):	0.00E+00

NOTE:
USE ONE PAGE PER CONTAMINANT, do not leave empty rows between samples
Do not enter samples with soil concentrations at or below the reporting limit
When leachate concentration is non-detect, enter the aqueous reporting limit
Enter site-specific dilution-attenuation factor (DAF) if desired

Data entry cells (do not skip rows)
Optional data entry
Calculated or locked cells
Indicates that Alternative Remediation Standard needs to be recalculated

Sample ID	Soil sample weight (kg)	Leachate Volume (L)	Total Soil Concentration (mg/kg)	SPLP Leachate Concentration (µg/L)	Final pH of Leachate (except VOCs)	Optional data				Kd (L/kg)	% Contaminant in Leachate	Field leachate concentration (µg/L)	Pass or fail?
						Sampling Depth (ft)	Soil Type	Organic Carbon (mg/kg)	Organic Carbon (%)				
N	0.1	2	8	1	9.99					7980.0	0.25	1.00	PASS
SW	0.1	2	5.23	1.09	9.92					4778.2	0.42	1.09	PASS
NE	0.1	2	1.39	4	10.05					327.5	5.76	4.24	PASS
E	0.1	2	1.33	4	9.94					312.5	6.02	4.25	PASS

SPLP RESULTS for

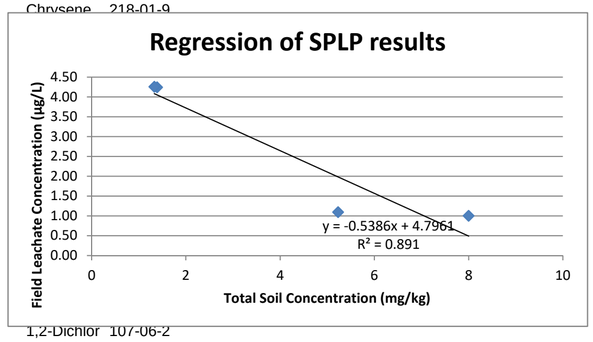
OPTION 1a: All adjusted leachate concentrations are below the leachate criterion

REMEDIATION STANDARD = 8 mg/kg

OPTION 1b: Simple inspection of tabulated results to find highest acceptable standard
EVERYTHING PASSED, OPTION 1b NOT VALID

OPTION 2: Remediation standard using site-specific Kd value
Kd ratio = 25.54, USE MINIMUM Kd
Kd USED FOR CALCULATING STANDARD = 312.5 L/kg
result before rounding = 25.0123 mg/kg
REMEDIATION STANDARD = 8 mg/kg (controlled by maximum soil concentration)

OPTION 3: Remediation standard using linear regression
Number of points = 4
Soil concentration midrange = 4.67
Number of points above midrange = 2
Enough points above midrange? YES
R-Square high enough? YES
Leachate criterion within range of leachate concentrations? NO
OPTION 3 NOT VALID



Acenaphth 83-32-9
Acetone (2 67-64-1
Acetophen 98-86-2
Acrolein 107-02-8
Acrylonitrile 107-13-1
Aldrin 309-00-2
Aluminum (7429-90-5
Anthracene 120-12-7
Antimony (7440-36-0
Arsenic (to 7440-38-2
Atrazine 1912-24-9
Barium (tot 7440-39-3
Benzene 71-43-2
Benzidine 92-87-5
Benzo(a)ar 56-55-3
Benzo(a)py 50-32-8
Benzo(b)flu 205-99-2
Benzo(k)flu 207-08-9
Beryllium 7440-41-7
1,1'-Bipher 92-52-4
Bis(2-chlor 111-44-4
Bis(2-chlor 108-60-1
Bis(2-ethyll 117-81-7
Bromodich 75-27-4
Bromoform 75-25-2
Bromometh 74-83-9
2-Butanone 78-93-3
Butylbenzy 85-68-7
Cadmium 7440-43-9
Caprolacta 105-60-2
Carbon dis 75-15-0
Carbon tetr 56-23-5
Chlordane 57-74-9
Chloroben: 108-90-7
Chloroform 67-66-3
2-Chloroph 95-57-8
Chrysene 218-01-9
1,2-Dichlor 107-06-2
1,1-Dichlor 75-35-4
1,2-Dichlor 156-59-2
1,2-Dichlor 156-60-5
2,4-Dichlor 120-83-2
1,2-Dichlor 78-87-5
1,3-Dichlor 542-75-6
Dieldrin 60-57-1
Diethylphth 84-66-2
2,4-Dimeth 105-67-9
Di-n-butyl p 84-74-2
4,6-Dinitro- 534-52-1
2,4-Dinitrop 51-28-5
2,4-Dinitrot 25321-14-6
Di-n-octyl p 117-84-0
1,2-Diphen 122-66-7
Endosulfan 115-29-7
Endosulfan 1031-07-8
Endrin 72-20-8
Ethylbenze 100-41-4
Fluoranthe 206-44-0
Fluorene 86-73-7
alpha-HCH 319-84-6
beta-HCH (319-85-7
Heptachlor 76-44-8
Heptachlor 1024-57-3
Hexachlorc 118-74-1
Hexachlorc 87-68-3
Hexachlorc 77-47-4
Hexachlorc 67-72-1
Indeno(1,2 193-39-5
Isophorone 78-59-1
Lead (total 7439-92-1

Lindane (g	58-89-9
Manganese	7439-96-5
Mercury (to	7439-97-6
Methoxych	72-43-5
Methyl ace	79-20-9
Methylene	75-09-2
2-Methylna	91-57-6
Methyl tert-	1634-04-4
Naphthaler	91-20-3
Nickel (tota	7440-02-0
Nitrobenze	98-95-3
N-Nitrosod	62-75-9
N-Nitrosod	621-64-7
N-Nitrosod	86-30-6
Pentachlor	87-86-5
Phenol	108-95-2
Polychlorin	1336-36-3
Pyrene	129-00-0
Selenium (	7782-49-2
Silver (tota	7440-22-4
Styrene	100-42-5
Tertiary bu	75-65-0
1,1,2,2-Tet	79-34-5
Tetrachlorc	127-18-4
Thallium (t	7440-28-0
Toluene	108-88-3
Toxaphene	8001-35-2
1,2,4-Trich	120-82-1
1,1,1-Trich	71-55-6
1,1,2-Trich	79-00-5
Trichloroetl	79-01-6
Trichloroflu	75-69-4
2,4,5-Trich	95-95-4
2,4,6-Trich	88-06-2
Vinyl chlori	75-01-4
Xylenes (to	1330-20-7
Zinc (total)	7440-66-6

NJDEP SPLP Spreadsheet, V3.1, November 2013

Case name/area of concern:	366-394 Wilson Ave Rear
Case number:	N/A
Sampling date:	9/26/2019
Contaminant:	Lead (total)
CAS No:	7439-92-1
Water solubility (mg/L)	NA
Aqueous reporting limit (µg/L):	5.00E+00
Soil reporting limit (mg/kg):	1.00E+00
Health-based GWQC (µg/L)	5.00E+00
DAF (20, or site-specific if approved):	**20**
Leachate Criterion (µg/L):	1.00E+02
Henry's law constant (dimensionless):	0.00E+00

CALCULATE SITE SPECIFIC IGW STANDARD

Reset Spreadsheet

Print Results

Instructions

CLICK HERE if chemical is not on drop-down list, or to enter alternate GWQC

Print to file

Exit

NOTE:
USE ONE PAGE PER CONTAMINANT, do not leave empty rows between samples
Do not enter samples with soil concentrations at or below the reporting limit
When leachate concentration is non-detect, enter the aqueous reporting limit
Enter site-specific dilution-attenuation factor (DAF) if desired

Data entry cells (do not skip rows)
Optional data entry
Calculated or locked cells
Indicates that Alternative Remediation Standard needs to be recalculated

Sample ID	Soil sample weight (kg)	Leachate Volume (L)	Total Soil Concentration (mg/kg)	SPLP Leachate Concentration (µg/L)	Final pH of Leachate (except VOCs)	Optional data				Kd (L/kg)	% Contaminant in Leachate	Field leachate concentration (µg/L)	Pass or fail?
						Sampling Depth (ft)	Soil Type	Organic Carbon (mg/kg)	Organic Carbon (%)				
NE	0.1	2	82.7	27.1	10.05					3031.7	0.66	27.28	PASS
SW	0.1	2	134	36.4	9.92					3661.3	0.54	36.60	PASS
E	0.1	2	78	36.4	9.94					2122.9	0.93	36.74	PASS
N	0.1	2	149	41.4	9.99					3579.0	0.56	41.63	PASS

SPLP RESULTS for

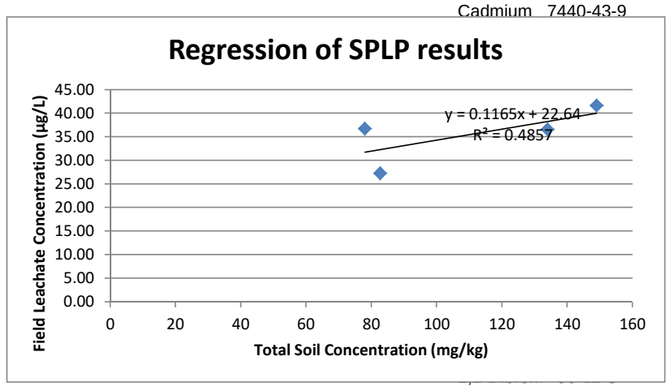
OPTION 1a: All adjusted leachate concentrations are below the leachate criterion

REMEDIATION STANDARD = 149 mg/kg

OPTION 1b: Simple inspection of tabulated results to find highest acceptable standard
EVERYTHING PASSED, OPTION 1b NOT VALID

OPTION 2: Remediation standard using site-specific Kd value
Kd ratio = 1.72, AVERAGING Kds OK
Kd USED FOR CALCULATING STANDARD = 3098.72 L/kg
result before rounding = 309.8871 mg/kg
REMEDIATION STANDARD = 150 mg/kg (controlled by maximum soil concentration)

OPTION 3: Remediation standard using linear regression
Number of points = 4
Soil concentration midrange = 113.5
Number of points above midrange = 2
Enough points above midrange? YES
R-Square high enough? NO
Leachate criterion within range of leachate concentrations? NO
OPTION 3 NOT VALID



Acenaphth 83-32-9

Acetone (2 67-64-1
Acetophen 98-86-2
Acrolein 107-02-8
Acrylonitrile 107-13-1
Aldrin 309-00-2
Aluminum (7429-90-5
Anthracene 120-12-7
Antimony (7440-36-0
Arsenic (to 7440-38-2
Atrazine 1912-24-9
Barium (tot 7440-39-3
Benzene 71-43-2
Benzidine 92-87-5
Benzo(a)ar 56-55-3
Benzo(a)py 50-32-8

Benzo(b)flu 205-99-2
Benzo(k)flu 207-08-9
Beryllium 7440-41-7
1,1'-Bipher 92-52-4
Bis(2-chlor 111-44-4
Bis(2-chlor 108-60-1
Bis(2-ethyll 117-81-7
Bromodich 75-27-4
Bromoform 75-25-2
Bromometh 74-83-9
2-Butanone 78-93-3
Butylbenzy 85-68-7
Cadmium 7440-43-9

1,2-Dibrom 106-93-4
1,2-Dichlor 95-50-1
1,3-Dichlor 541-73-1
1,4-Dichlor 106-46-7
3,3'-Dichlor 91-94-1
Dichlorodifl 75-71-8
1,1-Dichlor 75-34-3
1,2-Dichlor 107-06-2
1,1-Dichlor 75-35-4
1,2-Dichlor 156-59-2
1,2-Dichlor 156-60-5
2,4-Dichlor 120-83-2
1,2-Dichlor 78-87-5
1,3-Dichlor 542-75-6
Dieldrin 60-57-1
Diethylphth 84-66-2
2,4-Dimeth 105-67-9
Di-n-butyl p 84-74-2
4,6-Dinitro- 534-52-1
2,4-Dinitrop 51-28-5
2,4-Dinitrot 25321-14-6
Di-n-octyl p 117-84-0
1,2-Diphen 122-66-7

Endosulfan	115-29-7
Endosulfan	1031-07-8
Endrin	72-20-8
Ethylbenze	100-41-4
Fluoranthe	206-44-0
Fluorene	86-73-7
alpha-HCH	319-84-6
beta-HCH (	319-85-7
Heptachlor	76-44-8
Heptachlor	1024-57-3
Hexachlorc	118-74-1
Hexachlorc	87-68-3
Hexachlorc	77-47-4
Hexachlorc	67-72-1
Indeno(1,2	193-39-5
Isophorone	78-59-1
Lead (total	7439-92-1
Lindane (g	58-89-9
Manganes	7439-96-5
Mercury (to	7439-97-6
Methoxych	72-43-5
Methyl ace	79-20-9
Methylene	75-09-2
2-Methylna	91-57-6
Methyl tert-	1634-04-4
Naphthaler	91-20-3
Nickel (tota	7440-02-0
Nitrobenze	98-95-3
N-Nitrosod	62-75-9
N-Nitrosod	621-64-7
N-Nitrosod	86-30-6
Pentachlor	87-86-5
Phenol	108-95-2
Polychlorin	1336-36-3
Pyrene	129-00-0
Selenium (	7782-49-2
Silver (tota	7440-22-4
Styrene	100-42-5
Tertiary bu	75-65-0
1,1,2,2-Tet	79-34-5
Tetrachlorc	127-18-4
Thallium (t	7440-28-0
Toluene	108-88-3
Toxaphene	8001-35-2
1,2,4-Trich	120-82-1
1,1,1-Trich	71-55-6
1,1,2-Trich	79-00-5
Trichloroetl	79-01-6
Trichloroflu	75-69-4
2,4,5-Trich	95-95-4
2,4,6-Trich	88-06-2
Vinyl chlori	75-01-4
Xylenes (tc	1330-20-7
Zinc (total)	7440-66-6

NJDEP SPLP Spreadsheet, V3.1, November 2013

Case name/area of concern:	366-394 Wilson Ave Rear
Case number:	N/A
Sampling date:	9/26/2019
Contaminant:	Mercury (total)
CAS No:	7439-97-6
Water solubility (mg/L)	NA
Aqueous reporting limit (µg/L):	5.00E-02
Soil reporting limit (mg/kg):	1.00E-01
Health-based GWQC (µg/L)	2.00E+00
DAF (20, or site-specific if approved):	**20**
Leachate Criterion (µg/L):	4.00E+01
Henry's law constant (dimensionless):	0.00E+00

CALCULATE SITE SPECIFIC IGW STANDARD

Reset Spreadsheet

Print Results

Instructions

CLICK HERE if chemical is not on drop-down list, or to enter alternate GWQC

Print to file

Exit

NOTE:

USE ONE PAGE PER CONTAMINANT, do not leave empty rows between samples
Do not enter samples with soil concentrations at or below the reporting limit
When leachate concentration is non-detect, enter the aqueous reporting limit
Enter site-specific dilution-attenuation factor (DAF) if desired

Data entry cells (do not skip rows)
Optional data entry
Calculated or locked cells
Indicates that Alternative Remediation Standard needs to be recalculated

Sample ID	Soil sample weight (kg)	Leachate Volume (L)	Total Soil Concentration (mg/kg)	SPLP Leachate Concentration (µg/L)	Final pH of Leachate (except VOCs)	Optional data				Kd (L/kg)	% Contaminant in Leachate	Field leachate concentration (µg/L)	Pass or fail?
						Sampling Depth (ft)	Soil Type	Organic Carbon (mg/kg)	Organic Carbon (%)				
N	0.1	2	12.4	0.5	9.99					24780.0	0.08	0.50	PASS
SW	0.1	2	3.78	0.5	9.92					7540.0	0.26	0.50	PASS
E	0.1	2	0.924	0.5	9.94					1828.0	1.08	0.51	PASS
NE	0.1	2	0.709	0.5	10.05					1398.0	1.41	0.51	PASS

SPLP RESULTS for

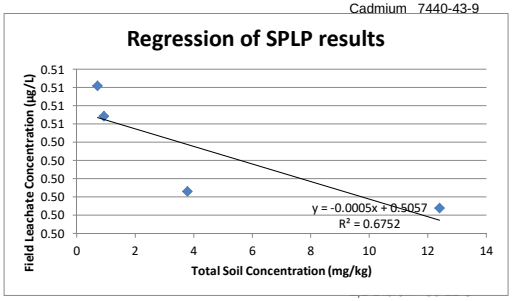
OPTION 1a: All adjusted leachate concentrations are below the leachate criterion

REMEDIATION STANDARD = 12.4 mg/kg

OPTION 1b: Simple inspection of tabulated results to find highest acceptable standard
EVERYTHING PASSED, OPTION 1b NOT VALID

OPTION 2: Remediation standard using site-specific Kd value
Kd ratio = 17.73, USE MINIMUM Kd
Kd USED FOR CALCULATING STANDARD = 1398. L/kg
result before rounding = 55.9261 mg/kg
REMEDIATION STANDARD = 12 mg/kg (controlled by maximum soil concentration)

OPTION 3: Remediation standard using linear regression
Number of points = 4
Soil concentration midrange = 6.55
Number of points above midrange = 1
Enough points above midrange? NO
R-Square high enough? NO
Leachate criterion within range of leachate concentrations? NO
OPTION 3 NOT VALID



Acenaphth 83-32-9

Acetone (2 67-64-1
Acetophen 98-86-2
Acrolein 107-02-8
Acrylonitril 107-13-1
Aldrin 309-00-2
Aluminum 7429-90-5
Anthracen 120-12-7
Antimony (7440-36-0
Arsenic (to 7440-38-2
Atrazine 1912-24-9
Barium (tot 7440-39-3
Benzene 71-43-2
Benzidine 92-87-5
Benzo(a)a 56-55-3
Benzo(a)py 50-32-8

Benzo(b)flu 205-99-2
Benzo(k)flu 207-08-9
Beryllium 7440-41-7
1,1'-Bipher 92-52-4
Bis(2-chlor 111-44-4
Bis(2-chlor 108-60-1
Bis(2-ethyl 117-81-7
Bromodich 75-27-4
Bromoform 75-25-2
Bromometl 74-83-9
2-Butanon 78-93-3
Butylbenzy 85-68-7
Cadmium 7440-43-9

1,2-Dibrom 106-93-4
1,2-Dichlor 95-50-1
1,3-Dichlor 541-73-1
1,4-Dichlor 106-46-7
3,3'-Dichlo 91-94-1
Dichlorodif 75-71-8
1,1-Dichlor 75-34-3
1,2-Dichlor 107-06-2
1,1-Dichlor 75-35-4
1,2-Dichlor 156-59-2
1,2-Dichlor 156-60-5
2,4-Dichlor 120-83-2
1,2-Dichlor 78-87-5
1,3-Dichlor 542-75-6
Dieldrin 60-57-1
Diethylphth 84-66-2
2,4-Dimeth 105-67-9
Di-n-butyl p 84-74-2
4,6-Dinitro- 534-52-1
2,4-Dinitro 51-28-5
2,4-Dinitrot 25321-14-6
Di-n-octyl p 117-84-0
1,2-Diphen 122-66-7
Endosulfar 115-29-7
Endosulfar 1031-07-8
Endrin 72-20-8
Ethylbenze 100-41-4
Fluoranthe 206-44-0
Fluorene 86-73-7
alpha-HCH 319-84-6
beta-HCH 319-85-7
Heptachlor 76-44-8
Heptachlor 1024-57-3
Hexachlorc 118-74-1
Hexachlorc 87-68-3
Hexachlorc 77-47-4

Hexachlorc	67-72-1
Indeno(1,2	193-39-5
Isophorone	78-59-1
Lead (total	7439-92-1
Lindane (g	58-89-9
Manganes	7439-96-5
Mercury (tc	7439-97-6
Methoxych	72-43-5
Methyl ace	79-20-9
Methylene	75-09-2
2-Methylna	91-57-6
Methyl tert	1634-04-4
Naphthaler	91-20-3
Nickel (tota	7440-02-0
Nitrobenze	98-95-3
N-Nitrosod	62-75-9
N-Nitrosod	621-64-7
N-Nitrosod	86-30-6
Pentachlor	87-86-5
Phenol	108-95-2
Polychlorin	1336-36-3
Pyrene	129-00-0
Selenium (	7782-49-2
Silver (tota	7440-22-4
Styrene	100-42-5
Tertiary bu	75-65-0
1,1,2,2-Tet	79-34-5
Tetrachlorc	127-18-4
Thallium (t	7440-28-0
Toluene	108-88-3
Toxaphene	8001-35-2
1,2,4-Trich	120-82-1
1,1,1-Trich	71-55-6
1,1,2-Trich	79-00-5
Trichloroet	79-01-6
Trichloroflu	75-69-4
2,4,5-Trich	95-95-4
2,4,6-Trich	88-06-2
Vinyl chlori	75-01-4
Xylenes (tc	1330-20-7
Zinc (total)	7440-66-6

Appendix D

Salomone Supplemental Phase II Report

January 20, 2020

Joseph Salomone
366-394-Wilson Ave, LLC
17 Demarest Drive
Wayne, NJ 07470

RE: Supplemental Limited Phase II Environmental Site Assessment
Due Diligence Investigation
Industrial Property
366-394 Wilson Avenue Rear
Newark, NJ 07105

Dear Mr. Salomone:

Environmental and Geotechnical Services (EGS) is providing this summary letter report to document the results of our Supplemental Limited Phase-II Environmental Site Assessment (ESA) performed at the subject property on December 27, 2019. This Supplemental Limited Phase-II ESA was completed for additional due diligence purposes pursuant to documentation received subsequent to our Limited Phase-II activities (Fifth Remedial Action Progress Report For MW-2 Area Remedial Activities dated August 26, 2009 and prepared by The Elm Group, Inc. "ELM" on behalf of Troy Chemical Corporation "Troy", received from the current property owner, Oberwill Corporation "Oberwill" on or about October 12, 2019.) Furthermore, this Supplemental Limited Phase-II ESA was further completed pursuant to information obtained during a meeting held at Region 2 of the United States Environmental Protection Agency's (USEPA) offices (New York, New York) on December 17, 2019. During the December 17, 2019 meeting, the USEPA indicated (verbally) that the laboratory analytical results of their own soil and sediment sampling conducted in August 2019 indicated very high concentrations of metals and PCBs in both soils and sediment at the unnamed tributary on the western portion of the subject property.

Our Supplemental Limited Phase-II ESA activities at the subject property involved soil borings and soil sampling, along with temporary well installation and groundwater sampling. Such additional soil and groundwater investigation included the following scope of work:

- The advancement of twelve soil borings and the collection of eleven soil samples from the soil borings.
- The installation of temporary monitoring wells at three of the soil boring locations and the collection of three groundwater samples from the wells.

The soil boring and temporary monitoring well locations are shown on the attached Site Plan.

The above-referenced and following scope of work was recommended by EGS and authorized by 366-394 Wilson Ave, LLC and is beyond the scope of the ASTM Standard E1527-13 (Phase-I ESA). The results of the latest scope of work are discussed in this report. The methodology used in the Supplemental Limited Phase-II ESA and the results are discussed below.

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Limited Phase-II ESA Purpose

On December 27, 2019, EGS conducted a Supplemental Limited Phase II ESA or site investigation ("SI") at the subject property in order to further investigate the subject property based on the receipt of documentation subsequent to the limited Phase II investigation (indicated trichloroethylene "TCE" and 1,2-dichloroethane groundwater contamination on the subject property) and based on information obtained during the December 17, 2019 meeting with the USEPA.

Soil Boring Installation

On December 27, 2019 supplemental limited Phase II activities consisted of advancing twelve (12) soil borings throughout the subject property. The December 27, 2019 soil borings were advanced by Salomone Bros., Inc. ("SBI") utilizing a direct-push drill rig (AMS PowerProbe model# 9630 VTR). A dual tube macro-core sampler assembly was used to limit potential cross contamination between sampling depths. The stainless steel sampler assembly and probe rods were decontaminated (using alconox and tap water) in between each soil sample location.

Eleven soil samples were collected from the soil borings. An EGS Geologist performed site assessment and soil sampling. The soil borings were advanced at the following locations:

- Soil boring SB-1 was advanced within the eastern portion of the main subject building.
- Soil boring SB-2 was advanced within the northwestern portion of the main subject building
- Soil boring SB-3 was advanced within the southwestern portion of the main subject building
- Soil boring SB-4 was advanced within the southeastern portion of the main subject building
- Soil boring SB-5 was advanced at the southern exterior of the subject property
- Soil boring SB-6 was advanced at the southern exterior of the subject property
- Soil boring SB-7 was advanced at the southeastern exterior of the subject property
- Soil borings SB-8 and SB-9 was advanced at the eastern exterior of the subject property
- Soil boring SB-10 was advanced on the edge of the concrete pad at the eastern exterior of the main subject building.
- Soil boring SB-11 was advanced at the northeastern eastern exterior of the subject property

Upon completion of all sampling activities, the boreholes were filled by SBI with soil drill cuttings and sealed with bentonite. The soil samples were sent to a state-certified laboratory for analysis.

Completed soil boring depths on December 27, 2019 consisted of the following:

- SB-1: 8 feet below grade
- SB-2: 8 feet below grade
- SB-3: 8 feet below grade
- SB-4: 8 feet below grade
- SB-5: 8 feet below grade
- SB-6: 8 feet below grade
- SB-7: 8 feet below grade
- SB-8: 8 feet below grade
- SB-9: 8 feet below grade
- SB-10: 8 feet below grade
- SB-11: 8 feet below grade

Sample Collection and Handling-Soil Boring Sampling

Soil sampling procedures and sample handling were based on the New Jersey Department of Environmental Protection ("NJDEP") *Field Sampling Procedures Manual* (2005). To prevent cross-contamination, the sampler wore dedicated, disposable, latex gloves and dedicated sampling devices at each sampling point. The soil samples were analyzed for a comprehensive suite of parameters which included United States Environmental Protection Agency (USEPA) target compound list/target analyte list (TCL/TAL) and Category 1 extractable petroleum hydrocarbons (EPH). Each soil sample for volatile organic compound (VOC) analysis was collected in the field using dedicated disposable Encore[R] samplers, while the aliquots for extractable petroleum hydrocarbons (EPH), semi-volatile organic compounds (SVOCs), target analyte list (TAL) metals, pesticides, polychlorinated biphenyls (PCBs) and cyanide were collected by transferring soil directly into a laboratory-provided glass jars.

The sample containers were labeled, and then temporarily stored in a chilled cooler with ice packs for transport to the laboratory. A chain-of-custody record was initiated and accompanied the sample jars to the laboratory for completion. A state-certified lab, Accredited Analytical Resources, LLC ("AAR") of Carteret, NJ (NJDEP Certification #12007), performed all analytical work.

Sample Collection and Handling-Temporary Well Point/ Groundwater Samples

The December 27, 2019 groundwater sampling activities consisted of converting two soil borings (SB-1 and SB-8) into temporary wells (TW-1 and TW-3). Additionally, a third temporary well (TW-2) was installed near the southeast corner of the subject property. The temporary wells, designated as TW-1, TW-2 and TW-3 were installed by SBI using a direct-push probe drill rig (AMS PowerProbe model# 9630 VTR). Based on groundwater Classification Exception Area (CEA) fact sheets that have been prepared and published for various adjacent and nearby properties on the NJDEP Dataminer database, including the western adjacent Troy Chemical site, groundwater flow is generally towards the east-northeast or east-southeast. Thus, the temporary monitoring wells were located in the suspected downgradient location of operational activities that were historically completed at the subject property and also downgradient of the westerly adjacent Troy Chemical facility and the Pierson's Creek Superfund Site. TW-1 was installed at the soil boring SB-1 location within the eastern portion of the main subject building. TW-2 was installed at the southeastern portion of the subject property. TW-3 was installed at the soil boring SB-8 location at the eastern portion of the subject property.

The temporary well points were installed to a bottom depth of 8 feet below grade (fbg). A 8 foot, 2" I.D. PVC 0.010" slot screen was installed with 1 of 2" I.D. PVC casing. Depth to water was measured at approximately 4.0 fbg in the temporary monitoring wells. Groundwater samples were collected from the temporary monitoring wells within 48 hours of installation pursuant to NJDEP *Field Sampling Procedures Manual.* The groundwater samples were collected on the same day as temporary well installation (December 27, 2019). The groundwater samples were collected via a dedicated disposable Teflon-lined bailer and were transferred directly into laboratory provided glassware. The groundwater samples were collected from the temporary wells were analyzed for TCL/TAL (with selected ion monitoring "SIM" for the base neutrals analysis) with a forward library search of thirty tentatively identified compounds (TICs). A state-certified lab, AAR, performed all analytical work.

Site Assessment Activities

December 27, 2019

The soil cores were extensively field-screened using a portable photoionization detector (PID; RKI Instruments model GX-6000) calibrated for isobutylene. With the exception of soil boring SB-4, no indications of significant contamination (e.g., staining, odors) were noted from the soil borings. An unknown purple-colored substance was noted at the soil-groundwater interface in SB-4. No PID readings were recorded from SB-3, SB-4, SB-8, SB-9, SB-10 and SB-11 advanced on December 27, 2019. Low PID readings were recorded from SB-1, SB-6 and SB-7. Evidence of historic fill material was observed at all of the soil boring locations. The historic fill material was generally observed at shallow depth intervals (generally a 3-4 foot thick layer) and consisted of black medium and coarse sand, gravel, ash, cinder concrete and brick fragments. Based on gauging of temporary monitoring wells installed during the supplemental limited Phase II investigation, depth to groundwater was determined to be at approximately 4 fbg. All soil samples were collected from in-situ soils at the 3.0-4.0 fbg depth interval which was also at the soil-groundwater interface (groundwater at 4 fbg). As a result of poor sample recovery, twelve inch increments were sampled from the soil borings. Additionally, twelve-inch increments were sampled from the soil borings in order to attain laboratory requirements for sample volume of the TCL/TAL and EPH analysis. The soil samples were collected from such depth intervals within in-situ soil material in order to further evaluate potential impacts from historical site operations and historic fill.

Temporary Monitoring Wells-December 27, 2019

The soil cores were extensively field-screened using a portable PID (RKI Instruments model GX-6000) calibrated for isobutylene. No indications of significant contamination (e.g., staining, odors) were noted from the soil cores and the groundwater samples that were collected to address temporary monitoring wells TW-2 and TW-3. An oily sheen was noted on the groundwater at the TW-1 location. The groundwater samples were collected in order to further evaluate potential impacts from historical site operations, historic fill, and potential offsite sources of contamination.

Results-Soil Boring Samples

Attachment 1 consists of a site plan depicting the soil boring and temporary monitoring well locations.

Attachment table 2 summarizes the sampling results of soil borings SB-1 through SB-11. The results are further discussed below.

Soil Sample SB-1:

All VOC, SVOC, EPH, PCB, pesticides, and cyanide concentrations were detected below their respective NJDEP Residential Direct Contact Soil Remediation Standards (RDCSRS), Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) and Default Impact-to-Groundwater Soil Screening Levels (DIGWSSLs).

However, the following metals were detected above applicable NJDEP soil remediation standards and DIGWSSL:

- Mercury was detected at 0.703 ppm which is above the NJDEP DIGWSSL of 0.1 ppb, but below the Site-Specific Impact-to-Groundwater Soil Remediation Standard (SSIGWSRS) of 12.4 ppm. The SSIGWSRS for mercury was established using results from a Synthetic Precipitation Leaching Procedure (SPLP) test during the limited Phase-II activities.
- Aluminum was detected at 13,500 ppm which is above the NJDEP DIGWSSL of 6,000 ppb. As noted previously in the Limited Phase II, the NJDEP considers aluminum to be a secondary metal

(not a health consideration, but rather an aesthetic consideration, i.e., based on taste, odor or appearance) unless there is reason to believe its presence is due to a site discharge. Aluminum was not noted to have been used in historical site operations based on information obtained during the due diligence process (i.e., Globe Metals Right-to-Know Surveys).

- Arsenic was detected at 1,890 ppm, which is above the NJDEP RDCSRS and the NRDCSRS of 19 ppm.
- Lead was detected at 161 ppm, which is above the NJDEP DIGWSSL of 90 ppm and the SSIGWSRS of 150 ppm. The SSIGWSRS for lead was established using results from a SPLP test during the limited Phase-II activities.
- Manganese was detected at 179 ppm, which is above the NJDEP DIGWSSL of 65 ppm. As noted previously in the Limited Phase II, the NJDEP considers manganese to be a secondary metal (not a health consideration, but rather an aesthetic consideration, i.e., based on taste, odor or appearance) unless there is reason to believe its presence is due to a site discharge. Manganese was not noted to have been used in historical site operations based on information obtained during the due diligence process (i.e., Globe Metals Right-to-Know Surveys).

Soil Sample SB-2:

All EPH, PCB, pesticides, and concentrations were detected below their respective NJDEP RDCSRS, NRDCSRS and DIGWSSLs.

However, the following SVOCs, metals, VOCs and cyanide were detected above applicable NJDEP soil remediation standards and DIGWSSL:

- The SVOC benzo(a)anthracene was detected at 63.9 ppm, which is above the NJDEP RDCSRS of 5 ppm and NRDCSRS of 17 ppm.
- The SVOC benzo(a)pyrene was detected at 60.2 ppm, which is above the NJDEP RDCSRS of 0.5 ppm and NRDCSRS of 2 ppm.
- The SVOC benzo(b)fluoranthene was detected at 83.1 ppm, which is above the NJDEP RDCSRS of 5 ppm and NRDCSRS of 17 ppm.
- The SVOC benzo(k)fluoranthene was detected at 27.7 ppm, which is above the NJDEP DIGWSSL of 25 ppm.
- The SVOC dibenzo(a,h) anthracene was detected at 14.4 ppm, which is above the NJDEP RDCSRS of 0.5 ppm and NRDCSRS of 2 ppm.
- The SVOC indeno(1,2,3-cd)pyrene was detected at 32.7 ppm, which is above the NJDEP RDCSRS of 5 ppm and NRDCSRS of 17 ppm.
- The SVOC N-Nitrosodiphenylamine was detected at 0.676 ppm, which is above the NJDEP DIGWSSL of 0.4 ppm.
- Mercury was detected at 0.36 ppm which is above the NJDEP DIGWSSL of 0.1 ppb, but below the SSIGWSRS of 12.4 ppm. The SSIGWSRS for mercury was established using results from a SPLP test during the limited Phase-II activities.
- The metal aluminum was detected at 8,830 ppm which is above the NJDEP DIGWSSL of 6,000 ppb. (Refer to comment regarding aluminum under SB-1 above.)
- The metal arsenic was detected at 542 ppm, which is above the NJDEP RDCSRS and the NRDCSRS of 19 ppm.
- The metal lead was detected at 100 ppm, which is above the NJDEP DIGWSSL of 90 ppm, but below the SSIGWSRS of 150 ppm. The SSIGWSRS for lead was established using results from a SPLP test during the limited Phase-II activities.
- The metal manganese was detected at 84.9 ppm, which is above the NJDEP DIGWSSL of 65 ppm. (Refer to comment regarding manganese under SB-1 above.)

- The VOC 1,2-dibromo-3-chloropropane was detected at 0.00525 ppm, which is slightly above the NJDEP DIGWSSL of 0.005 ppm.
- The VOC benzene was detected at 0.0499 ppm, which is above the DIGWSSL of 0.005 ppm.
- Cyanide was detected at 31.3 ppm, which is above the NJDEP RDCSRS of 20 ppm.

Soil Sample SB-3:

All VOC, SVOC, PCB, pesticides, and cyanide concentrations were detected below their respective NJDEP RDCSRS, NRDCSRS and DIGWSSLs.

However, EPH and arsenic were detected above applicable NJDEP soil remediation standards, DIGWSSL, and Ecological Screening Criteria (ESC) as discussed below:

- EPH was detected at 3,000 ppm, which is above the NJDEP ESC of 1,700 ppm.
- The metal arsenic was detected at 163 ppm, which is above the NJDEP RDCSRS and the NRDCSRS of 19 ppm.

Soil Sample SB-4:

All VOC, SVOC, EPH, PCB, pesticides, and cyanide concentrations were detected below their respective NJDEP RDCSRS, NRDCSRS and DIGWSSLs.

However, the following metals were detected above applicable NJDEP soil remediation standards and DIGWSSL:

- Mercury was detected at 0.17 ppm which is above the NJDEP DIGWSSL of 0.1 ppb, but below the SSIGWSRS of 12.4 ppm
- Aluminum was detected at 10,600 ppm which is above the NJDEP DIGWSSL of 6,000 ppb. (Refer to comment regarding aluminum under SB-1 above.)
- The metal arsenic was detected at 4,310 ppm, which is above the NJDEP RDCSRS and the NRDCSRS of 19 ppm.

Soil Sample SB-5:

All VOC, PCB, pesticides, and cyanide concentrations were detected below their respective NJDEP RDCSRS, NRDCSRS and DIGWSSLs.

However, EPH, one SVOC and the following metals were detected above applicable NJDEP soil remediation standards and DIGWSSL:

- EPH was detected at 9,430 ppm, which is above the NJDEP residential soil standard of 5,100 ppm for Category 1 EPH and above the NJDEP free product limit of 8,000 ppm for Category 1 EPH.
- The SVOC N-Nitrosodiphenylamine was detected at 1,420 ppm which is above the NJDEP RDCSRS of 99 ppm, the NRDCSRS of 390 ppm of 0.1 ppb and the DIGWSSL of 0.4 ppm.
- The metal cadmium was detected at 2,55 ppm which is above the DIGWSSL of 2 ppm but below the SSIGWSRS of 8 ppm. The SSIGWSRS for cadmium was established using results from a SPLP test during the limited Phase-II activities.
- The metal nickel was detected at 133 ppm, which is above the DIGWSSL of 48 ppm.
- The metal zinc was detected at 2,150 ppm, which is above the DIGWSSL of 930 ppm.

Soil Sample SB-6

All VOC, EPH, PCB, pesticides, and cyanide concentrations were detected below their respective NJDEP RDCSRS, NRDCSRS and DIGWSSLs.

However, one SVOC and mercury were detected above applicable NJDEP DIGWSSL, as discussed below:

- The SVOC N-Nitrosodiphenylamine was detected at 1.2 ppm, which is above the NJDEP DIGWSSL of 0.4 ppm.
- Mercury was detected at 0.389 ppm which is above the NJDEP DIGWSSL of 0.1 ppb, but below the SSIGWSRS of 12.4 ppm. The SSIGWSRS for mercury was established using results from a SPLP test during the limited Phase-II activities.

Soil Sample SB-7

All VOC, PCB, pesticides, and cyanide concentrations were detected below their respective NJDEP RDCSRS, NRDCSRS and DIGWSSLs.

However, EPH, one SVOC and the following metals were detected above applicable NJDEP DIGWSSL and ESC:

- Category 1 EPH was detected at 3,250 ppm, which is above the NJDEP ESC of 1,700 ppm.
- The SVOC benzo(a)pyrene was detected at 0.201 ppm, which is slightly above the NJDEP DIGWSSL of 0.2 ppm but below the SSIGWSRS of 0.414 ppm.
- Mercury was detected at 0.916 ppm which is above the NJDEP DIGWSSL of 0.1 ppb, but below the SSIGWSRS of 12.4 ppm. The SSIGWSRS for mercury was established using results from a SPLP test during the limited Phase-II activities.
- The metal arsenic was detected at 20.2 ppm, which is above the NJDEP RDCSRS and the NRDCSRS of 19 ppm.
- The metal cadmium was detected at 7.57 ppm which is above the DIGWSSL of 2 ppm but below the SSIGWSRS of 8 ppm. The SSIGWSRS cadmium was established using results from a SPLP test during the limited Phase-II activities.
- The metal lead was detected at 205 ppm, which is above the NJDEP DIGWSSL of 90 ppm and the SSIGWSRS of 150 ppm. The SSIGWSRS for lead was established using results from a SPLP test during the limited Phase-II activities.
- The metal manganese was detected at 98.8 ppm, which is above the NJDEP DIGWSSL of 65 ppm. (Refer to comment regarding manganese under SB-1 above.)
- The metal nickel was detected at 60.8 ppm, which is above the DIGWSSL of 48 ppm. See SPLP comment regarding nickel under the SB-5 above.

Soil Sample SB-8

All VOC, EPH, PCB, pesticides, and cyanide concentrations were detected below their respective NJDEP RDCSRS, NRDCSRS and DIGWSSLs.

However, the following SVOCs and metals were detected above applicable NJDEP RDCSRS and DIGWSSL:

- The SVOC benzo(a)anthracene was detected at 1.69 ppm, which is above the NJDEP DIGWSSL of 0.8 ppm.
- The SVOC benzo(a)pyrene was detected at 1.34 ppm, which is above the NJDEP RDCSRS of 0.5 ppm but below the NJDEP NRDCSRS of 2 ppm.
- Mercury was detected at 0.561 ppm which is above the NJDEP DIGWSSL of 0.1 ppb, but below the SSIGWSRS of 12.4 ppm. The SSIGWSRS for mercury was established using results from a SPLP test during the limited Phase-II activities.
- The metal lead was detected at 206 ppm, which is above the NJDEP DIGWSSL of 90 ppm and the SSIGWSRS of 150 ppm. The SSIGWSRS for lead was established using results from a SPLP test during the limited Phase-II activities.
- The metal manganese was detected at 253 ppm, which is above the NJDEP DIGWSSL of 65 ppm. (Refer to comment regarding manganese under SB-1 above.)

Soil Sample SB-9

All VOC, SVOC, EPH, PCB, pesticides, and cyanide concentrations were detected below their respective NJDEP RDCSRS, NRDCSRS and DIGWSSLs.

However, mercury was detected above the NJDEP DIGWSSL, as discussed below:

- Mercury was detected at 0.242 ppm which is above the NJDEP DIGWSSL of 0.1 ppb, but below the SSIGWSRS of 12.4 ppm. The SSIGWSRS for mercury was established using results from a SPLP test during the limited Phase-II activities.

Soil Sample SB-10

All VOC, EPH, PCB, pesticides, and cyanide concentrations were detected below their respective NJDEP RDCSRS, NRDCSRS and DIGWSSLs.

However, the following SVOCs and metals were detected above applicable NJDEP RDCSRS and DIGWSSL:

- The SVOC benzo(a)anthracene was detected at 1.22 ppm, which is above the NJDEP DIGWSSL of 0.8 ppm.
- The SVOC benzo(a)pyrene was detected at 1.35 ppm, which is above the NJDEP RDCSRS of 0.5 ppm but below the NJDEP NRDCSRS of 2 ppm.
- Mercury was detected at 0.313 ppm which is above the NJDEP DIGWSSL of 0.1 ppb, but below the SSIGWSRS of 12.4 ppm. The SSIGWSRS for mercury was established using results from a SPLP test during the limited Phase-II activities.
- The metal arsenic was detected at 21.9 ppm, which is above the NJDEP RDCSRS and the NRDCSRS of 19 ppm.

- The metal lead was detected at 194 ppm, which is above the NJDEP DIGWSSL of 90 ppm and the SSIGWSRS of 150 ppm. The SSIGWSRS for lead was established using results from a SPLP test during the limited Phase-II activities.

Soil Sample SB-11

All VOC, EPH, PCB, pesticides, and cyanide concentrations were detected below their respective NJDEP RDCSRS, NRDCSRS and DIGWSSLs.

However, arsenic as detected above applicable NJDEP RDCSRS, NRDCSRS and DIGWSSL, as discussed below:

- The metal arsenic was detected at 32 ppm, which is above the NJDEP RDCSRS and the NRDCSRS of 19 ppm.

Sampling and Analytical Results-Temporary Well Samples

Attachment Table 3 summarizes the sampling results of the temporary well samples collected on December 27, 2019. The results are further discussed below.

Attachment 1 consists of a site plan depicting the temporary well locations.

All PCB and pesticide concentrations were detected below their respective NJDEP Groundwater Quality Standards (GWQS) in the three temporary monitoring wells.

Groundwater Sample TW-1:

The following SVOCs, metals, and cyanide were detected above the GWQS:

- The SVOC benzo(a)anthracene was detected at 0.91 ppb, which is above the NJDEP GWQS of 0.1 ppb.
- The SVOC benzo(a)pyrene was detected at 1.51 ppb, which is above the NJDEP GWQS of 0.1 ppb.
- The SVOC benzo(b)fluoranthene was detected at 1.77 ppb, which is above the NJDEP GWQS of 0.2 ppb.
- The SVOC benzo(k)fluoranthene was detected at 0.546 ppb, which is slightly above the NJDEP GWQS of 0.5 ppb.
- The SVOC indeno(1,2,3-cd)pyrene was detected at 1.31 ppb, which is above the NJDEP GWQS of 0.2 ppb.
- The metal aluminum was detected at 48,900 ppb, which is above the NJDEP GWQS of 200 ppb. The NJDEP considers aluminum to be a secondary background metal (not health-based) but requires the performance of a background investigation of groundwater (groundwater samples at other areas of the site), research and published literature to prove that aluminum is representative of a background condition and not the result of a site discharge.
- The metal arsenic was detected at 1,930 ppb, which is above the NJDEP GWQS of 3 ppb.
- The metal beryllium was detected at 1.89 ppb, which is above the NJDEP GWQS of 1 ppb.
- The metal chromium was detected at 117 ppb, which is above the NJDEP GWQS of 70 ppb.
- The metal iron was detected at 54,700 ppb, which is above the NJDEP GWQS of 300 ppb. The NJDEP considers iron to be a secondary background metal (not health-based) but requires the performance of a background investigation of groundwater (groundwater samples at other areas

of the site), research and published literature to prove that aluminum is representative of a background condition and not the result of a site discharge.

- The metal lead was detected at 87.5 ppb, which is above the NJDEP GWQS of 5 ppb.
- The metal manganese was detected at 1,530 ppb, which is above the NJDEP GWQS of 50 ppb. The NJDEP considers manganese to be a secondary background metal (not health-based) but requires the performance of a background investigation of groundwater (groundwater samples at other areas of the site), research and published literature to prove that aluminum is representative of a background condition and not the result of a site discharge.
- The metal nickel was detected at 146 ppb, which is above the NJDEP GWQS of 100 ppb.
- The metal sodium was detected at 103,000 ppb, which is above the NJDEP GWQS of 50,000 ppb. The NJDEP considers sodium to be a secondary background metal (not health-based) but requires the performance of a background investigation of groundwater (groundwater samples at other areas of the site), research and published literature to prove that aluminum is representative of a background condition and not the result of a site discharge.
- The metal vanadium was detected at 66.5 ppb, which is above the NJDEP GWQS of 60 ppb.
- Cyanide was detected at 2,140 ppb, which is above the NJDEP GWQS of 100 ppb.

Groundwater Sample TW-2:

The following SVOCs, metals, and VOC were detected above the GWQS:

- The SVOC benzo(a)anthracene was detected at 0.748 ppb, which is above the NJDEP GWQS of 0.1 ppb.
- The SVOC benzo(a)pyrene was detected at 1.28 ppb, which is above the NJDEP GWQS of 0.1 ppb.
- The SVOC benzo(b)fluoranthene was detected at 1.48 ppb, which is above the NJDEP GWQS of 0.2 ppb.
- The SVOC indeno(1,2,3-cd)pyrene was detected at 1.1 ppb, which is above the NJDEP GWQS of 0.2 ppb.
- The metal aluminum was detected at 35,000 ppb, which is above the NJDEP GWQS of 200 ppb. (Refer to comment regarding aluminum under TW-1 above.)
- The metal arsenic was detected at 368 ppb, which is above the NJDEP GWQS of 3 ppb.
- The metal beryllium was detected at 2.1 ppb, which is above the NJDEP GWQS of 1 ppb.
- The metal cadmium was detected at 6.63 ppb, which is above the NJDEP GWQS of 4 ppb.
- The metal chromium was detected at 160 ppb, which is above the NJDEP GWQS of 70 ppb.
- The metal iron was detected at 51,300 ppb, which is above the NJDEP GWQS of 300 ppb. (Refer to comment regarding iron under TW-1 above.)
- The metal lead was detected at 119 ppb, which is above the NJDEP GWQS of 5 ppb.
- The metal manganese was detected at 586 ppb, which is above the NJDEP GWQS of 50 ppb. (Refer to comment regarding manganese under TW-1 above.)
- The metal sodium was detected at 77,200 ppb, which is above the NJDEP GWQS of 50,000 ppb. (Refer to comment regarding sodium under TW-1 above.)
- The metal vanadium was detected at 95.9 ppb, which is above the NJDEP GWQS of 60 ppb.
- The metal zinc was detected at 2,500 ppb, which is above the NJDEP GWQS of 2,000 ppb.
- The VOC trichloroethylene (TCE) was detected at 1.29 ppb, which is slightly above the GWQS of 1 ppb.

Groundwater Sample TW-3:

The following SVOCs, metals, and cyanide were detected above the GWQS:

- The SVOC benzo(a)anthracene was detected at 0.29 ppb, which is above the NJDEP GWQS of 0.1 ppb.
- The SVOC benzo(a)pyrene was detected at 0.326 ppb, which is above the NJDEP GWQS of 0.1 ppb.
- The SVOC benzo(b)fluoranthene was detected at 0.538 ppb, which is above the NJDEP GWQS of 0.2 ppb.
- The SVOC indeno(1,2,3-cd)pyrene was detected at 1.207 ppb, which is above the NJDEP GWQS of 0.2 ppb.
- The metal aluminum was detected at 28,700 ppb, which is above the NJDEP GWQS of 200 ppb. (Refer to comment regarding aluminum under TW-1 above.)
- The metal arsenic was detected at 259 ppb, which is above the NJDEP GWQS of 3 ppb.
- The metal beryllium was detected at 1.32 ppb, which is above the NJDEP GWQS of 1 ppb.
- The metal chromium was detected at 99.1 ppb, which is above the NJDEP GWQS of 70 ppb.
- The metal copper was detected at 5,660 ppb, which is above the NJDEP GWQS of 1,300 ppb. The copper concentration in groundwater is much higher than the concentration detected in the other two groundwater samples collected during the supplemental limited Phase II investigation.
- The metal iron was detected at 53,400 ppb, which is above the NJDEP GWQS of 300 ppb. (Refer to comment regarding iron under TW-1 above.)
- The metal lead was detected at 1,610 ppb, which is above the NJDEP GWQS of 5 ppb. The lead concentration in groundwater is much higher than the concentration detected in the other two groundwater samples collected during the supplemental limited Phase II investigation.
- The metal manganese was detected at 1,050 ppb, which is above the NJDEP GWQS of 50 ppb. (Refer to comment regarding manganese under TW-1 above.)
- The metal nickel was detected at 226 ppb, which is above the NJDEP GWQS of 100 ppb.
- The metal sodium was detected at 65,400 ppb, which is above the NJDEP GWQS of 50,000 ppb. (Refer to comment regarding sodium under TW-1 above.)
- The metal zinc was detected at 12,800 ppb, which is above the NJDEP GWQS of 2,000 ppb. The zinc concentration in groundwater is much higher than the concentration detected in the other two groundwater samples collected during the supplemental limited Phase II investigation.
- Cyanide was detected at 182 ppb, which is above the NJDEP GWQS of 100 ppb.

Conclusions & Recommendations

- Based on the results of our Supplemental Limited Phase-II ESA, all PCB and pesticides concentrations were detected below their respective NJDEP RDCSRS, NRDCSRS and DIGWSSLs.

- The results of our Supplemental Limited Phase-II ESA indicates that in-situ soils, including soils beneath the existing main subject building, contain contaminants above NJDEP remediation standards and screening levels.

- Metals, SVOCs, VOCs, EPH, and cyanide were detected above the NJDEP RDCSRS, NRDCSRS DIGWSSLs, and the SSIGWRS (for various metals) that was established during the limited Phase-II activities. The source of the SVOCs, VOCs, EPH, and cyanide may be attributed to historical site operations (e.g., scrap metal recycling, metal smelting and refining, ultramarine

manufacturing), historic fill material, or a combination of both. Further evaluation of site history may be needed to confirm this.

- Based on the metals, SVOCs, VOCs, EPH, cyanide results in soils, we recommend that additional inquiry be completed by a New Jersey Licensed Site Remediation Professional (LSRP) in order to determine if such results may attributable to historical site operations, historic fill material, an unknown source(s), an off-site source(s), or a combination of the preceding. EGS also recommends the completion of a remedial investigation in order to delineate the horizontal and vertical extent of the identified soil contamination.

- An alternative to compliance can be implemented via further SPLP testing of certain contaminants such as metals and SVOCs.

- Based on the results of the supplemental limited Phase-II ESA and the recommended remedial investigation, the remedial action to address such soil contamination may entail the establishment of Deed Notice for soils pursuant to applicable NJDEP regulations and guidance (e.g., Technical Requirements for Site Remediation, N.J.A.C. 7:26E-5.2(a)4, Administrative Requirement For The Remediation Of Contaminated Sites, N.J.A.C. 7:26C-7.2, Soil Remedial Action Permit Guidance). Such would involve performing a restricted use remediation, the use of engineering and/or institutional controls as a remedy for soil contamination (e.g., capping of soil in place, recording of a Deed Notice at the County Clerk/Register of Deeds and Mortgages and to obtain a remedial action permit (RAP) from the NJDEP). NJDEP soil Deed Notice compliance involves NJDEP fees and the retention of a New Jersey Licensed Site Remediation Professional (LSRP) to perform work, the establishment of a soil RAP (which involves a fee payable to the NJDEP), an annual soil RAP fee (payable to the NJDEP), and post-Response Action Outcome (RAO) inspections and biennial reports submitted to the NJDEP in order to ensure that the engineering control (cap) remains protective of human health and the environment. Alternate means of remedial action may be necessary to address the identified soil contamination following the performance of the recommended remedial investigation, especially if such contamination is deemed by a LSRP as attributable to discharge from historical site operations rather than historic fill.

- VOCs, SVOCs, metals and cyanide were detected above the NJDEP GWQS based on the results of temporary monitoring wells. The source(s) of groundwater contamination may be attributed to historical site operations (e.g., scrap metal recycling, metal smelting and refining, ultramarine manufacturing), historic fill material, an unknown source(s), an off-site source(s) or a combination of the preceding. Based on such results, we recommend that remedial investigation of groundwater is completed under LSRP oversight (e.g., permanent monitoring well installation and sampling). It is further recommended that additional inquiry and sampling as necessary is completed under LSRP oversight in order to determine if any of the groundwater contaminants may be attributable to an off-site source (e.g., completion of a Preliminary Assessment, upgradient monitoring installation and sampling).

- Further investigation may be conducted via permanent well installation and low flow purging and sampling (LFPS). Such methodology may obtain reduced contaminant levels compared to the temporary monitoring well sampling results (i.e., due to the turbidity of the temporary monitoring well samples).

- With regard to secondary metals groundwater contamination (e.g., aluminum, iron, manganese and sodium), additional groundwater investigation via permanent well installation and sampling, and possible vertical soil profiling, is warranted in order to determine if such concentrations can be attributed to natural background or operational discharge.

- Depending on the results of the recommended groundwater investigation, the establishment of a groundwater Classification Exception Area (CEA) may ultimately be required pursuant to applicable NJDEP regulations and guidance (e.g., Technical Requirements for Site Remediation, N.J.A.C. 7:26E-4.9(a)7, Administrative Requirement For The Remediation Of Contaminated Sites, N.J.A.C. 7:26C-7.3, Groundwater Remedial Action Permit Guidance). A groundwater CEA is an institutional control (IC) that is intended to prevent adverse impacts to sensitive receptors (e.g., potable wells) that may be affected by contaminants in the groundwater from the subject property. Unless attributable to historic fill, Groundwater CEA compliance involves NJDEP fees and the retention of a LSRP to perform work, the establishment of a groundwater RAP (which involves a fee payable to the NJDEP), an annual groundwater RAP fee (payable to the NJDEP), post-RAO sampling and laboratory analysis of monitoring wells as set forth in the schedule included in the groundwater RAP, evaluations to ascertain whether nearby receptors and/or sensitive populations may be affected by the groundwater contamination (e.g., Receptor Evaluation and Well Search), and post-RAO inspections and biennial reports submitted to the NJDEP in order to ensure that the institutional control (groundwater CEA) remains protective of human health and the environment.

  Such groundwater CEAs, as are typical in cases involving immobile compounds (e.g., metals), are often established for an indeterminate duration and part-in-parcel with a Limited Restricted Use Response Action Outcome "RAO" (e.g., regulatory closure) issued by a LSRP. If the recommended further groundwater investigation confirms that the any of the groundwater contamination is attributable to historic fill rather than site discharge, a groundwater CEA consisting of a Virtual Institutional Control (VIC) can be established. A VIC CEA does not involve NJDEP fees, retention of a LSRP, periodic sampling and laboratory analysis of monitoring wells as set forth in the schedule included in a groundwater RAP or inspections and biennial reports submitted to the NJDEP.

- Based on the metals results in soils, the results (above the NJDEP DIGWSSL) for aluminum and manganese can be attributable to background contamination when compared to median and 90th percentile concentrations noted in "*Ambient Levels of Metals in New Jersey Soils*" by P.F. Sanders, 2003.

- To reiterate the findings from our Phase-I ESA, although groundwater contamination in association with the adjacent Troy Chemical facility has been delineated and does not extend onto the subject property per a NJDEP CEA Fact Sheet and CEA extent map, EGS recommends that the status of the Troy Chemical/USEPA Pierson's Creek Superfund case be monitored on a periodic basis in order to determine any potential future impacts to the environmental condition of the subject property. This is especially the case since the December 17, 2019 meeting with the USEPA yielded information that the unnamed tributary is designated as a portion of operable unit 1 (OU-1) of the Pierson's Creek Superfund site, that very high concentrations of metals and PCBs were detected in soils and sediments of the unnamed tributary during sampling by the USEPA in August 2019 and that the remedial investigation/feasibility study (RI/FS) for the Superfund case ongoing.

Based on the results of our Limited Phase-II ESA, EGS recommends that the property owner and/or operator contact the NJDEP Hotline (1-877-927-6337) in order to report soil and groundwater contamination; unless an there is an agreement in existence with regard to non-disclosure of these due

diligence results. In the case of the latter, EGS recommends consultation with a transactional, business attorney with a focus in environmental compliance counseling regarding reporting obligations based on the results of the Supplemental Limited Phase II. Please note that by contacting the NJDEP to report soil and groundwater contamination, there will be many regulatory requirements and deadlines that will be triggered. A LSRP will be required to oversee all necessary remedial investigation and remediation actions.

For additional details on NJDEP requirements for a regulated site, please contact us at (973) 808-6600.

Sincerely yours,

James Kelly

James Kelly
Project Manager

Attachments:

Site Plan: Soil and Groundwater Sample Locations
Tabulation of Supplemental Phase II Soil Samples
Tabulation of Supplemental Phase II Groundwater Samples
Laboratory Reports and Chain-of-Custody Forms


SB-2
SB-11
SB-10
SB-1/TW-1
SB-3
SB-8/TW-3
SB-4
SB-9
SB-5
SB-6
SB-7
TW-2
© 2019 Google
151 ft
1995
Imagery Date: 5/10/2018 40°42'57.98" N 74°08'35.54" W elev 6 ft eye alt 659

Table 2-Supplemental Phase II Soil Sampling Results (12-27-19)
Lab: Accredited Analytical Resources LLC
366-394 Wilson Ave Rear, Newark, New Jersey

Compound	IPTGW	NRDCSRS	RDCSRS	SSIGWSRS	Sample No. SB-1 12/27/19	Sample No. SB-2 12/27/19	Sample No. SB-2 12/27/19	Sample No. SB-3 12/27/19	Sample No. SB-4 12/27/19	Sample No. SB-5 12/27/19	Sample No. SB-5 (Rerun) 12/27/19	Sample No. SB-6 12/27/19	Sample No. SB-6 12/27/19	Sample No. SB-7 12/27/19	Sample No. SB-8 12/27/19	Sample No. SB-9 12/27/19	Sample No. SB-10 12/27/19	Sample No. SB-11 12/27/19
EPA Method SW846 8081B/8082A (mg/kg)																		
4,4'-DDD	4	13	3	NA	0.00288 U	0.00139 U		0.00126 U	0.00261 U	0.00187 U		0.00137 U		0.00125 U	0.00123 U	0.00119 U	0.00117 U	0.00128 U
4,4'-DDE	18	9	2	NA	0.00288 U	0.00139 U		0.00126 U	0.00261 U	0.00187 U		0.00137 U		0.00125 U	0.00123 U	0.00119 U	0.00117 U	0.00128 U
4,4'-DDT	11	8	2	NA	0.00288 U	0.00139 U		0.00126 U	0.00261 U	0.00187 U		0.00137 U		0.00125 U	0.00123 U	0.00119 U	0.00117 U	0.00128 U
Aldrin	0.2	0.2	0.04	NA	0.00143 U	0.000690 U		0.000627 U	0.00130 U	0.000929 U		0.000680 U		0.000620 U	0.000610 U	0.000591 U	**0.00100**	0.000635 U
alpha-BHC	0.002	0.5	0.1	NA	0.00143 U	0.000690 U		0.000627 U	0.00130 U	0.000929 U		0.000680 U		0.000620 U	0.000610 U	0.000591 U	0.000582 U	0.000635 U
alpha-Chlordane	0.025	0.5	0.1	NA	0.00143 U	0.000690 U		0.000627 U	0.00130 U	0.000929 U		0.000680 U		0.000620 U	0.000610 U	0.000591 U	0.000582 U	0.000635 U
Aroclor-1016	0.2	1	0.2	NA	0.0360 U	0.0174 U		0.0158 U	0.0326 U	0.0234 U		0.0171 U		0.0156 U	0.0153 U	0.0149 U	0.0146 U	0.0160 U
Aroclor-1221	0.2	1	0.2	NA	0.0360 U	0.0174 U		0.0158 U	0.0326 U	0.0234 U		0.0171 U		0.0156 U	0.0153 U	0.0149 U	0.0146 U	0.0160 U
Aroclor-1232	0.2	1	0.2	NA	0.0360 U	0.0174 U		0.0158 U	0.0326 U	0.0234 U		0.0171 U		0.0156 U	0.0153 U	0.0149 U	0.0146 U	0.0160 U
Aroclor-1242	0.2	1	0.2	NA	0.0360 U	0.0174 U		0.0158 U	0.0326 U	0.0234 U		0.0171 U		0.0156 U	0.0153 U	0.0149 U	0.0146 U	0.0160 U
Aroclor-1248	0.2	1	0.2	NA	0.0360 U	0.0174 U		0.0158 U	0.0326 U	0.0234 U		0.0171 U		0.0156 U	0.0153 U	0.0149 U	0.0146 U	0.0160 U
Aroclor-1254	0.2	1	0.2	NA	0.0360 U	0.0174 U		0.0158 U	0.0326 U	0.0234 U		0.0171 U		0.0156 U	0.0153 U	0.0149 U	0.0146 U	0.0160 U
Aroclor-1260	0.2	1	0.2	NA	0.0360 U	0.0174 U		0.0158 U	0.0326 U	0.0234 U		0.0171 U		0.0156 U	0.0153 U	0.0149 U	0.0146 U	0.0160 U
Aroclor-1262	0.2	1	0.2	NA	0.0360 U	0.0174 U		0.0158 U	0.0326 U	0.0234 U		0.0171 U		0.0156 U	0.0153 U	0.0149 U	0.0146 U	0.0160 U
Aroclor-1268	0.2	1	0.2	NA	0.0360 U	0.0174 U		0.0158 U	0.0326 U	0.0234 U		0.0171 U		0.0156 U	0.0153 U	0.0149 U	0.0146 U	0.0160 U
beta-BHC	0.002	2	0.4	NA	0.00143 U	0.000690 U		0.000627 U	0.00130 U	0.000929 U		0.000680 U		0.000620 U	0.000610 U	0.000591 U	0.000582 U	0.000635 U
delta-BHC	NA	NA	NA	NA	0.00143 U	0.000690 U		0.000627 U	0.00130 U	0.000929 U		0.000680 U		0.000620 U	0.000610 U	0.000591 U	0.000582 U	0.000635 U
Dieldrin	0.003	0.2	0.04	NA	0.00288 U	0.00139 U		0.00126 U	0.00261 U	0.00187 U		0.00137 U		0.00125 U	0.00123 U	0.00119 U	0.00117 U	0.00128 U
Endosulfan I	2	3400	235	NA	0.00143 U	0.000690 U		0.000627 U	0.00130 U	0.000929 U		0.000680 U		0.000620 U	0.000610 U	0.000591 U	0.000582 U	0.000635 U
Endosulfan II	2	3400	235	NA	0.00288 U	0.00139 U		0.00126 U	0.00261 U	0.00187 U		0.00137 U		0.00125 U	0.00123 U	0.00119 U	0.00117 U	0.00128 U
Endosulfan sulfate	2	6800	470	NA	0.00288 U	0.00139 U		0.00126 U	0.00261 U	0.00187 U		0.00137 U		0.00125 U	0.00123 U	0.00119 U	0.00117 U	0.00128 U
Endrin	1	340	23	NA	0.00288 U	0.00139 U		0.00126 U	0.00261 U	0.00187 U		0.00137 U		0.00125 U	0.00123 U	0.00119 U	0.00117 U	0.00128 U
Endrin aldehyde	NA	NA	NA	NA	0.00288 U	0.00139 U		0.00126 U	0.00261 U	0.00187 U		0.00137 U		0.00125 U	0.00123 U	0.00119 U	0.00117 U	0.00128 U
Endrin ketone	NA	NA	NA	NA	0.00288 U	0.00139 U		0.00126 U	0.00261 U	0.00187 U		0.00137 U		0.00125 U	0.00123 U	0.00119 U	0.00117 U	0.00128 U
gamma-BHC [Lindane]	0.002	2	0.4	NA	0.00143 U	0.000690 U		0.000627 U	0.00130 U	0.000929 U		0.000680 U		0.000620 U	0.000610 U	0.000591 U	0.000582 U	0.000635 U
gamma-Chlordane	0.025	0.5	0.1	NA	0.00143 U	0.000690 U		0.000627 U	0.00130 U	0.000929 U		0.000680 U		**0.00163** P	0.000610 U	0.000591 U	0.000582 U	0.000635 U
Heptachlor	0.5	0.7	0.1	NA	0.00143 U	0.000690 U		0.000627 U	0.00130 U	0.000929 U		0.000680 U		0.000620 U	0.000610 U	0.000591 U	0.000582 U	0.000635 U
Heptachlor Epoxide	0.01	0.3	0.07	NA	0.00143 U	0.000690 U		0.000627 U	0.00130 U	0.000929 U		0.000680 U		0.000620 U	0.000610 U	0.000591 U	0.000582 U	0.000635 U
Methoxychlor	160	5700	390	NA	0.00434 U	0.00209 U		0.00190 U	0.00393 U	0.00281 U		0.00206 U		0.00188 U	0.00185 U	0.00179 U	0.00176 U	0.00192 U
Toxaphene	0.3	3	0.6	NA	0.0722 U	0.0348 U		0.0316 U	0.0654 U	0.0469 U		0.0343 U		0.0313 U	0.0308 U	0.0298 U	0.0294 U	0.0320 U
Extractable Petroleum Hydrocarbons by NJ EPH (mg/kg)																		
Extractable Petroleum Hydroca	NA	5,100	54,000	NA	46.2 U	**156**		**3000**	41.9 U	**9430**		22.0 U		**3250** D	**235**	19.1 U	**61.6**	**67.2**
Semivolatile Organic Compounds EPA Method SW846 8270D (mg/kg)																		
1,1-Biphenyl	140	240	61	NA	**0.138** J	**0.187**	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
1,2,4,5-Tetrachlorobenzene	NA	NA	NA	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
1,2-Diphenylhydrazine	0.7	2	0.7	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
2,3,4,6-Tetrachlorophenol	NA	NA	NA	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
2,4,5-Trichlorophenol	68	68000	6100	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
2,4,6-Trichlorophenol	0.2	74	19	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
2,4-Dichlorophenol	0.2	2100	180	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
2,4-Dimethylphenol	1	14000	1200	NA	0.0962 U	**0.361**	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
2,4-Dinitrophenol	0.3	1400	120	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
2,4-Dinitrotoluene	0.1	3	0.7	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
2,6-Dinitrotoluene	0.1	3	0.7	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
2-Chloronaphthalene	NA	NA	NA	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
2-Chlorophenol	0.8	2200	310	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
2-Methylnaphthylene	8	2400	230	NA	**0.154** J	**0.797**	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
2-Methylphenol	NA	3400	310	NA	0.0962 U	**0.366**	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
2-Nitroaniline	NA	23000	39	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
2-Nitrophenol	NA	NA	NA	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
3 & 4-Methylphenol	NA	340	31	NA	0.0962 U	**0.947**	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
3,3'-Dichlorobenzidine	0.2	4	1	NA	0.240 U	0.116 U	2.32 U	0.105 U	0.217 U	1.56 U	77.9 U	0.114 U		0.104 U	0.102 U	0.0990 U	0.0976 U	0.106 U
3-Nitroaniline	NA	NA	NA	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
4,6-Dinitro-2-methylphenol	0.3	68	6	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
4-Bromophenyl-phenylether	NA	NA	NA	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
4-Chloro-3-methylphenol	NA	NA	NA	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
4-Chloroaniline	NA	NA	NA	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
4-Chlorophenyl-phenylether	NA	NA	NA	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
4-Nitroaniline	NA	NA	NA	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
4-Nitrophenol	NA	NA	NA	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Acenaphthene	110	37000	3400	NA	**0.152** J	**0.547**	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	**0.0953** J	0.0397 U	**0.0421** J	0.0427 U
Acenaphthylene	NA	300000	NA	NA	0.0962 U	**4.16**	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	**0.124**	0.0397 U	0.0392 U	0.0427 U
Acetophenone	3	5	2	NA	0.0962 U	**0.120**	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Anthracene	2400	30000	17000	NA	**0.132** J	**6.86** E	**7.66** D	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		**0.0902** J	**0.530**	0.0397 U	**0.162**	0.0427 U
Atrazine	0.2	2400	210	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Azobenzene	0.7	2	0.7	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Benzaldehyde	NA	68000	6100	NA	**0.636**	**0.293**	0.929 U	0.0422 U	**1.23**	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Benzidine	0.7	0.7	0.7	NA	0.240 U	0.116 U	2.32 U	0.105 U	0.217 U	1.56 U	77.9 U	0.114 U		0.104 U	0.102 U	0.0990 U	0.0976 U	0.106 U
Benzo[a]anthracene	0.8	17	5	NA	**0.138** J	**63.9** E	**54.5** D	0.0422 U	0.0872 U	0.625 U	31.2 U	**0.0475** J		**0.197**	**1.69**	0.0397 U	**1.22**	**0.119**
Benzo[a]pyrene	0.2	2	0.5	0.414	**0.194** J	**17.6** E	**60.2** D	0.0422 U	0.0872 U	0.625 U	31.2 U	**0.0467** J		**0.201**	**1.34**	0.0397 U	**1.35**	**0.106** J
Benzo[b]fluoranthene	2	17	5	NA	**0.148** J	**70.4** E	**83.1** D	0.0422 U	0.0872 U	0.625 U	31.2 U	**0.0573** J		**0.268**	**1.74**	0.0397 U	**1.88**	**0.120**
Benzo[ghi]perylene	NA	30000	380000	NA	**0.143** J	**21.8** E	**32.9** D	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		**0.178**	**0.381**	0.0397 U	**0.358**	**0.0542** J
Benzo[k]fluoranthene	25	170	45	NA	**0.127** J	**27.7** E	**19.4** D	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		**0.200**	**1.24**	0.0397 U	**0.747**	**0.0919** J
bis(2-chloroethoxy)methane	NA	NA	NA	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
bis(2-chloroethyl)ether	0.2	2	0.4	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
bis(2-chloroisopropyl)ether	5	67	23	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
bis(2-ethylhexyl)phthalate	1200	140	35	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Butylbenzylphthalate	230	14000	1200	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U

Caprolactam	12	340000	31000	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Carbazole	NA	96	24	NA	**0.180** J	**1.02**	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	**0.236**	0.0397 U	**0.193**	0.0427 U
Chrysene	80	1700	450	NA	**0.131** J	**27.7** E	**54.0** D	0.0422 U	0.0872 U	0.625 U	31.2 U	**0.0496** J		**0.283**	**1.70**	0.0397 U	**1.43**	**0.168**
Dibenzo(a,h)anthracene	0.8	2	0.5	NA	0.0962 U	**8.37** E	**12.4** D	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		**0.0636** J	**0.164**	0.0397 U	**0.258**	0.0427 U
Dibenzofuran	NA	NA	NA	NA	**0.182** J	**1.13**	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	**0.105**	0.0397 U	0.0392 U	0.0427 U
Diethyl phthalate	88	550000	49000	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Dimethylphthalate	NA	NA	NA	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		**0.0750** J	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Di-n-butyl phthalate	760	68000	6100	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Di-n-octyl phthalate	3300	27000	2400	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Fluoranthene	1300	24000	2300	NA	**0.404**	**43.4** E	**96.4** D	0.0422 U	0.0872 U	0.625 U	31.2 U	**0.0811** J		**0.287**	**3.80**	**0.0475** J	**1.93**	**0.187**
Fluorene	170	24000	2300	NA	**0.166** J	**0.991**	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	**0.0778** J	0.0397 U	**0.0435** J	0.0427 U
Hexachlorobenzene	0.2	1	0.3	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Hexachlorobutadiene	0.9	25	6	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Hexachlorocyclopentadiene	320	110	45	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Hexachloroethane	0.2	48	12	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Indeno(1,2,3-cd)pyrene	7	17	5	NA	**0.120** J	**21.2** E	**32.7** D	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		**0.155**	**0.441**	0.0397 U	**0.394**	**0.0515** J
Isophorone	0.2	2000	510	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Naphthalene	25	17	6	NA	**1.69**	**5.94** E	**5.84** D	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	**0.0699** J	**0.0796** J
Nitrobenzene	0.2	14	5	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
N-Nitrosodimethylamine	0.7	0.7	0.7	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
N-Nitroso-di-n-propylamine	0.2	0.3	0.2	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
N-Nitrosodiphenylamine	0.4	390	99	NA	0.0962 U	**0.676**	0.929 U	0.0422 U	**0.168** J	**645** E	**1420** D	**1.20**		0.0417 U	**0.0549** J	0.0397 U	**0.0500** J	**0.0547** J
Pentachlorophenol	0.3	3	0.9	NA	0.0962 U	0.0464 U	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Phenanthrene	NA	300000	NA	NA	**0.489**	**13.6** E	**16.6** D	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		**0.345**	**2.97**	0.0397 U	**0.971**	**0.130**
Phenol	8	210000	18000	NA	0.0962 U	**0.641**	0.929 U	0.0422 U	0.0872 U	0.625 U	31.2 U	0.0457 U		0.0417 U	0.0410 U	0.0397 U	0.0392 U	0.0427 U
Pyrene	840	18000	1700	NA	**0.418**	**141** E	**110** D	0.0422 U	0.0872 U	0.625 U	31.2 U	**0.0893** J		**0.600**	**3.59**	**0.0455** J	**1.99**	**0.190**
TIC Summary	NA	NA	NA	NA	8.502	104.76		28.886	4.813	834.59	0	3.054		0.464	6.127	1.277	7.167	0.513
Total Mercury by SW846 7471B (mg/kg)																		
Mercury	0.1	65	23	12.4	**0.703**	**0.360**		0.0759 U	**0.170**	**0.223**		**0.389**		**0.916**	**0.561**	**0.242**	**0.313**	**0.0883**
Total Metals by EPA Method SW846 6010D (mg/kg)																		
Aluminum	6000	NA	78000	NA	**13500** D	**8830** D		**391**	**10600** D	**400**		**1090** D		**4080** D	**5560** D	**1530** D	**2650** D	**1210** D
Antimony	6	450	31	NA	6.41 U	2.82 U		2.74 U	5.47 U	4.00 U		2.84 U		**4.34**	2.57 U	2.53 U	2.44 U	2.64 U
Arsenic	19	19	19	NA	**1890**	**542**		**163**	**4310**	**15.1**		**3.92**		**20.8**	**5.53**	**2.81**	**21.9**	**32.0**
Barium	2100	59000	16000	NA	**79.4**	**77.1**		**20.9**	**45.9**	**27.3**		**17.9**		**108**	**99.7**	**26.0**	**108**	**106**
Beryllium	0.7	140	16	NA	0.801 U	**0.521**		0.343 U	0.683 U	0.500 U		0.355 U		0.325 U	0.321 U	0.317 U	0.305 U	0.330 U
Cadmium	2	78	78	8	0.801 U	**0.665**		0.343 U	0.683 U	**2.55**		**0.732**		**7.57**	**0.911**	0.317 U	**0.380**	0.330 U
Calcium	NA	NA	NA	NA	**31900** D	**7500**		**661**	**8150** D	**616**		**1100**		**1530**	**5690** D	**706**	**1110**	**676**
Chromium	NA	NA	NA	NA	**20.9**	**11.4**		**13.9**	**16.4**	**4.77**		**15.0**		**17.4**	**27.1**	**29.4**	**34.9**	**8.75**
Cobalt	90	590	1600	NA	8.01 U	**6.90**		3.43 U	6.83 U	5.00 U		3.55 U		**3.54**	**5.15**	3.17 U	**4.37**	**7.55**
Copper	11000	45000	3100	NA	**35.7**	**61.4**		**20.6**	**49.3**	**45.8**		**31.5**		**6120**	**269**	**15.2**	**93.4**	**64.0**
Iron	NA	NA	NA	NA	**15500** D	**11500** D		**3420** D	**19500** D	**227**		**4290** D		**18200** D	**19200** D	**4800** D	**8950** D	**9260** D
Lead	90	800	400	150	**161**	**100**		**3.58**	**81.4**	**80.3**		**11.8**		**205**	**206**	**15.1**	**194**	**6.74**
Magnesium	NA	NA	NA	NA	**2610**	**402**		**102**	**1960**	**112**		**177**		**1410**	**2030**	**137**	**235**	**116**
Manganese	65	5900	11000	NA	**179**	**84.9**		**5.26**	**205**	**6.96**		**11.4**		**98.8**	**233**	**14.8**	**53.6**	**4.34**
Nickel	48	23000	1600	NA	**15.5**	**26.7**		**8.10**	**15.2**	**133**		**16.2**		**60.8**	**32.0**	**6.61**	**16.1**	**16.4**
Potassium	NA	NA	NA	NA	**1100**	**687**		**116**	**784**	**78.3**		**169**		**434**	**508**	**142**	**322**	**221**
Selenium	11	5700	390	NA	6.41 U	2.82 U		2.74 U	5.47 U	4.00 U		2.84 U		2.60 U	2.57 U	2.53 U	2.44 U	**2.81**
Silver	1	5700	390	NA	0.801 U	0.353 U		0.343 U	0.683 U	0.500 U		0.355 U		0.325 U	0.321 U	0.317 U	0.305 U	0.330 U
Sodium	NA	NA	NA	NA	**638**	**668**		**111**	**697**	**166**		**125**		**151**	**170**	**124**	**98.6**	**132**
Thallium	3	NA	NA	NA	4.81 U	2.12 U		2.06 U	4.10 U	3.00 U		2.13 U		1.95 U	1.92 U	1.90 U	1.83 U	1.98 U
Vanadium	NA	1100	78	NA	**27.0**	**15.3**		**8.89**	**20.9**	**15.8**		**18.0**		**20.1**	**15.5**	**8.97**	**12.8**	**28.3**
Zinc	930	110000	23000	NA	**165**	**428**		**18.3**	**138**	**2150** D		**199**		**31700** D	**433**	**45.1**	**117**	**14.5**
Volatile Organic Compounds EPA Method SW846 8260C (mg/kg)																		
1,1,1-Trichloroethane	0.3	NA	160000	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
1,1,2,2-Tetrachloroethane	0.007	3	1	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
1,1,2-Trichloroethane	0.02	6	2	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
1,1-Dichloroethane	0.2	24	8	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
1,1-Dichloroethene	0.008	150	11	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
1,2,3-Trichlorobenzene	NA	NA	NA	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		**0.0948**	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
1,2,4-Trichlorobenzene	0.7	820	73	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		**0.478** E	**2.17** D	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
1,2-Dibromo-3-chloropropane	0.005	0.2	0.08	NA	0.00398 U	**0.00525**	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
1,2-Dibromoethane	0.005	0.04	0.008	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
1,2-Dichlorobenzene	17	59000	5300	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	**0.00379** J		**0.241**	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	**0.00212** J
1,2-Dichloroethane	0.005	3	0.9	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		**0.00205** J	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
1,2-Dichloropropane	0.005	5	2	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
1,3-Dichlorobenzene	19	59000	5300	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		**0.0254**	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
1,4-Dichlorobenzene	2	13	5	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		**0.0856**	0.0275 U	0.00170 U	0.00153 U	0.00170 U	**0.00587**	0.00198 U
2-Butanone	0.9	44000	3100	NA	0.00398 U	**0.0146**	0.0279 U	0.0253 U	**0.0120**	**0.0147**		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
2-Hexanone	NA	NA	NA	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
4-Methyl-2-pentanone	NA	NA	NA	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Acetone	19	NA	70000	NA	**0.0390** B	**0.0723**	0.0279 U	**0.130** BD	**0.109**	**0.0454**		**0.0133**	0.0275 U	**0.00737** B	**0.00680** B	**0.00949** B	**0.0178** B	**0.0498** B
Acrolein	0.5	1	0.5	NA	0.0239 U	0.0142 U	0.167 U	0.152 U	0.0183 U	0.0172 U		0.0115 U	0.165 U	0.0102 U	0.00919 U	0.0102 U	0.00939 U	0.0119 U
Acrylonitrile	0.5	3	0.9	NA	0.00796 U	0.00473 U	0.0558 U	0.0506 U	0.00609 U	0.00574 U		0.00384 U	0.0549 U	0.00341 U	0.00306 U	0.00340 U	0.00313 U	0.00396 U
Benzene	0.005	5	2	NA	0.00398 U	**0.0499**	0.0279 U	0.0253 U	0.00304 U	**0.00453** J		**0.00192** J	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Bromochloromethane	NA	NA	NA	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Bromodichloromethane	0.005	3	1	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Bromoform	0.03	280	81	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Bromomethane	0.04	59	25	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Carbon disulfide	6	110000	7800	NA	0.00398 U	**0.00279** J	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Carbon Tetrachloride	0.005	4	2	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Chlorobenzene	0.6	7400	510	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		**0.00712**	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Chloroethane	NA	1100	220	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Chloroform	0.4	2	0.6	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Chloromethane	NA	12	4	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U

cis-1,2-Dichloroethene	0.3	560	230	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	**0.00585**		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
cis-1,3-Dichloropropene	0.0025	3.5	1	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Cyclohexane	NA	NA	NA	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	**0.00364** J		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Dibromochloromethane	0.005	8	3	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Dichlorodifluoromethane	39	230000	490	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Ethylbenzene	13	110000	7800	NA	0.00398 U	**0.0747**	0.0279 U	0.0253 U	0.00304 U	**0.0174**		**0.0118**	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Freon 113	NA	NA	NA	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Isopropylbenzene	NA	NA	NA	NA	0.00398 U	**0.0478**	0.0279 U	**0.236** D	0.00304 U	**0.0213**		**0.00666**	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
m,p-Xylenes	9.5	85000	6000	NA	0.00796 U	**0.101**	0.0558 U	0.0506 U	0.00609 U	**0.122**		**0.0250**	0.0549 U	0.00341 U	0.00306 U	0.00340 U	0.00313 U	0.00396 U
Methyl Acetate	22	NA	78000	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Methyl tert-Butyl Ether	0.2	320	110	NA	0.00796 U	**0.00596** J	0.0558 U	0.0506 U	0.00609 U	0.00574 U		0.00384 U	0.0549 U	0.00341 U	0.00306 U	0.00340 U	0.00313 U	0.00396 U
Methylcyclohexane	NA	NA	NA	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	**0.0430**		**0.00336** J	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Methylene Chloride	0.01	230	46	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	**0.00537**	0.00198 U
o-Xylene	9.5	85000	6000	NA	0.00796 U	**0.0881**	0.0558 U	0.0506 U	0.00609 U	**0.0709**		**0.0163**	0.0549 U	0.00341 U	0.00306 U	0.00340 U	0.00313 U	0.00396 U
Styrene	3	260	90	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
t-Butyl alcohol	0.3	11000	1400	NA	0.0199 U	0.0118 U	0.139 U	0.127 U	0.0152 U	0.0143 U		0.00959 U	0.137 U	0.00851 U	0.00766 U	0.00850 U	0.00782 U	0.00989 U
Tetrachloroethene	0.005	1500	43	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Toluene	7	91000	6300	NA	0.00398 U	**0.0101**	0.0279 U	0.0253 U	0.00304 U	**0.0108**		**0.0152**	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
trans-1,2-Dichloroethene	0.6	720	300	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
trans-1,3-Dichloropropene	0.0025	3.5	1	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Trichloroethene	0.01	10	3	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Trichlorofluoromethane	34	340000	23000	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
Vinyl chloride	0.005	2	0.7	NA	0.00398 U	0.00236 U	0.0279 U	0.0253 U	0.00304 U	0.00287 U		0.00192 U	0.0275 U	0.00170 U	0.00153 U	0.00170 U	0.00156 U	0.00198 U
TIC Summary	NA	NA	NA	NA	0	5.521		103.96	0.5333	0.5338		1.5242		0	0	0	0	0
Wet Chemistry (%)																		
Percent Solids	NA	NA	NA	NA	**34.6**	**71.7**		**79.0**	**38.2**	**53.3**		**72.8**		**79.8**	**81.2**	**83.8**	**85.0**	**78.0**
Wet Chemistry (mg/kg)																		
Cyanide (total)	20	680	47	NA	**4.81**	**31.3**		1.27 U	**6.55**	1.88 U		1.37 U		1.25 U	1.23 U	**4.56**	1.18 U	1.28 U

Notes:

U= Analyzed for, but not detected

NA= Not applicable

B= Analyte was also detected in Lab blank, indicating lab contamination

J= Detected below lab's MDL; value is estimated

E= Exceeded the highest calibration standard

D= Result is based on a diluted run

Table 3-Temporary Well Sampling Results (12-27-2019) Lab: Accredited Analytical Resources LLC 366-394 Wilson Ave, Newark, NJ			Sample No. TW-1	Sample No. TW-2	Sample No. TW-3
CAS#	**Compound**	**GWQS**	**12/27/19**	**12/27/19**	**12/27/19**
EPA Method SW846 8081B/8082A (ug/L)					
72-54-8	4,4'-DDD	0.1	0.00460 U	0.00404 U	**0.0248** P
72-55-9	4,4'-DDE	0.1	0.00460 U	0.00404 U	0.00408 U
50-29-3	4,4'-DDT	0.1	0.00460 U	0.00404 U	0.00408 U
309-00-2	Aldrin	0.04	0.00230 U	0.00202 U	0.00204 U
319-84-6	alpha-BHC	0.02	0.00230 U	0.00202 U	0.00204 U
5103-71-9	alpha-Chlordane	NA	0.00230 U	0.00202 U	0.00204 U
12674-11-2	Aroclor-1016	0.5	0.0575 U	0.0505 U	0.0510 U
11104-28-2	Aroclor-1221	NA	0.0575 U	0.0505 U	0.0510 U
11141-16-5	Aroclor-1232	0.5	0.0575 U	0.0505 U	0.0510 U
53469-21-9	Aroclor-1242	0.5	0.0575 U	0.0505 U	0.0510 U
12672-29-6	Aroclor-1248	0.5	0.0575 U	0.0505 U	0.0510 U
11097-69-1	Aroclor-1254	0.5	0.0575 U	0.0505 U	0.0510 U
11096-82-5	Aroclor-1260	0.5	0.0575 U	0.0505 U	0.0510 U
319-85-7	beta-BHC	0.04	0.00230 U	0.00202 U	0.00204 U
319-86-8	delta-BHC	NA	0.00230 U	0.00202 U	0.00204 U
60-57-1	Dieldrin	0.03	0.00460 U	0.00404 U	0.00408 U
959-98-8	Endosulfan I	40	0.00230 U	0.00202 U	0.00204 U
33213-65-9	Endosulfan II	40	0.00460 U	0.00404 U	0.00408 U
1031-07-8	Endosulfan sulfate	40	0.00460 U	0.00404 U	0.00408 U
72-20-8	Endrin	2	0.00460 U	0.00404 U	0.00408 U
7421-93-4	Endrin aldehyde	NA	0.00460 U	0.00404 U	0.00408 U
53494-70-5	Endrin ketone	NA	0.00460 U	0.00404 U	0.00408 U
58-89-9	gamma-BHC [Lindane]	NA	0.00230 U	0.00202 U	0.00204 U
5566-34-7	gamma-Chlordane	NA	0.00230 U	0.00202 U	0.00204 U
76-44-8	Heptachlor	0.05	0.00230 U	0.00202 U	0.00204 U
1024-57-3	Heptachlor Epoxide	0.2	0.00230 U	0.00202 U	0.00204 U
72-43-5	Methoxychlor	40	0.0230 U	0.0202 U	0.0204 U
8001-35-2	Toxaphene	2	0.115 U	0.101 U	0.102 U
Semivolatile Organic Compounds EPA Method SW846 8270D (ug/L)					
92-52-4	1,1-Biphenyl	400	0.532 U	0.510 U	0.538 U
95-94-3	1,2,4,5-Tetrachlorobenzene	NA	0.532 U	0.510 U	0.538 U
122-66-7	1,2-Diphenylhydrazine	20	0.532 U	0.510 U	0.538 U
58-90-2	2,3,4,6-Tetrachlorophenol	200	0.532 U	0.510 U	0.538 U
95-95-4	2,4,5-Trichlorophenol	700	0.532 U	0.510 U	0.538 U
88-06-2	2,4,6-Trichlorophenol	20	0.532 U	0.510 U	0.538 U
120-83-2	2,4-Dichlorophenol	20	0.532 U	0.510 U	0.538 U
105-67-9	2,4-Dimethylphenol	100	0.532 U	0.510 U	0.538 U
51-28-5	2,4-Dinitrophenol	40	1.06 U	1.02 U	1.08 U
121-14-2	2,4-Dinitrotoluene	5	0.532 U	0.510 U	0.538 U
606-20-2	2,6-Dinitrotoluene	5	0.532 U	0.510 U	0.538 U
91-58-7	2-Chloronaphthalene	600	0.532 U	0.510 U	0.538 U
95-57-8	2-Chlorophenol	40	0.532 U	0.510 U	0.538 U
91-57-6	2-Methylnaphthylene	30	0.532 U	0.510 U	0.538 U
95-48-7	2-Methylphenol	NA	0.532 U	0.510 U	0.538 U
88-74-4	2-Nitroaniline	NA	0.532 U	0.510 U	0.538 U
88-75-5	2-Nitrophenol	NA	0.532 U	0.510 U	0.538 U
106-44-5	3 & 4-Methylphenol	NA	0.532 U	0.510 U	0.538 U
91-94-1	3,3'-Dichlorobenzidine	30	0.532 U	0.510 U	0.538 U
99-09-2	3-Nitroaniline	NA	0.532 U	0.510 U	0.538 U
534-52-1	4,6-Dinitro-2-methylphenol	NA	0.532 U	0.510 U	0.538 U

101-55-3	4-Bromophenyl-phenylether	NA	0.532 U	0.510 U	0.538 U
59-50-7	4-Chloro-3-methylphenol	100	0.532 U	0.510 U	0.538 U
106-47-8	4-Chloroaniline	30	0.532 U	0.510 U	0.538 U
7005-72-3	4-Chlorophenyl-phenylether	NA	0.532 U	0.510 U	0.538 U
100-01-6	4-Nitroaniline	NA	0.532 U	0.510 U	0.538 U
100-02-7	4-Nitrophenol	NA	0.532 U	0.510 U	0.538 U
83-32-9	Acenaphthene	400	0.532 U	0.510 U	0.538 U
208-96-8	Acenaphthylene	100	0.532 U	0.510 U	0.538 U
98-86-2	Acetophenone	700	0.532 U	0.510 U	0.538 U
120-12-7	Anthracene	2000	0.532 U	0.510 U	0.538 U
1912-24-9	Atrazine	3	0.532 U	0.510 U	0.538 U
103-33-3	Azobenzene	NA	0.532 U	0.510 U	0.538 U
100-52-7	Benzaldehyde	NA	0.532 U	0.510 U	0.538 U
92-87-5	Benzidine	20	0.532 U	0.510 U	0.538 U
56-55-3	Benzo[a]anthracene	0.1	**0.910**	**0.748**	**0.290**
50-32-8	Benzo[a]pyrene	0.1	**1.51**	**1.28**	**0.326**
205-99-2	Benzo[b]fluoranthene	0.2	**1.77**	**1.48**	**0.538**
191-24-2	Benzo[ghi]perylene	100	**1.39**	**1.18**	**0.228**
207-08-9	Benzo[k]fluoranthene	0.5	**0.564**	**0.481**	**0.189**
111-91-1	bis(2-chloroethoxy)methane	NA	0.532 U	0.510 U	0.538 U
111-44-4	bis(2-chloroethyl)ether	7	0.532 U	0.510 U	0.538 U
39638-32-9	bis(2-chloroisopropyl)ether	300	0.532 U	0.510 U	0.538 U
117-81-7	bis(2-ethylhexyl)phthalate	3	**0.765** J	**0.795** J	**0.859** J
85-68-7	Butylbenzylphthalate	100	0.532 U	0.510 U	0.538 U
105-60-2	Caprolactam	3500	0.532 U	**0.877** J	0.538 U
86-74-8	Carbazole	NA	0.532 U	0.510 U	0.538 U
218-01-9	Chrysene	5	**0.916**	**0.773**	**0.334**
53-70-3	Dibenzo(a,h)anthracene	0.3	**0.205**	**0.177**	**0.0857**
132-64-9	Dibenzofuran	NA	0.532 U	0.510 U	0.538 U
84-66-2	Diethyl phthalate	6000	0.532 U	0.510 U	0.538 U
131-11-3	Dimethylphthalate	100	0.532 U	0.510 U	0.538 U
84-74-2	Di-n-butyl phthalate	700	0.532 U	0.510 U	0.538 U
117-84-0	Di-n-octyl phthalate	100	0.532 U	0.510 U	0.538 U
206-44-0	Fluoranthene	300	**1.05** J	**0.989** J	0.538 U
86-73-7	Fluorene	300	0.532 U	0.510 U	0.538 U
118-74-1	Hexachlorobenzene	0.02	0.0106 U	0.0102 U	0.0108 U
87-68-3	Hexachlorobutadiene	1	0.532 U	0.510 U	0.538 U
77-47-4	Hexachlorocyclopentadiene	40	0.532 U	0.510 U	0.538 U
67-72-1	Hexachloroethane	7	0.532 U	0.510 U	0.538 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.2	**1.31**	**1.10**	**0.257**
78-59-1	Isophorone	40	0.532 U	0.510 U	0.538 U
91-20-3	Naphthalene	300	0.532 U	0.510 U	0.538 U
98-95-3	Nitrobenzene	6	0.532 U	0.510 U	0.538 U
62-75-9	N-Nitrosodimethylamine	0.8	0.532 U	0.510 U	0.538 U
621-64-7	N-Nitroso-di-n-propylamine	10	0.532 U	0.510 U	0.538 U
86-30-6	N-Nitrosodiphenylamine	10	**3.25**	**3.43**	0.538 U
87-86-5	Pentachlorophenol	0.3	0.532 U	0.510 U	0.538 U
85-01-8	Phenanthrene	100	**0.385**	**0.313**	**0.377**
108-95-2	Phenol	2000	0.532 U	0.510 U	0.538 U
129-00-0	Pyrene	200	**1.40** J	**1.25** J	0.538 U
	TIC Summary	NA	153.14	141.07	139.12
Total Mercury by SW846 7470A (ug/L)					
7439-97-6	Mercury	2	**1.80**	**0.942**	0.500 U
Total Metals by EPA Method SW846 6010D (ug/L)					
7429-90-5	Aluminum	200	**48900**	**35000**	**28700**
7440-36-0	Antimony	6	5.00 U	5.00 U	5.00 U

7440-38-2	Arsenic	3	**1930**	**368**	**159**
7440-39-3	Barium	6000	**176**	**606**	**700**
7440-41-7	Beryllium	1	**1.89**	**2.10**	**1.32**
7440-43-9	Cadmium	4	4.00 U	**6.63**	**28.4**
7440-70-2	Calcium	NA	**663000** D	**93100**	**147000**
7440-47-3	Chromium	70	**117**	**160**	**99.1**
7440-48-4	Cobalt	100	20.0 U	20.0 U	**42.9**
7440-50-8	Copper	1300	2.91 U	**121**	**5660**
7439-89-6	Iron	300	**54700**	**51300**	**53400**
7439-92-1	Lead	5	**87.5**	**119**	**1610**
7439-95-4	Magnesium	NA	**15900**	**18000**	**18200**
7439-96-5	Manganese	50	**1530**	**586**	**1050**
7440-02-0	Nickel	100	**146**	**89.2**	**226**
7440-09-7	Potassium	NA	**34600**	**14900**	**13400**
7782-49-2	Selenium	NA	10.0 U	10.0 U	10.0 U
7440-22-4	Silver	40	4.00 U	4.00 U	4.00 U
7440-23-5	Sodium	50000	**103000** D	**77200**	**65400**
7440-28-0	Thallium	2	2.00 U	2.00 U	2.00 U
7440-62-2	Vanadium	60	**66.5**	**95.9**	**249**
7440-66-6	Zinc	2000	**906**	**2500**	**12800**
Volatile Organic Compounds EPA Method SW846 8260C (ug/L)					
71-55-6	1,1,1-Trichloroethane	30	0.500 U	0.500 U	0.500 U
79-34-5	1,1,2,2-Tetrachloroethane	1	0.500 U	0.500 U	0.500 U
79-00-5	1,1,2-Trichloroethane	3	0.500 U	0.500 U	0.500 U
75-34-3	1,1-Dichloroethane	50	0.400 U	**0.430** J	0.400 U
75-35-4	1,1-Dichloroethene	1	0.400 U	0.400 U	0.400 U
87-61-6	1,2,3-Trichlorobenzene	NA	0.500 U	0.500 U	0.500 U
120-82-1	1,2,4-Trichlorobenzene	9	0.500 U	0.500 U	0.500 U
96-12-8	1,2-Dibromo-3-chloropropane	0.02	0.500 U	0.500 U	0.500 U
106-93-4	1,2-Dibromoethane	0.03	0.500 U	0.500 U	0.500 U
95-50-1	1,2-Dichlorobenzene	600	0.500 U	0.500 U	0.500 U
107-06-2	1,2-Dichloroethane	2	0.500 U	0.500 U	0.500 U
78-87-5	1,2-Dichloropropane	1	0.500 U	0.500 U	0.500 U
541-73-1	1,3-Dichlorobenzene	600	0.500 U	0.500 U	0.500 U
106-46-7	1,4-Dichlorobenzene	75	0.500 U	0.500 U	0.500 U
78-93-3	2-Butanone	300	**1.59** J	1.00 U	1.00 U
591-78-6	2-Hexanone	300	1.00 U	1.00 U	1.00 U
108-10-1	4-Methyl-2-pentanone	NA	1.00 U	1.00 U	1.00 U
67-64-1	Acetone	6000	**4.02** JB	**2.24** JB	**2.60** JB
107-02-8	Acrolein	5	5.00 U	5.00 U	5.00 U
107-13-1	Acrylonitrile	2	2.00 U	2.00 U	2.00 U
71-43-2	Benzene	1	0.400 U	0.400 U	0.400 U
74-97-5	Bromochloromethane	NA	0.500 U	0.500 U	0.500 U
75-27-4	Bromodichloromethane	1	0.500 U	0.500 U	0.500 U
75-25-2	Bromoform	4	0.500 U	0.500 U	0.500 U
74-83-9	Bromomethane	10	1.00 U	1.00 U	1.00 U
75-15-0	Carbon disulfide	700	0.500 U	0.500 U	0.500 U
56-23-5	Carbon Tetrachloride	1	0.500 U	0.500 U	0.500 U
108-90-7	Chlorobenzene	50	0.500 U	0.500 U	0.500 U
75-00-3	Chloroethane	5	1.00 U	1.00 U	1.00 U
67-66-3	Chloroform	70	0.500 U	0.500 U	0.500 U
74-87-3	Chloromethane	NA	1.00 U	1.00 U	1.00 U
156-59-4	cis-1,2-Dichloroethene	70	0.500 U	**2.79**	0.500 U
10061-01-5	cis-1,3-Dichloropropene	0.5	0.500 U	0.500 U	0.500 U
110-82-7	Cyclohexane	NA	0.500 U	0.500 U	0.500 U
124-48-1	Dibromochloromethane	1	0.500 U	0.500 U	0.500 U

75-71-8	Dichlorodifluoromethane	1000	1.00 U	1.00 U	1.00 U
100-41-4	Ethylbenzene	700	0.500 U	0.500 U	0.500 U
76-13-1	Freon 113	NA	1.00 U	1.00 U	1.00 U
98-82-8	Isopropylbenzene	700	0.500 U	0.500 U	0.500 U
108-38-3/106-	m,p-Xylenes	500	1.00 U	1.00 U	1.00 U
79-20-9	Methyl Acetate	7000	0.400 U	0.400 U	0.400 U
1634-04-4	Methyl tert-Butyl Ether	70	1.00 U	1.00 U	1.00 U
108-87-2	Methylcyclohexane	NA	0.500 U	0.500 U	0.500 U
75-09-2	Methylene Chloride	3	0.600 U	0.600 U	0.600 U
95-47-6	o-Xylene	500	1.00 U	1.00 U	1.00 U
100-42-5	Styrene	100	1.00 U	1.00 U	1.00 U
75-65-0	t-Butyl alcohol	100	3.00 U	3.00 U	3.00 U
127-18-4	Tetrachloroethene	1	**0.610** J	**0.580** J	0.500 U
108-88-3	Toluene	600	0.500 U	0.500 U	0.500 U
156-60-5	trans-1,2-Dichloroethene	100	0.400 U	**0.700** J	0.400 U
10061-02-6	trans-1,3-Dichloropropene	0.5	0.500 U	0.500 U	0.500 U
79-01-6	Trichloroethene	1	0.500 U	**1.29**	0.500 U
75-69-4	Trichlorofluoromethane	2000	1.00 U	1.00 U	1.00 U
75-01-4	Vinyl chloride	1	1.00 U	1.00 U	1.00 U
	TIC Summary	NA	0	0	0
Wet Chemistry (mg/L)					
	Cyanide (total)	0.1	**2.14** D	0.0100 U	**0.182**

Qualifiers:

E - Concentration exceeds highest calibration standard

B - Indicates compound found in associated blank

D - Indicates result is based on a dilution

H - Alternate peak selection upon analytical review

J - Indicates estimated value for TICs and all results when detected below the RL

U - Indicates compound analyzed for but not detected

P - Greater than 25% diff between 2 GC columns

GWQS = NJDEP Ground Water Quality Standards

Shaded-Detected above NJDEP GWQS

Appendix E

ENVOCARE Waste Classification Report

ENVOCARE
ENVIRONMENTAL & FACILITY MANAGEMENT

Certified: MBE, SBE, DBE & NMSDC
1527 Route 27, Suite 105, Somerset, New Jersey 08873
T (732) 253 5740 |F (732) 317 1043 | envocarenj.com

July 20, 2020
D*elivered via e-mail:* jlynch@salomone.com

John Lynch
Salomone Bros., Inc.
17 Demarest Drive
Wayne, NJ 07470

Re: Waste Classification Sampling Results
366-394 Wilson Avenue, Newark, NJ
General Facility Tracking Identification # NJN986663052

Dear Mr. Lynch:

Envocare Environmental & Facility Management Inc. (ENVOCARE) was retained to conduct waste classification soil sampling from the soil piles located at 366-394 Wilson Avenue, Newark, NJ (the Property/Site). The Property is owned by Oberwill Corp. Salomone Bros. Inc (the Client) is the responsible party.

Background

Excavated soil was stockpiled into three (3) distinct soil pile during drainage improvement of the property located at both onsite and offsite area. The stockpiled soil contains contaminants migrated from the Pierson's Creek Superfund Site as well as general overburden soil from the Property. And previously collected soil samples identified metals (arsenic, chromium, lead, mercury, nickel and cadmium), Semi volatile Compounds (SVOCs), Extractable Petroleum Hydrocarbon (EPH), and Polychlorinated Biphenyl (PCBs) above the Residential Direct Contact Soil Remediation Standards (RDCSRSs). The New Jersey Department of Environmental Protection (NJDEP) requires soil disposal of this material.

Based on the review of the analytical results provided by the Client, ENVOCARE reached out to Clean Earth of North Jersey (CENJ) to determine if the facility can treat the stockpile soil. Following the confirmation, ENVOCARE proposed collection of composite samples from each of the soil pile and analyze the soil sample for TCL/TAL+30, TCLP Full, RCRA characteristics, Paint Filter and EPH analysis so that a disposal approval can be obtained from CENJ.

Investigation

On July 10, 2020 ENVOCARE and the Client mobilized on the Property to conduct soil sampling. ENVOCARE observed three stock piles with two located in the north east portion of the Property and one stockpile located in the south west portion of the Property. The soil piles were labelled as SP1 through SP3 in north to west direction. Figure 1 presents the Soil Pile locations.

The Client informed ENVOCARE that SP1 pile was generated from northern portion of the drainage improvement, while SP2 was generated from drainage improvement throughout the Property and SP3 was generated from drainage improvement along the Troy Chemical side, as well as portion of the Stream north of the Property.

Based on the proposed sampling plan, Salomone bros. provided assistance to collect representative soil sample for disposal. Five locations at equally spaced interval were selected for test pit excavation. Except for

SP1, where only three test pits were advanced due to lack of access to the rear of the pile by the machine. The rear of the stock pile was sampled with hand at 0.5-1.0 feet into the pile. The visual inspection of the stockpile identified the presence of vegetation debris, some stones, black silt, construction debris and fill material. Photo documentation is presented as Exhibit A.

Each test pits and other portions of the soil piles were investigated with the use of Photoionization Detector (PID) and Jerome 431X (Jerome) to measure volatile organic compounds (VOCs) and vapor mercury (Hg) respectively. All locations investigated identified VOCs of 7 to 9 parts per million (ppm) in the western portion of SP1, in same area with petroleum impacted soil. All other areas of investigation found VOCs and Hg at 0.0 ppm and 0 milligram per cubic meter (mg/m3). Soil sample for VOCs was collected from highest suspected soil contamination (field instrument readings or visual evidence).

Five points composite sampling method was utilized subsequently samples were collected directly into sample containers, placed in shipping coolers, and maintained at approximately 4 ± 2 degrees Celsius. The coolers were hand-delivered to the analytical laboratory according to chain-of-custody procedures.

Findings and Recommendations

The analytical results were evaluated against the NJDEP RDCSRS and Non Residential Direct Contact Soil Remediation Standards (NRDCSRSs) as well as the EPA TCLP regulatory criteria.

The analytical results identified Pesticides (4,4-DDD, Chlordane, cis-Chlordane, Dieldrin, trans-Chlorodane), PCBs, Semi Volatile Organics, Metals (arsenic, copper, lead, mercury, nickel, zinc) and 1,4-Dichlorobenzene above the RDCSRS/NRDCSRS standards for one or all the samples. The analytical results are provided on Table 1. All compounds were reported below the EPA TCLP criteria. Based on the TCLP and RCRA analytical results the stockpile soil is considered to be non-hazardous based on chemical characteristics.

Based on the review of the analytical the onsite material is impacted with various compounds above the NJDEP criteria. Therefore, ENVOCARE recommends conducting off-site disposal at a regulated facility.

The stockpile soil treatment may be required onsite or offsite, based on the transportation method and/or disposal facility requirements.

Please contact the undersigned at (732) 208-0928 if you require further information or clarification.

Kind Regards,

Mayur Patel

Mayur Patel
Project Manager

Enclosed:
Figure 1
Table 1
Exhibit A - Photo Documentation

N
W
E
S

0 20 40 60

Scale in Feet

1:500

Legend

- Site Location
- Property Boundary
- Pile Location

NOTES:
1. PARCEL DATA OBTAINED FROM NEW JERSEY GEOGRAPHIC INFORMATION NETWORK (NJGIN)
2. PARCEL DATA IS NOT FROM A LICENSED SURVEYOR...AERIAL AND PROPERTY LINE MAY NOT ALIGN
3. SERVICE LAYER CREDITS: COPYRIGHT NEARMAP

1 " = 160 miles

Figure 1

WASTE CLASSIFICATION SAMPLE MAP

366-394 Wilson Avenue
(Block: 5038, Lot: 97)
Newark, New Jersey

Project No: 150405

Date: July 2020

Drawn By: K. Starkes

Checked By: DP

ENVOCARE
ENVIRONMENTAL & FACILITY MANAGEMENT

Table 1 Soil Analytical Results
366-394 Wilson Avenue, Newark, NJ

LOCATION SAMPLING DATE LAB SAMPLE ID SAMPLE TYPE	CasNum	EPA-TCLP	NJ-NRDCSRS	NJ-RDCSRS	Units	WL-SP1 7/10/2020 L2029228-01 SOIL		WL-SP1 7/10/2020 L2029228-01 R1 SOIL		WL-SP2 7/10/2020 L2029228-02 SOIL		WL-SP3 7/10/2020 L2029228-03 SOIL		WL-SP3 7/10/2020 L2029228-03 R1 SOIL	
						Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual
General Chemistry															
Cyanide, Reactive	57-12-5				mg/kg	10	U	-	-	10	U	10	U	-	-
Cyanide, Total	57-12-5		680	47	mg/kg	3.1		-	-	1.3	J	1.4		-	-
Paint Filter Liquid	PFLT				-	NEGATIVE		-	-	NEGATIVE		NEGATIVE		-	-
pH (H)	12408-02-5				SU	7.4		-	-	7.2		6.5		-	-
Solids, Total	NONE				%	80.5		-	-	67		68.3		-	-
Sulfide, Reactive	NONE				mg/kg	10	U	-	-	10	U	10	U	-	-
Ignitability	NONE					NI		-	-	NI		NI		-	-
Chromium, Hexavalent	18540-29-9				mg/kg	0.994	U	-	-	1.19	U	1.17	U	-	-
Oxidation/Reduction Potential	NONE				mv	220		-	-	240		260		-	-
pH	12408-02-5				SU	7.4		-	-	7.7		6.7		-	-
NJ Extractable Petroleum Hydrocarbons (Total)															
Total EPH	NONE				mg/kg	12200		-	-	2050		2930		-	-
Pesticides by GC															
4,4'-DDD	72-54-8		13	3	mg/kg	20.6		14	PE	0.386		0.561	P	-	-
4,4'-DDE	72-55-9		9	2	mg/kg	0.533	P	-	-	0.0403		0.0667	JP	-	-
4,4'-DDT	50-29-3		8	2	mg/kg	1.35	P	-	-	0.022	U	0.213	U	-	-
Aldrin	309-00-2		0.2	0.04	mg/kg	0.0196	U	-	-	0.0117	U	0.114	U	-	-
Alpha-BHC	319-84-6		0.5	0.1	mg/kg	0.00817	U	-	-	0.00488	U	0.0474	U	-	-
Beta-BHC	319-85-7		2	0.4	mg/kg	0.0196	U	-	-	0.0117	U	0.114	U	-	-
Chlordane	57-74-9		1	0.2	mg/kg	8.57	P	-	-	1.77		2.07	P	-	-
cis-Chlordane	5103-71-9		1	0.2	mg/kg	0.384	P	-	-	0.14	IP	0.152	P	-	-
Delta-BHC	319-86-8				mg/kg	0.0196	U	-	-	0.0117	U	0.114	U	-	-
Dieldrin	60-57-1		0.2	0.04	mg/kg	0.997	P	-	-	0.197		0.0933	P	-	-
Endosulfan I	959-98-8		6800	470	mg/kg	0.0196	U	-	-	0.0117	U	0.114	U	-	-
Endosulfan II	33213-65-9		6800	470	mg/kg	0.0196	U	-	-	0.0117	U	0.114	U	-	-
Endosulfan sulfate	1031-07-8		6800	470	mg/kg	0.00817	U	-	-	0.00488	U	0.0474	U	-	-
Endrin	72-20-8		340	23	mg/kg	0.00817	U	-	-	0.00488	U	0.0474	U	-	-
Endrin aldehyde	7421-93-4				mg/kg	0.0245	U	-	-	0.0146	U	0.142	U	-	-
Endrin ketone	53494-70-5				mg/kg	0.0196	U	-	-	0.0117	U	0.114	U	-	-
Heptachlor	76-44-8		0.7	0.1	mg/kg	0.0098	U	-	-	0.00586	U	0.0568	U	-	-
Heptachlor epoxide	1024-57-3		0.3	0.07	mg/kg	0.0368	U	-	-	0.022	U	0.213	U	-	-
Lindane	58-89-9		2	0.4	mg/kg	0.00817	U	-	-	0.00488	U	0.0474	U	-	-
Methoxychlor	72-43-5		5700	390	mg/kg	0.0368	U	-	-	0.022	U	0.213	U	-	-
Toxaphene	8001-35-2		3	0.6	mg/kg	0.368	U	-	-	0.22	U	2.13	U	-	-
trans-Chlordane	5103-74-2		1	0.2	mg/kg	1	P	-	-	0.147	IP	0.126	JIP	-	-
Polychlorinated Biphenyls by GC															
Aroclor 1016	12674-11-2		1	0.2	mg/kg	4.03	U	-	-	0.981	U	0.956	U	-	-
Aroclor 1221	11104-28-2		1	0.2	mg/kg	4.03	U	-	-	0.981	U	0.956	U	-	-
Aroclor 1232	11141-16-5		1	0.2	mg/kg	4.03	U	-	-	0.981	U	0.956	U	-	-
Aroclor 1242	53469-21-9		1	0.2	mg/kg	4.03	U	-	-	0.981	U	0.956	U	-	-
Aroclor 1248	12672-29-6		1	0.2	mg/kg	11.7		-	-	4.58		3.1		-	-
Aroclor 1254	11097-69-1		1	0.2	mg/kg	13.1		-	-	3.54		2.1		-	-
Aroclor 1260	11096-82-5		1	0.2	mg/kg	4.69		-	-	1.64		0.805	J	-	-
Aroclor 1262	37324-23-5		1	0.2	mg/kg	4.03	U	-	-	0.981	U	0.956	U	-	-
Aroclor 1268	11100-14-4		1	0.2	mg/kg	4.03	U	-	-	0.981	U	0.956	U	-	-
PCBs, Total	1336-36-3		1	0.2	mg/kg	29.5		-	-	9.76		6	J	-	-

Table 1 Soil Analytical Results
366-394 Wilson Avenue, Newark, NJ

LOCATION SAMPLING DATE LAB SAMPLE ID SAMPLE TYPE	CasNum	EPA-TCLP	NJ-NRDCSRS	NJ-RDCSRS	Units	WL-SP1 7/10/2020 L2029228-01 SOIL		WL-SP1 7/10/2020 L2029228-01 R1 SOIL		WL-SP2 7/10/2020 L2029228-02 SOIL		WL-SP3 7/10/2020 L2029228-03 SOIL		WL-SP3 7/10/2020 L2029228-03 R1 SOIL	
						Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual
Semivolatile Organics by GC/MS															
1,2,4,5-Tetrachlorobenzene	95-94-3				mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-
1,4-Dioxane	123-91-1				mg/kg	0.91	U	-	-	0.11	U	0.11	U	-	-
2,3,4,6-Tetrachlorophenol	58-90-2				mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-
2,4,5-Trichlorophenol	95-95-4		68000	6100	mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-
2,4,6-Trichlorophenol	88-06-2		74	19	mg/kg	3.5	U	-	-	0.42	U	0.41	U	-	-
2,4-Dichlorophenol	120-83-2		2100	180	mg/kg	2.9	U	-	-	0.35	U	0.35	U	-	-
2,4-Dimethylphenol	105-67-9		14000	1200	mg/kg	5.8	U	-	-	0.7	U	0.69	U	-	-
2,4-Dinitrophenol	51-28-5		1400	120	mg/kg	8.7	U	-	-	1	U	1	U	-	-
2,4-Dinitrotoluene	121-14-2		3	0.7	mg/kg	3	U	-	-	0.34	J	2.9		-	-
2,6-Dinitrotoluene	606-20-2		3	0.7	mg/kg	2.4	U	-	-	0.29	U	0.29	U	-	-
2-Chloronaphthalene	91-58-7				mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-
2-Chlorophenol	95-57-8		2200	310	mg/kg	2	U	-	-	0.24	U	0.24	U	-	-
2-Methylnaphthalene	91-57-6		2400	230	mg/kg	8.6		-	-	0.47	J	0.35	J	-	-
2-Methylphenol	95-48-7		3400	310	mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-
2-Nitroaniline	88-74-4		23000	39	mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-
2-Nitrophenol	88-75-5				mg/kg	13	U	-	-	1.6	U	1.6	U	-	-
3,3'-Dichlorobenzidine	91-94-1		4	1	mg/kg	4.7	U	-	-	0.56	U	0.56	U	-	-
3-Methylphenol/4-Methylphenol	)8-39-4/106-44		340	31	mg/kg	8.7	U	-	-	0.36	J	1	U	-	-
3-Nitroaniline	99-09-2				mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-
4,6-Dinitro-o-cresol	534-52-1		68	6	mg/kg	8.7	U	-	-	1	U	1	U	-	-
4-Bromophenyl phenyl ether	101-55-3				mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-
4-Chloroaniline	106-47-8				mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-
4-Chlorophenyl phenyl ether	7005-72-3				mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-
4-Nitroaniline	100-01-6				mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-
4-Nitrophenol	100-02-7				mg/kg	8.5	U	-	-	1	U	1	U	-	-
Acenaphthene	83-32-9		37000	3400	mg/kg	0.69	J	-	-	1.1		0.58	U	-	-
Acenaphthylene	208-96-8		300000		mg/kg	4.8	U	-	-	0.24	J	0.26	J	-	-
Acetophenone	98-86-2		5	2	mg/kg	6.1	U	-	-	0.18	J	0.22	J	-	-
Anthracene	120-12-7		30000	17000	mg/kg	5.5		-	-	2.7		2		-	-
Atrazine	1912-24-9		2400	210	mg/kg	4.8	U	-	-	0.59	U	0.58	U	-	-
Benzaldehyde	100-52-7		68000	6100	mg/kg	8	U	-	-	0.97	U	0.95	U	-	-
Benzo(a)anthracene	56-55-3		17	5	mg/kg	2		-	-	5.4		3.2		-	-
Benzo(a)pyrene	50-32-8		2	0.5	mg/kg	1.8	J	-	-	5		2.7		-	-
Benzo(b)fluoranthene	205-99-2		17	5	mg/kg	2.5		-	-	6.6		4.1		-	-
Benzo(ghi)perylene	191-24-2		30000	380000	mg/kg	1.4	J	-	-	3.3		2		-	-
Benzo(k)fluoranthene	207-08-9		170	45	mg/kg	0.96	J	-	-	2.2		1.6		-	-
Biphenyl	92-52-4		240	61	mg/kg	5.7	J	-	-	0.19	J	0.28	J	-	-
Bis(2-chloroethoxy)methane	111-91-1				mg/kg	6.6	U	-	-	0.79	U	0.78	U	-	-
Bis(2-chloroethyl)ether	111-44-4		2	0.4	mg/kg	2.2	U	-	-	0.26	U	0.26	U	-	-
Bis(2-chloroisopropyl)ether	108-60-1		67	23	mg/kg	7.3	U	-	-	0.88	U	0.87	U	-	-
Bis(2-ethylhexyl)phthalate	117-81-7		140	35	mg/kg	140		-	-	9.3		23		-	-
Butyl benzyl phthalate	85-68-7		14000	1200	mg/kg	4.6	J	-	-	0.91		0.72	U	-	-
Caprolactam	105-60-2		340000	31000	mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-
Carbazole	86-74-8		96	24	mg/kg	6.1	U	-	-	1.2		0.31	J	-	-
Chrysene	218-01-9		1700	450	mg/kg	2.1	J	-	-	5.2		3.4		-	-
Di-n-butylphthalate	84-74-2		68000	6100	mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-
Di-n-octylphthalate	117-84-0		27000	2400	mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-

Table 1 Soil Analytical Results
366-394 Wilson Avenue, Newark, NJ

LOCATION SAMPLING DATE LAB SAMPLE ID SAMPLE TYPE	CasNum	EPA-TCLP	NJ-NRDCSRS	NJ-RDCSRS	Units	WL-SP1 7/10/2020 L2029228-01 SOIL		WL-SP1 7/10/2020 L2029228-01 R1 SOIL		WL-SP2 7/10/2020 L2029228-02 SOIL		WL-SP3 7/10/2020 L2029228-03 SOIL		WL-SP3 7/10/2020 L2029228-03 R1 SOIL	
						Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual
Dibenzo(a,h)anthracene	53-70-3		2	0.5	mg/kg	2.1	U	-	-	1		0.63		-	-
Dibenzofuran	132-64-9				mg/kg	0.6	J	-	-	0.62	J	0.38	J	-	-
Diethyl phthalate	84-66-2		550000	49000	mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-
Dimethyl phthalate	131-11-3				mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-
Fluoranthene	206-44-0		24000	2300	mg/kg	3.9		-	-	10		5.1		-	-
Fluorene	86-73-7		24000	2300	mg/kg	1.3	J	-	-	0.88		0.33	J	-	-
Hexachlorobenzene	118-74-1		1	0.3	mg/kg	1.7	U	-	-	0.21	U	0.74		-	-
Hexachlorobutadiene	87-68-3		25	6	mg/kg	2.2	U	-	-	0.27	U	0.27	U	-	-
Hexachlorocyclopentadiene	77-47-4		110	45	mg/kg	17	U	-	-	2.1	U	2.1	U	-	-
Hexachloroethane	67-72-1		48	12	mg/kg	3	U	-	-	0.36	U	0.35	U	-	-
Indeno(1,2,3-cd)pyrene	193-39-5		17	5	mg/kg	1.2	J	-	-	3.3		2.1		-	-
Isophorone	78-59-1		2000	510	mg/kg	2	U	-	-	0.25	U	0.24	U	-	-
n-Nitrosodi-n-propylamine	621-64-7		0.3	0.2	mg/kg	1.5	U	-	-	0.18	U	0.18	U	-	-
Naphthalene	91-20-3		17	6	mg/kg	8.4		-	-	0.95		1.6		-	-
NDPA/DPA	86-30-6		390	99	mg/kg	2.8		-	-	0.18	U	0.98		-	-
Nitrobenzene	98-95-3		14	5	mg/kg	2.7	U	-	-	0.56		0.32	U	-	-
p-Chloro-m-cresol	59-50-7				mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-
Pentachlorophenol	87-86-5		3	0.9	mg/kg	4	U	-	-	0.48	U	0.48	U	-	-
Phenanthrene	85-01-8		300000		mg/kg	4.4		-	-	8.1		2.3		-	-
Phenol	108-95-2		210000	18000	mg/kg	6.1	U	-	-	0.73	U	0.72	U	-	-
Pyrene	129-00-0		18000	1700	mg/kg	3.8		-	-	9.2		4.4		-	-
Total Metals															
Aluminum, Total	7429-90-5			78000	mg/kg	7170		-	-	8500		7730		-	-
Antimony, Total	7440-36-0		450	31	mg/kg	21.7		-	-	27.6		28.1		-	-
Arsenic, Total	7440-38-2		19	19	mg/kg	498		-	-	453		1650		-	-
Barium, Total	7440-39-3		59000	16000	mg/kg	257		-	-	370		697		-	-
Beryllium, Total	7440-41-7		140	16	mg/kg	1.28		-	-	1.12		0.386	J	-	-
Cadmium, Total	7440-43-9		78	78	mg/kg	62.2		-	-	21.8		16.2		-	-
Calcium, Total	7440-70-2				mg/kg	11000		-	-	7490		8580		-	-
Chromium, Total	7440-47-3				mg/kg	1680		-	-	402		208		-	-
Cobalt, Total	7440-48-4		590	1600	mg/kg	96.2		-	-	51		22.3		-	-
Copper, Total	7440-50-8		45000	3100	mg/kg	60900		-	-	13200		1330		-	-
Iron, Total	7439-89-6				mg/kg	30900		-	-	36900		31900		-	-
Lead, Total	7439-92-1		800	400	mg/kg	1360		-	-	2160		1800		-	-
Magnesium, Total	7439-95-4				mg/kg	5820		-	-	3500		3270		-	-
Manganese, Total	7439-96-5		5900	11000	mg/kg	596		-	-	413		207		-	-
Mercury, Total	7439-97-6		65	23	mg/kg	278		-	-	1220		240		-	-
Nickel, Total	7440-02-0		23000	1600	mg/kg	2480		-	-	1440		229		-	-
Potassium, Total	7440-09-7				mg/kg	646		-	-	758		810		-	-
Selenium, Total	7782-49-2		5700	390	mg/kg	0.665	J	-	-	1.46	J	3.74		-	-
Silver, Total	7440-22-4		5700	390	mg/kg	17.9		-	-	43.3		26.4		-	-
Sodium, Total	7440-23-5				mg/kg	426		-	-	324		602		-	-
Thallium, Total	7440-28-0				mg/kg	0.917	J	-	-	2.27	U	2.34	U	-	-
Vanadium, Total	7440-62-2		1100	78	mg/kg	37.8		-	-	54.3		51.3		-	-
Zinc, Total	7440-66-6		110000	23000	mg/kg	26100		-	-	14900		1360		-	-

Table 1 Soil Analytical Results
366-394 Wilson Avenue, Newark, NJ

LOCATION						WL-SP1		WL-SP1		WL-SP2		WL-SP3		WL-SP3	
SAMPLING DATE						7/10/2020		7/10/2020		7/10/2020		7/10/2020		7/10/2020	
LAB SAMPLE ID	CasNum	EPA-TCLP	NJ-NRDCSRS	NJ-RDCSRS	Units	L2029228-01		L2029228-01 R1		L2029228-02		L2029228-03		L2029228-03 R1	
SAMPLE TYPE						SOIL		SOIL		SOIL		SOIL		SOIL	
						Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual
Volatile Organics by EPA 5035															
1,1,1-Trichloroethane	71-55-6			160000	mg/kg	0.053	U	-	-	0.0013	U	0.0013	U	0.00073	U
1,1,2,2-Tetrachloroethane	79-34-5		3	1	mg/kg	0.053	U	-	-	0.0013	U	0.0013	U	0.00073	U
1,1,2-Trichloroethane	79-00-5		6	2	mg/kg	0.11	U	-	-	0.0027	U	0.0027	U	0.0015	U
1,1-Dichloroethane	75-34-3		24	8	mg/kg	0.11	U	-	-	0.0027	U	0.0027	U	0.0015	U
1,1-Dichloroethene	75-35-4		150	11	mg/kg	0.11	U	-	-	0.0027	U	0.0027	U	0.0015	U
1,2,3-Trichlorobenzene	87-61-6				mg/kg	2.6		-	-	0.0079		0.0019	J	0.00066	J
1,2,4-Trichlorobenzene	120-82-1		820	73	mg/kg	12		-	-	0.032		0.0042	J	0.0012	J
1,2-Dibromo-3-chloropropane	96-12-8		0.2	0.08	mg/kg	0.32	U	-	-	0.008	U	0.008	U	0.0044	U
1,2-Dibromoethane	106-93-4		0.04	0.008	mg/kg	0.11	U	-	-	0.0027	U	0.0027	U	0.0015	U
1,2-Dichlorobenzene	95-50-1		59000	5300	mg/kg	33	E	29		0.082		0.0014	J	0.0012	J
1,2-Dichloroethane	107-06-2		3	0.9	mg/kg	0.11	U	-	-	0.071		0.0027	U	0.0015	U
1,2-Dichloroethene, Total	540-59-0				mg/kg	0.2		-	-	0.0083	J	0.0027	U	0.0015	U
1,2-Dichloropropane	78-87-5		5	2	mg/kg	0.11	U	-	-	0.0092		0.0027	U	0.0015	U
1,3-Dichlorobenzene	541-73-1		59000	5300	mg/kg	4.6		-	-	0.026		0.00075	J	0.0009	J
1,3-Dichloropropene, Total	542-75-6				mg/kg	0.053	U	-	-	0.0013	U	0.0013	U	0.00073	U
1,4-Dichlorobenzene	106-46-7		13	5	mg/kg	23		-	-	0.05		0.0013	J	0.0011	J
1,4-Dioxane	123-91-1				mg/kg	8.5	U	-	-	0.21	U	0.21	U	0.12	U
2-Butanone	78-93-3		44000	3100	mg/kg	1.1	U	-	-	0.025	J	0.027	U	0.023	
2-Hexanone	591-78-6				mg/kg	1.1	U	-	-	0.027	U	0.027	U	0.015	U
4-Methyl-2-pentanone	108-10-1				mg/kg	1.1	U	-	-	0.027	U	0.027	U	0.015	U
Acetone	67-64-1			70000	mg/kg	1.1		-	-	0.12		0.034	J	0.13	
Benzene	71-43-2		5	2	mg/kg	1.8		-	-	0.0065		0.00078	J	0.0022	
Bromochloromethane	74-97-5				mg/kg	0.21	U	-	-	0.0053	U	0.0053	U	0.0029	U
Bromodichloromethane	75-27-4		3	1	mg/kg	0.053	U	-	-	0.0013	U	0.0013	U	0.00073	U
Bromoform	75-25-2		280	81	mg/kg	0.43	U	-	-	0.011	U	0.011	U	0.0059	U
Bromomethane	74-83-9		59	25	mg/kg	0.21	U	-	-	0.0053	U	0.0053	U	0.0029	U
Carbon disulfide	75-15-0		110000	7800	mg/kg	1.1	U	-	-	0.027	U	0.027	U	0.015	U
Carbon tetrachloride	56-23-5		4	2	mg/kg	0.11	U	-	-	0.0027	U	0.0027	U	0.0015	U
Chlorobenzene	108-90-7		7400	510	mg/kg	14		-	-	0.0096		0.00038	J	0.00053	J
Chloroethane	75-00-3		1100	220	mg/kg	0.21	U	-	-	0.0053	U	0.0053	U	0.0029	U
Chloroform	67-66-3		2	0.6	mg/kg	0.16	U	-	-	0.0033	J	0.004	U	0.0022	U
Chloromethane	74-87-3		12	4	mg/kg	0.43	U	-	-	0.011	U	0.011	U	0.0059	U
cis-1,2-Dichloroethene	156-59-2		560	230	mg/kg	0.2		-	-	0.0074		0.0027	U	0.0015	U
cis-1,3-Dichloropropene	10061-01-5		7	2	mg/kg	0.053	U	-	-	0.0013	U	0.0013	U	0.00073	U
Cyclohexane	110-82-7				mg/kg	0.095	J	-	-	0.027	U	0.027	U	0.015	U
Dibromochloromethane	124-48-1		8	3	mg/kg	0.11	U	-	-	0.0027	U	0.0027	U	0.0015	U
Dichlorodifluoromethane	75-71-8		230000	490	mg/kg	1.1	U	-	-	0.027	U	0.027	U	0.015	U
Ethylbenzene	100-41-4		110000	7800	mg/kg	38	E	33		0.0067		0.00065	J	0.0011	J
Freon-113	76-13-1				mg/kg	0.43	U	-	-	0.011	U	0.011	U	0.0059	U
Isopropylbenzene	98-82-8				mg/kg	3.6		-	-	0.01		0.0027	U	0.00029	J
Methyl Acetate	79-20-9			78000	mg/kg	2		-	-	0.011	U	0.011	U	0.0059	U
Methyl cyclohexane	108-87-2				mg/kg	1		-	-	0.014		0.011	U	0.0059	U
Methyl tert butyl ether	1634-04-4		320	110	mg/kg	0.21	U	-	-	0.0053	U	0.0053	U	0.0029	U
Methylene chloride	75-09-2		230	46	mg/kg	0.53	U	-	-	0.013	U	0.013	U	0.0073	U
o-Xylene	95-47-6		170000	12000	mg/kg	26		-	-	0.017		0.0027	U	0.00069	J
p/m-Xylene	179601-23-1		170000	12000	mg/kg	120	E	87		0.012		0.0053	U	0.0019	J
Styrene	100-42-5		260	90	mg/kg	0.29		-	-	0.00062	J	0.0027	U	0.0015	U

Table 1 Soil Analytical Results
366-394 Wilson Avenue, Newark, NJ

LOCATION SAMPLING DATE LAB SAMPLE ID SAMPLE TYPE	CasNum	EPA-TCLP	NJ-NRDCSRS	NJ-RDCSRS	Units	WL-SP1 7/10/2020 L2029228-01 SOIL		WL-SP1 7/10/2020 L2029228-01 R1 SOIL		WL-SP2 7/10/2020 L2029228-02 SOIL		WL-SP3 7/10/2020 L2029228-03 SOIL		WL-SP3 7/10/2020 L2029228-03 R1 SOIL	
						Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual
Tetrachloroethene	127-18-4		1500	43	mg/kg	0.033	J	-	-	0.021		0.0013	U	0.00076	
Toluene	108-88-3		91000	6300	mg/kg	5.8		-	-	0.045		0.0029		0.018	
trans-1,2-Dichloroethene	156-60-5		720	300	mg/kg	0.16	U	-	-	0.0009	J	0.004	U	0.0022	U
trans-1,3-Dichloropropene	10061-02-6		7	2	mg/kg	0.11	U	-	-	0.0027	U	0.0027	U	0.0015	U
Trichloroethene	79-01-6		10	3	mg/kg	0.053	U	-	-	0.012		0.0013	U	0.00073	U
Trichlorofluoromethane	75-69-4		340000	23000	mg/kg	0.43	U	-	-	0.011	U	0.011	U	0.0059	U
Vinyl chloride	75-01-4		2	0.7	mg/kg	0.11	U	-	-	0.0027	U	0.0027	U	0.0015	U
Xylenes, Total	1330-20-7		170000	12000	mg/kg	110		-	-	0.029		0.0027	U	0.0026	J
TCLP Herbicides by EPA 1311															
2,4,5-TP (Silvex)	93-72-1	1			mg/l	0.005	U	-	-	0.005	U	0.005	U	-	-
2,4-D	94-75-7	10			mg/l	0.025	U	-	-	0.025	U	0.025	U	-	-
TCLP Metals by EPA 1311															
Arsenic, TCLP	7440-38-2	5			mg/l	0.24	J	-	-	0.026	J	0.293	J	-	-
Barium, TCLP	7440-39-3	100			mg/l	1.26		-	-	0.867		0.205	J	-	-
Beryllium, TCLP	7440-41-7				mg/l	0.1	U	-	-	0.1	U	0.1	U	-	-
Cadmium, TCLP	7440-43-9	1			mg/l	0.285		-	-	0.224		0.219		-	-
Chromium, TCLP	7440-47-3	5			mg/l	0.2	U	-	-	0.2	U	0.2	U	-	-
Copper, TCLP	7440-50-8				mg/l	2.54		-	-	47.2		0.643		-	-
Lead, TCLP	7439-92-1	5			mg/l	1.18		-	-	4.14		2.56		-	-
Mercury, TCLP	7439-97-6	0.2			mg/l	0.0021		-	-	0.0007	J	0.0011		-	-
Nickel, TCLP	7440-02-0				mg/l	2.94		-	-	4.01		0.979		-	-
Selenium, TCLP	7782-49-2	1			mg/l	0.5	U	-	-	0.5	U	0.5	U	-	-
Silver, TCLP	7440-22-4	5			mg/l	0.1	U	-	-	0.1	U	0.1	U	-	-
Zinc, TCLP	7440-66-6				mg/l	76		-	-	303		12.2		-	-
TCLP Pesticides by EPA 1311															
Chlordane	57-74-9	0.03			mg/l	0.001	U	-	-	0.001	U	0.001	U	-	-
Endrin	72-20-8	0.02			mg/l	0.0002	U	-	-	0.0002	U	0.00024		-	-
Heptachlor	76-44-8	0.008			mg/l	0.0001	U	-	-	0.0001	U	0.0001	U	-	-
Heptachlor epoxide	1024-57-3	0.008			mg/l	0.0001	U	-	-	0.0001	U	0.0001	U	-	-
Lindane	58-89-9	0.4			mg/l	0.0001	U	-	-	0.0001	U	0.0001	U	-	-
Methoxychlor	72-43-5	10			mg/l	0.001	U	-	-	0.001	U	0.001	U	-	-
Toxaphene	8001-35-2	0.5			mg/l	0.001	U	-	-	0.001	U	0.001	U	-	-
TCLP Semivolatiles by EPA 1311															
2,4,5-Trichlorophenol	95-95-4	400			mg/l	0.025	U	-	-	0.025	U	0.025	U	-	-
2,4,6-Trichlorophenol	88-06-2	2			mg/l	0.025	U	-	-	0.025	U	0.025	U	-	-
2,4-Dinitrotoluene	121-14-2	0.13			mg/l	0.025	U	-	-	0.025	U	0.025	U	-	-
2-Methylphenol	95-48-7	200			mg/l	0.025	U	-	-	0.025	U	0.025	U	-	-
3-Methylphenol/4-Methylphenol	108-39-4/106-44-5	200			mg/l	0.014	J	-	-	0.025	U	0.025	U	-	-
Hexachlorobenzene	118-74-1	0.13			mg/l	0.01	U	-	-	0.01	U	0.01	U	-	-
Hexachlorobutadiene	87-68-3	0.5			mg/l	0.01	U	-	-	0.01	U	0.01	U	-	-
Hexachloroethane	67-72-1	3			mg/l	0.01	U	-	-	0.01	U	0.01	U	-	-
Nitrobenzene	98-95-3	2			mg/l	0.01	U	-	-	0.01	U	0.01	U	-	-
Pentachlorophenol	87-86-5	100			mg/l	0.05	U	-	-	0.05	U	0.05	U	-	-
Pyridine	110-86-1	5			mg/l	0.018	U	-	-	0.018	U	0.018	U	-	-

Table 1 Soil Analytical Results
366-394 Wilson Avenue, Newark, NJ

LOCATION SAMPLING DATE LAB SAMPLE ID SAMPLE TYPE	CasNum	EPA-TCLP	NJ-NRDCSRS	NJ-RDCSRS	Units	WL-SP1 7/10/2020 L2029228-01 SOIL		WL-SP1 7/10/2020 L2029228-01 R1 SOIL		WL-SP2 7/10/2020 L2029228-02 SOIL		WL-SP3 7/10/2020 L2029228-03 SOIL		WL-SP3 7/10/2020 L2029228-03 R1 SOIL	
						Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual
TCLP Volatiles by EPA 1311															
1,1-Dichloroethene	75-35-4	0.7			mg/l	0.005	U	-	-	0.005	U	0.005	U	-	-
1,2-Dichloroethane	107-06-2	0.5			mg/l	0.005	U	-	-	0.005	U	0.005	U	-	-
1,4-Dichlorobenzene	106-46-7	7.5			mg/l	0.068		-	-	0.025	U	0.025	U	-	-
2-Butanone	78-93-3	200			mg/l	0.05	U	-	-	0.05	U	0.05	U	-	-
Benzene	71-43-2	0.5			mg/l	0.021		-	-	0.005	U	0.005	U	-	-
Carbon tetrachloride	56-23-5	0.5			mg/l	0.005	U	-	-	0.005	U	0.005	U	-	-
Chlorobenzene	108-90-7	100			mg/l	0.087		-	-	0.005	U	0.005	U	-	-
Chloroform	67-66-3	6			mg/l	0.0075	U	-	-	0.0075	U	0.0075	U	-	-
Tetrachloroethene	127-18-4	0.7			mg/l	0.005	U	-	-	0.005	U	0.005	U	-	-
Trichloroethene	79-01-6	0.5			mg/l	0.005	U	-	-	0.005	U	0.005	U	-	-
Vinyl chloride	75-01-4	0.2			mg/l	0.01	U	-	-	0.01	U	0.01	U	-	-

Footnotes:

EPA-TCLP: EPA Toxicity Characteristic (TCLP) Regulatory Levels Criteria per 40CFR Part 261 as of September 10, 2015.
NJ-NRDCSRS: New Jersey 2017 Non-Residential Direct Contact Soil Remediation Standards Criteria per Soil Remediation Standards, last amended September 18, 2017.
NJ-RDCSRS: New Jersey 2017 Residential Direct Contact Soil Remediation Standards Criteria per Soil Remediation Standards, last amended September 18, 2017.
I: The lower value for the two columns has been reported due to obvious interference.
P: The RPD between the results for the two columns exceeds the method-specified criteria.
R: Analytical results are from sample re-analysis.
E: Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
Gray Highlight Indicates Non-detect; Detection Limit above RDCSRS
Yellow Highlight indicates Detection above a standard RDCSRS or NRDCSRS

Exhibit A

Photo Documentation

Photo 1: Soil Pile S1

Photo 2: Soil Pile S1 center location with PID reading and Petroleum Staining

Photo 3: Soil Pile S2

Photo 4: Soil Pile S3

ENVOCARE

Site Photographs Project# 150405
366-394 Wilson Avenue, Newark, NJ

Appendix F

CDM Smith's Stockpile Sample Report

CDM Smith
14 Wall Street, Suite 1702
New York, New York 10005
tel: 212 785 9123

December 15, 2020

Ms. Pamela Tames
U.S. Environmental Protection Agency
290 Broadway - 20th Floor
New York, NY 10007-1866

PROJECT: EPA Region 2 RAC2 Contract No.: EP-W-09-002
Work Assignment No.: 060-RICO-02MV

DOC. CONTROL NO.: 3323-060-04398

SUBJECT: Summary of Globe Metals Property Soil Stockpile Sampling and Soil Erosion and Sediment Controls
Pierson's Creek Site, Operable Unit 1
Remedial Investigation/Feasibility Study
Newark, New Jersey

Dear Ms. Tames:

CDM Federal Programs Corporation (CDM Smith) is pleased to submit the Summary of Globe Metals Property Soil Stockpile Sampling and Soil Erosion and Sediment Controls, for the Pierson's Creek Site Operable Unit 1, Remedial Investigation/ Feasibility Study in Newark, New Jersey.

If you have any questions regarding this work plan, please contact me at your earliest convenience at (732) 590-4695.

Very truly yours,
CDM FEDERAL PROGRAMS CORPORATION

Edward Leonard, CHMM
Site Manager

PSO: KS

Enclosure

cc: B. MacDonald, CDM Smith (letter only)
C. Zielinkski, NJDEP (electronic copy)
K. Subramaniam, CDM Smith (letter only)
F. Rosado, EPA Region 2 (letter only)
J. Button, CDM Smith (electronic copy)
RAC2 Document Control

Memorandum

To: *Pamela Tames, EPA Region 2*

From: *Edward Leonard, CHMM*
Joseph Button, PG, PMP, CDM Smith

Date: *12/15/2020*

Subject: *Summary of Globe Metals Property*
Soil Stockpile Sampling and Soil Erosion and Sediment Controls
November 2-4, 2020
Pierson's Creek Superfund Site, OU1

Introduction

This memorandum briefly summarizes the field events performed by CDM Federal Programs Corporation (CDM Smith) on behalf of the United States Environmental Protection Agency (EPA) between November 2 and 4, 2020 at the Globe Metals property of Pierson's Creek Superfund Site, Operable Unit 1, in Newark, New Jersey.

In September 2019, the former prospective buyers of the Globe Metals property constructed drainage and site improvements on the property which included excavating and culverting the southern portion of the Upper Creek tributary on the property. As a result of this work, soil/sediment, vegetative matter, and other debris were stockpiled for storage in several piles on the northern and eastern side of the property. A total of eight stockpiles were identified on the property during the field activities; three of which contained soils, sediments and other debris that were removed from the tributary and surrounding soils. Sample results from previous investigations of the tributary and adjacent soils indicated that these stockpiles likely contained materials that were highly contaminated. The locations of the three stockpiles (Stockpiles A, B, and C) are shown on (**Figure 1**). Based on this information, stockpile sampling and characterization of these three stockpiles was requested by EPA.

CDM Smith collected samples from the stockpiles for waste characterization. These samples were analyzed by Katahdin Analytical Services for polychlorinated biphenyls (PCBs), toxicity via the Toxicity Characteristic Leaching Procedure (TCLP), reactivity, ignitability, and corrosivity analysis. Additionally, CDM Smith oversaw implementation of proper soil erosion and sediment controls. Details of the field activities are provided below.

Field Activities

Stockpiles A, B, and C have remained relatively unchanged from the last site visit in May 2020. The three stockpiles were mostly covered with tarps upon arrival at the site on November 2, 2020. Field observations indicate that stockpiles A and B primarily contain dry soils intermixed with various types of fill, construction, debris, and organic matter. Based on field observations, stockpile C is assumed to contain excavated material, similar to that found in A and B. **Table 1** presents a description of stockpile contents and the sampling rationale for each pile.

Soil sampling of stockpiles A, B, and C was conducted on November 2, 2020. Photographs of field activities are provided in **Attachment 1**. Sampling procedures followed sampling protocol based on New Jersey's Fill Material Guidance for SRP Sites (2015). Representative soil samples were collected from different locations and depth horizons within each stockpile, based on the following criteria: one sample collected every 20 cubic yards (CY) for the first 100 CY of material, and one sample collected every 100 CY for the next 1,000 CY of material. A total of 26 soil samples were collected from all 3 stockpiles: 7 samples from stockpile A, 11 samples from stockpile B, and 8 samples from stockpile C. One duplicate sample was collected from stockpile A for quality control. All samples were analyzed for PCBs, toxicity via TCLP, reactivity, ignitability, and corrosivity by Katahdin Analytical Services in Scarborough, Maine.

To minimize migration of contaminated stockpile material, soil erosion and sediment controls were implemented for the stockpiles in accordance with New Jersey's Standards for Soil Erosion and Sediment Control in New Jersey (2017). CDM Smith reviewed the specifications of the silt fence and tarp material brought onsite prior to installation. Stockpiles were covered and properly anchored with 6-millimeter-thick heavy grade sheets of polyethylene on November 3, 2020. A silt fence was installed around the toe of each stockpile slope to contain movement of the stockpiled material on November 4, 2020. Silt fence and tarp installation was competed by Innovative Recycling Technologies (IRT) on November 3 and 4, 2020 with oversight provided by CDM Smith personnel. After cover and silt fence installation, CDM Smith personnel inspected the cover to be sure properly anchored and the silt fence to ensure the bottom portion of the fence was securely placed 6 inches below ground surface.

Results and Analysis

The detected results for stockpile A, B, and C are presented in **Table 2a, Table 2b,** and **Table 2c**, respectively. TCLP results are compared to the Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24). Corrosivity is evaluated by comparing pH concentrations to guidance values (40 CFR 261.22). Soil PCB concentrations are compared to 50 mg/kg of total PCBs to determine whether the materials are regulated under the Toxic Substances and Control Act (TSCA) (40 CFR 761.20). Notable results are:

- Five soil samples (and one duplicate sample) collected from stockpile A contained PCB concentrations in soil greater than 50 mg/kg.
- Leachate from seven soil samples collected from stockpile B contained lead concentrations greater than the Maximum Concentration of Contaminants for the Toxicity Characteristic.
- Leachate from one soil sample collected from stockpile C contained a lead concentration greater than the Maximum Concentration of Contaminants for the Toxicity Characteristic.

References

New Jersey Department of Agriculture. 2017. The Standards for Soil Erosion and Sediment Control in New Jersey, 7th Edition. January 2014, Revised July 2017.

New Jersey Department of Environmental Protection. 2015. Fill Material Guidance for SRP Sites, Version 3.0. April.

40 CFR 261.22. 2005. Characteristic of corrosivity. June 14. Viewed at: https://www.law.cornell.edu/cfr/text/40/261.22

40 CFR 261.24. 2006. Toxicity Characteristic. July 14. Viewed at: https://www.law.cornell.edu/cfr/text/40/261.24

40 CFR 761.20. 1999. Prohibitions and exceptions. June 24. Viewed at: https://www.law.cornell.edu/cfr/text/40/761.20

Tables

Table 1
Stockpile Contents and Sampling Rationale
Pierson's Creek Superfund Site
Newark, New Jersey

Stock Pile ID	General Dimensions	Approximate Volume (cubic yards)	General Makeup of Debris Pile	Waste Characterization Samples (TCLP full, reactivity, corrosivity, and ignitability)
A	55' long x 35' wide x 3' high	215	Excavated materials. 50% soil/sediment, 25% general fill, 25% phragmites and other debris (based on material at base – pile was mostly covered)	7 samples
B	55' long x 30' wide x 10' high	610	Excavated materials. 50% soil/sediment, 25% general fill, 25% phragmites and other debris	11 samples
C	50' long x 40' wide x 5' high	370	Excavated materials. 50% soil/sediment, 25% general fill, 25% phragmites and other debris (based on material at base – pile was mostly covered)	8 samples

Notes:
1. The sampling scope is based on guidance provided in the New Jersey Fill Material Guidance for SRP Sites, April 2015. Version 3.
2. One sample was collected every 20 cubic yards for the first 100 cubic yards of material, and one sample was collected every 100 cubic yards for the next 1,000 cubic yards of material.

Acronyms:
ID - identification
SRP - Site Remediation Program
TCLP - Toxicity Characteristic Leaching Procedure

Table 2a
Stockpile A Sample Results
Pierson's Creek Superfund Site
Newark, New Jersey

			Sample ID	SP-A-1		SP-A-2		SP-A-3		SP-A-4		SP-A-5		SP-A-6		SP-A-7		SP-A-900	
Analyte	CAS Number	Screening Criteria	Unit	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
TCLP Leachate Concentrations																			
1,4-Dichlorobenzene	106-46-7	7.5	mg/L	0.083		0.045	J	0.062		0.054			U		U	0.04	J	0.059	
Arsenic	7440-38-2	5	mg/L	1.57		0.33	N	0.766		0.624			U		U	0.874		1.39	
Barium	7440-39-3	100	mg/L	3.28		2.25		2.98		2.97		1.48		1.91		3.78		3.28	
Benzene	71-43-2	0.5	mg/L	0.12		0.044	J	0.11		0.059	J		U		U	0.11		0.13	
Cadmium	7440-43-9	1	mg/L	0.0454		0.24		0.0123	J	0.0686		0.129		0.136		0.181		0.00752	J
Chlorobenzene	108-90-7	100	mg/L	0.35		0.11		0.19		0.12			U		U	0.14		0.17	
Chromium	7440-47-3	5	mg/L	0.05	J	0.0079	J	0.015	J	0.01	J	0.0077	J	0.0078	J	0.022	J	0.012	J
Endrin	72-20-8	0.02	mg/L		U		U	0.000053	J	0.000057	J		U		U	0.000087	JJ	0.000059	J
Lead	7439-92-1	5	mg/L	1.47		1.12	N	0.581		0.674		4.94		2.67		1.95		0.413	
Mercury	7439-97-6	0.2	mg/L	0.000612		0.00555	EA	0.000499		0.00121		0.000761		0.00189		0.0014		0.000937	
Methoxychlor	72-43-5	10	mg/L		U		U		U		U		U		U	0.094	JJ		U
Other Waste Characteristics Results																			
Sulfide Reactive	SREAC	*	mg/kg	45	J	21	J	45	J	32	J	32	J		U		U	33	J
Total Cyanide	57-12-5	*	mg/kg	2.5		2		2.2			U	0.9	J		U	3		2.2	
pH	pH	<2 or >12.5	pH units	7.7		8		7.9		7.6		8		8.1		7.7		7.7	
Soil PCB Concentrations																			
Aroclor-1242	53469-21-9	N/A	mg/kg	12	J	12		15		13		0.33		0.44		11		14	
Aroclor-1254	11097-69-1	N/A	mg/kg	35	J	27	J	35	J	39	J	1.7		2.4	J	28	J	35	J
Acroclor-1260	11096-82-5	N/A	mg/kg	14		12		13		15		0.76		0.96		12		15	
Total PCBs		50	mg/kg	61		51		63		67		2.79		3.8		51		64	
Other Results																			
Total Solids	TSOLIDS	N/A	%	55		66		71		63		77		56		72		63	

Notes:

1. All samples were collected on 11/2/2020.
2. Only analytes that were detected in at least one sample are included in this table.
3. The screening criteria for the TCLP leachate concentrations are the maximum concentration of contaminants for the toxicity characteristics listed in Table 1 of 40 CFR § 261.24.
The screening criteria for total PCBs is based on the Toxic Substances Control Act (TSCA).
4. Total PCBs are calculated as the sum of all Aroclor results
5. Results that are highlighted have concentrations greater than the screening criteria.

* EPA currently does not have guidance threshold levels for determining whether a waste is cyanide-bearing or sulfide-bearing.

Acronyms:

CAS - Chemical Abstract Services
EA - estimated value, result exceeded the upper level of calibration
ID - identification
J - estimated value
mg/kg - milligram per kilogram
mg/L - milligram per liter
N - presumptive evidence of a compound based on mass spectral library search
PCB - polychlorinated biphenyl
ppm - parts per million
Q - qualifier
TCLP - Toxicity Characteristic Leaching Procedure
U - compound was analyzed for but not detected
N/A - not applicable

Table 2b
Stockpile B Sample Results
Pierson's Creek Superfund Site
Newark, New Jersey

			Sample ID	SP-B-1		SP-B-2		SP-B-3		SP-B-4		SP-B-5		SP-B-6		SP-B-7		SP-B-8		SP-B-9		SP-B-10		SP-B-11	
Analyte	CAS Number	Screening Criteria	Unit	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
TCLP Leachate Concentrations																									
Barium	7440-39-3	100	mg/L	1.64		1.74		1.33		0.874		0.687		1.38		0.874		0.92		1.54		2.28		1.54	
Cadmium	7440-43-9	1	mg/L	0.217		0.183		0.245		0.189		0.346		0.169		0.234		0.233		0.167		0.145		0.241	
Chromium	7440-47-3	5	mg/L	0.036	J	0.139		0.02	J	0.0083	J	0.011	J	0.0058	J	0.012	J	0.0068	J	0.0068	J		U	0.022	J
Lead	7439-92-1	5	mg/L	6.88		13.6		17.4		2.64		5.08		17.7	N	2.43		2.5		9.73		0.788		5.42	
Mercury	7439-97-6	0.2	mg/L	0.0011		0.0013		0.00135		0.00203		0.00493		0.00172	NEA	0.00314		0.00274		0.00164		0.000772		0.00105	
Tetrachloroethene	127-18-4	0.7	mg/L		U		U		U	0.16		0.02	J		U		U		U		U		U		U
Other Waste Characteristics Results																									
Sulfide Reactive	SREAC	*	mg/kg		U	28	J		U		U	32	J	29	J	29	J	42	J	19	J	54		34	J
Total Cyanide	57-12-5	*	mg/kg		U	0.78	J		U	2.2		0.95	J		U	2.1	J	1.6	J	0.96	J	1.1			U
pH	pH	<2 or >12.5	pH units	7.7		8		7.6		7.8		6.9		7.9		7.5		7.5		7.8		7.7		7.9	
Soil PCB Concentrations																									
Aroclor-1242	53469-21-9	N/A	mg/kg	0.96		0.2		1.3		1.4		2.4		0.51	J	1.1		1.6		0.4		0.95		1.1	
Aroclor-1254	11097-69-1	N/A	mg/kg	2		1.5		2.7		5	J	4.1		0.99		2.8		3.2		2.4		3.5	J	32	
Aroclor-1260	11096-82-5	N/A	mg/kg	0.89		0.73		1.4		2		2.2		0.4	MM	1.3		1.3	J	1		1.2		3.8	
Total PCBs		50		3.85		2.43		5.4		8.4		8.7		1.9		5.2		6.1		3.8		5.65		36.9	
Other Results																									
Total Solids	TSOLIDS	N/A	%	65		85		69		82		60		74		58		76		79		75		77	

Notes:

1. All samples were collected on 11/2/2020.
2. Only analytes that were detected in at least one sample are included in this table.
3. The screening criteria for the TCLP leachate concentrations are the maximum concentration of contaminants for the toxicity characteristics listed in Table 1 of 40 CFR § 261.24.
The screening criteria for total PCBs is based on the Toxic Substances Control Act (TSCA).
4. Total PCBs are calculated as the sum of all Aroclor results
5. Results that are highlighted have concentrations greater than the screening criteria.
* EPA currently does not have guidance threshold levels for determining whether a waste is cyanide-bearing or sulfide-bearing.

Acronyms:

CAS - Chemical Abstract Services
EA - estimated value, result exceeded the upper level of calibration
ID - identification
J - estimated value
M - indicates that the flagged compound did not meet criteria in the matrix spike/matrix spike duplicate
mg/kg - milligram per kilogram
mg/L - milligram per liter
N - presumptive evidence of a compound based on mass spectral library search
PCB - polychlorinated biphenyl
ppm - parts per million
Q - qualifier
TCLP - Toxicity Characteristic Leaching Procedure
U - compound was analyzed for but not detected
N/A - not applicable

Table 2c
Stockpile C Sample Results
Pierson's Creek Superfund Site
Newark, New Jersey

			Sample ID	SP-C-1		SP-C-2		SP-C-3		SP-C-4		SP-C-5		SP-C-6		SP-C-7		SP-C-8	
Analyte	CAS Number	Screening Criteria	Unit	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
TCLP Leachate Concentrations																			
Arsenic	7440-38-2	5	mg/L	0.1	J	0.19			U	0.53		0.951		0.26		3.07		0.561	
Barium	7440-39-3	100	mg/L	0.166		0.456		0.111		0.358		0.148		0.166		0.965		0.694	
Cadmium	7440-43-9	1	mg/L	0.266		0.139		0.186		0.203		0.165		0.203		0.121		0.148	
Chromium	7440-47-3	5	mg/L	0.015	J	0.0089	J	0.0619	J	0.012	J	0.044	J	0.02	J	0.0084	J	0.006	J
Lead	7439-92-1	5	mg/L	1.53		0.779		15.6		0.946		5.41		4.72		0.853		0.825	
Mercury	7439-97-6	0.2	mg/L	0.0126		0.00141		0.00413		0.00015	JA	0.00145		0.00156		0.00537		0.00469	
Selenium	7782-49-2	1	mg/L		U		U		U	0.022	J		U		U		U		U
Other Waste Characteristics Results																			
Sulfide Reactive	SREAC	*	mg/kg	32	J		U		U	33	J		U		U		U	40	J
Total Cyanide	57-12-5	*	mg/kg		U	0.71	J	4.9		1.8		5.1		3.4		1	J		U
pH	pH	<2 or >12.5	pH units	5.8		7.4		3.7		5.5		4		4.6		7.4		7.2	
Soil PCB Concentrations																			
Aroclor-1242	53469-21-9	N/A	mg/kg	6.2		2.6		21		2		13		6.2		1.5		2.2	
Aroclor-1254	11097-69-1	N/A	mg/kg	9.7	J	6.2		14		1.7		6.5		5		3.7		3.4	
Aroclor-1260	11096-82-5	N/A	mg/kg	3.4		3		5.5		0.67		2.5		2		1.4		1.3	
Total PCBs		50		19.3		11.8		40.5		4.37		22		13.2		6.6		6.9	
Other Information																			
Total Solids	TSOLIDS		%	58		61		50		71		58		67		77		61	

Notes:

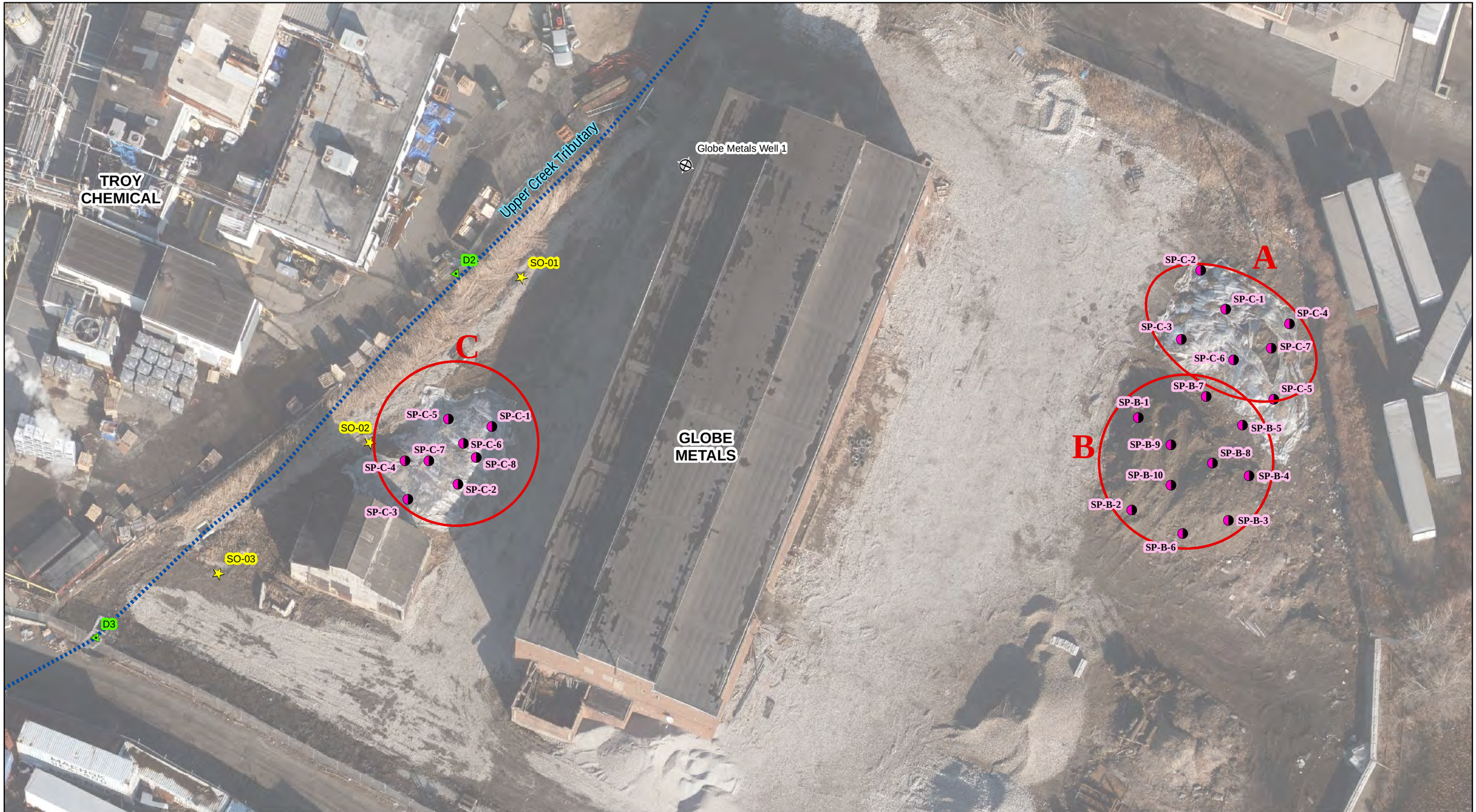
1. All samples were collected on 11/2/2020.
2. Only analytes that were detected in at least one sample are included in this table.
3. The screening criteria for the TCLP leachate concentrations are the maximum concentration of contaminants for the toxicity characteristics listed in Table 1 of 40 CFR § 261.24.
The screening criteria for total PCBs is based on the Toxic Substances Control Act (TSCA).
4. Total PCBs are calculated as the sum of all Aroclor results
5. Results that are highlighted have concentrations greater than the screening criteria.

* EPA currently does not have guidance threshold levels for determining whether a waste is cyanide-bearing or sulfide-bearing.

Acronyms:

A - indicated that a tentatively identified compound is a suspected aldol-condensation product
CAS - Chemical Abstract Services
EA - estimated value, result exceeded the upper level of calibration
ID - identification
J - estimated value
mg/kg - milligram per kilogram
mg/L - milligram per liter
N - presumptive evidence of a compound based on mass spectral library search
PCB - polychlorinated biphenyl
ppm - parts per million
Q - qualifier
TCLP - Toxicity Characteristic Leaching Procedure
U - compound was analyzed for but not detected
N/A - not applicable

Figures



Culverted Portion of Upper Creek Tributary

A Soil/Sediment/Debris Stockpile or Debris Pile

Stockpile Material TCLP Sampling Location

Remedial Investigation Sample Locations:

Sediment Core

Soil Boring

Historic Monitoring Wells

N

0 30 60 Feet

1 in = 30 feet

Figure 1
Globe Metals Stockpile Sampling Locations
Pierson's Creek Superfund Site
Newark, NJ

CDM Smith

Attachment 1

Photographs of Field Activities

Globe Metals Property – Pierson's Creek Superfund Site, OU1

Photo #1: Looking northeast at Pile A (being covered to the left) and Pile B (larger on the right).

Photo #2: Looking east at Pile A (covered).

Globe Metals Property – Pierson's Creek Superfund Site, OU1

Photo #3: Looking east at southern side of Pile B (covered).

Photo #4: Looking NE at northern side of Pile A with silt fence installed.

Globe Metals Property – Pierson's Creek Superfund Site, OU1

Photo #5: Looking SE at western side of Pile B with silt fence installed.

Photo #6: Looking east along southern end of Pile B with silt fence installed.

Globe Metals Property – Pierson's Creek Superfund Site, OU1

Photo #7: Looking south at Pile C (uncovered).

Photo #8: Looking south at Pile C (covered) with silt fence installed.

Appendix G

Project Limits Criteria

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Toxicity and Chemical-specific Information															Contaminant		Carcinogenic Target Risk (TR) = 1E-04				Noncancer Child Hazard Index (HI) = 1			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	GIABS	ABS_d	Analyte	CAS No.	Ingestion SL TR=1E-04 (mg/kg)	Dermal SL TR=1E-04 (mg/kg)	Inhalation SL TR=1E-04 (mg/kg)	Carcinogenic SL TR=1E-04 (mg/kg)	Ingestion SL Child THQ=1 (mg/kg)	Dermal SL Child THQ=1 (mg/kg)	Inhalation SL Child THQ=1 (mg/kg)	Noncarcinogenic SL Child THI=1 (mg/kg)
				3.0E-04	O						1.36E+09		1	0.1	Acephate	30560-19-1					2.3E+01	9.9E+01		1.9E+01
		2.2E-06	I			9.0E-03	I	V		1.07E+05	1.36E+09	8.72E+03	1		Acetaldehyde	75-07-0			1.1E+03	1.1E+03			8.2E+01	8.2E+01
				2.0E-02	I						1.36E+09		1	0.1	Acetochlor	34256-82-1					1.6E+03	6.6E+03		1.3E+03
				9.0E-01	I			V		1.14E+05	1.36E+09	1.37E+04	1		Acetone	67-64-1					7.0E+04			7.0E+04
						2.0E-03	X				1.36E+09		1	0.1	Acetone Cyanohydrin	75-86-5							2.8E+06	2.8E+06
						6.0E-02	I	V		1.28E+05	1.36E+09	1.30E+04	1		Acetonitrile	75-05-8							8.1E+02	8.1E+02
				1.0E-01	I			V		2.52E+03	1.36E+09	5.97E+04	1		Acetophenone	98-86-2					7.8E+03			7.8E+03
3.8E+00	C	1.3E-03	C								1.36E+09		1	0.1	Acetylaminofluorene, 2-	53-96-3	1.8E+01	6.5E+01	2.9E+05	1.4E+01				
				5.0E-04	I	2.0E-05	I	V		2.27E+04	1.36E+09	6.91E+03	1		Acrolein	107-02-8					3.9E+01		1.4E-01	1.4E-01
5.0E-01	I	1.0E-04	I	2.0E-03	I	6.0E-03	I		M		1.36E+09		1	0.1	Acrylamide	79-06-1	3.1E+01	1.2E+02	1.4E+06	2.4E+01	1.6E+02	6.6E+02	8.5E+06	1.3E+02
				5.0E-01	I	2.0E-04	P	V		1.09E+05	1.36E+09	9.53E+04	1		Acrylic Acid	79-10-7					3.9E+04		2.0E+01	2.0E+01
5.4E-01	I	6.8E-05	I	1.0E-02	A	2.0E-03	I	V		1.13E+04	1.36E+09	7.69E+03	1		Acrylonitrile	107-13-1	1.3E+02		3.2E+01	2.5E+01	7.8E+02		1.6E+01	1.6E+01
						6.0E-03	P				1.36E+09		1	0.1	Adiponitrile	111-69-3							8.5E+06	8.5E+06
5.6E-02	C			1.0E-02	I						1.36E+09		1	0.1	Alachlor	15972-60-8	1.2E+03	4.4E+03		9.7E+02	7.8E+02	3.3E+03		6.3E+02
				1.0E-03	I						1.36E+09		1	0.1	Aldicarb	116-06-3					7.8E+01	3.3E+02		6.3E+01
				1.0E-03	I						1.36E+09		1	0.1	Aldicarb Sulfone	1646-88-4					7.8E+01	3.3E+02		6.3E+01
											1.36E+09		1	0.1	Aldicarb sulfoxide	1646-87-3								
1.7E+01	I	4.9E-03	I	3.0E-05	I			V			1.36E+09	1.72E+06	1		Aldrin	309-00-2	4.1E+00		9.8E+01	3.9E+00	2.3E+00			2.3E+00
				4.0E-03	P	1.0E-04	X	V		1.11E+05	1.36E+09	3.42E+04	1		Allyl Alcohol	107-18-6					3.1E+02		3.6E+00	3.5E+00
2.1E-02	C	6.0E-06	C			1.0E-03	I	V		1.42E+03	1.36E+09	1.58E+03	1		Allyl Chloride	107-05-1	3.3E+03		7.4E+01	7.2E+01			1.7E+00	1.7E+00
				1.0E+00	P	5.0E-03	P				1.36E+09		1		Aluminum	7429-90-5					7.8E+04		7.1E+06	7.7E+04
				4.0E-04	I						1.36E+09		1		Aluminum Phosphide	20859-73-8					3.1E+01			3.1E+01
				9.0E-03	I						1.36E+09		1	0.1	Ametryn	834-12-8					7.0E+02	3.0E+03		5.7E+02
2.1E+01	C	6.0E-03	C								1.36E+09		1	0.1	Aminobiphenyl, 4-	92-67-1	3.3E+00	1.2E+01	6.4E+04	2.6E+00				
				8.0E-02	P						1.36E+09		1	0.1	Aminophenol, m-	591-27-5					6.3E+03	2.6E+04		5.1E+03
				4.0E-03	X						1.36E+09		1	0.1	Aminophenol, o-	95-55-6					3.1E+02	1.3E+03		2.5E+02
				2.0E-02	P						1.36E+09		1	0.1	Aminophenol, p-	123-30-8					1.6E+03	6.6E+03		1.3E+03
				2.5E-03	I						1.36E+09		1	0.1	Amitraz	33089-61-1					2.0E+02	8.2E+02		1.6E+02
						5.0E-01	I	V					1		Ammonia	7664-41-7								
				2.0E-03	X						1.36E+09		1	0.1	Ammonium Picrate	131-74-8					1.6E+02	6.6E+02		1.3E+02
				2.0E-01	I						1.36E+09		1		Ammonium Sulfamate	7773-06-0					1.6E+04			1.6E+04
						3.0E-03	X	V		1.37E+04	1.36E+09	2.62E+04	1		Amyl Alcohol, tert-	75-85-4							8.2E+01	8.2E+01
5.7E-03	I	1.6E-06	C	7.0E-03	P	1.0E-03	I				1.36E+09		1	0.1	Aniline	62-53-3	1.2E+04	4.3E+04	2.4E+08	9.5E+03	5.5E+02	2.3E+03	1.4E+06	4.4E+02
4.0E-02	P			2.0E-03	X						1.36E+09		1	0.1	Anthraquinone, 9,10-	84-65-1	1.7E+03	6.2E+03		1.4E+03	1.6E+02	6.6E+02		1.3E+02
				4.0E-04	I	3.0E-04	A				1.36E+09		0.15		Antimony (metallic)	7440-36-0					3.1E+01		4.3E+05	3.1E+01
				5.0E-04	H						1.36E+09		0.15		Antimony Pentoxide	1314-60-9					3.9E+01			3.9E+01
				4.0E-04	H						1.36E+09		0.15		Antimony Tetroxide	1332-81-6					3.1E+01			3.1E+01
						2.0E-04	I				1.36E+09		0.15		Antimony Trioxide	1309-64-4							2.8E+05	2.8E+05
1.5E+00	I	4.3E-03	I	3.0E-04	I	1.5E-05	C				1.36E+09		1	0.03	Arsenic, Inorganic	7440-38-2	7.7E+01	5.5E+02	8.9E+04	6.8E+01	3.9E+01	3.3E+02	2.1E+04	3.5E+01
				3.5E-06	C	5.0E-05	I				1.36E+09		1		Arsine	7784-42-1					2.7E-01		7.1E+04	2.7E-01
													1		Asbestos (units in fibers)	1332-21-4								
				3.6E-01	O						1.36E+09		1	0.1	Asulam	3337-71-1					2.8E+04	1.2E+05		2.3E+04
2.3E-01	C			3.0E-03	A						1.36E+09		1	0.1	Atrazine	1912-24-9	3.0E+02	1.1E+03		2.4E+02	2.3E+02	9.9E+02		1.9E+02
8.8E-01	C	2.5E-04	C								1.36E+09		1	0.1	Auramine	492-80-8	7.9E+01	2.8E+02	1.5E+06	6.2E+01				
				4.0E-04	I						1.36E+09		1	0.1	Avermectin B1	65195-55-3					3.1E+01	1.3E+02		2.5E+01
				3.0E-03	A	1.0E-02	A				1.36E+09		1	0.1	Azinphos-methyl	86-50-0					2.3E+02	9.9E+02	1.4E+07	1.9E+02
1.1E-01	I	3.1E-05	I					V			1.36E+09	5.23E+05	1		Azobenzene	103-33-3	6.3E+02		4.7E+03	5.6E+02				
				1.0E+00	P	7.0E-06	P				1.36E+09		1	0.1	Azodicarbonamide	123-77-3					7.8E+04	3.3E+05	9.9E+03	8.6E+03
				2.0E-01	I	5.0E-04	H				1.36E+09		0.07		Barium	7440-39-3					1.6E+04		7.1E+05	1.5E+04
				5.0E-03	O			V			1.36E+09	3.07E+05	1		Benfluralin	1861-40-1					3.9E+02			3.9E+02
				5.0E-02	I						1.36E+09		1	0.1	Benomyl	17804-35-2					3.9E+03	1.6E+04		3.2E+03
				2.0E-01	I						1.36E+09		1	0.1	Bensulfuron-methyl	83055-99-6					1.6E+04	6.6E+04		1.3E+04
				3.0E-02	I						1.36E+09		1	0.1	Bentazon	25057-89-0					2.3E+03	9.9E+03		1.9E+03
4.0E-03	P			1.0E-01	I			V		1.16E+03	1.36E+09	2.25E+04	1		Benzaldehyde	100-52-7	1.7E+04			1.7E+04	7.8E+03			7.8E+03
5.5E-02	I	7.8E-06	I	4.0E-03	I	3.0E-02	I	V		1.82E+03	1.36E+09	3.54E+03	1		Benzene	71-43-2	1.3E+03		1.3E+02	1.2E+02	3.1E+02		1.1E+02	8.2E+01
1.0E-01	X			3.0E-04	X						1.36E+09		1	0.1	Benzenediamine-2-methyl sulfate, 1,4-	6369-59-1	7.0E+02	2.5E+03		5.4E+02	2.3E+01	9.9E+01		1.9E+01
				1.0E-03	P			V		1.26E+03	1.36E+09	1.94E+04	1		Benzenethiol	108-98-5					7.8E+01			7.8E+01
2.3E+02	I	6.7E-02	I	3.0E-03	I				M		1.36E+09		1	0.1	Benzidine	92-87-5	6.7E-02	2.6E-01	2.1E+03	5.3E-02	2.3E+02	9.9E+02		1.9E+02
				4.0E+00	I						1.36E+09		1	0.1	Benzoic Acid	65-85-0					3.1E+05	1.3E+06		2.5E+05
1.3E+01	I							V		3.24E+02	1.36E+09	6.76E+04	1		Benzotrichloride	98-07-7	5.3E+00			5.3E+00				
				1.0E-01	P						1.36E+09		1	0.1	Benzyl Alcohol	100-51-6					7.8E+03	3.3E+04		6.3E+03
1.7E-01	I	4.9E-05	C	2.0E-03	P	1.0E-03	P	V		1.46E+03	1.36E+09	2.55E+04	1		Benzyl Chloride	100-44-7	4.1E+02		1.5E+02	1.1E+02	1.6E+02		2.7E+01	2.3E+01
		2.4E-03	I	2.0E-03	I	2.0E-05	I				1.36E+09		0.007		Beryllium and compounds	7440-41-7			1.6E+05	1.6E+05	1.6E+02		2.8E+04	1.6E+02
				9.0E-03	P						1.36E+09		1	0.1	Bifenox	42576-02-3					7.0E+02	3.0E+03		5.7E+02
				1.5E-02	I						1.36E+09		1	0.1	Biphenthrin	82657-04-3					1.2E+03	4.9E+03		9.5E+02
8.0E-03	I			5.0E-01	I	4.0E-04	X	V			1.36E+09	1.14E+05	1		Biphenyl, 1,1'-	92-52-4	8.7E+03			8.7E+03	3.9E+04		4.8E+01	4.7E+01
				4.0E-02	I			V		1.02E+03	1.36E+09	3.50E+04	1		Bis(2-chloro-1-methylethyl) ether	108-60-1					3.1E+03			3.1E+03
				3.0E-03	P						1.36E+09		1	0.1	Bis(2-chloroethoxy)methane	111-91-1					2.3E+02	9.9E+02		1.9E+02
1.1E+00	I	3.3E-04	I					V		5.05E+03	1.36E+09	4.25E+04	1		Bis(2-chloroethyl)ether	111-44-4	6.3E+01		3.6E+01	2.3E+01				
2.2E+02	I	6.2E-02	I					V		4.22E+03	1.36E+09	1.88E+03	1		Bis(chloromethyl)ether	542-88-1	3.2E-01		8.5E-03	8.3E-03				
				5.0E-02	I						1.36E+09		1	0.1	Bisphenol A	80-05-7					3.9E+03	1.6E+04		3.2E+03
				2.0E-01	I	2.0E-02	H				1.36E+09		1		Boron And Borates Only	7440-42-8					1.6E+04		2.8E+07	1.6E+04
				2.0E+00	P	2.0E-02	P	V			1.36E+09		1		Boron Trichloride	10294-34-5					1.6E+05		2.8E+07	1.6E+05
				4.0E-02	C	1.3E-02	C	V			1.36E+09		1		Boron Trifluoride	7637-07-2					3.1E+03		1.8E+07	3.1E+03
7.0E-01	I			4.0E-03	I						1.36E+09		1		Bromate	15541-45-4	9.9E+01			9.9E+01	3.1E+02			3.1E+02
				1.0E-04	X	6.0E-05	X	V		2.38E+03	1.36E+09	5.92E+03	1		Bromo-2-chloroethane, 1-	107-04-0					7.8E+00		3.7E-01	3.5E-01
				3.0E-04	X			V		8.96E+02	1.36E+09	1.12E+04	1		Bromo-3-fluorobenzene, 1-	1073-06-9					2.3E+01			2.3E+01
				3.0E-04	X			V		3.23E+02	1.36E+09	1.14E+04	1		Bromo-4-fluorobenzene, 1-	460-00-4					2.3E+01			2.3E+01

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Toxicity and Chemical-specific Information															Contaminant		Carcinogenic Target Risk (TR) = 1E-04				Noncancer Child Hazard Index (HI) = 1			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	GIABS	ABS_d	Analyte	CAS No.	Ingestion SL TR=1E-04 (mg/kg)	Dermal SL TR=1E-04 (mg/kg)	Inhalation SL TR=1E-04 (mg/kg)	Carcinogenic SL TR=1E-04 (mg/kg)	Ingestion SL Child THQ=1 (mg/kg)	Dermal SL Child THQ=1 (mg/kg)	Inhalation SL Child THQ=1 (mg/kg)	Noncarcinogenic SL Child THI=1 (mg/kg)
											1.36E+09		1	0.1	Bromoacetic acid	79-08-3								
				8.0E-03	I	6.0E-02	I	V		6.79E+02	1.36E+09	8.37E+03	1		Bromobenzene	108-86-1					6.3E+02		5.2E+02	2.9E+02
						4.0E-02	X	V		4.04E+03	1.36E+09	3.58E+03	1		Bromochloromethane	74-97-5							1.5E+02	1.5E+02
6.2E-02	I	3.7E-05	C	8.0E-03	P			V		9.32E+02	1.36E+09	3.97E+03	1		Bromodichloromethane	75-27-4	1.1E+03		3.0E+01	2.9E+01	6.3E+02			6.3E+02
7.9E-03	I	1.1E-06	I	2.0E-02	I			V		9.15E+02	1.36E+09	9.70E+03	1		Bromoform	75-25-2	8.8E+03		2.5E+03	1.9E+03	1.6E+03			1.6E+03
				1.4E-03	I	5.0E-03	I	V		3.59E+03	1.36E+09	1.40E+03	1		Bromomethane	74-83-9					1.1E+02		7.3E+00	6.8E+00
				5.0E-03	H			V			1.36E+09	1.24E+05	1		Bromophos	2104-96-3					3.9E+02			3.9E+02
						1.0E-01	A	V		9.66E+02	1.36E+09	2.14E+03	1		Bromopropane, 1-	106-94-5							2.2E+02	2.2E+02
1.0E-01	O			1.5E-02	O						1.36E+09		1	0.1	Bromoxynil	1689-84-5	6.7E+02	2.4E+03		5.3E+02	1.2E+03	4.9E+03		9.5E+02
1.0E-01	O			1.5E-02	O			V			1.36E+09	4.74E+05	1		Bromoxynil Octanoate	1689-99-2	6.7E+02			6.7E+02	1.2E+03			1.2E+03
6.0E-01	C	3.0E-05	I			2.0E-03	I	V		6.67E+02	1.36E+09	8.66E+02	1		Butadiene, 1,3-	106-99-0	1.2E+02		8.1E+00	7.6E+00			1.8E+00	1.8E+00
				1.0E-01	I			V		7.64E+03	1.36E+09	3.00E+04	1		Butanol, N-	71-36-3					7.8E+03			7.8E+03
5.0E-04	I			4.0E-01	I	5.0E+00	I	V			1.36E+09	2.87E+04	1		Butyl Alcohol, t-	75-65-0	1.4E+05			1.4E+05	3.1E+04		1.5E+05	2.6E+04
				2.0E+00	P	3.0E+01	P	V		2.13E+04	1.36E+09	2.92E+04	1		Butyl alcohol, sec-	78-92-2					1.6E+05		9.1E+05	1.3E+05
				5.0E-02	I			V			1.36E+09	8.63E+04	1		Butylate	2008-41-5					3.9E+03			3.9E+03
2.0E-04	C	5.7E-08	C								1.36E+09		1	0.1	Butylated hydroxyanisole	25013-16-5	3.5E+05	1.2E+06	6.7E+09	2.7E+05				
3.6E-03	P			3.0E-01	P						1.36E+09		1	0.1	Butylated hydroxytoluene	128-37-0	1.9E+04	6.9E+04		1.5E+04	2.3E+04	9.9E+04		1.9E+04
				5.0E-02	P			V		1.08E+02	1.36E+09	8.14E+03	1		Butylbenzene, n-	104-51-8					3.9E+03			3.9E+03
				1.0E-01	X			V		1.45E+02	1.36E+09	7.35E+03	1		Butylbenzene, sec-	135-98-8					7.8E+03			7.8E+03
				1.0E-01	X			V		1.83E+02	1.36E+09	7.36E+03	1		Butylbenzene, tert-	98-06-6					7.8E+03			7.8E+03
				2.0E-02	A						1.36E+09		1	0.1	Cacodylic Acid	75-60-5					1.6E+03	6.6E+03		1.3E+03
		1.8E-03	I	1.0E-04	A	1.0E-05	A				1.36E+09		0.025	0.001	Cadmium (Diet)	7440-43-9			2.1E+05	2.1E+05	7.8E+00	8.2E+01	1.4E+04	7.1E+00
		1.8E-03	I	1.0E-04	A	1.0E-05	A						0.05	0.001	Cadmium (Water)	7440-43-9								
				5.0E-01	I	2.2E-03	C				1.36E+09		1	0.1	Caprolactam	105-60-2					3.9E+04	1.6E+05	3.1E+06	3.1E+04
1.5E-01	C	4.3E-05	C	2.0E-03	I						1.36E+09		1	0.1	Captafol	2425-06-1	4.6E+02	1.6E+03	8.9E+06	3.6E+02	1.6E+02	6.6E+02		1.3E+02
2.3E-03	C	6.6E-07	C	1.3E-01	I						1.36E+09		1	0.1	Captan	133-06-2	3.0E+04	1.1E+05	5.8E+08	2.4E+04	1.0E+04	4.3E+04		8.2E+03
				1.0E-01	I						1.36E+09		1	0.1	Carbaryl	63-25-2					7.8E+03	3.3E+04		6.3E+03
				5.0E-03	I						1.36E+09		1	0.1	Carbofuran	1563-66-2					3.9E+02	1.6E+03		3.2E+02
				1.0E-01	I	7.0E-01	I	V		7.38E+02	1.36E+09	1.17E+03	1		Carbon Disulfide	75-15-0					7.8E+03		8.5E+02	7.7E+02
7.0E-02	I	6.0E-06	I	4.0E-03	I	1.0E-01	I	V		4.58E+02	1.36E+09	1.49E+03	1		Carbon Tetrachloride	56-23-5	9.9E+02		7.0E+01	6.5E+01	3.1E+02		1.6E+02	1.0E+02
						1.0E-01	P	V		5.89E+03	1.36E+09	6.46E+02	1		Carbonyl Sulfide	463-58-1							6.7E+01	6.7E+01
				1.0E-02	I						1.36E+09		1	0.1	Carbosulfan	55285-14-8					7.8E+02	3.3E+03		6.3E+02
				1.0E-01	I						1.36E+09		1	0.1	Carboxin	5234-68-4					7.8E+03	3.3E+04		6.3E+03
						9.0E-04	I				1.36E+09		1		Ceric oxide	1306-38-3							1.3E+06	1.3E+06
				1.0E-01	I			V			1.36E+09	1.45E+05	1		Chloral Hydrate	302-17-0					7.8E+03			7.8E+03
				1.5E-02	I						1.36E+09		1	0.1	Chloramben	133-90-4					1.2E+03	4.9E+03		9.5E+02
											1.36E+09		1	0.1	Chloramines, Organic	E701235								
4.0E-01	H										1.36E+09		1	0.1	Chloranil	118-75-2	1.7E+02	6.1E+02		1.3E+02				
				5.0E-04	G			V			1.36E+09	1.49E+06	1	0.04	Chlordane (alpha)	5103-71-9					3.9E+01	4.1E+02		3.6E+01
				5.0E-04	G			V			1.36E+09	1.49E+06	1	0.04	Chlordane (gamma)	5103-74-2					3.9E+01	4.1E+02		3.6E+01
3.5E-01	I	1.0E-04	I	5.0E-04	I	7.0E-04	I	V			1.36E+09	1.53E+06	1	0.04	Chlordane (technical mixture)	12789-03-6	2.0E+02	1.8E+03	4.3E+03	1.7E+02	3.9E+01	4.1E+02	1.1E+03	3.5E+01
1.0E+01	I	4.6E-03	C	3.0E-04	I						1.36E+09		1	0.1	Chlordecone (Kepone)	143-50-0	7.0E+00	2.5E+01	8.3E+04	5.4E+00	2.3E+01	9.9E+01		1.9E+01
				7.0E-04	A						1.36E+09		1	0.1	Chlorfenvinphos	470-90-6					5.5E+01	2.3E+02		4.4E+01
				9.0E-02	O						1.36E+09		1	0.1	Chlorimuron, Ethyl-	90982-32-4					7.0E+03	3.0E+04		5.7E+03
				1.0E-01	I	1.5E-04	A	V		2.78E+03	1.36E+09	1.22E+03	1		Chlorine	7782-50-5					7.8E+03		1.8E-01	1.8E-01
				3.0E-02	I	2.0E-04	I	V			1.36E+09		1		Chlorine Dioxide	10049-04-4					2.3E+03		2.8E+05	2.3E+03
				3.0E-02	I						1.36E+09		1		Chlorite (Sodium Salt)	7758-19-2					2.3E+03			2.3E+03
						5.0E+01	I	V		1.15E+03	1.36E+09	1.03E+03	1		Chloro-1,1-difluoroethane, 1-	75-68-3							5.4E+04	5.4E+04
		3.0E-04	I	2.0E-02	H	2.0E-02	I	V		7.86E+02	1.36E+09	1.08E+03	1		Chloro-1,3-butadiene, 2-	126-99-8			1.0E+00	1.0E+00	1.6E+03		2.2E+01	2.2E+01
4.6E-01	H										1.36E+09		1	0.1	Chloro-2-methylaniline HCl, 4-	3165-93-3	1.5E+02	5.4E+02		1.2E+02				
1.0E-01	P	7.7E-05	C	3.0E-03	X						1.36E+09		1	0.1	Chloro-2-methylaniline, 4-	95-69-2	7.0E+02	2.5E+03	5.0E+06	5.4E+02	2.3E+02	9.9E+02		1.9E+02
2.7E-01	X							V		1.18E+04	1.36E+09	1.62E+04	1		Chloroacetaldehyde, 2-	107-20-0	2.6E+02			2.6E+02				
											1.36E+09		1	0.1	Chloroacetic Acid	79-11-8								
						3.0E-05	I				1.36E+09		1	0.1	Chloroacetophenone, 2-	532-27-4							4.3E+04	4.3E+04
2.0E-01	P			5.0E-04	P						1.36E+09		1	0.1	Chloroaniline, p-	106-47-8	3.5E+02	1.2E+03		2.7E+02	3.9E+01	1.6E+02		3.2E+01
				2.0E-02	I	5.0E-02	P	V		7.61E+02	1.36E+09	6.45E+03	1		Chlorobenzene	108-90-7					1.6E+03		3.4E+02	2.8E+02
				1.0E-01	X						1.36E+09		1	0.1	Chlorobenzene sulfonic acid, p-	98-66-8					7.8E+03	3.3E+04		6.3E+03
1.1E-01	C	3.1E-05	C	2.0E-02	I						1.36E+09		1	0.1	Chlorobenzilate	510-15-6	6.3E+02	2.2E+03	1.2E+07	4.9E+02	1.6E+03	6.6E+03		1.3E+03
				3.0E-02	X						1.36E+09		1	0.1	Chlorobenzoic Acid, p-	74-11-3					2.3E+03	9.9E+03		1.9E+03
		8.6E-06	C	3.0E-03	P	3.0E-01	P	V		2.90E+02	1.36E+09	6.76E+03	1		Chlorobenzotrifluoride, 4-	98-56-6			2.2E+02	2.2E+02	2.3E+02		2.1E+03	2.1E+02
				4.0E-02	P			V		7.28E+02	1.36E+09	1.76E+03	1		Chlorobutane, 1-	109-69-3					3.1E+03			3.1E+03
						5.0E+01	I	V		1.68E+03	1.36E+09	9.38E+02	1		Chlorodifluoromethane	75-45-6							4.9E+04	4.9E+04
				2.0E-02	P			V		1.11E+05	1.36E+09	7.81E+04	1		Chloroethanol, 2-	107-07-3					1.6E+03			1.6E+03
3.1E-02	C	2.3E-05	I	1.0E-02	I	9.8E-02	A	V		2.54E+03	1.36E+09	2.63E+03	1		Chloroform	67-66-3	2.2E+03		3.2E+01	3.2E+01	7.8E+02		2.7E+02	2.0E+02
						9.0E-02	I	V		1.32E+03	1.36E+09	1.18E+03	1		Chloromethane	74-87-3							1.1E+02	1.1E+02
2.4E+00	C	6.9E-04	C					V		9.32E+03	1.36E+09	5.33E+03	1		Chloromethyl Methyl Ether	107-30-2	2.9E+01		2.2E+00	2.0E+00				
3.0E-01	P			3.0E-03	P	1.0E-05	X				1.36E+09		1	0.1	Chloronitrobenzene, o-	88-73-3	2.3E+02	8.2E+02		1.8E+02	2.3E+02	9.9E+02	1.4E+04	1.9E+02
6.0E-02	P			7.0E-04	P	2.0E-03	P				1.36E+09		1	0.1	Chloronitrobenzene, p-	100-00-5	1.2E+03	4.1E+03		9.0E+02	5.5E+01	2.3E+02	2.8E+06	4.4E+01
				5.0E-03	I			V		2.74E+04	1.36E+09	1.39E+05	1		Chlorophenol, 2-	95-57-8					3.9E+02			3.9E+02
						4.0E-04	C	V		6.17E+02	1.36E+09	4.68E+03	1		Chloropicrin	76-06-2							2.0E+00	2.0E+00
1.7E-02	C			1.5E-02	I						1.36E+09		1	0.1	Chlorothalonil	1897-45-6	4.1E+03	1.5E+04		3.2E+03	1.2E+03	4.9E+03		9.5E+02
				2.0E-02	I			V		9.07E+02	1.36E+09	8.12E+03	1		Chlorotoluene, o-	95-49-8					1.6E+03			1.6E+03
				2.0E-02	X			V		2.53E+02	1.36E+09	7.29E+03	1		Chlorotoluene, p-	106-43-4					1.6E+03			1.6E+03
2.4E+02	C	6.9E-02	C								1.36E+09		1	0.1	Chlorozotocin	54749-90-5	2.9E-01	1.0E+00	5.5E+03	2.3E-01				
				5.0E-03	O						1.36E+09		1	0.1	Chlorpropham	101-21-3					3.9E+02	1.6E+03		3.2E+02
				1.0E-03	A						1.36E+09		1	0.1	Chlorpyrifos	2921-88-2					7.8E+01	3.3E+02		6.3E+01
				1.0E-02	H						1.36E+09		1	0.1	Chlorpyrifos Methyl	5598-13-0					7.8E+02	3.3E+03		6.3E+02
				5.0E-02	O						1.36E+09		1	0.1	Chlorsulfuron	64902-72-3					3.9E+03	1.6E+04		3.2E+03

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Toxicity and Chemical-specific Information															Contaminant		Carcinogenic Target Risk (TR) = 1E-04				Noncancer Child Hazard Index (HI) = 1			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	GIABS	ABS_d	Analyte	CAS No.	Ingestion SL TR=1E-04 (mg/kg)	Dermal SL TR=1E-04 (mg/kg)	Inhalation SL TR=1E-04 (mg/kg)	Carcinogenic SL TR=1E-04 (mg/kg)	Ingestion SL Child THQ=1 (mg/kg)	Dermal SL Child THQ=1 (mg/kg)	Inhalation SL Child THQ=1 (mg/kg)	Noncarcinogenic SL Child THI=1 (mg/kg)
				1.0E-02	I						1.36E+09		1	0.1	Chlorthal-dimethyl	1861-32-1					7.8E+02	3.3E+03		6.3E+02
				8.0E-04	H						1.36E+09		1	0.1	Chlorthiophos	60238-56-4					6.3E+01	2.6E+02		5.1E+01
				1.5E+00	I						1.36E+09		0.013		Chromium(III), Insoluble Salts	16065-83-1					1.2E+05			1.2E+05
5.0E-01	C	8.4E-02	G	3.0E-03	I	1.0E-04	I		M		1.36E+09		0.025		Chromium(VI)	18540-29-9	3.1E+01		1.6E+03	3.0E+01	2.3E+02		1.4E+05	2.3E+02
											1.36E+09		0.013		Chromium, Total	7440-47-3								
				1.3E-02	I						1.36E+09		1	0.1	Clofentezine	74115-24-5					1.0E+03	4.3E+03		8.2E+02
		9.0E-03	P	3.0E-04	P	6.0E-06	P				1.36E+09		1		Cobalt	7440-48-4			4.2E+04	4.2E+04	2.3E+01		8.5E+03	2.3E+01
		6.2E-04	I					V	M				1		Coke Oven Emissions	E649830								
				4.0E-02	H						1.36E+09		1		Copper	7440-50-8					3.1E+03			3.1E+03
				5.0E-02	I	6.0E-01	C				1.36E+09		1	0.1	Cresol, m-	108-39-4					3.9E+03	1.6E+04	8.5E+08	3.2E+03
				5.0E-02	I	6.0E-01	C				1.36E+09		1	0.1	Cresol, o-	95-48-7					3.9E+03	1.6E+04	8.5E+08	3.2E+03
				2.0E-02	P	6.0E-01	C				1.36E+09		1	0.1	Cresol, p-	106-44-5					1.6E+03	6.6E+03	8.5E+08	1.3E+03
				1.0E-01	A						1.36E+09		1	0.1	Cresol, p-chloro-m-	59-50-7					7.8E+03	3.3E+04		6.3E+03
				1.0E-01	A	6.0E-01	C				1.36E+09		1	0.1	Cresols	1319-77-3					7.8E+03	3.3E+04	8.5E+08	6.3E+03
1.9E+00	H			1.0E-03	P			V		1.66E+04	1.36E+09	1.89E+04	1		Crotonaldehyde, trans-	123-73-9	3.7E+01			3.7E+01	7.8E+01			7.8E+01
				1.0E-01	I	4.0E-01	I	V		2.68E+02	1.36E+09	6.21E+03	1		Cumene	98-82-8					7.8E+03		2.6E+03	1.9E+03
2.2E-01	C	6.3E-05	C								1.36E+09		1	0.1	Cupferron	135-20-6	3.2E+02	1.1E+03	6.1E+06	2.5E+02				
8.4E-01	H			2.0E-03	H						1.36E+09		1	0.1	Cyanazine	21725-46-2	8.3E+01	2.9E+02		6.5E+01	1.6E+02	6.6E+02		1.3E+02
															Cyanides									
				1.0E-03	I						1.36E+09		1		~Calcium Cyanide	592-01-8					7.8E+01			7.8E+01
				5.0E-03	I						1.36E+09		1		~Copper Cyanide	544-92-3					3.9E+02			3.9E+02
				6.0E-04	I	8.0E-04	G	V		9.54E+05	1.36E+09	5.33E+04	1		~Cyanide (CN-)	57-12-5					4.7E+01		4.4E+01	2.3E+01
				1.0E-03	I			V			1.36E+09		1		~Cyanogen	460-19-5					7.8E+01			7.8E+01
				9.0E-02	I			V			1.36E+09		1		~Cyanogen Bromide	506-68-3					7.0E+03			7.0E+03
				5.0E-02	I			V			1.36E+09		1		~Cyanogen Chloride	506-77-4					3.9E+03			3.9E+03
				6.0E-04	I	8.0E-04	I	V		1.00E+07	1.36E+09	5.22E+04	1		~Hydrogen Cyanide	74-90-8					4.7E+01		4.4E+01	2.3E+01
				2.0E-03	I						1.36E+09		1		~Potassium Cyanide	151-50-8					1.6E+02			1.6E+02
				5.0E-03	I						1.36E+09		0.04		~Potassium Silver Cyanide	506-61-6					3.9E+02			3.9E+02
				1.0E-01	I						1.36E+09		0.04		~Silver Cyanide	506-64-9					7.8E+03			7.8E+03
				1.0E-03	I						1.36E+09		1		~Sodium Cyanide	143-33-9					7.8E+01			7.8E+01
				2.0E-04	P						1.36E+09		1		~Thiocyanates	E1790665					1.6E+01			1.6E+01
				2.0E-04	X			V			1.36E+09		1		~Thiocyanic Acid	463-56-9					1.6E+01			1.6E+01
				5.0E-02	I						1.36E+09		1		~Zinc Cyanide	557-21-1					3.9E+03			3.9E+03
						6.0E+00	I	V		1.17E+02	1.36E+09	1.04E+03	1		Cyclohexane	110-82-7							6.5E+03	6.5E+03
2.0E-02	X			2.0E-02	X						1.36E+09		1	0.1	Cyclohexane, 1,2,3,4,5-pentabromo-6-chloro-	87-84-3	3.5E+03	1.2E+04		2.7E+03	1.6E+03	6.6E+03		1.3E+03
				5.0E+00	I	7.0E-01	P	V		5.11E+03	1.36E+09	4.17E+04	1		Cyclohexanone	108-94-1					3.9E+05		3.0E+04	2.8E+04
				5.0E-03	P	1.0E+00	X	V		2.83E+02	1.36E+09	1.46E+03	1		Cyclohexene	110-83-8					3.9E+02		1.5E+03	3.1E+02
				2.0E-01	I			V		2.93E+05	1.36E+09	7.46E+04	1		Cyclohexylamine	108-91-8					1.6E+04			1.6E+04
				2.5E-02	I						1.36E+09		1	0.1	Cyfluthrin	68359-37-5					2.0E+03	8.2E+03		1.6E+03
				5.0E-01	O						1.36E+09		1	0.1	Cyromazine	66215-27-8					3.9E+04	1.6E+05		3.2E+04
2.4E-01	I	6.9E-05	C	5.0E-04	A						1.36E+09		1	0.1	DDD, p,p`- (DDD)	72-54-8	2.9E+02	1.0E+03	5.5E+06	2.3E+02	3.9E+01	1.6E+02		3.2E+01
3.4E-01	I	9.7E-05	C	5.0E-04	A			V			1.36E+09	2.10E+06	1		DDE, p,p'-	72-55-9	2.0E+02		6.1E+03	2.0E+02	3.9E+01			3.9E+01
3.4E-01	I	9.7E-05	I	5.0E-04	I						1.36E+09		1	0.03	DDT	50-29-3	2.0E+02	2.4E+03	3.9E+06	1.9E+02	3.9E+01	5.5E+02		3.7E+01
				3.0E-02	I						1.36E+09		1	0.1	Dalapon	75-99-0					2.3E+03	9.9E+03		1.9E+03
1.8E-02	C	5.1E-06	C	1.5E-01	I						1.36E+09		1	0.1	Daminozide	1596-84-5	3.9E+03	1.4E+04	7.5E+07	3.0E+03	1.2E+04	4.9E+04		9.5E+03
7.0E-04	I			7.0E-03	I						1.36E+09		1	0.1	Decabromodiphenyl ether, 2,2',3,3',4,4',5,5',6,6'- (BDE-209)	1163-19-5	9.9E+04	3.5E+05		7.8E+04	5.5E+02	2.3E+03		4.4E+02
				4.0E-05	I						1.36E+09		1	0.1	Demeton	8065-48-3					3.1E+00	1.3E+01		2.5E+00
1.2E-03	I			6.0E-01	I						1.36E+09		1	0.1	Di(2-ethylhexyl)adipate	103-23-1	5.8E+04	2.1E+05		4.5E+04	4.7E+04	2.0E+05		3.8E+04
6.1E-02	H										1.36E+09		1	0.1	Diallate	2303-16-4	1.1E+03	4.1E+03		8.9E+02				
				7.0E-04	A						1.36E+09		1	0.1	Diazinon	333-41-5					5.5E+01	2.3E+02		4.4E+01
8.0E-01	P	6.0E-03	P	2.0E-04	P	2.0E-04	I	V	M	9.79E+02	1.36E+09	3.20E+04	1		Dibromo-3-chloropropane, 1,2-	96-12-8	1.9E+01		5.4E-01	5.3E-01	1.6E+01		6.7E+00	4.7E+00
											1.36E+09		1	0.1	Dibromoacetic acid	631-64-1								
				4.0E-04	X			V		1.59E+02	1.36E+09	1.93E+04	1		Dibromobenzene, 1,3-	108-36-1					3.1E+01			3.1E+01
				1.0E-02	I			V			1.36E+09	2.20E+04	1		Dibromobenzene, 1,4-	106-37-6					7.8E+02			7.8E+02
8.4E-02	I			2.0E-02	I			V		8.02E+02	1.36E+09	7.95E+03	1		Dibromochloromethane	124-48-1	8.3E+02			8.3E+02	1.6E+03			1.6E+03
2.0E+00	I	6.0E-04	I	9.0E-03	I	9.0E-03	I	V		1.34E+03	1.36E+09	8.64E+03	1		Dibromoethane, 1,2-	106-93-4	3.5E+01		4.0E+00	3.6E+00	7.0E+02		8.1E+01	7.3E+01
						4.0E-03	X	V		2.82E+03	1.36E+09	5.64E+03	1		Dibromomethane (Methylene Bromide)	74-95-3							2.4E+01	2.4E+01
				3.0E-04	P						1.36E+09		1	0.1	Dibutyltin Compounds	E1790661					2.3E+01	9.9E+01		1.9E+01
				3.0E-02	I						1.36E+09		1	0.1	Dicamba	1918-00-9					2.3E+03	9.9E+03		1.9E+03
											1.36E+09		1	0.1	Dichloramine	3400-09-7								
		4.2E-03	P					V		5.54E+02	1.36E+09	3.21E+03	1		Dichloro-2-butene, 1,4-	764-41-0			2.1E-01	2.1E-01				
		4.2E-03	P					V		5.19E+02	1.36E+09	1.11E+04	1		Dichloro-2-butene, cis-1,4-	1476-11-5			7.4E-01	7.4E-01				
		4.2E-03	P					V		7.60E+02	1.36E+09	1.11E+04	1		Dichloro-2-butene, trans-1,4-	110-57-6			7.4E-01	7.4E-01				
5.0E-02	I			4.0E-03	I						1.36E+09		1	0.1	Dichloroacetic Acid	79-43-6	1.4E+03	4.9E+03		1.1E+03	3.1E+02	1.3E+03		2.5E+02
				9.0E-02	I	2.0E-01	H	V		3.76E+02	1.36E+09	1.17E+04	1		Dichlorobenzene, 1,2-	95-50-1					7.0E+03		2.4E+03	1.8E+03
5.4E-03	C	1.1E-05	C	7.0E-02	A	8.0E-01	I	V			1.36E+09	1.04E+04	1		Dichlorobenzene, 1,4-	106-46-7	1.3E+04		2.7E+02	2.6E+02	5.5E+03		8.7E+03	3.4E+03
4.5E-01	I	3.4E-04	C								1.36E+09		1	0.1	Dichlorobenzidine, 3,3'-	91-94-1	1.5E+02	5.5E+02	1.1E+06	1.2E+02				
				9.0E-03	X						1.36E+09		1	0.1	Dichlorobenzophenone, 4,4'-	90-98-2					7.0E+02	3.0E+03		5.7E+02
				2.0E-01	I	1.0E-01	X	V		8.45E+02	1.36E+09	8.41E+02	1		Dichlorodifluoromethane	75-71-8					1.6E+04		8.8E+01	8.7E+01
5.7E-03	C	1.6E-06	C	2.0E-01	P			V		1.69E+03	1.36E+09	2.08E+03	1		Dichloroethane, 1,1-	75-34-3	1.2E+04		3.7E+02	3.6E+02	1.6E+04			1.6E+04
9.1E-02	I	2.6E-05	I	6.0E-03	X	7.0E-03	P	V		2.98E+03	1.36E+09	4.57E+03	1		Dichloroethane, 1,2-	107-06-2	7.6E+02		4.9E+01	4.6E+01	4.7E+02		3.3E+01	3.1E+01
				5.0E-02	I	2.0E-01	I	V		1.19E+03	1.36E+09	1.16E+03	1		Dichloroethylene, 1,1-	75-35-4					3.9E+03		2.4E+02	2.3E+02
				2.0E-03	I	4.0E-02	X	V		2.37E+03	1.36E+09	2.50E+03	1		Dichloroethylene, cis-1,2-	156-59-2					1.6E+02		1.0E+02	6.3E+01
				2.0E-02	I	4.0E-02	X	V		1.85E+03	1.36E+09	1.75E+03	1		Dichloroethylene, trans-1,2-	156-60-5					1.6E+03		7.3E+01	7.0E+01
				3.0E-03	I						1.36E+09		1	0.1	Dichlorophenol, 2,4-	120-83-2					2.3E+02	9.9E+02		1.9E+02
				1.0E-02	I						1.36E+09		1	0.05	Dichlorophenoxy Acetic Acid, 2,4-	94-75-7					7.8E+02	6.6E+03		7.0E+02
3.7E-02	P	3.7E-06	P	4.0E-02	P	4.0E-03	I	V		1.36E+03	1.36E+09	3.79E+03	1		Dichloropropane, 1,2-	78-87-5	1.9E+03		2.9E+02	2.5E+02	3.1E+03		1.6E+01	1.6E+01
				2.0E-02	P			V		1.49E+03	1.36E+09	6.76E+03	1		Dichloropropane, 1,3-	142-28-9					1.6E+03			1.6E+03

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Toxicity and Chemical-specific Information															Contaminant		Carcinogenic Target Risk (TR) = 1E-04				Noncancer Child Hazard Index (HI) = 1			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	GIABS	ABS_d	Analyte	CAS No.	Ingestion SL TR=1E-04 (mg/kg)	Dermal SL TR=1E-04 (mg/kg)	Inhalation SL TR=1E-04 (mg/kg)	Carcinogenic SL TR=1E-04 (mg/kg)	Ingestion SL Child THQ=1 (mg/kg)	Dermal SL Child THQ=1 (mg/kg)	Inhalation SL Child THQ=1 (mg/kg)	Noncarcinogenic SL Child THI=1 (mg/kg)
				3.0E-03	I						1.36E+09		1	0.1	Dichloropropanol, 2,3-	616-23-9					2.3E+02	9.9E+02		1.9E+02
1.0E-01	I	4.0E-06	I	3.0E-02	I	2.0E-02	I	V		1.57E+03	1.36E+09	3.55E+03	1		Dichloropropene, 1,3-	542-75-6	7.0E+02		2.5E+02	1.8E+02	2.3E+03		7.4E+01	7.2E+01
2.9E-01	I	8.3E-05	C	5.0E-04	I	5.0E-04	I				1.36E+09		1	0.1	Dichlorvos	62-73-7	2.4E+02	8.5E+02	4.6E+06	1.9E+02	3.9E+01	1.6E+02	7.1E+05	3.2E+01
				3.0E-05	O						1.36E+09		1	0.1	Dicrotophos	141-66-2					2.3E+00	9.9E+00		1.9E+00
				8.0E-02	P	3.0E-04	X	V		2.56E+02	1.36E+09	4.11E+03	1		Dicyclopentadiene	77-73-6					6.3E+03		1.3E+00	1.3E+00
1.6E+01	I	4.6E-03	I	5.0E-05	I						1.36E+09		1	0.1	Dieldrin	60-57-1	4.3E+00	1.5E+01	8.3E+04	3.4E+00	3.9E+00	1.6E+01		3.2E+00
		3.0E-04	C			5.0E-03	I						1	0.1	Diesel Engine Exhaust	E17136615								
				2.0E-03	P	2.0E-04	P				1.36E+09		1	0.1	Diethanolamine	111-42-2					1.6E+02	6.6E+02	2.8E+05	1.3E+02
				3.0E-02	P	1.0E-04	P				1.36E+09		1	0.1	Diethylene Glycol Monobutyl Ether	112-34-5					2.3E+03	9.9E+03	1.4E+05	1.9E+03
				6.0E-02	P	3.0E-04	P				1.36E+09		1	0.1	Diethylene Glycol Monoethyl Ether	111-90-0					4.7E+03	2.0E+04	4.3E+05	3.8E+03
				1.0E-03	P			V		1.12E+05	1.36E+09	1.39E+05	1		Diethylformamide	617-84-5					7.8E+01			7.8E+01
3.5E+02	C	1.0E-01	C								1.36E+09		1	0.1	Diethylstilbestrol	56-53-1	2.0E-01	7.1E-01	3.8E+03	1.6E-01				
				8.3E-02	O						1.36E+09		1	0.1	Difenzoquat	43222-48-6					6.5E+03	2.7E+04		5.2E+03
				2.0E-02	I						1.36E+09		1	0.1	Diflubenzuron	35367-38-5					1.6E+03	6.6E+03		1.3E+03
						4.0E+01	I	V		1.43E+03	1.36E+09	1.15E+03	1		Difluoroethane, 1,1-	75-37-6							4.8E+04	4.8E+04
						3.0E+01	X	V		6.91E+02	1.36E+09	7.58E+02	1		Difluoropropane, 2,2-	420-45-1							2.4E+04	2.4E+04
4.4E-02	C	1.3E-05	C					V			1.36E+09	1.23E+05	1		Dihydrosafrole	94-58-6	1.6E+03		2.7E+03	9.9E+02				
						7.0E-01	P	V		2.26E+03	1.36E+09	3.06E+03	1		Diisopropyl Ether	108-20-3							2.2E+03	2.2E+03
				8.0E-02	I			V		5.30E+02	1.36E+09	3.81E+04	1		Diisopropyl Methylphosphonate	1445-75-6					6.3E+03			6.3E+03
				2.2E-02	O						1.36E+09		1	0.1	Dimethipin	55290-64-7					1.7E+03	7.2E+03		1.4E+03
				2.2E-03	O						1.36E+09		1	0.1	Dimethoate	60-51-5					1.7E+02	7.3E+02		1.4E+02
1.6E+00	P										1.36E+09		1	0.1	Dimethoxybenzidine, 3,3'-	119-90-4	4.3E+01	1.5E+02		3.4E+01				
1.7E-03	P			6.0E-02	P						1.36E+09		1	0.1	Dimethyl methylphosphonate	756-79-6	4.1E+04	1.5E+05		3.2E+04	4.7E+03	2.0E+04		3.8E+03
4.6E+00	C	1.3E-03	C								1.36E+09		1	0.1	Dimethylamino azobenzene [p-]	60-11-7	1.5E+01	5.4E+01	2.9E+05	1.2E+01				
5.8E-01	H										1.36E+09		1	0.1	Dimethylaniline HCl, 2,4-	21436-96-4	1.2E+02	4.3E+02		9.4E+01				
2.0E-01	P			2.0E-03	X						1.36E+09		1	0.1	Dimethylaniline, 2,4-	95-68-1	3.5E+02	1.2E+03		2.7E+02	1.6E+02	6.6E+02		1.3E+02
2.7E-02	P			2.0E-03	I			V		8.30E+02	1.36E+09	3.13E+04	1		Dimethylaniline, N,N-	121-69-7	2.6E+03			2.6E+03	1.6E+02			1.6E+02
1.1E+01	P										1.36E+09		1	0.1	Dimethylbenzidine, 3,3'-	119-93-7	6.3E+00	2.2E+01		4.9E+00				
				1.0E-01	P	3.0E-02	I	V		1.06E+05	1.36E+09	1.28E+05	1		Dimethylformamide	68-12-2					7.8E+03		4.0E+03	2.6E+03
				1.0E-04	X	2.0E-06	X	V		1.72E+05	1.36E+09	2.77E+04	1		Dimethylhydrazine, 1,1-	57-14-7					7.8E+00		5.8E-02	5.7E-02
5.5E+02	C	1.6E-01	C					V		1.89E+05	1.36E+09	1.68E+05	1		Dimethylhydrazine, 1,2-	540-73-8	1.3E-01		2.9E-01	8.8E-02				
				2.0E-02	I						1.36E+09		1	0.1	Dimethylphenol, 2,4-	105-67-9					1.6E+03	6.6E+03		1.3E+03
				6.0E-04	I						1.36E+09		1	0.1	Dimethylphenol, 2,6-	576-26-1					4.7E+01	2.0E+02		3.8E+01
				1.0E-03	I						1.36E+09		1	0.1	Dimethylphenol, 3,4-	95-65-8					7.8E+01	3.3E+02		6.3E+01
4.5E-02	C	1.3E-05	C					V		4.73E+02	1.36E+09	5.48E+03	1		Dimethylvinylchloride	513-37-1	1.5E+03		1.2E+02	1.1E+02				
				8.0E-05	X						1.36E+09		1	0.1	Dinitro-o-cresol, 4,6-	534-52-1					6.3E+00	2.6E+01		5.1E+00
				2.0E-03	I						1.36E+09		1	0.1	Dinitro-o-cyclohexyl Phenol, 4,6-	131-89-5					1.6E+02	6.6E+02		1.3E+02
				4.0E-04	X	2.0E-03	X				1.36E+09		1	0.1	Dinitroaniline, 3,5-	618-87-1					3.1E+01	1.3E+02	2.8E+06	2.5E+01
				1.0E-04	P						1.36E+09		1	0.1	Dinitrobenzene, 1,2-	528-29-0					7.8E+00	3.3E+01		6.3E+00
				1.0E-04	I						1.36E+09		1	0.1	Dinitrobenzene, 1,3-	99-65-0					7.8E+00	3.3E+01		6.3E+00
				1.0E-04	P						1.36E+09		1	0.1	Dinitrobenzene, 1,4-	100-25-4					7.8E+00	3.3E+01		6.3E+00
				2.0E-03	I						1.36E+09		1	0.1	Dinitrophenol, 2,4-	51-28-5					1.6E+02	6.6E+02		1.3E+02
6.8E-01	I										1.36E+09		1	0.1	Dinitrotoluene Mixture, 2,4/2,6-	E1615210	1.0E+02	3.6E+02		8.0E+01				
3.1E-01	C	8.9E-05	C	2.0E-03	I						1.36E+09		1	0.102	Dinitrotoluene, 2,4-	121-14-2	2.2E+02	7.8E+02	4.3E+06	1.7E+02	1.6E+02	6.5E+02		1.3E+02
1.5E+00	P			3.0E-04	X						1.36E+09		1	0.099	Dinitrotoluene, 2,6-	606-20-2	4.6E+01	1.7E+02		3.6E+01	2.3E+01	1.0E+02		1.9E+01
				1.0E-04	X						1.36E+09		1	0.006	Dinitrotoluene, 2-Amino-4,6-	35572-78-2					7.8E+00	5.5E+02		7.7E+00
				1.0E-04	X						1.36E+09		1	0.009	Dinitrotoluene, 4-Amino-2,6-	19406-51-0					7.8E+00	3.7E+02		7.7E+00
4.5E-01	X			9.0E-04	X						1.36E+09		1	0.1	Dinitrotoluene, Technical grade	25321-14-6	1.5E+02	5.5E+02		1.2E+02	7.0E+01	3.0E+02		5.7E+01
				1.0E-03	I						1.36E+09		1	0.1	Dinoseb	88-85-7					7.8E+01	3.3E+02		6.3E+01
1.0E-01	I	5.0E-06	I	3.0E-02	I	3.0E-02	I	V		1.16E+05	1.36E+09	3.96E+04	1		Dioxane, 1,4-	123-91-1	7.0E+02		2.2E+03	5.3E+02	2.3E+03		1.2E+03	8.1E+02
															Dioxins									
6.2E+03	I	1.3E+00	I								1.36E+09		1	0.03	~Hexachlorodibenzo-p-dioxin, Mixture	34465-46-8	1.1E-02	1.3E-01	2.9E+02	1.0E-02				
1.3E+05	C	3.8E+01	C	7.0E-10	I	4.0E-08	C	V			1.36E+09	1.96E+06	1	0.03	~TCDD, 2,3,7,8-	1746-01-6	5.3E-04	6.3E-03	1.4E-02	4.8E-04	5.5E-05	7.7E-04	8.2E-02	5.1E-05
				3.0E-02	I						1.36E+09		1	0.1	Diphenamid	957-51-7					2.3E+03	9.9E+03		1.9E+03
						4.0E-04	X	V			1.36E+09	8.06E+04	1		Diphenyl Ether	101-84-8							3.4E+01	3.4E+01
				8.0E-04	X						1.36E+09		1	0.1	Diphenyl Sulfone	127-63-9					6.3E+01	2.6E+02		5.1E+01
				1.0E-01	O						1.36E+09		1	0.1	Diphenylamine	122-39-4					7.8E+03	3.3E+04		6.3E+03
8.0E-01	I	2.2E-04	I								1.36E+09		1	0.1	Diphenylhydrazine, 1,2-	122-66-7	8.7E+01	3.1E+02	1.7E+06	6.8E+01				
				2.2E-03	I						1.36E+09		1	0.1	Diquat	2764-72-9					1.7E+02	7.3E+02		1.4E+02
7.4E+00	C	2.1E-03	C								1.36E+09		1	0.1	Direct Black 38	1937-37-7	9.4E+00	3.3E+01	1.8E+05	7.3E+00				
7.4E+00	C	2.1E-03	C								1.36E+09		1	0.1	Direct Blue 6	2602-46-2	9.4E+00	3.3E+01	1.8E+05	7.3E+00				
6.7E+00	C	1.9E-03	C								1.36E+09		1	0.1	Direct Brown 95	16071-86-6	1.0E+01	3.7E+01	2.0E+05	8.1E+00				
				4.0E-05	I						1.36E+09		1	0.1	Disulfoton	298-04-4					3.1E+00	1.3E+01		2.5E+00
				1.0E-02	I			V			1.36E+09	4.54E+04	1		Dithiane, 1,4-	505-29-3					7.8E+02			7.8E+02
				2.0E-03	I						1.36E+09		1	0.1	Diuron	330-54-1					1.6E+02	6.6E+02		1.3E+02
				2.0E-02	O						1.36E+09		1	0.1	Dodine	2439-10-3					1.6E+03	6.6E+03		1.3E+03
				5.0E-02	O			V			1.36E+09	1.17E+05	1		EPTC	759-94-4					3.9E+03			3.9E+03
				6.0E-03	I			V			1.36E+09	4.10E+05	1		Endosulfan	115-29-7					4.7E+02			4.7E+02
				6.0E-03	P						1.36E+09		1	0.1	Endosulfan Sulfate	1031-07-8					4.7E+02	2.0E+03		3.8E+02
				2.0E-02	I						1.36E+09		1	0.1	Endothall	145-73-3					1.6E+03	6.6E+03		1.3E+03
				3.0E-04	I						1.36E+09		1	0.1	Endrin	72-20-8					2.3E+01	9.9E+01		1.9E+01
9.9E-03	I	1.2E-06	I	6.0E-03	P	1.0E-03	I	V		1.05E+04	1.36E+09	1.89E+04	1		Epichlorohydrin	106-89-8	7.0E+03		4.4E+03	2.7E+03	4.7E+02		2.0E+01	1.9E+01
						2.0E-02	I	V		1.53E+04	1.36E+09	7.66E+03	1		Epoxybutane, 1,2-	106-88-7							1.6E+02	1.6E+02
				4.0E-02	P						1.36E+09		1	0.1	Ethanol, 2-(2-methoxyethoxy)-	111-77-3					3.1E+03	1.3E+04		2.5E+03
				5.0E-03	I						1.36E+09		1	0.1	Ethephon	16672-87-0					3.9E+02	1.6E+03		3.2E+02
				5.0E-04	I						1.36E+09		1	0.1	Ethion	563-12-2					3.9E+01	1.6E+02		3.2E+01
				1.0E-01	P	6.0E-02	P	V		2.38E+04	1.36E+09	6.15E+04	1		Ethoxyethanol Acetate, 2-	111-15-9					7.8E+03		3.8E+03	2.6E+03
				9.0E-02	P	4.0E-02	P	V		1.06E+05	1.36E+09	9.84E+04	1		Ethoxyethanol, 2-	110-80-5					7.0E+03		4.1E+03	2.6E+03

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Toxicity and Chemical-specific Information															Contaminant		Carcinogenic Target Risk (TR) = 1E-04				Noncancer Child Hazard Index (HI) = 1			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	GIABS	ABS_d	Analyte	CAS No.	Ingestion SL TR=1E-04 (mg/kg)	Dermal SL TR=1E-04 (mg/kg)	Inhalation SL TR=1E-04 (mg/kg)	Carcinogenic SL TR=1E-04 (mg/kg)	Ingestion SL Child THQ=1 (mg/kg)	Dermal SL Child THQ=1 (mg/kg)	Inhalation SL Child THQ=1 (mg/kg)	Noncarcinogenic SL Child THI=1 (mg/kg)
				7.0E-01	P	7.0E-02	P	V		1.08E+04	1.36E+09	8.62E+03	1		Ethyl Acetate	141-78-6					5.5E+04		6.3E+02	6.2E+02
				5.0E-03	P	8.0E-03	P	V		2.50E+03	1.36E+09	6.34E+03	1		Ethyl Acrylate	140-88-5					3.9E+02		5.3E+01	4.7E+01
						4.0E+00	P	V		2.12E+03	1.36E+09	1.29E+03	1		Ethyl Chloride (Chloroethane)	75-00-3							5.4E+03	5.4E+03
				2.0E-01	I			V		1.01E+04	1.36E+09	3.12E+03	1		Ethyl Ether	60-29-7					1.6E+04			1.6E+04
						3.0E-01	P	V		1.10E+03	1.36E+09	5.77E+03	1		Ethyl Methacrylate	97-63-2							1.8E+03	1.8E+03
		8.0E-08	I	1.0E+00	I	4.0E+01	I	V		2.87E+03	1.36E+09	3.67E+03	1		Ethyl Tertiary Butyl Ether (ETBE)	637-92-3			1.3E+04	1.3E+04	7.8E+04		1.5E+05	5.2E+04
				1.0E-05	I						1.36E+09		1	0.1	Ethyl-p-nitrophenyl Phosphonate	2104-64-5					7.8E-01	3.3E+00		6.3E-01
1.1E-02	C	2.5E-06	C	5.0E-02	P	1.0E+00	I	V		4.80E+02	1.36E+09	5.67E+03	1		Ethylbenzene	100-41-4	6.3E+03		6.4E+02	5.8E+02	3.9E+03		5.9E+03	2.4E+03
				7.0E-02	P						1.36E+09		1	0.1	Ethylene Cyanohydrin	109-78-4					5.5E+03	2.3E+04		4.4E+03
				9.0E-02	P			V		1.89E+05	1.36E+09	1.80E+05	1		Ethylene Diamine	107-15-3					7.0E+03			7.0E+03
				8.0E-01	A	4.0E-01	C				1.36E+09		1	0.1	Ethylene Glycol	107-21-1					6.3E+04	2.6E+05	5.7E+08	5.1E+04
				1.0E-01	I	1.6E+00	I				1.36E+09		1	0.1	Ethylene Glycol Monobutyl Ether	111-76-2					7.8E+03	3.3E+04	2.3E+09	6.3E+03
3.1E-01	C	3.0E-03	I			3.0E-02	C	V	M	1.21E+05	1.36E+09	6.09E+03	1		Ethylene Oxide	75-21-8	4.9E+01		2.1E-01	2.0E-01			1.9E+02	1.9E+02
4.5E-02	C	1.3E-05	C	8.0E-05	I						1.36E+09		1	0.1	Ethylene Thiourea	96-45-7	1.5E+03	5.5E+03	2.9E+07	1.2E+03	6.3E+00	2.6E+01		5.1E+00
6.5E+01	C	1.9E-02	C					V		1.54E+05	1.36E+09	2.39E+04	1		Ethyleneimine	151-56-4	1.1E+00		3.5E-01	2.7E-01				
				3.0E+00	I						1.36E+09		1	0.1	Ethylphthalyl Ethyl Glycolate	84-72-0					2.3E+05	9.9E+05		1.9E+05
				2.5E-04	I						1.36E+09		1	0.1	Fenamiphos	22224-92-6					2.0E+01	8.2E+01		1.6E+01
				2.5E-02	I						1.36E+09		1	0.1	Fenpropathrin	39515-41-8					2.0E+03	8.2E+03		1.6E+03
				2.5E-02	I						1.36E+09		1	0.1	Fenvalerate	51630-58-1					2.0E+03	8.2E+03		1.6E+03
				1.3E-02	I						1.36E+09		1	0.1	Fluometuron	2164-17-2					1.0E+03	4.3E+03		8.2E+02
				4.0E-02	C	1.3E-02	C				1.36E+09		1		Fluoride	16984-48-8					3.1E+03		1.8E+07	3.1E+03
				6.0E-02	I	1.3E-02	C				1.36E+09		1		Fluorine (Soluble Fluoride)	7782-41-4					4.7E+03		1.8E+07	4.7E+03
				8.0E-02	I						1.36E+09		1	0.1	Fluridone	59756-60-4					6.3E+03	2.6E+04		5.1E+03
				4.0E-02	O						1.36E+09		1	0.1	Flurprimidol	56425-91-3					3.1E+03	1.3E+04		2.5E+03
				2.0E-03	O						1.36E+09		1	0.1	Flusilazole	85509-19-9					1.6E+02	6.6E+02		1.3E+02
				5.0E-01	O						1.36E+09		1	0.1	Flutolanil	66332-96-5					3.9E+04	1.6E+05		3.2E+04
				1.0E-02	I						1.36E+09		1	0.1	Fluvalinate	69409-94-5					7.8E+02	3.3E+03		6.3E+02
				9.0E-02	O						1.36E+09		1	0.1	Folpet	133-07-3					7.0E+03	3.0E+04		5.7E+03
				1.0E-02	O						1.36E+09		1	0.1	Fomesafen	72178-02-0					7.8E+02	3.3E+03		6.3E+02
				2.0E-03	I						1.36E+09		1	0.1	Fonofos	944-22-9					1.6E+02	6.6E+02		1.3E+02
2.1E-02	C	1.3E-05	I	2.0E-01	I	9.8E-03	A	V		4.24E+04	1.36E+09	7.77E+04	1		Formaldehyde	50-00-0	3.3E+03		1.7E+03	1.1E+03	1.6E+04		8.0E+02	7.6E+02
				9.0E-01	P	3.0E-04	X	V		1.06E+05	1.36E+09	9.30E+04	1		Formic Acid	64-18-6					7.0E+04		2.9E+01	2.9E+01
				2.5E+00	O						1.36E+09		1	0.1	Fosetyl-AL	39148-24-8					2.0E+05	8.2E+05		1.6E+05
															Furans									
				1.0E-03	X			V			1.36E+09	1.56E+05	1		~Dibenzofuran	132-64-9					7.8E+01			7.8E+01
				1.0E-03	I			V		6.22E+03	1.36E+09	2.62E+03	1		~Furan	110-00-9					7.8E+01			7.8E+01
				9.0E-01	I	2.0E+00	I	V		1.65E+05	1.36E+09	1.20E+04	1		~Tetrahydrofuran	109-99-9					7.0E+04		2.5E+04	1.8E+04
3.8E+00	H										1.36E+09		1	0.1	Furazolidone	67-45-8	1.8E+01	6.5E+01		1.4E+01				
				3.0E-03	I	5.0E-02	H	V		1.01E+04	1.36E+09	4.86E+04	1		Furfural	98-01-1					2.3E+02		2.5E+03	2.1E+02
1.5E+00	C	4.3E-04	C								1.36E+09		1	0.1	Furium	531-82-8	4.6E+01	1.6E+02	8.9E+05	3.6E+01				
3.0E-02	I	8.6E-06	C								1.36E+09		1	0.1	Furmecyclox	60568-05-0	2.3E+03	8.2E+03	4.4E+07	1.8E+03				
				6.0E-03	O						1.36E+09		1	0.1	Glufosinate, Ammonium	77182-82-2					4.7E+02	2.0E+03		3.8E+02
				1.0E-01	A	8.0E-05	C				1.36E+09		1	0.1	Glutaraldehyde	111-30-8					7.8E+03	3.3E+04	1.1E+05	6.0E+03
				4.0E-04	I	1.0E-03	X	V		1.06E+05	1.36E+09	8.43E+04	1		Glycidaldehyde	765-34-4					3.1E+01		8.8E+01	2.3E+01
				1.0E-01	I						1.36E+09		1	0.1	Glyphosate	1071-83-6					7.8E+03	3.3E+04		6.3E+03
				1.0E-02	X			V			1.36E+09	1.45E+05	1		Guanidine	113-00-8					7.8E+02			7.8E+02
				2.0E-02	P						1.36E+09		1	0.1	Guanidine Chloride	50-01-1					1.6E+03	6.6E+03		1.3E+03
				3.0E-02	X						1.36E+09		1	0.1	Guanidine Nitrate	506-93-4					2.3E+03	9.9E+03		1.9E+03
				5.0E-05	I						1.36E+09		1	0.1	Haloxyfop, Methyl	69806-40-2					3.9E+00	1.6E+01		3.2E+00
4.5E+00	I	1.3E-03	I	1.0E-04	A			V			1.36E+09	4.79E+05	1		Heptachlor	76-44-8	1.5E+01		1.0E+02	1.3E+01	7.8E+00			7.8E+00
9.1E+00	I	2.6E-03	I	1.3E-05	I			V			1.36E+09	8.43E+05	1		Heptachlor Epoxide	1024-57-3	7.6E+00		9.1E+01	7.0E+00	1.0E+00			1.0E+00
						3.0E-03	X	V		2.09E+02	1.36E+09	7.80E+03	1		Heptanal, n-	111-71-7							2.4E+01	2.4E+01
				3.0E-04	X	4.0E-01	P	V		5.79E+01	1.36E+09	8.95E+02	1		Heptane, N-	142-82-5					2.3E+01		3.7E+02	2.2E+01
				2.0E-03	I			V			1.36E+09	3.80E+05	1		Hexabromobenzene	87-82-1					1.6E+02			1.6E+02
				2.0E-04	I						1.36E+09		1	0.1	Hexabromodiphenyl ether, 2,2',4,4',5,5'- (BDE-153)	68631-49-2					1.6E+01	6.6E+01		1.3E+01
1.6E+00	I	4.6E-04	I	1.0E-05	P			V			1.36E+09	6.80E+04	1		Hexachlorobenzene	118-74-1	4.3E+01		4.1E+01	2.1E+01	7.8E-01			7.8E-01
7.8E-02	I	2.2E-05	I	1.0E-03	P			V		1.68E+01	1.36E+09	1.08E+04	1		Hexachlorobutadiene	87-68-3	8.9E+02		1.4E+02	1.2E+02	7.8E+01			7.8E+01
6.3E+00	I	1.8E-03	I	8.0E-03	A						1.36E+09		1	0.1	Hexachlorocyclohexane, Alpha-	319-84-6	1.1E+01	3.9E+01	2.1E+05	8.6E+00	6.3E+02	2.6E+03		5.1E+02
1.8E+00	I	5.3E-04	I								1.36E+09		1	0.1	Hexachlorocyclohexane, Beta-	319-85-7	3.9E+01	1.4E+02	7.2E+05	3.0E+01				
1.1E+00	C	3.1E-04	C	1.0E-05	A						1.36E+09		1	0.04	Hexachlorocyclohexane, Gamma- (Lindane)	58-89-9	6.3E+01	5.6E+02	1.2E+06	5.7E+01	7.8E-01	8.2E+00		7.1E-01
1.8E+00	I	5.1E-04	I								1.36E+09		1	0.1	Hexachlorocyclohexane, Technical	608-73-1	3.9E+01	1.4E+02	7.5E+05	3.0E+01				
				6.0E-03	I	2.0E-04	I	V		1.57E+01	1.36E+09	8.51E+03	1		Hexachlorocyclopentadiene	77-47-4					4.7E+02		1.8E+00	1.8E+00
4.0E-02	I	1.1E-05	C	7.0E-04	I	3.0E-02	I	V			1.36E+09	8.01E+03	1		Hexachloroethane	67-72-1	1.7E+03		2.0E+02	1.8E+02	5.5E+01		2.5E+02	4.5E+01
				3.0E-04	I						1.36E+09		1	0.1	Hexachlorophene	70-30-4					2.3E+01	9.9E+01		1.9E+01
8.0E-02	I			4.0E-03	I						1.36E+09		1	0.015	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	8.7E+02	2.1E+04		8.3E+02	3.1E+02	8.8E+03		3.0E+02
						1.0E-05	I	V		3.39E+03	1.36E+09	3.00E+05	1		Hexamethylene Diisocyanate, 1,6-	822-06-0							3.1E+00	3.1E+00
						4.0E-04	C				1.36E+09		1	0.1	Hexamethylene diisocyanate biuret	4035-89-6							5.7E+05	5.7E+05
						4.0E-04	C				1.36E+09		1	0.1	Hexamethylene diisocyanate isocyanurate	3779-63-3							5.7E+05	5.7E+05
				4.0E-04	P						1.36E+09		1	0.1	Hexamethylphosphoramide	680-31-9					3.1E+01	1.3E+02		2.5E+01
		2.0E-07	X			6.0E-01	P	V		1.41E+02	1.36E+09	8.29E+02	1		Hexane, Commercial	E5241997			1.2E+03	1.2E+03			5.2E+02	5.2E+02
						7.0E-01	I	V		1.41E+02	1.36E+09	8.29E+02	1		Hexane, N-	110-54-3							6.1E+02	6.1E+02
				2.0E+00	P						1.36E+09		1	0.1	Hexanedioic Acid	124-04-9					1.6E+05	6.6E+05		1.3E+05
9.5E-03	P			7.0E-02	P	4.0E-04	P	V		2.74E+02	1.36E+09	3.62E+04	1		Hexanol, 1-,2-ethyl- (2-Ethyl-1-hexanol)	104-76-7	7.3E+03			7.3E+03	5.5E+03		1.5E+01	1.5E+01
				5.0E-03	I	3.0E-02	I	V		3.28E+03	1.36E+09	1.33E+04	1		Hexanone, 2-	591-78-6					3.9E+02		4.2E+02	2.0E+02
				3.3E-02	I						1.36E+09		1	0.1	Hexazinone	51235-04-2					2.6E+03	1.1E+04		2.1E+03
				2.5E-02	I						1.36E+09		1	0.1	Hexythiazox	78587-05-0					2.0E+03	8.2E+03		1.6E+03
				1.7E-02	O						1.36E+09		1	0.1	Hydramethylnon	67485-29-4					1.3E+03	5.6E+03		1.1E+03
3.0E+00	I	4.9E-03	I			3.0E-05	P	V		1.12E+05	1.36E+09	6.52E+04	1		Hydrazine	302-01-2	2.3E+01		3.7E+00	3.2E+00			2.0E+00	2.0E+00

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Toxicity and Chemical-specific Information														Contaminant		Carcinogenic Target Risk (TR) = 1E-04				Noncancer Child Hazard Index (HI) = 1			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	GIABS	ABS_d	Analyte	CAS No.	Ingestion SL TR=1E-04 (mg/kg)	Dermal SL TR=1E-04 (mg/kg)	Inhalation SL TR=1E-04 (mg/kg)	Carcinogenic SL TR=1E-04 (mg/kg)	Ingestion SL Child THQ=1 (mg/kg)	Dermal SL Child THQ=1 (mg/kg)	Inhalation SL Child THQ=1 (mg/kg)	Noncarcinogenic SL Child THI=1 (mg/kg)
3.0E+00	I	4.9E-03	I								1.36E+09		1		Hydrazine Sulfate	10034-93-2	2.3E+01		7.8E+04	2.3E+01				
						2.0E-02	I	V			1.36E+09		1		Hydrogen Chloride	7647-01-0							2.8E+07	2.8E+07
				4.0E-02	C	1.4E-02	C	V			1.36E+09		1		Hydrogen Fluoride	7664-39-3					3.1E+03		2.0E+07	3.1E+03
						2.0E-03	I	V			1.36E+09		1		Hydrogen Sulfide	7783-06-4							2.8E+06	2.8E+06
6.0E-02	P			4.0E-02	P						1.36E+09		1	0.1	Hydroquinone	123-31-9	1.2E+03	4.1E+03		9.0E+02	3.1E+03	1.3E+04		2.5E+03
6.1E-02	O			1.1E-01	O						1.36E+09		1	0.1	Imazalil	35554-44-0	1.1E+03	4.0E+03		8.9E+02	8.4E+03	3.6E+04		6.8E+03
				2.5E-01	I						1.36E+09		1	0.1	Imazaquin	81335-37-7					2.0E+04	8.2E+04		1.6E+04
				2.5E+00	O						1.36E+09		1	0.1	Imazethapyr	81335-77-5					2.0E+05	8.2E+05		1.6E+05
				1.0E-02	A						1.36E+09		1		Iodine	7553-56-2					7.8E+02			7.8E+02
				4.0E-02	I						1.36E+09		1	0.1	Iprodione	36734-19-7					3.1E+03	1.3E+04		2.5E+03
				7.0E-01	P						1.36E+09		1		Iron	7439-89-6					5.5E+04			5.5E+04
				3.0E-01	I			V		1.00E+04	1.36E+09	2.81E+04	1		Isobutyl Alcohol	78-83-1					2.3E+04			2.3E+04
9.5E-04	I			2.0E-01	I	2.0E+00	C				1.36E+09		1	0.1	Isophorone	78-59-1	7.3E+04	2.6E+05		5.7E+04	1.6E+04	6.6E+04	2.8E+09	1.3E+04
				1.5E-02	I			V			1.36E+09	4.20E+05	1		Isopropalin	33820-53-0					1.2E+03			1.2E+03
				2.0E+00	P	2.0E-01	P	V		1.09E+05	1.36E+09	2.77E+04	1		Isopropanol	67-63-0					1.6E+05		5.8E+03	5.6E+03
				1.0E-01	I						1.36E+09		1	0.1	Isopropyl Methyl Phosphonic Acid	1832-54-8					7.8E+03	3.3E+04		6.3E+03
				5.0E-02	I						1.36E+09		1	0.1	Isoxaben	82558-50-7					3.9E+03	1.6E+04		3.2E+03
						3.0E-01	A	V			1.36E+09		1		JP-7	E1737665							4.3E+08	4.3E+08
				8.0E-03	O						1.36E+09		1	0.1	Lactofen	77501-63-4					6.3E+02	2.6E+03		5.1E+02
				2.0E-04	X						1.36E+09		1	0.1	Lactonitrile	78-97-7					1.6E+01	6.6E+01		1.3E+01
				5.0E-05	P						1.36E+09		1		Lanthanum	7439-91-0					3.9E+00			3.9E+00
				2.1E-05	P						1.36E+09		1	0.1	Lanthanum Acetate Hydrate	100587-90-4					1.6E+00	6.9E+00		1.3E+00
				1.9E-05	P						1.36E+09		1		Lanthanum Chloride Heptahydrate	10025-84-0					1.5E+00			1.5E+00
				2.8E-05	P						1.36E+09		1		Lanthanum Chloride, Anhydrous	10099-58-8					2.2E+00			2.2E+00
				1.6E-05	P						1.36E+09		1		Lanthanum Nitrate Hexahydrate	10277-43-7					1.3E+00			1.3E+00
															Lead Compounds									
8.5E-03	C	1.2E-05	C								1.36E+09		1		~Lead Phosphate	7446-27-7	8.2E+03		3.2E+07	8.2E+03				
2.1E-01	C	8.0E-05	C								1.36E+09		1	0.1	~Lead acetate	301-04-2	3.3E+02	1.2E+03	4.8E+06	2.6E+02				
											1.36E+09		1		~Lead and Compounds	7439-92-1								4.0E+02
3.8E-02	C	1.1E-05	C								1.36E+09		1	0.1	~Lead subacetate	1335-32-6	1.8E+03	6.5E+03	3.5E+07	1.4E+03				
				1.0E-07	I			V		2.43E+00	1.36E+09	1.91E+03	1		~Tetraethyl Lead	78-00-2					7.8E-03			7.8E-03
				5.0E-06	P			V		3.83E+02	1.36E+09	2.55E+04	1		Lewisite	541-25-3					3.9E-01			3.9E-01
				7.7E-03	O						1.36E+09		1	0.1	Linuron	330-55-2					6.0E+02	2.5E+03		4.9E+02
				2.0E-03	P						1.36E+09		1		Lithium	7439-93-2					1.6E+02			1.6E+02
				5.0E-04	I						1.36E+09		1	0.1	MCPA	94-74-6					3.9E+01	1.6E+02		3.2E+01
				4.4E-02	O						1.36E+09		1	0.1	MCPB	94-81-5					3.4E+03	1.5E+04		2.8E+03
				1.0E-03	I						1.36E+09		1	0.1	MCPP	93-65-2					7.8E+01	3.3E+02		6.3E+01
				2.0E-02	I						1.36E+09		1	0.1	Malathion	121-75-5					1.6E+03	6.6E+03		1.3E+03
				1.0E-01	I	7.0E-04	C				1.36E+09		1	0.1	Maleic Anhydride	108-31-6					7.8E+03	3.3E+04	9.9E+05	6.3E+03
				5.0E-01	I						1.36E+09		1	0.1	Maleic Hydrazide	123-33-1					3.9E+04	1.6E+05		3.2E+04
				1.0E-04	P						1.36E+09		1	0.1	Malononitrile	109-77-3					7.8E+00	3.3E+01		6.3E+00
				3.0E-02	H						1.36E+09		1	0.1	Mancozeb	8018-01-7					2.3E+03	9.9E+03		1.9E+03
				5.0E-03	I						1.36E+09		1	0.1	Maneb	12427-38-2					3.9E+02	1.6E+03		3.2E+02
				1.4E-01	I	5.0E-05	I						1		Manganese (Diet)	7439-96-5								
				2.4E-02	G	5.0E-05	I				1.36E+09		0.04		Manganese (Non-diet)	7439-96-5					1.9E+03		7.1E+04	1.8E+03
				9.0E-05	H						1.36E+09		1	0.1	Mephosfolan	950-10-7					7.0E+00	3.0E+01		5.7E+00
				3.0E-02	I						1.36E+09		1	0.1	Mepiquat Chloride	24307-26-4					2.3E+03	9.9E+03		1.9E+03
1.1E-02	P			4.0E-03	P						1.36E+09		1	0.1	Mercaptobenzothiazole, 2-	149-30-4	6.3E+03	2.2E+04		4.9E+03	3.1E+02	1.3E+03		2.5E+02
															Mercury Compounds									
				3.0E-04	I	3.0E-04	G				1.36E+09		0.07		~Mercuric Chloride (and other Mercury salts)	7487-94-7					2.3E+01		4.3E+05	2.3E+01
						3.0E-04	I	V		3.13E+00	1.36E+09	3.47E+04	1		~Mercury (elemental)	7439-97-6							1.1E+01	1.1E+01
				1.0E-04	I						1.36E+09		1		~Methyl Mercury	22967-92-6					7.8E+00			7.8E+00
				8.0E-05	I						1.36E+09		1	0.1	~Phenylmercuric Acetate	62-38-4					6.3E+00	2.6E+01		5.1E+00
				3.0E-05	I			V			1.36E+09	1.94E+06	1		Merphos	150-50-5					2.3E+00			2.3E+00
				6.0E-02	I						1.36E+09		1	0.1	Metalaxyl	57837-19-1					4.7E+03	2.0E+04		3.8E+03
				1.0E-04	I	3.0E-02	P	V		4.58E+03	1.36E+09	6.79E+03	1		Methacrylonitrile	126-98-7					7.8E+00		2.1E+02	7.5E+00
				5.0E-05	I						1.36E+09		1	0.1	Methamidophos	10265-92-6					3.9E+00	1.6E+01		3.2E+00
				2.0E+00	I	2.0E+01	I	V		1.06E+05	1.36E+09	2.90E+04	1		Methanol	67-56-1					1.6E+05		6.1E+05	1.2E+05
				1.5E-03	O						1.36E+09		1	0.1	Methidathion	950-37-8					1.2E+02	4.9E+02		9.5E+01
				2.5E-02	I						1.36E+09		1	0.1	Methomyl	16752-77-5					2.0E+03	8.2E+03		1.6E+03
4.9E-02	C										1.36E+09		1	0.1	Methoxy-5-nitroaniline, 2-	99-59-2	1.4E+03	5.0E+03		1.1E+03				
				5.0E-03	I						1.36E+09		1	0.1	Methoxychlor	72-43-5					3.9E+02	1.6E+03		3.2E+02
				8.0E-03	P	1.0E-03	P	V		1.15E+05	1.36E+09	1.24E+05	1		Methoxyethanol Acetate, 2-	110-49-6					6.3E+02		1.3E+02	1.1E+02
				5.0E-03	P	7.0E-03	P	V		1.06E+05	1.36E+09	1.01E+05	1		Methoxyethanol, 2-	109-86-4					3.9E+02		7.4E+02	2.6E+02
				1.0E+00	X			V		2.90E+04	1.36E+09	8.12E+03	1		Methyl Acetate	79-20-9					7.8E+04			7.8E+04
						2.0E-02	P	V		6.75E+03	1.36E+09	6.97E+03	1		Methyl Acrylate	96-33-3							1.5E+02	1.5E+02
				6.0E-01	I	5.0E+00	I	V		2.84E+04	1.36E+09	1.22E+04	1		Methyl Ethyl Ketone (2-Butanone)	78-93-3					4.7E+04		6.4E+04	2.7E+04
	1.0E-03	X		1.0E-03	P	2.0E-05	X	V		1.80E+05	1.36E+09	5.04E+04	1		Methyl Hydrazine	60-34-4			1.4E+01	1.4E+01	7.8E+01		1.1E+00	1.0E+00
						3.0E+00	I	V		3.36E+03	1.36E+09	1.06E+04	1		Methyl Isobutyl Ketone (4-methyl-2-pentanone)	108-10-1							3.3E+04	3.3E+04
						1.0E-03	C	V		1.01E+04	1.36E+09	4.42E+03	1		Methyl Isocyanate	624-83-9							4.6E+00	4.6E+00
				1.4E+00	I	7.0E-01	I	V		2.36E+03	1.36E+09	6.33E+03	1		Methyl Methacrylate	80-62-6					1.1E+05		4.6E+03	4.4E+03
				2.5E-04	I						1.36E+09		1	0.1	Methyl Parathion	298-00-0					2.0E+01	8.2E+01		1.6E+01
				6.0E-02	X						1.36E+09		1	0.1	Methyl Phosphonic Acid	993-13-5					4.7E+03	2.0E+04		3.8E+03
				6.0E-03	H	4.0E-02	H	V		3.93E+02	1.36E+09	2.43E+04	1		Methyl Styrene (Mixed Isomers)	25013-15-4					4.7E+02		1.0E+03	3.2E+02
9.9E-02	C	2.8E-05	C								1.36E+09		1	0.1	Methyl methanesulfonate	66-27-3	7.0E+02	2.5E+03	1.4E+07	5.5E+02				
1.8E-03	C	2.6E-07	C			3.0E+00	I	V		8.87E+03	1.36E+09	4.90E+03	1		Methyl tert-Butyl Ether (MTBE)	1634-04-4	3.9E+04		5.3E+03	4.7E+03			1.5E+04	1.5E+04
				3.0E-04	X						1.36E+09		1	0.1	Methyl-1,4-benzenediamine dihydrochloride, 2-	615-45-2					2.3E+01	9.9E+01		1.9E+01
						3.0E+00	X	V		2.45E+03	1.36E+09	1.72E+04	1		Methyl-2-Pentanol, 4-	108-11-2							5.4E+04	5.4E+04

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Toxicity and Chemical-specific Information																Contaminant		Carcinogenic Target Risk (TR) = 1E-04				Noncancer Child Hazard Index (HI) = 1			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	GIABS	ABS_d	Analyte	CAS No.	Ingestion SL TR=1E-04 (mg/kg)	Dermal SL TR=1E-04 (mg/kg)	Inhalation SL TR=1E-04 (mg/kg)	Carcinogenic SL TR=1E-04 (mg/kg)	Ingestion SL Child THQ=1 (mg/kg)	Dermal SL Child THQ=1 (mg/kg)	Inhalation SL Child THQ=1 (mg/kg)	Noncarcinogenic SL Child THI=1 (mg/kg)
9.0E-03	P			2.0E-02	X						1.36E+09		1	0.1	Methyl-5-Nitroaniline, 2-	99-55-8	7.7E+03	2.7E+04		6.0E+03	1.6E+03	6.6E+03		1.3E+03
8.3E+00	C	2.4E-03	C								1.36E+09		1	0.1	Methyl-N-nitro-N-nitrosoguanidine, N-	70-25-7	8.4E+00	3.0E+01	1.6E+05	6.5E+00				
1.3E-01	C	3.7E-05	C								1.36E+09		1	0.1	Methylaniline Hydrochloride, 2-	636-21-5	5.3E+02	1.9E+03	1.0E+07	4.2E+02				
				1.0E-02	A						1.36E+09		1	0.1	Methylarsonic acid	124-58-3					7.8E+02	3.3E+03		6.3E+02
				2.0E-04	X						1.36E+09		1	0.1	Methylbenzene,1-4-diamine monohydrochloride, 2-	74612-12-7					1.6E+01	6.6E+01		1.3E+01
1.0E-01	X			3.0E-04	X						1.36E+09		1	0.1	Methylbenzene-1,4-diamine sulfate, 2-	615-50-9	7.0E+02	2.5E+03		5.4E+02	2.3E+01	9.9E+01		1.9E+01
2.2E+01	C	6.3E-03	C						M		1.36E+09		1	0.1	Methylcholanthrene, 3-	56-49-5	7.0E-01	2.7E+00	2.2E+04	5.5E-01				
2.0E-03	I	1.0E-08	I	6.0E-03	I	6.0E-01	I	V	M	3.32E+03	1.36E+09	2.19E+03	1		Methylene Chloride	75-09-2	7.7E+03		2.2E+04	5.7E+03	4.7E+02		1.4E+03	3.5E+02
1.0E-01	P	4.3E-04	C	2.0E-03	P				M		1.36E+09		1	0.1	Methylene-bis(2-chloroaniline), 4,4'-	101-14-4	1.5E+02	6.0E+02	3.2E+05	1.2E+02	1.6E+02	6.6E+02		1.3E+02
4.6E-02	I	1.3E-05	C								1.36E+09		1	0.1	Methylene-bis(N,N-dimethyl) Aniline, 4,4'-	101-61-1	1.5E+03	5.4E+03	2.9E+07	1.2E+03				
1.6E+00	C	4.6E-04	C			2.0E-02	C				1.36E+09		1	0.1	Methylenebisbenzenamine, 4,4'-	101-77-9	4.3E+01	1.5E+02	8.3E+05	3.4E+01			2.8E+07	2.8E+07
						6.0E-04	I				1.36E+09		1	0.1	Methylenediphenyl Diisocyanate	101-68-8							8.5E+05	8.5E+05
				7.0E-02	H			V		5.00E+02	1.36E+09	1.28E+04	1		Methylstyrene, Alpha-	98-83-9					5.5E+03			5.5E+03
				1.5E-01	I						1.36E+09		1	0.1	Metolachlor	51218-45-2					1.2E+04	4.9E+04		9.5E+03
				2.5E-02	I						1.36E+09		1	0.1	Metribuzin	21087-64-9					2.0E+03	8.2E+03		1.6E+03
				2.5E-01	I						1.36E+09		1	0.1	Metsulfuron-methyl	74223-64-6					2.0E+04	8.2E+04		1.6E+04
		4.5E-06	X	1.0E-02	X	1.0E-01	P	V		6.86E+00	1.36E+09	1.04E+03	1		Midrange Aliphatic Hydrocarbon Streams	E1790669			6.5E+01	6.5E+01	7.8E+02		1.1E+02	9.6E+01
				3.0E+00	P			V		3.42E-01	1.36E+09	1.38E+03	1		Mineral oils	8012-95-1					2.3E+05			2.3E+05
1.8E+01	C	5.1E-03	C	2.0E-04	I			V			1.36E+09	8.58E+05	1		Mirex	2385-85-5	3.9E+00		4.7E+01	3.6E+00	1.6E+01			1.6E+01
				2.0E-03	I						1.36E+09		1	0.1	Molinate	2212-67-1					1.6E+02	6.6E+02		1.3E+02
				5.0E-03	I	2.0E-03	A				1.36E+09		1		Molybdenum	7439-98-7					3.9E+02		2.8E+06	3.9E+02
				1.0E-01	I						1.36E+09		1		Monochloramine	10599-90-3					7.8E+03			7.8E+03
				2.0E-03	P						1.36E+09		1	0.1	Monomethylaniline	100-61-8					1.6E+02	6.6E+02		1.3E+02
				2.5E-02	I						1.36E+09		1	0.1	Myclobutanil	88671-89-0					2.0E+03	8.2E+03		1.6E+03
				3.0E-04	X						1.36E+09		1	0.1	N,N'-Diphenyl-1,4-benzenediamine	74-31-7					2.3E+01	9.9E+01		1.9E+01
				2.0E-03	I			V			1.36E+09	5.70E+04	1		Naled	300-76-5					1.6E+02			1.6E+02
				3.0E-02	X	1.0E-01	P	V			1.36E+09		1		Naphtha, High Flash Aromatic (HFAN)	64742-95-6					2.3E+03		1.4E+08	2.3E+03
1.8E+00	C	0.0E+00	C								1.36E+09		1	0.1	Naphthylamine, 2-	91-59-8	3.9E+01	1.4E+02		3.0E+01				
				1.2E-01	O						1.36E+09		1	0.1	Napropamide	15299-99-7					9.4E+03	4.0E+04		7.6E+03
		2.6E-04	C	1.1E-02	C	1.4E-05	C				1.36E+09		1	0.1	Nickel Acetate	373-02-4			1.5E+06	1.5E+06	8.6E+02	3.6E+03	2.0E+04	6.7E+02
		2.6E-04	C	1.1E-02	C	1.4E-05	C				1.36E+09		1	0.1	Nickel Carbonate	3333-67-3			1.5E+06	1.5E+06	8.6E+02	3.6E+03	2.0E+04	6.7E+02
		2.6E-04	C	1.1E-02	C	1.4E-05	C	V			1.36E+09		1		Nickel Carbonyl	13463-39-3			1.5E+06	1.5E+06	8.6E+02		2.0E+04	8.2E+02
		2.6E-04	C	1.1E-02	C	1.4E-05	C				1.36E+09		0.04		Nickel Hydroxide	12054-48-7			1.5E+06	1.5E+06	8.6E+02		2.0E+04	8.2E+02
		2.6E-04	C	1.1E-02	C	2.0E-05	C				1.36E+09		0.04		Nickel Oxide	1313-99-1			1.5E+06	1.5E+06	8.6E+02		2.8E+04	8.4E+02
		2.4E-04	I	1.1E-02	C	1.4E-05	C				1.36E+09		0.04		Nickel Refinery Dust	E715532			1.6E+06	1.6E+06	8.6E+02		2.0E+04	8.2E+02
		2.6E-04	C	2.0E-02	I	9.0E-05	A				1.36E+09		0.04		Nickel Soluble Salts	7440-02-0			1.5E+06	1.5E+06	1.6E+03		1.3E+05	1.5E+03
1.7E+00	C	4.8E-04	I	1.1E-02	C	1.4E-05	C				1.36E+09		0.04		Nickel Subsulfide	12035-72-2	4.1E+01		8.0E+05	4.1E+01	8.6E+02		2.0E+04	8.2E+02
9.1E-01	C	2.6E-04	C	1.1E-02	C	1.4E-05	C				1.36E+09		1	0.1	Nickelocene	1271-28-9	7.6E+01	2.7E+02	1.5E+06	6.0E+01	8.6E+02	3.6E+03	2.0E+04	6.7E+02
				1.6E+00	I						1.36E+09		1		Nitrate (measured as nitrogen)	14797-55-8					1.3E+05			1.3E+05
											1.36E+09		1		Nitrate + Nitrite (measured as nitrogen)	E701177								
				1.0E-01	I						1.36E+09		1		Nitrite (measured as nitrogen)	14797-65-0					7.8E+03			7.8E+03
				1.0E-02	X	5.0E-05	X				1.36E+09		1	0.1	Nitroaniline, 2-	88-74-4					7.8E+02	3.3E+03	7.1E+04	6.3E+02
2.0E-02	P			4.0E-03	P	6.0E-03	P				1.36E+09		1	0.1	Nitroaniline, 4-	100-01-6	3.5E+03	1.2E+04		2.7E+03	3.1E+02	1.3E+03	8.5E+06	2.5E+02
		4.0E-05	I	2.0E-03	I	9.0E-03	I	V		3.05E+03	1.36E+09	7.32E+04	1		Nitrobenzene	98-95-3			5.1E+02	5.1E+02	1.6E+02		6.9E+02	1.3E+02
				3.0E+03	P						1.36E+09		1	0.1	Nitrocellulose	9004-70-0					2.3E+08	9.9E+08		1.9E+08
				7.0E-02	H						1.36E+09		1	0.1	Nitrofurantoin	67-20-9					5.5E+03	2.3E+04		4.4E+03
1.3E+00	C	3.7E-04	C								1.36E+09		1	0.1	Nitrofurazone	59-87-0	5.3E+01	1.9E+02	1.0E+06	4.2E+01				
1.7E-02	P			1.0E-04	P						1.36E+09		1	0.1	Nitroglycerin	55-63-0	4.1E+03	1.5E+04		3.2E+03	7.8E+00	3.3E+01		6.3E+00
				1.0E-01	I						1.36E+09		1	0.1	Nitroguanidine	556-88-7					7.8E+03	3.3E+04		6.3E+03
		8.8E-06	P			5.0E-03	P	V		1.80E+04	1.36E+09	1.69E+04	1		Nitromethane	75-52-5			5.4E+02	5.4E+02			8.8E+01	8.8E+01
		5.8E-04	X			2.0E-02	I	V		4.86E+03	1.36E+09	1.31E+04	1		Nitropropane, 2-	79-46-9			6.4E+00	6.4E+00			2.7E+02	2.7E+02
2.7E+01	C	7.7E-03	C						M		1.36E+09		1	0.1	Nitroso-N-ethylurea, N-	759-73-9	5.7E-01	2.2E+00	1.8E+04	4.5E-01				
1.2E+02	C	3.4E-02	C						M		1.36E+09		1	0.1	Nitroso-N-methylurea, N-	684-93-5	1.3E-01	5.0E-01	4.1E+03	1.0E-01				
5.4E+00	I	1.6E-03	I					V			1.36E+09	2.43E+05	1		Nitroso-di-N-butylamine, N-	924-16-3	1.3E+01		4.3E+01	9.9E+00				
7.0E+00	I	2.0E-03	C								1.36E+09		1	0.1	Nitroso-di-N-propylamine, N-	621-64-7	9.9E+00	3.5E+01	1.9E+05	7.8E+00				
2.8E+00	I	8.0E-04	C								1.36E+09		1	0.1	Nitrosodiethanolamine, N-	1116-54-7	2.5E+01	8.8E+01	4.8E+05	1.9E+01				
1.5E+02	I	4.3E-02	I						M		1.36E+09		1	0.1	Nitrosodiethylamine, N-	55-18-5	1.0E-01	4.0E-01	3.2E+03	8.1E-02				
5.1E+01	I	1.4E-02	I	8.0E-06	P	4.0E-05	X	V	M	2.37E+05	1.36E+09	8.23E+04	1		Nitrosodimethylamine, N-	62-75-9	3.0E-01		6.0E-01	2.0E-01	6.3E-01		3.4E+00	5.3E-01
4.9E-03	I	2.6E-06	C								1.36E+09		1	0.1	Nitrosodiphenylamine, N-	86-30-6	1.4E+04	5.0E+04	1.5E+08	1.1E+04				
2.2E+01	I	6.3E-03	C					V		1.08E+05	1.36E+09	1.21E+05	1		Nitrosomethylethylamine, N-	10595-95-6	3.2E+00		5.4E+00	2.0E+00				
6.7E+00	C	1.9E-03	C								1.36E+09		1	0.1	Nitrosomorpholine [N-]	59-89-2	1.0E+01	3.7E+01	2.0E+05	8.1E+00				
9.4E+00	C	2.7E-03	C								1.36E+09		1	0.1	Nitrosopiperidine [N-]	100-75-4	7.4E+00	2.6E+01	1.4E+05	5.8E+00				
2.1E+00	I	6.1E-04	I								1.36E+09		1	0.1	Nitrosopyrrolidine, N-	930-55-2	3.3E+01	1.2E+02	6.3E+05	2.6E+01				
				1.0E-04	X						1.36E+09		1	0.1	Nitrotoluene, m-	99-08-1					7.8E+00	3.3E+01		6.3E+00
2.2E-01	P			9.0E-04	P			V		1.51E+03	1.36E+09	1.37E+05	1		Nitrotoluene, o-	88-72-2	3.2E+02			3.2E+02	7.0E+01			7.0E+01
1.6E-02	P			4.0E-03	P						1.36E+09		1	0.1	Nitrotoluene, p-	99-99-0	4.3E+03	1.5E+04		3.4E+03	3.1E+02	1.3E+03		2.5E+02
				3.0E-04	X	2.0E-02	P	V		6.86E+00	1.36E+09	1.04E+03	1		Nonane, n-	111-84-2					2.3E+01		2.2E+01	1.1E+01
				1.5E-03	O						1.36E+09		1	0.1	Norflurazon	27314-13-2					1.2E+02	4.9E+02		9.5E+01
				3.0E-03	I						1.36E+09		1	0.1	Octabromodiphenyl Ether	32536-52-0					2.3E+02	9.9E+02		1.9E+02
				5.0E-02	I						1.36E+09		1	0.006	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0					3.9E+03	2.7E+05		3.9E+03
				2.0E-03	H						1.36E+09		1	0.1	Octamethylpyrophosphoramide	152-16-9					1.6E+02	6.6E+02		1.3E+02
7.8E-03	O			1.9E-01	O						1.36E+09		1	0.1	Oryzalin	19044-88-3	8.9E+03	3.2E+04		7.0E+03	1.5E+04	6.3E+04		1.2E+04
				5.0E-03	I						1.36E+09		1	0.1	Oxadiazon	19666-30-9					3.9E+02	1.6E+03		3.2E+02
				2.5E-02	I						1.36E+09		1	0.1	Oxamyl	23135-22-0					2.0E+03	8.2E+03		1.6E+03
7.3E-02	O			4.0E-02	O						1.36E+09		1	0.1	Oxyfluorfen	42874-03-3	9.5E+02	3.4E+03		7.4E+02	3.1E+03	1.3E+04		2.5E+03
				1.3E-02	I						1.36E+09		1	0.1	Paclobutrazol	76738-62-0					1.0E+03	4.3E+03		8.2E+02
				4.5E-03	I						1.36E+09		1	0.1	Paraquat Dichloride	1910-42-5					3.5E+02	1.5E+03		2.8E+02
				6.0E-03	H						1.36E+09		1	0.1	Parathion	56-38-2					4.7E+02	2.0E+03		3.8E+02

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Toxicity and Chemical-specific Information																Contaminant		Carcinogenic Target Risk (TR) = 1E-04				Noncancer Child Hazard Index (HI) = 1			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	GIABS	ABS_d	Analyte	CAS No.	Ingestion SL TR=1E-04 (mg/kg)	Dermal SL TR=1E-04 (mg/kg)	Inhalation SL TR=1E-04 (mg/kg)	Carcinogenic SL TR=1E-04 (mg/kg)	Ingestion SL Child THQ=1 (mg/kg)	Dermal SL Child THQ=1 (mg/kg)	Inhalation SL Child THQ=1 (mg/kg)	Noncarcinogenic SL Child THI=1 (mg/kg)
				5.0E-02	H			V			1.36E+09	4.49E+04	1		Pebulate	1114-71-2					3.9E+03			3.9E+03
				3.0E-01	O						1.36E+09		1	0.1	Pendimethalin	40487-42-1					2.3E+04	9.9E+04		1.9E+04
				2.0E-03	I			V		3.12E-01	1.36E+09	5.13E+05	1		Pentabromodiphenyl Ether	32534-81-9					1.6E+02			1.6E+02
				1.0E-04	I						1.36E+09		1	0.1	Pentabromodiphenyl ether, 2,2',4,4',5- (BDE-99)	60348-60-9					7.8E+00	3.3E+01		6.3E+00
				8.0E-04	I			V			1.36E+09	8.12E+04	1		Pentachlorobenzene	608-93-5					6.3E+01			6.3E+01
9.0E-02	P							V		4.57E+02	1.36E+09	9.65E+03	1		Pentachloroethane	76-01-7	7.7E+02			7.7E+02				
2.6E-01	H			3.0E-03	I			V			1.36E+09	4.32E+05	1		Pentachloronitrobenzene	82-68-8	2.7E+02			2.7E+02	2.3E+02			2.3E+02
4.0E-01	I	5.1E-06	C	5.0E-03	I						1.36E+09		1	0.25	Pentachlorophenol	87-86-5	1.7E+02	2.5E+02	7.5E+07	1.0E+02	3.9E+02	6.6E+02		2.5E+02
4.3E-03	X			9.0E-03	P						1.36E+09		1	0.1	Pentaerythritol tetranitrate (PETN)	78-11-5	1.6E+04	5.7E+04		1.3E+04	7.0E+02	3.0E+03		5.7E+02
				1.0E-04	X						1.36E+09		1	0.1	Pentamethylphosphoramide (PMPA)	10159-46-3					7.8E+00	3.3E+01		6.3E+00
						1.0E+00	P	V		3.88E+02	1.36E+09	7.79E+02	1		Pentane, n-	109-66-0							8.1E+02	8.1E+02
															Per- and Polyfluoroalkyl Substances (PFAS)									
				3.0E-06	D						1.36E+09		1	0.1	~Ammonium perfluoro-2-methyl-3-oxahexanoate	62037-80-3					2.3E-01	9.9E-01		1.9E-01
				3.0E-06	D			V			1.36E+09		1		~Hexafluoropropylene oxide dimer acid (HFPO-DA)	13252-13-6					2.3E-01			2.3E-01
				3.0E-04	P						1.36E+09		1	0.1	~Perfluorobutanesulfonate	45187-15-3					2.3E+01	9.9E+01		1.9E+01
				3.0E-04	P						1.36E+09		1	0.1	~Perfluorobutanesulfonic acid (PFBS)	375-73-5					2.3E+01	9.9E+01		1.9E+01
				2.0E-05	A						1.36E+09		1	0.1	~Perfluorohexanesulfonate	108427-53-8					1.6E+00	6.6E+00		1.3E+00
				2.0E-05	A						1.36E+09		1	0.1	~Perfluorohexanesulfonic acid (PFHxS)	355-46-4					1.6E+00	6.6E+00		1.3E+00
				3.0E-06	A						1.36E+09		1	0.1	~Perfluorononanoate	72007-68-2					2.3E-01	9.9E-01		1.9E-01
				3.0E-06	A						1.36E+09		1	0.1	~Perfluorononanoic acid (PFNA)	375-95-1					2.3E-01	9.9E-01		1.9E-01
				2.0E-06	A						1.36E+09		1	0.1	~Perfluorooctanesulfonate	45298-90-6					1.6E-01	6.6E-01		1.3E-01
				2.0E-06	A						1.36E+09		1	0.1	~Perfluorooctanesulfonic acid (PFOS)	1763-23-1					1.6E-01	6.6E-01		1.3E-01
7.0E-02	D			3.0E-06	A						1.36E+09		1	0.1	~Perfluorooctanoate	45285-51-6	9.9E+02	3.5E+03		7.8E+02	2.3E-01	9.9E-01		1.9E-01
7.0E-02	D			3.0E-06	A						1.36E+09		1	0.1	~Perfluorooctanoic acid (PFOA)	335-67-1	9.9E+02	3.5E+03		7.8E+02	2.3E-01	9.9E-01		1.9E-01
				3.0E-04	P						1.36E+09		1	0.1	~Potassium perfluorobutanesulfonate	29420-49-3					2.3E+01	9.9E+01		1.9E+01
				2.0E-06	A						1.36E+09		1	0.1	~Potassium perfluorooctanesulfonate	2795-39-3					1.6E-01	6.6E-01		1.3E-01
															Perchlorates									
				7.0E-04	I						1.36E+09		1		~Ammonium Perchlorate	7790-98-9					5.5E+01			5.5E+01
				7.0E-04	I						1.36E+09		1		~Lithium Perchlorate	7791-03-9					5.5E+01			5.5E+01
				7.0E-04	I						1.36E+09		1		~Perchlorate and Perchlorate Salts	14797-73-0					5.5E+01			5.5E+01
				7.0E-04	I						1.36E+09		1		~Potassium Perchlorate	7778-74-7					5.5E+01			5.5E+01
				7.0E-04	I						1.36E+09		1		~Sodium Perchlorate	7601-89-0					5.5E+01			5.5E+01
				5.0E-02	I						1.36E+09		1	0.1	Permethrin	52645-53-1					3.9E+03	1.6E+04		3.2E+03
2.2E-03	C	6.3E-07	C								1.36E+09		1	0.1	Phenacetin	62-44-2	3.2E+04	1.1E+05	6.1E+08	2.5E+04				
				2.4E-01	O						1.36E+09		1	0.1	Phenmedipham	13684-63-4					1.9E+04	7.9E+04		1.5E+04
				3.0E-01	I	2.0E-01	C				1.36E+09		1	0.1	Phenol	108-95-2					2.3E+04	9.9E+04	2.8E+08	1.9E+04
				4.0E-03	I						1.36E+09		1	0.1	Phenol, 2-(1-methylethoxy)-, methylcarbamate	114-26-1					3.1E+02	1.3E+03		2.5E+02
				5.0E-04	X						1.36E+09		1	0.1	Phenothiazine	92-84-2					3.9E+01	1.6E+02		3.2E+01
				2.0E-04	X			V		1.29E+02	1.36E+09	7.06E+03	1		Phenyl Isothiocyanate	103-72-0					1.6E+01			1.6E+01
				6.0E-03	I						1.36E+09		1	0.1	Phenylenediamine, m-	108-45-2					4.7E+02	2.0E+03		3.8E+02
1.2E-01	P			4.0E-03	P						1.36E+09		1	0.1	Phenylenediamine, o-	95-54-5	5.8E+02	2.1E+03		4.5E+02	3.1E+02	1.3E+03		2.5E+02
				1.0E-03	X						1.36E+09		1	0.1	Phenylenediamine, p-	106-50-3					7.8E+01	3.3E+02		6.3E+01
1.9E-03	H										1.36E+09		1	0.1	Phenylphenol, 2-	90-43-7	3.6E+04	1.3E+05		2.8E+04				
				2.0E-04	H						1.36E+09		1	0.1	Phorate	298-02-2					1.6E+01	6.6E+01		1.3E+01
						3.0E-04	I	V		1.61E+03	1.36E+09	9.81E+02	1		Phosgene	75-44-5							3.1E-01	3.1E-01
				2.0E-02	I						1.36E+09		1	0.1	Phosmet	732-11-6					1.6E+03	6.6E+03		1.3E+03
				3.0E-04	I	3.0E-04	I	V			1.36E+09		1		Phosphine	7803-51-2					2.3E+01		4.3E+05	2.3E+01
						1.0E-02	I				1.36E+09		1		Phosphoric Acid	7664-38-2							1.4E+07	1.4E+07
				2.0E-05	I			V			1.36E+09	6.92E+03	1		Phosphorus, White	7723-14-0					1.6E+00			1.6E+00
															Phthalates									
1.4E-02	I	2.4E-06	C	2.0E-02	I						1.36E+09		1	0.1	~Bis(2-ethylhexyl)phthalate	117-81-7	5.0E+03	1.8E+04	1.6E+08	3.9E+03	1.6E+03	6.6E+03		1.3E+03
1.9E-03	P			2.0E-01	I						1.36E+09		1	0.1	~Butyl Benzyl Phthalate	85-68-7	3.7E+04	1.3E+05		2.9E+04	1.6E+04	6.6E+04		1.3E+04
				1.0E+00	I						1.36E+09		1	0.1	~Butylphthalyl Butylglycolate	85-70-1					7.8E+04	3.3E+05		6.3E+04
				1.0E-01	I						1.36E+09		1	0.1	~Dibutyl Phthalate	84-74-2					7.8E+03	3.3E+04		6.3E+03
				8.0E-01	I						1.36E+09		1	0.1	~Diethyl Phthalate	84-66-2					6.3E+04	2.6E+05		5.1E+04
				1.0E-01	I			V			1.36E+09	2.13E+04	1		~Dimethylterephthalate	120-61-6					7.8E+03			7.8E+03
				1.0E-02	P						1.36E+09		1	0.1	~Octyl Phthalate, di-N-	117-84-0					7.8E+02	3.3E+03		6.3E+02
				5.0E-01	X						1.36E+09		1	0.1	~Phthalic Acid, p-	100-21-0					3.9E+04	1.6E+05		3.2E+04
				2.0E+00	I	2.0E-02	C				1.36E+09		1	0.1	~Phthalic Anhydride	85-44-9					1.6E+05	6.6E+05	2.8E+07	1.3E+05
				7.0E-02	I						1.36E+09		1	0.1	Picloram	1918-02-1					5.5E+03	2.3E+04		4.4E+03
				1.0E-04	X						1.36E+09		1	0.1	Picramic Acid (2-Amino-4,6-dinitrophenol)	96-91-3					7.8E+00	3.3E+01		6.3E+00
				2.0E-03	X						1.36E+09		1	0.1	Picric Acid (2,4,6-Trinitrophenol)	88-89-1					1.6E+02	6.6E+02		1.3E+02
				7.3E-04	O						1.36E+09		1	0.1	Pirimiphos, Methyl	29232-93-7					5.7E+01	2.4E+02		4.6E+01
3.0E+01	C	8.6E-03	C	7.0E-06	H						1.36E+09		1	0.1	Polybrominated Biphenyls	36355-01-8	2.3E+00	8.2E+00	4.4E+04	1.8E+00	5.5E-01	2.3E+00		4.4E-01
															Polychlorinated Biphenyls (PCBs)									
7.0E-02	G	2.0E-05	G	7.0E-05	I			V			1.36E+09	5.86E+05	1	0.14	~Aroclor 1016	12674-11-2	9.9E+02	2.5E+03	8.2E+03	6.6E+02	5.5E+00	1.6E+01		4.1E+00
2.0E+00	G	5.7E-04	G					V			1.36E+09	2.04E+05	1	0.14	~Aroclor 1221	11104-28-2	3.5E+01	8.8E+01	1.0E+02	2.0E+01				
2.0E+00	G	5.7E-04	G					V			1.36E+09	1.12E+05	1	0.14	~Aroclor 1232	11141-16-5	3.5E+01	8.8E+01	5.5E+01	1.7E+01				
2.0E+00	G	5.7E-04	G					V			1.36E+09	5.91E+05	1	0.14	~Aroclor 1242	53469-21-9	3.5E+01	8.8E+01	2.9E+02	2.3E+01				
2.0E+00	G	5.7E-04	G					V			1.36E+09	5.14E+05	1	0.14	~Aroclor 1248	12672-29-6	3.5E+01	8.8E+01	2.5E+02	2.3E+01				
2.0E+00	G	5.7E-04	G	2.0E-05	I			V			1.36E+09	8.43E+05	1	0.14	~Aroclor 1254	11097-69-1	3.5E+01	8.8E+01	4.1E+02	2.4E+01	1.6E+00	4.7E+00		1.2E+00
2.0E+00	G	5.7E-04	G					V			1.36E+09	1.31E+06	1	0.14	~Aroclor 1260	11096-82-5	3.5E+01	8.8E+01	6.5E+02	2.4E+01				
				6.0E-04	X			V			1.36E+09	1.15E+06	1	0.14	~Aroclor 5460	11126-42-4					4.7E+01	1.4E+02		3.5E+01
3.9E+00	W	1.1E-03	W	2.3E-05	W	1.3E-03	W	V			1.36E+09	2.43E+06	1	0.14	~Heptachlorobiphenyl, 2,3,3',4,4',5,5'- (PCB 189)	39635-31-9	1.8E+01	4.5E+01	6.0E+02	1.3E+01	1.8E+00	5.5E+00	3.4E+03	1.4E+00
3.9E+00	W	1.1E-03	W	2.3E-05	W	1.3E-03	W	V			1.36E+09	1.58E+06	1	0.14	~Hexachlorobiphenyl, 2,3',4,4',5,5'- (PCB 167)	52663-72-6	1.8E+01	4.5E+01	3.9E+02	1.2E+01	1.8E+00	5.5E+00	2.2E+03	1.4E+00
3.9E+00	W	1.1E-03	W	2.3E-05	W	1.3E-03	W	V			1.36E+09	1.04E+06	1	0.14	~Hexachlorobiphenyl, 2,3,3',4,4',5'- (PCB 157)	69782-90-7	1.8E+01	4.5E+01	2.6E+02	1.2E+01	1.8E+00	5.5E+00	1.4E+03	1.4E+00
3.9E+00	W	1.1E-03	W	2.3E-05	W	1.3E-03	W	V			1.36E+09	1.11E+06	1	0.14	~Hexachlorobiphenyl, 2,3,3',4,4',5- (PCB 156)	38380-08-4	1.8E+01	4.5E+01	2.7E+02	1.2E+01	1.8E+00	5.5E+00	1.5E+03	1.4E+00
3.9E+03	W	1.1E+00	W	2.3E-08	W	1.3E-06	W	V			1.36E+09	1.58E+06	1	0.14	~Hexachlorobiphenyl, 3,3',4,4',5,5'- (PCB 169)	32774-16-6	1.8E-02	4.5E-02	3.9E-01	1.2E-02	1.8E-03	5.5E-03	2.2E+00	1.4E-03

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Toxicity and Chemical-specific Information															Contaminant		Carcinogenic Target Risk (TR) = 1E-04				Noncancer Child Hazard Index (HI) = 1			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	GIABS	ABS_d	Analyte	CAS No.	Ingestion SL TR=1E-04 (mg/kg)	Dermal SL TR=1E-04 (mg/kg)	Inhalation SL TR=1E-04 (mg/kg)	Carcinogenic SL TR=1E-04 (mg/kg)	Ingestion SL Child THQ=1 (mg/kg)	Dermal SL Child THQ=1 (mg/kg)	Inhalation SL Child THQ=1 (mg/kg)	Noncarcinogenic SL Child THI=1 (mg/kg)
3.9E+00	W	1.1E-03	W	2.3E-05	W	1.3E-03	W	V			1.36E+09	7.33E+05	1	0.14	~Pentachlorobiphenyl, 2',3,4,4',5- (PCB 123)	65510-44-3	1.8E+01	4.5E+01	1.8E+02	1.2E+01	1.8E+00	5.5E+00	1.0E+03	1.4E+00
3.9E+00	W	1.1E-03	W	2.3E-05	W	1.3E-03	W	V			1.36E+09	5.90E+05	1	0.14	~Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	31508-00-6	1.8E+01	4.5E+01	1.5E+02	1.2E+01	1.8E+00	5.5E+00	8.2E+02	1.4E+00
3.9E+00	W	1.1E-03	W	2.3E-05	W	1.3E-03	W	V			1.36E+09	6.01E+05	1	0.14	~Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	32598-14-4	1.8E+01	4.5E+01	1.5E+02	1.2E+01	1.8E+00	5.5E+00	8.4E+02	1.4E+00
3.9E+00	W	1.1E-03	W	2.3E-05	W	1.3E-03	W	V			1.36E+09	1.05E+06	1	0.14	~Pentachlorobiphenyl, 2,3,4,4',5- (PCB 114)	74472-37-0	1.8E+01	4.5E+01	2.6E+02	1.2E+01	1.8E+00	5.5E+00	1.5E+03	1.4E+00
1.3E+04	W	3.8E+00	W	7.0E-09	W	4.0E-07	W	V			1.36E+09	7.26E+05	1	0.14	~Pentachlorobiphenyl, 3,3',4,4',5- (PCB 126)	57465-28-8	5.3E-03	1.4E-02	5.4E-02	3.6E-03	5.5E-04	1.6E-03	3.0E-01	4.1E-04
2.0E+00	I	5.7E-04	I					V			1.36E+09	5.32E+05	1	0.14	~Polychlorinated Biphenyls (high risk)	1336-36-3	3.5E+01	8.8E+01	2.6E+02	2.3E+01				
4.0E-01	I	1.0E-04	I					V					1	0.14	~Polychlorinated Biphenyls (low risk)	1336-36-3								
7.0E-02	I	2.0E-05	I					V					1	0.14	~Polychlorinated Biphenyls (lowest risk)	1336-36-3								
1.3E+01	W	3.8E-03	W	7.0E-06	W	4.0E-04	W				1.36E+09		1	0.14	~Tetrachlorobiphenyl, 3,3',4,4'- (PCB 77)	32598-13-3	5.3E+00	1.4E+01	1.0E+05	3.8E+00	5.5E-01	1.6E+00	5.7E+05	4.1E-01
3.9E+01	W	1.1E-02	W	2.3E-06	W	1.3E-04	W	V			1.36E+09	5.09E+05	1	0.14	~Tetrachlorobiphenyl, 3,4,4',5- (PCB 81)	70362-50-4	1.8E+00	4.5E+00	1.3E+01	1.2E+00	1.8E-01	5.5E-01	7.1E+01	1.4E-01
						6.0E-04	I				1.36E+09		1	0.1	Polymeric Methylene Diphenyl Diisocyanate (PMDI)	9016-87-9							8.5E+05	8.5E+05
															Polynuclear Aromatic Hydrocarbons (PAHs)									
				6.0E-02	I			V			1.36E+09	1.41E+05	1	0.13	~Acenaphthene	83-32-9					4.7E+03	1.5E+04		3.6E+03
				3.0E-01	I			V			1.36E+09	5.23E+05	1	0.13	~Anthracene	120-12-7					2.3E+04	7.6E+04		1.8E+04
1.0E-01	E	6.0E-05	E					V	M		1.36E+09	4.41E+06	1	0.13	~Benz[a]anthracene	56-55-3	1.5E+02	4.6E+02	7.4E+03	1.1E+02				
				9.0E-05	X	2.0E-06	X				1.36E+09		1	0.1	~Benzo(e)pyrene	192-97-2					7.0E+00	3.0E+01	2.8E+03	5.7E+00
1.2E+00	C	1.1E-04	C								1.36E+09		1	0.13	~Benzo(i)fluoranthene	205-82-3	5.8E+01	1.6E+02	3.5E+06	4.2E+01				
1.0E+00	I	6.0E-04	I	3.0E-04	I	2.0E-06	I		M		1.36E+09		1	0.13	~Benzo[a]pyrene	50-32-8	1.5E+01	4.6E+01	2.3E+05	1.1E+01	2.3E+01	7.6E+01	2.8E+03	1.8E+01
1.0E-01	E	6.0E-05	E						M		1.36E+09		1	0.13	~Benzo[b]fluoranthene	205-99-2	1.5E+02	4.6E+02	2.3E+06	1.1E+02				
1.0E-02	E	6.0E-06	E						M		1.36E+09		1	0.13	~Benzo[k]fluoranthene	207-08-9	1.5E+03	4.6E+03	2.3E+07	1.1E+03				
				8.0E-02	I			V			1.36E+09	7.99E+04	1	0.13	~Chloronaphthalene, Beta-	91-58-7					6.3E+03	2.0E+04		4.8E+03
1.0E-03	E	6.0E-07	E						M		1.36E+09		1	0.13	~Chrysene	218-01-9	1.5E+04	4.6E+04	2.3E+08	1.1E+04				
1.0E+00	E	6.0E-04	E						M		1.36E+09		1	0.13	~Dibenz[a,h]anthracene	53-70-3	1.5E+01	4.6E+01	2.3E+05	1.1E+01				
1.2E+01	C	1.1E-03	C								1.36E+09		1	0.13	~Dibenzo(a,e)pyrene	192-65-4	5.8E+00	1.6E+01	3.5E+05	4.2E+00				
2.5E+02	C	7.1E-02	C						M		1.36E+09		1	0.13	~Dimethylbenz(a)anthracene, 7,12-	57-97-6	6.1E-02	1.8E-01	1.9E+03	4.6E-02				
				4.0E-02	I						1.36E+09		1	0.13	~Fluoranthene	206-44-0					3.1E+03	1.0E+04		2.4E+03
				4.0E-02	I			V			1.36E+09	2.81E+05	1	0.13	~Fluorene	86-73-7					3.1E+03	1.0E+04		2.4E+03
1.0E-01	E	6.0E-05	E						M		1.36E+09		1	0.13	~Indeno[1,2,3-cd]pyrene	193-39-5	1.5E+02	4.6E+02	2.3E+06	1.1E+02				
2.9E-02	P			7.0E-02	A			V		3.94E+02	1.36E+09	5.86E+04	1	0.13	~Methylnaphthalene, 1-	90-12-0	2.4E+03	6.6E+03		1.8E+03	5.5E+03	1.8E+04		4.2E+03
				4.0E-03	I			V			1.36E+09	5.80E+04	1	0.13	~Methylnaphthalene, 2-	91-57-6					3.1E+02	1.0E+03		2.4E+02
1.2E-01	C	3.4E-05	C	2.0E-02	I	3.0E-03	I	V			1.36E+09	4.63E+04	1	0.13	~Naphthalene	91-20-3	5.8E+02	1.6E+03	3.8E+02	2.0E+02	1.6E+03	5.1E+03	1.4E+02	1.3E+02
1.2E+00	C	1.1E-04	C								1.36E+09		1	0.13	~Nitropyrene, 4-	57835-92-4	5.8E+01	1.6E+02	3.5E+06	4.2E+01				
				3.0E-02	I			V			1.36E+09	2.38E+06	1	0.13	~Pyrene	129-00-0					2.3E+03	7.6E+03		1.8E+03
1.5E-01	I			9.0E-03	I						1.36E+09		1	0.1	Prochloraz	67747-09-5	4.6E+02	1.6E+03		3.6E+02	7.0E+02	3.0E+03		5.7E+02
				6.0E-03	H			V			1.36E+09	4.20E+05	1		Profluralin	26399-36-0					4.7E+02			4.7E+02
				1.5E-02	I						1.36E+09		1	0.1	Prometon	1610-18-0					1.2E+03	4.9E+03		9.5E+02
				4.0E-02	O						1.36E+09		1	0.1	Prometryn	7287-19-6					3.1E+03	1.3E+04		2.5E+03
				7.5E-02	I						1.36E+09		1	0.1	Pronamide	23950-58-5					5.9E+03	2.5E+04		4.7E+03
				1.3E-02	I						1.36E+09		1	0.1	Propachlor	1918-16-7					1.0E+03	4.3E+03		8.2E+02
				5.0E-03	I						1.36E+09		1	0.1	Propanil	709-98-8					3.9E+02	1.6E+03		3.2E+02
1.9E-01	O			4.0E-02	O						1.36E+09		1	0.1	Propargite	2312-35-8	3.6E+02	1.3E+03		2.8E+02	3.1E+03	1.3E+04		2.5E+03
				2.0E-03	I			V		1.11E+05	1.36E+09	6.27E+04	1		Propargyl Alcohol	107-19-7					1.6E+02			1.6E+02
				2.0E-02	I						1.36E+09		1	0.1	Propazine	139-40-2					1.6E+03	6.6E+03		1.3E+03
				2.0E-02	I						1.36E+09		1	0.1	Propham	122-42-9					1.6E+03	6.6E+03		1.3E+03
				1.0E-01	O						1.36E+09		1	0.1	Propiconazole	60207-90-1					7.8E+03	3.3E+04		6.3E+03
						8.0E-03	I	V		3.26E+04	1.36E+09	8.94E+03	1		Propionaldehyde	123-38-6							7.5E+01	7.5E+01
				1.0E-01	X	1.0E+00	X	V		2.64E+02	1.36E+09	6.99E+03	1		Propyl benzene	103-65-1					7.8E+03		7.3E+03	3.8E+03
						3.0E+00	C	V		3.49E+02	1.36E+09	7.04E+02	1		Propylene	115-07-1							2.2E+03	2.2E+03
				2.0E+01	P						1.36E+09		1	0.1	Propylene Glycol	57-55-6					1.6E+06	6.6E+06		1.3E+06
						2.7E-04	A				1.36E+09		1	0.1	Propylene Glycol Dinitrate	6423-43-4							3.9E+05	3.9E+05
				7.0E-01	H	2.0E+00	I	V		1.06E+05	1.36E+09	7.83E+04	1		Propylene Glycol Monomethyl Ether	107-98-2					5.5E+04		1.6E+05	4.1E+04
2.4E-01	I	3.7E-06	I			3.0E-02	I	V		7.77E+04	1.36E+09	1.03E+04	1		Propylene Oxide	75-56-9	2.9E+02		7.8E+02	2.1E+02			3.2E+02	3.2E+02
				1.0E-03	I			V		5.30E+05	1.36E+09	5.54E+04	1		Pyridine	110-86-1					7.8E+01			7.8E+01
				5.0E-04	I						1.36E+09		1	0.1	Quinalphos	13593-03-8					3.9E+01	1.6E+02		3.2E+01
3.0E+00	I										1.36E+09		1	0.1	Quinoline	91-22-5	2.3E+01	8.2E+01		1.8E+01				
				9.0E-03	I						1.36E+09		1	0.1	Quizalofop-ethyl	76578-14-8					7.0E+02	3.0E+03		5.7E+02
						3.0E+04	A						1		Refractory Ceramic Fibers (units in fibers)	E715557								
				3.0E-02	I						1.36E+09		1	0.1	Resmethrin	10453-86-8					2.3E+03	9.9E+03		1.9E+03
				5.0E-02	H			V			1.36E+09	4.65E+05	1		Ronnel	299-84-3					3.9E+03			3.9E+03
				4.0E-03	I						1.36E+09		1	0.1	Rotenone	83-79-4					3.1E+02	1.3E+03		2.5E+02
2.2E-01	C	6.3E-05	C						M		1.36E+09		1	0.1	Safrole	94-59-7	7.0E+01	2.7E+02	2.2E+06	5.5E+01				
				5.0E-03	I						1.36E+09		1		Selenious Acid	7783-00-8					3.9E+02			3.9E+02
				5.0E-03	I	2.0E-02	C				1.36E+09		1		Selenium	7782-49-2					3.9E+02		2.8E+07	3.9E+02
				5.0E-03	C	2.0E-02	C				1.36E+09		1		Selenium Sulfide	7446-34-6					3.9E+02		2.8E+07	3.9E+02
				1.4E-01	O						1.36E+09		1	0.1	Sethoxydim	74051-80-2					1.1E+04	4.6E+04		8.8E+03
						3.0E-03	C				1.36E+09		1		Silica (crystalline, respirable)	7631-86-9							4.3E+06	4.3E+06
				5.0E-03	I						1.36E+09		0.04		Silver	7440-22-4					3.9E+02			3.9E+02
1.2E-01	H			5.0E-03	I						1.36E+09		1	0.1	Simazine	122-34-9	5.8E+02	2.1E+03		4.5E+02	3.9E+02	1.6E+03		3.2E+02
				1.3E-02	I						1.36E+09		1	0.1	Sodium Acifluorfen	62476-59-9					1.0E+03	4.3E+03		8.2E+02
				4.0E-03	I						1.36E+09		1		Sodium Azide	26628-22-8					3.1E+02			3.1E+02
2.7E-01	H			3.0E-02	I						1.36E+09		1	0.1	Sodium Diethyldithiocarbamate	148-18-5	2.6E+02	9.2E+02		2.0E+02	2.3E+03	9.9E+03		1.9E+03
				5.0E-02	A	1.3E-02	C				1.36E+09		1		Sodium Fluoride	7681-49-4					3.9E+03		1.8E+07	3.9E+03
				2.0E-05	I						1.36E+09		1	0.1	Sodium Fluoroacetate	62-74-8					1.6E+00	6.6E+00		1.3E+00
				1.0E-03	H						1.36E+09		1		Sodium Metavanadate	13718-26-8					7.8E+01			7.8E+01
				8.0E-04	P						1.36E+09		1		Sodium Tungstate	13472-45-2					6.3E+01			6.3E+01
				8.0E-04	P						1.36E+09		1		Sodium Tungstate Dihydrate	10213-10-2					6.3E+01			6.3E+01
2.4E-02	H			3.0E-02	I						1.36E+09		1	0.1	Sirofos (Tetrachlorovinphos)	961-11-5	2.9E+03	1.0E+04		2.3E+03	2.3E+03	9.9E+03		1.9E+03
				6.0E-01	I						1.36E+09		1		Strontium, Stable	7440-24-6					4.7E+04			4.7E+04

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Toxicity and Chemical-specific Information															Contaminant		Carcinogenic Target Risk (TR) = 1E-04				Noncancer Child Hazard Index (HI) = 1			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	GIABS	ABS_d	Analyte	CAS No.	Ingestion SL TR=1E-04 (mg/kg)	Dermal SL TR=1E-04 (mg/kg)	Inhalation SL TR=1E-04 (mg/kg)	Carcinogenic SL TR=1E-04 (mg/kg)	Ingestion SL Child THQ=1 (mg/kg)	Dermal SL Child THQ=1 (mg/kg)	Inhalation SL Child THQ=1 (mg/kg)	Noncarcinogenic SL Child THI=1 (mg/kg)
				3.0E-04	I						1.36E+09		1	0.1	Strychnine	57-24-9					2.3E+01	9.9E+01		1.9E+01
				2.0E-01	I	1.0E+00	I	V		8.67E+02	1.36E+09	9.35E+03	1		Styrene	100-42-5					1.6E+04		9.7E+03	6.0E+03
				3.0E-03	P						1.36E+09		1	0.1	Styrene-Acrylonitrile (SAN) Trimer (THNA isomer)	57964-39-3					2.3E+02	9.9E+02		1.9E+02
				3.0E-03	P						1.36E+09		1	0.1	Styrene-Acrylonitrile (SAN) Trimer (THNP isomer)	57964-40-6					2.3E+02	9.9E+02		1.9E+02
				1.0E-03	P	2.0E-03	X				1.36E+09		1	0.1	Sulfolane	126-33-0					7.8E+01	3.3E+02	2.8E+06	6.3E+01
				8.0E-04	P						1.36E+09		1	0.1	Sulfonylbis(4-chlorobenzene), 1,1'-	80-07-9					6.3E+01	2.6E+02		5.1E+01
						1.0E-03	C	V			1.36E+09		1		Sulfur Trioxide	7446-11-9							1.4E+06	1.4E+06
						1.0E-03	C				1.36E+09		1		Sulfuric Acid	7664-93-9							1.4E+06	1.4E+06
2.5E-02	I	7.1E-06	I	5.0E-02	H						1.36E+09		1	0.1	Sulfurous acid, 2-chloroethyl 2-[4-(1,1-dimethylethyl)phenoxy]-1-methylethyl	140-57-8	2.8E+03	9.9E+03	5.4E+07	2.2E+03	3.9E+03	1.6E+04		3.2E+03
				3.0E-02	H						1.36E+09		1	0.1	TCMTB	21564-17-0					2.3E+03	9.9E+03		1.9E+03
				7.0E-02	I						1.36E+09		1	0.1	Tebuthiuron	34014-18-1					5.5E+03	2.3E+04		4.4E+03
				2.0E-02	H						1.36E+09		1	0.1	Temephos	3383-96-8					1.6E+03	6.6E+03		1.3E+03
				1.3E-02	I						1.36E+09		1	0.1	Terbacil	5902-51-2					1.0E+03	4.3E+03		8.2E+02
				2.5E-05	H			V		3.09E+01	1.36E+09	2.64E+05	1		Terbufos	13071-79-9					2.0E+00			2.0E+00
				1.0E-03	I						1.36E+09		1	0.1	Terbutryn	886-50-0					7.8E+01	3.3E+02		6.3E+01
5.0E-03	C	1.3E-06	C					V			1.36E+09	3.99E+03	1		Tert-Butyl Acetate	540-88-5	1.4E+04		8.6E+02	8.1E+02				
				1.0E-04	I						1.36E+09		1	0.1	Tetrabromodiphenyl ether, 2,2',4,4'- (BDE-47)	5436-43-1					7.8E+00	3.3E+01		6.3E+00
				3.0E-05	P			V			1.36E+09	5.07E+04	1		Tetrachlorobenzene, 1,2,4,5-	95-94-3					2.3E+00			2.3E+00
2.6E-02	I	7.4E-06	I	3.0E-02	I			V		6.80E+02	1.36E+09	5.68E+03	1		Tetrachloroethane, 1,1,1,2-	630-20-6	2.7E+03		2.2E+02	2.0E+02	2.3E+03			2.3E+03
2.0E-01	I	5.8E-05	C	2.0E-02	I			V		1.90E+03	1.36E+09	1.51E+04	1		Tetrachloroethane, 1,1,2,2-	79-34-5	3.5E+02		7.3E+01	6.0E+01	1.6E+03			1.6E+03
2.1E-03	I	2.6E-07	I	6.0E-03	I	4.0E-02	I	V		1.66E+02	1.36E+09	2.35E+03	1		Tetrachloroethylene	127-18-4	3.3E+04		2.5E+03	2.4E+03	4.7E+02		9.8E+01	8.1E+01
				3.0E-02	I						1.36E+09		1	0.1	Tetrachlorophenol, 2,3,4,6-	58-90-2					2.3E+03	9.9E+03		1.9E+03
1.6E+01	X			6.0E-05	X			V			1.36E+09	1.05E+05	1		Tetrachlorotoluene, p- alpha, alpha, alpha-	5216-25-1	4.3E+00			4.3E+00	4.7E+00			4.7E+00
				5.0E-04	I						1.36E+09		1	0.1	Tetraethyl Dithiopyrophosphate	3689-24-5					3.9E+01	1.6E+02		3.2E+01
						8.0E+01	I	V		2.05E+03	1.36E+09	1.22E+03	1		Tetrafluoroethane, 1,1,1,2-	811-97-2							1.0E+05	1.0E+05
				1.0E-04	X						1.36E+09		1	0.1	Tetramethylphosphoramide, -N,N,N',N'' (TMPA)	16853-36-4					7.8E+00	3.3E+01		6.3E+00
				2.0E-03	P						1.36E+09		1	0.00065	Tetryl (Trinitrophenylmethylnitramine)	479-45-8					1.6E+02	1.0E+05		1.6E+02
				2.0E-05	G						1.36E+09		1		Thallic Oxide	1314-32-5					1.6E+00			1.6E+00
				1.0E-05	X						1.36E+09		1		Thallium (I) Nitrate	10102-45-1					7.8E-01			7.8E-01
				1.0E-05	X						1.36E+09		1		Thallium (Soluble Salts)	7440-28-0					7.8E-01			7.8E-01
				1.0E-05	X			V			1.36E+09	1.40E+05	1		Thallium Acetate	563-68-8					7.8E-01			7.8E-01
				2.0E-05	X						1.36E+09		1	0.1	Thallium Carbonate	6533-73-9					1.6E+00	6.6E+00		1.3E+00
				1.0E-05	X						1.36E+09		1		Thallium Chloride	7791-12-0					7.8E-01			7.8E-01
				1.0E-05	G						1.36E+09		1		Thallium Selenite	12039-52-0					7.8E-01			7.8E-01
				2.0E-05	X						1.36E+09		1		Thallium Sulfate	7446-18-6					1.6E+00			1.6E+00
				4.3E-02	O						1.36E+09		1	0.1	Thifensulfuron-methyl	79277-27-3					3.4E+03	1.4E+04		2.7E+03
				1.0E-02	I						1.36E+09		1	0.1	Thiobencarb	28249-77-6					7.8E+02	3.3E+03		6.3E+02
				7.0E-02	X						1.36E+09		1	0.0075	Thiodiglycol	111-48-8					5.5E+03	3.1E+05		5.4E+03
				3.0E-04	H						1.36E+09		1	0.1	Thiofanox	39196-18-4					2.3E+01	9.9E+01		1.9E+01
1.2E-02	O			1.6E-01	O						1.36E+09		1	0.1	Thiophanate, Methyl	23564-05-8	6.0E+03	2.1E+04		4.7E+03	1.3E+04	5.3E+04		1.0E+04
				1.5E-02	O						1.36E+09		1	0.1	Thiram	137-26-8					1.2E+03	4.9E+03		9.5E+02
				6.0E-01	H						1.36E+09		1		Tin	7440-31-5					4.7E+04			4.7E+04
						1.0E-04	A	V			1.36E+09		1		Titanium Tetrachloride	7550-45-0							1.4E+05	1.4E+05
				8.0E-02	I	5.0E+00	I	V		8.18E+02	1.36E+09	4.29E+03	1		Toluene	108-88-3					6.3E+03		2.2E+04	4.9E+03
3.9E-02	C	1.1E-05	C			8.0E-06	C	V			1.36E+09	7.62E+05	1		Toluene-2,4-diisocyanate	584-84-9	1.8E+03		1.9E+04	1.6E+03			6.4E+00	6.4E+00
1.8E-01	X			2.0E-04	X						1.36E+09		1	0.1	Toluene-2,5-diamine	95-70-5	3.9E+02	1.4E+03		3.0E+02	1.6E+01	6.6E+01		1.3E+01
3.9E-02	C	1.1E-05	C			8.0E-06	C	V		1.71E+03	1.36E+09	6.32E+05	1		Toluene-2,6-diisocyanate	91-08-7	1.8E+03		1.6E+04	1.6E+03			5.3E+00	5.3E+00
				1.0E-04	X						1.36E+09		1	0.1	Toluenediamine, 2,3-	2687-25-4					7.8E+00	3.3E+01		6.3E+00
				1.0E-04	X						1.36E+09		1	0.1	Toluenediamine, 3,4-	496-72-0					7.8E+00	3.3E+01		6.3E+00
				5.0E-03	P						1.36E+09		1	0.1	Toluic Acid, p-	99-94-5					3.9E+02	1.6E+03		3.2E+02
1.6E-02	P	5.1E-05	C								1.36E+09		1	0.1	Toluidine, o- (Methylaniline, 2-)	95-53-4	4.3E+03	1.5E+04	7.5E+06	3.4E+03				
3.0E-02	P			4.0E-03	X						1.36E+09		1	0.1	Toluidine, p-	106-49-0	2.3E+03	8.2E+03		1.8E+03	3.1E+02	1.3E+03		2.5E+02
				3.0E+00	P			V		3.42E-01	1.36E+09	1.38E+03	1		Total Petroleum Hydrocarbons (Aliphatic High)	E1790670					2.3E+05			2.3E+05
				5.0E-03	P	4.0E-01	P	V		5.19E+01	1.36E+09	1.14E+03	1		Total Petroleum Hydrocarbons (Aliphatic Low)	E1790666					3.9E+02		4.7E+02	2.1E+02
				1.0E-02	X	1.0E-01	P	V		6.86E+00	1.36E+09	1.04E+03	1		Total Petroleum Hydrocarbons (Aliphatic Medium)	E1790668					7.8E+02		1.1E+02	9.6E+01
				3.0E-04	P	2.0E-06	P		M		1.36E+09		1	0.13	Total Petroleum Hydrocarbons (Aromatic High)	E1790676					2.3E+01	7.6E+01	2.8E+03	1.8E+01
				1.0E-02	P	6.0E-02	P	V		2.31E+02	1.36E+09	7.75E+03	1		Total Petroleum Hydrocarbons (Aromatic Medium)	E1790674					7.8E+02		4.8E+02	3.0E+02
1.1E+00	I	3.2E-04	I	9.0E-05	P						1.36E+09		1	0.1	Toxaphene	8001-35-2	6.3E+01	2.2E+02	1.2E+06	4.9E+01	7.0E+00	3.0E+01		5.7E+00
				3.0E-05	X						1.36E+09		1	0.1	Toxaphene, Weathered	E1841606					2.3E+00	9.9E+00		1.9E+00
				7.5E-03	I						1.36E+09		1	0.1	Tralomethrin	66841-25-6					5.9E+02	2.5E+03		4.7E+02
				3.0E-04	A			V			1.36E+09	3.36E+03	1		Tri-n-butyltin	688-73-3					2.3E+01			2.3E+01
				8.0E+01	X						1.36E+09		1	0.1	Triacetin	102-76-1					6.3E+06	2.6E+07		5.1E+06
				3.4E-02	O						1.36E+09		1	0.1	Triadimefon	43121-43-3					2.7E+03	1.1E+04		2.1E+03
7.2E-02	O			2.5E-02	O			V			1.36E+09	3.62E+05	1		Triallate	2303-17-5	9.7E+02			9.7E+02	2.0E+03			2.0E+03
				1.0E-02	I						1.36E+09		1	0.1	Triasulfuron	82097-50-5					7.8E+02	3.3E+03		6.3E+02
				8.0E-03	I						1.36E+09		1	0.1	Tribenuron-methyl	101200-48-0					6.3E+02	2.6E+03		5.1E+02
				5.0E-03	I			V			1.36E+09	4.83E+04	1		Tribromobenzene, 1,2,4-	615-54-3					3.9E+02			3.9E+02
				9.0E-03	X						1.36E+09		1	0.1	Tribromophenol, 2,4,6-	118-79-6					7.0E+02	3.0E+03		5.7E+02
				2.0E-04	O						1.36E+09		1	0.1	Tribufos	78-48-8					1.6E+01	6.6E+01		1.3E+01
9.0E-03	P			1.0E-02	P						1.36E+09		1	0.1	Tributyl Phosphate	126-73-8	7.7E+03	2.7E+04		6.0E+03	7.8E+02	3.3E+03		6.3E+02
				3.0E-04	P						1.36E+09		1	0.1	Tributyltin Compounds	E1790679					2.3E+01	9.9E+01		1.9E+01
				3.0E-04	I						1.36E+09		1	0.1	Tributyltin Oxide	56-35-9					2.3E+01	9.9E+01		1.9E+01
											1.36E+09		1	0.1	Trichloramine	10025-85-1								
				3.0E+01	I	5.0E+00	P	V		9.10E+02	1.36E+09	1.29E+03	1		Trichloro-1,2,2-trifluoroethane, 1,1,2-	76-13-1					2.3E+06		6.7E+03	6.7E+03
7.0E-02	I			2.0E-02	I						1.36E+09		1	0.1	Trichloroacetic Acid	76-03-9	9.9E+02	3.5E+03		7.8E+02	1.6E+03	6.6E+03		1.3E+03
2.9E-02	H										1.36E+09		1	0.1	Trichloroaniline HCl, 2,4,6-	33663-50-2	2.4E+03	8.5E+03		1.9E+03				
7.0E-03	X			3.0E-05	X						1.36E+09		1	0.1	Trichloroaniline, 2,4,6-	634-93-5	9.9E+03	3.5E+04		7.8E+03	2.3E+00	9.9E+00		1.9E+00
				8.0E-04	X			V			1.36E+09	3.22E+04	1		Trichlorobenzene, 1,2,3-	87-61-6					6.3E+01			6.3E+01

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Toxicity and Chemical-specific Information															Contaminant		Carcinogenic Target Risk (TR) = 1E-04				Noncancer Child Hazard Index (HI) = 1			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	GIABS	ABS_d	Analyte	CAS No.	Ingestion SL TR=1E-04 (mg/kg)	Dermal SL TR=1E-04 (mg/kg)	Inhalation SL TR=1E-04 (mg/kg)	Carcinogenic SL TR=1E-04 (mg/kg)	Ingestion SL Child THQ=1 (mg/kg)	Dermal SL Child THQ=1 (mg/kg)	Inhalation SL Child THQ=1 (mg/kg)	Noncarcinogenic SL Child THI=1 (mg/kg)
2.9E-02	P			1.0E-02	I	2.0E-03	P	V		4.04E+02	1.36E+09	2.99E+04	1		Trichlorobenzene, 1,2,4-	120-82-1	2.4E+03			2.4E+03	7.8E+02		6.2E+01	5.8E+01
				2.0E+00	I	5.0E+00	I	V		6.40E+02	1.36E+09	1.65E+03	1		Trichloroethane, 1,1,1-	71-55-6					1.6E+05		8.6E+03	8.1E+03
5.7E-02	I	1.6E-05	I	4.0E-03	I	2.0E-04	X	V		2.16E+03	1.36E+09	7.22E+03	1		Trichloroethane, 1,1,2-	79-00-5	1.2E+03		1.3E+02	1.1E+02	3.1E+02		1.5E+00	1.5E+00
4.6E-02	I	4.1E-06	I	5.0E-04	I	2.0E-03	I	V	M	6.92E+02	1.36E+09	2.21E+03	1		Trichloroethylene	79-01-6	8.8E+02		1.1E+02	9.4E+01	3.9E+01		4.6E+00	4.1E+00
				3.0E-01	I			V		1.23E+03	1.36E+09	1.04E+03	1		Trichlorofluoromethane	75-69-4					2.3E+04			2.3E+04
				1.0E-01	I						1.36E+09		1	0.1	Trichlorophenol, 2,4,5-	95-95-4					7.8E+03	3.3E+04		6.3E+03
1.1E-02	I	3.1E-06	I	1.0E-03	P						1.36E+09		1	0.1	Trichlorophenol, 2,4,6-	88-06-2	6.3E+03	2.2E+04	1.2E+08	4.9E+03	7.8E+01	3.3E+02		6.3E+01
				1.0E-02	I						1.36E+09		1	0.1	Trichlorophenoxyacetic Acid, 2,4,5-	93-76-5					7.8E+02	3.3E+03		6.3E+02
				8.0E-03	I						1.36E+09		1	0.1	Trichlorophenoxypropionic acid, -2,4,5	93-72-1					6.3E+02	2.6E+03		5.1E+02
				5.0E-03	I			V		1.28E+03	1.36E+09	1.50E+04	1		Trichloropropane, 1,1,2-	598-77-6					3.9E+02			3.9E+02
3.0E+01	I			4.0E-03	I	3.0E-04	I	V	M	1.40E+03	1.36E+09	1.57E+04	1		Trichloropropane, 1,2,3-	96-18-4	5.1E-01			5.1E-01	3.1E+02		4.9E+00	4.8E+00
				3.0E-03	X	3.0E-04	P	V		3.11E+02	1.36E+09	2.34E+03	1		Trichloropropene, 1,2,3-	96-19-5					2.3E+02		7.3E-01	7.3E-01
				2.0E-02	A						1.36E+09		1	0.1	Tricresyl Phosphate (TCP)	1330-78-5					1.6E+03	6.6E+03		1.3E+03
				3.0E-03	I						1.36E+09		1	0.1	Tridiphane	58138-08-2					2.3E+02	9.9E+02		1.9E+02
						7.0E-03	I	V		2.79E+04	1.36E+09	1.58E+04	1		Triethylamine	121-44-8							1.2E+02	1.2E+02
				2.0E+00	P						1.36E+09		1	0.1	Triethylene Glycol	112-27-6					1.6E+05	6.6E+05		1.3E+05
						2.0E+01	P	V		4.81E+03	1.36E+09	7.12E+02	1		Trifluoroethane, 1,1,1-	420-46-2							1.5E+04	1.5E+04
7.7E-03	I			7.5E-03	I			V			1.36E+09	5.13E+05	1		Trifluralin	1582-09-8	9.0E+03			9.0E+03	5.9E+02			5.9E+02
2.0E-02	P			1.0E-02	P						1.36E+09		1	0.1	Trimethyl Phosphate	512-56-1	3.5E+03	1.2E+04		2.7E+03	7.8E+02	3.3E+03		6.3E+02
				1.0E-02	I	6.0E-02	I	V		2.93E+02	1.36E+09	9.44E+03	1		Trimethylbenzene, 1,2,3-	526-73-8					7.8E+02		5.9E+02	3.4E+02
				1.0E-02	I	6.0E-02	I	V		2.19E+02	1.36E+09	7.91E+03	1		Trimethylbenzene, 1,2,4-	95-63-6					7.8E+02		5.0E+02	3.0E+02
				1.0E-02	I	6.0E-02	I	V		1.82E+02	1.36E+09	6.61E+03	1		Trimethylbenzene, 1,3,5-	108-67-8					7.8E+02		4.1E+02	2.7E+02
				1.0E-02	X			V		2.96E+01	1.36E+09	1.00E+03	1		Trimethylpentene, 2,4,4-	25167-70-8					7.8E+02			7.8E+02
				3.0E-02	I						1.36E+09		1	0.019	Trinitrobenzene, 1,3,5-	99-35-4					2.3E+03	5.2E+04		2.2E+03
3.0E-02	I			5.0E-04	I						1.36E+09		1	0.032	Trinitrotoluene, 2,4,6-	118-96-7	2.3E+03	2.6E+04		2.1E+03	3.9E+01	5.2E+02		3.6E+01
				2.0E-02	P						1.36E+09		1	0.1	Triphenylphosphine Oxide	791-28-6					1.6E+03	6.6E+03		1.3E+03
				2.0E-02	A						1.36E+09		1	0.1	Tris(1,3-Dichloro-2-propyl) Phosphate	13674-87-8					1.6E+03	6.6E+03		1.3E+03
				1.0E-02	X						1.36E+09		1	0.1	Tris(1-chloro-2-propyl)phosphate	13674-84-5					7.8E+02	3.3E+03		6.3E+02
2.3E+00	C	6.6E-04	C					V		4.67E+02	1.36E+09	9.03E+05	1		Tris(2,3-dibromopropyl)phosphate	126-72-7	3.0E+01		3.8E+02	2.8E+01				
2.0E-02	P			7.0E-03	P						1.36E+09		1	0.1	Tris(2-chloroethyl)phosphate	115-96-8	3.5E+03	1.2E+04		2.7E+03	5.5E+02	2.3E+03		4.4E+02
3.2E-03	P			1.0E-01	P						1.36E+09		1	0.1	Tris(2-ethylhexyl)phosphate	78-42-2	2.2E+04	7.7E+04		1.7E+04	7.8E+03	3.3E+04		6.3E+03
				8.0E-04	P						1.36E+09		1		Tungsten	7440-33-7					6.3E+01			6.3E+01
				2.0E-04	A	4.0E-05	A				1.36E+09		1		Uranium	7440-61-1					1.6E+01		5.7E+04	1.6E+01
1.0E+00	C	2.9E-04	C						M		1.36E+09		1	0.1	Urethane	51-79-6	1.5E+01	6.0E+01	4.8E+05	1.2E+01				
		8.3E-03	P	9.0E-03	I	7.0E-06	P				1.36E+09		0.026		Vanadium Pentoxide	1314-62-1			4.6E+04	4.6E+04	7.0E+02		9.9E+03	6.6E+02
				5.0E-03	G	1.0E-04	A				1.36E+09		0.026		Vanadium and Compounds	7440-62-2					3.9E+02		1.4E+05	3.9E+02
				1.0E-03	I			V			1.36E+09	1.23E+05	1		Vernolate	1929-77-7					7.8E+01			7.8E+01
				1.2E-03	O						1.36E+09		1	0.1	Vinclozolin	50471-44-8					9.4E+01	4.0E+02		7.6E+01
				1.0E+00	H	2.0E-01	I	V		2.75E+03	1.36E+09	4.40E+03	1		Vinyl Acetate	108-05-4					7.8E+04		9.2E+02	9.1E+02
		1.5E-05	P			3.0E-03	I	V		2.47E+03	1.36E+09	1.37E+03	1		Vinyl Bromide	593-60-2			2.6E+01	2.6E+01			4.3E+00	4.3E+00
7.2E-01	I	4.4E-06	I	3.0E-03	I	8.0E-02	A	V	M	3.92E+03	1.36E+09	9.56E+02	1		Vinyl Chloride	75-01-4	9.4E+00		1.6E+01	5.9E+00	2.3E+02		8.0E+01	6.0E+01
				3.0E-04	I						1.36E+09		1	0.1	Warfarin	81-81-2					2.3E+01	9.9E+01		1.9E+01
				2.0E-01	G	1.0E-01	G	V		3.88E+02	1.36E+09	5.47E+03	1		Xylene, m-	108-38-3					1.6E+04		5.7E+02	5.5E+02
				2.0E-01	G	1.0E-01	G	V		4.34E+02	1.36E+09	6.45E+03	1		Xylene, o-	95-47-6					1.6E+04		6.7E+02	6.4E+02
				2.0E-01	G	1.0E-01	G	V		3.90E+02	1.36E+09	5.58E+03	1		Xylene, p-	106-42-3					1.6E+04		5.8E+02	5.6E+02
				2.0E-01	I	1.0E-01	I	V		2.60E+02	1.36E+09	5.74E+03	1		Xylenes	1330-20-7					1.6E+04		6.0E+02	5.8E+02
				3.0E-04	I						1.36E+09		1		Zinc Phosphide	1314-84-7					2.3E+01			2.3E+01
				3.0E-01	I						1.36E+09		1		Zinc and Compounds	7440-66-6					2.3E+04			2.3E+04
				5.0E-02	I						1.36E+09		1	0.1	Zineb	12122-67-7					3.9E+03	1.6E+04		3.2E+03
				8.0E-05	X						1.36E+09		1		Zirconium	7440-67-7					6.3E+00			6.3E+00

	CasNum	NJ-MGW-SRS	NJ-NRI-SRS	NJ-NRID-SRS	NJ-RI-SRS	NJ-RID-SRS	Units
General Chemistry							
Cyanide, Reactive	57-12-5						mg/kg
Cyanide, Total	57-12-5	20		780		47	mg/kg
Paint Filter Liquid	PFLT						-
pH (H)	12408-02-5						SU
Solids, Total	NONE						%
Sulfide, Reactive	NONE						mg/kg
Ignitability of Solids							
Ignitability	NONE						
NJ Extractable Petroleum Hydrocarbons (Total)							
Total EPH	NONE			75000		5300	mg/kg
NJ Hexavalent Chromium							
Chromium, Hexavalent	18540-29-9						mg/kg
Oxidation/Reduction Potential	NONE						mv
pH	12408-02-5						SU
Pesticides by GC							
4,4'-DDD	72-54-8	0.47		11		2.3	mg/kg
4,4'-DDE	72-55-9	0.47		11		2	mg/kg
4,4'-DDT	50-29-3	0.67		9.5		1.9	mg/kg
Aldrin	309-00-2	0.13		0.21		0.041	mg/kg
Alpha-BHC	319-84-6	0.0023		0.41		0.086	mg/kg
Beta-BHC	319-85-7	0.0046		1.4		0.3	mg/kg
Chlordane	57-74-9	1.4		1.4		0.27	mg/kg
cis-Chlordane	5103-71-9	1.4		1.4		0.27	mg/kg
Delta-BHC	319-86-8						mg/kg
Dieldrin	60-57-1	0.024		0.16		0.034	mg/kg
Endosulfan I	959-98-8			7800		470	mg/kg
Endosulfan II	33213-65-9			7800		470	mg/kg
Endosulfan sulfate	1031-07-8						mg/kg
Endrin	72-20-8	1.6		270		19	mg/kg
Endrin aldehyde	7421-93-4						mg/kg
Endrin ketone	53494-70-5						mg/kg
Heptachlor	76-44-8	0.083		0.81		0.15	mg/kg
Heptachlor epoxide	1024-57-3	0.081		0.4		0.076	mg/kg
Lindane	58-89-9	0.0035		2.8		0.57	mg/kg
Methoxychlor	72-43-5			4600		320	mg/kg
Toxaphene	8001-35-2	6.2		2.3		0.49	mg/kg
trans-Chlordane	5103-74-2	1.4		1.4		0.27	mg/kg
Polychlorinated Biphenyls by GC							
Aroclor 1016	12674-11-2	1.6		1.1		0.25	mg/kg
Aroclor 1221	11104-28-2	1.6		1.1		0.25	mg/kg
Aroclor 1232	11141-16-5	1.6		1.1		0.25	mg/kg
Aroclor 1242	53469-21-9	1.6		1.1		0.25	mg/kg
Aroclor 1248	12672-29-6	1.6		1.1		0.25	mg/kg
Aroclor 1254	11097-69-1	1.6		1.1		0.25	mg/kg
Aroclor 1260	11096-82-5	1.6		1.1		0.25	mg/kg
Aroclor 1262	37324-23-5	1.6		1.1		0.25	mg/kg
Aroclor 1268	11100-14-4	1.6		1.1		0.25	mg/kg
PCBs, Total	1336-36-3	1.6		1.1		0.25	mg/kg
Semivolatile Organics by GC/MS							
1,2,4,5-Tetrachlorobenzene	95-94-3			390		23	mg/kg
1,4-Dioxane	123-91-1	0.067	210	36	45	7	mg/kg
2,3,4,6-Tetrachlorophenol	58-90-2	26		27000		1900	mg/kg
2,4,5-Trichlorophenol	95-95-4	68		91000		6300	mg/kg
2,4,6-Trichlorophenol	88-06-2	0.86		230		49	mg/kg
2,4-Dichlorophenol	120-83-2	0.19		2700		190	mg/kg
2,4-Dimethylphenol	105-67-9	2.3		18000		1300	mg/kg
2,4-Dinitrophenol	51-28-5	0.33		1800		130	mg/kg
2,4-Dinitrotoluene	121-14-2	0.27		3.8		0.8	mg/kg
2,6-Dinitrotoluene	606-20-2	0.27		3.8		0.8	mg/kg
2-Chloronaphthalene	91-58-7			67000		4800	mg/kg
2-Chlorophenol	95-57-8	0.76		6500		390	mg/kg
2-Methylnaphthalene	91-57-6	3.1		3300		240	mg/kg
2-Methylphenol	95-48-7	0.77		4600		320	mg/kg
2-Nitroaniline	88-74-4						mg/kg
2-Nitrophenol	88-75-5						mg/kg
3,3'-Dichlorobenzidine	91-94-1	3.9		5.7		1.2	mg/kg
3-Methylphenol/4-Methylphenol	108-39-4/106-44-5	0.75		9100		630	mg/kg
3-Nitroaniline	99-09-2						mg/kg

4,6-Dinitro-o-cresol	534-52-1						mg/kg
4-Bromophenyl phenyl ether	101-55-3						mg/kg
4-Chloroaniline	106-47-8	0.23		13		2.7	mg/kg
4-Chlorophenyl phenyl ether	7005-72-3						mg/kg
4-Nitroaniline	100-01-6			130		27	mg/kg
4-Nitrophenol	100-02-7						mg/kg
Acenaphthene	83-32-9			50000		3600	mg/kg
Acenaphthylene	208-96-8						mg/kg
Acetophenone	98-86-2	3.6		130000		7800	mg/kg
Anthracene	120-12-7			250000		18000	mg/kg
Atrazine	1912-24-9	0.33		3200		220	mg/kg
Benzaldehyde	100-52-7			910		170	mg/kg
Benzo(a)anthracene	56-55-3	0.71	370000	23	78000	5.1	mg/kg
Benzo(a)pyrene	50-32-8		16000	2.3	3500	0.51	mg/kg
Benzo(b)fluoranthene	205-99-2		370000	23	78000	5.1	mg/kg
Benzo(ghi)perylene	191-24-2						mg/kg
Benzo(k)fluoranthene	207-08-9			230	780000	51	mg/kg
Biphenyl	92-52-4			450		87	mg/kg
Bis(2-chloroethoxy)methane	111-91-1			2700		190	mg/kg
Bis(2-chloroethyl)ether	111-44-4	0.33		3.3		0.63	mg/kg
Bis(2-chloroisopropyl)ether	108-60-1	1.9		52000		3100	mg/kg
Bis(2-ethylhexyl)phthalate	117-81-7	14		180		39	mg/kg
Butyl benzyl phthalate	85-68-7	29		1300		290	mg/kg
Caprolactam	105-60-2	16	1300	460000	290	32000	mg/kg
Carbazole	86-74-8						mg/kg
Chrysene	218-01-9			2300		510	mg/kg
Di-n-butylphthalate	84-74-2			91000		6300	mg/kg
Di-n-octylphthalate	117-84-0			9100		630	mg/kg
Dibenzo(a,h)anthracene	53-70-3		37000	2.3	7800	0.51	mg/kg
Dibenzofuran	132-64-9						mg/kg
Diethyl phthalate	84-66-2	44		730000		51000	mg/kg
Dimethyl phthalate	131-11-3						mg/kg
Fluoranthene	206-44-0			33000		2400	mg/kg
Fluorene	86-73-7			33000		2400	mg/kg
Hexachlorobenzene	118-74-1	0.17		2.3		0.43	mg/kg
Hexachlorobutadiene	87-68-3	0.17		47		8.9	mg/kg
Hexachlorocyclopentadiene	77-47-4	2.5		7800	2.7	470	mg/kg
Hexachloroethane	67-72-1	0.17		91		17	mg/kg
Indeno(1,2,3-cd)pyrene	193-39-5		370000	23	78000	5.1	mg/kg
Isophorone	78-59-1	0.23		2700		570	mg/kg
n-Nitrosodi-n-propylamine	621-64-7	0.17		0.36		0.17	mg/kg
Naphthalene	91-20-3	19	27	34000	5.7	2500	mg/kg
NDPA/DPA	86-30-6	1.1		520		110	mg/kg
Nitrobenzene	98-95-3	0.17	36	2600	7.5	160	mg/kg
p-Chloro-m-cresol	59-50-7						mg/kg
Pentachlorophenol	87-86-5	0.33		4.4		1	mg/kg
Phenanthrene	85-01-8						mg/kg
Phenol	108-95-2	21		270000	39000	19000	mg/kg
Pyrene	129-00-0			25000		1800	mg/kg
TCLP Herbicides by EPA 1311							
2,4,5-TP (Silvex)	93-72-1						mg/l
2,4-D	94-75-7						mg/l
TCLP Metals by EPA 1311							
Arsenic, TCLP	7440-38-2						mg/l
Barium, TCLP	7440-39-3						mg/l
Beryllium, TCLP	7440-41-7						mg/l
Cadmium, TCLP	7440-43-9						mg/l
Chromium, TCLP	7440-47-3						mg/l
Copper, TCLP	7440-50-8						mg/l
Lead, TCLP	7439-92-1						mg/l
Mercury, TCLP	7439-97-6						mg/l
Nickel, TCLP	7440-02-0						mg/l
Selenium, TCLP	7782-49-2						mg/l
Silver, TCLP	7440-22-4						mg/l
Zinc, TCLP	7440-66-6						mg/l
TCLP Pesticides by EPA 1311							
Chlordane	57-74-9	1.4		1.4		0.27	mg/l
Endrin	72-20-8	1.6		270		19	mg/l
Heptachlor	76-44-8	0.083		0.81		0.15	mg/l
Heptachlor epoxide	1024-57-3	0.081		0.4		0.076	mg/l
Lindane	58-89-9	0.0035		2.8		0.57	mg/l
Methoxychlor	72-43-5			4600		320	mg/l
Toxaphene	8001-35-2	6.2		2.3		0.49	mg/l
TCLP Semivolatiles by EPA 1311							
2,4,5-Trichlorophenol	95-95-4	68		91000		6300	mg/l

2,4,6-Trichlorophenol	88-06-2	0.86		230		49	mg/l
2,4-Dinitrotoluene	121-14-2	0.27		3.8		0.8	mg/l
2-Methylphenol	95-48-7	0.77		4600		320	mg/l
3-Methylphenol/4-Methylphenol	108-39-4/106-44-5	0.75		9100		630	mg/l
Hexachlorobenzene	118-74-1	0.17		2.3		0.43	mg/l
Hexachlorobutadiene	87-68-3	0.17		47		8.9	mg/l
Hexachloroethane	67-72-1	0.17		91		17	mg/l
Nitrobenzene	98-95-3	0.17	36	2600	7.5	160	mg/l
Pentachlorophenol	87-86-5	0.33		4.4		1	mg/l
Pyridine	110-86-1						mg/l
TCLP Volatiles by EPA 1311							
1,1-Dichloroethene	75-35-4	0.0069	240	180	52	11	mg/l
1,2-Dichloroethane	107-06-2	0.0095	320	30	71	5.8	mg/l
1,4-Dichlorobenzene	106-46-7	1.4		13000		780	mg/l
2-Butanone	78-93-3	0.98		780000		47000	mg/l
Benzene	71-43-2	0.0094	11	16	2.2	3	mg/l
Carbon tetrachloride	56-23-5	0.0075	6.9	40	1.4	7.6	mg/l
Chlorobenzene	108-90-7	0.64		8400		510	mg/l
Chloroform	67-66-3	0.33		13000	590	780	mg/l
Tetrachloroethene	127-18-4	0.0086		1700	47	330	mg/l
Trichloroethene	79-01-6	0.0065	14	79	3	15	mg/l
Vinyl chloride	75-01-4	0.0067	6.4	5	1.4	0.97	mg/l
Total Metals							
Aluminum, Total	7429-90-5					78000	mg/kg
Antimony, Total	7440-36-0	5.4		520		31	mg/kg
Arsenic, Total	7440-38-2	19	5200	19	1100	19	mg/kg
Barium, Total	7440-39-3	2100		260000	870000	16000	mg/kg
Beryllium, Total	7440-41-7	0.7	9300	2600	2000	160	mg/kg
Cadmium, Total	7440-43-9	1.9	12000	1100	2600	71	mg/kg
Calcium, Total	7440-70-2						mg/kg
Chromium, Total	7440-47-3						mg/kg
Cobalt, Total	7440-48-4	90	2500	390	520	23	mg/kg
Copper, Total	7440-50-8	910		52000		3100	mg/kg
Iron, Total	7439-89-6						mg/kg
Lead, Total	7439-92-1	90		800		400	mg/kg
Magnesium, Total	7439-95-4						mg/kg
Manganese, Total	7439-96-5		400000	31000	87000	1900	mg/kg
Mercury, Total	7439-97-6	0.1		390	520000	23	mg/kg
Nickel, Total	7440-02-0	48	93000	26000	20000	1600	mg/kg
Potassium, Total	7440-09-7						mg/kg
Selenium, Total	7782-49-2	11		6500		390	mg/kg
Silver, Total	7440-22-4	0.5		6500		390	mg/kg
Sodium, Total	7440-23-5						mg/kg
Thallium, Total	7440-28-0						mg/kg
Vanadium, Total	7440-62-2		800000	6500	170000	390	mg/kg
Zinc, Total	7440-66-6	930		390000		23000	mg/kg
Volatile Organics by EPA 5035							
1,1,1-Trichloroethane	71-55-6	0.2				160000	mg/kg
1,1,2,2-Tetrachloroethane	79-34-5	0.0069		18		3.5	mg/kg
1,1,2-Trichloroethane	79-00-5	0.017		64		12	mg/kg
1,1-Dichloroethane	75-34-3	0.24		640		120	mg/kg
1,1-Dichloroethene	75-35-4	0.0069	240	180	52	11	mg/kg
1,2,3-Trichlorobenzene	87-61-6						mg/kg
1,2,4-Trichlorobenzene	120-82-1	0.52		13000	94	780	mg/kg
1,2-Dibromo-3-chloropropane	96-12-8	0.005	0.12	4.5	0.026	0.87	mg/kg
1,2-Dibromoethane	106-93-4	0.005	0.41	1.8	0.085	0.35	mg/kg
1,2-Dichlorobenzene	95-50-1	11		110000		6700	mg/kg
1,2-Dichloroethane	107-06-2	0.0095	320	30	71	5.8	mg/kg
1,2-Dichloroethene, Total	540-59-0						mg/kg
1,2-Dichloropropane	78-87-5	0.0058	27	98	5.7	19	mg/kg
1,3-Dichlorobenzene	541-73-1	11		110000		6700	mg/kg
1,3-Dichloropropene, Total	542-75-6						mg/kg
1,4-Dichlorobenzene	106-46-7	1.4		13000		780	mg/kg
1,4-Dioxane	123-91-1	0.067	210	36	45	7	mg/kg
2-Butanone	78-93-3	0.98		780000		47000	mg/kg
2-Hexanone	591-78-6	0.15		6500	1000	390	mg/kg
4-Methyl-2-pentanone	108-10-1						mg/kg
Acetone	67-64-1	19				70000	mg/kg
Benzene	71-43-2	0.0094	11	16	2.2	3	mg/kg
Bromochloromethane	74-97-5						mg/kg
Bromodichloromethane	75-27-4	0.005		59		11	mg/kg
Bromoform	75-25-2	0.018		460		88	mg/kg
Bromomethane	74-83-9	0.043	82	1800	18	110	mg/kg
Carbon disulfide	75-15-0	3.7					mg/kg
Carbon tetrachloride	56-23-5	0.0075	6.9	40	1.4	7.6	mg/kg

Chlorobenzene	108-90-7	0.64		8400		510	mg/kg
Chloroethane	75-00-3						mg/kg
Chloroform	67-66-3	0.33		13000	590	780	mg/kg
Chloromethane	74-87-3		1200		270		mg/kg
cis-1,2-Dichloroethene	156-59-2	0.35		13000		780	mg/kg
cis-1,3-Dichloropropene	10061-01-5	0.0063	23	36	4.8	7	mg/kg
Cyclohexane	110-82-7						mg/kg
Dibromochloromethane	124-48-1	0.005		43		8.3	mg/kg
Dichlorodifluoromethane	75-71-8	38		260000		16000	mg/kg
Ethylbenzene	100-41-4	15	48	130000	10	7800	mg/kg
Freon-113	76-13-1						mg/kg
Isopropylbenzene	98-82-8	22		130000		7800	mg/kg
Methyl Acetate	79-20-9	22				78000	mg/kg
Methyl cyclohexane	108-87-2						mg/kg
Methyl tert butyl ether	1634-04-4	0.25	650	13000	140	780	mg/kg
Methylene chloride	75-09-2	0.013		260	1400	50	mg/kg
o-Xylene	95-47-6	19		190000		12000	mg/kg
p/m-Xylene	179601-23-1	19		190000		12000	mg/kg
Styrene	100-42-5	2.1		260000		16000	mg/kg
Tetrachloroethene	127-18-4	0.0086		1700	47	330	mg/kg
Toluene	108-88-3	7.8		100000		6300	mg/kg
trans-1,2-Dichloroethene	156-60-5	0.56		22000		1300	mg/kg
trans-1,3-Dichloropropene	10061-02-6	0.0063	23	36	4.8	7	mg/kg
Trichloroethene	79-01-6	0.0065	14	79	3	15	mg/kg
Trichlorofluoromethane	75-69-4	29		390000		23000	mg/kg
Vinyl chloride	75-01-4	0.0067	6.4	5	1.4	0.97	mg/kg
Xylenes, Total	1330-20-7	19		190000		12000	mg/kg

Appendix H

Field Sampler Checklist

Personnel Preparation Checklist

Personnel Briefing	Yes	No	Comments
1. Did you review sampling team responsibilities and identify individual(s) responsible for corrective actions?			
2. Did you ensure that you have met the appropriate personal safety and protection requirements?			
3. Did you identify sampling locations and receive permission to access them, as appropriate?			
4. Did you contact the appropriate utility companies PRIOR to the start of sampling? By law, utility companies must be contacted prior to the start of digging/sampling so that any underground utilities (gas lines, water lines, electrical lines, etc.) can be marked. A list of one-call centers for each state may be found at: http://www.call811.com.			
5. If sampling on private property, do you have sample receipts to provide to the property owner for all samples taken and removed from the property?			
6. Have you determined the number and type of samples to be collected?			
7. Did you review sample collection methods?			
8. Have you reviewed sample container requirements?			
9. Did you review decontamination requirements, procedures, and locations?			
10. Did you determine holding times and conditions?			
11. Did you determine Performance Evaluation (PE) and Quality Control (QC) sample requirements?			
12. Have you obtained shipping cooler temperature blanks, if required?			
13. Did you review sample label and tag requirements?			
14. Did you review Traffic Report/Chain of Custody (TR/COC) record and custody seal requirements?			
15. Have you obtained the laboratory name, shipping addresses, and telephone number?			
16. Did you review cooler return instructions?			
17. Have you obtained shipping company information (name, telephone number, account number, pickup schedule)?			
18. Have you obtained shipping schedules?			
19. Did you review shipment reporting requirements and the appropriate contact names and telephone numbers for reporting?			

Personnel Briefing	Yes	No	Comments
20. Have you included any sampler comments regarding sampling issues (e.g., low volumes, matrix, suspected concentrations based on field measurements)?			

General Sample Collection Checklist (Page 1 of 1)

General Sample Collection	Yes	No	Comments
1. Did you identify and mark the sampling location with buoys, flags, or stakes according to the sampling plans, maps, and grids?			
2. If the sampling location is inaccessible, did you contact the appropriate field or regional personnel for instructions?			
3. Did you use the correct sampling equipment?			
4. Did you follow the correct decontamination procedures?			
5. Did you follow the correct collection procedures?			
6. Did you use the correct sample containers for each sample collected?			
7. Did you use certified clean containers for all samples? Are certificates kept on record?			
8. Did you use certified clean water for all field, trip, equipment and rinsate blanks? Are certificates kept on record?			
9. Did you collect the correct volume for each sample?			
10. Did you collect the correct type of sample, including primary samples and Quality Control (QC) samples?			
11. Did you properly preserve each sample collected?			
12. Did you correctly document and label each sample with all necessary information?  Under no circumstances should the site name appear on any documentation being sent to the laboratory, unless the laboratory is a Regional U.S. Environmental Protection Agency (EPA) laboratory. Then the Region copy of the TR/COC record shall be sent to the EPA laboratory.			
13. If sampling on private property, did you provide a sample receipt to the owner of the property for all samples taken and removed from the property?			

Completing Field Logbook Checklist (Page 1 of 1)

Completing Field Logbook	Yes	No	Comments
1. Did you use waterproof ink when writing in the field logbook?			
2. Did you document sampling project information such as: • Project name, ID, and location • Names of samplers • Geological observations, including maps • Atmospheric conditions • Field measurements • Sampling dates, times, and locations?  Under no circumstances should the site name appear on any documentation being sent to the laboratory, unless the laboratory is a Regional EPA laboratory. Then the Region copy of the TR/COC record shall be sent to the EPA laboratory.			
3. Did you record sampling activity information such as: • Sampling dates and times • Sample identifications • Sample matrices • Sample descriptions (e.g., odors and/or colors) • Number of samples taken • Sampling methods/equipment • Description of QC samples?			
4. Did you document any and all deviations from the sampling plan?			
5. Did you document any and all difficulties in sampling and/or any unusual circumstances?			
6. Were all errors corrected by crossing a line through the error, initialing the error, dating the error, and then adding the correct information?			

Appendix I

Sample Chain of Custody

CHEMTECH
CHAIN OF CUSTODY RECORD

284 Sheffield Street, Mountainside, NJ 07092
(908) 789-8900 Fax (908) 789-8922
www.chemtech.net

Chemtech Project Number

COC Number

CLIENT INFORMATION

Report to be sent to:

COMPANY:

ADDRESS:

CITY: STATE: ZIP:

ATTENTION:

PHONE: FAX:

PROJECT INFORMATION

PROJECT NAME:

PROJECT #: LOCATION:

PROJECT MANAGER:

E-MAIL:

PHONE: FAX:

BILLING INFORMATION

BILL TO: PO#

ADDRESS:

CITY: STATE: ZIP:

ATTENTION:

PHONE:

DATA TURNAROUND INFORMATION

FAX (RUSH) _____ DAYS*

HARDCOPY (DATA PACKAGE): _____ DAYS*

EDD: _____ DAYS*

*TO BE APPROVED BY CHEMTECH

STANDARD HARDCOPY TURNAROUND TIME IS 10 BUSINESS DAYS

DATA DELIVERABLE INFORMATION

- ❑ Level 1 (Results Only)
- ❑ Level 2 (Results + QC)
- ❑ Level 3 (Results + QC + Raw Data)
- ❑ EDD FORMAT _____
- ❑ Level 4 (QC + Full Raw Data)
- ❑ NJ Reduced ❑ US EPA CLP
- ❑ NYS ASP A ❑ NYS ASP B
- ❑ Other _____

ANALYSIS

	CHEMTECH SAMPLE ID	PROJECT SAMPLE IDENTIFICATION	SAMPLE MATRIX	SAMPLE TYPE COMP	SAMPLE TYPE GRAB	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	# of Bottles	PRESERVATIVES 1	2	3	4	5	6	7	8	9	COMMENTS
1.																		
2.																		
3.																		
4.																		
5.																		
6.																		
7.																		
8.																		
9.																		
10.																		

<— Specify Preservatives

A-HCl D-NaOH

B-HNO3 E-ICE

C-H2SO4 F-OTHER

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE PROSSESSION INCLUDING COURIER DELIVERY

RELINQUISHED BY SAMPLER	DATE/TIME	RECEIVED BY
1.		1.
RELINQUISHED BY	DATE/TIME	RECEIVED BY
2.		2.
RELINQUISHED BY	DATE/TIME	RECEIVED FOR LAB BY
3.		3.

Conditions of bottles or collers at receipt: ❑ COMPLIANT ❑ NON COMPLIANT ❑ COOLER TEMP _____

Comments: _____

Page _____ of _____

CLIENT: ❑ Hand Delivered ❑ Other: _____

CHEMTECH: ❑ Picked Up

Shipment Complete

❑ YES ❑ NO

WHITE - CHEMTECH COPY FOR RETURN TO CLIENT **YELLOW** - CHEMTECH COPY **PINK** - SAMPLER COPY

Appendix J

Document Review Tracking Form

Envocare Document Review Tracking Form

NOTE: This Review Tracking Form is provided as an example to document that peer review has been completed. Other methods of documentation can be substituted as such as an email confirming review of the specific items reviewed, the document for which they were reviewed, the date the review was completed, and if any revisions are needed/comments to be resolved along with a note requiring an additional review of those changes.

Instructions

1. Project Manager/Author

i. Fill out all blanks above the table. Indicate which items in table are required to be reviewed.

ii. Provide this form, the document and any additional information needed to the reviewer.

2. Reviewer(s)

i. Review all required items assigned.

ii. Return this form and deliverable with comments to the PM/author.

3. After review is complete, indicate on form whether all comments or issues have been resolved or a second review is required.

Note:

Reviewer must have the knowledge needed to complete the review or portion of the review they are conducting.

Deliverable Title and version number: _____
Review Due Date: _____

Project Number: _____ **Project Manager: _____**
Project/Client: _____ **Client Contact(s): _____**
(or see attached list)

Author(s): _____ **Reviewer(s): _____**
Allotted time for review _____

Review Scope	Required (Y or N)	Comments (note if on document or recorded below)	Reviewer Initials and Date	All comments resolved? (Y or N)
Contracted Scope of Services				
Cost Estimates				
Deadlines Review				
Data Verification Review				
Tables Review				
Figures Review				
Calculations Review				
Professional Standards Review				
Other				
Editorial/Administrative Review				
Overall Deliverable Review				

Additional Comment from reviewer(s):

Is a second review required after all revisions?:

Appendix K

Non-Conformance Identification and Tracking Form

Non-conformance Identification and Tracking form

Project Name: _____ Project Number: _____

Project Manager: _____

Identified problem:
Nature and scope of problem:
Root cause of problem (where possible):
Effect on project/program (list all effects):
Corrective actions required (list all):
Person responsible to implement corrective action:
List of actions needed to prevent recurrence:
Time frame for corrective actions to be implemented and completed:
Method to assess and verify the effectiveness of the corrective action:

The corrective actions should be taken as quickly as possible, and all corrective actions are to be recorded and reported.

Version: 00

Appendix L

Data Usability Review Form

Data Usability Review Form

Purpose: to identify non-conformances and determine if they affect data usability

Project Name: _____
Project Number: _____

Sample Date(s): _____
Matrix: _____
Analytical laboratory: _____
Lab Job Number(s): _____

	Yes	No	N/A	Notes
1. Were the samples received by the lab intact?				
A. Was chain of custody (COC) filled out completely and correctly (sample ID and time, matrix, number of bottles)?				
B. Were the samples preserved on ice or was it not required?				
i. If yes, was the temperature 4 $\pm$ 2 degrees Celsius?				
a. If no, check with lab for possible effects on sample results.				
C. Were any other preservatives used? If so for what analysis?				
i. Were preservative requirements met?				
2. Were holding times met?				
3. Were the data reporting limits (RLs) and any other data quality objectives (DQOs) desired provided to the lab?				
4. Were the desired RLs met?				
A. If no, were any of these constituents of concern?				
5. Were the RLs below the relevant standards?				
A. If no, were any of these constituents of concern?				
6. Was the Lab Control Sample (LCS) within the allowable percent recovery?				
A. If sample results were above 4x spike amount, no further review of LCS is needed.				
7. Was the relative percent difference (RPD) within the allowable limits?				
A. If no, were any of these constituents of concern?				
8. Were any nonconformances reported by the lab?				
A. If yes, do they affect the data meeting the data quality objectives?				
9. Were project-specific matrix spike/matrix spike duplicate (MS/MSD) and/or laboratory duplicate samples provided for this data set?				

Additional Notes:

Appendix M

Chemtech Accreditation/ Intent to perform letter/ Signature

State of New Jersey

Department of Environmental Protection

Certifies That

CHEMTECH

Laboratory Certification ID # 20012

is hereby approved as a

Nationally Accredited Environmental Laboratory

to perform the analyses as indicated on the Annual Certified Parameter List which must accompany this certificate to be valid

having duly met the requirements of the

Regulations Governing the Certification of Laboratories and Environmental Measurements N.J.A.C. 7:18 et. seq.

and

having been found compliant with the 2016 TNI Standard approved by the

The NELAC Institute

Expires June 30, 2023

Michele M. Potter
Manager

NJDEP is a NELAP Recognized Accreditation Body

This certificate is to be conspicuously displayed at the laboratory with the annual certified parameter list in a location on the premises visible to the public. Consumers are urged to verify the laboratory's current accreditation status with the State of NJ, NELAP.

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF QUALITY ASSURANCE
401 East State Street
P.O. Box 420, Mail Code 401-02D
Trenton, New Jersey 08625-0420
Tel. (609) 292-3950 • Fax (609) 777-1774
www.nj.gov/dep

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

SHAWN M. LATOURETTE
Commissioner

July 7, 2022

Emanuel Hedvat
Laboratory Manager
Chemtech
284 Sheffield Street
Mountainside, NJ 07092

Dear Mr. Hedvat:

Re: Updated Renewal ACPL
Laboratory Certification ID # 20012

The Non-potable Water (NPW) cyanide methods were updated with the most recent Method Update Rule (MUR); however your laboratory's Annual Certified Parameter List (ACPL) was issued with the old methods. The OQA has updated the NPW cyanide methods to reflect the update to the new methods in the MUR. Your Fiscal Year 2023 ACPL has been updated to reflect the correct updated methods. This new ACPL will replace the one originally mailed to your laboratory. If there are any discrepancies, please contact your Laboratory Certification Officer to verify information and make arrangements for a new ACPL. Please find enclosed an updated ACPL.

If this office can be of any further assistance, please contact your certification officer or me at (609) 292-3950.

Sincerely,

Michele M. Potter
Manager

Enclosure: ACPL

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: AE04 --Organics Analysis

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	AE04.17950	Acetone	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.18300	Allyl chloride	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.18400	Benzene	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.18450	Benzyl chloride	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.18600	Bromodichloromethane	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.18650	Bromoform	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.18700	Bromomethane	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.18750	Butadiene (1,3-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.18850	Butylbenzene (n-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.18900	Carbon disulfide	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.19000	Carbon tetrachloride	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.19150	Chlorobenzene	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.19200	Chloroethane	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.19250	Chloroform	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.19300	Chloromethane	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.19400	Chlorotoluene (2-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.19500	Cyclohexane	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.19650	Dibromochloromethane	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.19700	Dibromoethane (1,2-) (EDB)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.19750	Dichlorobenzene (1,2-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.19800	Dichlorobenzene (1,3-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.19850	Dichlorobenzene (1,4-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.19900	Dichlorodifluoromethane	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.19950	Dichloroethane (1,1-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.20000	Dichloroethane (1,2-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.20050	Dichloroethene (1,1-)	GC/MS, Canisters	EPA TO-15	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: AE04 --Organics Analysis

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	AE04.20100	Dichloroethene (cis-1,2-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.20150	Dichloroethene (trans-1,2-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.20250	Dichloropropane (1,2-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.20300	Dichloropropene (cis-1,3-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.20350	Dichloropropene (trans-1,3-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.20400	Dichlorotetrafluoroethane (1,2-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.20750	Dioxane (1,4-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.20900	Ethanol	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.20950	Ethyl acetate	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.21100	Ethylbenzene	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.21250	Ethyltoluene (4-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.21400	Heptane (n-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.21450	Hexachlorobutadiene (1,3-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.21550	Hexane (n-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.21600	Hexanone (2-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.21700	Isopropanol	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.21750	Isopropylbenzene	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.21850	Methyl ethyl ketone (MEK)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.21950	Methyl isobutyl ketone (MIBK)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.22050	Methyl methacrylate	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.22100	Methyl tert-butyl ether	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.22150	Methylene chloride (Dichloromethane)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.22300	Naphthalene	GC/MS, Canisters	EPA TO-15	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: AE04 --Organics Analysis

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	AE04.22850	Propylbenzene (n-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.22950	Propylene	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.23100	Sec-butylbenzene	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.23150	Styrene	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.23250	Tert-butyl alcohol	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.23300	Tert-butylbenzene	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.23350	Tetrachloroethane (1,1,2,2-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.23400	Tetrachloroethene	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.23450	Tetrahydrofuran	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.23500	Toluene	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.23550	Trichloro (1,1,2-) trifluoroethane (1,2,2-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.23600	Trichlorobenzene (1,2,4-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.23650	Trichloroethane (1,1,1-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.23700	Trichloroethane (1,1,2-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.23750	Trichloroethene	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.23800	Trichlorofluoromethane	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.24050	Trimethylbenzene (1,2,4-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.24100	Trimethylbenzene (1,3,5-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.24150	Trimethylpentane (2,2,4-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.24200	Vinyl acetate	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.24250	Vinyl bromide	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.24300	Vinyl chloride	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.24350	Xylene (m-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.24400	Xylene (o-)	GC/MS, Canisters	EPA TO-15	NJ
Certified	Yes	AE04.24450	Xylene (p-)	GC/MS, Canisters	EPA TO-15	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: AE04 --Organics Analysis

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	AE04.24500	Xylenes (total)	GC/MS, Canisters	EPA TO-15	NJ

Category: CLP-1--NPW - Multi-Concentration Inorganics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-1.00960	Aluminum	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.00970	Aluminum	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.00980	Antimony	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.00990	Antimony	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01000	Arsenic	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01010	Arsenic	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01020	Barium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01030	Barium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01040	Beryllium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01050	Beryllium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01060	Cadmium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01070	Cadmium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01080	Calcium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01090	Calcium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01100	Chromium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01110	Chromium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01120	Cobalt	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01130	Cobalt	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01140	Copper	ICP	EPA ISM02.4	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: CLP-1--NPW - Multi-Concentration Inorganics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-1.01150	Copper	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01160	Cyanide, Total in Water and Soil / Sediments	Micro Distillation, Spectrophotometric	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01170	Cyanide, Total in Water and Soil / Sediments	Midi Distillation, Spectrophotometric	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01180	Hardness - total as CaCO3	ICP/Calculation	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01190	Iron	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01200	Iron	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01210	Lead	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01220	Lead	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01230	Magnesium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01240	Magnesium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01250	Manganese	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01260	Manganese	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01270	Mercury	CVAA	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01280	Nickel	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01290	Nickel	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01300	Potassium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01310	Potassium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01320	Selenium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01330	Selenium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01340	Silver	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01350	Silver	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01360	Sodium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01370	Sodium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01380	Thallium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01390	Thallium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01400	Vanadium	ICP	EPA ISM02.4	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: CLP-1--NPW - Multi-Concentration Inorganics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-1.01410	Vanadium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01420	Zinc	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-1.01430	Zinc	ICP/MS	EPA ISM02.4	NJ

Category: CLP-2--NPW - Multi-Concentration Organics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-2.01500	Acenaphthene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01510	Acenaphthylene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01520	Acetophenone	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01530	Anthracene	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01540	Atrazine	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01550	Benzaldehyde	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01560	Benzo(a)anthracene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01570	Benzo(a)pyrene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01580	Benzo(b)fluoranthene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01590	Benzo(ghi)perylene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01600	Benzo(k)fluoranthene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01610	Biphenyl (1,1'-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01620	Bis (2-chloroethoxy) methane	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01630	Bis (2-chloroethyl) ether	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01640	Bis(2-chloroisopropyl) ether|2,2'-oxybis(1-chloropropane)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: CLP-2--NPW - Multi-Concentration Organics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-2.01650	Bis (2-ethylhexyl) phthalate	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01660	Bromophenyl-phenyl ether (4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01670	Butylbenzylphthalate	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01680	Caprolactam	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01690	Carbazole	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01692	Chloroaniline (4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01700	Chloronaphthalene (2-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01710	Chlorophenol (2-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01720	Chlorophenyl-phenyl ether (4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01730	Chrysene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01740	Dibenzo(a,h)anthracene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01750	Dibenzofuran	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01760	Dichlorobenzidine (3,3'-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01770	Dichlorophenol (2,4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01780	Diethyl phthalate	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01790	Dimethyl phthalate	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01800	Dimethylphenol (2,4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01810	Di-n-butyl phthalate	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01820	Dinitrophenol (2,4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01830	Dinitrophenol (2-methyl-4,6-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01840	Dinitrotoluene (2,4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01850	Dinitrotoluene (2,6-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01860	Di-n-octyl phthalate	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01870	Dioxane (1,4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01880	Fluoranthene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: CLP-2--NPW - Multi-Concentration Organics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-2.01890	Fluorene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01900	Hexachlorobenzene	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01910	Hexachlorobutadiene (1,3-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01920	Hexachlorocyclopentadiene	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01930	Hexachloroethane	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01940	Indeno(1,2,3-cd)pyrene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01950	Isophorone	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01960	Methyl phenol (4-chloro-3-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01970	Methylnaphthalene (2-)	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01980	Methylphenol (2-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.01990	Methylphenol (3-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02000	Methylphenol (4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02010	Naphthalene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02020	Nitroaniline (2-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02030	Nitroaniline (3-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02040	Nitroaniline (4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02050	Nitroaromatics and isophorone	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02060	Nitrobenzene	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02070	Nitrophenol (2-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02080	Nitrophenol (4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02090	N-Nitroso-di-n-propylamine	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02100	N-Nitrosodiphenylamine	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02110	Pentachlorophenol	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02120	Phenanthrene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: CLP-2--NPW - Multi-Concentration Organics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-2.02130	Phenol	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02140	Pyrene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02150	Tetrachlorobenzene (1,2,4,5-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02160	Tetrachlorophenol (2,3,4,6-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02170	Trichlorophenol (2,4,5-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02180	Trichlorophenol (2,4,6-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02190	Aldrin	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02200	Alpha BHC	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02210	Beta BHC	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02220	Chlordane (alpha) (cis-)	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02230	Chlordane (gamma) (trans-)	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02240	DDD (4,4'-)	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02250	DDE (4,4'-)	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02260	DDT (4,4'-)	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02270	Delta BHC	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02280	Dieldrin	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02290	Endosulfan I	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02300	Endosulfan II	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02310	Endosulfan sulfate	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02320	Endrin	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02330	Endrin aldehyde	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02340	Endrin ketone	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02350	Heptachlor	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02360	Heptachlor epoxide	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02370	Lindane (gamma BHC)	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02380	Methoxychlor	Extraction/GC (ECD)	EPA SOM02.4	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: CLP-2--NPW - Multi-Concentration Organics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-2.02390	PCB 1016	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02400	PCB 1221	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02410	PCB 1232	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02420	PCB 1242	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02430	PCB 1248	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02440	PCB 1254	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02450	PCB 1260	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02460	PCB 1262	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02470	PCB 1268	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02480	Toxaphene	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02490	Acetone	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02500	Benzene	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02510	Bromochloromethane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02520	Bromodichloromethane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02530	Bromoform	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02540	Bromomethane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02550	Butanone (2-) (Methyl ethyl ketone)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02560	Carbon disulfide	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02570	Carbon tetrachloride	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02580	Chlorobenzene	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02590	Chloroethane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02600	Chloroform	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02610	Chloromethane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02620	Cyclohexane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02630	Dibromo-3-chloropropane (1,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02640	Dibromochloromethane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: CLP-2--NPW - Multi-Concentration Organics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-2.02650	Dibromoethane (1,2-) (EDB)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02660	Dichlorobenzene (1,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02670	Dichlorobenzene (1,3-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02680	Dichlorobenzene (1,4-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02690	Dichlorodifluoromethane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02700	Dichloroethane (1,1-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02710	Dichloroethane (1,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02720	Dichloroethene (1,1-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02730	Dichloroethene (cis-1,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02740	Dichloroethene (trans-1,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02750	Dichloropropane (1,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02760	Dichloropropene (cis-1,3-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02770	Dichloropropene (trans-1,3-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02780	Ethylbenzene	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02790	Hexanone (2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02800	Isopropylbenzene	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02810	Methyl acetate	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02820	Methylcyclohexane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02830	Methylene chloride (Dichloromethane)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02840	Pentanone (4-methyl-2-) (MIBK)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02850	Styrene	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02860	Tert-butyl methyl ether	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02870	Tetrachloroethane (1,1,2,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: CLP-2--NPW - Multi-Concentration Organics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-2.02880	Tetrachloroethene	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02890	Toluene	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02900	Trichloro (1,1,2-) trifluoroethane (1,2,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02910	Trichlorobenzene (1,2,3-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02920	Trichlorobenzene (1,2,4-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02930	Trichloroethane (1,1,1-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02940	Trichloroethane (1,1,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02950	Trichloroethene	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02960	Trichlorofluoromethane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02970	Vinyl chloride	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02980	Xylene (m- + p-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-2.02990	Xylene (o-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ

Category: CLP-4--SCM - Multi-Concentration Inorganics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-4.00840	Aluminum	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.00850	Aluminum	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.00860	Antimony	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.00870	Antimony	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.00880	Arsenic	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.00890	Arsenic	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.00900	Barium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.00910	Barium	ICP/MS	EPA ISM02.4	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: CLP-4--SCM - Multi-Concentration Inorganics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-4.00920	Beryllium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.00930	Beryllium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.00940	Cadmium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.00950	Cadmium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.00960	Calcium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.00970	Calcium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.00980	Chromium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.00990	Chromium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01000	Cobalt	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01010	Cobalt	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01020	Copper	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01030	Copper	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01040	Cyanide, Total in Water and Soil / Sediments	Micro Distillation, Spectrophotometric	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01050	Cyanide, Total in Water and Soil / Sediments	Midi Distillation, Spectrophotometric	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01060	Hardness - total as CaCO3	ICP/Calculation	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01070	Iron	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01080	Iron	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01090	Lead	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01100	Lead	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01110	Magnesium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01120	Magnesium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01130	Manganese	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01140	Manganese	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01150	Mercury	CVAA	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01160	Nickel	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01170	Nickel	ICP/MS	EPA ISM02.4	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: CLP-4--SCM - Multi-Concentration Inorganics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-4.01180	Potassium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01190	Potassium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01200	Selenium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01210	Selenium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01220	Silver	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01230	Silver	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01240	Sodium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01250	Sodium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01260	Thallium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01270	Thallium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01280	Vanadium	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01290	Vanadium	ICP/MS	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01300	Zinc	ICP	EPA ISM02.4	NJ
Certified	Yes	CLP-4.01310	Zinc	ICP/MS	EPA ISM02.4	NJ

Category: CLP-5--SCM - Multi-Concentration Organics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-5.01500	Acenaphthene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01510	Acenaphthylene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01520	Acetophenone	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01530	Anthracene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01540	Atrazine	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01550	Benzaldehyde	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: CLP-5--SCM - Multi-Concentration Organics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-5.01560	Benzo(a)anthracene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01570	Benzo(a)pyrene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01580	Benzo(b)fluoranthene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01590	Benzo(ghi)perylene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01600	Benzo(k)fluoranthene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01610	Biphenyl (1,1'-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01620	Bis (2-chloroethoxy) methane	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01630	Bis (2-chloroethyl) ether	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01640	Bis(2-chloroisopropyl) ether|2,2'-oxybis(1-chloropropane)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01650	Bis (2-ethylhexyl) phthalate	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01660	Bromophenyl-phenyl ether (4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01670	Butylbenzylphthalate	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01680	Caprolactam	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01690	Carbazole	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01692	Chloroaniline (4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01700	Chloronaphthalene (2-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01710	Chlorophenol (2-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01720	Chlorophenyl-phenyl ether (4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01730	Chrysene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01740	Dibenzo(a,h)anthracene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01750	Dibenzofuran	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01760	Dichlorobenzidine (3,3'-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01770	Dichlorophenol (2,4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01780	Diethyl phthalate	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: CLP-5--SCM - Multi-Concentration Organics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-5.01790	Dimethyl phthalate	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01800	Dimethylphenol (2,4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01810	Di-n-butyl phthalate	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01820	Dinitrophenol (2,4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01830	Dinitrophenol (2-methyl-4,6-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01840	Dinitrotoluene (2,4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01850	Dinitrotoluene (2,6-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01860	Di-n-octyl phthalate	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01870	Dioxane (1,4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01880	Fluoranthene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01890	Fluorene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01900	Hexachlorobenzene	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01910	Hexachlorobutadiene (1,3-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01920	Hexachlorocyclopentadiene	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01930	Hexachloroethane	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01940	Indeno(1,2,3-cd)pyrene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01950	Isophorone	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01960	Methyl phenol (4-chloro-3-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01970	Methylnaphthalene (2-)	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01980	Methylphenol (2-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.01990	Methylphenol (3-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02000	Methylphenol (4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02010	Naphthalene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02020	Nitroaniline (2-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02030	Nitroaniline (3-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: CLP-5--SCM - Multi-Concentration Organics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-5.02040	Nitroaniline (4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02050	Nitroaromatics and isophorone	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02060	Nitrobenzene	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02070	Nitrophenol (2-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02080	Nitrophenol (4-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02090	N-Nitroso-di-n-propylamine	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02100	N-Nitrosodiphenylamine	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02110	Pentachlorophenol	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02120	Phenanthrene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02130	Phenol	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02140	Pyrene	Extraction, GC/MS/SIM, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02150	Tetrachlorobenzene (1,2,4,5-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02160	Tetrachlorophenol (2,3,4,6-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02170	Trichlorophenol (2,4,5-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02180	Trichlorophenol (2,4,6-)	Extraction, GC/MS, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02190	Aldrin	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02200	Alpha BHC	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02210	Beta BHC	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02220	Chlordane (alpha) (cis-)	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02230	Chlordane (gamma) (trans-)	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02240	DDD (4,4'-)	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02250	DDE (4,4'-)	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02260	DDT (4,4'-)	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02270	Delta BHC	Extraction/GC (ECD)	EPA SOM02.4	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: CLP-5--SCM - Multi-Concentration Organics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-5.02280	Dieldrin	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02290	Endosulfan I	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02300	Endosulfan II	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02310	Endosulfan sulfate	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02320	Endrin	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02330	Endrin aldehyde	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02340	Endrin ketone	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02350	Heptachlor	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02360	Heptachlor epoxide	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02370	Lindane (gamma BHC)	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02380	Methoxychlor	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02390	PCB 1016	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02400	PCB 1221	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02410	PCB 1232	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02420	PCB 1242	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02430	PCB 1248	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02440	PCB 1254	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02450	PCB 1260	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02460	PCB 1262	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02470	PCB 1268	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02480	Toxaphene	Extraction/GC (ECD)	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02490	Acetone	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02500	Benzene	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02510	Bromochloromethane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02520	Bromodichloromethane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02530	Bromoform	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02540	Bromomethane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: CLP-5--SCM - Multi-Concentration Organics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-5.02550	Butanone (2-) (Methyl ethyl ketone)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02560	Carbon disulfide	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02570	Carbon tetrachloride	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02580	Chlorobenzene	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02590	Chloroethane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02600	Chloroform	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02610	Chloromethane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02620	Cyclohexane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02630	Dibromo-3-chloropropane (1,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02640	Dibromochloromethane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02650	Dibromoethane (1,2-) (EDB)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02660	Dichlorobenzene (1,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02670	Dichlorobenzene (1,3-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02680	Dichlorobenzene (1,4-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02690	Dichlorodifluoromethane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02700	Dichloroethane (1,1-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02710	Dichloroethane (1,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02720	Dichloroethene (1,1-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02730	Dichloroethene (cis-1,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02740	Dichloroethene (trans-1,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02750	Dichloropropane (1,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02760	Dichloropropene (cis-1,3-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02770	Dichloropropene (trans-1,3-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02780	Ethylbenzene	GC/MS, P & T, Capillary	EPA SOM02.4	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: CLP-5--SCM - Multi-Concentration Organics

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	CLP-5.02790	Hexanone (2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02800	Isopropylbenzene	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02810	Methyl acetate	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02820	Methylcyclohexane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02830	Methylene chloride (Dichloromethane)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02840	Pentanone (4-methyl-2-) (MIBK)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02850	Styrene	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02860	Tert-butyl methyl ether	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02870	Tetrachloroethane (1,1,2,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02880	Tetrachloroethene	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02890	Toluene	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02900	Trichloro (1,1,2-) trifluoroethane (1,2,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02910	Trichlorobenzene (1,2,3-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02920	Trichlorobenzene (1,2,4-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02930	Trichloroethane (1,1,1-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02940	Trichloroethane (1,1,2-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02950	Trichloroethene	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02960	Trichlorofluoromethane	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02970	Vinyl chloride	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02980	Xylene (m- + p-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ
Certified	Yes	CLP-5.02990	Xylene (o-)	GC/MS, P & T, Capillary	EPA SOM02.4	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: DW03 --Inorganic Parameters

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	DW03.07800	Turbidity	Nephelometric	EPA 180.1	NJ
Certified	Yes	DW03.08100	Turbidity	Nephelometric	SM 2130 B	NJ

Category: DW06 --Metals

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	DW06.01500	Mercury	Manual Cold Vapor	EPA 245.1	NJ

Category: DW07 --Metals - ICP, ICP/MS and DCP

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	DW07.00950	Aluminum	ICP	EPA 200.7	NJ
Certified	Yes	DW07.01000	Barium	ICP	EPA 200.7	NJ
Certified	Yes	DW07.01050	Beryllium	ICP	EPA 200.7	NJ
Certified	Yes	DW07.01100	Boron	ICP	EPA 200.7	NJ
Certified	Yes	DW07.01150	Cadmium	ICP	EPA 200.7	NJ
Certified	Yes	DW07.01200	Calcium	ICP	EPA 200.7	NJ
Certified	Yes	DW07.01250	Chromium	ICP	EPA 200.7	NJ
Certified	Yes	DW07.01300	Cobalt	ICP	EPA 200.7	NJ
Certified	Yes	DW07.01350	Copper	ICP	EPA 200.7	NJ
Certified	Yes	DW07.01400	Iron	ICP	EPA 200.7	NJ
Certified	Yes	DW07.01500	Magnesium	ICP	EPA 200.7	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: DW07 --Metals - ICP, ICP/MS and DCP

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	DW07.01550	Manganese	ICP	EPA 200.7	NJ
Certified	Yes	DW07.01650	Nickel	ICP	EPA 200.7	NJ
Certified	Yes	DW07.01700	Potassium	ICP	EPA 200.7	NJ
Certified	Yes	DW07.01750	Silica	ICP	EPA 200.7	NJ
Certified	Yes	DW07.01800	Silver	ICP	EPA 200.7	NJ
Certified	Yes	DW07.01850	Sodium	ICP	EPA 200.7	NJ
Certified	Yes	DW07.01900	Strontium	ICP	EPA 200.7	NJ
Certified	Yes	DW07.02050	Vanadium	ICP	EPA 200.7	NJ
Certified	Yes	DW07.02100	Zinc	ICP	EPA 200.7	NJ
Certified	Yes	DW07.02150	Aluminum	ICP/MS	EPA 200.8	NJ
Certified	Yes	DW07.02200	Antimony	ICP/MS	EPA 200.8	NJ
Certified	Yes	DW07.02250	Arsenic	ICP/MS	EPA 200.8	NJ
Certified	Yes	DW07.02300	Barium	ICP/MS	EPA 200.8	NJ
Certified	Yes	DW07.02350	Beryllium	ICP/MS	EPA 200.8	NJ
Certified	Yes	DW07.02400	Cadmium	ICP/MS	EPA 200.8	NJ
Certified	Yes	DW07.02450	Chromium	ICP/MS	EPA 200.8	NJ
Certified	Yes	DW07.02500	Cobalt	ICP/MS	EPA 200.8	NJ
Certified	Yes	DW07.02550	Copper	ICP/MS	EPA 200.8	NJ
Certified	Yes	DW07.02600	Lead	ICP/MS	EPA 200.8	NJ
Certified	Yes	DW07.02650	Manganese	ICP/MS	EPA 200.8	NJ
Certified	Yes	DW07.02800	Nickel	ICP/MS	EPA 200.8	NJ
Certified	Yes	DW07.02850	Selenium	ICP/MS	EPA 200.8	NJ
Certified	Yes	DW07.02900	Silver	ICP/MS	EPA 200.8	NJ
Certified	Yes	DW07.02950	Thallium	ICP/MS	EPA 200.8	NJ
Certified	Yes	DW07.03050	Vanadium	ICP/MS	EPA 200.8	NJ
Certified	Yes	DW07.03100	Zinc	ICP/MS	EPA 200.8	NJ
Certified	Yes	DW07.03150	Calcium-hardness	Ca as Carbonate, ICP	SM 2340 B	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: DW07 --Metals - ICP, ICP/MS and DCP

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	DW07.03200	Total hardness	Hardness By Calculation, ICP	SM 2340 B	NJ

Category: DW08 --Organic Parameters - Chromatography

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	DW08.03550	Dibromo-3-chloropropane (1,2-)	Solvent Extract, GC	EPA 504.1	NJ
Certified	Yes	DW08.03600	Dibromoethane (1,2-) (EDB)	Solvent Extract, GC	EPA 504.1	NJ
Applied	No	DW08.03650	Trichloropropane (1,2,3-)	Solvent Extract, GC	EPA 504.1	NJ

Category: DW09 --Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	DW09.11450	Acetone	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.11500	Acrylonitrile	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.11550	Allyl chloride	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.11600	Benzene	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.11650	Bromobenzene	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.11700	Bromochloromethane	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.11750	Bromodichloromethane	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.11800	Bromoform	GC/MS, P & T	EPA 524.2	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: DW09 --Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	DW09.11850	Bromomethane	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.11900	Butanone (2-) (Methyl ethyl ketone)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.11950	Butylbenzene (n-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12000	Carbon disulfide	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12050	Carbon tetrachloride	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12150	Chlorobenzene	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12200	Chlorobutane (1-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12250	Chloroethane	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12300	Chloroform	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12350	Chloromethane	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12400	Chlorotoluene (2-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12450	Chlorotoluene (4-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12500	Dibromo-3-chloropropane (1,2-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12550	Dibromochloromethane	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12600	Dibromoethane (1,2-) (EDB)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12650	Dibromomethane	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12700	Dichloro-2-butene (trans-1,4-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12750	Dichlorobenzene (1,2-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12800	Dichlorobenzene (1,3-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12850	Dichlorobenzene (1,4-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12900	Dichlorodifluoromethane	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.12950	Dichloroethane (1,1-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.13000	Dichloroethane (1,2-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.13050	Dichloroethene (1,1-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.13100	Dichloroethene (cis-1,2-)	GC/MS, P & T	EPA 524.2	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: DW09 --Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	DW09.13150	Dichloroethene (trans-1,2-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.13200	Dichloropropane (1,2-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.13250	Dichloropropane (1,3-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.13300	Dichloropropane (2,2-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.13400	Dichloropropene (1,1-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.13450	Dichloropropene (cis-1,3-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.13500	Dichloropropene (trans-1,3-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.13550	Diethyl ether (Ethyl ether)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.13650	Ethyl methacrylate	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.13700	Ethylbenzene	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.13800	Hexachlorobutadiene (1,3-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.13850	Hexachloroethane	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.13950	Hexanone (2-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.14000	Isopropylbenzene	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.14050	Isopropyltoluene (4-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.14100	Methacrylonitrile	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.14150	Methyl acrylate	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.14200	Methyl iodide	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.14250	Methyl methacrylate	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.14300	Methyl tert-butyl ether	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.14350	Methylene chloride (Dichloromethane)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.14400	Naphthalene	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.14450	Nitrobenzene	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.14550	Pentachloroethane	GC/MS, P & T	EPA 524.2	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: DW09 --Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	DW09.14600	Pentanone (4-methyl-2-) (MIBK)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.14650	Propionitrile	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.14700	Propylbenzene (n-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.14750	Sec-butylbenzene	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.14800	Styrene	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.14900	Tert-butyl alcohol	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.14950	Tert-butylbenzene	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.15000	Tetrachloroethane (1,1,1,2-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.15050	Tetrachloroethane (1,1,2,2-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.15100	Tetrachloroethene	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.15150	Tetrahydrofuran	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.15200	Toluene	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.15250	Trichlorobenzene (1,2,3-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.15300	Trichlorobenzene (1,2,4-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.15400	Trichloroethane (1,1,1-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.15450	Trichloroethane (1,1,2-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.15500	Trichloroethene	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.15550	Trichlorofluoromethane	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.16000	Trichloropropane (1,2,3-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.16050	Trimethylbenzene (1,2,4-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.16100	Trimethylbenzene (1,3,5-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.16150	Vinyl chloride	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.16200	Xylene (m- + p-)	GC/MS, P & T	EPA 524.2	NJ
Certified	Yes	DW09.16250	Xylene (o-)	GC/MS, P & T	EPA 524.2	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: DW09 --Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	DW09.16300	Xylenes (total)	GC/MS, P & T	EPA 524.2	NJ

Category: NPW03--Inorganic Parameters

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW03.00350	Alkalinity as CaCO3	Electrometric Titration	SM 2320 B-11	NJ
Certified	Yes	NPW03.01150	Ammonia	Distillation or Gas Diffusion, Semi-automated Phenate	SM 4500-NH3 B plus G-11	NJ
Certified	Yes	NPW03.01550	Biochemical oxygen demand	Dissolved Oxygen Depletion - Membrane Electrode	SM 5210 B-16	NJ
Certified	Yes	NPW03.02400	Bromide	Ion Chromatography	EPA 300.0	NJ
Certified	Yes	NPW03.02500	Bromide	Ion Chromatography	SW-846 9056A	NJ
Certified	Yes	NPW03.02900	Carbonaceous BOD (CBOD)	Diss. Oxygen Depl., Nitrif. Inhib. - Membrane Electrode	SM 5210 B-16	NJ
Certified	Yes	NPW03.03600	Chemical oxygen demand	Spectrophotometric Manual/Auto	SM 5220 D-11	NJ
Certified	Yes	NPW03.04150	Chloride	Titrimetric, Mercuric Nitrate	SM 4500-Cl C-11	NJ
Certified	Yes	NPW03.04900	Chloride	Ion Chromatography	EPA 300.0	NJ
Certified	Yes	NPW03.05100	Chloride	Ion Chromatography	SW-846 9056A	NJ
Certified	Yes	NPW03.06000	Color	Colorimetric (Platinum-Cobalt)	SM 2120 B-11	NJ
Certified	Yes	NPW03.06300	Cyanide	Titrimetric/Manual Spectrophotometric	SW-846 9014	NJ
Certified	Yes	NPW03.06400	Cyanide	Distillation, Spectrophotometric (Manual)	SM 4500-CN B-16 plus E-16	NJ
Certified	Yes	NPW03.06450	Cyanide	Distillation, Spectrophotometric (Manual)	SM 4500-CN C-16 plus E-16	NJ
Certified	Yes	NPW03.06850	Cyanide	Colorimetric, Automated	SW-846 9012B	NJ
Certified	Yes	NPW03.07200	Cyanide	Distillation	SW-846 9010C	NJ
Certified	Yes	NPW03.07300	Cyanide - amenable to Cl2	Manual Distillation, Titrimetr/Spectro	SM 4500-CN B-16 plus G-16	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW03--Inorganic Parameters

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW03.07350	Cyanide - amenable to Cl2	Manual Distillation, Titrimetr/Spectro	SM 4500-CN C-16 plus G-16	NJ
Certified	Yes	NPW03.07600	Cyanide - amenable to Cl2	Distillation	SW-846 9010C	NJ
Certified	Yes	NPW03.07700	Dissolved organic carbon (DOC)	Filtration and Combustion	SM 5310 B-11	NJ
Certified	Yes	NPW03.08500	Fluoride	Ion Chromatography	EPA 300.0	NJ
Certified	Yes	NPW03.08700	Fluoride	Ion Chromatography	SW-846 9056A	NJ
Certified	Yes	NPW03.09850	Kjeldahl nitrogen - total	Digestion, Dist. or Gas Diffusion, Semi-auto. phenate	SM 4500-N Org C-11 plus NH3 B plus G-11	NJ
Applied	No	NPW03.10400	Kjeldahl nitrogen - total	Digestion, Distillation, Titration	SM 4500-N Org C-11 plus NH3 B-11 plus NH3 C-11	NJ
Certified	Yes	NPW03.11050	Nitrate	Ion Chromatography	EPA 300.0	NJ
Certified	Yes	NPW03.11250	Nitrate	Ion Chromatography	SW-846 9056A	NJ
Certified	Yes	NPW03.12450	Nitrate - nitrite	Ion Chromatography	EPA 300.0	NJ
Certified	Yes	NPW03.12950	Nitrite	Spectrophotometric, Manual	SM 4500-NO2 B-11	NJ
Certified	Yes	NPW03.13650	Nitrite	Ion Chromatography	EPA 300.0	NJ
Certified	Yes	NPW03.13900	Nitrite	Ion Chromatography	SW-846 9056A	NJ
Certified	Yes	NPW03.14100	Oil & grease - hem-LL	Gravimetric, Hexane Extractable Material-LL	EPA 1664A	NJ
Certified	Yes	NPW03.14650	Oil & grease - sgt-non polar	Gravimetric, Silica Gel Treated-Hem-LL	EPA 1664A	NJ
Certified	Yes	NPW03.14750	Organic nitrogen	Total Kjeldahl-N Minus Ammonia-N	SM TKN - NH3 method references	NJ
Certified	Yes	NPW03.15350	Orthophosphate	Ascorbic Acid, Manual Single Reagent	SM 4500-P E-11	NJ
Certified	Yes	NPW03.15550	Orthophosphate	Ion Chromatography	EPA 300.0	NJ
Certified	Yes	NPW03.16150	Orthophosphate	Ion Chromatography	SW-846 9056A	NJ
Certified	Yes	NPW03.16600	Phenols	Manual Distillation, Colorimetric 4AAP, Manual	EPA 420.1	NJ
Certified	Yes	NPW03.16700	Phenols	Manual Distillation, Colorimetric 4AAP, Manual	SW-846 9065	NJ
Certified	Yes	NPW03.17100	Phosphorus (total)	Persulfate Digestion + Manual	EPA 365.3	NJ
Certified	Yes	NPW03.17850	Residue - filterable (TDS)	Gravimetric, 180 Degrees C	SM 2540 C-15	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW03--Inorganic Parameters

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW03.18000	Residue - nonfilterable (TSS)	Gravimetric, 103-105 Degrees C, Post Washing	SM 2540 D-15	NJ
Certified	Yes	NPW03.18100	Residue - settleable	Volumetric (Imhoff Cone) or Gravimetric	SM 2540 F-15	NJ
Certified	Yes	NPW03.18150	Residue - total	Gravimetric, 103-105 Degrees C	SM 2540 B-15	NJ
Certified	Yes	NPW03.18250	Residue - volatile	Gravimetric, 550 Degrees C	EPA 160.4	NJ
Applied	No	NPW03.18400	Salinity	Electrical Conductivity	SM 2520 B	NJ
Certified	Yes	NPW03.18750	Specific conductance	Wheatstone Bridge	EPA 120.1	NJ
Certified	Yes	NPW03.18800	Specific conductance	Wheatstone Bridge	SM 2510 B-11	NJ
Certified	Yes	NPW03.18850	Specific conductance	Wheatstone Bridge	SW-846 9050A	NJ
Certified	Yes	NPW03.19500	Sulfate	Turbidimetric	SW-846 9038	NJ
Certified	Yes	NPW03.19850	Sulfate	Ion Chromatography	EPA 300.0	NJ
Certified	Yes	NPW03.20050	Sulfate	Ion Chromatography	SW-846 9056A	NJ
Certified	Yes	NPW03.20550	Sulfides - extractable	Water Extraction, Distillation	SW-846 9031	NJ
Certified	Yes	NPW03.20600	Sulfides, acid sol. & insol.	Redox Titration	SW-846 9030B	NJ
Certified	Yes	NPW03.20650	Sulfides, acid sol. & insol.	Titration	SW-846 9034	NJ
Certified	Yes	NPW03.21110	Total organic carbon (TOC)	Combustion	SM 5310 B-14	NJ
Certified	Yes	NPW03.21450	Total organic carbon (TOC)	Infrared Spectrometry or FID	SW-846 9060A	NJ
Certified	Yes	NPW03.21850	Total, fixed, and volatile solids (SQAR)	Gravimetric, 500 Degrees C	SM 2540 G SM 18th Ed.	NJ
Certified	Yes	NPW03.22100	Turbidity	Nephelometric	EPA 180.1	NJ
Certified	Yes	NPW03.22150	Turbidity	Nephelometric	SM 2130 B-11	NJ

Category: NPW04--Analyze-Immed. and Continuous Monitoring

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW04.00400	Chlorine	Spectrophotometric, DPD	SM 4500-Cl G-11	NJ
Certified	Yes	NPW04.00950	Oxygen (dissolved)	Membrane Electrode	SM 4500-O G-16	NJ
Certified	Yes	NPW04.01300	Oxygen (dissolved)	Winkler, Azide Modification	SM 4500-O C-16	NJ
Certified	Yes	NPW04.01650	pH	Electrometric	SM 4500-H B-11	NJ
Certified	Yes	NPW04.01750	pH (corrosivity)	Aqueous, Electrometric	SW-846 9040C	NJ
Certified	Yes	NPW04.01800	pH	Wide Range pH Paper	SW-846 9041A	NJ
Certified	Yes	NPW04.01950	Temperature	Thermometric	SM 2550 B-10	NJ

Category: NPW06--Metals - NPW Preparation Methods

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW06.00050	Metals	TCLP, Toxicity Procedure, Shaker	SW-846 1311	NJ
Certified	Yes	NPW06.00100	Metals	Synthetic PPT Leachate Procedure	SW-846 1312	NJ
Certified	Yes	NPW06.00150	Metals	Multiple Extractions	SW-846 1320	NJ
Certified	Yes	NPW06.00200	Metals, Total Rec and Dissolved	Acid Digestion/Surface and Groundwater	SW-846 3005A	NJ
Certified	Yes	NPW06.00250	Metals, Total	Acid Digestion/Aqueous Samples	SW-846 3010A	NJ

Category: NPW07--Metals

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW07.03350	Mercury	Manual Cold Vapor	EPA 245.1	NJ
Certified	Yes	NPW07.08650	Chromium (VI)	0.45u Filter, Colorimetric DPC	SM 3500-Cr B-11	NJ
Certified	Yes	NPW07.11950	Chromium (VI)	Colorimetric	SW-846 7196A	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW07--Metals

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW07.12150	Mercury - liquid waste	AA, Manual Cold Vapor	SW-846 7470A	NJ

Category: NPW08--Metals - ICP, ICP/MS and DCP

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW08.04150	Aluminum	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.04200	Antimony	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.04250	Arsenic	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.04300	Barium	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.04350	Beryllium	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.04400	Boron	ICP	EPA 200.7	NJ
Certified	Yes	NPW08.04450	Cadmium	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.04500	Calcium	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.04550	Chromium	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.04600	Cobalt	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.04650	Copper	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.04700	Iron	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.04750	Lead	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.04850	Magnesium	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.04900	Manganese	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.04950	Molybdenum	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.05000	Nickel	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.05100	Potassium	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.05150	Selenium	Digestion, ICP	EPA 200.7	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW08--Metals - ICP, ICP/MS and DCP

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW08.05200	Silica - dissolved	0.45u Filtration + ICP	EPA 200.7	NJ
Certified	Yes	NPW08.05250	Silver	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.05300	Sodium	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.05350	Strontium	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.05400	Thallium	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.05450	Tin	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.05500	Titanium	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.05550	Vanadium	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.05600	Zinc	Digestion, ICP	EPA 200.7	NJ
Certified	Yes	NPW08.05650	Aluminum	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.05700	Antimony	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.05750	Arsenic	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.05800	Barium	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.05850	Beryllium	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.05950	Cadmium	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.06000	Calcium	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.06050	Chromium	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.06100	Cobalt	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.06150	Copper	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.06250	Iron	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.06300	Lead	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.06350	Magnesium	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.06400	Manganese	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.06450	Molybdenum	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.06500	Nickel	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.06550	Potassium	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.06600	Selenium	Digestion, ICP/MS	EPA 200.8	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW08--Metals - ICP, ICP/MS and DCP

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW08.06700	Silver	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.06750	Sodium	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.06850	Thallium	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.06900	Thorium	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.06950	Tin	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.07000	Titanium	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.07100	Uranium	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.07150	Vanadium	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.07200	Zinc	Digestion, ICP/MS	EPA 200.8	NJ
Certified	Yes	NPW08.09800	Hardness - total as CaCO3	Ca + Mg Carbonates, ICP	SM 2340 B-11	NJ
Certified	Yes	NPW08.12800	Aluminum	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.12850	Antimony	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.12900	Arsenic	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.12950	Barium	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13000	Beryllium	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13050	Boron	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13100	Cadmium	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13150	Calcium	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13200	Chromium	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13250	Cobalt	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13300	Copper	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13350	Iron	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13400	Lead	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13450	Lithium	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13500	Magnesium	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13550	Manganese	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13600	Molybdenum	ICP	SW-846 6010D	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW08--Metals - ICP, ICP/MS and DCP

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW08.13650	Nickel	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13750	Potassium	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13800	Selenium	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13850	Silver	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13900	Sodium	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.13950	Strontium	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.14000	Thallium	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.14100	Tin	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.14150	Titanium	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.14250	Vanadium	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.14300	Zinc	ICP	SW-846 6010D	NJ
Certified	Yes	NPW08.14400	Aluminum	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.14450	Antimony	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.14500	Arsenic	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.14550	Barium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.14600	Beryllium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.14650	Boron	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.14700	Cadmium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.14750	Calcium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.14800	Chromium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.14850	Cobalt	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.14900	Copper	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.14950	Iron	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.15000	Lead	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.15050	Magnesium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.15100	Manganese	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.15150	Molybdenum	ICP/MS	SW-846 6020B	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW08--Metals - ICP, ICP/MS and DCP

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW08.15200	Nickel	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.15250	Potassium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.15300	Selenium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.15400	Silver	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.15450	Sodium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.15500	Strontium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.15550	Thallium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.15600	Thorium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.15650	Tin	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.15700	Titanium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.15800	Uranium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.15850	Vanadium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.15900	Zinc	ICP/MS	SW-846 6020B	NJ
Certified	Yes	NPW08.15950	Zirconium	ICP/MS	SW-846 6020B	NJ

Category: NPW09--Organics - NPW Preparation Methods

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW09.00250	Organics	Synthetic PPT Leachate Procedure	SW-846 1312	NJ
Certified	Yes	NPW09.00450	Semivolatile organics	TCLP, Toxicity Procedure, Shaker	SW-846 1311	NJ
Certified	Yes	NPW09.00500	Semivolatile organics	Separatory Funnel Extraction	SW-846 3510C	NJ
Certified	Yes	NPW09.00600	Semivolatile organics	Continuous Liquid-Liquid Extraction	SW-846 3520C	NJ
Applied	No	NPW09.00650	Semivolatile organics	Solid Phase Extraction (SPE)	SW-846 3535A	NJ
Certified	Yes	NPW09.01350	Volatile organics	TCLP, Toxicity Procedure, ZHE	SW-846 1311	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW09--Organics - NPW Preparation Methods

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW09.01550	Volatile organics	Purge & Trap Aqueous	SW-846 5030C	NJ

Category: NPW10--Organic Parameters - Chromatography

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW10.19150	Aldrin	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.19200	Alpha BHC	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.19300	Beta BHC	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.19650	Chlordane	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.19700	Chlordane (alpha) (cis-)	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.19750	Chlordane (gamma) (trans-)	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.20050	DDD (4,4'-)	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.20100	DDE (4,4'-)	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.20150	DDT (4,4'-)	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.20200	Delta BHC	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.20350	Dieldrin	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.20400	Endosulfan I	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.20450	Endosulfan II	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.20500	Endosulfan sulfate	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.20550	Endrin	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.20600	Endrin aldehyde	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.20650	Endrin ketone	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.20800	Heptachlor	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.20850	Heptachlor epoxide	Extract/GC (ECD)	EPA 608.3	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW10--Organic Parameters - Chromatography

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW10.21000	Lindane (gamma BHC)	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.21050	Methoxychlor	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.21200	Mirex	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.21800	Toxaphene	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.21900	PCB 1016	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.21950	PCB 1221	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.22000	PCB 1232	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.22050	PCB 1242	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.22100	PCB 1248	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.22150	PCB 1254	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.22200	PCB 1260	Extract/GC (ECD)	EPA 608.3	NJ
Certified	Yes	NPW10.31400	Ethane	GC, Headspace, FID	Other J. Chrom. Sci. RSK-175	NJ
Certified	Yes	NPW10.31450	Ethene	GC, Headspace, FID	Other J. Chrom. Sci. RSK-175	NJ
Certified	Yes	NPW10.31550	Methane	GC, Headspace, FID	Other J. Chrom. Sci. RSK-175	NJ
Certified	Yes	NPW10.31650	Extractable Petroleum Hydrocarbons	Extraction, GC, FID	Other NJDEP EPH 10/08, Rev. 3	NJ
Certified	Yes	NPW10.39250	Dibromo-3-chloropropane (1,2-)	Extract/GC (ECD)	SW-846 8011	NJ
Certified	Yes	NPW10.39300	Dibromoethane (1,2-) (EDB)	Extract/GC (ECD)	SW-846 8011	NJ
Applied	No	NPW10.39350	Trichloropropane (1,2,3-)	Extract/GC (ECD)	SW-846 8011	NJ
Certified	Yes	NPW10.39800	Diesel range organic	Extraction, GC, FID	SW-846 8015D	NJ
Certified	Yes	NPW10.40200	Gasoline range organic	GC P&T, FID	SW-846 8015D	NJ
Certified	Yes	NPW10.44600	Aldrin	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.44650	Alpha BHC	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.44750	Beta BHC	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.44800	Chlordane (alpha) (cis-)	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.44850	Chlordane (gamma) (trans-)	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW10--Organic Parameters - Chromatography

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW10.44900	Chlordane (technical)	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.45250	DDD (4,4'-)	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.45300	DDE (4,4'-)	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.45350	DDT (4,4'-)	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.45400	Delta BHC	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.45450	Dieldrin	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.45500	Endosulfan I	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.45550	Endosulfan II	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.45600	Endosulfan sulfate	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.45650	Endrin	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.45700	Endrin aldehyde	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.45750	Endrin ketone	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.45850	Heptachlor	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.45900	Heptachlor epoxide	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.46050	Lindane (gamma BHC)	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.46100	Methoxychlor	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.46250	Mirex	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.46450	Toxaphene	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	NPW10.47600	PCB 1016	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	NPW10.47650	PCB 1221	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	NPW10.47700	PCB 1232	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	NPW10.47750	PCB 1242	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	NPW10.47800	PCB 1248	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	NPW10.47850	PCB 1254	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	NPW10.47900	PCB 1260	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	NPW10.47950	PCB 1262	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	NPW10.48000	PCB 1268	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW10--Organic Parameters - Chromatography

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW10.55350	D (2,4-)	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	NPW10.55400	Dalapon	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	NPW10.55450	DB (2,4-)	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	NPW10.55500	DCPA (Dacthal)	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	NPW10.55550	Dicamba	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	NPW10.55600	Dichlorobenzoic acid (3,5-)	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	NPW10.55650	Dichlorprop	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	NPW10.55700	Dinoseb	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	NPW10.55800	MCPA	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	NPW10.55850	MCPP	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	NPW10.55900	Nitrophenol (4-)	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	NPW10.55950	Pentachlorophenol	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	NPW10.56000	Picloram	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	NPW10.56050	T (2,4,5-)	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	NPW10.56100	TP (2,4,5-) (Silvex)	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ

Category: NPW11--Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW11.38400	Acetone	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.38500	Acrolein	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.38550	Acrylonitrile	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.38750	Benzene	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.38800	Bromobenzene	GC/MS, P & T, Capillary Column	EPA 624.1	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW11--Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW11.38900	Bromodichloromethane	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.39000	Bromoform	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.39050	Bromomethane	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.39200	Butanone (2-) (Methyl ethyl ketone)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.39400	Butylbenzene (n-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.39450	Carbon disulfide	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.39500	Carbon tetrachloride	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.39550	Chlorobenzene	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.39600	Chloroethane	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.39650	Chloroethyl vinyl ether (2-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.39700	Chloroform	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.39750	Chloromethane	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.39800	Chlorotoluene (2-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.39850	Chlorotoluene (4-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.39950	Cyclohexane	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.40050	Dibromo-3-chloropropane (1,2-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.40100	Dibromochloromethane	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.40105	Dibromoethane (1,2-) (EDB)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.40200	Dibromomethane	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.40350	Dichlorobenzene (1,2-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.40400	Dichlorobenzene (1,3-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.40450	Dichlorobenzene (1,4-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.40500	Dichlorodifluoromethane	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.40550	Dichloroethane (1,1-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.40600	Dichloroethane (1,2-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW11--Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW11.40650	Dichloroethene (1,1-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.40700	Dichloroethene (cis-1,2-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.40750	Dichloroethene (trans-1,2-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.40800	Dichloropropane (1,2-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.40850	Dichloropropane (1,3-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.40900	Dichloropropane (2,2-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.40950	Dichloropropene (1,1-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.41000	Dichloropropene (cis-1,3-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.41050	Dichloropropene (trans-1,3-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.41200	Dioxane (1,4-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.41350	Ethyl acetate	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.41450	Ethylbenzene	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.41600	Hexachlorobutadiene (1,3-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.41700	Hexanone (2-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.42000	Isopropylbenzene	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.42050	Isopropyltoluene (4-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.42150	Methyl acetate	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.42350	Methyl isobutyl ketone (MIBK)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.42450	Methyl tert-butyl ether	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.42500	Methylcyclohexane	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.42550	Methylene chloride (Dichloromethane)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.42600	Naphthalene	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.42900	Propylbenzene (n-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.42950	Sec-butylbenzene	GC/MS, P & T, Capillary Column	EPA 624.1	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW11--Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW11.43000	Styrene	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.43150	Tert-butyl alcohol	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.43250	Tetrachloroethane (1,1,1,2-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.43300	Tetrachloroethane (1,1,2,2-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.43350	Tetrachloroethene	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.43450	Toluene	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.43500	Trichloro (1,1,2-) trifluoroethane (1,2,2-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.43550	Trichlorobenzene (1,2,3-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.43600	Trichlorobenzene (1,2,4-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.43650	Trichloroethane (1,1,1-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.43700	Trichloroethane (1,1,2-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.43750	Trichloroethene	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.43800	Trichlorofluoromethane	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.43850	Trichloropropane (1,2,3-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.43950	Trimethylbenzene (1,2,4-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.44000	Trimethylbenzene (1,3,5-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.44050	Vinyl acetate	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.44100	Vinyl chloride	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.44150	Xylene (m- + p-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.44250	Xylene (o-)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.44350	Xylenes (total)	GC/MS, P & T, Capillary Column	EPA 624.1	NJ
Certified	Yes	NPW11.44400	Acenaphthene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.44450	Acenaphthylene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.44500	Acetophenone	Extract, GC/MS	EPA 625.1	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW11--Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW11.44650	Alpha - terpineol	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.44800	Aniline	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.44850	Anthracene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.45200	Benzidine	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.45250	Benzo(a)anthracene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.45300	Benzo(a)pyrene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.45350	Benzo(b)fluoranthene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.45400	Benzo(ghi)perylene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.45500	Benzo(k)fluoranthene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.45550	Benzoic acid	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.45700	Bis (2-chloroethoxy) methane	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.45750	Bis (2-chloroethyl) ether	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.45800	Bis(2-chloroisopropyl) ether|2,2'-oxybis(1-chloropropane)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.45850	Bis (2-ethylhexyl) phthalate	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.46000	Bromophenyl-phenyl ether (4-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.46050	Butylbenzylphthalate	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.46250	Carbazole	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.46400	Chloroaniline (4-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.46550	Chloronaphthalene (2-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.46650	Chlorophenol (2-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.46700	Chlorophenyl-phenyl ether (4-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.46900	Chrysene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.47050	Decane (n-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.47500	Dibenzo(a,h)anthracene	Extract, GC/MS	EPA 625.1	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

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Certified	Yes	NPW11.47650	Dibenzofuran	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.47700	Dichloroaniline (2,3-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.47750	Dichlorobenzidine (3,3'-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.47800	Dichlorophenol (2,4-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.47950	Diethyl phthalate	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.48100	Dimethyl phthalate	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.48250	Dimethylphenol (2,4-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.48300	Di-n-butyl phthalate	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.48400	Dinitrophenol (2,4-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.48450	Dinitrophenol (2-methyl-4,6-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.48500	Dinitrotoluene (2,4-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.48550	Dinitrotoluene (2,6-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.48600	Di-n-octyl phthalate	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.48700	Diphenylhydrazine / Azobenzene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.48800	Docosane (n-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.48850	Dodecane (n-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.49000	Eicosane (n-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.49250	Fluoranthene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.49300	Fluorene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.49350	Hexachlorobenzene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.49400	Hexachlorobutadiene (1,3-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.49450	Hexachlorocyclopentadiene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.49500	Hexachloroethane	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.49650	Hexadecane (n-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.49700	Indeno(1,2,3-cd)pyrene	Extract, GC/MS	EPA 625.1	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

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Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW11.49800	Isophorone	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.50350	Methyl phenol (4-chloro-3-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.50450	Methylnaphthalene (2-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.50500	Methylphenanthrene (1-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.50550	Methylphenol (2-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.50600	Methylphenol (3-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.50650	Methylphenol (4-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.50950	Naphthalene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.51150	Nitroaniline (2-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.51200	Nitroaniline (3-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.51250	Nitroaniline (4-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.51300	Nitrobenzene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.51350	Nitrophenol (2-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.51400	Nitrophenol (4-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.51500	N-Nitrosodimethylamine	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.51550	N-Nitroso-di-n-propylamine	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.51600	N-Nitrosodiphenylamine / Diphenylamine	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.51900	Octadecane (n-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.52550	Pentachlorophenol	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.52700	Phenanthrene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.52750	Phenol	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.53400	Pyrene	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.53450	Pyridine	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.55100	Tetrachlorobenzene (1,2,4,5-)	Extract, GC/MS	EPA 625.1	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

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284 SHEFFIELD ST
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Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW11.55150	Tetrachlorophenol (2,3,4,6-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.55200	Tetradecane (n-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.55400	Trichlorobenzene (1,2,4-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.55500	Trichlorophenol (2,4,5-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.55550	Trichlorophenol (2,4,6-)	Extract, GC/MS	EPA 625.1	NJ
Certified	Yes	NPW11.68750	Acetone	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.68850	Acrolein	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.68900	Acrylonitrile	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.69100	Benzene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.69200	Bromobenzene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.69250	Bromochloromethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.69300	Bromodichloromethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.69350	Bromoethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.69400	Bromoform	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.69450	Bromomethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.69650	Butanone (2-) (Methyl ethyl ketone)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.69850	Butylbenzene (n-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.69900	Carbon disulfide	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.69950	Carbon tetrachloride	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.70000	Chlorobenzene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.70050	Chloroethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.70100	Chloroethyl vinyl ether (2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.70150	Chloroform	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.70200	Chloromethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.70250	Chlorotoluene (2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.70300	Chlorotoluene (4-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ

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Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW11.70400	Cyclohexane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.70500	Dibromo-3-chloropropane (1,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.70550	Dibromochloromethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.70600	Dibromoethane (1,2-) (EDB)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.70650	Dibromomethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.70800	Dichlorobenzene (1,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.70850	Dichlorobenzene (1,3-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.70900	Dichlorobenzene (1,4-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.70950	Dichlorodifluoromethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.71000	Dichloroethane (1,1-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.71050	Dichloroethane (1,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.71100	Dichloroethene (1,1-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.71150	Dichloroethene (cis-1,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.71200	Dichloroethene (trans-1,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.71250	Dichloropropane (1,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.71300	Dichloropropane (1,3-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.71350	Dichloropropane (2,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.71400	Dichloropropene (1,1-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.71450	Dichloropropene (cis-1,3-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.71500	Dichloropropene (trans-1,3-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.71650	Dioxane (1,4-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.71800	Ethyl acetate	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.71900	Ethylbenzene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.72050	Hexachlorobutadiene (1,3-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ

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Certified	Yes	NPW11.72100	Hexachloroethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.72200	Hexanone (2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.72400	Isopropylbenzene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.72450	Isopropyltoluene (4-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.72550	Methyl acetate	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.72650	Methyl iodide	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.72750	Methyl tert-butyl ether	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.72800	Methylcyclohexane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.72850	Methylene chloride (Dichloromethane)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.73000	Naphthalene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.73350	Pentanone (4-methyl-2-) (MIBK)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.73450	Propylbenzene (n-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.73500	Sec-butylbenzene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.73550	Styrene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.73700	Tert-butyl alcohol	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.73750	Tert-butylbenzene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.73800	Tetrachloroethane (1,1,1,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.73850	Tetrachloroethane (1,1,2,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.73900	Tetrachloroethene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.74000	Toluene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.74100	Trichloro (1,1,2-) trifluoroethane (1,2,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.74150	Trichlorobenzene (1,2,3-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.74200	Trichlorobenzene (1,2,4-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.74250	Trichloroethane (1,1,1-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ

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Environmental Laboratory Certification Program

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Certified	Yes	NPW11.74300	Trichloroethane (1,1,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.74350	Trichloroethene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.74400	Trichlorofluoromethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.74450	Trichloropropane (1,2,3-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.74550	Trimethylbenzene (1,2,4-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.74600	Trimethylbenzene (1,3,5-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.74700	Vinyl acetate	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.74750	Vinyl chloride	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.74800	Xylene (m-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.74850	Xylene (o-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.74900	Xylene (p-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.74950	Xylenes (total)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	NPW11.75150	Acenaphthene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.75200	Acenaphthylene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.75250	Acetophenone	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.75600	Aniline	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.75650	Anthracene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.75750	Atrazine	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.75850	Benzaldehyde	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.75950	Benzidine	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.76000	Benzo(a)anthracene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.76050	Benzo(a)pyrene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.76100	Benzo(b)fluoranthene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.76150	Benzo(ghi)perylene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.76250	Benzo(k)fluoranthene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.76300	Benzoic acid	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW11--Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW11.76400	Benzyl alcohol	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.76550	Biphenyl (1,1'-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.76600	Bis (2-chloroethoxy) methane	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.76650	Bis (2-chloroethyl) ether	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.76700	Bis(2-chloroisopropyl) ether|2,2'-oxybis(1-chloropropane)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.76750	Bis (2-ethylhexyl) phthalate	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.76800	Bromophenyl-phenyl ether (4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.76850	Butylbenzylphthalate	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.76900	Caprolactam	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.76950	Carbazole	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.77150	Chloroaniline (4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.77300	Chloronaphthalene (2-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.77350	Chlorophenol (2-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.77400	Chlorophenyl-phenyl ether (4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.77450	Chrysene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.78000	Dibenzo(a,h)anthracene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.78200	Dibenzofuran	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.78250	Dichlorobenzene (1,2-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.78300	Dichlorobenzene (1,3-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.78350	Dichlorobenzene (1,4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.78400	Dichlorobenzidine (3,3'-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.78450	Dichlorophenol (2,4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.78600	Diethyl phthalate	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.78750	Dimethyl phthalate	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW11--Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW11.79100	Dimethylphenol (2,4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.79150	Di-n-butyl phthalate	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.79300	Dinitrophenol (2,4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.79350	Dinitrophenol (2-methyl-4,6-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.79400	Dinitrotoluene (2,4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.79450	Dinitrotoluene (2,6-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.79500	Di-n-octyl phthalate	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.79600	Dioxane (1,4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.79650	Diphenylhydrazine / Azobenzene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.80150	Fluoranthene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.80200	Fluorene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.80350	Hexachlorobenzene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.80400	Hexachlorobutadiene (1,3-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.80450	Hexachlorocyclopentadiene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.80500	Hexachloroethane	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.80750	Indeno(1,2,3-cd)pyrene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.80850	Isophorone	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.81300	Methyl phenol (4-chloro-3-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.81400	Methylnaphthalene (1-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.81450	Methylnaphthalene (2-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.81500	Methylphenol (2-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.81550	Methylphenol (3-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.81600	Methylphenol (4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.81650	Naphthalene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW11--Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW11.81850	Nitroaniline (2-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.81900	Nitroaniline (3-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.81950	Nitroaniline (4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.82000	Nitrobenzene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.82100	Nitrophenol (2-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.82150	Nitrophenol (4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.82250	N-Nitrosodimethylamine	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.82350	N-Nitroso-di-n-propylamine	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.82400	N-Nitrosodiphenylamine / Diphenylamine	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.83300	Pentachlorophenol	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.83400	Phenanthrene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.83450	Phenol	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.83850	Pyrene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.83900	Pyridine	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.84350	Tetrachlorobenzene (1,2,4,5-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.84400	Tetrachlorophenol (2,3,4,6-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.84650	Trichlorobenzene (1,2,4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.84700	Trichlorophenol (2,4,5-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.84750	Trichlorophenol (2,4,6-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.84900	Acenaphthene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.84950	Acenaphthylene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.85000	Anthracene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.85050	Benzo(a)anthracene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.85100	Benzo(a)pyrene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.85150	Benzo(b)fluoranthene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 7/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: NPW11--Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	NPW11.85200	Benzo(ghi)perylene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.85250	Benzo(k)fluoranthene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.85300	Chrysene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.85350	Dibenzo(a,h)anthracene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.85500	Dinitrophenol (2-methyl-4,6-)	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.85550	Dioxane (1,4-)	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.85600	Fluoranthene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.85650	Fluorene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.85700	Hexachlorobenzene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.85850	Indeno(1,2,3-cd)pyrene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.86000	Methylnaphthalene (2-)	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.86050	Naphthalene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.86100	N-Nitrosodimethylamine	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.86150	Pentachlorophenol	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.86200	Phenanthrene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	NPW11.86250	Pyrene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ

Category: SCM02--Characteristics of Hazardous Waste

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM02.00450	Free liquid	Flow-Through Paint Filter, Observation	SW-846 9095B	NJ
Certified	Yes	SCM02.00560	Ignitability	Pensky-Martin	SW-846 1010B	NJ
Certified	Yes	SCM02.00700	Ignitability of solids	Burn Rate	SW-846 1030	NJ
Certified	Yes	SCM02.00750	pH	Wide Range pH Paper	SW-846 9041A	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 7/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: SCM02--Characteristics of Hazardous Waste

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM02.00800	pH - soil and waste	Mix with Water or Calcium Chlorides	SW-846 9045D	NJ

Category: SCM03--Inorganic Parameters and Preparation

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM03.00250	Ammonia	Distillation, Semi-automated	SM 4500-NH3 B plus NH3 G-11	NJ
Certified	Yes	SCM03.00550	Bromide	Ion Chromatography	SW-846 9056A	NJ
Certified	Yes	SCM03.00900	Chloride	Ion Chromatography	SW-846 9056A	NJ
Certified	Yes	SCM03.01150	Cyanide	Distillation	SW-846 9010C	NJ
Certified	Yes	SCM03.01200	Cyanide	Extraction, Oils and Solids	SW-846 9013A	NJ
Certified	Yes	SCM03.01250	Cyanide	Colorimetric, Automated	SW-846 9012B	NJ
Certified	Yes	SCM03.01550	Cyanide - amenable to Cl2	Distillation	SW-846 9010C	NJ
Certified	Yes	SCM03.01950	Fluoride	Ion Chromatography	SW-846 9056A	NJ
Certified	Yes	SCM03.02550	Kjeldahl nitrogen - total	Digestion, Distillation, Semi-auto., Phenate	SM 4500-N Org C-11 plus NH3 B plus NH3 G-11	NJ
Certified	Yes	SCM03.02700	Nitrate	Ion Chromatography	SW-846 9056A	NJ
Certified	Yes	SCM03.03100	Nitrite	Ion Chromatography	SW-846 9056A	NJ
Certified	Yes	SCM03.03200	Oil & grease - sludge-hem	Extraction & Gravimetric	SW-846 9071B	NJ
Certified	Yes	SCM03.03250	Oil & grease - sludge-hem-npm	Extraction & Gravimetric	SW-846 9071B	NJ
Certified	Yes	SCM03.03550	Orthophosphate	Ion Chromatography	SW-846 9056A	NJ
Certified	Yes	SCM03.03700	Phenols	Colorimetric, Man, 4AAP Distillation	SW-846 9065	NJ
Certified	Yes	SCM03.03900	Residue - total	Gravimetric, 103-105 Degrees C	SM 2540 B-16	NJ
Certified	Yes	SCM03.04200	Sulfate	Ion Chromatography	SW-846 9056A	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: SCM03--Inorganic Parameters and Preparation

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM03.04350	Sulfides - extractable	Water Extraction, Distillation	SW-846 9031	NJ
Certified	Yes	SCM03.04450	Sulfides, acid sol. & insol.	Redox Titration	SW-846 9030B	NJ
Certified	Yes	SCM03.04500	Sulfides, acid sol. & insol.	Titration	SW-846 9034	NJ
Certified	No	SCM03.04650	Total organic carbon (TOC)	Infrared Spectrometry or FID	Other NJ Modified SM-846 9060A	NJ
Certified	Yes	SCM03.04700	Total organic carbon (TOC)	Pyrolytic	Other Lloyd Kahn	NJ

Category: SCM05--Metals - SCM Preparation Methods

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Applied	No	SCM05.00001	Metals	Acid Digestion, Oil	SW-846 3031	NJ
Certified	Yes	SCM05.00050	Metals	Acid Digestion, Soil Sediment & Sludge	SW-846 3050B	NJ
Certified	Yes	SCM05.00100	Metals	Chromium VI Digestion	SW-846 3060A	NJ
Certified	Yes	SCM05.00150	Metals	Dissolution of Oil, Grease & Wax	SW-846 3040A	NJ
Applied	No	SCM05.00250	Metals - oily waste	Extraction	SW-846 1330A	NJ
Applied	No	SCM05.00350	Metals	Microwave Acid Digest: Soil Sediment & Sludge	SW-846 3051A	NJ
Certified	Yes	SCM05.00400	Metals	Multiple Extractions	SW-846 1320	NJ
Certified	Yes	SCM05.00550	Metals	Synthetic PPT Leachate Procedure	SW-846 1312	NJ
Certified	Yes	SCM05.00600	Metals	TCLP, Toxicity Procedure, Shaker	SW-846 1311	NJ

Category: SCM06--Metals

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM06.02600	Chromium (VI)	Colorimetric	SW-846 7196A	NJ
Certified	Yes	SCM06.02800	Mercury - solid waste	AA, Manual Cold Vapor	SW-846 7471B	NJ

Category: SCM07--Metals - ICP, ICP/MS and DCP

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM07.00001	Aluminum	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00050	Antimony	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00100	Arsenic	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00150	Barium	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00200	Beryllium	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00250	Boron	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00300	Cadmium	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00350	Calcium	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00400	Chromium	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00450	Cobalt	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00500	Copper	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00550	Iron	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00600	Lead	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00650	Lithium	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00700	Magnesium	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00750	Manganese	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00800	Molybdenum	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00850	Nickel	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.00950	Potassium	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.01000	Selenium	ICP	SW-846 6010D	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: SCM07--Metals - ICP, ICP/MS and DCP

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM07.01050	Silver	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.01100	Sodium	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.01150	Strontium	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.01200	Thallium	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.01300	Tin	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.01350	Titanium	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.01450	Vanadium	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.01500	Zinc	ICP	SW-846 6010D	NJ
Certified	Yes	SCM07.01600	Aluminum	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.01650	Antimony	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.01700	Arsenic	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.01750	Barium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.01800	Beryllium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.01900	Cadmium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.01950	Calcium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.02000	Chromium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.02050	Cobalt	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.02100	Copper	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.02150	Iron	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.02200	Lead	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.02250	Magnesium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.02300	Manganese	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.02350	Molybdenum	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.02400	Nickel	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.02450	Potassium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.02500	Selenium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.02600	Silver	ICP/MS	SW-846 6020B	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: SCM07--Metals - ICP, ICP/MS and DCP

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM07.02650	Sodium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.02700	Strontium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.02750	Thallium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.02800	Thorium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.02850	Tin	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.02900	Titanium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.03000	Uranium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.03050	Vanadium	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.03100	Zinc	ICP/MS	SW-846 6020B	NJ
Certified	Yes	SCM07.03150	Zirconium	ICP/MS	SW-846 6020B	NJ

Category: SCM08--Organics - SCM Prep. / Screening Methods

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM08.00400	Organics	Synthetic PPT Leachate Procedure	SW-846 1312	NJ
Certified	Yes	SCM08.00500	Organics	Waste Dilution	SW-846 3580A	NJ
Certified	Yes	SCM08.00700	Semivolatile organics	TCLP, Toxicity Procedure, Shaker	SW-846 1311	NJ
Certified	Yes	SCM08.00800	Semivolatile organics	Automatic Soxhlet Extraction	SW-846 3541	NJ
Certified	Yes	SCM08.00850	Semivolatile organics	Pressurized Fluid Extraction	SW-846 3545A	NJ
Certified	Yes	SCM08.01250	Semivolatile organics	Cleanup-Alumina	SW-846 3610B	NJ
Certified	Yes	SCM08.01350	Semivolatile organics	Cleanup-Florisil	SW-846 3620C	NJ
Certified	Yes	SCM08.01400	Semivolatile organics	Cleanup-Silica Gel	SW-846 3630C	NJ
Certified	Yes	SCM08.01450	Semivolatile organics	Cleanup-Gel Permeation	SW-846 3640A	NJ
Certified	Yes	SCM08.01550	Semivolatile organics	Cleanup-Sulfur Removal	SW-846 3660B	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

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284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: SCM08--Organics - SCM Prep. / Screening Methods

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM08.01600	Semivolatile organics	Cleanup-Sulfuric Acid/KMnO4	SW-846 3665A	NJ
Certified	Yes	SCM08.01700	Triad Immunoassay	Field Immunoassay	SW-846 4000	NJ
Certified	Yes	SCM08.01850	Volatile organics	TCLP, Toxicity Procedure, ZHE	SW-846 1311	NJ
Certified	Yes	SCM08.02050	Volatile organics - high conc.	Methanol Extract, Closed System P & T	SW-846 5035A	NJ
Certified	Yes	SCM08.02100	Volatile organics - low conc.	Closed System Purge & Trap	SW-846 5035A	NJ

Category: SCM09--Organic Parameters - Chromatography

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM09.00150	Extractable Petroleum Hydrocarbons	Extraction, GC, FID	Other NJDEP EPH 10/08, Rev. 3	NJ
Certified	Yes	SCM09.00450	Diesel range organic	Extraction, GC, FID	SW-846 8015D	NJ
Certified	Yes	SCM09.00500	Gasoline range organic	GC P&T, FID	SW-846 8015D	NJ
Certified	Yes	SCM09.05650	Aldrin	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.05700	Alpha BHC	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.05800	Beta BHC	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.05850	Chlordane (alpha) (cis-)	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.05900	Chlordane (gamma) (trans-)	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.05950	Chlordane (technical)	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.06300	DDD (4,4'-)	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.06350	DDE (4,4'-)	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.06400	DDT (4,4'-)	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.06450	Delta BHC	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

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Category: SCM09--Organic Parameters - Chromatography

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM09.06500	Dieldrin	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.06550	Endosulfan I	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.06600	Endosulfan II	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.06650	Endosulfan sulfate	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.06700	Endrin	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.06750	Endrin aldehyde	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.06800	Endrin ketone	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.06900	Heptachlor	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.06950	Heptachlor epoxide	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.07100	Lindane (gamma BHC)	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.07150	Methoxychlor	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.07300	Mirex	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.07500	Toxaphene	GC, Extraction, ECD or HECD, Capillary	SW-846 8081B	NJ
Certified	Yes	SCM09.08700	PCB 1016	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	SCM09.08750	PCB 1221	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	SCM09.08800	PCB 1232	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	SCM09.08850	PCB 1242	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	SCM09.08900	PCB 1248	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	SCM09.08950	PCB 1254	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	SCM09.09000	PCB 1260	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	SCM09.09050	PCB 1262	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	SCM09.09100	PCB 1268	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	SCM09.09105	PCB 1016 (Oil)	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	SCM09.09110	PCB 1221 (Oil)	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	SCM09.09115	PCB 1232 (Oil)	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	SCM09.09120	PCB 1242 (Oil)	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	SCM09.09125	PCB 1248 (Oil)	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: SCM09--Organic Parameters - Chromatography

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM09.09130	PCB 1254 (Oil)	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	SCM09.09135	PCB 1260 (Oil)	GC, Extraction, ECD or HECD, Capillary	SW-846 8082A	NJ
Certified	Yes	SCM09.15400	D (2,4-)	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	SCM09.15450	Dalapon	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	SCM09.15500	DB (2,4-)	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	SCM09.15550	DCPA (Dacthal)	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	SCM09.16000	Dicamba	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	SCM09.16050	Dichlorobenzoic acid (3,5-)	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	SCM09.16100	Dichlorprop	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	SCM09.16150	Dinoseb	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	SCM09.16250	MCPA	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	SCM09.16300	MCPP	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	SCM09.16350	Nitrophenol (4-)	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	SCM09.16400	Pentachlorophenol	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	SCM09.16450	Picloram	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	SCM09.16500	T (2,4,5-)	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ
Certified	Yes	SCM09.16550	TP (2,4,5-) (Silvex)	GC, Extraction, ECD, Capillary	SW-846 8151A	NJ

Category: SCM10--Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM10.22900	Acetone	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.23000	Acrolein	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.23050	Acrylonitrile	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

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284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: SCM10--Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM10.23200	Benzene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.23300	Bromobenzene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.23350	Bromochloromethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.23400	Bromodichloromethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.23450	Bromoethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.23500	Bromoform	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.23550	Bromomethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.23650	Butanone (2-) (Methyl ethyl ketone)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.23800	Butylbenzene (n-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.23850	Carbon disulfide	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.23900	Carbon tetrachloride	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.23950	Chlorobenzene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.24000	Chloroethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.24050	Chloroethyl vinyl ether (2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.24100	Chloroform	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.24150	Chloromethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.24200	Chlorotoluene (2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.24250	Chlorotoluene (4-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.24330	Cyclohexane	GC/MS, P & T, or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.24400	Dibromo-3-chloropropane (1,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.24450	Dibromochloromethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.24500	Dibromoethane (1,2-) (EDB)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.24550	Dibromomethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.24700	Dichlorobenzene (1,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.24750	Dichlorobenzene (1,3-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

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MOUNTAINSIDE NJ 07092

Category: SCM10--Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM10.24800	Dichlorobenzene (1,4-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.24850	Dichlorodifluoromethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.24900	Dichloroethane (1,1-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.24950	Dichloroethane (1,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.25000	Dichloroethene (1,1-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.25050	Dichloroethene (cis-1,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.25100	Dichloroethene (trans-1,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.25150	Dichloropropane (1,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.25200	Dichloropropane (1,3-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.25250	Dichloropropane (2,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.25300	Dichloropropene (1,1-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.25350	Dichloropropene (cis-1,3-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.25400	Dichloropropene (trans-1,3-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.25550	Dioxane (1,4-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.25650	Ethyl acetate	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.25750	Ethylbenzene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.25850	Hexachlorobutadiene (1,3-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.25900	Hexachloroethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.25950	Hexanone (2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.26150	Isopropylbenzene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.26200	Isopropyltoluene (4-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.26280	Methyl acetate	GC/MS, P & T, or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.26330	Methylcyclohexane	GC/MS, P & T, or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.26350	Methyl iodide	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.26450	Methyl tert-butyl ether	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

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Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: SCM10--Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM10.26500	Methylene chloride (Dichloromethane)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.26650	Naphthalene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.26850	Pentanone (4-methyl-2-) (MIBK)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.26950	Propylbenzene (n-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.27000	Sec-butylbenzene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.27050	Styrene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.27200	Tert-butyl alcohol	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.27250	Tert-butylbenzene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.27300	Tetrachloroethane (1,1,1,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.27350	Tetrachloroethane (1,1,2,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.27400	Tetrachloroethene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.27500	Toluene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.27600	Trichloro (1,1,2-) trifluoroethane (1,2,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.27650	Trichlorobenzene (1,2,3-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.27700	Trichlorobenzene (1,2,4-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.27750	Trichloroethane (1,1,1-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.27800	Trichloroethane (1,1,2-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.27850	Trichloroethene	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.27900	Trichlorofluoromethane	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.27950	Trichloropropane (1,2,3-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.28000	Trimethylbenzene (1,2,4-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.28050	Trimethylbenzene (1,3,5-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.28150	Vinyl acetate	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ

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Environmental Laboratory Certification Program

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MOUNTAINSIDE NJ 07092

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Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM10.28200	Vinyl chloride	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.28250	Xylene (m-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.28300	Xylene (o-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.28350	Xylene (p-)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.28400	Xylenes (total)	GC/MS, P & T or Direct Injection, Capillary	SW-846 8260D	NJ
Certified	Yes	SCM10.28900	Acenaphthene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.28950	Acenaphthylene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.29000	Acetophenone	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.29350	Aniline	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.29450	Anthracene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.29550	Atrazine	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.29650	Benzaldehyde	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.29750	Benzidine	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.29800	Benzo(a)anthracene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.29850	Benzo(a)pyrene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.29900	Benzo(b)fluoranthene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.29950	Benzo(ghi)perylene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.30050	Benzo(k)fluoranthene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.30100	Benzoic acid	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.30200	Benzyl alcohol	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.30350	Biphenyl (1,1'-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.30400	Bis (2-chloroethoxy) methane	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.30450	Bis (2-chloroethyl) ether	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.30500	Bis(2-chloroisopropyl) ether|2,2'-oxybis(1-chloropropane)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.30550	Bis (2-ethylhexyl) phthalate	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: SCM10--Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM10.30600	Bromophenyl-phenyl ether (4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.30650	Butylbenzylphthalate	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.30700	Caprolactam	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.30750	Carbazole	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.30950	Chloroaniline (4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.31100	Chloronaphthalene (2-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.31150	Chlorophenol (2-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.31200	Chlorophenyl-phenyl ether (4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.31250	Chrysene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.31800	Dibenzo(a,h)anthracene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.32000	Dibenzofuran	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.32050	Dichlorobenzene (1,2-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.32100	Dichlorobenzene (1,3-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.32150	Dichlorobenzene (1,4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.32200	Dichlorobenzidine (3,3'-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.32250	Dichlorophenol (2,4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.32400	Diethyl phthalate	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.32550	Dimethyl phthalate	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.32900	Dimethylphenol (2,4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.32950	Di-n-butyl phthalate	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.33100	Dinitrophenol (2,4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.33150	Dinitrophenol (2-methyl-4,6-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.33200	Dinitrotoluene (2,4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.33250	Dinitrotoluene (2,6-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.33300	Di-n-octyl phthalate	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.33400	Dioxane (1,4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: SCM10--Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM10.33450	Diphenylhydrazine / Azobenzene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.33950	Fluoranthene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.34000	Fluorene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.34150	Hexachlorobenzene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.34200	Hexachlorobutadiene (1,3-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.34250	Hexachlorocyclopentadiene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.34300	Hexachloroethane	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.34550	Indeno(1,2,3-cd)pyrene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.34650	Isophorone	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.35100	Methyl phenol (4-chloro-3-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.35200	Methylnaphthalene (1-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.35250	Methylnaphthalene (2-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.35300	Methylphenol (2-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.35350	Methylphenol (3-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.35400	Methylphenol (4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.35450	Naphthalene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.35650	Nitroaniline (2-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.35700	Nitroaniline (3-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.35750	Nitroaniline (4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.35800	Nitrobenzene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.35900	Nitrophenol (2-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.35950	Nitrophenol (4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.36050	N-Nitrosodimethylamine	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.36150	N-Nitroso-di-n-propylamine	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: SCM10--Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM10.36200	N-Nitrosodiphenylamine / Diphenylamine	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.37100	Pentachlorophenol	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.37200	Phenanthrene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.37250	Phenol	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.37650	Pyrene	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.37700	Pyridine	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.38150	Tetrachlorobenzene (1,2,4,5-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.38200	Tetrachlorophenol (2,3,4,6-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.38450	Trichlorobenzene (1,2,4-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.38500	Trichlorophenol (2,4,5-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.38550	Trichlorophenol (2,4,6-)	GC/MS, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.38700	Acenaphthene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.38750	Acenaphthylene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.38800	Anthracene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.38850	Benzo(a)anthracene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.38900	Benzo(a)pyrene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.38950	Benzo(b)fluoranthene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.39000	Benzo(ghi)perylene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.39050	Benzo(k)fluoranthene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.39100	Chrysene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.39150	Dibenzo(a,h)anthracene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.39200	Dinitrophenol (2-methyl-4,6-)	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.39250	Dioxane (1,4-)	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.39300	Fluoranthene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.39350	Fluorene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ

New Jersey Department of Environment Protection
Environmental Laboratory Certification Program

Annual Certified Parameter List and Current Status

Effective as of 07/01/2022 until 6/30/2023

Laboratory Name: CHEMTECH Laboratory Number: 20012 Activity ID: NLC 220001
284 SHEFFIELD ST
MOUNTAINSIDE NJ 07092

Category: SCM10--Organic Parameters - Chromatography/MS

Status	Eligible to Report NJ Data	Code	Parameter	Technique	Approved Methods	Primary State
Certified	Yes	SCM10.39400	Hexachlorobenzene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.39550	Indeno(1,2,3-cd)pyrene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.39650	Methylnaphthalene (2-)	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.39700	Naphthalene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.39750	N-Nitrosodimethylamine	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.39800	Pentachlorophenol	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.39850	Phenanthrene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ
Certified	Yes	SCM10.39900	Pyrene	GC/MS/SIM, Extract or Dir Inj, Capillary	SW-846 8270E	NJ

Michele M. Potter, Manager

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
	1 2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
P00019	09/10/2022	PR-OLEM-22-00689	CASC

6. ISSUED BY	CODE	7. ADMINISTERED BY *(If other than Item 6)*	CODE
HQAD	HQAD		

HQAD
US Environmental Protection Agency
William Jefferson Clinton Building
1200 Pennsylvania Avenue, N. W.
Mail Code: 3803R
Washington DC 20460

8. NAME AND ADDRESS OF CONTRACTOR *(No., street, county, State and ZIP Code)*

Chemtech Consulting Group, Inc.
Attn: EMANUEL HEDVAT
284 SHEFFIELD ST
MOUNTAINSIDE NJ 070922319

CODE ZKA4ZBLC2GS3 FACILITY CODE

(x) 9A. AMENDMENT OF SOLICITATION NO.

9B. DATED *(SEE ITEM 11)*

x 10A. MODIFICATION OF CONTRACT/ORDER NO.
68HERH20D0011
68HERH21F0045

10B. DATED *(SEE ITEM 13)*
11/06/2020

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☐ is extended, ☐ is not extended.
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended , by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted ; or (c) By separate letter or electronic communication which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted , such change may be made by letter or electronic communication, provided each letter or electronic communication makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*
See Schedule

Net Increase: [redacted]

13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

CHECK ONE	
	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation data, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
X	D. OTHER *(Specify type of modification and authority)* B.3 - Lim of the Gvt's Obl (EPA-B-32-103); EPAAR 1552.217-76 OPTION TO EXTEND THE EFF PD OF THE CONTRACT

E. IMPORTANT: Contractor ☒ is not ☐ is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION *(Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

UEI: ZKA4ZBLC2GS3
Superfund Task Order
TOCOR: Brett Moody Max Expire Date: 09/09/2026

The purpose of this modification is to:
1) Exercise Option Period II with an effective date of September 10, 2022. The period of performance is September 10, 2022 through September 9, 2024.
2) Obligate funds in the amount of [redacted] to Option Period II of this task order. Funding for Option Period II is hereby increased by [redacted] from $0.00 to [redacted].

Continued ...

Except as provided herein, all terms and conditions of the document referenced in Item 9 A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER *(Type or print)*		16A. NAME AND TITLE OF CONTRACTING OFFICER *(Type or print)*	
		Ross Miller	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
_____ *(Signature of person authorized to sign)*		ELECTRONIC SIGNATURE *(Signature of Contracting Officer)*	09/08/2022

NAME OF OFFEROR OR CONTRACTOR
Chemtech Consulting Group, Inc.

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	LIST OF CHANGES: Reason for Modification: Exercise an Option Period Of Performance End Date changed from 09-SEP-22 to 09-SEP-24 Total Amount for this Modification: [redacted] New Total Amount for this Version: [redacted] New Total Amount for this Award: [redacted] Period of Performance: 09/10/2020 to 09/09/2024				
0003	Contract Ceiling and Funding for Option Period 2 9/10/2022 - 9/09/2024 Superfund Analytical Methods, SFAM - Organic. Option Period 2 Total Amount: [redacted] Superfund Analytical Methods, SFAM - Inorganic. Option Period 2 Total Amount: [redacted] Product/Service Code: F999 Accounting Info: 21-TD-72BS-000DD2-2505-HQ00LA00-2272BS5010-001 BFY: 21 Fund: TD Budget Org: 72BS Program (PRC): 000DD2 Budget (BOC): 2505 Job #: HQ00LA00 DCN - Line ID: 2272BS5010-001 Funding Flag: Complete Funded: [redacted]				

CHEMTECH 284 Sheffield Street, Mountainside, NJ 07092 Phone: 908 789 8900 Fax: 908 789 8922

02-01-2023

Envocare Environmental & Facilities Management, d.b.a UAV Inspection Services, LLC
1527 Route 27, Suite 105
Somerset, NJ 08873

Attn: Devang Patel
CC: Mayur Patel, Cody Lin
(732) 253-5740

RE: Intent to Perform - Project ID: 366-394 Wilson Ave

To Whom It May Concern:

CHEMTECH is an Accredited Environmental Analytical Laboratory located in Mountainside, NJ. Providing comprehensive analytical testing services for the identification and assessment of environmental contaminates is our only business. CHEMTECH's sole role and responsibility in the referenced project "366-394 Wilson Ave" is to provide analytical testing of soil via Methods SFAM_HG for Mercury, SFAM_MS for Lead, SFAM_PCB, SW-846 7196A, SW-846 9095B, SW-846 8260D, SW-846 8270E, SW-846 1010B, SW-846 9045D, SW-846 1030, SW-846 9012B, SW-846 9034, SW-846 1311, SW-846 7470A, SW-846 7471B, SW-846 6010D, SW-846 8081B, SW-846 8082A, SW-846 8151A. CHEMTECH quality control managers are listed as follows:

CHEMTECH Lab Manager – Mohammad Ahmed
CHEMTECH QAQC Director – Sohil Jodhani

Sincerely,

CHEMTECH

Jordan Hedvat
Account Executive
(908) 789-8900

Appendix N

Laboratory Reporting Limits/ MDLs

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	CAS#	molecular weight	mdl air (ppbv)	lod air (ppbv)	loq air (ppbv)	mdl air (ug/m3)	lod air (ug/m3)	loq air (ug/m3)
EPA TO-15	Not Certified	1,1,1,2-Tetrachloroethane	630-20-6	168	0.039	0.10	0.50	0.27	0.69	3.44
EPA TO-15	Certified	1,1,1-Trichloroethane	71-55-6	133	0.021	0.030	0.030	0.11	0.16	0.16
EPA TO-15	Certified	1,1,2,2-Tetrachloroethane	79-34-5	168	0.022	0.030	0.030	0.15	0.21	0.21
EPA TO-15	Certified	1,1,2-Trichloroethane	79-00-5	133	0.034	0.10	0.50	0.18	0.54	2.72
EPA TO-15	Certified	1,1,2-Trichlorotrifluoroethane	76-13-1	187	0.043	0.10	0.50	0.33	0.76	3.82
EPA TO-15	Certified	1,1-Dichloroethane	75-34-3	99	0.043	0.10	0.50	0.17	0.40	2.02
EPA TO-15	Certified	1,1-Dichloroethene	75-35-4	97	0.046	0.10	0.50	0.18	0.40	1.98
EPA TO-15	Certified	1,2,4-Trichlorobenzene	120-82-1	181	0.049	0.10	0.50	0.36	0.74	3.70
EPA TO-15	Certified	1,2,4-Trimethylbenzene	95-63-6	120	0.058	0.10	0.50	0.28	0.49	2.45
EPA TO-15	Certified	1,2-Dibromoethane	106-93-4	188	0.032	0.10	0.10	0.25	0.77	0.77
EPA TO-15	Certified	1,2-Dichlorobenzene	95-50-1	147	0.035	0.10	0.50	0.21	0.60	3.01
EPA TO-15	Certified	1,2-Dichloroethane	107-06-2	99	0.042	0.10	0.50	0.17	0.40	2.02
EPA TO-15	Certified	1,2-Dichloropropane	78-87-5	113	0.044	0.10	0.50	0.20	0.46	2.31
EPA TO-15	Certified	1,3,5-Trimethylbenzene	108-67-8	120	0.052	0.10	0.50	0.26	0.49	2.45
EPA TO-15	Certified	1,3-Butadiene	106-99-0	54	0.056	0.10	0.50	0.12	0.22	1.10
EPA TO-15	Certified	1,3-Dichlorobenzene	541-73-1	147	0.043	0.10	0.50	0.26	0.60	3.01
EPA TO-15	Certified	1,4-Dichlorobenzene	106-46-7	147	0.034	0.10	0.50	0.20	0.60	3.01
EPA TO-15	Certified	1,4-Dioxane	123-91-1	88	0.13	0.40	0.50	0.47	1.44	1.80
EPA TO-15	Certified	2,2,4-Trimethylpentane	540-84-1	114	0.048	0.10	0.50	0.22	0.47	2.33
EPA TO-15	Certified	2-Butanone (Methyl ethyl ketone (MEK))	78-93-3	72	0.12	0.40	0.50	0.35	1.18	1.47
EPA TO-15	Certified	2-Chlorotoluene	95-49-8	126.6	0.038	0.10	0.50	0.20	0.52	2.59
EPA TO-15	Certified	2-Hexanone	591-78-6	100	0.049	0.10	0.50	0.20	0.41	2.04
EPA TO-15	Certified	4-Ethyltoluene	622-96-8	120	0.049	0.10	0.50	0.24	0.49	2.45
EPA TO-15	Certified	4-Methyl-2-pentanone (Methyl isobutyl ketone (MIBK))	108-10-1	100	0.055	0.10	0.50	0.22	0.41	2.04
EPA TO-15	Certified	Acetone	67-64-1	58	0.12	0.40	0.50	0.28	0.95	1.19
EPA TO-15	Certified	Allyl Chloride	107-05-1	77	0.038	0.10	0.50	0.12	0.31	1.57
EPA TO-15	Certified	Benzene	71-43-2	78	0.039	0.10	0.50	0.12	0.32	1.60
EPA TO-15	Certified	Benzyl Chloride	100-44-7	141	0.19	0.40	0.50	1.10	2.31	2.88
EPA TO-15	Certified	Bromodichloromethane	75-27-4	164	0.027	0.10	0.50	0.18	0.67	3.35
EPA TO-15	Certified	Bromoethene (Vinyl Bromide)	593-60-2	107	0.034	0.10	0.50	0.15	0.44	2.19
EPA TO-15	Certified	Bromoform	75-25-2	253	0.030	0.10	0.50	0.31	1.03	5.17
EPA TO-15	Certified	Bromomethane	74-83-9	95	0.052	0.10	0.50	0.20	0.39	1.94
EPA TO-15	Certified	Carbon disulfide	75-15-0	76	0.043	0.10	0.50	0.13	0.31	1.55
EPA TO-15	Certified	Carbon tetrachloride	56-23-5	154	0.022	0.030	0.030	0.14	0.19	0.19
EPA TO-15	Certified	Chlorobenzene	108-90-7	113	0.021	0.10	0.50	0.10	0.46	2.31
EPA TO-15	Not Certified	Chlorodifluoromethane	75-45-6	86.5	0.028	0.10	0.50	0.10	0.35	1.77
EPA TO-15	Certified	Chloroethane	75-00-3	65	0.043	0.10	0.50	0.11	0.27	1.33
EPA TO-15	Certified	Chloroform	67-66-3	119	0.030	0.10	0.50	0.15	0.49	2.43
EPA TO-15	Certified	Chloromethane	74-87-3	50	0.044	0.10	0.50	0.09	0.20	1.02

EPA TO-15	Certified	cis-1,2-Dichloroethene	156-59-2	97	0.037	0.10	0.50	0.15	0.40	1.98
EPA TO-15	Certified	cis-1,3-Dichloropropene	10061-01-5	111	0.018	0.10	0.50	0.08	0.45	2.27
EPA TO-15	Certified	Cyclohexane	110-82-7	82	0.062	0.10	0.50	0.21	0.34	1.68
EPA TO-15	Certified	Dibromochloromethane	124-48-1	208	0.020	0.10	0.50	0.17	0.85	4.25
EPA TO-15	Certified	Dichlorodifluoromethane	75-71-8	121	0.079	0.10	0.50	0.39	0.49	2.47
EPA TO-15	Certified	Dichlorotetrafluoroethane (Dichlorotetrafluoroethane (1,2-))	76-14-2	171	0.039	0.10	0.50	0.27	0.70	3.50
EPA TO-15	Certified	Ethanol	64-17-5	46.1	0.33	0.40	0.50	0.62	0.75	0.94
EPA TO-15	Certified	Ethyl Acetate	141-78-6	88	0.024	0.10	0.50	0.09	0.36	1.80
EPA TO-15	Certified	Ethyl Benzene	100-41-4	106	0.050	0.10	0.50	0.22	0.43	2.17
EPA TO-15	Certified	Heptane	142-82-5	100	0.046	0.10	0.50	0.19	0.41	2.04
EPA TO-15	Certified	Hexachloro-1,3-butadiene	87-68-3	261	0.031	0.10	0.50	0.33	1.07	5.34
EPA TO-15	Certified	Hexane	110-54-3	86	0.040	0.10	0.50	0.14	0.35	1.76
EPA TO-15	Certified	Isopropyl Alcohol (Isopropanol)	67-63-0	60	0.064	0.10	0.50	0.16	0.25	1.23
EPA TO-15	Certified	Isopropylbenzene	98-82-8	120	0.049	0.10	0.50	0.24	0.49	2.46
EPA TO-15	Certified	m&p-Xylenes	179601-23-1	106	0.14	0.20	1.00	0.61	0.87	4.34
EPA TO-15	Certified	Methyl Methacrylate	80-62-6	100.1	0.037	0.10	0.50	0.15	0.41	2.05
EPA TO-15	Certified	Methyl tert-butyl Ether	1634-04-4	88	0.037	0.10	0.50	0.13	0.36	1.80
EPA TO-15	Certified	Methylene chloride	75-09-2	85	0.23	0.45	0.50	0.80	1.56	1.74
EPA TO-15	Certified	Naphthalene	91-20-3	128	0.015	0.10	0.10	0.08	0.52	0.52
EPA TO-15	Certified	n-Butylbenzene	104-51-8	134	0.042	0.10	0.50	0.23	0.55	2.74
EPA TO-15	Certified	N-propylbenzene	103-65-1	120	0.060	0.10	0.50	0.29	0.49	2.46
EPA TO-15	Certified	o-xylene	95-47-6	106	0.059	0.10	0.50	0.26	0.43	2.17
EPA TO-15	Not Certified	p-Isopropyltoluene {4-Isopropyltoluene}	99-87-6	134	0.052	0.10	0.50	0.29	0.55	2.74
EPA TO-15	Certified	Propene (Propylene)	115-07-1	42	0.080	0.10	0.50	0.14	0.17	0.86
EPA TO-15	Certified	sec-butylbenzene	135-98-8	134	0.053	0.10	0.50	0.29	0.55	2.74
EPA TO-15	Certified	Styrene	100-42-5	104	0.039	0.10	0.50	0.17	0.43	2.13
EPA TO-15	Certified	tert-Butyl Alcohol	75-65-0	74.1	0.050	0.40	0.50	0.15	1.21	1.52
EPA TO-15	Certified	tert-Butylbenzene	98-06-6	134	0.059	0.10	0.50	0.32	0.55	2.74
EPA TO-15	Certified	Tetrachloroethene	127-18-4	166	0.017	0.030	0.030	0.12	0.20	0.20
EPA TO-15	Certified	Tetrahydrofuran	109-99-9	72	0.048	0.10	0.50	0.14	0.29	1.47
EPA TO-15	Certified	Toluene	108-88-3	92	0.046	0.10	0.50	0.17	0.38	1.88
EPA TO-15	Certified	trans-1,2-Dichloroethene	156-60-5	97	0.061	0.10	0.50	0.24	0.40	1.98
EPA TO-15	Certified	Trans-1,3-dichloropropene	10061-02-6	111	0.023	0.10	0.50	0.10	0.45	2.27
EPA TO-15	Certified	Trichloroethene	79-01-6	131	0.018	0.030	0.030	0.10	0.16	0.16
EPA TO-15	Certified	Trichlorofluoromethane	75-69-4	137	0.043	0.10	0.50	0.24	0.56	2.80
EPA TO-15	Certified	Vinyl Acetate	108-05-4	86	0.058	0.10	0.50	0.20	0.35	1.76
EPA TO-15	Certified	Vinyl Chloride	75-01-4	62.5	0.022	0.030	0.030	0.06	0.08	0.08
EPA TO-15	Certified	Total Xylenes	1330-20-7	106	0.199	0.30	1.50	0.86	1.30	6.50

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	CAS#	MDL water (ug/L)	LOD water (ug/L)	LOQ water (ug/L)
EPA 524.2	Certified	1,1,1,2-Tetrachloroethane	630-20-6	0.045	0.25	0.50
EPA 524.2	Certified	1,1,1-Trichloroethane	71-55-6	0.060	0.25	0.50
EPA 524.2	Certified	1,1,2,2-Tetrachloroethane	79-34-5	0.047	0.25	0.50
EPA 524.2	Certified	1,1,2-Trichloroethane	79-00-5	0.064	0.25	0.50
EPA 524.2	Certified	1,1-Dichloroethane	75-34-3	0.060	0.25	0.50
EPA 524.2	Certified	1,1-Dichloroethene	75-35-4	0.074	0.25	0.50
EPA 524.2	Certified	1,1-Dichloropropene	563-58-6	0.063	0.25	0.50
EPA 524.2	Certified	1,2,3-Trichlorobenzene	87-61-6	0.080	0.25	0.50
EPA 524.2	Certified	1,2,3-Trichloropropane	96-18-4	0.122	0.25	0.50
EPA 524.2	Certified	1,2,4-Trichlorobenzene	120-82-1	0.081	0.25	0.50
EPA 524.2	Certified	1,2,4-Trimethylbenzene	95-63-6	0.071	0.25	0.50
EPA 524.2	Certified	1,2-Dibromo-3-chloropropane	96-12-8	0.25	0.40	0.50
EPA 524.2	Certified	1,2-Dibromoethane	106-93-4	0.061	0.25	0.50
EPA 524.2	Certified	1,2-Dichlorobenzene	95-50-1	0.065	0.25	0.50
EPA 524.2	Certified	1,2-Dichloroethane	107-06-2	0.081	0.25	0.50
EPA 524.2	Certified	1,2-Dichloropropane	78-87-5	0.051	0.25	0.50
EPA 524.2	Certified	1,3,5-Trimethylbenzene	108-67-8	0.077	0.25	0.50
EPA 524.2	Certified	1,3-Dichlorobenzene	541-73-1	0.063	0.25	0.50
EPA 524.2	Certified	1,3-Dichloropropane	142-28-9	0.050	0.25	0.50
EPA 524.2	Certified	1,4-Dichlorobenzene	106-46-7	0.071	0.25	0.50
EPA 524.2	Certified	1-Chlorobutane	109-69-3	0.066	0.25	0.50
EPA 524.2	Certified	2,2-Dichloropropane	594-20-7	0.11	0.25	0.50
EPA 524.2	Certified	2-Butanone	78-93-3	0.68	1.25	2.50
EPA 524.2	Certified	2-Chlorotoluene	95-49-8	0.16	0.40	0.50
EPA 524.2	Certified	2-Hexanone	591-78-6	0.27	1.25	2.50
EPA 524.2	Certified	4-Chlorotoluene	106-43-4	0.20	0.40	0.50
EPA 524.2	Certified	4-Methyl-2-pentanone	108-10-1	0.33	1.25	2.50
EPA 524.2	Certified	Acetone	67-64-1	0.76	1.25	2.50
EPA 524.2	Certified	Acrylonitrile	107-13-1	0.31	0.50	1.00
EPA 524.2	Certified	Allyl Chloride	107-05-1	0.095	0.25	0.50
EPA 524.2	Certified	Benzene	71-43-2	0.062	0.25	0.50
EPA 524.2	Certified	Bromobenzene	108-86-1	0.075	0.25	0.50
EPA 524.2	Certified	Bromochloromethane	74-97-5	0.092	0.25	0.50
EPA 524.2	Certified	Bromodichloromethane	75-27-4	0.046	0.25	0.50
EPA 524.2	Certified	Bromoform	75-25-2	0.097	0.25	0.50
EPA 524.2	Certified	Bromomethane	74-83-9	0.11	0.25	0.50
EPA 524.2	Certified	Carbon disulfide	75-15-0	0.065	0.25	0.50
EPA 524.2	Certified	Carbon tetrachloride	56-23-5	0.072	0.25	0.50

EPA 524.2	Certified	Chlorobenzene	108-90-7	0.065	0.25	0.50
EPA 524.2	Certified	Chloroethane	75-00-3	0.15	0.25	0.50
EPA 524.2	Certified	Chloroform	67-66-3	0.053	0.25	0.50
EPA 524.2	Certified	Chloromethane	74-87-3	0.10	0.25	0.50
EPA 524.2	Certified	cis-1,2-Dichloroethene	156-59-2	0.070	0.25	0.50
EPA 524.2	Certified	cis-1,3-Dichloropropene	10061-01-5	0.057	0.25	0.50
EPA 524.2	Certified	Dibromochloromethane	124-48-1	0.052	0.25	0.50
EPA 524.2	Certified	Dibromomethane	74-95-3	0.060	0.25	0.50
EPA 524.2	Certified	Dichlorodifluoromethane	75-71-8	0.092	0.25	0.50
EPA 524.2	Certified	Diethyl Ether	60-29-7	0.15	0.25	0.50
EPA 524.2	Certified	Ethyl Benzene	100-41-4	0.066	0.25	0.50
EPA 524.2	Certified	Ethyl methacrylate	97-63-2	0.069	0.25	0.50
EPA 524.2	Certified	Hexachlorobutadiene	87-68-3	0.075	0.25	0.50
EPA 524.2	Certified	Hexachloroethane	67-72-1	0.12	0.40	0.50
EPA 524.2	Certified	Iodomethane	74-88-4	0.14	0.80	1.00
EPA 524.2	Certified	Isopropylbenzene	98-82-8	0.065	0.25	0.50
EPA 524.2	Certified	m/p-Xylenes	179601-23-1	0.15	0.50	1.00
EPA 524.2	Certified	Methacrylonitrile	126-98-7	0.17	0.25	0.50
EPA 524.2	Certified	Methyl acrylate	96-33-3	0.17	0.25	0.50
EPA 524.2	Certified	Methyl methacrylate	80-62-6	0.15	0.50	1.00
EPA 524.2	Certified	Methyl tert-butyl Ether	1634-04-4	0.075	0.25	0.50
EPA 524.2	Certified	Methylene chloride	75-09-2	0.45	0.50	0.50
EPA 524.2	Certified	Naphthalene	91-20-3	0.14	0.80	1.00
EPA 524.2	Certified	n-Butylbenzene	104-51-8	0.063	0.25	0.50
EPA 524.2	Certified	N-propylbenzene	103-65-1	0.17	0.40	0.50
EPA 524.2	Certified	Nitrobenzene	98-95-3	0.92	2.50	5.00
EPA 524.2	Certified	o-xylene	95-47-6	0.066	0.25	0.50
EPA 524.2	Certified	Pentachloroethane	363-72-4	0.052	0.25	0.50
EPA 524.2	Certified	p-Isopropyltoluene	99-87-6	0.072	0.25	0.50
EPA 524.2	Certified	Propionitrile	107-12-0	1.25	2.00	2.50
EPA 524.2	Certified	Sec-butylbenzene	135-98-8	0.061	0.25	0.50
EPA 524.2	Certified	Styrene	100-42-5	0.071	0.25	0.50
EPA 524.2	Certified	t-1,3-Dichloropropene	10061-02-6	0.080	0.25	0.50
EPA 524.2	Certified	t-1,4-Dichloro-2-butene	110-57-6	0.36	0.50	1.00
EPA 524.2	Certified	tert-Butyl Alcohol	75-65-0	5.79	8.00	10.0
EPA 524.2	Certified	tert-Butylbenzene	98-06-6	0.053	0.25	0.50
EPA 524.2	Certified	Tetrachloroethene	127-18-4	0.079	0.25	0.50
EPA 524.2	Certified	Tetrahydrofuran	109-99-9	0.44	0.50	1.00
EPA 524.2	Certified	Toluene	108-88-3	0.063	0.25	0.50
EPA 524.2	Certified	Trans-1,2-dichloroethene	156-60-5	0.089	0.25	0.50
EPA 524.2	Certified	Trichloroethene	79-01-6	0.080	0.25	0.50
EPA 524.2	Certified	Trichlorofluoromethane	75-69-4	0.072	0.25	0.50

EPA 524.2	Certified	Vinyl chloride	75-01-4	0.059	0.25	0.50
EPA 524.2	Certified	Total Xylenes	1330-20-7	0.216	0.75	1.50
		Extra analytes				
	Not Certified	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	0.073	0.25	0.50
	Not Certified	Cyclohexane	110-82-7	0.081	0.25	0.50
	Not Certified	Methylcyclohexane	108-87-2	0.065	0.25	0.50
	Not Certified	Isopropyl Ether	108-20-3	0.070	0.25	0.50

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	CAS#	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)
EPA 624.1	Certified	1,1,1,2-Tetrachloroethane	630-20-6	0.55	2.50	5.00
EPA 624.1	Certified	1,1,1-Trichloroethane	71-55-6	0.75	2.50	5.00
EPA 624.1	Certified	1,1,2,2-Tetrachloroethane	79-34-5	0.70	2.50	5.00
EPA 624.1	Certified	1,1,2-Trichloroethane	79-00-5	0.77	2.50	5.00
EPA 624.1	Certified	1,1,2-Trichlorotrifluoroethane	76-13-1	0.45	2.50	5.00
EPA 624.1	Certified	1,1-Dichloroethane	75-34-3	0.60	2.50	5.00
EPA 624.1	Certified	1,1-Dichloroethene	75-35-4	0.59	2.50	5.00
EPA 624.1	Certified	1,1-Dichloropropene	563-58-6	0.54	2.50	5.00
EPA 624.1	Certified	1,2,3-Trichlorobenzene	87-61-6	1.25	2.50	5.00
EPA 624.1	Certified	1,2,3-Trichloropropane	96-18-4	0.66	2.50	5.00
EPA 624.1	Certified	1,2,4-Trichlorobenzene	120-82-1	1.03	2.50	5.00
EPA 624.1	Certified	1,2,4-Trimethylbenzene	95-63-6	0.55	2.50	5.00
EPA 624.1	Certified	1,2-Dibromo-3-Chloropropane	96-12-8	0.95	2.50	5.00
EPA 624.1	Certified	1,2-Dibromoethane	106-93-4	0.60	2.50	5.00
EPA 624.1	Certified	1,2-Dichlorobenzene	95-50-1	0.69	2.50	5.00
EPA 624.1	Certified	1,2-Dichloroethane	107-06-2	0.64	2.50	5.00
EPA 624.1	Certified	1,2-Dichloropropane	78-87-5	0.55	2.50	5.00
EPA 624.1	Certified	1,3,5-Trimethylbenzene	108-67-8	0.62	2.50	5.00
EPA 624.1	Certified	1,3-Dichlorobenzene	541-73-1	0.76	2.50	5.00
EPA 624.1	Certified	1,3-Dichloropropane	142-28-9	0.57	2.50	5.00
EPA 624.1	Certified	1,4-Dichlorobenzene	106-46-7	0.75	2.50	5.00
EPA 624.1	Certified	1,4-Dioxane	123-91-1	16.2	50.0	100
EPA 624.1	Certified	2,2-Dichloropropane	594-20-7	0.84	2.50	5.00
EPA 624.1	Certified	2-Butanone	78-93-3	2.83	12.5	25.0
EPA 624.1	Certified	2-Chloroethyl vinyl ether	110-75-8	5.66	12.5	25.0
EPA 624.1	Certified	2-Chlorotoluene	95-49-8	0.57	2.50	5.00
EPA 624.1	Certified	2-Hexanone	591-78-6	3.42	12.5	25.0
EPA 624.1	Certified	4-Chlorotoluene	106-43-4	0.70	2.50	5.00
EPA 624.1	Certified	4-Methyl-2-Pentanone (Methyl isobutyl ketone (MIBK))	108-10-1	2.71	12.5	25.0

EPA 624.1	Certified	Acetone	67-64-1	4.05	12.5	25.0
EPA 624.1	Certified	Acrolein	107-02-8	16.7	25.0	25.0
EPA 624.1	Certified	Acrylonitrile	107-13-1	2.83	12.5	25.0
EPA 624.1	Certified	Benzene	71-43-2	0.59	2.50	5.00
EPA 624.1	Certified	Bromobenzene	108-86-1	0.56	2.50	5.00
EPA 624.1	Certified	Bromodichloromethane	75-27-4	0.57	2.50	5.00
EPA 624.1	Certified	Bromoform	75-25-2	0.64	2.50	5.00
EPA 624.1	Certified	Bromomethane	74-83-9	1.47	2.50	5.00
EPA 624.1	Certified	Carbon Disulfide	75-15-0	1.06	2.50	5.00
EPA 624.1	Certified	Carbon Tetrachloride	56-23-5	0.61	2.50	5.00
EPA 624.1	Certified	Chlorobenzene	108-90-7	0.65	2.50	5.00
EPA 624.1	Certified	Chloroethane	75-00-3	0.94	2.50	5.00
EPA 624.1	Certified	Chloroform	67-66-3	0.50	2.50	5.00
EPA 624.1	Certified	Chloromethane	74-87-3	0.85	2.50	5.00
EPA 624.1	Certified	cis-1,2-Dichloroethene	156-59-2	0.59	2.50	5.00
EPA 624.1	Certified	cis-1,3-Dichloropropene	10061-01-5	0.65	2.50	5.00
EPA 624.1	Certified	Cyclohexane	110-82-7	0.61	2.50	5.00
EPA 624.1	Certified	Dibromochloromethane	124-48-1	0.66	2.50	5.00
EPA 624.1	Certified	Dibromomethane	74-95-3	0.53	2.50	5.00
EPA 624.1	Certified	Dichlorodifluoromethane	75-71-8	0.99	2.50	5.00
EPA 624.1	Certified	Ethyl Acetate	141-78-6	0.88	2.50	5.00
EPA 624.1	Certified	Ethyl Benzene	100-41-4	0.52	2.50	5.00
EPA 624.1	Certified	Hexachlorobutadiene	87-68-3	0.53	2.50	5.00
EPA 624.1	Certified	Isopropylbenzene	98-82-8	0.57	2.50	5.00
EPA 624.1	Certified	m/p-Xylenes	179601-23-1	1.13	5.00	10.0
EPA 624.1	Certified	Methyl Acetate	79-20-9	0.68	2.50	5.00
EPA 624.1	Certified	Methyl tert-Butyl Ether	1634-04-4	0.51	2.50	5.00
EPA 624.1	Certified	Methylcyclohexane	108-87-2	0.71	2.50	5.00
EPA 624.1	Certified	Methylene Chloride	75-09-2	0.72	2.50	5.00
EPA 624.1	Certified	Naphthalene	91-20-3	1.74	2.50	5.00
EPA 624.1	Certified	n-Butylbenzene	104-51-8	0.79	2.50	5.00
EPA 624.1	Certified	n-propylbenzene	103-65-1	0.63	2.50	5.00
EPA 624.1	Certified	o-Xylene	95-47-6	0.54	2.50	5.00
EPA 624.1	Certified	p-Isopropyltoluene	99-87-6	0.61	2.50	5.00

EPA 624.1	Certified	sec-Butylbenzene	135-98-8	0.59	2.50	5.00
EPA 624.1	Certified	Styrene	100-42-5	0.56	2.50	5.00
EPA 624.1	Certified	t-1,3-Dichloropropene	10061-02-6	0.59	2.50	5.00
EPA 624.1	Certified	tert-Butyl Alcohol	75-65-0	5.00	12.5	25.0
EPA 624.1	Certified	Tetrachloroethene	127-18-4	0.53	2.50	5.00
EPA 624.1	Certified	Toluene	108-88-3	0.57	2.50	5.00
EPA 624.1	Certified	Total Xylenes	1330-20-7	1.67	7.50	15.0
EPA 624.1	Certified	trans-1,2-Dichloroethene	156-60-5	0.66	2.50	5.00
EPA 624.1	Certified	Trichloroethene	79-01-6	0.77	2.50	5.00
EPA 624.1	Certified	Trichlorofluoromethane	75-69-4	0.63	2.50	5.00
EPA 624.1	Certified	Vinyl Acetate	108-05-4	3.13	12.5	25.0
EPA 624.1	Certified	Vinyl Chloride	75-01-4	0.74	2.50	5.00
Extra analytes _ Not certified						
EPA 624	Not Certified	Allyl chloride	107-05-1	1.35	2.50	5.00
EPA 624	Not Certified	Diethyl Ether	60-29-7	0.75	2.50	5.00
EPA 624	Not Certified	Diisopropyl ether	108-20-3	0.55	2.50	5.00
EPA 624	Not Certified	Ethyl methacrylate	97-63-2	0.51	2.50	5.00
EPA 624	Not Certified	Hexachloroethane	67-72-1	0.60	2.50	5.00
EPA 624	Not Certified	Isopropyl Acetate	108-21-4	0.54	2.50	5.00
EPA 624	Not Certified	Methacrylonitrile	126-98-7	0.83	2.50	5.00
EPA 624	Not Certified	Methyl Iodide	74-88-4	3.05	5.00	5.00
EPA 624	Not Certified	Methyl methacrylate	80-62-6	0.63	2.50	5.00
EPA 624	Not Certified	n-amyl Acetate	628-63-7	1.50	2.50	5.00
EPA 624	Not Certified	t-1,4-Dichloro-2-butene	110-57-6	0.85	2.50	5.00
EPA 624	Not Certified	tert-butylbenzene	98-06-6	0.54	2.50	5.00

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	CAS#	MDL water (ug/L)	LOD water (ug/L)	LOQ water (ug/L)
EPA SW846 8260D	Certified	1,1,1,2-Tetrachloroethane	630-20-6	0.19	0.50	1.00
EPA SW846 8260D	Certified	1,1,1-Trichloroethane	71-55-6	0.18	0.50	1.00
EPA SW846 8260D	Certified	1,1,2,2-Tetrachloroethane	79-34-5	0.23	0.75	1.00
EPA SW846 8260D	Certified	1,1,2-Trichloroethane	79-00-5	0.19	0.50	1.00
EPA SW846 8260D	Certified	1,1,2-Trichlorotrifluoroethane	76-13-1	0.17	0.50	1.00
EPA SW846 8260D	Certified	1,1-Dichloroethane	75-34-3	0.20	0.50	1.00
EPA SW846 8260D	Certified	1,1-Dichloroethene	75-35-4	0.23	0.75	1.00
EPA SW846 8260D	Certified	1,1-Dichloropropene	563-58-6	0.16	0.50	1.00
EPA SW846 8260D	Certified	1,2,3-Trichlorobenzene	87-61-6	0.33	0.75	1.00
EPA SW846 8260D	Certified	1,2,3-Trichloropropane	96-18-4	0.23	0.75	1.00
EPA SW846 8260D	Certified	1,2,4-Trichlorobenzene	120-82-1	0.23	0.75	1.00
EPA SW846 8260D	Certified	1,2,4-Trimethylbenzene	95-63-6	0.18	0.50	1.00
EPA SW846 8260D	Certified	1,2-Dibromo-3-chloropropane	96-12-8	0.42	0.75	1.00
EPA SW846 8260D	Certified	1,2-Dibromoethane	106-93-4	0.14	0.50	1.00
EPA SW846 8260D	Certified	1,2-Dichlorobenzene	95-50-1	0.17	0.50	1.00
EPA SW846 8260D	Certified	1,2-Dichloroethane	107-06-2	0.18	0.50	1.00
EPA SW846 8260D	Certified	1,2-Dichloropropane	78-87-5	0.17	0.50	1.00
EPA SW846 8260D	Certified	1,3,5-Trimethylbenzene	108-67-8	0.20	0.50	1.00
EPA SW846 8260D	Certified	1,3-Dichlorobenzene	541-73-1	0.20	0.50	1.00
EPA SW846 8260D	Certified	1,3-Dichloropropane	142-28-9	0.17	0.50	1.00
EPA SW846 8260D	Certified	1,4-Dichlorobenzene	106-46-7	0.19	0.50	1.00
EPA SW846 8260D	Certified	1,4-Dioxane	123-91-1	4.68	15.0	100
EPA SW846 8260D	Certified	2,2-Dichloropropane	594-20-7	0.27	0.75	1.00
EPA SW846 8260D	Certified	2-Butanone	78-93-3	0.82	2.50	5.00
EPA SW846 8260D	Certified	2-Chloroethyl vinyl ether	110-75-8	1.35	2.50	5.00
EPA SW846 8260D	Certified	2-Chlorotoluene	95-49-8	0.19	0.50	1.00
EPA SW846 8260D	Certified	2-Hexanone	591-78-6	0.76	2.50	5.00
EPA SW846 8260D	Certified	4-Chlorotoluene	106-43-4	0.21	0.50	1.00
EPA SW846 8260D	Certified	4-Methyl-2-pentanone	108-10-1	0.87	2.50	5.00
EPA SW846 8260D	Certified	Acetone	67-64-1	1.16	3.75	5.00
EPA SW846 8260D	Certified	Acrolein	107-02-8	7.22	20.0	25.0
EPA SW846 8260D	Certified	Acrylonitrile	107-13-1	0.79	2.50	5.00
EPA SW846 8260D	Certified	Benzene	71-43-2	0.16	0.50	1.00
EPA SW846 8260D	Certified	Bromobenzene	108-86-1	0.24	0.75	1.00
EPA SW846 8260D	Certified	Bromochloromethane	74-97-5	0.19	0.75	1.00

EPA SW846 8260D	Certified	Bromodichloromethane	75-27-4	0.18	0.50	1.00
EPA SW846 8260D	Certified	Bromoform	75-25-2	0.16	0.50	1.00
EPA SW846 8260D	Certified	Bromomethane	74-83-9	1.57	2.50	5.00
EPA SW846 8260D	Certified	Carbon disulfide	75-15-0	0.26	0.75	1.00
EPA SW846 8260D	Certified	Carbon tetrachloride	56-23-5	0.18	0.75	1.00
EPA SW846 8260D	Certified	Chlorobenzene	108-90-7	0.17	0.50	1.00
EPA SW846 8260D	Certified	Chlorodibromomethane	124-48-1	0.18	0.50	1.00
EPA SW846 8260D	Certified	Chloroethane	75-00-3	0.26	0.75	1.00
EPA SW846 8260D	Certified	Chloroform	67-66-3	0.18	0.75	1.00
EPA SW846 8260D	Certified	Chloromethane	74-87-3	0.20	0.75	1.00
EPA SW846 8260D	Certified	cis-1,2-Dichloroethene	156-59-2	0.17	0.75	1.00
EPA SW846 8260D	Certified	cis-1,3-Dichloropropene	10061-01-5	0.16	0.50	1.00
EPA SW846 8260D	Certified	Cyclohexane	110-82-7	1.21	3.75	5.00
EPA SW846 8260D	Certified	Dibromomethane	74-95-3	0.16	0.50	1.00
EPA SW846 8260D	Certified	Dichlorodifluoromethane	75-71-8	0.17	0.50	1.00
EPA SW846 8260D	Certified	Ethyl Acetate	141-78-6	0.30	0.75	1.00
EPA SW846 8260D	Certified	Ethyl Benzene	100-41-4	0.17	0.50	1.00
EPA SW846 8260D	Certified	Hexachlorobutadiene	87-68-3	0.25	0.75	1.00
EPA SW846 8260D	Certified	Hexachloroethane	67-72-1	0.24	0.75	1.00
EPA SW846 8260D	Certified	Isopropylbenzene	98-82-8	0.19	0.50	1.00
EPA SW846 8260D	Certified	m/p-Xylenes	179601-23-1	0.33	1.00	2.00
EPA SW846 8260D	Certified	Methyl Acetate	79-20-9	0.53	0.75	1.00
EPA SW846 8260D	Certified	Methyl Cyclohexane	108-87-2	0.13	0.50	1.00
EPA SW846 8260D	Certified	Methyl iodide	74-88-4	0.81	2.50	5.00
EPA SW846 8260D	Certified	Methyl tert-butyl Ether	1634-04-4	0.18	0.50	1.00
EPA SW846 8260D	Certified	Methylene chloride	75-09-2	0.18	0.50	1.00
EPA SW846 8260D	Certified	Naphthalene	91-20-3	0.26	0.75	1.00
EPA SW846 8260D	Certified	n-Butylbenzene	104-51-8	0.22	0.50	1.00
EPA SW846 8260D	Certified	N-propylbenzene	103-65-1	0.21	0.50	1.00
EPA SW846 8260D	Certified	o-xylene	95-47-6	0.18	0.50	1.00
EPA SW846 8260D	Certified	p-Isopropyltoluene {4-Isopropyltoluene}	99-87-6	0.19	0.50	1.00
EPA SW846 8260D	Certified	Sec-butylbenzene	135-98-8	0.18	0.50	1.00
EPA SW846 8260D	Certified	Styrene	100-42-5	0.13	0.50	1.00
EPA SW846 8260D	Certified	t-1,3-Dichloropropene	10061-02-6	0.14	0.50	1.00
EPA SW846 8260D	Certified	Tert butyl alcohol	75-65-0	7.01	18.8	25.0
EPA SW846 8260D	Certified	tert-Butylbenzene	98-06-6	0.20	0.75	1.00
EPA SW846 8260D	Certified	Tetrachloroethene	127-18-4	0.18	0.50	1.00
EPA SW846 8260D	Certified	Toluene	108-88-3	0.17	0.50	1.00

EPA SW846 8260D	Certified	Total Xylenes	1330-20-7	0.51	1.50	3.00
EPA SW846 8260D	Certified	Trans-1,2-dichloroethene	156-60-5	0.20	0.50	1.00
EPA SW846 8260D	Certified	Trichloroethene	79-01-6	0.27	0.50	1.00
EPA SW846 8260D	Certified	Trichlorofluoromethane	75-69-4	0.20	0.50	1.00
EPA SW846 8260D	Certified	Vinyl Acetate	108-05-4	0.70	2.50	5.00
EPA SW846 8260D	Certified	Vinyl chloride	75-01-4	0.22	0.50	1.00
EPA SW846 8260D	Not Certified	Allyl chloride	107-05-1	0.31	0.50	1.00
EPA SW846 8260D	Not Certified	Diethyl Ether	60-29-7	0.22	0.50	1.00
EPA SW846 8260D	Not Certified	Diisopropyl ether	108-20-3	0.17	0.50	1.00
EPA SW846 8260D	Not Certified	Ethyl methacrylate	97-63-2	0.13	0.50	1.00
EPA SW846 8260D	Not Certified	Isopropyl Acetate	108-21-4	0.12	0.50	1.00
EPA SW846 8260D	Not Certified	Methacrylonitrile	126-98-7	0.27	0.50	1.00
EPA SW846 8260D	Not Certified	n-amyl acetate	628-63-7	0.19	0.50	1.00
EPA SW846 8260D	Not Certified	Tetrahydrofuran	109-99-9	0.70	2.50	5.00
EPA SW846 8260D	Not Certified	trans-1,4-dichloro-2-butene	110-57-6	0.40	2.50	5.00
EPA SW846 8260D	Not Certified	Methyl methacrylate	80-62-6	0.16	0.50	1.00

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	CAS#	mdl soil (ug/kg)	lod soil (ug/kg)	loq soil (ug/kg)
SW-846 8260D	Certified	1,1,1,2-Tetrachloroethane	630-20-6	0.71	2.50	5.00
SW-846 8260D	Certified	1,1,1-Trichloroethane	71-55-6	0.75	2.50	5.00
SW-846 8260D	Certified	1,1,2,2-Tetrachloroethane	79-34-5	1.13	2.50	5.00
SW-846 8260D	Certified	1,1,2-Trichloroethane	79-00-5	0.86	2.50	5.00
SW-846 8260D	Certified	1,1,2-Trichlorotrifluoroethane	76-13-1	0.72	2.50	5.00
SW-846 8260D	Certified	1,1-Dichloroethane	75-34-3	0.70	2.50	5.00
SW-846 8260D	Certified	1,1-Dichloroethene	75-35-4	0.86	2.50	5.00
SW-846 8260D	Certified	1,1-Dichloropropene	563-58-6	0.69	2.50	5.00
SW-846 8260D	Certified	1,2,3-Trichlorobenzene	87-61-6	1.01	4.00	5.00
SW-846 8260D	Certified	1,2,3-Trichloropropane	96-18-4	1.46	4.00	5.00
SW-846 8260D	Certified	1,2,4-Trichlorobenzene	120-82-1	0.94	2.50	5.00
SW-846 8260D	Certified	1,2,4-Trimethylbenzene	95-63-6	0.71	2.50	5.00
SW-846 8260D	Certified	1,2-Dibromo-3-chloropropane	96-12-8	1.24	4.00	5.00
SW-846 8260D	Certified	1,2-Dibromoethane	106-93-4	0.75	2.50	5.00
SW-846 8260D	Certified	1,2-Dichlorobenzene	95-50-1	0.64	2.50	5.00
SW-846 8260D	Certified	1,2-Dichloroethane	107-06-2	0.84	2.50	5.00
SW-846 8260D	Certified	1,2-Dichloropropane	78-87-5	0.65	2.50	5.00
SW-846 8260D	Certified	1,3,5-Trimethylbenzene	108-67-8	0.64	2.50	5.00
SW-846 8260D	Certified	1,3-Dichlorobenzene	541-73-1	0.67	2.50	5.00
SW-846 8260D	Certified	1,3-Dichloropropane	142-28-9	0.80	2.50	5.00
SW-846 8260D	Certified	1,4-Dichlorobenzene	106-46-7	0.63	2.50	5.00
SW-846 8260D	Certified	1,4-Dioxane	123-91-1	25.5	80.0	100
SW-846 8260D	Certified	2,2-Dichloropropane	594-20-7	1.13	4.00	5.00
SW-846 8260D	Certified	2-Butanone	78-93-3	7.28	20.0	25.0
SW-846 8260D	Certified	2-Chloroethyl vinyl ether	110-75-8	3.55	12.5	25.0
SW-846 8260D	Certified	2-Chlorotoluene	95-49-8	0.69	2.50	5.00
SW-846 8260D	Certified	2-Hexanone	591-78-6	4.68	12.5	25.0
SW-846 8260D	Certified	4-Chlorotoluene	106-43-4	0.74	2.50	5.00
SW-846 8260D	Certified	4-Methyl-2-pentanone	108-10-1	4.58	12.5	25.0
SW-846 8260D	Certified	Acetone	67-64-1	12.2	20.0	25.0
SW-846 8260D	Certified	Acrolein	107-02-8	7.23	25.0	25.0
SW-846 8260D	Certified	Acrylonitrile	107-13-1	5.59	20.0	25.0
SW-846 8260D	Certified	Benzene	71-43-2	0.66	2.50	5.00

SW-846 8260D	Certified	Bromobenzene	108-86-1	0.74	2.50	5.00
SW-846 8260D	Certified	Bromochloromethane	74-97-5	0.81	2.50	5.00
SW-846 8260D	Certified	Bromodichloromethane	75-27-4	0.70	2.50	5.00
SW-846 8260D	Certified	Bromoform	75-25-2	0.81	2.50	5.00
SW-846 8260D	Certified	Bromomethane	74-83-9	1.16	4.00	5.00
SW-846 8260D	Certified	Carbon disulfide	75-15-0	0.75	2.50	5.00
SW-846 8260D	Certified	Carbon tetrachloride	56-23-5	0.79	2.50	5.00
SW-846 8260D	Certified	Chlorobenzene	108-90-7	0.65	2.50	5.00
SW-846 8260D	Certified	Chlorodibromomethane	124-48-1	0.75	2.50	5.00
SW-846 8260D	Certified	Chloroethane	75-00-3	0.89	2.50	5.00
SW-846 8260D	Certified	Chloroform	67-66-3	0.67	2.50	5.00
SW-846 8260D	Certified	Chloromethane	74-87-3	1.05	4.00	5.00
SW-846 8260D	Certified	cis-1,2-Dichloroethene	156-59-2	0.68	2.50	5.00
SW-846 8260D	Certified	cis-1,3-Dichloropropene	10061-01-5	0.71	2.50	5.00
SW-846 8260D	Certified	Cyclohexane	110-82-7	0.84	2.50	5.00
SW-846 8260D	Certified	Dibromomethane	74-95-3	0.82	2.50	5.00
SW-846 8260D	Certified	Dichlorodifluoromethane	75-71-8	0.86	2.50	5.00
SW-846 8260D	Certified	Ethyl Acetate	141-78-6	1.12	4.00	5.00
SW-846 8260D	Certified	Ethyl Benzene	100-41-4	0.70	2.50	5.00
SW-846 8260D	Certified	Hexachlorobutadiene	87-68-3	0.76	2.50	5.00
SW-846 8260D	Certified	Hexachloroethane	67-72-1	0.77	2.50	5.00
SW-846 8260D	Certified	Isopropylbenzene	98-82-8	0.72	2.50	5.00
SW-846 8260D	Certified	m/p-Xylenes	179601-23-1	1.48	5.00	10.0
SW-846 8260D	Certified	Methyl Acetate	79-20-9	1.26	4.00	5.00
SW-846 8260D	Certified	Methyl Cyclohexane	108-87-2	0.80	2.50	5.00
SW-846 8260D	Certified	Methyl Iodide	74-88-4	0.71	2.50	5.00
SW-846 8260D	Certified	Methyl tert-butyl Ether	1634-04-4	0.93	2.50	5.00
SW-846 8260D	Certified	Methylene chloride	75-09-2	5.96	8.00	10.00
SW-846 8260D	Certified	Naphthalene	91-20-3	1.17	4.00	5.00
SW-846 8260D	Certified	n-Butylbenzene	104-51-8	0.71	2.50	5.00
SW-846 8260D	Certified	N-propylbenzene	103-65-1	0.71	2.50	5.00
SW-846 8260D	Certified	o-xylene	95-47-6	0.79	2.50	5.00
SW-846 8260D	Certified	p-Isopropyltoluene	99-87-6	0.83	2.50	5.00
SW-846 8260D	Certified	Sec-butylbenzene	135-98-8	0.76	2.50	5.00
SW-846 8260D	Certified	Styrene	100-42-5	0.79	2.50	5.00
SW-846 8260D	Certified	t-1,3-Dichloropropene	10061-02-6	0.74	2.50	5.00
SW-846 8260D	Certified	Tert butyl alcohol	75-65-0	8.99	20.00	25.00

SW-846 8260D	Certified	tert-Butylbenzene	98-06-6	0.79	2.50	5.00
SW-846 8260D	Certified	Tetrachloroethene	127-18-4	0.76	2.50	5.00
SW-846 8260D	Certified	Toluene	108-88-3	0.63	2.50	5.00
SW-846 8260D	Certified	Total Xylenes	1330-20-7	2.27	7.50	15.0
SW-846 8260D	Certified	Trans-1,2-dichloroethene	156-60-5	0.68	2.50	5.00
SW-846 8260D	Certified	Trichloroethene	79-01-6	0.73	2.50	5.00
SW-846 8260D	Certified	Trichlorofluoromethane	75-69-4	0.97	2.50	5.00
SW-846 8260D	Certified	Vinyl Acetate	108-05-4	4.10	12.5	25.0
SW-846 8260D	Certified	Vinyl chloride	75-01-4	0.91	2.50	5.00
SW-846 8260D	Certified	Bromoethane	76-96-4	No MDL/LOD/LOQ		
SW-846 8260D	Not Certified	Allyl chloride	107-05-1	0.8	2.50	5.00
SW-846 8260D	Not Certified	Diethyl Ether	60-29-7	0.87	2.50	5.00
SW-846 8260D	Not Certified	Diisopropyl ether	108-20-3	0.76	2.50	5.00
SW-846 8260D	Not Certified	Ethyl methacrylate	97-63-2	0.79	2.50	5.00
SW-846 8260D	Not Certified	Isopropyl Acetate	108-21-4	0.89	2.50	5.00
SW-846 8260D	Not Certified	Methacrylonitrile	126-98-7	0.94	2.50	5.00
SW-846 8260D	Not Certified	n-amyl acetate	628-63-7	0.78	2.50	5.00
SW-846 8260D	Not Certified	Tetrahydrofuran	109-99-9	5.20	20.0	25.0
SW-846 8260D	Not Certified	trans-1,4-dichloro-2-butene	110-57-6	0.91	2.50	5.00
SW-846 8260D	Not Certified	Methyl methacrylate	80-62-6	0.79	2.50	5.00

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	parameter	Status	CAS #	MDL Soil (ug/kg)	LOQ Soil (ug/kg)	LOQ Soil (ug/kg)
SW-846 8270E	1,1-Biphenyl	Certified	92-52-4	86.5	130	170
SW-846 8270E	1,2,4,5-Tetrachlorobenzene	Certified	95-94-3	91.2	130	170
SW-846 8270E	1,2,4-Trichlorobenzene	Certified	120-82-1	78.9	130	170
SW-846 8270E	1,2-Dichlorobenzene	Certified	95-50-1	86.7	130	170
SW-846 8270E	1,3-Dichlorobenzene	Certified	541-73-1	87.9	130	170
SW-846 8270E	1,4-Dichlorobenzene	Certified	106-46-7	78.9	130	170
SW-846 8270E	1,4-Dioxane	Certified	123-91-1	89.1	130	170
SW-846 8270E	1-Methylnaphthalene	Certified	90-12-0	79.4	130	170
SW-846 8270E	2,2-oxybis(1-Chloropropane) {Bis(2-chloroisopropyl) Ether}	Certified	108-60-1	95.9	130	170
SW-846 8270E	2,3,4,6-Tetrachlorophenol	Certified	58-90-2	81.2	130	170
SW-846 8270E	2,4,5-Trichlorophenol	Certified	95-95-4	83.6	130	170
SW-846 8270E	2,4,6-Trichlorophenol	Certified	88-06-2	85.4	130	170
SW-846 8270E	2,4-Dichlorophenol	Certified	120-83-2	81.7	130	170
SW-846 8270E	2,4-Dimethylphenol	Certified	105-67-9	98.8	130	170
SW-846 8270E	2,4-Dinitrophenol	Certified	51-28-5	129	270	330
SW-846 8270E	2,4-Dinitrotoluene	Certified	121-14-2	84.6	130	170
SW-846 8270E	2,6-Dinitrotoluene	Certified	606-20-2	78.1	130	170
SW-846 8270E	2-Chloronaphthalene	Certified	91-58-7	85.5	130	170
SW-846 8270E	2-Chlorophenol	Certified	95-57-8	68.3	130	170
SW-846 8270E	2-Methylnaphthalene	Certified	91-57-6	75.0	130	170
SW-846 8270E	2-Methylphenol	Certified	95-48-7	107	130	170
SW-846 8270E	2-Nitroaniline	Certified	88-74-4	109	130	170
SW-846 8270E	2-Nitrophenol	Certified	88-75-5	92.8	130	170
SW-846 8270E	3,3-Dichlorobenzidine	Certified	91-94-1	138	270	330
SW-846 8270E	3+4-Methylphenols (3-Methylphenol and 4-Methyl phenol)	Certified	65794-96-9	97.4	130	330
SW-846 8270E	3-Nitroaniline	Certified	99-09-2	101	130	170
SW-846 8270E	4,6-Dinitro-2-methylphenol	Certified	534-52-1	86.2	270	330
SW-846 8270E	4-Bromophenyl-phenylether	Certified	101-55-3	98.4	130	170
SW-846 8270E	4-Chloro-3-methylphenol	Certified	59-50-7	78.7	130	170
SW-846 8270E	4-Chloroaniline	Certified	106-47-8	96.3	130	170
SW-846 8270E	4-Chlorophenyl-phenylether	Certified	7005-72-3	93.6	130	170
SW-846 8270E	4-Nitroaniline	Certified	100-01-6	104	130	170
SW-846 8270E	4-Nitrophenol	Certified	100-02-7	138	270	330

SW-846 8270E	Acenaphthene	Certified	83-32-9	78.9	130	170
SW-846 8270E	Acenaphthylene	Certified	208-96-8	68.7	130	170
SW-846 8270E	Acetophenone	Certified	98-86-2	80.1	130	170
SW-846 8270E	Aniline	Certified	62-53-3	107	130	170
SW-846 8270E	Anthracene	Certified	120-12-7	84.0	130	170
SW-846 8270E	Atrazine	Certified	1912-24-9	90.0	130	170
SW-846 8270E	Azobenzene	Certified	103-33-3	61.9	130	170
SW-846 8270E	Benzaldehyde	Certified	100-52-7	141	270	330
SW-846 8270E	Benzidine	Certified	92-87-5	192	270	330
SW-846 8270E	Benzo(a)anthracene	Certified	56-55-3	86.8	130	170
SW-846 8270E	Benzo(a)pyrene	Certified	50-32-8	67.7	130	170
SW-846 8270E	Benzo(b)fluoranthene	Certified	205-99-2	69.0	130	170
SW-846 8270E	Benzo(g,h,I)perylene	Certified	191-24-2	96.9	130	170
SW-846 8270E	Benzo(k)fluoranthene	Certified	207-08-9	73.6	130	170
SW-846 8270E	Benzoic acid	Certified	65-85-0	179	270	330
SW-846 8270E	Benzyl Alcohol	Certified	100-51-6	98.9	270	330
SW-846 8270E	bis(2-Chloroethoxy)methane	Certified	111-91-1	108	130	170
SW-846 8270E	bis(2-Chloroethyl)ether	Certified	111-44-4	80.3	130	170
SW-846 8270E	bis(2-Ethylhexyl)phthalate	Certified	117-81-7	88.6	130	170
SW-846 8270E	Butylbenzylphthalate	Certified	85-68-7	82.7	130	170
SW-846 8270E	Caprolactam	Certified	105-60-2	100	270	330
SW-846 8270E	Carbazole	Certified	86-74-8	84.2	130	170
SW-846 8270E	**Chrysene** {Benzo(a)Phenanthrene}	Certified	218-01-9	85.5	130	170
SW-846 8270E	Dibenzo(a,h)anthracene	Certified	53-70-3	102	130	170
SW-846 8270E	Dibenzofuran	Certified	132-64-9	74.2	130	170
SW-846 8270E	Diethylphthalate	Certified	84-66-2	80.5	130	170
SW-846 8270E	Dimethylphthalate	Certified	131-11-3	80.9	130	170
SW-846 8270E	Di-n-butylphthalate	Certified	84-74-2	87.0	130	170
SW-846 8270E	Di-n-octyl phthalate	Certified	117-84-0	91.0	270	330
SW-846 8270E	Fluoranthene	Certified	206-44-0	79.8	130	170
SW-846 8270E	Fluorene	Certified	86-73-7	78.8	130	170
SW-846 8270E	Hexachlorobenzene	Certified	118-74-1	104	130	170
SW-846 8270E	Hexachlorobutadiene	Certified	87-68-3	99.4	130	170
SW-846 8270E	Hexachlorocyclopentadiene	Certified	77-47-4	174	270	330
SW-846 8270E	Hexachloroethane	Certified	67-72-1	73.7	130	170
SW-846 8270E	Indeno(1,2,3-cd)pyrene	Certified	193-39-5	101	130	170
SW-846 8270E	Isophorone	Certified	78-59-1	66.6	130	170
SW-846 8270E	Naphthalene	Certified	91-20-3	73.9	130	170
SW-846 8270E	Nitrobenzene	Certified	98-95-3	73.9	130	170

SW-846 8270E	n-Nitrosodimethylamine	Certified	62-75-9	76.7	270	330
SW-846 8270E	N-Nitroso-di-n-propylamine	Certified	621-64-7	76.1	130	170
SW-846 8270E	n-Nitrosodiphenylamine	Certified	86-30-6	82.2	130	170
SW-846 8270E	Pentachlorophenol	Certified	87-86-5	117	270	330
SW-846 8270E	Phenanthrene	Certified	85-01-8	83.6	130	170
SW-846 8270E	Phenol	Certified	108-95-2	67.7	130	170
SW-846 8270E	Pyrene	Certified	129-00-0	74.2	130	170
SW-846 8270E	Pyridine	Certified	110-86-1	82.5	130	170

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	parameter	Status	CAS #	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)
SW-846 8270E	1,1-Biphenyl	Certified	92-52-4	2.39	4.00	5.00
SW-846 8270E	1,2,4,5-Tetrachlorobenzene	Certified	95-94-3	2.37	4.00	5.00
SW-846 8270E	1,2,4-Trichlorobenzene	Certified	120-82-1	1.87	4.00	5.00
SW-846 8270E	1,2-Dichlorobenzene	Certified	95-50-1	1.92	4.00	5.00
SW-846 8270E	1,3-Dichlorobenzene	Certified	541-73-1	2.06	4.00	5.00
SW-846 8270E	1,4-Dichlorobenzene	Certified	106-46-7	1.89	4.00	5.00
SW-846 8270E	1,4-Dioxane	Certified	123-91-1	2.17	4.00	5.00
SW-846 8270E	1-Methylnaphthalene	Certified	90-12-0	2.02	4.00	5.00
SW-846 8270E	2,2-oxybis(1-Chloropropane) {Bis(2-chloroisopropyl) Ether}	Certified	108-60-1	2.07	4.00	5.00
SW-846 8270E	2,3,4,6-Tetrachlorophenol	Certified	58-90-2	1.55	4.00	5.00
SW-846 8270E	2,4,5-Trichlorophenol	Certified	95-95-4	2.01	4.00	5.00
SW-846 8270E	2,4,6-Trichlorophenol	Certified	88-06-2	1.76	4.00	5.00
SW-846 8270E	2,4-Dichlorophenol	Certified	120-83-2	1.89	4.00	5.00
SW-846 8270E	2,4-Dimethylphenol	Certified	105-67-9	3.10	4.00	5.00
SW-846 8270E	2,4-Dinitrophenol	Certified	51-28-5	3.87	8.00	10.0
SW-846 8270E	2,4-Dinitrotoluene	Certified	121-14-2	1.87	4.00	5.00
SW-846 8270E	2,6-Dinitrotoluene	Certified	606-20-2	1.77	4.00	5.00
SW-846 8270E	2-Chloronaphthalene	Certified	91-58-7	2.16	4.00	5.00
SW-846 8270E	2-Chlorophenol	Certified	95-57-8	1.67	4.00	5.00
SW-846 8270E	2-Methylnaphthalene	Certified	91-57-6	2.05	4.00	5.00
SW-846 8270E	2-Methylphenol	Certified	95-48-7	2.21	4.00	5.00
SW-846 8270E	2-Nitroaniline	Certified	88-74-4	1.57	4.00	5.00
SW-846 8270E	2-Nitrophenol	Certified	88-75-5	1.96	4.00	5.00
SW-846 8270E	3,3-Dichlorobenzidine	Certified	91-94-1	4.61	8.00	10.0
SW-846 8270E	3+4-Methylphenols (3-Methylphenol and 4-Methyl phenol)	Certified	65794-96-9	2.11	8.00	10.0
SW-846 8270E	3-Nitroaniline	Certified	99-09-2	2.22	4.00	5.00
SW-846 8270E	4,6-Dinitro-2-methylphenol	Certified	534-52-1	1.90	8.00	10.0
SW-846 8270E	4-Bromophenyl-phenylether	Certified	101-55-3	2.01	4.00	5.00
SW-846 8270E	4-Chloro-3-methylphenol	Certified	59-50-7	1.83	4.00	5.00
SW-846 8270E	4-Chloroaniline	Certified	106-47-8	2.46	4.00	5.00
SW-846 8270E	4-Chlorophenyl-phenylether	Certified	7005-72-3	2.40	4.00	5.00
SW-846 8270E	4-Nitroaniline	Certified	100-01-6	2.48	4.00	5.00
SW-846 8270E	4-Nitrophenol	Certified	100-02-7	3.56	8.00	10.0
SW-846 8270E	Acenaphthene	Certified	83-32-9	2.33	4.00	5.00
SW-846 8270E	Acenaphthylene	Certified	208-96-8	2.13	4.00	5.00

SW-846 8270E	Acetophenone	Certified	98-86-2	2.05	4.00	5.00
SW-846 8270E	Aniline	Certified	62-53-3	2.25	4.00	5.00
SW-846 8270E	Anthracene	Certified	120-12-7	2.39	4.00	5.00
SW-846 8270E	Atrazine	Certified	1912-24-9	3.66	4.00	5.00
SW-846 8270E	Azobenzene	Certified	103-33-3	2.15	4.00	5.00
SW-846 8270E	Benzaldehyde	Certified	100-52-7	3.94	8.00	10.0
SW-846 8270E	Benzidine	Certified	92-87-5	6.70	8.00	10.0
SW-846 8270E	Benzo(a)anthracene	Certified	56-55-3	2.22	4.00	5.00
SW-846 8270E	Benzo(a)pyrene	Certified	50-32-8	2.27	4.00	5.00
SW-846 8270E	Benzo(b)fluoranthene	Certified	205-99-2	1.93	4.00	5.00
SW-846 8270E	Benzo(g,h,I)perylene	Certified	191-24-2	2.01	4.00	5.00
SW-846 8270E	Benzo(k)fluoranthene	Certified	207-08-9	1.93	4.00	5.00
SW-846 8270E	Benzoic acid	Certified	65-85-0	5.04	8.00	10.0
SW-846 8270E	Benzyl Alcohol	Certified	100-51-6	2.69	8.00	10.0
SW-846 8270E	bis(2-Chloroethoxy)methane	Certified	111-91-1	2.22	4.00	5.00
SW-846 8270E	bis(2-Chloroethyl)ether	Certified	111-44-4	1.80	4.00	5.00
SW-846 8270E	bis(2-Ethylhexyl)phthalate	Certified	117-81-7	2.43	4.00	5.00
SW-846 8270E	Butylbenzylphthalate	Certified	85-68-7	2.22	4.00	5.00
SW-846 8270E	Caprolactam	Certified	105-60-2	3.04	8.00	10.0
SW-846 8270E	Carbazole	Certified	86-74-8	2.33	4.00	5.00
SW-846 8270E	**Chrysene** {Benzo(a)Phenanthrene}	Certified	218-01-9	2.32	4.00	5.00
SW-846 8270E	Dibenzo(a,h)anthracene	Certified	53-70-3	2.36	4.00	5.00
SW-846 8270E	Dibenzofuran	Certified	132-64-9	2.13	4.00	5.00
SW-846 8270E	Diethylphthalate	Certified	84-66-2	1.87	4.00	5.00
SW-846 8270E	Dimethylphthalate	Certified	131-11-3	1.88	4.00	5.00
SW-846 8270E	Di-n-butylphthalate	Certified	84-74-2	2.43	4.00	5.00
SW-846 8270E	Di-n-octyl phthalate	Certified	117-84-0	2.89	8.00	10.0
SW-846 8270E	Fluoranthene	Certified	206-44-0	2.44	4.00	5.00
SW-846 8270E	Fluorene	Certified	86-73-7	2.02	4.00	5.00
SW-846 8270E	Hexachlorobenzene	Certified	118-74-1	2.15	4.00	5.00
SW-846 8270E	Hexachlorobutadiene	Certified	87-68-3	2.23	4.00	5.00
SW-846 8270E	Hexachlorocyclopentadiene	Certified	77-47-4	4.34	8.00	10.0
SW-846 8270E	Hexachloroethane	Certified	67-72-1	1.67	4.00	5.00
SW-846 8270E	Indeno(1,2,3-cd)pyrene	Certified	193-39-5	2.00	4.00	5.00
SW-846 8270E	Isophorone	Certified	78-59-1	2.15	4.00	5.00
SW-846 8270E	Naphthalene	Certified	91-20-3	2.02	4.00	5.00
SW-846 8270E	Nitrobenzene	Certified	98-95-3	2.04	4.00	5.00
SW-846 8270E	n-Nitrosodimethylamine	Certified	62-75-9	1.94	8.00	10.0
SW-846 8270E	N-Nitroso-di-n-propylamine	Certified	621-64-7	1.69	4.00	5.00
SW-846 8270E	n-Nitrosodiphenylamine	Certified	86-30-6	2.17	4.00	5.00
SW-846 8270E	Pentachlorophenol	Certified	87-86-5	2.17	8.00	10.0

SW-846 8270E	Phenanthrene	Certified	85-01-8	2.31	4.00	5.00
SW-846 8270E	Phenol	Certified	108-95-2	1.67	4.00	5.00
SW-846 8270E	Pyrene	Certified	129-00-0	2.15	4.00	5.00
SW-846 8270E	Pyridine	Certified	110-86-1	2.77	4.00	5.00

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	CAS #	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)
EPA 625.1	Not Certified	1,1-Biphenyl	92-52-4	2.39	4.00	5.00
EPA 625.1	Certified	1,2,4,5-Tetrachlorobenzene	95-94-3	2.37	4.00	5.00
EPA 625.1	Certified	1,2,4-Trichlorobenzene	120-82-1	1.87	4.00	5.00
EPA 625.1	Not Certified	1,2-Dichlorobenzene	95-50-1	1.92	4.00	5.00
EPA 625.1	Not Certified	1,3-Dichlorobenzene	541-73-1	2.06	4.00	5.00
EPA 625.1	Not Certified	1,4-Dichlorobenzene	106-46-7	1.89	4.00	5.00
EPA 625.1	Not Certified	1,4-Dioxane	123-91-1	2.17	4.00	5.00
EPA 625.1	Not Certified	1-Methylnaphthalene	90-12-0	2.02	4.00	5.00
EPA 625.1	Certified	Bis(2-chloroisopropyl)ether|2,2'-oxybis(1-chloropropane)	108-60-1	2.07	4.00	5.00
EPA 625.1	Certified	2,3,4,6-Tetrachlorophenol	58-90-2	1.55	4.00	5.00
EPA 625.1	Certified	2,4,5-Trichlorophenol	95-95-4	2.01	4.00	5.00
EPA 625.1	Certified	2,4,6-Trichlorophenol	88-06-2	1.76	4.00	5.00
EPA 625.1	Certified	2,4-Dichlorophenol	120-83-2	1.89	4.00	5.00
EPA 625.1	Certified	2,4-Dimethylphenol	105-67-9	3.10	4.00	5.00
EPA 625.1	Certified	2,4-Dinitrophenol	51-28-5	3.87	8.00	10.0
EPA 625.1	Certified	2,4-Dinitrotoluene	121-14-2	1.87	4.00	5.00
EPA 625.1	Certified	2,6-Dinitrotoluene	606-20-2	1.77	4.00	5.00
EPA 625.1	Certified	2-Chloronaphthalene	91-58-7	2.16	4.00	5.00
EPA 625.1	Certified	2-Chlorophenol	95-57-8	1.67	4.00	5.00
EPA 625.1	Certified	2-Methylnaphthalene	91-57-6	2.05	4.00	5.00
EPA 625.1	Certified	2-Methylphenol	95-48-7	2.21	4.00	5.00
EPA 625.1	Certified	2-Nitroaniline	88-74-4	1.57	4.00	5.00
EPA 625.1	Certified	2-Nitrophenol	88-75-5	1.96	4.00	5.00
EPA 625.1	Certified	3,3-Dichlorobenzidine	91-94-1	4.61	8.00	10.0
EPA 625.1	Certified	3+4-Methylphenols (3-Methylphenol & 4-Methylphenol)	65794-96-9	2.11	8.00	10.0
EPA 625.1	Certified	3-Nitroaniline	99-09-2	2.22	4.00	5.00
EPA 625.1	Certified	4,6-Dinitro-2-methylphenol	534-52-1	1.90	8.00	10.0
EPA 625.1	Certified	4-Bromophenyl-phenylether	101-55-3	2.01	4.00	5.00
EPA 625.1	Certified	4-Chloro-3-methylphenol	59-50-7	1.83	4.00	5.00
EPA 625.1	Certified	4-Chloroaniline	106-47-8	2.46	4.00	5.00
EPA 625.1	Certified	4-Chlorophenyl-phenylether	7005-72-3	2.40	4.00	5.00
EPA 625.1	Certified	4-Nitroaniline	100-01-6	2.48	4.00	5.00
EPA 625.1	Certified	4-Nitrophenol	100-02-7	3.56	8.00	10.0
EPA 625.1	Certified	Acenaphthene	83-32-9	2.33	4.00	5.00

EPA 625.1	Certified	Acenaphthylene	208-96-8	2.13	4.00	5.00
EPA 625.1	Certified	Acetophenone	98-86-2	2.05	4.00	5.00
EPA 625.1	Certified	Aniline	62-53-3	2.25	4.00	5.00
EPA 625.1	Certified	Anthracene	120-12-7	2.39	4.00	5.00
EPA 625.1	Not Certified	Atrazine	1912-24-9	3.66	4.00	5.00
EPA 625.1	Certified	Azobenzene	103-33-3	2.15	4.00	5.00
EPA 625.1	Not Certified	Benzaldehyde	100-52-7	3.94	8.00	10.0
EPA 625.1	Certified	Benzidine	92-87-5	6.70	8.00	10.0
EPA 625.1	Certified	Benzo(a)anthracene	56-55-3	2.22	4.00	5.00
EPA 625.1	Certified	Benzo(a)pyrene	50-32-8	2.27	4.00	5.00
EPA 625.1	Certified	Benzo(b)fluoranthene	205-99-2	1.93	4.00	5.00
EPA 625.1	Certified	Benzo(g,h,I)perylene	191-24-2	2.01	4.00	5.00
EPA 625.1	Certified	Benzo(k)fluoranthene	207-08-9	1.93	4.00	5.00
EPA 625.1	Certified	Benzoic acid	65-85-0	5.04	8.00	10.0
EPA 625.1	Not Certified	Benzyl Alcohol	100-51-6	2.69	8.00	10.0
EPA 625.1	Certified	bis(2-Chloroethoxy)methane	111-91-1	2.22	4.00	5.00
EPA 625.1	Certified	bis(2-Chloroethyl)ether	111-44-4	1.80	4.00	5.00
EPA 625.1	Certified	bis(2-Ethylhexyl)phthalate	117-81-7	2.43	4.00	5.00
EPA 625.1	Certified	Butylbenzylphthalate	85-68-7	2.22	4.00	5.00
EPA 625.1	Not Certified	Caprolactam	105-60-2	3.04	8.00	10.0
EPA 625.1	Certified	Carbazole	86-74-8	2.33	4.00	5.00
EPA 625.1	Certified	Chrysene {Benzo(a)Phenanthrene}	218-01-9	2.32	4.00	5.00
EPA 625.1	Certified	Dibenzo(a,h)anthracene	53-70-3	2.36	4.00	5.00
EPA 625.1	Certified	Dibenzofuran	132-64-9	2.13	4.00	5.00
EPA 625.1	Certified	Diethylphthalate	84-66-2	1.87	4.00	5.00
EPA 625.1	Certified	Dimethylphthalate	131-11-3	1.88	4.00	5.00
EPA 625.1	Certified	Di-n-butylphthalate	84-74-2	2.43	4.00	5.00
EPA 625.1	Certified	Di-n-octyl phthalate	117-84-0	2.89	8.00	10.0
EPA 625.1	Certified	Fluoranthene	206-44-0	2.44	4.00	5.00
EPA 625.1	Certified	Fluorene	86-73-7	2.02	4.00	5.00
EPA 625.1	Certified	Hexachlorobenzene	118-74-1	2.15	4.00	5.00
EPA 625.1	Certified	Hexachlorobutadiene	87-68-3	2.23	4.00	5.00
EPA 625.1	Certified	Hexachlorocyclopentadiene	77-47-4	4.34	8.00	10.0
EPA 625.1	Certified	Hexachloroethane	67-72-1	1.67	4.00	5.00
EPA 625.1	Certified	Indeno(1,2,3-cd)pyrene	193-39-5	2.00	4.00	5.00
EPA 625.1	Certified	Isophorone	78-59-1	2.15	4.00	5.00
EPA 625.1	Certified	Naphthalene	91-20-3	2.02	4.00	5.00
EPA 625.1	Certified	Nitrobenzene	98-95-3	2.04	4.00	5.00
EPA 625.1	Certified	n-Nitrosodimethylamine	62-75-9	1.94	8.00	10.0
EPA 625.1	Certified	N-Nitroso-di-n-propylamine	621-64-7	1.69	4.00	5.00

EPA 625.1	Certified	n-Nitrosodiphenylamine	86-30-6	2.17	4.00	5.00
EPA 625.1	Certified	Pentachlorophenol	87-86-5	2.17	8.00	10.0
EPA 625.1	Certified	Phenanthrene	85-01-8	2.31	4.00	5.00
EPA 625.1	Certified	Phenol	108-95-2	1.67	4.00	5.00
EPA 625.1	Certified	Pyrene	129-00-0	2.15	4.00	5.00
EPA 625.1	Certified	Pyridine	110-86-1	2.77	4.00	5.00

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	CAS #	mdl soil (ug/kg)	lod soil (ug/kg)	loq soil (ug/kg)
SW-846 8270E-Modified	Certified	1,4-Dioxane	123-91-1	1.67	6.60	6.60
SW-846 8270E-Modified	Certified	n-Nitrosodimethylamine	62-75-9	1.55	6.60	6.60
SW-846 8270E-Modified	Certified	Naphthalene	91-20-3	1.30	3.30	3.30
SW-846 8270E-Modified	Certified	2-Methylnaphthalene	91-57-6	1.39	3.30	3.30
SW-846 8270E-Modified	Certified	Acenaphthylene	208-96-8	1.26	3.30	3.30
SW-846 8270E-Modified	Certified	Acenaphthene	83-32-9	1.37	3.30	3.30
SW-846 8270E-Modified	Certified	Fluorene	86-73-7	1.35	3.30	3.30
SW-846 8270E-Modified	Certified	Hexachlorobenzene	118-74-1	1.34	3.30	3.30
SW-846 8270E-Modified	Certified	Pentachlorophenol	87-86-5	5.16	6.60	6.60
SW-846 8270E-Modified	Certified	Phenanthrene	85-01-8	1.36	3.30	3.30
SW-846 8270E-Modified	Certified	Anthracene	120-12-7	1.26	3.30	3.30
SW-846 8270E-Modified	Certified	Fluoranthene	206-44-0	1.34	3.30	3.30
SW-846 8270E-Modified	Certified	Pyrene	129-00-0	1.61	3.30	3.30
SW-846 8270E-Modified	Certified	Benzo(a)anthracene	56-55-3	1.11	3.30	3.30
SW-846 8270E-Modified	Certified	Chrysene {Benzo(a)Phenanthrene}	218-01-9	1.12	3.30	3.30
SW-846 8270E-Modified	Certified	Indeno(1,2,3-cd)pyrene	193-39-5	1.24	3.30	3.30
SW-846 8270E-Modified	Certified	Benzo(b)fluoranthene	205-99-2	1.42	3.30	3.30
SW-846 8270E-Modified	Certified	Benzo(k)fluoranthene	207-08-9	1.38	3.30	3.30
SW-846 8270E-Modified	Certified	Benzo(a)pyrene	50-32-8	1.34	3.30	3.30
SW-846 8270E-Modified	Certified	Dibenzo(a,h)anthracene	53-70-3	1.04	3.30	3.30
SW-846 8270E-Modified	Certified	Benzo(g,h,i)perylene	191-24-2	1.09	3.30	3.30
SW-846 8270E-Modified	Certified	4,6-Dinitro-2-methylphenol	534-52-1	3.63	6.60	6.60
SW-846 8270E-Modified	Not Certified/NJ doesn't offer	bis(2-Chloroethyl)ether	111-44-4	1.60	3.30	3.30
SW-846 8270E-Modified	Not Certified	Hexachlorobutadiene	87-68-3	1.38	3.30	3.30
SW-846 8270E-Modified	Not Certified/NJ doesn't offer	4-Bromophenyl-phenylether	101-55-3	1.42	3.30	3.30
SW-846 8270E-Modified	Not Certified/NJ doesn't offer	Bis(2-ethylhexyl)phthalate	117-81-7	3.18	6.60	6.60
SW-846 8270E-Modified	Not Certified/NJ doesn't offer	Atrazine	1912-24-9	0.49	3.30	3.30

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	CAS #	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)
SW-846 8270E-Modified	Certified	1,4-Dioxane	123-91-1	0.075	0.20	0.20
SW-846 8270E-Modified	Certified	n-Nitrosodimethylamine	62-75-9	0.067	0.20	0.20
SW-846 8270E-Modified	Certified	Naphthalene	91-20-3	0.075	0.10	0.10
SW-846 8270E-Modified	Certified	2-Methylnaphthalene	91-57-6	0.074	0.10	0.10
SW-846 8270E-Modified	Certified	Acenaphthylene	208-96-8	0.064	0.10	0.10
SW-846 8270E-Modified	Certified	Acenaphthene	83-32-9	0.070	0.10	0.10
SW-846 8270E-Modified	Certified	Fluorene	86-73-7	0.070	0.10	0.10
SW-846 8270E-Modified	Certified	Hexachlorobenzene	118-74-1	0.074	0.10	0.10
SW-846 8270E-Modified	Certified	Pentachlorophenol	87-86-5	0.16	0.20	0.20
SW-846 8270E-Modified	Certified	Phenanthrene	85-01-8	0.072	0.10	0.10
SW-846 8270E-Modified	Certified	Anthracene	120-12-7	0.068	0.10	0.10
SW-846 8270E-Modified	Certified	Fluoranthene	206-44-0	0.072	0.10	0.10
SW-846 8270E-Modified	Certified	Pyrene	129-00-0	0.077	0.10	0.10
SW-846 8270E-Modified	Certified	Benzo(a)anthracene	56-55-3	0.064	0.10	0.10
SW-846 8270E-Modified	Certified	Chrysene {Benzo(a)Phenanthrene}	218-01-9	0.071	0.10	0.10
SW-846 8270E-Modified	Certified	Indeno(1,2,3-cd)pyrene	193-39-5	0.070	0.10	0.10
SW-846 8270E-Modified	Certified	Benzo(b)fluoranthene	205-99-2	0.070	0.10	0.10
SW-846 8270E-Modified	Certified	Benzo(k)fluoranthene	207-08-9	0.077	0.10	0.10
SW-846 8270E-Modified	Certified	Benzo(a)pyrene	50-32-8	0.073	0.10	0.10
SW-846 8270E-Modified	Certified	Dibenzo(a,h)anthracene	53-70-3	0.063	0.10	0.10
SW-846 8270E-Modified	Certified	Benzo(g,h,i)perylene	191-24-2	0.069	0.10	0.10
SW-846 8270E-Modified	Certified	4,6-Dinitro-2-methylphenol	534-52-1	0.088	0.20	0.20
SW-846 8270E-Modified	Not Certified/NJ doesn't offer	bis(2-Chloroethyl)ether	111-44-4	0.078	0.10	0.10
SW-846 8270E-Modified	Not Certified	Hexachlorobutadiene	87-68-3	0.073	0.10	0.10
SW-846 8270E-Modified	Not Certified/NJ doesn't offer	4-Bromophenyl-phenylether	101-55-3	0.070	0.10	0.10
SW-846 8270E-Modified	Not Certified/NJ doesn't offer	Bis(2-ethylhexyl)phthalate	117-81-7	0.12	0.20	0.20
SW-846 8270E-Modified	Not Certified/NJ doesn't offer	Atrazine	1912-24-9	0.021	0.10	0.10

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	CAS#	MDL Soil (ug/kg)	LOD Soil (ug/kg)	LOQ Soil (ug/kg)
ESW-846 8081B	Certified	alpha-BHC	319-84-6	0.19	0.83	1.70
ESW-846 8081B	Certified	beta-BHC	319-85-7	0.34	0.83	1.70
ESW-846 8081B	Certified	delta-BHC	319-86-8	0.40	0.83	1.70
ESW-846 8081B	Certified	gamma-BHC (Lindane)	58-89-9	0.15	0.33	1.70
ESW-846 8081B	Certified	Heptachlor	76-44-8	0.19	0.83	1.70
ESW-846 8081B	Certified	Aldrin	309-00-2	0.17	0.33	1.70
ESW-846 8081B	Certified	Heptachlor epoxide	1024-57-3	0.24	0.83	1.70
ESW-846 8081B	Certified	Endosulfan I	959-98-8	0.14	0.33	1.70
ESW-846 8081B	Certified	Dieldrin	60-57-1	0.15	0.33	1.70
ESW-846 8081B	Certified	4,4-DDE	72-55-9	0.16	0.33	1.70
ESW-846 8081B	Certified	Endrin	72-20-8	0.17	0.33	1.70
ESW-846 8081B	Certified	Endosulfan II	33213-65-9	0.31	0.83	1.70
ESW-846 8081B	Certified	4,4-DDD	72-54-8	0.19	0.83	1.70
ESW-846 8081B	Certified	Endosulfan Sulfate	1031-07-8	0.18	0.83	1.70
ESW-846 8081B	Certified	4,4-DDT	50-29-3	0.18	0.83	1.70
ESW-846 8081B	Certified	Methoxychlor	72-43-5	0.20	0.83	1.70
ESW-846 8081B	Certified	Endrin ketone	53494-70-5	0.24	0.83	1.70
ESW-846 8081B	Certified	Endrin aldehyde	7421-93-4	0.35	0.83	1.70
ESW-846 8081B	Certified	alpha-Chlordane	5103-71-9	0.13	0.33	1.70
ESW-846 8081B	Certified	gamma-Chlordane	5103-74-2	0.14	0.33	1.70
ESW-846 8081B	Certified	Mirex	2385-85-5	0.32	0.83	1.70
ESW-846 8081B	Certified	Toxaphene	8001-35-2	5.93	17.0	33.0
ESW-846 8081B	Certified	Chlordane	57-74-9	3.01	8.30	17.0

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	CAS#	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)
SW-846 8081B	Certified	alpha-BHC	319-84-6	0.0057	0.025	0.050
SW-846 8081B	Certified	beta-BHC	319-85-7	0.0080	0.025	0.050
SW-846 8081B	Certified	delta-BHC	319-86-8	0.0125	0.025	0.050
SW-846 8081B	Certified	gamma-BHC (Lindane)	58-89-9	0.0052	0.010	0.050
SW-846 8081B	Certified	Heptachlor	76-44-8	0.0060	0.025	0.050
SW-846 8081B	Certified	Aldrin	309-00-2	0.0061	0.025	0.050
SW-846 8081B	Certified	Heptachlor epoxide	1024-57-3	0.0067	0.025	0.050
SW-846 8081B	Certified	Endosulfan I	959-98-8	0.0045	0.010	0.050
SW-846 8081B	Certified	Dieldrin	60-57-1	0.0045	0.010	0.050
SW-846 8081B	Certified	4,4-DDE	72-55-9	0.0048	0.010	0.050
SW-846 8081B	Certified	Endrin	72-20-8	0.0048	0.010	0.050
SW-846 8081B	Certified	Endosulfan II	33213-65-9	0.0068	0.025	0.050
SW-846 8081B	Certified	4,4-DDD	72-54-8	0.0048	0.010	0.050
SW-846 8081B	Certified	Endosulfan Sulfate	1031-07-8	0.0050	0.010	0.050
SW-846 8081B	Certified	4,4-DDT	50-29-3	0.0060	0.025	0.050
SW-846 8081B	Certified	Methoxychlor	72-43-5	0.0060	0.025	0.050
SW-846 8081B	Certified	Endrin ketone	53494-70-5	0.0068	0.025	0.050
SW-846 8081B	Certified	Endrin aldehyde	7421-93-4	0.011	0.025	0.050
SW-846 8081B	Certified	alpha-Chlordane	5103-71-9	0.0045	0.010	0.050
SW-846 8081B	Certified	gamma-Chlordane	5103-74-2	0.0044	0.010	0.050
SW-846 8081B	Certified	Mirex	2385-85-5	0.0076	0.025	0.050
SW-846 8081B	Certified	Toxaphene	8001-35-2	0.17	0.50	1.00
SW-846 8081B	Certified	Chlordane	57-74-9	0.088	0.25	0.50

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

				Extract Final Volume = 10 ml		
method	**Status**	**parameter**	**CAS#**	**mdl water (ug/L)**	**lod water (ug/L)**	**loq water (ug/L)**
EPA 608.3	Certified	alpha-BHC	319-84-6	0.0057	0.025	0.050
EPA 608.3	Certified	beta-BHC	319-85-7	0.0080	0.025	0.050
EPA 608.3	Certified	delta-BHC	319-86-8	0.0125	0.025	0.050
EPA 608.3	Certified	gamma-BHC (Lindane)	58-89-9	0.0052	0.010	0.050
EPA 608.3	Certified	Heptachlor	76-44-8	0.0060	0.025	0.050
EPA 608.3	Certified	Aldrin	309-00-2	0.0061	0.025	0.050
EPA 608.3	Certified	Heptachlor epoxide	1024-57-3	0.0067	0.025	0.050
EPA 608.3	Certified	Endosulfan I	959-98-8	0.0045	0.010	0.050
EPA 608.3	Certified	Dieldrin	60-57-1	0.0045	0.010	0.050
EPA 608.3	Certified	4,4-DDE	72-55-9	0.0048	0.010	0.050
EPA 608.3	Certified	Endrin	72-20-8	0.0048	0.010	0.050
EPA 608.3	Certified	Endosulfan II	33213-65-9	0.0068	0.025	0.050
EPA 608.3	Certified	4,4-DDD	72-54-8	0.0048	0.010	0.050
EPA 608.3	Certified	Endosulfan Sulfate	1031-07-8	0.0050	0.010	0.050
EPA 608.3	Certified	4,4-DDT	50-29-3	0.0060	0.025	0.050
EPA 608.3	Certified	Methoxychlor	72-43-5	0.0060	0.025	0.050
EPA 608.3	Certified	Endrin ketone	53494-70-5	0.0068	0.025	0.050
EPA 608.3	Certified	Endrin aldehyde	7421-93-4	0.011	0.025	0.050
EPA 608.3	Certified	alpha-Chlordane	5103-71-9	0.0045	0.010	0.050
EPA 608.3	Certified	gamma-Chlordane	5103-74-2	0.0044	0.010	0.050
EPA 608.3	Certified	Mirex	2385-85-5	0.0076	0.025	0.050
EPA 608.3	Certified	Toxaphene	8001-35-2	0.17	0.50	1.00
EPA 608.3	Certified	Chlordane	57-74-9	0.11	0.25	0.50

				Extract Final Volume = 1 ml		
method	**Status**	**parameter**	**CAS#**	**mdl water (ug/L)**	**lod water (ug/L)**	**loq water (ug/L)**
EPA 608.3	Certified	alpha-BHC	319-84-6	0.00057	0.0025	0.0050
EPA 608.3	Certified	beta-BHC	319-85-7	0.00080	0.0025	0.0050
EPA 608.3	Certified	delta-BHC	319-86-8	0.00125	0.0025	0.0050
EPA 608.3	Certified	gamma-BHC (Lindane)	58-89-9	0.00052	0.0010	0.0050
EPA 608.3	Certified	Heptachlor	76-44-8	0.00060	0.0025	0.0050
EPA 608.3	Certified	Aldrin	309-00-2	0.00061	0.0025	0.0050

EPA 608.3	Certified	Heptachlor epoxide	1024-57-3	0.00067	0.0025	0.0050
EPA 608.3	Certified	Endosulfan I	959-98-8	0.00045	0.0010	0.0050
EPA 608.3	Certified	Dieldrin	60-57-1	0.00045	0.0010	0.0050
EPA 608.3	Certified	4,4-DDE	72-55-9	0.00048	0.0010	0.0050
EPA 608.3	Certified	Endrin	72-20-8	0.00048	0.0010	0.0050
EPA 608.3	Certified	Endosulfan II	33213-65-9	0.00068	0.0025	0.0050
EPA 608.3	Certified	4,4-DDD	72-54-8	0.00048	0.0010	0.0050
EPA 608.3	Certified	Endosulfan Sulfate	1031-07-8	0.00050	0.0010	0.0050
EPA 608.3	Certified	4,4-DDT	50-29-3	0.00060	0.0025	0.0050
EPA 608.3	Certified	Methoxychlor	72-43-5	0.00060	0.0025	0.0050
EPA 608.3	Certified	Endrin ketone	53494-70-5	0.00068	0.0025	0.0050
EPA 608.3	Certified	Endrin aldehyde	7421-93-4	0.00110	0.0025	0.0050
EPA 608.3	Certified	alpha-Chlordane	5103-71-9	0.00045	0.0010	0.0050
EPA 608.3	Certified	gamma-Chlordane	5103-74-2	0.00044	0.0010	0.0050
EPA 608.3	Certified	Mirex	2385-85-5	0.00076	0.0025	0.0050
EPA 608.3	Certified	Toxaphene	8001-35-2	0.017	0.050	0.10
EPA 608.3	Certified	Chlordane	57-74-9	0.011	0.025	0.050

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	CAS#	MDL Soil (ug/kg)	LOD Soil (ug/kg)	LOQ Soil (ug/kg)
EPA SW-846 8082A	Certified	Aroclor-1016	12674-11-2	3.05	8.30	17.0
EPA SW-846 8082A	Certified	Aroclor-1260	11096-82-5	3.24	8.30	17.0
EPA SW-846 8082A	Certified	Aroclor-1221	11104-28-2	4.70	13.0	17.0
EPA SW-846 8082A	Certified	Aroclor-1232	11141-16-5	3.93	8.30	17.0
EPA SW-846 8082A	Certified	Aroclor-1242	53469-21-9	2.42	8.30	17.0
EPA SW-846 8082A	Certified	Aroclor-1248	12672-29-6	2.98	8.30	17.0
EPA SW-846 8082A	Certified	Aroclor-1254	11097-69-1	4.21	13.0	17.0
EPA SW-846 8082A	Certified	Aroclor-1262	37324-23-5	3.33	8.30	17.0
EPA SW-846 8082A	Certified	Aroclor-1268	11100-14-4	5.73	13.0	17.0

method	Status	parameter	CAS#	MDL (ng/wipe)	LOD (ng/wipe)	LOQ (ng/wipe)
EPA SW-846 8082A	Certified	Aroclor-1016	12674-11-2	91.5	250	500
EPA SW-846 8082A	Certified	Aroclor-1260	11096-82-5	97.2	250	500
EPA SW-846 8082A	Certified	Aroclor-1221	11104-28-2	141	400	500
EPA SW-846 8082A	Certified	Aroclor-1232	11141-16-5	118	250	500
EPA SW-846 8082A	Certified	Aroclor-1242	53469-21-9	91.5	250	500
EPA SW-846 8082A	Certified	Aroclor-1248	12672-29-6	89.4	250	500
EPA SW-846 8082A	Certified	Aroclor-1254	11097-69-1	126	400	500
EPA SW-846 8082A	Certified	Aroclor-1262	37324-23-5	100	250	500
EPA SW-846 8082A	Certified	Aroclor-1268	11100-14-4	172	400	500

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	CAS#	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)
EPA SW-846 8082A	Certified	Aroclor-1016	12674-11-2	0.14	0.40	0.50
EPA SW-846 8082A	Certified	Aroclor-1260	11096-82-5	0.11	0.25	0.50
EPA SW-846 8082A	Certified	Aroclor-1221	11104-28-2	0.14	0.40	0.50
EPA SW-846 8082A	Certified	Aroclor-1232	11141-16-5	0.17	0.40	0.50
EPA SW-846 8082A	Certified	Aroclor-1242	53469-21-9	0.12	0.25	0.50
EPA SW-846 8082A	Certified	Aroclor-1248	12672-29-6	0.15	0.40	0.50
EPA SW-846 8082A	Certified	Aroclor-1254	11097-69-1	0.22	0.40	0.50
EPA SW-846 8082A	Certified	Aroclor-1262	37324-23-5	0.17	0.40	0.50
EPA SW-846 8082A	Certified	Aroclor-1268	11100-14-4	0.13	0.40	0.50

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

Extract Final Volume = 10 ml

method	Status	parameter	CAS#	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)
EPA 608.3	Certified	Aroclor-1016	12674-11-2	0.14	0.40	0.50
EPA 608.3	Certified	Aroclor-1260	11096-82-5	0.11	0.25	0.50
EPA 608.3	Certified	Aroclor-1221	11104-28-2	0.14	0.40	0.50
EPA 608.3	Certified	Aroclor-1232	11141-16-5	0.17	0.40	0.50
EPA 608.3	Certified	Aroclor-1242	53469-21-9	0.12	0.25	0.50
EPA 608.3	Certified	Aroclor-1248	12672-29-6	0.15	0.40	0.50
EPA 608.3	Certified	Aroclor-1254	11097-69-1	0.22	0.40	0.50

Extract Final Volume = 1 ml

method	Status	parameter	CAS#	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)
EPA 608.3	Certified	Aroclor-1016	12674-11-2	0.014	0.040	0.050
EPA 608.3	Certified	Aroclor-1260	11096-82-5	0.011	0.025	0.050
EPA 608.3	Certified	Aroclor-1221	11104-28-2	0.014	0.040	0.050
EPA 608.3	Certified	Aroclor-1232	11141-16-5	0.017	0.040	0.050
EPA 608.3	Certified	Aroclor-1242	53469-21-9	0.012	0.025	0.050
EPA 608.3	Certified	Aroclor-1248	12672-29-6	0.015	0.040	0.050
EPA 608.3	Certified	Aroclor-1254	11097-69-1	0.022	0.040	0.050

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	CAS#	mdl soil (ug/kg)	lod soil (ug/kg)	loq soil (ug/kg)
SW-846 8151A	Certified	2,4,5-T	93-76-5	7.79	33.0	67.0
SW-846 8151A	Certified	2,4,5-TP (Silvex)	93-72-1	12.1	33.0	67.0
SW-846 8151A	Certified	2,4-D	94-75-7	12.1	33.0	67.0
SW-846 8151A	Certified	2,4-DB	94-82-6	8.86	33.0	67.0
SW-846 8151A	Certified	3,5-DICHLOROBENZOIC ACID	51-36-5	9.78	33.0	67.0
SW-846 8151A	Certified	4-Nitrophenol	100-02-7	11.8	33.0	67.0
SW-846 8151A	Certified	DALAPON	75-99-0	24.1	50.0	67.0
SW-846 8151A	Certified	DCPA	1861-32-1	13.9	33.0	67.0
SW-846 8151A	Certified	DICAMBA	1918-00-9	7.70	33.0	67.0
SW-846 8151A	Certified	DICHLORPROP	120-36-5	8.48	33.0	67.0
SW-846 8151A	Certified	DINOSEB	88-85-7	13.6	50.0	67.0
SW-846 8151A	Certified	MCPA	94-74-6	4600	5000	6700
SW-846 8151A	Certified	MCPP	93-65-2	1170	3300	6700
SW-846 8151A	Certified	Pentachlorophenol	87-86-5	6.00	33.0	67.0
SW-846 8151A	Certified	PICLORAM	1918-02-1	21.2	50.0	67.0

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	CAS#	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)
SW-846 8151A	Certified	2,4,5-T	93-76-5	0.44	1.00	2.00
SW-846 8151A	Certified	2,4,5-TP (Silvex)	93-72-1	0.47	1.00	2.00
SW-846 8151A	Certified	2,4-D	94-75-7	0.39	1.50	2.00
SW-846 8151A	Certified	2,4-DB	94-82-6	0.40	1.50	2.00
SW-846 8151A	Certified	3,5-DICHLOROBENZOIC ACID	51-36-5	0.46	1.00	2.00
SW-846 8151A	Certified	4-Nitrophenol	100-02-7	0.48	1.50	2.00
SW-846 8151A	Certified	DALAPON	75-99-0	0.82	1.50	2.00
SW-846 8151A	Certified	DCPA	1861-32-1	0.62	1.50	2.00
SW-846 8151A	Certified	DICAMBA	1918-00-9	0.44	1.00	2.00
SW-846 8151A	Certified	DICHLORPROP	120-36-5	0.45	1.00	2.00
SW-846 8151A	Certified	DINOSEB	88-85-7	0.58	1.50	2.00
SW-846 8151A	Certified	MCPA	94-74-6	130	150	200
SW-846 8151A	Certified	MCPP	93-65-2	50.0	100	200
SW-846 8151A	Certified	Pentachlorophenol	87-86-5	0.47	1.00	2.00
SW-846 8151A	Certified	PICLORAM	1918-02-1	0.64	1.50	2.00

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	mdl soil (mg/kg)	lod soil (mg/kg)	loq soil (mg/kg)	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)		
NJDEP EPH	Certified	Aliphatic C9-C12	0.22	0.50	1.00	6.48	15.0	30.0	15	24
NJDEP EPH	Certified	Aliphatic C12-C16	0.15	0.33	0.67	3.70	10.0	20.0	10	16
NJDEP EPH	Certified	Aliphatic C16-C21	0.26	0.80	1.00	5.38	15.0	30.0	15	24
NJDEP EPH	Certified	Aliphatic C21-C28	0.40	1.07	1.33	6.10	20.0	40.0	20	32
NJDEP EPH	Certified	Aliphatic C28-C40	0.95	1.60	2.00	15.6	48.0	60.0	30	48
NJDEP EPH	Certified	Aromatic C10-C12	0.12	0.33	0.67	3.79	10.0	20.0	10	16
NJDEP EPH	Certified	Aromatic C12-C16	0.13	0.50	1.00	5.87	15.0	30.0	15	24
NJDEP EPH	Certified	Aromatic C16-C21	0.29	0.83	1.67	15.2	40.0	50.0	25	40
NJDEP EPH	Certified	Aromatic C21-C36	0.32	1.33	2.67	17.7	40.0	80.0	40	64

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	CAS#	MDL Water (ug/l)	LOD Water (ug/l)	LOQ Water (ug/l)
RSK 175	Certified	Ethane	74-84-0	0.42	1.92	9.60
RSK 175	Certified	Ethylene(Ethene)	74-85-1	0.63	2.64	13.2
RSK 175	Certified	Methane	74-82-8	0.42	0.94	4.70

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	CAS#	MDL Water (ug/l)	LOD Water (ug/l)	LOQ Water (ug/l)
EPA 504.1/8011	Certified	1,2-Dibromoethane (EDB)	106-93-4	0.0039	0.025	0.025
EPA 504.1/8011	Certified	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	0.0045	0.025	0.025

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)	mdl soil (ug/kg)	lod soil (ug/kg)	loq soil (ug/kg)
SW846 8015 D	Certified	DRO	7.33	25.0	50.0	219	825	1700
SW846 8015 D	Certified	TPH GC	8.95	42.5	85.0	402	1400	2800

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	mdl soil (ug/kg)	lod soil (ug/kg)	loq soil (ug/kg)	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)
EPA SW846 8015 D	Certified	GRO	3.96	9.00	45.0	3.62	9.00	45.0

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

	method	Status(NPW)	parameter	CAS#	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)
DW	245.1	Certified	Mercury	7439-97-6	0.033	0.050	0.200
DW	200.7	Certified	Aluminum	7429-90-5	15.0	25.0	50.0
	200.7	Certified	Antimony	7440-36-0	2.43	12.5	25.0
	200.7	Certified	Arsenic	7440-38-2	3.08	5.00	10.0
DW	200.7	Certified	Barium	7440-39-3	30.8	25.0	50.0
DW	200.7	Certified	Beryllium	7440-41-7	0.21	1.50	3.00
DW	200.7	Certified	Boron	7440-42-8	6.78	25.0	50.0
DW	200.7	Certified	Cadmium	7440-43-9	0.23	1.50	3.00
DW	200.7	Certified	Calcium	7440-70-2	81.2	500	1000
DW	200.7	Certified	Chromium	7440-47-3	0.78	3.75	5.00
DW	200.7	Certified	Cobalt	7440-48-4	1.28	7.50	15.0
DW	200.7	Certified	Copper	7440-50-8	4.99	5.00	10.0
DW	200.7	Certified	Iron	7439-89-6	13.2	37.5	50.0
	200.7	Certified	Lead	7439-92-1	1.17	4.50	6.00
DW	200.7	Certified	Magnesium	7439-95-4	92.4	500	1000
DW	200.7	Certified	Manganese	7439-96-5	0.94	5.00	10.0
	200.7	Certified	Molybdenum	7439-98-7	6.48	50.0	100
DW	200.7	Certified	Nickel	7440-02-0	1.51	10.0	20.0
DW	200.7	Certified	Potassium	7440-09-7	198	500	1000
	200.7	Certified	Selenium	7782-49-2	3.69	7.50	10.0
DW	200.7	Certified	Silicon (silica-dissolved)	7440-21-3	36.1	100	200
DW	200.7	Certified	Silver	7440-22-4	0.78	2.50	5.00
DW	200.7	Certified	Sodium	7440-23-5	267	500	1000
	200.7	Certified	Thallium	7440-28-0	2.79	10.0	20.0
	200.7	Certified	Tin	7440-31-5	1.75	10.0	20.0
	200.7	Certified	Titanium	7440-32-6	1.96	10.0	20.0
DW	200.7	Certified	Vanadium	7440-62-2	2.45	10.0	20.0
DW	200.7	Certified	Zinc	7440-66-6	2.33	10.0	20.0
DW	200.7	Certified	Strontium		No MDL LOD LOQ		
	SM2340B	Certified	Hardness		580	3300	6600

	method	Status(NPW)	parameter	CAS#	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)
DW	200.8	Certified	Aluminum	7429-90-5	2.49	5.00	20.0
DW	200.8	Certified	Antimony	7440-36-0	0.080	0.75	2.00
DW	200.8	Certified	Arsenic	7440-38-2	0.10	0.25	1.00
DW	200.8	Certified	Barium	7440-39-3	0.18	1.25	10.0
DW	200.8	Certified	Beryllium	7440-41-7	0.10	0.25	1.00

DW	200.8	Certified	Cadmium	7440-43-9	0.25	0.75	1.00
	200.8	Certified	Calcium	7440-70-2	30.9	75.0	500
DW	200.8	Certified	Chromium	7440-47-3	0.12	0.25	2.00
DW	200.8	Certified	Cobalt	7440-48-4	0.048	0.25	1.00
DW	200.8	Certified	Copper	7440-50-8	0.32	0.50	2.00
	200.8	Certified	Iron	7439-89-6	6.64	12.5	50.0
DW	200.8	Certified	Lead	7439-92-1	0.27	0.75	1.00
	200.8	Certified	Magnesium	7439-95-4	15.4	25.0	500
DW	200.8	Certified	Manganese	7439-96-5	0.29	0.50	1.00
	200.8	Certified	Molybdenum	7439-98-7	0.87	1.25	5.00
DW	200.8	Certified	Nickel	7440-02-0	0.12	0.25	1.00
	200.8	Certified	Potassium	7440-09-7	62.6	75.0	500
DW	200.8	Certified	Selenium	7782-49-2	2.32	4.25	5.00
DW	200.8	Certified	Silver	7440-22-4	0.74	0.75	1.00
	200.8	Certified	Sodium	7440-23-5	67	75.0	500
	200.8	Not Certified	Strontium	7440-24-6	0.10	0.25	1.00
DW	200.8	Certified	Thallium	7440-28-0	0.081	0.25	1.00
	200.8	Certified	Tin	7440-31-5	0.54	3.75	5.00
	200.8	Certified	Titanium	7440-32-6	0.93	1.25	5.00
DW	200.8	Certified	Vanadium	7440-62-2	0.050	0.25	5.00
DW	200.8	Certified	Zinc	7440-66-6	0.72	1.50	2.00

	method	**Status(NPW)**	**parameter**	**CAS#**	**mdl water (ug/L)**	**lod water (ug/L)**	**loq water (ug/L)**
	7470A	Certified	Mercury	7439-97-6	0.070	0.16	0.20
	6010D-3010A	Certified	Aluminum	7429-90-5	16.1	40.0	50.0
	6010D-3010A	Certified	Antimony	7440-36-0	2.33	6.25	25.0
	6010D-3010A	Certified	Arsenic	7440-38-2	3.08	8.00	10.0
	6010D-3010A	Certified	Barium	7440-39-3	7.79	25.0	50.0
	6010D-3010A	Certified	Beryllium	7440-41-7	0.25	0.75	3.00
	6010D-3010A	Certified	Boron	7440-42-8	6.03	12.5	50.0
	6010D-3010A	Certified	Cadmium	7440-43-9	0.26	0.75	3.00
	6010D-3010A	Certified	Calcium	7440-70-2	75.3	250	1000
	6010D-3010A	Certified	Chromium	7440-47-3	1.04	2.50	5.00
	6010D-3010A	Certified	Cobalt	7440-48-4	0.90	3.75	15.0
	6010D-3010A	Certified	Copper	7440-50-8	3.08	8.00	10.0
	6010D-3010A	Certified	Iron	7439-89-6	16.9	40.0	50.0
	6010D-3010A	Certified	Lead	7439-92-1	1.94	4.80	6.00
	6010D-3010A	Certified	Magnesium	7439-95-4	70	250	1000
	6010D-3010A	Certified	Manganese	7439-96-5	0.92	2.50	10.0
	6010D-3010A	Certified	Molybdenum	7439-98-7	6.43	25.0	100
	6010D-3010A	Certified	Nickel	7440-02-0	1.57	5.00	20.0

	6010D-3010A	Certified	Potassium	7440-09-7	123	250	1000
	6010D-3010A	Certified	Selenium	7782-49-2	3.53	8.00	10.0
	6010D-3010A	Certified	Silver	7440-22-4	0.82	2.50	5.00
	6010D-3010A	Certified	Sodium	7440-23-5	250	500	1000
	6010D-3010A	Certified	Thallium	7440-28-0	3.54	10.0	20.0
	6010D-3010A	Certified	Tin	7440-31-5	1.92	5.00	20.0
	6010D-3010A	Certified	Titanium	7440-32-6	1.73	5.00	20.0
	6010D-3010A	Certified	Vanadium	7440-62-2	2.65	10.0	20.0
	6010D-3010A	Certified	Zinc	7440-66-6	2.44	5.00	20.0
	6010D-3010A	Not Certified	Silicon	7440-21-3	31.7	100	200
	6010D-3010A	Certified	Strontium	10042-76-9	No MDL/LOD/LOQ		
	6010D-3010A	Certified	Lithium	7439-93-2	No MDL/LOD/LOQ		
	6010D-3010A	Not Certified	Sulfur	7704-34-9	No MDL/LOD/LOQ		

	method	Status(NPW)	parameter	CAS#	MDL water (ug/L)	LOD water (ug/L)	LOQ water (ug/L)
	6020B	Certified	Aluminum	7429-90-5	3.81	10.0	20.0
	6020B	Certified	Antimony	7440-36-0	0.080	0.25	2.00
	6020B	Certified	Arsenic	7440-38-2	0.10	0.25	1.00
	6020B	Certified	Barium	7440-39-3	0.24	1.25	10.0
	6020B	Certified	Beryllium	7440-41-7	0.10	0.25	1.00
	6020B	Certified	Cadmium	7440-43-9	0.20	0.50	1.00
	6020B	Certified	Calcium	7440-70-2	35.2	75.0	500
	6020B	Certified	Chromium	7440-47-3	0.10	0.25	2.00
	6020B	Certified	Cobalt	7440-48-4	0.048	0.25	1.00
	6020B	Certified	Copper	7440-50-8	0.26	1.00	2.00
	6020B	Certified	Iron	7439-89-6	6.88	25.0	50.0
	6020B	Certified	Lead	7439-92-1	0.29	0.75	1.00
	6020B	Certified	Magnesium	7439-95-4	11.8	25.0	500
	6020B	Certified	Manganese	7439-96-5	0.29	0.75	1.00
	6020B	Certified	Molybdenum	7439-98-7	0.88	2.50	5.00
	6020B	Certified	Nickel	7440-02-0	0.09	0.25	1.00
	6020B	Certified	Potassium	7440-09-7	54.5	200	500
	6020B	Certified	Selenium	7782-49-2	1.94	4.50	5.00
	6020B	Certified	Silver	7440-22-4	0.16	0.50	1.00
	6020B	Certified	Sodium	7440-23-5	73.0	200	500
	6020B	Certified	Strontium	7440-24-6	0.24	0.50	1.00
	6020B	Certified	Thallium	7440-28-0	0.15	0.50	1.00
	6020B	Certified	Tin	7440-31-5	0.61	2.00	5.00
	6020B	Certified	Titanium	7440-32-6	0.92	2.50	5.00
	6020B	Certified	Vanadium	7440-62-2	0.041	0.25	5.00

6020B	Certified	Zinc	7440-66-6	0.71	1.50	2.00
6020B	Certified	Boron	7440-42-8	No MDL/LOD/LOQ		
6020B	Certified	Thorium	7440-29-1	No MDL/LOD/LOQ		
6020B	Certified	Zirconium	10026-11-6	No MDL/LOD/LOQ		
6020B	Certified	Uranium	7440-61-1	No MDL/LOD/LOQ		
6020B	Not Certified	Silicon	7440-21-3	No MDL/LOD/LOQ		

CHEMTECH 284 Sheffield Street, Mountainside, New Jersey 07092 Phone : 908 789 8900 Fax : 908 789 8922

method	Status	parameter	CAS#	mdl soil (mg/kg)	lod soil (mg/kg)	loq soil (mg/kg)
7471B	Certified	Mercury	7439-97-6	0.0034	0.011	0.014
6010D-3050B	Certified	Aluminum	7429-90-5	2.21	4.00	5.00
6010D-3050B	Certified	Antimony	7440-36-0	0.27	0.625	2.50
6010D-3050B	Certified	Arsenic	7440-38-2	0.21	0.50	1.00
6010D-3050B	Certified	Barium	7440-39-3	0.72	2.50	5.00
6010D-3050B	Certified	Beryllium	7440-41-7	0.021	0.075	0.30
6010D-3050B	Certified	Boron	7440-42-8	0.70	2.50	5.00
6010D-3050B	Certified	Cadmium	7440-43-9	0.027	0.075	0.30
6010D-3050B	Certified	Calcium	7440-70-2	7.14	25.0	100
6010D-3050B	Certified	Chromium	7440-47-3	0.090	0.25	0.50
6010D-3050B	Certified	Cobalt	7440-48-4	0.075	0.375	1.50
6010D-3050B	Certified	Copper	7440-50-8	0.42	0.80	1.00
6010D-3050B	Certified	Iron	7439-89-6	3.93	4.00	5.00
6010D-3050B	Certified	Lead	7439-92-1	0.26	0.48	0.60
6010D-3050B	Certified	Magnesium	7439-95-4	9.11	25.0	100
6010D-3050B	Certified	Manganese	7439-96-5	0.11	0.25	1.00
6010D-3050B	Certified	Molybdenum	7439-98-7	0.71	2.50	10.0
6010D-3050B	Certified	Nickel	7440-02-0	0.18	0.50	2.00
6010D-3050B	Certified	Potassium	7440-09-7	23.3	50.0	100
6010D-3050B	Certified	Selenium	7782-49-2	0.43	0.80	1.00
6010D-3050B	Certified	Silver	7440-22-4	0.078	0.25	0.50
6010D-3050B	Certified	Sodium	7440-23-5	23.4	50.0	100
6010D-3050B	Certified	Thallium	7440-28-0	0.31	1.00	2.00
6010D-3050B	Certified	Tin	7440-31-5	0.28	1.00	2.00
6010D-3050B	Certified	Titanium	7440-32-6	0.20	0.50	2.00
6010D-3050B	Certified	Vanadium	7440-62-2	0.32	1.00	2.00
6010D-3050B	Certified	Zinc	7440-66-6	0.20	0.50	2.00
6010D-3050B	Not Certified	Silicon	7440-21-3	4.73	10.0	20.0
6010D-3050B	Certified	Lithium	7439-93-2	NO MDL/LOD/LOQ		
6010D-3050B	Not Certified	Sulfur	7704-34-9	NO MDL/LOD/LOQ		
6010D-3050B	Certified	Strontium	10042-76-9	NO MDL/LOD/LOQ		

method	Status	parameter	CAS#	mdl soil (mg/kg)	lod soil (mg/kg)	loq soil (mg/kg)
6020B	Certified	Aluminum	7429-90-5	0.32	1.00	2.00
6020B	Certified	Antimony	7440-36-0	0.0063	0.025	0.20

6020B	Certified	Arsenic	7440-38-2	0.0083	0.025	0.10
6020B	Certified	Barium	7440-39-3	0.016	0.125	1.00
6020B	Certified	Beryllium	7440-41-7	0.0058	0.025	0.10
6020B	Certified	Cadmium	7440-43-9	0.023	0.075	0.10
6020B	Certified	Calcium	7440-70-2	3.02	7.50	50.0
6020B	Certified	Chromium	7440-47-3	0.0090	0.025	0.20
6020B	Certified	Cobalt	7440-48-4	0.0033	0.025	0.10
6020B	Certified	Copper	7440-50-8	0.039	0.05	0.20
6020B	Certified	Iron	7439-89-6	0.33	1.25	5.00
6020B	Certified	Lead	7439-92-1	0.024	0.025	0.10
6020B	Certified	Magnesium	7439-95-4	0.75	2.50	50.0
6020B	Certified	Manganese	7439-96-5	0.011	0.025	0.10
6020B	Certified	Molybdenum	7439-98-7	0.086	0.125	0.50
6020B	Certified	Nickel	7440-02-0	0.012	0.025	0.10
6020B	Certified	Potassium	7440-09-7	2.09	5.00	50.0
6020B	Certified	Selenium	7782-49-2	0.16	0.45	0.50
6020B	Certified	Silver	7440-22-4	0.0086	0.025	0.10
6020B	Certified	Sodium	7440-23-5	6.65	25.0	50.0
6020B	Certified	Strontium	7440-24-6	0.0044	0.025	0.10
6020B	Certified	Thallium	7440-28-0	0.015	0.025	0.10
6020B	Certified	Tin	7440-31-5	0.074	0.20	0.50
6020B	Certified	Titanium	7440-32-6	0.085	0.125	0.50
6020B	Certified	Vanadium	7440-62-2	0.0042	0.025	0.10
6020B	Certified	Zinc	7440-66-6	0.030	0.15	0.50
6020B	Certified	Uranium	7440-61-1	NO MDL/LOD/LOQ		
6020B	Not Certified	Silicon	7440-21-3	NO MDL/LOD/LOQ		
6020B	Certified	Thorium	7440-29-1	NO MDL/LOD/LOQ		
6020B	Certified	Zirconium	10026-11-6	NO MDL/LOD/LOQ		
6020B	Not Certified	Boron	7440-42-8	NO MDL/LOD/LOQ		

method	Status	parameter	CAS#	mdl wipe (ug)	lod wipe (ug)	loq wipe (ug)
7471A/B	Certified	Mercury	7439-97-6	0.0068	0.022	0.028
6010D-3050B	Certified	Aluminum	7429-90-5	4.42	8.00	10.0
6010D-3050B	Certified	Antimony	7440-36-0	0.54	1.25	5.00
6010D-3050B	Certified	Arsenic	7440-38-2	0.42	1.00	2.00
6010D-3050B	Certified	Barium	7440-39-3	1.44	5.00	10.0
6010D-3050B	Certified	Beryllium	7440-41-7	0.042	0.15	0.60
6010D-3050B	Certified	Boron	7440-42-8	1.40	5.00	10.0

6010D-3050B	Certified	Cadmium	7440-43-9	0.054	0.15	0.60
6010D-3050B	Certified	Calcium	7440-70-2	14.3	50.0	200
6010D-3050B	Certified	Chromium	7440-47-3	0.18	0.50	1.00
6010D-3050B	Certified	Cobalt	7440-48-4	0.15	0.75	3.00
6010D-3050B	Certified	Copper	7440-50-8	0.84	1.60	2.00
6010D-3050B	Certified	Iron	7439-89-6	7.86	8.00	10.0
6010D-3050B	Certified	Lead	7439-92-1	0.52	0.96	1.20
6010D-3050B	Certified	Magnesium	7439-95-4	18.2	50.0	200
6010D-3050B	Certified	Manganese	7439-96-5	0.22	0.50	2.00
6010D-3050B	Certified	Molybdenum	7439-98-7	1.42	5.00	20.0
6010D-3050B	Certified	Nickel	7440-02-0	0.36	1.00	4.00
6010D-3050B	Certified	Potassium	7440-09-7	46.6	100	200
6010D-3050B	Certified	Selenium	7782-49-2	0.86	1.60	2.00
6010D-3050B	Certified	Silver	7440-22-4	0.16	0.50	1.00
6010D-3050B	Certified	Sodium	7440-23-5	46.8	100	200
6010D-3050B	Certified	Thallium	7440-28-0	0.62	2.00	4.00
6010D-3050B	Certified	Tin	7440-31-5	0.56	2.00	4.00
6010D-3050B	Certified	Titanium	7440-32-6	0.40	1.00	4.00
6010D-3050B	Certified	Vanadium	7440-62-2	0.64	2.00	4.00
6010D-3050B	Certified	Zinc	7440-66-6	0.40	1.00	4.00
6010D-3050B	Not Certified	Silicon	7440-21-3	9.46	20.0	40.0
6010D-3050B	Certified	Strontium	10042-76-9	NO MDL/LOD/LOQ		
6010D-3050B	Certified	Lithium	7439-93-2	NO MDL/LOD/LOQ		
6010D-3050B	Not Certified	Sulfur	7704-34-9	NO MDL/LOD/LOQ		

method	Status	parameter	CAS#	mdl wipe (ug)	lod wipe (ug)	loq wipe (ug)
6020B	Certified	Aluminum	7429-90-5	0.32	1.00	2
6020B	Certified	Antimony	7440-36-0	0.0063	0.025	0.2
6020B	Certified	Arsenic	7440-38-2	0.0083	0.025	0.1
6020B	Certified	Barium	7440-39-3	0.016	0.125	1
6020B	Certified	Beryllium	7440-41-7	0.0058	0.025	0.1
6020B	Certified	Cadmium	7440-43-9	0.023	0.075	0.1
6020B	Certified	Calcium	7440-70-2	3.02	7.50	50
6020B	Certified	Chromium	7440-47-3	0.0090	0.025	0.2
6020B	Certified	Cobalt	7440-48-4	0.0033	0.025	0.1
6020B	Certified	Copper	7440-50-8	0.039	0.050	0.2
6020B	Certified	Iron	7439-89-6	0.33	1.25	5
6020B	Certified	Lead	7439-92-1	0.024	0.025	0.1
6020B	Certified	Magnesium	7439-95-4	0.75	2.50	50

6020B	Certified	Manganese	7439-96-5	0.011	0.025	0.1
6020B	Certified	Molybdenum	7439-98-7	0.086	0.125	0.5
6020B	Certified	Nickel	7440-02-0	0.012	0.025	0.1
6020B	Certified	Potassium	7440-09-7	2.09	5.00	50
6020B	Certified	Selenium	7782-49-2	0.16	0.45	0.5
6020B	Certified	Silver	7440-22-4	0.0086	0.025	0.1
6020B	Certified	Sodium	7440-23-5	6.65	25.0	50
6020B	Certified	Strontium	7440-24-6	0.0044	0.025	0.1
6020B	Certified	Thallium	7440-28-0	0.015	0.025	0.1
6020B	Certified	Tin	7440-31-5	0.074	0.200	0.5
6020B	Certified	Titanium	7440-32-6	0.085	0.13	0.5
6020B	Certified	Vanadium	7440-62-2	0.0042	0.025	0.1
6020B	Certified	Zinc	7440-66-6	0.030	0.15	0.5
6020B	Certified	Uranium	7440-61-1	NO MDL/LOD/LOQ		
6020B	Not Certified	Silicon	7440-21-3	NO MDL/LOD/LOQ		
6020B	Certified	Thorium	7440-29-1	NO MDL/LOD/LOQ		
6020B	Certified	Zirconium	10026-11-6	NO MDL/LOD/LOQ		
6020B	Not Certified	Boron	7440-42-8	NO MDL/LOD/LOQ		

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METHOD	STATUS	MATRIX	PARAMETER	MDL	LOD	LOQ	UNIT
ASTM D1067-92	Dropped	Water	Acidity	4	10.0	10.0	mg/L
SM 2310 B-11	Dropped	Water	Acidity as CaCO3	4	10.0	10.0	mg/L
SM2320B	Certified	Water	Alkalinity	1	1.00	2.00	mg/L
SM4500 NH3 G,H	Certified	Water	Ammonia	0.042	0.08	0.10	mg/L
SM4500 NH3 G,H	Certified	Soil	Ammonia	2.4	4.00	5.00	mg/Kg
SM4500-CN C,G	Certified	Water	Amenable Cyanide	0.0019	0.0025	0.0050	mg/L
SM4500 CN C,E	Certified	Water	Cyanide	0.0019	0.0025	0.0050	mg/L
9010C/9012B	Certified	Water	Cyanide	0.0011	0.0025	0.0050	mg/L
9010C/9012B	Certified	Soil	Cyanide	0.064	0.125	0.25	mg/Kg
9014	Certified	Water	Cyanide	0.0011	0.0025	0.0050	mg/L
9014		Soil	Cyanide	0.064	0.125	0.25	mg/Kg
9012B		Water	Reactive Cyanide	0.0011	0.0025	0.0050	mg/L
9012B		Soil	Reactive Cyanide	0.064	0.125	0.25	mg/Kg
SM2510B	Certified	Water	Conductivity	0.91	1.00	2.00	umhos/cm
9050A	Certified	Water	Conductivity	0.91	1.00	2.00	umhos/cm
120.1	Certified	Water	Conductivity	0.91	1.00	2.00	umhos/cm
SM5210B	Certified	Water	BOD	0.17	2.00	2.00	mg/L
SM5210B	Certified	Water	CBOD	0.20	2.00	2.00	mg/L
SM5220D	Certified	Water	COD	2.4	5.00	10.0	mg/L
SM5220D	Certified	Soil	COD	101	250	500	mg/Kg
SM2120B	Certified	Water	Color	5	5.00	5.00	mg/L
SM4500-O G	Certified	Water	Dissolved Oxygen	NA	NA	NA	NA
SM3500-Cr B	Certified	Water	Hexavalent Chromium	0.0031	0.005	0.010	mg/L
3060A/7196A	Certified	Water	Hexavalent Chromium	0.0025	0.005	0.010	mg/L
3060A/7196A	Certified	Soil	Hexavalent Chromium	0.12	0.20	0.40	mg/Kg
1010A	Certified	Water	Flash Point	NA	NA	NA	Solid/Water
1030	Certified	Soil	Ignitability of solids	NA	NA	NA	Solid
9071B	Certified	Soil	Oil & Grease	5.0	10.0	25.0	mg/Kg
9071B	Certified	Soil	TPH (Non-polar Material)	8.0	10.0	25.0	mg/Kg
1664A	Certified	Water	TPH (Non-polar Material)	0.82	2.00	5.00	mg/L
1664A	Certified	Water	Oil & Grease	0.62	2.00	5.00	mg/L
9095A	Certified	Water	Paint Filter-Free liquid	1	1.00	1.00	ml/100gm
420.1	Certified	Water	Phenols	0.013	0.025	0.050	mg/L
9065	Certified	Water	Phenols	0.011	0.025	0.050	mg/L
9065	Certified	Soil	Phenols	0.43	2.50	5.00	mg/Kg
SM4500-Cl G	Certified	Water	Residual Chlorine	0.017	0.05	0.10	mg/L
SM2520C	Certified	Water	Salinity	NA	NA	NA	NA
SM2540F	Certified	Water	Settlable solids	0.5	0.5	0.50	mL/L

SM4500 S E or F		Water	Sulfide	0.21	0.50	1.00	mg/L
9030B/9034	Certified	Water	Sulfide	0.25	0.50	1.00	mg/L
9030B/9034	Certified	Soil	Sulfide	2.0	5.00	10.0	mg/Kg
9034		Soil	Reactive Sulfide	2.0	5.00	10.0	mg/Kg
9034		Water	Reactive Sulfide	0.25	0.50	1.00	mg/L
SM2540C	Certified	Water	TDS	1.0	10.0	10.0	mg/L
SM 4500-N Org C-11 plus NH3 B-11 plus NH3 C-11	Certified	Water	TKN	0.15	0.25	0.50	mg/L
SM 4500-N Org C-11 plus NH3 B plus NH3 G-11	Certified	Soil	TKN	8.9	12.5	25.0	mg/Kg
SM5310B	Certified	Water	TOC	0.42	0.50	1.00	mg/L
9060A	Certified	Water	TOC	0.42	0.50	1.00	mg/L
9060	Certified	Soil	TOC	20	50	250	mg/Kg
9060A		Water	Dissolved Organic carbon	0.42	0.50	1.00	mg/L
Lloyd Kahn	Certified	Soil	TOC	17	50	250	mg/Kg
Walkley-Black		Soil	TOC	320	500	500	mg/Kg
365.3	Certified	Water	Total Phosphorus	0.0096	0.025	0.050	mg/L
365.3		Soil	Total Phosphorus	0.79	1.25	2.50	mg/Kg
SM2540G	Certified	Water	Total fixed vol. Solids	1.0	10.0	10.0	mg/L
SM2540D	Certified	Water	TSSResidue - nonfilterable	1.0	4.00	4.00	mg/L
SM2540B	Certified	Water	TS (Residue - total)	1.0	5.00	5.00	mg/L
180.1	Certified	Water	Turbidity - DW also	0.22	0.50	1.00	NTU
SM2130B	Certified	Water	Turbidity - DW also	0.24	0.50	1.00	NTU
160.4	Certified	Water	TVS {VS (Residue - volatile)}	1.0	10.0	10.0	mg/L
9040C	Certified	Water	PH (corrosivity)	NA	NA	NA	water
SM 4500-H B-11	Certified	Water	pH	NA	NA	NA	water
9041A	Certified	Water	pH	NA	NA	NA	water
9045D	Certified	Soil	pH - soil and waste	NA	NA	NA	Solid
9056A	Certified	Water	Bromide	0.14	1.00	2.00	mg/L
9056A	Certified	Water	Chloride	0.097	0.30	0.60	mg/L
9056A	Certified	Water	Fluoride	0.092	0.20	0.40	mg/L
9056A	Certified	Water	Nitrate	0.050	0.25	0.50	mg/L
9056A	Certified	Water	Nitrite	0.032	0.30	0.60	mg/L
9056A	Certified	Water	Orthophosphate as P	0.30	0.50	1.00	mg/L
9056A	Certified	Water	Sulfate	0.18	1.50	3.00	mg/L
9056A	Certified	Soil	Bromide	3.6	20.0	40.0	mg/Kg
9056A	Certified	Soil	Chloride	1.1	6.00	12.0	mg/Kg
9056A	Certified	Soil	Fluoride	1.8	4.00	8.00	mg/Kg
9056A	Certified	Soil	Nitrate	0.87	5.00	10.0	mg/Kg
9056A	Certified	Soil	Nitrite	0.54	6.00	12.0	mg/Kg
9056A	Certified	Soil	Orthophosphate as P	4.1	10.0	20.0	mg/Kg
9056A	Certified	Soil	Sulfate	5.8	30.0	60.0	mg/Kg

300.0	Certified	Water	Bromide	0.14	1.00	2.00	mg/L
300.0	Certified	Water	Chloride	0.097	0.30	0.60	mg/L
300.0	Certified	Water	Fluoride	0.092	0.20	0.40	mg/L
300.0	Certified	Water	Nitrate	0.050	0.25	0.50	mg/L
300.0	Certified	Water	Nitrite	0.032	0.30	0.60	mg/L
300.0	Certified	Water	Orthophosphate	0.30	0.50	1.00	mg/L
300.0	Certified	Water	Sulfate	0.18	1.50	3.00	mg/L
300.0	Certified	Water	Nitrate+Nitrite	0.082	0.40	0.80	mg/L
SM4500 Cl C,E	Certified	Water	Chloride	0.68	2.50	5.00	mg/L
SM4500 NO2	Certified	Water	Nitrite	0.0031	0.0060	0.012	mg/L
SM4500-P E	Certified	Water	Orthophosphate	0.0083	0.025	0.050	mg/L
SM4500-SO4 E	Certified	Water	Sulfate	0.65	2.50	5.00	mg/L
SM426C 15Ed	Certified	Water	Sulfate	0.65	2.50	5.00	mg/L
9038	Certified	Water	Sulfate	0.78	2.50	5.00	mg/L
9038		Water	Dissolved Sulfate	0.78	2.50	5.00	mg/L
HACH 8146	Not Certified	Water	Ferrous Iron	0.0077	0.050	0.10	mg/L

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method	parameter	CAS#	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)
SW-846 8260D (1311-ZHE)	1,1-Dichloroethene (1,1-DCE)	75-35-4	0.20	0.50	1.00
SW-846 8260D (1311-ZHE)	1,2-Dichloroethane (EDC)	106-93-4	0.14	0.50	1.00
SW-846 8260D (1311-ZHE)	2-Butanone (Methyl ethyl ketone; MEK)	78-93-3	0.82	2.50	5.00
SW-846 8260D (1311-ZHE)	Benzene	71-43-2	0.16	0.50	1.00
SW-846 8260D (1311-ZHE)	Carbon Tetrachloride	56-23-5	0.18	0.50	1.00
SW-846 8260D (1311-ZHE)	Chlorobenzene	108-90-7	0.17	0.50	1.00
SW-846 8260D (1311-ZHE)	Chloroform	67-66-3	0.18	0.50	1.00
SW-846 8260D (1311-ZHE)	Tetrachloroethene (PCE; PERC)	127-18-4	0.18	0.50	1.00
SW-846 8260D (1311-ZHE)	Trichloroethene (TCE)	79-01-6	0.27	0.50	1.00
SW-846 8260D (1311-ZHE)	Vinyl Chloride (VC)	75-01-4	0.22	0.50	1.00

method	parameter	CAS#	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)
SW-846 8270E (1311)	2,4,5-Trichlorophenol	95-95-4	20.1	40.0	50.0
SW-846 8270E (1311)	2,4,6-Trichlorophenol (TCP)	88-06-2	17.6	40.0	50.0
SW-846 8270E (1311)	1,4-Dichlorobenzene	106-46-7	18.9	40.0	50.0
SW-846 8270E (1311)	2,4-Dinitrotoluene (DNT)	121-14-2	18.7	40.0	50.0
SW-846 8270E (1311)	2-Methylphenol (o-Cresol)	95-48-7	22.1	40.0	50.0
SW-846 8270E (1311)	3+4-Methylphenol (m+p-Cresol)	65794-96-9	21.1	80.0	100
SW-846 8270E (1311)	Hexachlorobenzene (HCB)	118-74-1	21.5	40.0	50.0
SW-846 8270E (1311)	Hexachlorobutadiene (HCBD)	87-68-3	22.3	40.0	50.0
SW-846 8270E (1311)	Hexachloroethane (HCE)	67-72-1	16.7	40.0	50.0
SW-846 8270E (1311)	Nitrobenzene	98-95-3	20.4	40.0	50.0
SW-846 8270E (1311)	Pentachlorophenol	87-86-5	21.7	80.0	100
SW-846 8270E (1311)	Pyridine	110-86-1	27.7	40.0	50.0

method	parameter	CAS#	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)
SW-846 8081B (1311)	Chlordane	57-74-9	0.88	2.50	5.00
SW-846 8081B (1311)	Endrin	72-20-8	0.048	0.10	0.50
SW-846 8081B (1311)	gamma-BHC (Lindane; gamma-HCH)	58-89-9	0.052	0.10	0.50
SW-846 8081B (1311)	Heptachlor	76-44-8	0.060	0.25	0.50
SW-846 8081B (1311)	Heptachlor epoxide	1024-57-3	0.067	0.25	0.50
SW-846 8081B (1311)	Methoxychlor	72-43-5	0.060	0.25	0.50
SW-846 8081B (1311)	Toxaphene	8001-35-2	1.70	5.00	10.0

method	parameter	CAS#	mdl water (ug/L)	lod water (ug/L)	loq water (ug/L)

SW-846 8151A (1311)	2,4,5-TP (Silvex)	93-72-1	4.70	10.0	20.0
SW-846 8151A (1311)	2,4-D	94-75-7	3.90	15.0	20.0

method	**parameter**	**CAS#**	**mdl water (ug/L)**	**lod water (ug/L)**	**loq water (ug/L)**
6010D-3010A (1311)	Arsenic	7440-38-2	30.8	80.0	100
6010D-3010A (1311)	Barium	7440-39-3	77.9	250	500
6010D-3010A (1311)	Cadmium	7440-43-9	2.60	7.50	30.0
6010D-3010A (1311)	Chromium, total	7440-47-3	10.4	25.0	50.0
6010D-3010A (1311)	Lead	7439-92-1	19.4	48.0	60.0
7470A (1311)	Mercury	7439-97-6	0.70	1.60	2.00
6010D-3010A (1311)	Selenium	7782-49-2	35.3	80.0	100
6010D-3010A (1311)	Silver	7440-22-4	8.20	25.0	50.0

Appendix O

Laboratory Standard Operating Procedures/Equipment Calibrations

DETERMINATION OF IGNITABILITY OF SOLIDS

1. Test Method

1.1 Determination of Ignitability of solids using SW 846 method 1030

2. Applicable Matrices

2.1 Solids

3. Detection Limit

3.1 N/A

4. Scope and Application

4.1 This method is applicable to solids pastes, granular materials and powder substances.

5. Summary

5.1 In a preliminary test, the material is formed into an unbroken strip 250mm in length.

5.2 At one end ignition source is applied and checked whether combustion propagates within a specified time period.

5.3 The materials that do not ignite or propagate do not require further test for burning rate.

6. Definitions

6.1 Ignitability: the solid material that combustion is applied upon, heat source is termed ignitable.

6.2 Burning rate: Time in seconds required to burn the 100mm strip prepared from the material being tested.

6.3 Analyst: the designated individual who performs the "hands-on" analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.

6.4 Batch: Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents.

6.4.1 Preparation Batch: is composed of one to 20 environmental samples of the same matrix, meeting the above-mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours.

6.4.2 Analytical Batch: is composed of prepared environmental samples (extracts, digestates or concentrates), which are analyzed together as a group. An analytical batch can include prepared samples originating from various environmental matrices and can exceed 20 samples.

6.5 Blank: A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis the blank is subjected to the usual analytical and measurement process to establish a zero

baseline or background value and is sometimes used to adjust or correct routine analytical results.

6.6 Corrective Action: The action taken to eliminate the causes of an existing nonconformity, defect or other undesirable situation in order to prevent recurrence.

6.7 Duplicate Analyses: The analysis or measurements of the variable of interest performed identically on two sub-samples of the same sample. The results from duplicate analyses are used to evaluate analytical or measurement precision but not the precision of sampling, preservation or storage internal to the laboratory.

6.8 Holding Times (Maximum Allowable Holding Times): The maximum times that samples may be held prior to analysis and still be considered valid or not compromised.

6.9 Method Blank: A sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest, which is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations tat impact the analytical results for sample analyses.

6.10 Preservation: Refrigeration and/or reagents added at the time of sample collection (or later) to maintain the chemical and/or biological integrity of the sample.

6.11 Pure Reagent Water: Water (defined by national or international standard) in which no target analytes or interferences are detected as required by the analytical method.

6.12 Standard: The document describing the elements of laboratory accreditation that has been developed and established within the consensus principles of NELAC and meets the approval requirements of NELAC procedures and policies.

7. Interferences

7.1 Variation in air flow, particle size, moisture content, the ambient temperature, etc. imparts variation in test results.

7.2 Performing the test in an identical condition for all samples reduces the variation in the results.

8. Safety

8.1 Wear appropriate safety clothing and eye protection.

8.2 Use heat resistant gloves when conducting the test on the samples.

8.3 Pre-test the samples for explosiveness.

8.4 Perform the test in a fume hood with test apparatus perpendicular to the direction of the airflow.

9. Equipment and Supplies

9.1 Ceramic tile (25x25x2.5cm)

9.2 High temperature marker

9.3 Bunsen burner capable of attaining a temp of 1000ºC.

9.4 Thermometer (0 to 100 ºC)

9.5 Thermocouple to check temperature of the flame

9.6 Vanometer to check airflow
9.7 Stopwatch

10. Reagents and Standards

10.1 N/A

11. Sample Collection, Shipment, and Storage

11.1 Sample container should be completely filled and tightly sealed.
11.2 Samples are refrigerated upon receipt. Allow samples to reach ambient temperature before performing the test.
11.3 Analyze as soon as possible after removal from the sample container. Do not allow the samples to dry or absorb moisture for excessive periods or to lose volatiles.
11.4 There is no hold time for Ignitability analysis.

12. Quality Control

12.1 Duplicate
12.1.1 Analyze a duplicate sample for every sample with positive ignitability.

13. Calibration and Standardization

13.1 Set the flame temperature at least at 1000ºC.
13.2 Adjust the flame height (6.5 to 7.5 cm)
13.3 Check the temp of the flame tip using the thermocouple.

14. Procedure

Note: All sample materials must be tested to determine if that material is explosive or extremely flammable. Use about 1g or less of the sample to check flammability. If the sample displays explosivity or extreme flammability, do not conduct this test.

14.1 Screening test performed on all samples
14.1.1 On the ceramic tile clearly mark 200mm long test path and make another mark at exactly 200mm from the start of the sample path.
14.1.2 Prepare sample by forming an unbroken strip 250mm long by 20mm wide by 10mm high.
14.1.3 Place the ceramic tile in the fume hood perpendicular to the airflow. The air velocity should be approximately 0.7m/s.
14.1.4 Light the burner, adjust the height of the flame (6.5 to 7.5cm) and measure the temperature of the flame tip. (At least 1000ºC)
14.1.5 Apply flame tip on one end of the sample strip.
14.1.6 If the waste is non-metallic, hold the flame tip on the sample strip until the sample ignites or for a maximum of 2 minutes. If combustion occurs, begin timing with a stop watch and note whether the combustion propagates up to 200mm mark within the 2 minute test period.

14.1.7 If the waste is a metal or metal-alloy powder, hold the flame tip on the sample strip until the sample ignites or for a maximum of 5 minutes. If combustion occurs, begin timing with a stop watch and note whether the combustion propagates up to the 200mm mark within the 20 minute test period.

14.1.8 If waste does not ignite by open flame within 2 minutes, it is considered not ignitable.

14.1.9 If waste ignites and propagates combustion along the sample strip within the test period, the material must be evaluated by the burning rate test.

14.1.10 Report results as ignitable or non-ignitable.

14.2 Burning rate test

14.2.1 Clearly mark 250mm long test path. Make two additional timing marks at 80mm and at 180mm from the start of the sample path. The distance between the two marks will be used to calculate the rate of burn.

14.2.2 Load the sample on the ceramic tile.

14.2.3 Place the tile in a fume hood perpendicular to the airflow. The air velocity should be about 0.7m/s.

14.2.4 Light the Bunsen burner and adjust the height of the flame (6.5 – 7.5cm) by adjusting the propane gas and air flow.

14.2.5 Apply the tip of the flame to one end of the sample strip to ignite the test strip.

14.2.6 When the test strip has burned up to the 80mm time marker, begin timing the rate of combustion with a stop watch. Stop the time when the burned strip reaches the 180mm time marker.

14.2.7 Record the amount of time (in seconds) required to burn the 100mm test strip.

14.2.8 Calculate the rate of burning by dividing the length of the burn test strip (100mm) by the total time (seconds). Results of the burn rate test should be reported in mm/sec.

14.2.9 Wastes that have a rate of burning of more than 2.2mm/sec. (or burn time of less than 45sec. for 100mm) are considered to have a positive result for ignitability. For metals, this time is 10mins. or less for 100mm (or a burn rate of more than 0.17mm/sec.)

15. Calculations

15.1 Ignitability in mm/sec = $\frac{\text{length of the burn test strip (mm)}}{\text{Total time (sec.)}}$

16. Method Performance

16.1 N/A

17. Pollution Prevention

17.1 Use the hood when working with strong chemicals or fumes.

17.2 Keep the work area clean and clutter free to avoid mishaps

18. Data Assessment and Criteria for QC

18.1 Duplicate

18.1.1 The results for the burn rate for the duplicate analysis must be within ±20%

19. Corrective Actions for Out-of-Control Data

19.1 Duplicate

19.1 If the duplicate results are not within control limits, check the air flow, particle size, etc.

19.2 If the results are still not within limits, notify the laboratory manager/technical director.

20. Contingencies for Handling Out-of-Control and Unacceptable Data

20.1 Document any anomalies clearly in your laboratory notebook and place a copy of the information in the case narrative of the final data report.

20.2 The supervisor must contact the Laboratory Manager, and Technical Director and notify them of the situation.

21. Waste Management

21.1 Keep samples in house for 180 days after analysis and dispose of them according to the procedure explained in the SOP for waste disposal.

22. References

22.1 Test Methods for Evaluating Solid Waste, SW846 3rd Edition: Method 1030, Revision 0, December 1996 - Ignitability.

22.2 Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.3 2019.

23. List of Tables, Appendix, Attachments

23.1 N/A

CHEMTECH 284 Sheffield Street, Mountainside, NJ 07092, (908) 789-8900

READ RECEIPT

Employee Name: _____

Department: _____

_____ **M1030-Ignitability**_____
Method or Document Read (Include Title, Number, Revision, as applicable)

Employee Statement: I have read and understood the information in the above mentioned method or document.

_____ _____
Employee Signature Date

Supervisory Statement: I have reviewed this document or method with the employee.

_____ _____
Supervisor Signature Date

Note: This receipt is to be returned to the Quality Assurance/Quality Control Department for incorporation into employee training record files. If you have questions or would like to review your train record files, please see QA/QC Director.

SAMPLE PREPARATION FOR TOXICITY CHARACTERISTICS LEACHATE PROCEDURE

1. Test Method

1.1 Sample preparation for toxicity characteristics leaching procedure by Method SW 846-1311.

2. Applicable Matrices

2.1 Liquid, solid and multiphase waste

3. Method Detection Limit

3.1 NA

4. Scope and Application

4.1 This method determines the mobility of organic and inorganic analytes present in liquid, solid and multiphase wastes.

4.2 Total analysis of a sample that demonstrates individual analytes not present or substantially below the regulatory level need to be determined by TCLP.

4.3 If the analysis for any TCLP extract exceeds the regulatory level, it may not be necessary to analyze the remaining fractions.

4.4 If the analysis of the extract from a bottle extractor shows analyte levels greater than the regulatory level, the ZHE extraction may not be necessary.

5. Summary

5.1 For liquid wastes, those containing less than 0.5% dry solid material, the waste after filtration through a 0.6 to 0.8-micron glass fiber filter, is defined as the TCLP extract.

5.2 For wastes containing greater than or equal to 0.5% solids, the liquid, if any is separated from the solid phase and stored for later analysis. The solid phase is extracted with an amount of extraction fluid equal to 20 times the weight of the solid phase. A special extractor vessel is used when testing for volatile analytes. Following extraction the liquid extract is separated from the solid phase by filtration through a 0.6 to 0.8-micron glass fiber filter.

5.3 For multiphase samples the initial liquid phase of the waste is added to the liquid extract, and these are analyzed together, if compatible. If not compatible, the liquids are analyzed separately and the results are mathematically combined to yield a volume-weighted average concentration.

6. Definitions

6.1 Analyst: the designated individual who performs the “hands-on” analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.

6.2 Batch: Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents.

6.2.1 Preparation Batch: is composed of one to 20 environmental samples of the same matrix, meeting the above-mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours.

6.2.2 Analytical Batch: is composed of prepared environmental samples (extracts, digestates or concentrates), which are analyzed together as a group. An analytical batch can include prepared samples originating from various environmental matrices and can exceed 20 samples.

6.3 Blank: A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis the blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results.

6.4 Corrective Action: The action taken to eliminate the causes of an existing nonconformity, defect or other undesirable situation in order to prevent recurrence.

6.5 Duplicate Analyses: The analysis or measurements of the variable of interest performed identically on two sub-samples of the same sample. The results from duplicate analyses are used to evaluate analytical or measurement precision but not the precision of sampling, preservation or storage internal to the laboratory.

6.6 Holding Times (Maximum Allowable Holding Times): The maximum times that samples may be held prior to analysis and still be considered valid or not compromised.

6.7 Method Blank: A sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest, which is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations tat impact the analytical results for sample analyses.

6.8 Preservation: Refrigeration and/or reagents added at the time of sample collection (or later) to maintain the chemical and/or biological integrity of the sample.

6.9 Pure Reagent Water: Water (defined by national or international standard) in which no target analytes or interferences are detected as required by the analytical method.

6.10 Standard: The document describing the elements of laboratory accreditation that has been developed and established within the consensus principles of NELAC and meets the approval requirements of NELAC procedures and policies.

6.11 Standard Operating Procedures (SOPs): A written document which details the method of an operation, analysis or action whose techniques and procedures are thoroughly prescribed and which is accepted as the method for performing certain routine or repetitive task.

6.12 Test Method: An adoption of a scientific technique for a specific measurement problem, as documented in a laboratory SOP.

7. Interferences

7.1 Potential interferences that may be encountered during analysis are discussed in the individual analytical methods.

8. Safety

8.1 Wear appropriate safety clothing and eye protection.
8.2 Use protective gloves when handling corrosive chemicals.
8.3 Always use safety carts when transporting large bottles of chemicals.
8.4 Read material safety data sheet (MSDS) for the chemicals used in the laboratory for the identity of the ingredients, the physical and chemical characteristics of the substance, the physical hazards, and safe handling and safety precautions.

9. Equipment and Supplies

9.1 Rotary agitator - The agitation apparatus capable of rotating the extraction vessels in an end-over-end fashion at 30 ± 2 rpm. In the beginning of each batch of TCLP, verify RPM with samples vessels loaded.
9.2 Zero-headspace Extraction Vessels (ZHE), with internal volume of 500-600mL and equipped to accommodate a 90-110mm filter, for volatile.
9.2.1 The piston within the ZHE should be able to be moved with approximately 15 psi or less. If it takes more pressure to move the piston, the O-rings in the device should be replaced. If this does not solve the problem, the ZHE is unacceptable for TCLP analyses and the manufacturer should be contacted.
9.2.2 ZHE should be checked for leak after every extraction. pressurize the device to 50 psi, allow it to stand unattended for 1 hour, and recheck the pressure. If pressure is lost, check all fittings and inspect and replace O-rings, if necessary. Retest the device. If leakage problems cannot be solved, the manufacturer should be contacted.
9.2.3 If the device does not have a built-in pressure gauge, pressurize the device to 50 psi, submerge it in water, and check for the presence of air bubbles escaping from any of the fittings.
9.3 Bottle Extraction Vessels, plastic for metals and Teflon bottles for organic.
9.4 Pressure Filter, (to 50 psi), stainless steel
9.5 Filters, borosilicate glass fiber, containing no binder materials, pore sizes 0.6 to 0.8 um.
9.6 Gas tight syringe to collect extracts form ZHE
9.7 Beakers- 500 ml or Erlenmeyer Flask
9.8 Balance
9.9 Tedlar bags
9.10 pH meter - Thermo Orion 350 from Thermo Scientific.

10. Reagents and Standards

10.1 1.0 N HNO_3 = 64 ml concentrated HNO_3 /1000 ml
10.2 1.0 N HCl = 83 ml concentrated HCl / 1000 ml

10.3 1.0 N NaOH = 40.0 g NaOH pellets/ 1000ml

Extraction Fluid # 1	Extraction Fluid # 2
500 ml DI water	500 ml DI water
5.7 ml Glacial Acetic Acid	5.7 ml Glacial Acetic Acid
64.3 ml 1.0 N NaOH solution	Dilute to 1000 ml
Dilute to 1 liter	(pH should be 2.88 +/- 0.05)
(pH should be 4.93 +/-0.05)	

Note: These extraction fluids should be monitored frequently for impurities. The pH should be checked prior to use to ensure that these fluids are made up accurately. If impurities are found or the pH is not within the above specifications, the fluid shall be. Discarded and fresh extraction fluid prepared.

11. Sample Collection, Shipment, and Storage

11.1 Refrigerate at 4^0C until extraction. Do not add preservatives prior to extraction. If organics are to be analyzed for, use glass containers with teflon lined septa. Preserve extracts according to the guidance given in the individual; analytical methods. The general chemistry department will immediately acidify extracts for metallic aanalytes with nitric acid to pH <2 unless precipitation occurs.

SAMPLE MAXIMUM HOLDING TIMES (days) For Non-CLP Methods:

Analysis Type	From Field Collection to 1311 Extraction	From 1311 Extraction to Preparative Extraction	From Preparative Extraction to Determinative Analysis
Volatile Soil	14	NA	14
Volatile Water	14	NA	14
Semi-Volatile Soil	14	7	40
Semi-Volatile Water	14	7	40
Pesticide Soil	14	7	40
Pesticide Water	14	7	40
Mercury Soil	28	NA	28
Mercury Water	28	NA	28
Cyanide Soil	14	NA	14
Cyanide Water	14	NA	14
Metals Soil (except Mercury)	180	NA	180
Metals Water (except Mercury)	180	NA	180

SAMPLE MAXIMUM HOLDING TIMES (days) For ISM/SOM/SFAM CLP methods:

Analysis Type	From VTSR to 1311 Extraction	From 1311 Extraction to Preparative Extraction	From Preparative Extraction to Determinative Analysis
Volatile Soil	10	NA	7
Volatile Water	5	NA	7
Semi-Volatile Soil	10	7	40
Semi-Volatile Water	5	7	40
Pesticide Soil	10	7	40
Pesticide Water	5	7	40
Mercury Soil	26	26	26
Mercury Water	26	26	26
Cyanide Soil	12	12	12
Cyanide Water	12	12	12
Metals Soil (except Mercury)	180	180	180
Metals Water (except Mercury)	180	180	180

VTSR= Validated Time of Sample Receipt

12. Quality Control

12.1 Laboratory Reagent Blank

12.1.1 Analyze a minimum of one blank (using the same extraction fluid as used for the samples) daily or for every batch of 20 or fewer extractions (whichever is more frequent) that have been conducted in an extraction vessel.

12.1.2 Rotate TCLP extractor and ZHE extractor vessel every time which is used for Blank Extraction.

12.2 Spike Sample

12.2.1 Perform a matrix spike for every waste type. A minimum of one matrix spike must be analyzed daily or for each analytical batch (20 or less samples). As a minimum, follow the matrix spike addition guidance provided in each analytical method.

12.2.2 Matrix spikes are added after filtration of TCLP extract and before preservation. Matrix spikes are not added prior to TCLP extraction of the sample.

13. Calibration and Standardization

13.1 NA

14. Procedure

14.1 Procedure for all tests other than Volatile

14.1.1 Room temperature must be constant (21-25^{0}C). Record the temperature in the prep log at the beginning and at the end of the extraction process. Temperature is also monitor using data logger for every 2 hours which upload to the LIMS. If the temperature is outside control limits contact the supervisor.

14.1.2 If the sample is a soil or other solid with no free liquid, proceed to section 14.1.4.

14.1.3 If the sample is a liquid, or has a phase which appears to be fluid, proceed to section 14.2.

14.1.4 Determine whether or not the waste requires particle size reduction. Refer follow Section 14.4, for particle size determination.

14.1.5 Take a 5.0g subsample of the waste and place it into a 500 ml beaker or Erlenmeyer flask. Add 96.5-ml DI water to the beaker, cover with a watch glass and stir for 5 minutes using a magnetic stirrer. Measure and record the pH. If the pH is less than 5.0 use extraction fluid #1. If the pH is greater than 5.0, add 3.5 ml 1.0 N HCl, mix briefly and heat to 50^{0}C.

14.1.6 Hold at 50^{0}C for ten minutes, cool to room temperature, and record the pH. If the pH is less than 5.0, use extraction fluid #1; if the pH is greater than 5.0, use extraction fluid # 2. (pHs should be taken using multirange pH paper since only a less than or greater than 5.0 result needs to be measured. The probe may be damaged from the type of samples routinely encountered in TCLP analysis.)

14.1.7 Weigh a 100.0g aliquot of sample into a 2000 ml plastic jar and combine it with 2000 ml of the appropriate extraction fluid. If sufficient sample is not available, weigh as much as is available and combine the sample with 20X the amount of extraction fluid. If semivolatiles organic are to be determined, a Teflon (PTFE) or FEP (fluorinated ethylene propylene) jar must be used, but a plastic jar is suitable for metals only.

14.1.8 Place the sample into the rotary agitator and rotate for 18 +/- 2 hours at 30 rpm. Be sure to counterbalance the agitator when odd numbers of samples are extracted. After 10-15 minutes, stop the agitator to check if any leakage.

14.1.9 When the rotation period is completed, remove the sample from the agitator and allow it to settle. Check and record the pH. Samples in which the solids do not easily separate may be centrifuged. Do not use prefilters to aid in filtration. Only sufficient sample to support the analysis needs to be filtered (500 mls). In cases where the filtrate may need to be combined with a previously separated phase, filter the entire sample.

14.1.10 After insertion into the filtration device, rinse all the filters with 1000 ml 1.0 N HNO3 followed by two 1000-ml volumes of DI water. Filter the extract or prefiltered extract through a 0.8u glass fiber filter. The filtrate can now be transferred to sample bottles appropriate for the required analysis. The general chemistry department will immediately acidify extracts for metallic analytes with nitric acid to pH <2 unless precipitation occurs. Store samples at 4^0C until the time of analysis.

14.2 Assemble the pressure filtration device and place a pre-weighed filter on the support screen. Record the weight of the filter. Rinse the filter with 1000mL 1.0 N HNO_3 followed by two 1000 ml volumes of DI water.

14.2.1 Weigh out a 100g subsample of waste and add it to the filtration device. Apply pressure gradually and increase to 10 psi until air or pressurizing gas moves through the filter. If this point is reached under 10 psi, and if no additional liquid has passed through the filter in any 2-minute interval, slowly increase the pressure in 10-psi increments to a maximum of 50 psi. NOTE: Instantaneous application of high pressure can degrade the filter or when the liquid flow has ceased at 50 psi for a period of 2 minutes, stop the filtration. If the sample fails to yield any filtrate during the pressure filtration procedure, treat it as 100% solid and proceed as described in Section A.

***NOTE**: Some wastes will obviously contain some materials that appear to be liquid, i.e.-oily wastes. If after filtration the material does not filter it is defined as a solid. Do not replace the original filter with a fresh filter under any circumstances. Use only one filter.*

14.2.2 Weigh any filtered liquid (filtrate) and record the weight.

14.2.3 Determine the weight of the solid phase of the waste by subtracting the weight of the filtrate from the weight of the original sample. Calculate and record the percent solids using the formula:

$$\text{Percent Solids} = \frac{\text{wt. of solid}}{\text{total wt. of waste}} \times 100$$

14.2.4 If the percent solids are less than 0.5% then the filtrate is the sample extract. More sample may be filtered if necessary.

14.2.5 If the percent solids are greater than 0.5% remove the solid phase along with the filter and dry at 100 ± 20°C to a constant weight. Determine the % dry solids using the formula:

$$\%\ \text{Dry} = \frac{\{(\text{wt. of dry waste \& filter}) - (\text{tared wt. of filter})\} \times 100}{\text{Solids} \times (\text{initial wt. of waste})}$$

14.2.6 If the percent dry solids are less than 0.5% then the filtrate is the extract as described previously.

14.2.7 If the percent dry solids are greater than 0.5% then filter another sample of waste, retaining both the solids and the filtrate. Using the percent solids result from the initial filtration, calculate the volume of extraction fluid needed using the formula:

$$\text{Wt. of ext. Fluid} = \frac{20 \times (\text{percent solids}) \times (\text{wt. of waste filtered})}{100}$$

14.2.8 It may be necessary to filter two portions of the waste to determine the type of extraction fluid to use and to perform the actual extraction. The test to determine the type of extraction fluid to use may need to be modified (scaled down) if only a small amount of solid materials is available.

14.2.9 It should be noted that the filtered solids along with the entire filter are added to the extractor.

14.2.10 After obtaining the final filtered extract, it may be combined with the initial sample filtrate if physically compatible. If the two phases are not compatible they should be analyzed separately and the results combined mathematically using the formula:

$$\text{Final analyte concentration} = \frac{(V1)\ (C1)\ +\ (V2)\ (C2)}{V1 + V2}$$

V1 = Volume of the first phase
C1 = Concentration of analyte in the first phase
V2 = Volume of the second phase
C2 = Concentration of the analyte in the second phase

14.3 Procedure for Volatile

14.3.1 Room temperature must be constant (21-25^{0}C). Record the temperature in the temperature log twice a day. If the temperature is outside control limits contact the supervisor.

14.3.2 If the percent solids or percent dry solids is <0.5% the filtrate is defined as the TCLP extract. Store in VOA vials and refrigerate until analysis.

14.3.3 Determine whether or not the waste requires particle size reduction. Please follow Section 14.4, for particle size determination.

14.3.4 Weigh 25 gram of sample into Zero-Headspace Extractor (ZHE). Apply gentle pressure to 10 psi to force any liquid phase through the filter and into a tared collection container. Gradually increase the pressure in 10-psi increments to a maximum 50 psi, continuing to collect any liquid expelled. Reweigh the collection container. Store the filtrate at 4^{0}C under minimal headspace conditions.

14.3.5 Calculate and add to the ZHE the required amount of extraction fluid #1 (EF#1):

Weight (g) EF #1 = 20 (25-g. of filtrate)

14.3.6 Expel all air from the ZHE and pressurize to 5 to 10 psi. Place it in the rotary agitator and rotate for 18 +/- 2 hrs.

14.3.7 Express the aqueous leachate through the ZHE filter and collect. This filtrate plus the original filtrate (14.25) are collectively defined as the TCLP extract. If miscible, they are combined and analyzed. If immiscible, they are analyzed separately and the results are combined mathematically as in Section 14.2.

14.3.8 Rotate ZHE extractor every time which is used for Blank Extraction.

14.3.9 If the waste contains no initial liquid phase (100% solids) then use syringe to collect final extract and discard the first 5 mL of liquid expressed from the device.

14.3.10 If a waste contains initial liquid phase, then use TEDLAR bags to collect initial and final liquid extract to combine.

14.3 Particle Size Determination

14.4.1 Using the solid portion of the waste, evaluate the solid for particle size.

14.4.2 Particle size reduction is required, unless the solid has a surface area per gram of material equal to or greater than 3.1 cm2, or is smaller than 1 cm in its narrowest dimension (i.e., is capable of passing through a 9.5 mm (0.375 inch) standard sieve).

14.4.3 If the surface area is smaller or the particle size larger than described above, prepare the solid portion of the waste for extraction by crushing, cutting, or grinding the waste to a surface area or particle size as described above.

14.4.4 If the solids are prepared for organic volatiles extraction, special precautions must be taken.

14.4.5 Surface area criteria are meant for filamentous (e.g., paper, cloth, and similar) waste materials. Actual measurement of surface area is not required, nor is it recommended.

14.4.6 For materials that do not obviously meet the criteria, sample specific methods would need to be developed and employed to measure the surface area. Such methodology is currently not available.

14.4.7 If we use sieve to check the particle size, first clean sieve and then pass TCLP fluid thought it and this TCLP fluid will be uses as TCLB blank for that batch.

14.5 TCLP Extractor and ZHE Extractor RPM Check

14.5.1 Measure RPM of TCLP Extractor and ZHE Extractor once every quarter. If there is any major maintenance performed on TCLP Extractor and ZHE Extractor then measure RPM again before using it for sample extraction.

14.5.2 Measure RPM of TCLP Extractor and ZHE Extractor when it is fully loaded with samples.

14.5.3 The RPM must meet requirement of 30 ± 2.

15. Calculations

15.1 Calculate results as per the specific method.

16. Method Performance

16.1 NA

17. Pollution Prevention

17.1 Use amount of chemicals as required. Do not make large quantities of solutions.
17.2 Use the hood when working with strong chemicals or fumes.
17.3 Keep the work area clean and clutter free to avoid any mishaps.

18. Data Assessment and Criteria for QC

18.1 Follow QC Criteria as per the individual analysis method SOP respectively.

19. Corrective Actions for Out-of-Control Data

19.1 Follow QC Criteria as per the individual analysis method SOP respectively.

20. Contingencies for Handling Out-of-Control and Unacceptable Data

20.1 When all the above mentioned (Section 19) corrective measures have been taken and data remain outside the QA criteria set forth above, immediately contact your supervisor.
20.2 Document the situation clearly in your laboratory notebook and place a copy of the information in the case narrative of the final data report.
20.3 The supervisor must contact the QA/QC Director, Laboratory Manager, and Technical Director and notify them of the situation.
20.4 A corrective action plan must be developed in order to solve the problem.

21. Waste Management

21.1 Keep sample for 180 days after analysis and dispose of them according to the procedures explained in the SOP for waste disposal.

22. References

22.1 Test Method for Evaluating Solid Wastes, SW 846, 3 rd Edition, Method 1311, Revision 0, July 1992 - Toxicity Characteristics Leaching Procedure Federal Register, Volume 57, No. 227, 55114-55117.

23. Tables, appendix, attachments

23.1 TCLP Extraction Log

Appendix

CHEMTECH **TCLP EXTRACTION LOGPAGE** PB135316

SOP ID :	M1311-TCLP-12		
SDG No :	N/A	**Start Prep Date :** 03/23/2021 **Time :**	16:40
Weigh By :	JP	**End Prep Date :** 03/24/2021 **Time :**	09:25
Balance ID :	WC SC-4	**Combination Ratio :**	20
pH Meter ID :	WC PH METER-1	**ZHE Cleaning Batch :**	N/A
Extraction By :	JP	**Initial Room Temperature:**	22 °C
Filter By :	JP	**Final Room Temperature:**	22 °C
Pippete ID :	WC	**TCLP Technician Signature :**	JP
Tumbler ID :	T-1	**Supervisor By :**	
TCLP Filter ID :	113075		

Standared Name	MLS USED	STD REF. # FROM LOG
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Chemical Used	ML/SAMPLE US	Lot Number
TCLP-FLUID-1	N/A	WP88876
HCL-TCLP,1N	N/A	WP88878
HNO3-TCLP,1N	N/A	WP88879
pH Strips	N/A	W1931,W1934,W2755,W2350
pH Strips	N/A	W1937,W1938,W1939,W1940,W1941,W1942.
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Extraction Conformance/Non-Conformance Comments:

Matrix spikes are added after fitration and preservation. M1730-03 IS USED FOR MS-MSD. TUMBLER T-1 CHECKED,30 RPM. M1772-02 ,M1776-03 BOTH SAMPLES ARE OIL SAMPLES, SO NO FLUID DETERMATION.

Date / Time	Received By	Relinquished By	Location
03/24/21 10:00	D.T.	JP	DOA Dig.
	Analysis Group	Preparation Group	

Appendix

CHEMTECH

TCLP EXTRACTION LOGPAGE PB135316

Sample ID	ClientID	TCLP Vessel ID	Sample Wt (g)	Volume Extraction Fluid #1 (mL)	Multi phasic	Phase Miscible	Phases Combined	Final Leachate PH	Metals Leachate Adj. PH	Prep Pos
M1730-03	TP-8A	01	100.03	2000	N/A	N/A	N/A	5.5	1.5	T-1
M1771-05	COMP-SOIL-323	02	100.01	2000	N/A	N/A	N/A	7.2	1.0	T-1
M1772-01	DRUM-1-2-COMP	03	100.03	2000	N/A	N/A	N/A	5.0	1.5	T-1
M1772-02	550026646	N/A	N/A	N/A	N/A	N/A	N/A	4.5	1.0	N/A
M1776-01	110	04	100.02	2000	N/A	N/A	N/A	4.0	1.5	T-1
M1776-03	106	N/A	N/A	N/A	N/A	N/A	N/A	4.0	1.0	N/A
M1777-01	244	05	100.02	2000	N/A	N/A	N/A	4.5	1.5	T-1
M1777-02	248-250	06	100.01	2000	N/A	N/A	N/A	4.0	1.0	T-1
PB135316TB	LEB316	07	N/A	2000	N/A	N/A	N/A	4.93	1.5	T-1

Page 2 of 4

Appendix

CHEMTECH **TCLP Solid Determination** PB135316

SampleID	ClientID	Sample Weight (g)	Filter Weight (g)	Filtrate (mL)	Filter + Solid (After 100°C)	% solids	% Dry Solids
M1730-03	TP-8A	100.02	0.60	0	N/A	100	N/A
M1771-05	COMP-SOIL-323	100.01	0.61	0	N/A	100	N/A
M1772-01	DRUM-1-2-COMP	100.03	0.60	0	N/A	100	N/A
M1772-02	550026646	N/A	N/A	N/A	N/A	<0.5	N/A
M1776-01	110	100.00	0.59	0	N/A	100	N/A
M1776-03	106	N/A	N/A	N/A	N/A	<0.5	N/A
M1777-01	244	100.02	0.60	0	N/A	100	N/A
M1777-02	248-250	100.01	0.62	0	N/A	100	N/A
PB135316TB	LEB316	N/A	N/A	N/A	N/A	N/A	N/A

Appendix

CHEMTECH

TCLP Fluid Determination PB135316

Hot Block ID : WC SC-1/WC S-2 **Thermometer ID :** FLASHPOINT

SampleID	ClientID	Sample Weight (g)	Volume DI Water (mL)	PH after 5 min stir	PH after 10 min stir	Extraction Fluid 1 or 2	pH Extraction Fluid
M1730-03	TP-8A	5.02	96.5	7.2	2.0	#1	4.93
M1771-05	COMP-SOIL-323	5.03	96.5	9.0	3.5	#1	4.93
M1772-01	DRUM-1-2-COMP	5.01	96.5	6.0	1.5	#1	4.93
M1772-02	550026646	N/A	N/A	N/A	N/A	N/A	N/A
M1776-01	110	5.03	96.5	5.6	2.0	#1	4.93
M1776-03	106	N/A	N/A	N/A	N/A	N/A	N/A
M1777-01	244	5.01	96.5	5.6	1.5	#1	4.93
M1777-02	248-250	5.02	96.5	5.5	2.0	#1	4.93
PB135316TB	LEB316	N/A	N/A	N/A	N/A	#1	4.93

Page 4 of 4

CHEMTECH 284 Sheffield Street, Mountainside, NJ 07092 (908) 789-8900

READ RECEIPT

Employee Name: _____

Department: _____

_____ **M1311-TCLP** _____
Method or Document Read (Include Title, Number, Revision, as applicable)

Employee Statement: I have read and understood the information in the above mentioned method or document.

_____ _____
Employee Signature Date

Supervisory Statement: I have reviewed this document or method with the employee.

_____ _____
Supervisor Signature Date

Note: This receipt is to be returned to the Quality Assurance/Quality Control Department for incorporation into employee training record files. If you have questions or would like to review your train record files, please see QA/QC Director.

QA Control Code: A2040051

SOP Name:	Determination of Hexavalent Chromium in Soil by Method 3060A and Method 7196A
SOP ID:	M3060A,7196A-Hex.Chromium
Revision #:	25
Date Created:	January 29, 2002
Effective Date:	February 16, 2021
Reason for Revision:	NJDEP Audit 2020 finding
Supercedes:	M3060A,7196A -Hex.Chromium-24

Approvals:

Analyst	Date
Supervisor	Date
QA/QC Director	Date
Technical Director	Date

HEXAVALENT CHROMIUM

1. Test Method

1.1 Determination of Hexavalent Chromium in soil and water samples by SW-846 Method 3060A and Method 7196A.

2. Applicable Matrices

2.1 Soil, water

3. Reporting Limit

3.1 0.4 mg/kg, 0.01mg/L

4. Scope and Application

4.1 Method 3060A is an alkaline digestion procedure for extracting hexavalent chromium [Cr(VI)] from soluble, adsorbed, and precipitated forms of chromium compounds in soils, sludges, sediments, and similar waste materials

4.2 The addition of Mg2+ in a phosphate buffer to the alkaline solution has been shown to suppress oxidation from Cr3+ to Cr6+

4.3 The accuracy of the extraction procedure is assessed using spike recovery data for soluble and insoluble forms of Cr(VI) (e.g., K Cr O and PbCrO) coupled with measurement of soil properties such as oxidation reduction potential (ORP), and pH to see the potential for the soil to maintain a Cr(VI) spike during digestion.

4.4 The quantification of Cr(VI) in Method 3060A digests and in any other ground waters should be performed using Method 7196A (colorimetrically by spectrophotometry)

5. Summary

5.1 Approximately 2.5g of sample is digested at 90 – 95 °C with 3%sodium carbonate, 2%sodium hydroxide solution (0.28M Na2CO3 /0.5M NaOH solution) to dissolve all hexavalent chromium and to protect it from reduction to trivalent chromium.

5.2 After filtration and pH adjustment, diphenylcarbazide is added to a portion of the filtrate, and the resulting color is read on a spectrophotometer at 540nm.

5.3 A second pH adjusted portion is also read at 540nm, and serves as a correction for sample color and/or turbidity.

5.4 Dissolved hexavalent chromium is determined colorimetrically by reaction with diphenylcarbazide in acid solution. A red-violet color of unknown composition is produced.

6. Definitions

6.1 Analyst: the designated individual who performs the “hands-on” analytical methods and associated techniques and who is the one responsible for applying

required laboratory practices and other pertinent quality controls to meet the required level of quality.

6.2 Batch: Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents.

6.2.1 Preparation Batch: is composed of one to 20 environmental samples of the same matrix, meeting the above-mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours.

6.2.2 Analytical Batch: is composed of prepared environmental samples (extracts, digestates or concentrates), which are analyzed together as a group. An analytical batch can include prepared samples originating from various environmental matrices and can exceed 20 samples.

6.3 Blank: A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis the blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results.

6.4 Calibration: To determine, by measurement or comparison with a standard, the correct value of each scale reading on a meter, instrument, or other device. The levels of the applied calibration standard should bracket the range of planned or expected sample measurement.

6.5 Corrective Action: The action taken to eliminate the causes of an existing nonconformity, defect or other undesirable situation in order to prevent recurrence.

6.6 Detection Limit: The lowest concentration or amount of the target analyte that can be determined to be different from zero by a single measurement at a stated degree of confidence.

6.7 Duplicate Analyses: The analysis or measurements of the variable of interest performed identically on two sub-samples of the same sample. The results from duplicate analyses are used to evaluate analytical or measurement precision but not the precision of sampling, preservation or storage internal to the laboratory.

6.8 Holding Times (Maximum Allowable Holding Times): The maximum times that samples may be held prior to analysis and still be considered valid or not compromised.

6.9 Matrix Spike (spiked sample or fortified sample): A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

6.10 Method Blank: A sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest, which is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses.

6.11 Method Detection Limit: The minimum concentration of a substance (an analyte) that can be measured and reported with 99 % confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

6.12 Precision: The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms.

6.13 Preservation: Refrigeration and/or reagents added at the time of sample collection (or later) to maintain the chemical and/or biological integrity of the sample.

6.14 Pure Reagent Water: Water (defined by national or international standard) in which no target analytes or interferences are detected as required by the analytical method.

6.15 Range: The difference between the minimum and the maximum of a set of values.

6.16 Spike: A known mass of target analyte added to a blank sample or sub-sample, used to determine recovery efficiency or for other quality control purpose.

6.17 Standard: The document describing the elements of laboratory accreditation that has been developed and established within the consensus principles of NELAC and meets the approval requirements of NELAC procedures and policies.

6.18 Standard Operating Procedures (SOPs): A written document which details the method of an operating, analysis or action whose techniques and procedures are thoroughly prescribed and which is accepted as the method for performing certain routine or repetitive task.

6.19 Test Method: An adoption of a scientific technique for a specific measurement problem, as documented in a laboratory SOP.

7. Interferences

7.1 Hexavalent molybdenum and mercury salts also react to form color with the reagent; however, the red-violet intensities produced are much lower than those for chromium at the specified pH. Concentrations of up to 200 mg/L of molybdenum and mercury can be tolerated.

7.2 When analyzing a sample digest for total Cr(VI), it is appropriate to determine the reducing/oxidizing tendency of each sample matrix by additional parameters such as pH (Method 9045D) and Oxidation Reduction Potential (ORP) (ASTM Method D 1498-93 - aqueous samples). The ORP and temperature probes are inserted directly into the soil slurry and after equilibrating, measurement is recorded. Analysis of these additional parameters establishes the tendency of Cr(VI) to exist or not exist in the unspiked sample(s) and assists in the interpretation of QC data for matrix spike recoveries outside conventionally accepted criteria for total metals.

7.3 Vanadium interferes strongly, but concentrations up to 10 times that of chromium will not cause trouble.

7.4 Iron in concentrations greater than 1 mg/L may produce a yellow color, but the ferric iron color is not strong and difficulty is not normally encountered if the absorbance is measured photometrically at the appropriate wavelength.

7.5 To count the effect of the turbidity in the sample, an aliquot of the sample containing all reagents except diphenylcarbazide should be prepared and used to correct the sample for turbidity (i.e., a turbidity blank).
7.6 reducing/oxidizing tendency of the sample could affect the extraction recovery of the hexavalent chromium so appropriate to determine pH an ORP to evaluate the tendency and record (as a graph) with each Matrix spike data.
7.7 For waste materials or soils containing soluble Cr(III) concentrations greater than four times the laboratory Cr(VI) reporting limit, Cr(VI) results obtained using this method may be biased high due to method-induced oxidation. The addition of Mg2+ in a phosphate buffer to the alkaline extraction solution has been shown to suppress this oxidation.

8. Safety

8.1 Wear appropriate safety clothing and eye protection.
8.2 Use protective gloves when handling corrosive chemicals.
8.3 Always use safety carts when transporting large bottles of chemicals.
8.4 Read material safety data sheet (MSDS) for the chemicals used in the laboratory for the identity of the ingredients, the physical and chemical characteristics of the substance, the physical hazards, and safe handling and safety precautions.

9. Equipment and Supplies

9.1 Spectrophotometer Hach DR3900 (540 nm) & 1 cm cuvettes
9.2 Stirring hot plate
9.3 pH meter
9.4 Beakers- various
9.5 Volumetric flasks
9.6 Pipettes
9.7 Balance
9.8 Filtration apparatus & filters (0.45u)

10. Reagents and Standards

10.1 Distilled water – Distilled and de-ionized water
10.2 Stock Chromium Solution, 50ppm: Dissolve 141.4 mg dried $K_2Cr_2O_7$ in deionized water and dilute to 1000 ml in volumetric flask.
10.3 Stock Chromium Solution, 50ppm (2nd Source): Dissolve 141.4 mg dried K2Cr2O7 (other than lot# used in section 10.2) in deionized water and dilute to 1000 ml in volumetric flask.
10.4 Intermediate Chromium standard solution, 5ppm: Dilute 10mL of Stock Chromium solution (see 10.2) into 100mL Final concentration 5mg/L.
10.5 Diphenylcarbazide solution: Dissolve 250 mg 1,5-Diphenylcarbazide in 50 ml acetone. Store in a brown bottle and prepare this solution every week.
10.6 Sulfuric acid, 5N: Add 140mL conc. H2SO4 to DI water and make final volume 1000ml with DI water.

10.7 Digestion solution: Dissolve 80g of NaOH and 120g of Na2CO3 in distilled water in a volumetric flask and make volume to 4L. Prepare Monthly and Store the solution in a tightly capped polyethylene bottle at 20-25oC. Check the pH before using. The ph should be 11.5 or greater. If not discard and prepare the solution again.

10.8 Add 320ml Conc Nitric Acid into DI water and make final volume 1000ml with DI water. Store at 20-25oC in the dark.

10.9 Phosphate Buffer (1 M): Add 87.09 g K_2HPO_4 and 68.04 g KH_2PO_4 and make final volume 1L with DI water.

10.10 Insoluble spike: Add 0.02g Lead Chromate $PbCrO_4$.

10.11 Magnesium Chloride, analytical reagent grade. Store at 20-25°C in a tightly sealed container.

10.12 Ammonium sulfate buffer for preservation – Dissolve 165g of Ammonium sulfate and 32.5ml ammonium hydroxide into final volume of 500ml DI water.

11. Sample Collection, Shipment, and Storage

11.1 Refrigerate the samples at 4°C.

11.2 Holding time is 24 hours for unpreserved water samples and if preserved with Ammonium sulfate then it is extended to 28 days.

12. Quality Control

12.1 Preparation Blank

12.1.1 Analyze a minimum of one blank daily or for every batch of 20 or fewer samples, whichever is more frequent.

12.2 Duplicate Sample

12.2.1 Run one duplicate sample daily or for every batch of 20 or fewer samples, whichever is more frequent.

12.3 Laboratory Control Sample

12.3.1 Run one LCS daily with every batch of 20 or fewer samples, whichever is more frequent. Since none are commercially available for hexavalent chromium, this is prepared with reagents and spiked with a second source standard.

12.4 Pre-Digestion Matrix Spike

12.4.1 Run one pre-digestion matrix spike daily or every 20 or fewer samples, whichever is more frequent. Prepare 40mg/Kg spike by adding 2mL 50ppm spike solution to 50mL digestion solution, bring volume to 100mL with DI water after digestion.

12.4.1 Dilute 2X to analyze within calibration range.

12.4.2 After filtration of pre-digestion MS sample, remaining solids and filter paper are saved for analysis in case of low recovery. Stored filtered solid at 4±2°C.

12.5 Post Digestion Matrix Spike (for soil samples)

12.5.1 Run one post digestion matrix spike daily or for every batch of 20 or fewer samples, whichever is more frequent. Prepare 40mg/Kg spike by adding

2mL 50ppm spike solution to 100mL DI water + 2.5g sample after digestion.

12.5.2 Dilute 2X to analyze within calibration range.

Note: More frequent matrix spikes must be analyzed if the soil characteristics within the analytical batch appear to have significant variability based on visual observation.

12.6 Insoluble Matrix Spike (for soil samples)

12.6.1 Run one Insoluble matrix spike daily or for every batch of 20 or fewer samples, whichever is more frequent. Add 20mg Lead Chromate into 2.5g sample.

12.6.2 Dilute 40X to analyze within calibration range.

12.7 Initial Calibration Verification

12.7.1 Analyze a second source standard immediately after the initial calibration standards.

12.8 Limit of Detection (LOD)

12.8.1 Verify established LOD by spiking a clean matrix at the established LOD concentration.

12.8.2 MDL spike is 0.005ppm – dilute 0.1ml of 5ppm intermediate std (as in 10.4) to final volume 100ml with DI water.

12.8.3 LOD is specific to each combination of analyte, matrix, method (including sample preparation) and instrument configuration.

12.8.4 Refer SOP P203-Laboratory limits and demonstration of capability for Method Detection Limit procedure.

12.9 Limit of Quantitation (LOQ)

12.9.1 LOQ must be greater than the LOD.

12.9.2 LOQ spike 0.01ppm - dilute 0.2ml of 5ppm intermediate std (as in 10.4) to final volume 100ml with DI water.

12.9.3 LOQ must be verified quarterly for each quality system matrix, method and analyte, by analyzing QC sample containing the analyte in each quality system matrix.

12.9.4 LOQ must be performed and verified if the method is modified.

12.10 Reporting Limit Check

12.10.1 RL Check Standard 0.01ppm - dilute 0.2ml of 5ppm intermediate std (as in 10.4) to final volume 100ml with DI water.

12.10.2 RL Check Standard must be verified after each calibration.

13. Calibration and Standardization

13.1 Prepare a series of standards in 100ml volumetric flasks (*standard concentrations may vary)

13.2 For Soil samples analysis – Initial Calibration standards, Initial Calibration Verification (ICVs), Continuing Calibration Verification (CCVs) & Calibration Blanks (ICB/CCBs) must be digested same as soil samples. Please refer section 14.1 for preparation.

13.3 Initial Calibration standards.

Cr^{+6} mg/L*	Amount added standard solution to 100 ml flask
0.0	0.0
0.01	0.2mL of 5.0 mg/L standard
0.025	0.5mL of 5.0 mg/L standard
0.05	1.0ml of 5.0 mg/L standard
0.1	0.2ml of 50.0 mg/L standard
0.5 / CCV	1.0ml of 50.0 mg/L standard
1.0	2.0ml of 50.0 mg/L standard

13.3.1 Correlation coefficient must be ≥ 0.995.

13.3.2 Calculate and check Relative Error (%RE) for Low and mid calibration points, should agree within 30% and 10% respectively. Refer section 15.3 for %RE calculation.

13.4 Initial Calibration Verification (ICV)

Cr^{+6} mg/L*	Amount added of 50 mg/L solution to 100 ml flask
0.5	1.0mL

13.5 Run a CCV every 10 samples and at the beginning and end of the sequence.

13.6 Analyze a reference blank (reagent water), before beginning standards or sample analysis for blank subtraction.

13.7 Analyze a second source standard (Initial Calibration Verification standard) immediately after the initial calibration standards.

14. Procedure

14.1 Soil Samples:

14.1.1 Take 5-10g sample in a disposable pan.

14.1.2 Mix the sample thoroughly with a spatula or equivalent tool, especially composite samples. Remove twigs, rocks, leaves and other foreign particles. Mix the sample with the spatula and take representative sample for analysis.

14.1.3 Weigh 2.5g ± 0.1g of well mixed sample and for standards (Calibration, CCVs, ICVs and ICB/CCBs) spike appropriate amount at this time as per section 13.3 & 13.4.

14.1.4 Add 0.5mL of 1M phosphate buffer.

14.1.5 Add a pinch (Approx. 0.4g) of Magnesium Chloride.

14.1.6 Add 50ml of alkaline digestion solution and heat to near boiling with constant stirring for 60min (on stirring hot plate). Maintain digestion temperature 90-95 °C and record the temperature with start and with end time.

14.1.7 Cool with continuous agitation to room temperature, transfer the content to the filtration apparatus, rinsing the digestion vessel with 3 successive portions of DI water and transfer to the filtration apparatus. Filter through a 0.45um membrane filter. If the filter becomes clogged using the 0.45 µm filter paper, a larger size filter paper (Whatman GFB or GFF) may be used to prefilter the samples. Rinse the inside of the filter flask and filter pad with reagent water and transfer the filtrate and the rinses to a clean 250-mL vessel. The remaining solids and filter paper resulting from filtration of the matrix spike should be saved for possible use in assessing low Cr(VI) matrix spike recoveries as in 19.3.1. Store the filtered solid at 4 ± 2 °C.

14.1.8 Transfer filtrate to a beaker and using an appropriate stirring device with constant stirring add 5.0 M nitric acid dropwise to adjust the pH to 7.5 ± 0.5 using pH meter. If the pH of the digest should deviate from the desired range, discard the solution, and redigest. If overshooting the desired pH range occurs repeatedly, prepare diluted nitric acid solution and repeat digestion procedure

14.1.9 Remove the stirring device and rinse and collect the rinsate in the beaker and adjust the sample volume to 95mL with DI water, add 5N H_2SO_4 dropwise to adjust pH 2.0±0.5 using pH meter. Record pH.

14.1.10 make final volume to 100ml with DI water, spilt into two 50ml portions and add 1mL Diphenylcarbazide solution to one portion. Let stand 5 to 10 min for full color development.

14.1.11 Use a 1-cm absorption cell and measure its absorbance at 540 nm. Use reagent water as a reference by zeroing the spectrophotometer absorbance reading. Use one portion of the sample without diphenylcarbazide to take absorbance reading and subtract from the absorbance of colored portion for turbidity correction. From the corrected absorbance, determinethe mg/L of chromium present by reference to the calibration curve.

14.2 Water Samples:

14.2.1 Shake sample well to mix thoroughly and filter each sample through 0.45um filter.

14.2.2 Take 95mL of sample or standard aliquot

14.2.3 Add 5N H_2SO_4 dropwise to adjust pH 2.0+0.5 using pH meter.

14.2.4 make final volume to 100ml with DI water, spilt into two 50ml portions and add 1mL Diphenylcarbazide solution to one portion. Let stand 5 to 10 min for full color development.

14.2.5 Use a 1-cm absorption cell and read standards and samples after color development at 540nm. Use deionized water as a reference. Take absorbance readings for both without carbazide reagent added and with carbazide reagent added portions and calculate final absorbance difference by subtracting from previous reading of without carbazide reagent added portion for turbidity correction. From the corrected absorbance, determine the mg/L of chromium present by reference to the calibration curve.

15. Calculations

15.1 Hexavalent Chromium in Soil samples.

$$\text{Cr+6 (mg/kg)} = \frac{A \times D \times E}{B \times C}$$

Where: A = Concentration observed in the digest (mg/L)
B = Initial moist sample weight (g)
C = %Solids/100
D = Dilution Factor
E = Final Digest volume (mL)

15.2 Hexavalent Chromium in Water samples.

$$\text{Cr+6 (mg/L)} = A \times D$$

Where: A = Concentration observed (mg/L)
D = Dilution Factor

15.3 Relative error is calculated using the following equation:

$$\% \text{ Relative Error} = \frac{x'_i - x_i}{x_i} \times 100$$

x_i = True value for the calibration standard
x'_i = Measured concentration of the calibration standard

16. Method Performance

16.1 Precision and accuracy data are obtained for Hexavalent Chromium using laboratory fortified blank with hexavalent chromium concentration of 0.5 mg/L.

16.2

17. Pollution Prevention

17.1 Use amount of chemicals as required. Do not make large quantities of solutions.
17.2 Use the hood when working with strong chemicals or fumes.
17.3 Keep the work area clean and clutter free to avoid any mishaps.

18. Data Assessment and Criteria for QC

18.1 Preparation Blank
18.1.1 The value of blank must be < ½ RL
18.2 Duplicate Samples
18.2.1 If both the original and duplicate results are >4 x RL then control limits are ±20%.

18.3 Matrix Spike/Matrix Spike Duplicate Samples
18.3.1 The control limits are 90-111% recovery.
18.4 Predigestion and insoluble digestion Matrix Spike
18.4.1 The control limits are 75-125% recovery.
18.5 Post Digestion Matrix Spike
18.5.1 The control limits are 85-115% recovery.
18.6 Initial Calibration Verification
18.6.1 The control limits are 90-110% recovery.
18.7 Continuing Calibration Verification
18.7.1 The limits are 90-110% recovery.
18.8 Laboratory Control Sample
18.8.1 Water Matrix: For Regular & DoD Work, control limits are 90-111%
18.8.2 Soil Matrix: For Regular & DoD Work, control limits are 84-110%
18.9 Limit of Quantitation
18.9.1 Analysis must meet the acceptance criteria of 70-130%.
18.10 Reporting Limit Check Standard
18.10.1 Reporting Limit Check Standard result must meet an acceptance criteria of 50-150%.

19. Corrective Actions for Out-of-Control Data

19.1 Laboratory Reagent Blank
19.1.1 If the blank is above the ½ RL, the samples must be redigested and reanalyzed. No correction of results is performed.
19.1.2 If the blank is outside the limit, verify that there is no contamination.
19.1.3 Use fresh clean glassware.
19.1.4 Verify that the laboratory water is of good quality.
19.1.5 Prepare fresh reagents and standard if necessary.
19.2 Duplicate Sample: If duplicate sample is outside control limits:
19.2.1 Check technique (esp. homogeneity of sample)
19.2.2 Rerun duplicate.
19.2.3 If duplicate still fails - contact supervisor, technical director for assistance. Contact client.
19.3 Spike sample: If spike sample is outside control limits:
19.3.1 If pre-digestion and insoluble spike recoveries do not meet criteria, redigest and rerun entire batches. Alternatively, if low pre-digestion MS recoveries are obtained, then use the digested filtered solids from prior MS digestion to determine the total hexavalent chromium values. Difference in the total hexavalent chromium values for the original sample and the reanalyzed pre-digestion MS run should be approximately equal to the amount of spike added to the MS. Note all observations in the case narrative.
19.3.2 If spike still fails, perform the following procedure:
19.3.2.1 Measure the pH and oxidation-reduction potential.
19.3.2.2 Plot pH-Eh values on Figure 1 to determine the sample's oxidizing/reducing nature. If point falls below the curve, the soil

reduces Cr(VI), and low recovery would be expected. If the point lies above the curve, the sample is expected to support Cr(VI).

19.3.2.3 If the sample is reducing for Cr(VI), perform TOC, Sulfide, and Fe(II) if the unspiked sample contains Cr(VI).

19.3.2.4 If the sample is oxidizing, then extraction should be repeated along with pH and Eh measurements.

19.4 Initial Calibration Verification: If the ICV is outside of control limits:

19.4.1 Correct the problem and verify the second source standard.

19.4.2 Rerun ICV.

19.4.3 If rerun fails, correct problem and repeat calibration.

19.4.4 Rerun all samples since the last successful calibration.

19.5 Continuing Calibration Verification: If the CCV fails:

19.5.1 Correct the problem and rerun CCV.

19.5.2 If rerun fails, correct problem and repeat calibration.

19.5.2 Rerun all samples since the last successful calibration verification.

19.6 Laboratory Control Sample: If the LCS fails:

19.6.1 Correct the problem.

19.6.2 Reprep and rerun the LCS and all samples in the associated prep batch.

19.6.3 If it is not possible to reprep and rerun the samples and the associated QC, then apply Q flag in all sample results in the associated prep batch.

19.8 Limit of Quantitation

19.8.1 Reevaluate the LOQ, if outside the acceptance limit of 70-130%.

19.9 Reporting Limit Check Standard

19.9.1 Rerun RL Check standard.

19.9.2 If rerun fails, correct the problem and repeat calibration.

20. Contingencies for Handling Out-of-Control and Unacceptable Data

20.1 When all the above mentioned (Section 19) corrective measures have been taken and data remain outside the QA criteria set forth above, immediately contact your supervisor.

20.2 Document the situation clearly in your laboratory notebook and place a copy of the information in the case narrative of the final data report.

20.3 The supervisor must contact the QA/QC Director, Laboratory Manager, and Technical Director and notify them of the situation.

20.4 A corrective action plan must be developed in order to solve the problem.

21. Waste Management

21.1 Keep sample for 180 days after analysis and dispose of them according to the procedures explained in the SOP for waste disposal.

22. References

22.1 EPA Test Methods for Evaluating Solid Waste, SW 846, Method 3060A (Revision 1, December 1996) and Method 7196A (Revision 1, July 1992).

22.2 Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.3 2019.

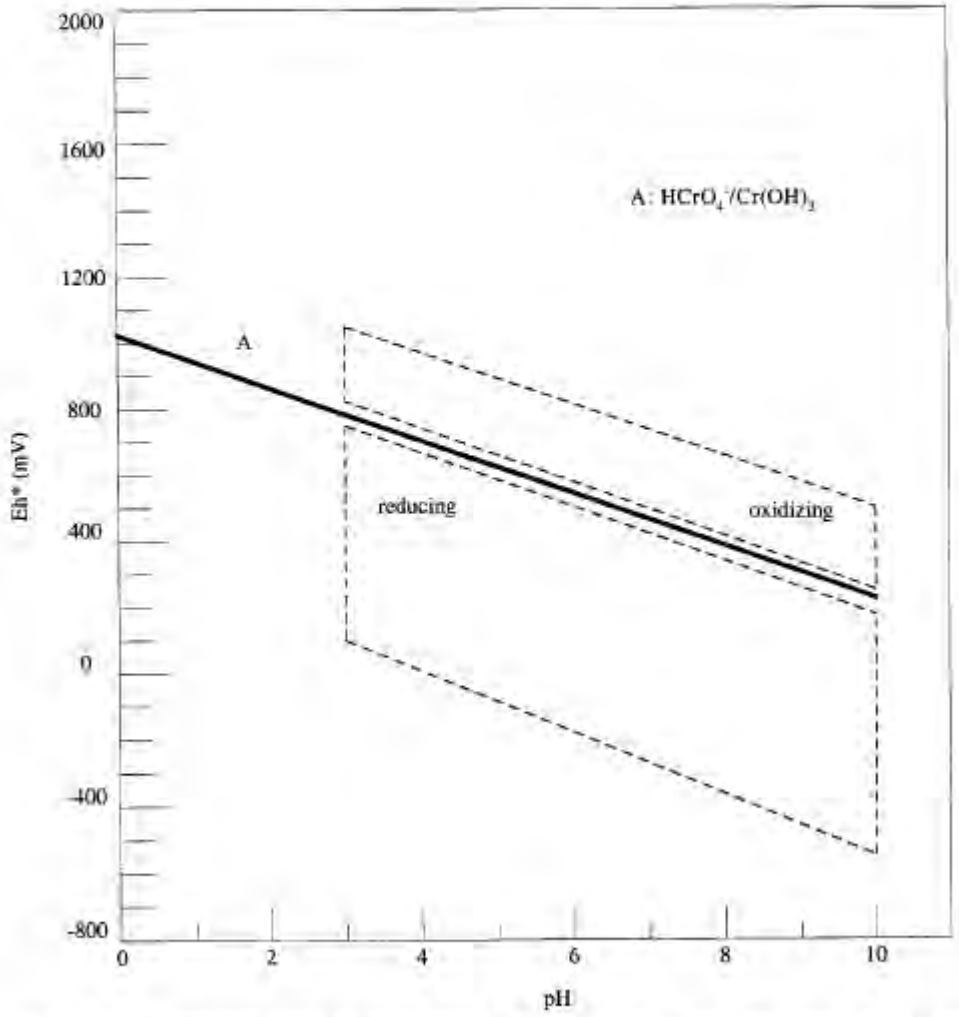
23. List of Tables, Appendix, Attachments

23.1 Appendix A: Eh/pH Phase Diagram

Appendix A

FIGURE 2
Eh/pH PHASE DIAGRAM

The dashed lines define Eh-pH boundaries commonly encountered in soils and sediments



* Note the Eh values plotted on this diagram are corrected for the reference electrode voltage: 244 mV units must be added to the measured value when a separate calomel electrode is used, or 199 mV units must be added if a combination platinum electrode is used.

CHEMTECH 284 Sheffield Street, Mountainside, NJ 07092 (908) 789-8900

READ RECEIPT

Employee Name: _____

Department: _____

_____ **M3060A,7196A-Hex.Chromium**_____
Method or Document Read (Include Title, Number, Revision, as applicable)

Employee Statement: I have read and understood the information in the above mentioned method or document.

_____ _____
Employee Signature Date

Supervisory Statement: I have reviewed this document or method with the employee.

_____ _____
Supervisor Signature Date

Note: This receipt is to be returned to the Quality Assurance/Quality Control Department for incorporation into employee training record files. If you have questions or would like to review your train record files, please see QA/QC Director.

QA Control Code: A2040091

SOP Name:	Trace Elemental Analysis by Inductively Coupled Plasma-Atomic Emission Spectrometric Method
SOP ID:	M6010D-Trace Elements
Revision #:	28
Date Created:	April 9, 2002
Effective Date:	January 26, 2021
Reason for Revision:	NJDEP Audit 2020 Findings
Supercedes:	M6010D-Trace Elements-27

Approvals:

_____	_____
Analyst	Date
_____	_____
Supervisor	Date
_____	_____
QA/QC Director	Date
_____	_____
Technical Director	Date

TRACE ELEMENTAL ANALYSIS BY INDUCTIVELY COUPLED PLASMA – ATOMIC EMMISION SPECTROMETRIC METHOD

1. Test Method

1.1 Determination of trace metals in water, wastewater, sediments, sludges, and soils by inductively coupled plasma (ICP) atomic emission spectrometry using USEPA Test Methods 6010D.

2. Applicable Matrices

2.1 Fresh (surface and ground) water and wastewater

2.2 Sediments, sludges, and soils

3. Reporting Limits

3.1 Appendix B gives the Laboratory Reporting Limits

4. Scope and Application

4.1 This method is utilized for the determination of dissolved, suspended, total, and total recoverable trace elements in surface water and domestic and industrial wastewaters by the method of ICP atomic emission spectrometry.

4.2 This method is also utilized for the determination of total metals in sediments, sludges and soil samples in addition to TCLP leachates by the method of ICP atomic emission spectrometry.

4.3 Total elements are determined after appropriate mineral acid digestion procedure.

5. Summary of Method

5.1 This method describes the technique for the simultaneous multielement determination of trace elements in solution.

5.2 The basis of the method is the measurement of atomic emission by an optical spectroscopic technique.

5.3 Samples are nebulized and the aerosol that is produced is transported to the plasma torch where electron excitation occurs.

5.4 Characteristic atomic-line emission spectra are produced by a radio frequency inductively coupled plasma (ICP).

5.5 The spectra are dispersed by a grating spectrometer and the intensities of the line are monitored by photomultiplier tubes. The photocurrents from the 7 photomultiplier tubes are processed and controlled by a computer system.

5.6 Background correction technique is performed to compensate for variable background contribution to the determination of trace elements.

5.6.1 Background must be measured adjacent to analyte lines on samples during analysis.

5.6.2 The position selected for the background intensity measurement, on either or both sides of the analytical line, is determined by the complexity of the spectrum adjacent to the analyte line.

5.6.3 The position used is free of spectral interference and reflects the same change in background intensity as occurs at the analyte wavelength being measured.

5.6.4 Background correction is not performed in cases of line broadening where a background correction measurement would actually degrade the analytical result.

6. Definitions

6.1 Aliquot - A measured portion of a field sample, standard, or solution taken for sample preparation and/or analysis.

6.2 Analysis Date/Time - The date and military time (24-hour clock) of the introduction of the sample, standard, or blank into the analysis system.

6.3 Analyte - The element, ion, or parameter an analysis seeks to determine; the element of interest.

6.4 Analytical Sample - Any solution or media introduced into an instrument on which an analysis is performed, excluding instrument calibration, initial calibration verification (ICV), initial calibration blank (ICB), continuing calibration verification (CCV), continuing calibration blank (CCB), and tunes. Note the following are all defined as analytical sample: undiluted and diluted samples, matrix spike samples, duplicate samples, serial dilution samples, analytical spike samples, post-digestion spike samples, interference check samples (ICSs), Contract Required Quantitation Limit (CRQL) Check Standards (CRIs), Laboratory Fortified Blanks (LFBs) Laboratory control Samples (LCSs), performance Evaluation (PE) samples, Preparation Blanks (PBs), and Linear Range Samples (LRSs).

6.5 Analytical Sequence - The actual instrumental analysis of the samples from the time instrument calibration through the analysis of the final CCV or CCB.

6.6 Analytical Spike - A spike that is fortified just prior to analysis by adding a known quantity of the analyte to an aliquot of the prepared sample.

6.7 Background Correction - A technique to compensate for variable background contribution to the instrument signal in the determination of trace elements.

6.8 Batch - A group of sample designed to assess specific sources of contamination. See individual definitions for types of blanks.

6.9 Blank - An analytical sample designed to assess specific sources of using the same method.

6.10 Calibration - The establishment of an analytical curve based on the absorbance, emission intensity, or other measured characteristics of known standard. The calibration standards must be prepared using the same type of reagents or concentration of acids as used in the sample preparation.

6.11 Calibration Blank - A blank solution containing all of the reagents and in the same concentration as those used in the analytical sample preparation. This blank is not subjected to the preparation method.

6.12 Calibration Standards - A series of known standard solutions used by the analyst for calibration of the instrument (i.e., preparation of the analytical curve). The solutions may not be subjected to the preparation method but contain the same

matrix (i.e., the same amount of reagents and/or preservatives) as the sample preparations to be analyzed.

6.13 Contamination - A component of a sample or an extract that is not representative of the environmental source of the sample. Contamination may stem from other sample, sampling equipment, while in transit, from laboratory reagents laboratory environment, or analytical instruments.

6.14 Continuing Calibration Verification (CCV) - A single parameter or multi-parameter standard solution prepared by the analyst and used to verify the stability of the instrument calibration with time, and the instrument performance during the analysis of samples. The CCV can be one of the calibration standards. However, all parameters being measured by the particular system must be represented in this standard and the standard must have the same matrix (i.e., the same amount of reagents and/or preservatives) as the samples.

6.15 Contract Required Quantitation Limit (CRQL) Check Standard (CRI) - A single parameter or multi-parameter standard solution prepared at the CRQL and used to verify the instrument calibration at low levels.

6.16 Control Limits - A range within which specified measurement results must fall to be compliant. Control limits may be mandatory, requiring corrective action if exceeded, or advisory, requiring that noncompliant data be flagged.

6.17 Digestion Log - An official record of the sample preparation (digestion).

6.18 Dissolved Metals - Analyte elements in a water/aqueous sample that will pass through a 0.45 micrometer (um) filter.

6.19 Dry Weight - The weight of a sample based on percent solids. The weight obtained after drying in an oven.

6.20 Duplicate - A second aliquot of a sample that is treated the same as the original sample in order to determine the precision of the method.

6.21 Field Blank - This is any sample that is submitted from the field is an identified as blank. This includes trip blank, rinsates, equipment blanks, etc.

6.22 Field QC - Any Quality Control sample submitted form the field to the laboratory. Examples include, but are not limited to: field blanks, field duplicates, and field spikes.

6.23 Field Sample - A portion of material received for analysis that is contained in single or multiple containers and identified by a unique sample number.

6.24 Holding Time - The elapsed time expressed in days from the date of receipt of the sample by the Contractor until the date of its analysis. Holding time = (sample analysis date- sample receipt date)

6.25 Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES) – A technique for the simulation or sequential multi-element determination of elements in solution. The basis of the method is the measurement of atomic emission by an optical spectroscopic technique. Characteristic atomic line emission spectra are produced by excitation of the sample in a radio frequency inductively coupled plasma.

6.26 Initial Calibration - Analysis of analytical standards for a series of different specified concentrations; used to define the quantitative response, linearity, and dynamic range of the instrument to target analytes.

6.27 Initial Calibration Verification (ICV) – Solution (s) prepared from stock standard solutions, metals or salts obtained form a source separate from that utilized to prepare the calibration standards. The ICV is used to verify the concentration of the calibration standards and the adequacy of the instrument calibration. The ICV should be traceable to NIST or other certified standard source.

6.28 Interference Check Sample – A solution containing both interfering and analyte elements of known concentration that can be used to verify background and interelement correction factors.

6.29 Interferents – Substances that affect the analysis for the element/parameter o interest.

6.30 Laboratory Control Sample (LCS) – A control sample of known composition. Laboratory control samples are analyzed using the same sample preparation, reagents, and analytical methods employed for the samples received.

6.31 Linear Range, Linear Dynamic Range – The concentration range over which the instrument response remains linear.

6.32 Matrix – The predominant material of which the sample to be analyzed is composed.

6.33 Matrix Effect – In general, the effect of particular matrix constituents.

6.34 Matrix Spike – Aliquot of sample (water/aqueous or soil) fortified (spiked) with known quantities of specific compounds and subjected to the entire analytical procedure in order to indicate the appropriateness of the method for the matrix by measuring recovery.

6.35 Method Detection Limit (MDL) – The concentration of a target parameter that, when a sample is processed through the complete method, produces a signal with 99 percent probability that it is different from the blank. For 7 replicates of the sample, the mean value must be 3.14s above the blank, where "s" is the standard deviation of the 7 replicates.

6.36 Narrative (SDG Narrative) – Portion of the data package which includes laboratory, contract, Case, sample number identification, and descriptive documentation of any problems encountered in processing the samples, along with corrective action taken and problem resolution.

6.37 Percent Difference (% D) – As used in this SOW and elsewhere to compare tow values. The difference between the two values divided by one of the values.

6.38 Percent Solids (% S) – The proportion of solid in a soil sample determined by drying an aliquot of the sample.

6.39 Preparation Blank – An analytical control that contains reagent water and reagents, which is carried through the entire preparation and analytical procedure.

6.40 Preparation Log – An official record of the sample preparation (digestion, distillation, and extraction).

6.41 Reagent Water – The purity of this water must be equivalent to ASTM Type II reagent water of Specification D1193-77, "Standard Specification for Reagent Water".

6.42 Relative Percent Difference (RPD) – The relative percent difference is based on the mean of the two values, and is reported as an absolute value, i.e., always expressed as a positive number or zero.

6.43 Run – A continuous analytical sequence consisting of prepared samples and all associated Quality Assurance (QA) measurements. A run begins with the instrument calibration and is to be completed within a 24-hour period.

6.44 Sample – A portion of material to be analyzed that is contained in single or multiple containers and identified by a unique sample number.

6.45 Sensitivity – The slope of the analytical curve (i.e., functional relationship between instrument response and concentration).

6.46 Serial Dilution – The dilution of a sample by a factor of five. When corrected by the dilution factor, the diluted sample must agree with the original undiluted sample within specified limits. Serial dilution may reflect the influence of interferents.

6.47 Standard Analysis – An analytical determination made with known quantities of target analytes.

6.48 Stock Solutions – A standard solution that can be diluted to derive other standards.

7. Interferences

7.1 Spectral interferences can be categorized as follows:

a) Overlap of a spectral line from another element;

b) Unresolved overlap of molecular band spectra;

c) Background contribution from continuous or recombination phenomena; and

d) Background contribution from stray light from the line emission of high concentration elements.

7.1.1 These effects can be compensated by employment of interelement correction factors, selection of an alternate wavelength and/or application of background correction points adjacent to the analyte line.

7.2 Physical interferences are generally considered to be effects associated with sample nebulization and transport processes such as change in viscosity, surface tension, high dissolved solids and acid concentration.

7.2.1 If such interferences are encountered, sample dilution may be performed. Additionally, when the presence of high dissolved solids is suspected, acidified Type II water is analyzed before and after each sample of the sample batch in order to reduce the potential for salt build up on the nebulizer tip.

7.3 Chemical interferences are not pronounced using inductively coupled plasma technique. However, if these interferences become a problem, instrument optimization in the form of power level adjustment and/or torch height adjustment is performed.

7.4 Any kind of interference is noted in the case narrative.

8. Safety

8.1 The toxicity and carcinogenity of each reagent used in this method has not been fully established. Each chemical should be regarded as a potential health hazard and exposure to these compounds should be minimized.

8.2 Always wear safety glasses for eye protection when working with these reagents.
8.3 use protective gloves when handling the chemicals.

9. Equipment and Supplies

9.1 Thermo Scientific ICAP 6000 series ICP Spectrometer
9.2 Instrument Software: Thermo Iteva-Analyst (Version:9.9.2),
9.3 50 mL tubes
9.4 Class A volumetric pipettes 1-100mL
9.5 Eppendorf Pipettes 10-1000uL
9.6 Analytical Balance - VWR G400 - DO
9.7 Argon Gas (99.998% pure)
9.8 Nitrogen Gas (99.998% pure)
9.9 4-oz plastic bottles
9.10 Thermospec Software Version 6.20 from TJA
9.11 pH paper (pH Hydrion range 0-2.5)
9.12 Class A volumetric flasks (10mL-1000mL)

10. Reagents and Standards

10.1 Concentrated Nitric Acid (Instra Analyzed)
10.2 1:1 Hydrochloric Acid (Instra Analyzed)*
10.3 1:1 Nitric Acid (Instra Analyzed)*
10.4 Type II water (DI water)
10.5 See Table Appendix A for standards information.
*(Add 500 mL of conc. acid to 400 mL Type II water and dilute to 1 L)
10.6 Concentrated Hydrochloric acid
10.7 Internal standard: 10000ug/mL Yttrium in 2% HNO3 (v/v), 10000ug/mL Indium in 5% (v/v) HNO3
10.7.1 Add 1mL 10000ug/L Yttrium and 10mL 10000ug/mL Indium standard to 20mL conc. HNO_3, make final volume to 2000mL.

11. Sample Handling and Preservation

Matrix	Container Type	Preservative
Water	Glass or Polyethylene	HNO_3 to pH <2
Sediment/Sludge/Soil	Glass or Polyethylene	Maintain at 4C ±2°C
Holding times	180 days	

12. Quality Control

12.1 Calibration
12.1.1 Calibrate the instrument every 24 hours prior to each analytical run.
12.1.2 Indicate the date and time of calibration on the raw data.
12.1.3 Perform standardization for all of the elements.
12.1.4 Perform a zero standard (S0) and minimum five (5) non-zero standard for calibration. (see section 14.3)
12.2 Initial Calibration Verification (ICV)

12.2.1 Conduct an ICV on an independent quality control standard from a second source after each initial calibration.
12.2.2 Run ICV near mid-level concentration..
12.2.3 Analyze the ICV in order to verify the instrument calibration.

12.3 Initial Calibration Blank (ICB)
12.3.1 Analyze an ICB immediately following the ICV at each element wavelength used for analysis.

12.4 Interference Check Sample (ICS)
12.4.1 Analyze an ICS solution (consisting of the interferents and analyte elements) in order to assess the interelement interferences.
12.4.2 Run this solution at all wavelengths used for each analyte for a given analytical run.
12.4.3 Analyze the ICS solution at the beginning of the analytical run.
12.4.4 See *Appendix A* for details pertaining to the preparation of this solution.

12.5 Continuing Calibration Verification (CCV)
12.5.1 Prepare the CCV by using the same standards used for calibration at a concentration near the mid-point of the calibration curve.
12.5.2 In addition, for Method 6010D & DOD, prepare a low-level continuing calibration verification (LLCCV) standard at the lower limit of quantitation (this is the same as CRI standard).
12.5.3 Analyze the CCV at the beginning of the run, every 10 samples and after the last analytical sample.
12.5.4 For Method 6010D & DOD, analyze LLCCV daily before analyzing samples.

12.6 Continuing Calibration Blank (CCB)
12.6.1 Analyze the CCB immediately following the CCV.

12.7 Preparation Blank (PB)
12.7.1 Process one PB consisting of clean quality matrix sample through the sample preparation and analysis procedure for each sample batch.

12.8 Laboratory Control Sample
12.8.1 Analyze LCSs for each analyte using the same sample preparations, analytical methods and QA/QC procedures employed for the samples received except field blank.
12.8.2 Use the solutions # WW-LFS-1 and # WW-LFS-2 (see Table 5) to prepare the LCS for Method 6010D.
12.8.3 Prepare one LCS for each sample batch and/or matrix.

12.9 Spike Sample Analysis (S)
12.9.1 Perform at least one spike and spike duplicate sample analysis on each group of samples of a similar matrix.
12.9.2 Analyze these spiked samples at a frequency of 20 samples or per digestion batch or per matrix.
12.9.3 Add the spike to the sample prior to any reagent addition or digestion.
12.9.4 If the spike analysis is performed on the same sample that is chosen for the duplicate analysis, perform spike calculations using the result of the sample designated as the original sample.

12.9.5 Field blanks are not used for spiked sample analysis.

12.9.6 Perform Post Digestion Spike addition when MS/MSD recovery is not within control limits.

12.9.6 For DOD work- Perform Post Digestion Spike addition when MS/MSD recovery is not within control limits.

12.10 Duplicate Sample Analysis (D)

12.10.1 Analyze one duplicate sample from each group of samples of a similar matrix type in each sample batch.

12.10.2 Analyze duplicate samples at a minimum frequency of 20 samples or per digestion batch or per matrix. Do not average duplicate sample results.

12.10.3 Do not use field blanks for duplicate sample analysis is performed for each method employed.

12.11 ICP Serial Dilution Analysis (L)

12.11.1 Perform the ICP Serial Dilution Analysis on a sample from each group of samples of a similar matrix and for each sample batch.

12.12 Linear Range Analysis

12.12.1 Samples having concentrations exceed the calibration range should be diluted into calibration range.

12.12.2 Use highest calibration standard as Linear Dynamic Range.

12.13 Interelement Corrections

12.13.1 Determine, semi-annually for Method 6010D analysis, the correction factors for spectral interferences due to Al, Ca, Fe, and Mg for all wavelengths used for each analyte reported.

12.13.2 Program these and any other correction factors determined for other interfering elements into the computer's interelement correction routine at this time.

12.13.3 Update the factors as needed when changes in instrument conditions make it necessary.

12.13.4 Once correction factors are entered into instrument software, a single elements must be analyzed to confirm the validity of the correction factors

12.14 Reporting Level Standard CRI and Low Level QC standard (LLQC), LLOQ

12.14.1 Run a reporting level standard or CRI at the beginning of every calibration. Run LLQC standard, prepared in the same manner as the CRI standard at the reporting level concentration and processed through the preparation and analytical procedures quarterly.

12.14.2 For 6010D, Lower Limit of Quantitation Check Standard (LLOQ) is the lowest concentration in the calibration curve. It needs to be initially verified by the analysis of at least 7 replicate samples, spiked at LLOQ and processed through all preparation and analysis steps of the method. Ongoing LLOQ verification, at a minimum, is on a quarterly basis to validate quantitation capability at low analyte concentration levels. LLOQ must be performed for both Water and Soil matrix

12.14.4 For **DOD** work - set the CRI at the required reporting level.

12.15 Method Detection Limit
- 12.15.1 Please refer to SOP P203-Laboratory limits and demonstration of capability for MDL procedure.

12.16 Limit of Detection (LOD)
- 12.16.1 Establish LOD by spiking a quality system matrix at approximately 1-4x detection limit for multiple analyte tests.
- 12.16.2 LOD is specific to each combination of analyte, matrix, method (including sample preparation) and instrument configuration.
- 12.16.3 LOD must be verified quarterly.
- 12.16.4 LOD must be verified on each instrument used, and every time the method is modified.

12.17 Limit of Quantitation (LOQ)
- 12.17.1 LOQ must be greater than the LOD.
- 12.17.2 LOQ must be verified quarterly for each quality system matrix, method and analyte, by analyzing QC sample containing the analytes of concern in each quality system matrix.
- 12.17.3 LOQ must be performed if the method is modified.

12.18 Instrument Detection Limit (IDL)
- 12.18.1 IDL study is performed once at initial set-up of the instrument and after significant change in instrument type, personnel, test method or sample matrix.
- 12.18.2 IDLs in µg/L can be estimated as the mean of the blank results plus three times the standard deviation of 10 replicate analyses of the reagent blank solution. (Use zero for the mean if the mean is negative).

13. Calibration and Standardization

13.1 Calibrate the instrument prior to each analytical run (for calibration standard levels refer to *Appendix A*).

13.2 Blank (S0): Use reagent blank as a calibration blank standard.

13.3 Calibration Standards (S): Use the ICP calibration standards available from Inorganic Ventures, Inc, or equivalent.

13.4 Run an initial calibration verification standard from a second source immediately after the calibration.(ICV) See section 17.

13.5 For **DOD** work: Calculate the linear regression.
- 13.5.1 The correlation coefficient must be > 0.995.
- 13.5.2 If the linear regression is not met recalibrate the instrument.

13.6 Use internal standard when calibrating the instrument and analyzing the samples.

14. Sample Preparation

14.1 Method 3010
- 14.1.1 By this method prepare waste samples for total metal determination. Determine the pH by using a narrow range pH paper.
- 14.1.2 Digest samples vigorously with nitric acid followed by dilution with Hydrochloric acid.
- 14.1.3 The method is applicable to aqueous samples, and TCLP extracts.

14.2 Method 3050

14.2.1 This method prepares waste samples for total metals determination.

14.2.2 Digest samples vigorously in nitric acid and hydrogen peroxide followed by dilution with either nitric or hydrochloric acid.

14.2.3 The method is applicable to soils, sludges, and solid waste samples.

Note: For details of sample preparation refer to M3010A-Metals Digestion SOP and M3050B-Metals Digestion SOP.

14.3 Analytical Run

A typical sequence in an analytical run for trace elements analysis is as follows (2 injections):

Initial Analytical Run

- STD-S0 (Blank)
- S1, S2, S3, S4, S5
- ICV (Initial Calibration Verification)
- ICB (Initial Calibration Blank)
- CRI
- ICSA
- ICSAB
- CCV
- LLCCV (For Method 6010D & DOD)
- CCB
- LLOQ (For Method 6010D & DOD)
- PBW or PBS (Preparation Blank W-Water or S-Soil)
- LCSS or LCSW (Laboratory Control Sample)
- 7 Samples
- CCV
- CCB

Continuing Analytical Run

- 10 samples

Note: Analyze a CCV, CCB every 10 samples.

14.4 Instrument Shutdown

14.4.1 When the sample analysis is complete, the instrument can be shutdown.

14.4.2 Press (ESC) then (Enter).

14.4.3 Cursor to the (Control Panel) option and press (Enter).

14.4.4 Press (F5) =Plasma off.

14.4.4.1 Allow the instrument to cool down for approximately 30 seconds.

14.4.4.2 A message reading "The plasma has been turned off" will then appear.

14.4.5 Press (Enter)

14.4.6 Press (F7) =shutdown.

14.4.7 A message reading, "The system has been shutdown" will appear on the screen.

14.4.8 Then press (Enter).
14.4.9 The instrument is now shutdown.
14.4.10 Turn the water pump off.
14.4.11 Disconnect the pump tubing.
14.4.12 Turn off the computer.
14.4.13 Turn off the argon and nitrogen tanks.
14.4.14 Place caps back on standards and QC checks.
14.4.15 Recalibrate the instrument once more and run the samples according to the analytical sequence listed previously.

14.5 Instrument Preventive Maintenance (See P255-Maintenance SOP)

14.5.1 *Nebulizer*
14.5.1.1 Remove the nebulizer, clean using DI water by backflushing with syringe.
14.5.1.2 This will remove any sample particles that may accumulate and cause clogs.

14.5.2 *Sample Tubing*
14.5.2.1 Check the sample tubing daily for clogs or rips.
14.5.2.2 If needed, part or all of the tubing should be replaced.

14.5.3 *Mixing Chamber*
14.5.3.1 Remove the mixing chamber.
14.5.3.2 Clean using DI water.
14.5.3.3 Let it dry and replace.

14.5.4 *Torch*
14.5.4.1 Remove torch.
14.5.4.2 Place in aqua regia under the hood.
14.5.4.3 Remove, clean with DI water.
14.5.4.4 Let it dry and replace.

15. Calculations

15.1 The ICP is a direct readout instrument in ppm. The result need only to be corrected for preparation and dilution factors, if any, and reported to three significant figures.

15.1.1 If client results require ppb levels reported for water samples multiply the readout by 1000.

15.1.2 For soil samples: The concentrations in the digestates are to be reported on the basis of the dry weight of the sample with the following equation:

$$\text{Concentration dry weight (mg/Kg)} = \frac{C \times V}{W \times S}$$

Where:
C = Concentration in mg/L
V = Final volume in liters
W = Weight in kg of wet sample
S = Percent solids ÷ 100

15.2 Calculations applied to the quality control samples are outlined in the Quality Control Section (see Section 18).

16. Method Performance

16.1 Precision and accuracy data are obtained for Trace Elements using laboratory fortified blank.

17. Pollution Prevention

17.1 Use only the amounts of chemicals required. Do not make large quantities of solutions.
17.2 Use hood when working with acids.
17.3 Keep the area clean and clutter free in the digestion lab and around the instruments in order to avoid any mishaps.
17.4 Keep chemicals away from drains.
17.5 Properly collect and dispose of waste according to Chemtech's Waste Disposal SOP.
17.6 Laboratory is properly equipped with spill cleanup equipment and laboratory personnel trained. Depending upon the size and type of spill, it may be handled by the individual or department creating the spill or by specially trained personnel.
17.7 Small spills may occur routinely and shall be handled by the individual person or department creating the spill. Spill kits are stored in a blue basket or blue cover bin located in each laboratory and chemical storage area. The spill kits can handle water based, solvent and mercury spills. Specially trained personnel handle larger spills, which may pose a threat to health or environment involves a large volume not easily contained.
17.8 A detailed description of the procedure for handling a spill or accident is covered in the CHEMTECH Emergency and Contingency Plan.
17.9 The Safety Coordinator is responsible for implementing the Chemical Hygiene and the CHEMTECH Emergency and Contingency Plans. It is the responsibility of various company personnel to assist in implementing the different aspects of the Plan. These include: Laboratory Coordinator, Technical Director, Operations Manager, Department Managers and Supervisors.

18. Data Assessment and QC Criteria

18.1 Initial Calibration
18.1.1 Coefficient of detection value $r \geq 0.995$
18.1.2 Back calculate the concentration for lower-level and mid-level initial calibration points. Calculate the percent recovery.
18.1.3 Low-level standard percent recovery must be within 80 – 120%.
18.1.4 Mid-level standard percent recovery must be within 90 – 110%.
18.2 Initial Calibration Verification (ICV)
18.2.1 Ensure that agreement between the true value and the actual value is $\pm$10% for the mid-level standard and $\pm$20% for the low-level standard for Method 6010D.

18.3 Initial Calibration Blank (ICB)
- 18.3.1 For DoD & NC work – No analytes detected > ½ RL.
- 18.3.2 For Method 6010D, No analytes detected > ½ LLOQ.

18.4 Interference Check Sample (ICS)
- 18.4.1 Verify the interelement and background correction factors at the beginning of each analytical run. Do this by analyzing the ICS. Confirm that the results are within ±20% of the true value for the spiked analytes.
- 18.4.2 For analytes not present in the Interference check solution, the concentration found must be within a range equal to ±LLOQ (CRQL) the analyte reporting limit for Method 6010D.
- 18.4.3 For DoD & NC work – The concentration of analytes not present in the ICSA solution must be < ½ RL, unless they are verified trace impurity from one of the spiked analytes.

18.5 Continuing Calibration Verification (CCV) / LLCCV
- 18.5.1 Ensure that agreement between true value and the actual value for the CCV is ±10%.
- 18.5.2 Ensure that agreement between the true value and the actual value for the LLCCV standard for Method 6010D and for DOD is ±20%.

18.6 Continuing Calibration Blank (CCB)
- 18.6.1 The acceptance criteria are the same for the CCB as the ICB (See Section 18.3).

18.7 Preparation Blank (PB)
- 18.7.1 Redigest any samples associated with that blank along with a new preparation blank.
- 18.7.2 Do not correct the sample concentration for the blank value.
- 18.7.3 If the concentration is below the negative reporting limit, redigest any sample not at least 10 times the MDL for that target analyte along with a reanalysis of new preparation blank.
- 18.7.4 For **DOD & NC work:** The acceptance criteria is no analytes can be detected at ≥ 1/2RL and greater than 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater).
- 18.7.5 For Method 6010D, The acceptance criteria is no analytes can be detected at > ½ LLOQ.

18.8 Laboratory Control Sample (LCS)
- 18.8.1 Confirm that the agreement between true values and actual values for each analyte is within the in-house control limits. If the recovery is within 80-120% limit, note in the non-conformance sheet and/or case narrative for non-DOD work. The 80-120% recovery limits (except silver at 75-120% recovery limit for soil matrix only) must be met for DOD work.
- 18.8.2 If agreement is not within in-house or 80-120% recovery limits, do not report the results for any associated sample with the out-of-control LCS.

18.9 Spike Sample Analysis (S)
- 18.9.1 Spike recovery for both aqueous and sediment, sludge and soil batches must be within the in-house control limits. If recovery is within ±25%,

note in the non-conformance sheet and/or case narrative. For DOD work, the MS recoveries must meet the LCS recovery criteria.

18.9.2 Additionally, ensure that agreement between the spike and duplicate spike results is within 20% of each other.

18.9.3 If recovery is not within in-house limits and 75-125% recovery, then post-spike the sample.

18.9.4 Calculate spike Recoveries as follows:

$$\% \text{ Recovery} = \frac{SSR - SR}{SA} \times 100$$

Where: SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added

Note: When sample concentration is less than the MDL, the sample result value is understood to equal zero and is reported as undetected.

18.9.4 The Relative Percent Difference between spike and duplicate results is

$$RPD = \frac{SS - SSD}{(SS + SSD)/2} \times 100$$

Where: RPD = Relative Percent Difference
SS = Sample Spike Value
SSD = Sample Spike Duplicate Value

18.10 Duplicate Sample Analysis (D)

18.10.1 Calculate the Relative Percent Difference (RPD) for each analyte as follows:

$$RPD = \frac{S - D}{(S = D)/2} \times 100$$

Where: RPD = Relative Percent Difference
S = Original Sample Value
D = Duplicate Sample Value

18.10.2 Use the control limit of 20% for RPD when the original result is greater than 10X MDL.

18.10.3 When the average between the original and duplicate results is less than 10X MDL, calculate the control limit as follows:

$$\text{Control Limit} = \frac{\text{Method Detection Limit}}{\text{Average of original and duplicate result}} \times 100$$

18.11 ICP Serial Dilution Analysis (L)

18.11.1 For Method 6010D, If the analyte concentration is at a minimum of 25 times above the LLOQ, ensure that the five fold serial dilution agrees within 20%, if not, suspect a chemical or physical interference effect. Mention non-conformance in case narrative.

18.11.2 Calculate the Percent Difference for each analyte as follows:

$$\% \text{ Difference} = \frac{I - S}{I} \times 100$$

Where: I = Initial Sample Result
S = Instrument Serial Dilution Result x 5

18.12 Linear Range Analysis
18.12.1 Samples having concentrations exceed the calibration range should be diluted into calibration range.
18.12.2 Use highest calibration standard as Linear Dynamic Range.

18.13 Reporting Level Standard (CRI), LLQC, LLOQ standard
18.13.1 For **DOD work** -The acceptance range for the reporting level standard is ± 20%. The lowest standard will be set at the RL.
18.13.2 For Method 6010D, the acceptance criteria for LLOQ standard are 65%-135% and RSD should be <20%. For quarterly verification, acceptance criteria for LLOQ standard are 65%-135%.

18.14 Sample Analysis
18.14.1 Dilute all samples that exceed the calibration range to bring the concentration within the calibration range.
18.14.2 Flag the first results as estimated when a dilution is needed.
18.14.3 When sample result is above highest calibration standard, the sample will be diluted and results will be reported within the calibration range.

18.15 Limit of Detection
18.15.1 All analytes spiked should be positively identified.

18.16 Limit of Quantitation
18.16.1 Analysis must meet the acceptance criteria for the laboratory control sample.

18.17 Instrument Detection Limit
18.17.1 IDL values must be less than or equal to the LOD.

19. Corrective Actions for Out-of-Control Data

19.1 Preparation Blank
19.1.1 For Method 6010D, if criteria are not met, re-analyze once, if still not met, re-digest and re-analyze the samples.
19.1.2 If the method blank continues to contain target constituents after the batch is reprocessed, tell your supervisor and document it in your laboratory notebook.

19.2 Laboratory Control Sample (LCS)
19.2.1 Reanalyze the LCS if it does not meet criteria.
19.2.2 If the limits are still not met after two consecutive analyses, re-prepare and re-analyze all samples in that batch.
19.2.3 If LCS fails criteria and if it is not possible to re-digest the samples & associated QC, then Q flag must be applied to the specific failing analyte in all sample results in the associated Prep Batch.

19.3 Soluble and insoluble spikes (Matrix spike)
19.3.1 If the matrix spikes are not within these recovery limits, check the calculation.
19.3.2 If the recoveries are still outside the limits, perform a post-spike analysis.
19.3.3 Report results for the matrix spike and the post-spike analyses.

19.3.4 For DOD work- If the recoveries are still outside the limits, perform a post-spike analysis.

19.4 Initial Calibration Verification (ICV)
- 19.4.1 If the ICV fails to meet criteria reanalyze.
- 19.4.2 If the ICV fails twice then recalibrate the instrument.

19.5 Initial Calibration Blank (ICB) and Continuing Calibration Blank (CCB)
- 19.5.1 If the absolute value of the calibration blank exceeds the reporting limit for any target analyte, do not report those associated target analyte sample results.
- 19.5.2 Instead, reanalyze these samples following instrument recalibration with an in-control ICB.

19.6 Interference Check Sample (ICS)
- 19.6.1 If the criteria are not met, rerun the interferent check solutions.
- 19.6.2 If it fails again, recalibrate the instrument.

19.7 Continuing Calibration Verification (CCV)
- 19.7.1 If the CCV fails to meet criteria, then all samples associated with the CCV are reanalyzed.
- 19.7.2 If the LLCCV standard fails to meet criteria, then all samples associated with the LLCCV are reanalyzed. For DOD, if LLCCV fail, the correct the problem and repeat ICAL

19.8 Initial Calibration Curve(ICC)
- 19.8.1 If the ICC does not meet calibration requirements, recalibrate.
- 19.8.2 If the ICC does not meet the calibration requirements have instrument serviced. Notify the Supervisor and the Department Manager

19.9 Limit of Detection
- 19.9.1 If LOD verification fails, then repeat the detection limit determination and LOD verification at a higher concentration and set the LOD at the higher concentration.

19.10 Limit of Quantitation
- 19.10.1 Reevaluate the LOQ when outside the acceptance limit 70-130%.

19.11 Instrument Detection Limit
- 19.11.1 Reevaluate the LOD and IDL.

19.12 Reporting Level Standard (CRI), LLQC, LLOQ standard
- 19.12.1 Reanalyze. If it still fails, note in case narrative.

20. Contingencies for Handling Out-of-Control or Unacceptable Data

20.1 When all above corrective measures have been taken and the data remains outside the quality assurance criteria set forth above, immediately contact your supervisor and inform the individual of the situation.

20.2 Document the situation clearly in your laboratory notebook and place a copy of the information in the case narrative of the final data report.

20.3 The supervisor must then contact the Quality Assurance Officer, Laboratory Manager, and Technical Director and notify them of the situation. A corrective action plan will be developed amongst these individuals and implemented.

20.4 Following three types of result qualifiers are used for out-of-control and unacceptable data:

20.4.1 Concentration (C) qualifier

20.4.1.1 "J" – If the reported value was obtained from a reading that was less than the CRQL but greater than or equal to the MDL.

20.4.1.2 "U" – Enter "U" if the reported value was less than the MDL.

20.4.2 Qualifier (Q)

20.4.2.1 "N" - Spiked sample recovery was not within control limits

20.4.2.2 "∗" - Duplicate analysis not within control limits

20.4.2.3 "D" – The reported value from a dilution

20.4.2.4 "E"– The reported value is estimated due to the presence of interference

21. Waste Management

21.1 Keep samples for 180 days and dispose them off according to the procedures explained in the SOP for waste disposal.

22. References

22.1 DoD Quality Systems Manual for Environmental Laboratories, Version 5.3, September 2019.

22.2 Method 6010D, Inductively Coupled Plasma-Atomic Emission Spectrometry, Revision 4, July 2014, SW 846 Update V.

23. Appendices

Appendix A *Table 1. Metals Standards*
Table 2. Metals Calibration Stock Standards
Table 3. ICV-1
Table 4. "True Value" Concentrations for the elements in Interference Check Sample Part A (1197) and Part A (1197) Mixed with Part B (0596)
Table 5 Metals Spiking Stock Standards Inorganic Ventures

Appendix B *Reporting Limits*

Appendix A

Table 1. Metals Standards

Standard Name	Inorganic Ventures catalog number	Volume used	Conc. of Standard	Conc. HNO_3	Conc. HCl	Final Volume
		mL	mg/L	Ml	mL	mL
S0/ICB/CCB				2	10	200
S1	CRI Stock Solution	4.0	Refer CRI Stock solution table	2	10	200
S2	S5	16	See Table 2	2	10	200
S3	S5	50	See Table 2	2	10	200
S4	S5	100	See Table 2	2	10	200
S5	CLPP-CAL-1	5.0	See Table 2	5	25	500
	Antimony	5.0	See Table 2			
	CLPP-CAL-3	5.0	See Table 2			
	CHEM-CLP-4	5.0	See Table 2			
	Sulfur*	5	1000			
	Strontium	5	1000			
	Phosphorous	5	1000			
	Lithium*	5	1000			
ICV	ICV-1 (1201)	10	See Table 3	1	5	100
	CHEM-QC-4	0.25	See Table 2			
	Li Second source*	0.025	10000			
	Strontium	0.025	10000			
	Phosphorous	0.025	10000			
	S Second source*	0.025	10000			
CCV	CLPP-CAL-1	1.0	See Table 2	2	10	200
	Sb 1000 ppm	1.0	See Table 2			
	CLPP-CAL-3	1.0	See Table 2			
	CHEM-CLP-4	1.0	See Table 2			
	Sulfur*	1	1000			
	Strontium	1	1000			
	Phosphorous	1	1000			
	Lithium*	1.0	1000			
ICSAB	ICS-A (0503)	10.0	See Table 4	1	5	100
	ICS-B (0203)	10.0	See Table 4			
	Chem-QC-4 (B, Mo, Si, Sn, Ti)	0.1	1000			
	Sulfur*	0.1	1000			
	Strontium*	0.1	1000			
	Phosphorous*	0.1	1000			
	Lithium*	0.1	1000			
ICSA	ICS-A (0503)	10.0	See Table 4	1	5	100

- ***ICV Standard is obtained from the EPA***

- *Prepare LLICV as the reporting limit level, in the same manner as S1 standard.*
- *Prepare LLCCV standard in the same manner as S1 standard.*
- *Prepare LLQC & LLOQ standard in the same manner as S1 standard, and process this standard through all the sample preparation and analytical procedures.*

CRI solution: Add 1mL HNO3 + 5mL HCl + 2mL CRI stock solution, FV 100mL

Element	Initial Concentration (ppm)	Volume used (mL)	Final concentration in CRI stock solution (ppb)	Final concentration in Standard S1
Aluminum	10000	0.05	5000	100
Antimony	1000	0.25	2500	50
Arsenic	1000	0.10	1000	20
Barium	1000	0.50	5000	100
Beryllium	1000	0.03	300	6
Boron	1000	0.50	5000	100
Cadmium	1000	0.03	300	6
Calcium	10000	1	100000	2000
Chromium	1000	0.05	500	10
Cobalt	1000	0.15	1500	30
Copper	1000	0.10	1000	20
Iron	10000	0.05	5000	100
Lead	1000	0.06	600	12
Lithium	1000	0.10	1000	20
Manganese	1000	0.10	1000	20
Magnesium	10000	1	100000	2000
Molybdenum	1000	1.0	10000	200
Nickel	1000	0.20	2000	40
Selenium	1000	0.10	1000	20
Silicon	1000	2.0	20000	400
Silver	1000	0.05	500	10
Sulfur	1000	0.10	1000	20

Element	Initial Concentration (ppm)	Volume used (mL)	Final concentration in CRI stock solution (ppb)	Final concentration in Standard S1
Sodium	10000	1	100000	2000
Strontium	1000	0.1	1000	20
Thallium	1000	0.20	2000	40
Tin	1000	0.20	2000	40
Titanium	1000	0.20	2000	40
Potassium	10000	1	100000	2000
Phosphorous	1000	0.1	1000	20
Vanadium	1000	0.20	2000	40
Zinc	1000	0.20	2000	40

Table 2. Metals Calibration Stock Standards

Stock Standard Catalog Number	Analytes Present	Volume used (mL)	Initial Concentration (µg/mL)	Final Concentration S5 standard (µg/mL)
CLPP-CAL-1	Ca, K, Mg, Na	See Table 1	5,000	50
	Al, Ba		2,000	20
	Fe		1,000	10
	Co, Mn, Ni, V, Zn		500	5.0
	Cu, Ag		250	2.5
	Cr		200	2.0
	Be		50	0.5
CLPP-CAL-2*	Sb		1000	10
CLPP-CAL-3	As, Se, Tl, Pb		1,000	10
	Cd		500	5
CHEM-QC-4	B, Mo, Si, Ti, Sn		1,000	10
CHEM-CLP-4	B, Mo, Si, Ti, Sn		1,000	10
CGLI1-1**	Lithium		1000	10
CGS10-1**	Sulfur		10000	10
CGSR1-1	Strontium		1000	10
57015	Phosphorous		1000	10

** Sb 1000ppm standard can also be used*
******* *Standard concentration subject to change from 1000ppm to 10000ppm, preparation is adjusted accordingly.*

Prepare S5 standard as per Table 1.
The concentration for S1 standard (CRI) is as per Table 1 and Table 2.
The concentration for S2 standard is 1/12.5 S5 standard concentration.
The concentration for S3 standard is ¼ S5 standard concentration.
The concentration for S4 standard is ½ S5 standard concentration.

Table 3. ICV (Concentration subject to change)

Element	Concentration (µg/L)
Al	2500
Sb	1000
As	1000
Ba	520
Be	510
Cd	510
Ca	10000
Cr	520
Co	520
Cu	510
Fe	10000
Pb	1000
Mg	6000
Mn	520
Ni	530
K	9900
Se	1029
Ag	501
Na	10097
Tl	1028
V	501
Zn	1025
B	2500
Mo	2500
Ti	2500
Sn	2500
Si	2500
S	2500
Li	2500
Sr	2500

ICV – Use a 10-fold dilution by pipetting 10mL of the ICV solution into a 100mL volumetric flask and dilute to volume with Blank Solution.

Table 4. "True Value" Concentrations for the Elements in Interference Check Sample Part A (0801) and Part A (0801) Mixed with Part B (0596) (Concentrations subject to change)

Element	Concentration (µg/L)	
	Part A	Part B
Al	250000	250000
Sb	(0.0)	620
As	(0.0)	100
Ba	(6.0)	(540)
Be	(0.0)	500
Cd	(1.0)	970
Ca	240000	230000
Cr	(52)	540
Co	(0.0)	480
Cu	(2.0)	510
Fe	100000	99000
Pb	(0.0)	(49)
Mg	260000	250000
Mn	(7.0)	510
Ni	(2.0)	950
Se	(0.0)	(46)
Ag	(0.0)	200
Tl	(0.0)	(110)
V	(0.0)	490
Zn	(0.0)	950
B	(0.0)	1000
Mo	(0.0)	1000
Sn	(0.0)	1000
Ti	(0.0)	1000
Si	(0.0)	1000
S	(0.0)	1000
Li	(0.0)	1000
Sr	(0.0)	1000
P	(0.0)	1000

ICSAB – Prepare by adding 10mL ICSA Interference Check Solution + 10mL ICSB Interference Check Solution + 0.10mL CHEM-QC-4 + 0.01mL each of 10000 ug/mL Sulfur, 10000 ug/mL Li, 10000 ug/mL Sr + 0.01mL of 10000 ug/mL Phosphorous and make Final Volume to 100mL with Blank Solution.

TABLE 5
Metals Spiking Stock Standard

Stock Standard Catalog Number	Analytes Present	Initial Concentration (µg/mL)	Amount of solution needed used mL *	Final Concentration (µg/mL)
WW-LFS-1	K	1000	**0.25mL**	10
	Fe, Na	300		3
	Al, Mg, Tl, Se	200		2
	Ca, Pb	100		1
	As	80		0.8
	Hg	70		0.7
	Ni	50		0.5
	Cr	40		0.4
	B, Cu, V	30		0.3
	Ba, Be, Cd, Co, Li, Mn, Sr, Zn	20		0.2
	Ag	7.5		0.075
WW-LFS-2	SiO_2	200	**0.25mL**	2.0
	Sb	80		0.8
	Sn	70		0.7
	Mo	40		0.4
	Ti	20		0.2
Sulfur*	S	1000	**0.25mL**	10

*Final volume in **25 mL**.

Note: If sulfur is requested to be analyzed, add 1mL 1000ppm Sulfur standard to LCS, Spike, SD (Final volume 100mL, Final concentration 10ug/mL)
* 1000ppm or 10000ppm initial concentration is used, preparation is adjusted accordingly.

Appendix B

Reporting Limit

Analyte	Wavelength Nm	RL µg/L Water	RL mg/Kg Soil**
Aluminum	308.20/396.1	50	5
Antimony	206.80	25	2.5
Arsenic	189.00/193.7	10	1
Barium	493.40	50	5
Beryllium	234.8	3	0.3
Cadmium	226.50/214.4	3	0.3
Calcium	373.6	1000	100
Chromium	267.70	5	0.5
Cobalt	228.60	15	1.5
Copper	324.70/224.7	10	1
Iron	240.488	50	5
Lead	220.3	6	0.6
Magnesium	279.00	1000	100
Manganese	257.60	10	1
Nickel	231.60	20	2
Potassium	769.8/766.4	1000	100
Selenium	196.00	10	1
Silver	328.00	5	0.5
Sodium	818.3/589.5	1000	100
Thallium	190.8	20	2
Vanadium	292.40	20	2
Zinc	213.8/206.20	20	2
Boron	249.6	50	5
Molybdenum	202	100	10
Tin	189.9	20	2
Titanium	336.1	20	2
Silicon	288.1/251.6	200	20
Sulfur	182.0	10	1
Lithium	670.7	10	1
Strontium	407.8	10	1

** Will be adjusted for % Moisture

CHEMTECH 284 Sheffield Street, Mountainside, NJ 07092 (908) 789-8900

READ RECEIPT

Employee Name: _____

Department: _____

_____ **M6010D-Trace Elements**_____
Method or Document Read (Include Title, Number, Revision, as applicable)

Employee Statement: I have read and understood the information in the above-mentioned method or document.

_____ _____
Employee Signature Date

Supervisory Statement: I have reviewed this document or method with the employee.

_____ _____
Supervisor Signature Date

Note: This receipt is to be returned to the Quality Assurance/Quality Control Department for incorporation into employee training record files. If you have questions or would like to review your train record files, please see QA/QC Director.

TRACE ELEMENTAL ANALYSIS BY INDUCTIVELY COUPLED PLASMA – MASS SPECTROMETRIC METHOD

1. Test Method

1.1 Trace Elemental Analysis by Inductively Coupled Plasma-Mass Spectrometric Method using USEPA Test Methods SW 846 6020B.

2. Applicable Matrices

2.1 Fresh (surface and ground) water and wastewater
2.2 Sediments, sludges, and soils
2.3 Industrial waste

3. Reporting Limits

3.1 See Appendix A for Reporting limits.

4. Scope and Application

4.1 This method is utilized for the determination of ppb levels of a trace element.
4.2 No digestion is required for dissolved metals analysis. Samples must be filtered and acid preserved prior to analysis for dissolved elements.
4.3 The use of internal standard is required for each analyte determined by ICPMS

5. Summary of Method

5.1 Samples must be digested before analysis using methods SW 846 3005, 3010 or 3050.
5.2 The method measures ions produced by a radio-frequency inductively coupled plasma.
5.3 Analyte species originating in a liquid are nebulized and the resulting aerosol transported by argon gas into the plasma torch.
5.4 The ions produced are entrained in the plasma gas and introduced, by means of an interface, into a mass spectrometer. The ions produced in the plasma are sorted according to their mass to charge ratios and quantified with a channel electron multiplier.

6. Definitions

6.1 Aliquot - A measured portion of a field sample, standard, or solution taken for sample preparation and/or analysis.
6.2 Analysis Date/Time - The date and military time (24-hour clock) of the introduction of the sample, standard, or blank into the analysis system.
6.3 Analyte - The element, ion, or parameter an analysis seeks to determine; the element of interest.
6.4 Analytical Sample - Any solution or media introduced into an instrument on which an analysis is performed, excluding instrument calibration, initial calibration verification (ICV), initial calibration blank (ICB), continuing calibration verification (CCV), continuing calibration blank (CCB), and tunes.

Note the following are all defined as analytical sample: undiluted and diluted samples, matrix spike samples, duplicate samples, serial dilution samples, analytical spike samples, post-digestion spike samples, interference check samples (ICSs), Contract Required Quantitation Limit (CRQL) Check Standards (CRIs), Laboratory Fortified Blanks (LFBs) Laboratory control Samples (LCSs), performance Evaluation (PE) samples, Preparation Blanks (PBs), and Linear Range Samples (LRSs).

6.5 Analytical Sequence - The actual instrumental analysis of the samples from the time instrument calibration through the analysis of the final CCV or CCB.

6.6 Analytical Spike - A spike that is fortified just prior to analysis by adding a known quantity of the analyte to an aliquot of the prepared sample.

6.7 Background Correction - A technique to compensate for variable background contribution to the instrument signal in the determination of trace elements.

6.8 Batch - A group of sample designed to assess specific sources of contamination. See individual definitions for types of blanks.

6.9 Blank - An analytical sample designed to assess specific sources of using the same method.

6.10 Calibration - The establishment of an analytical curve based on the absorbance, emission intensity, or other measured characteristics of known standard. The calibration standards must be prepared using the same type of reagents or concentration of acids as used in the sample preparation.

6.11 Calibration Blank - A blank solution containing all of the reagents and in the same concentration as those used in the analytical sample preparation. This blank is not subjected to the preparation method.

6.12 Calibration Standards - A series of known standard solutions used by the analyst for calibration of the instrument (i.e., preparation of the analytical curve). The solutions may not be subjected to the preparation method but contain the same matrix (i.e., the same amount of reagents and/or preservatives) as the sample preparations to be analyzed.

6.13 Contamination - A component of a sample or an extract that is not representative of the environmental source of the sample. Contamination may stem from other sample, sampling equipment, while in transit, from laboratory reagents laboratory environment, or analytical instruments.

6.14 Continuing Calibration Verification (CCV) - A single parameter or multi-parameter standard solution prepared by the analyst and used to verify the stability of the instrument calibration with time, and the instrument performance during the analysis of samples. The CCV can be one of the calibration standards. However, all parameters being measured by the particular system must be represented in this standard and the standard must have the same matrix (i.e., the same amount of reagents and/or preservatives) as the samples.

6.15 Contract Required Quantitation Limit (CRQL) Check Standard (CRI) - A single parameter or multi-parameter standard solution prepared at the CRQL and used to verify the instrument calibration at low levels.

6.16 Control Limits - A range within which specified measurement results must fall to be compliant. Control limits may be mandatory, requiring corrective action if exceeded, or advisory, requiring that noncompliant data be flagged.

6.17 Digestion Log - An official record of the sample preparation (digestion).

6.18 Dissolved Metals - Analyte elements in a water/aqueous sample that will pass through a 0.45 micrometer (um) filter.

6.19 Dry Weight - The weight of a sample based on percent solids. The weight obtained after drying in an oven.

6.20 Duplicate - A second aliquot of a sample that is treated the same as the original sample in order to determine the precision of the method.

6.21 Field Blank - This is any sample that is submitted from the field is an identified as blank. This includes trip blank, rinsates, equipment blanks, etc.

6.22 Field QC - Any Quality Control sample submitted form the field to the laboratory. Examples include, but are not limited to: field blanks, field duplicates, and field spikes.

6.23 Field Sample - A portion of material received for analysis that is contained in single or multiple containers and identified by a unique sample number.

6.24 Holding Time - The elapsed time expressed in days from the date of receipt of the sample by the Contractor until the date of its analysis. Holding time = (sample analysis date- sample receipt date)

6.25 Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS) – A technique for the simulation or sequential multi-element determination of elements in solution. The basis of the method is the measurement of atomic emission by an optical spectroscopic technique. Characteristic atomic line emission spectra are produced by excitation of the sample in a radio frequency inductively coupled plasma.

6.26 Initial Calibration - Analysis of analytical standards for a series of different specified concentrations; used to define the quantitative response, linearity, and dynamic range of the instrument to target analytes.

6.27 Initial Calibration Verification (ICV) – Solution (s) prepared from stock standard solutions, metals or salts obtained form a source separate from that utilized to prepare the calibration standards. The ICV is used to verify the concentration of the calibration standards and the adequacy of the instrument calibration. The ICV should be traceable to NIST or other certified standard source.

6.28 Interference Check Sample – A solution containing both interfering and analyte elements of known concentration that can be used to verify background and interelement correction factors.

6.29 Interferents – Substances that affect the analysis for the element/parameter o interest.

6.30 Laboratory Control Sample (LCS) – A control sample of known composition. Laboratory control samples are analyzed using the same sample preparation, reagents, and analytical methods employed for the samples received.

6.31 Linear Range, Linear Dynamic Range – The concentration range over which the instrument response remains linear.

6.32 Matrix – The predominant material of which the sample to be analyzed is composed.

6.33 Matrix Effect – In general, the effect of particular matrix constituents.

6.34 Matrix Spike – Aliquot of sample (water/aqueous or soil) fortified (spiked) with known quantities of specific compounds and subjected to the entire analytical procedure in order to indicate the appropriateness of the method for the matrix by measuring recovery.

6.35 Method Detection Limit (MDL) – The concentration of a target parameter that, when a sample is processed through the complete method, produces a signal with 99 percent probability that it is different from the blank. For 7 replicates of the sample, the mean value must be 3.14s above the blank, where "s" is the standard deviation of the 7 replicates.

6.36 Narrative (SDG Narrative) – Portion of the data package which includes laboratory, contract, Case, sample number identification, and descriptive documentation of any problems encountered in processing the samples, along with corrective action taken and problem resolution.

6.37 Percent Difference (% D) – As used in this SOW and elsewhere to compare tow values. The difference between the two values divided by one of the values.

6.38 Percent Solids (% S) – The proportion of solid in a soil sample determined by drying an aliquot of the sample.

6.39 Preparation Blank – An analytical control that contains reagent water and reagents, which is carried through the entire preparation and analytical procedure.

6.40 Preparation Log – An official record of the sample preparation (digestion, distillation, and extraction).

6.41 Reagent Water – The purity of this water must be equivalent to ASTM Type II reagent water of Specification D1193-77, "Standard Specification for Reagent Water".

6.42 Relative Percent Difference (RPD) – The relative percent difference is based on the mean of the two values, and is reported as an absolute value, i.e., always expressed as a positive number or zero.

6.43 Run – A continuous analytical sequence consisting of prepared samples and all associated Quality Assurance (QA) measurements. A run begins with the instrument calibration and is to be completed within a 24-hour period.

6.44 Sample – A portion of material to be analyzed that is contained in single or multiple containers and identified by a unique sample number.

6.45 Sensitivity – The slope of the analytical curve (i.e., functional relationship between instrument response and concentration).

6.46 Serial Dilution – The dilution of a sample by a factor of five. When corrected by the dilution factor, the diluted sample must agree with the original undiluted sample within specified limits. Serial dilution may reflect the influence of interferents.

6.47 Standard Analysis – An analytical determination made with known quantities of target analytes.

6.48 Stock Solutions – A standard solution that can be diluted to derive other standards.

6.49 Tune Solution – A standard solution which is prepared and analyzed to check initial system performance before analyzing any samples.

7. Interferences

7.1 Isobaric elemental interferences in ICP-MS are caused by isotopes of different elements forming atomic ions with the same nominal mass-to-charge

7.1.1 To correct this determine the signal of another isotope of the interfering element. Subtract the signal from the analyte isotope signal.

7.1.2 Polyatomic correction factors are used as below.

7.1.2.1 No gas mode (without collision cell)

Mc(75) = M(75) * 1 + M(77) * 3.127 + M(82) * 2.549
Mc(82) = M(82) * 1 - M(83) * 1
Mc(111) = M(106) * 0.7 - M(108) * 0.7 + M(111) * 1
Mc(115) = M(115) * 1 - M(118) * 0.034
Mc(208) = M(206) * 1 + M(207) * 1 + M(208) * 1

7.1.2.2 He mode (With collision cell)

Mc(115) = M(115) * 1 - M(118) * 0.034

7.2 High ion currents at adjacent masses can also contribute to ion signals at the mass of interest.

7.3 Ions consisting of more than one atom or charge can cause Isobaric molecular and doubly–charged.

7.4 Physical interferences are generally considered to be effects associated with sample nebulization and transport processes such as change in viscosity, surface tension, high dissolved solids and acid concentration.

7.4.1 If such interferences are encountered, sample dilution may be performed. Additionally, when the presence of high dissolved solids is suspected, acidified Type II water is analyzed before and after each sample of the sample batch in order to reduce the potential for salt build up on the nebulizer tip.

7.5 Memory interferences can occur when there are large concentration differences between samples or standards, which are analyzed sequentially.

7.6 Sample deposition on the sampler, spray chamber design and the type of nebulizer affect the extent of the memory interferences that are observed.

7.6.1 Set the rinse period between samples long enough to eliminate significant memory interference.

7.7 Any kind of interference is noted in the case narrative.

8. Safety

8.1 The toxicity and carcinogenity of each reagent used in this method has not been fully established. Each chemical should be regarded as a potential health hazard and exposure to these compounds should be minimized.

8.2 Always wear safety glasses for eye protection when working with these reagents.

8.3 Use protective gloves when handling the chemicals.

8.4 Analytical Plasma sources emit radio frequency radiation in addition to intense UV radiation. Suitable precautions should be taken to protect personnel from such hazards. The inductively coupled plasma should only be viewed with proper eye protection from UV emissions.

9. Equipment and Supplies

9.1 Agilent Technologies, ICP-MS, 7900, HP Windows 7 Professional
9.2 Agilent ASX-500 Auto sampler
9.3 Instrument Software: Mass Hunter 4.1 Workstation software (C.01.03)
9.4 pH paper (narrow range 0-2.5)
9.5 Class A volumetric pipettes
9.6 Eppendorf Pipettes
9.7 Analytical Balance- VWR G400-DO
9.8 Argon Gas (99.998% pure)
9.9 Helium Gas (99.998% Pure)
9.10 4-oz plastic bottles

10. Reagents and Standards

10.1 Concentrated Nitric Acid (Trace metals Analyzed)
10.2 1:1 Hydrochloric Acid (Trace metals Analyzed)*
10.3 1:1 Nitric Acid (Trace Metals Analyzed)*
10.4 Type II water (DI water)
10.5 See Table 1 for standards information.
10.6 MS tuning solution
10.7 Resolution check
10.8 Internal standard: Add 75mL 6020ISS (10ug/mL Bi, Ho, Li, Rh, Sc, Tb, In, Y) to 5.0mL conc. HNO3. Make final volume to 250mL DI Water.

11. Sample Handling and Preservation

Matrix	Container Type	Preservative
Water	Glass or Polyethylene	HNO_3 to pH <2
Sediment/Sludge/Soil	Glass or Polyethylene	Maintain at 4C ±2°C
Holding times	180 days	

12. Quality Control

12.1 Calibration
- 12.1.1 Calibrate the instrument prior to each analytical run.
- 12.1.2 Indicate the date and time of calibration on the raw data.
- 12.1.3 Perform standardization for all of the elements.
- 12.1.4 Perform Low level standard read back for method 6020B.

12.2 Tuning Solution
- 12.2.1 Analyze a tune standard before the calibration.

12.3 Spectral Interference Check Solutions (SIC)
- 12.3.1 Due to the unique configuration of each ICP, and the uniqueness of the methods, check all elements for their interfering properties.

12.4 Initial Calibration Verification (ICV)
- 12.4.1 Conduct an ICV on an independent quality control standard.
- 12.4.2 Run ICV at a concentration other than that used for instrument calibration but within the calibration range for Method 6020.
- 12.4.3 Run ICV near mid-level and low-level concentration for Method 6020B.

12.4.5 Analyze the ICV in order to verify the instrument calibration.

12.5 Initial Calibration Blank (ICB)

12.5.1 Analyze an ICB immediately following the ICV at each element wavelength used for analysis.

12.6 Interference Check Sample (ICS)

12.6.1 Analyze an ICS solution (consisting of the interferents and analyte elements) in order to assess the interelement interferences.

12.6.2 Run this solution at all wavelengths used for each analyte for a given analytical run.

12.6.3 Analyze the ICS solution at the beginning of the analytical run.

12.6.4 See Table 1 and Table 4 for details pertaining to the preparation of this solution.

12.7 Continuing Calibration Verification (CCV)

12.7.1 Prepare the CCV by using the same standards used for calibration at a concentration near the mid-point of the calibration curve.

12.7.2 In addition, for Method 6020B, prepare a low-level continuing calibration verification (LLCCV) standard at the lower limit of quantitation (LLCCV standard = S2, See Table 1 and 2).

12.7.3 Analyze the CCV every 10 samples and after the last analytical sample.

12.7.4 For Method 6020B, analyze LLCCV standard at the end of the analytical run.

12.8 Continuing Calibration Blank (CCB)

12.8.1 Analyze the CCB immediately following the CCV.

12.9 Preparation Blank (PB)

12.9.1 Process one PB consisting of Type II water through the sample preparation and analysis procedure for each sample batch.

12.10 Laboratory Control Sample

12.10.1 Analyze aqueous and solid LCSs for each analyte using the same sample preparations, analytical methods and QA/QC procedures employed for the samples received except field blank.

12.10.2 Prepare the spiking solutions for LCS as per Table 6.

12.10.3 Spike at approximately mid-point of the calibration curve for Method 6020B.

12.10.4 Add the spike into LCS sample prior to any reagent addition or digestion as per Table 7.

12.10.3 Prepare one LCS for each sample batch and/or matrix.

12.11 Spike Sample Analysis (S)

12.11.1 Perform at least one aqueous spike sample analysis on each group of samples of a similar liquid matrix.

12.11.2 In the case of sediment, sludge, and soil batch, perform a duplicate spike on a sample of a single ID.

12.11.3 Prepare the spiking solutions for MS/MSD as per Table 6.

12.11.3 Add the spike to the sample prior to any reagent addition or digestion as per Table 7.

12.11.4 Analyze these spiked samples at a frequency of 20 samples or per digestion batch or per matrix.

12.11.5 If the spike analysis is performed on the same sample that is chosen for the duplicate analysis, perform spike calculations using the result of the sample designated as the original sample.

12.11.6 Field blanks are not used for spiked sample analysis.

12.12 Duplicate Sample Analysis (D)

12.12.1 Analyze one duplicate sample from each group of samples of a similar matrix type in each sample batch.

12.12.2 Analyze duplicate samples at a minimum frequency of 20 samples or per digestion batch or per matrix. Do not average duplicate sample results.

12.12.3 Do not use field blanks for duplicate sample analysis is performed for each method employed.

12.13 ICP Serial Dilution Analysis (L)

12.13.1 Perform the ICP Serial Dilution Analysis on a sample from each group of samples of a similar matrix and for each sample batch.

12.14 Linear Range Analysis

12.14.1 Samples having concentrations exceed the calibration range should be diluted into calibration range.

12.14.2 Use highest calibration standard as Linear Dynamic Range.

12.15 Method Detection Limit

12.15.1 Please refer to SOP P203-Laboratory limits and demonstration of capability for MDL procedure.

12.16 Instrument Detection Limit

12.16.1 An IDL is performed once at initial set up of the instrument and after significant change in instrument type or test method or sample matrix.

12.16.2 IDLs in µg/L can be estimated as the mean of the blank results plus three times the standard deviation of 10 replicate analyses of the reagent blank solution. (Use zero for the mean if the mean is negative).

12.17 Reporting Level Standard CRI, LLCCV, LLOQ, LLICV

12.17.1 Run a reporting level standard or CRI at the beginning of every calibration. Run LLQC standard, prepared in the same manner as the CRI standard at the reporting level concentration and processed through all the preparation and analytical procedures quarterly.

12.17.2 For DoD work, set LLCCV or CRI at the required reporting level.

12.17.3 Lower Limit of Quantitation Check Standard (LLOQ) is the lowest concentration in the calibration curve. It needs to be initially verified by the analysis of at least 7 replicate samples, spiked at LLOQ and processed through all preparation and analysis steps of the method. Ongoing LLOQ verification, at a minimum, is on a quarterly basis to validate quantitation capability at low analyte concentration levels. LLOQ must be performed for both Water and Soil matrix.

12.18 Limit of Detection (LOD)
- 12.18.1 Verify LOD by spiking a quality system matrix at the established LOD concentration.
- 12.18.2 LOD is specific to each combination of analyte, matrix, method (including sample preparation) and instrument configuration.
- 12.18.3 LOD must be verified quarterly.
- 12.18.4 LOD must be verified on each instrument used, and every time the method is modified.

12.19 Limit of Quantitation (LOQ)
- 12.19.1 LOQ must be greater than the LOD.
- 12.19.2 LOQ must be verified quarterly for each quality system matrix, method and analyte, by analyzing QC sample containing the analytes of concern in each quality system matrix.
- 12.19.3 LOQ must be performed if the method is modified.

13. Calibration and Standardization

13.1 Analyze the tune standard five times and calculate the %RSD.
- 13.1.1 The % RSD must meet $\leq$ 5%.
- 13.1.2 The peak width must be between 0.65-0.85 amu at 5% peak width.
- 13.1.3 Optimization specifications (tune parameters) are included in tune report. Instrument will use these tune parameters at the time of Autotuning which will provide a good stability and maximum intensity.
- 13.1.4 If a drop in intensity is observed then routine maintenance will be done for cones and/or nebulizer. After that Autotune is performed. Once Autotune is performed then same specification used for tune, calibration and samples analysis. Tune Specifications are selected automatically by instrument every time when Autotune is performed. Example Tune Specifications are added in Appendix C.

13.2 Calibrate the instrument prior to each analytical run (for calibration standard levels refer to Table 1.

13.2 Blank (S0): Use reagent blank as a calibration blank standard.

13.3 Calibration Standards (S): Use the ICPMS calibration standards available form Inorganic Ventures, Inc and Absolute Standards Inc.

13.4 Run an initial calibration verification (ICV) standard near midpoint concentration from a second source immediately after the calibration.

13.5 Calculate the linear regression.
- 13.5.1 The linear regression, correlation coefficient (r) must be $\geq$ 0.995.
- 13.5.2 If the linear regression is not met, recalibrate the instrument.

14. Sample Preparation

14.1 For digestion of soil samples, use Method SW846 3050B and for digestion of water samples, use Method SW846 3010A.

14.2 Analytical Procedure

14.2.1 ICP MS Startup

14.2.1.1 Start instrument for at least 30 min to stabilize.

14.2.1.2 Analyze the tuning solution five times
14.2.1.3 The relative standard deviation of these five readings must be ≤5% for all analytes.
14.2.1.4 Analyze a Mass Calibration and Resolution checks
14.2.1.4.1 Mass Calibration of interest must not vary for more than 0.1amu.
14.2.1.4.2 The resolution check must be less than 0.9amu.

14.2.2 Calibration
14.2.2.1 Calibrate the instrument using the analytical sequence listed on section 14.6.
14.2.2.2 Verify the calibration with the ICV before proceeding to the sample analysis.
14.2.2.3 Flush the instrument with a rinse blank after every standard sample or QC sample is analyzed.

14.2.3 Analyze the ICV and ICB immediately after the calibration.
14.2.4 Analyze the ICSA, ICSAB at the beginning of the analytical run, and CCV, CCB every 10 samples.

Note: Analysis is done in multiple mass of measurement. We reserve the right, in case of interference, to use a different mass to report the results than those listed in Appendix B.

14.3 Sample Analysis

Note: Once the instrument has been checked for performance (tune), it is ready for calibration and sample analysis.

14.3.1 Perform three injections for each run.
14.3.2 For DoD work, when sample result is above the highest calibration standard, the sample will be diluted and results will be reported within the calibration range.

14.4 Analytical Run

A typical sequence in an analytical run for trace elements analysis is as follows:

Initial Analytical Run

- Tuning Check
- STD-S0 (Blank)
- STD-S1
- STD-S2
- STD-S3
- STD-S4
- STD-S5
- STD-S6
- STD-S7
- STD-S8
- ICV (Initial Calibration Verification)

Continuing Analytical Run

10 Samples
CCV
CCB

- ICB (Initial Calibration Blank)
- ICSA
- ICSAB
- CCV
- LLCCV for DOD
- CCB
- CRI
- LLOQ (Analyzed quarterly)
- PBW or PBS (Preparation Blank W-Water or S-Soil)
- LCSS or LCSW(Laboratory Control Sample)
- 6 Samples
- CCV
- CCB

15. Calculations

15.1 The ICPMS is a direct readout instrument in ppb. The result need only to be corrected for preparation and dilution factors, if any, and reported to three significant figures.

15.1.1 For soil samples: The concentrations in the digestates are to be reported on the basis of the dry weight of the sample with the following equation:

$$\text{Concentration dry weight (mg/Kg)} = \frac{C \times V}{W \times S}$$

Where:
- C = Concentration in mg/L
- V = Final volume in liters
- W = Weight in kg of wet sample
- S = Percent solids ÷ 100

15.2 Calculations applied to the quality control samples are outlined in the Quality Control Section (see Section 18).

16. Method Performance

16.1 Precision and accuracy data are obtained for Trace Elements using laboratory fortified blank with trace elements concentrations.

17. Pollution Prevention

17.1 Use only the amounts of chemicals required.
17.2 Do not make large quantities of solutions.
17.3 Use hood when working with acids.
17.4 Keep the area clean and clutter free in the digestion lab and around the instruments in order to avoid any mishaps.
17.5 Keep chemicals away from drains.
17.6 Properly collect and dispose of waste according to Chemtech Waste Disposal SOP.

17.7 Laboratory is properly equipped with spill cleanup equipment and laboratory personnel are trained. Depending upon the size and type of spill, it may be handled by the individual or department creating the spill or by specially trained personnel.

17.8 Small spills may occur routinely and shall be handled by the individual person or department creating the spill. Spill kits are stored in a blue basket or blue cover bin located in each laboratory and chemical storage area. The spill kits can handle water based, solvent and mercury spills. Specially trained personnel handle larger spills, which may pose a threat to health or environment involves a large volume not easily contained.

17.9 A detailed description of the procedure for handling a spill or accident is covered in the CHEMTECH Emergency and Contingency Plan.

17.10 The Safety Coordinator is responsible for implementing the Chemical Hygiene and the CHEMTECH Emergency and Contingency Plans. It is the responsibility of various company personnel to assist in implementing the different aspects of the Plan. These include: Laboratory Coordinator, Technical Director, Operations Manager, Department Managers and Supervisors.

18. Data Assessment and QC Criteria

18.1 Initial Calibration

18.1.1 Verify that the calibration meets r=0.995 or better.

18.1.2 Back calculate the concentration for lower-level and mid-level initial calibration points. Calculate the percent recovery.

18.1.3 Low-level standard percent recovery must be within 80 – 120%.

18.1.4 Mid-level standard percent recovery must be within 90 – 110%.

18.2 Initial Calibration Verification (ICV)

18.2.1 Ensure that the agreement between the true value and the actual value is ±10% for the mid-level standard and ±20% for the low-level standard.

18.3 Initial Calibration Blank (ICB)

18.3.1 The magnitude (absolute value) of the calibration blank should not exceed ½ CRQL for DOD & 6020B.

18.4 Interference Check Sample (ICS)

18.4.1 Verify the interelement and background correction factors at the beginning of each analytical run. Do this by analyzing the ICS. Confirm that the results are within ±20% of the true value.

18.4.2 For analytes not present in the Interference check solution, the concentration found must be within a range equal to ± 2 x CRQL.

18.4.3 For DoD work, the concentration of the analytes not present in the ICSA solution must be < 1/2 RL, unless they are verified trace impurity from one of the spiked analysis.

18.5 Continuing Calibration Verification (CCV)

18.5.1 Ensure that agreement between true value and the actual value for the CCV is ±10% for 6020B, DOD.

18.5.2 Ensure that agreement between true value and the actual value for the LLCCV standard is ±20%.

18.6 Continuing Calibration Blank (CCB)

18.6.1 The acceptance criteria are the same for the CCB as the ICB for DOD (See Section 18.3).

18.6.2 The magnitude (absolute value) of the CCB should not exceed CRQL for 6020B.

18.7 Preparation Blank (PB)

18.7.1 If the absolute value of the concentration of the blank is less than the ½ CRQL for each target analyte, don not take any corrective action.

18.7.2 If any target analyte concentration in the blank is above the 1/2 CRQL it is out-of-control.

18.7.3 Redigest any samples associated with that blank along with a new preparation blank.

18.7.4 If, however, the target analyte concentration is at least 10 times the blank concentration, report the results.

18.7.5 Do not correct the sample concentration for the blank value.

18.7.6 If the concentration is below the negative MDL, redigest any sample not at least 10 times the MDL for that target analyte along with a reanalysis of new preparation blank.

18.7.7 For 6020B, DoD & NC work, the acceptance criteria is no analytes can be detected at > ½ RL.

18.8 Laboratory Control Sample

18.8.1 Confirm that the agreement between true values and actual values for each analyte is ±20%.

18.8.2 If agreement is not ±20%, do not report the results for any associated sample with the out-of-control LCS.

18.8.3 For DoD work, Refer to the control limits in the DoD QSM Appendix D unless project specific limits are provided.

18.9 Spike Sample Analysis (S)

18.9.1 Spike recovery for both aqueous and sediment, sludge and soil batches must be within the limits of 75-125%.

18.9.2 For sediment, sludge and soil batches both spike and spike duplicate results are governed by the above criteria.

18.9.3 Additionally, ensure that agreement between the spike and duplicate spike results is within 20% of each other.

18.9.4 Calculate spike Recoveries as follows:

$$\% \text{ Recovery} = \frac{SSR - SR}{SA} \times 100$$

Where: SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added

Note: When sample concentration is less than the MDL, the sample result value is understood to equal zero and is reported as undetected.

18.9.5 The Relative Percent Difference between spike and duplicate results is

$$RPD = \frac{SS - SSD \quad X\ 100}{(SS + SSD)/2}$$

Where: RPD = Relative Percent Difference
SS = Sample Spike Value
SSD = Sample Spike Duplicate Value

18.10 Duplicate Sample Analysis (D)

18.10.1 Calculate the Relative Percent Difference (RPD) for each analyte as follows:

$$RPD = \frac{S - D \quad X\ 100}{(S = D)/2}$$

Where: RPD = Relative Percent Difference
S = Original Sample Value
D = Duplicate Sample Value

18.10.2 Use the control limit of 20% for RPD when the original result > 10X LOQ.

18.10.3 When the average between the original and duplicate results is less than 10X LOQ, calculate the control limit as follows:

$$\text{Control Limit} = \frac{\text{Method Detection Limit} \quad X\ 100}{\text{Average of original and duplicate result}}$$

18.11 ICP Serial Dilution Analysis (L)

18.11.1 if the analyte concentration is at a minimum of 25x LLOQ, ensure that the 5x serial dilution agrees within 20%, if not, suspect a chemical or physical interference effect. Note the non-conformance in case narrative for 6020B.

18.11.2 if the analyte concentration is at a minimum of 50x LLOQ, ensure that the 5x serial dilution agrees within 10%, if not, suspect a chemical or physical interference effect. Note the non-conformance in case narrative for DOD.

18.11.3 Calculate the Percent Difference for each analyte as follows:

$$\%\ Difference = \frac{I - S\ X\ 100}{I}$$

Where: I = Initial Sample Result
S = Instrument Serial Dilution Result x 5

18.12 Linear Range Analysis or Linear Dynamic Range (LDR)

18.12.1 Samples having concentrations exceed the calibration range should be diluted into calibration range.

18.12.2 Use highest calibration standard as Linear Dynamic Range.

18.13 Reporting Level Standard (CRI) and LLQC, LLOQ standard for 6020B or LLCCV for DOD

18.13.1 The acceptance range for the reporting level standard CRI is 70-130% except for Co, Mn, Zn, Al, Fe, Mg, K, Na and Ca at 50-150%. The acceptance range for the LLQC standard is 70-130% recovery. For Method 6020B, acceptance range for the LLOQ standard is 65-135% recovery

18.13.2 For 6020B, **USACE/DoD work** -The acceptance range for the reporting level standard is ± 20%. The lowest standard will be set at the RDL.

18.14 Sample Analysis

18.14.1 Diluted all samples that exceed the highest standard in the calibration curve.

18.14.2 Flag the first results as estimated when a dilution is needed.

18.14.3 When sample result is above highest calibration standard, the sample will be diluted and results will be reported within the calibration range.

18.15 Internal Standards (ISTD)

18.15.1 No ISTD must deviate from 70-130%.

18.15.2 If criteria are not met, run 5x dilution.

18.15.3 For DOD, ISTD intensity in the samples within 30-120% of intensity of the IS in ICAL Blank.

18.15.4 For DOD, If Internal standard recoveries are not acceptable for field sample then re-analyze sample at 5x dilution until criteria is met.

18.16 Post digestion Spike

18.16.1 The post digestion spike must meet 75-125% for 6020B.

18.16.2 The Post digestion spike must meet 80-20% for DOD.

18.17 Limit of Detection

18.17.1 All analytes spiked should be positively identified.

18.17.2 The apparent signal to noise ratio at the LOD must be at least three and the results must meet all method requirements for analyte identification.

18.18 Limit of Quantitation

18.18.1 Analysis must meet the acceptance criteria 70-130%.

19. Corrective Actions for Out-of-Control Data

19.1 Method Blank

19.1.1 if concentrations exceed ½ reporting limit, then should be re-analyzed once. If still unacceptable, then re-digest and re-analyze the samples.

19.2 Laboratory Control Sample (LCS)

19.2.1 Reanalyze the LCS if it does not meet criteria. If the limits are still not met after two consecutive analyses, re-prepare and re-analyze all samples in that batch.

19.2.2 For DoD work, reprep and reanalyze the LCS and all associated samples if it exceeds the QC criteria

19.2.3 For DoD work, if it is not possible to redigest the samples and associated QC, then Q flag must be applied to the specific failing analyte in all sample results in the associated preparation batch.

19.3 Spike sample

19.3.1 If the matrix spikes are not within recovery limits, perform a post-spike analysis for that element.

19.3.2 If upon re-analysis the matrix spike recoveries are still outside acceptable criteria, and the LCS is within acceptable criteria, note this in the laboratory notebook and tell your supervisor. Place a note in the case narrative section of the final data package.

19.3.3 For DoD work, If the matrix spikes are not within recovery limits, perform a post-spike analysis for that element.

19.4 Initial Calibration Verification (ICV)
19.4.1 If the ICV fails to meet criteria reanalyze.
19.4.2 If the ICV fails twice then recalibrate the instrument.

19.5 Initial Calibration Blank (ICB)
19.5.1 If the absolute value of the calibration blank exceeds the CRQL for any target analyte, do not report those associated target analyte sample results.
19.5.2 Instead, reanalyze these samples following instrument recalibration with an in-control ICB.

19.6 Interference Check Sample (ICS)
19.6.1 If the criteria are not met, rerun the interferent check solutions.
19.6.2 If ICS still fails, recalibrate the instrument.

19.7 Continuing Calibration Verification (CCV)
19.7.1 If the CCV fails to meet criteria reanalyze.
19.7.2 If the CCV fails to meet criteria for the second time, all samples analyzed after the last acceptable CCV must be reanalyzed.
19.7.3 If the LLCCV standard fails to meet criteria, then all samples associated with the LLCCV are reanalyzed.

19.8 Initial Calibration Curve(ICC)
19.8.1 If the ICC does not meet calibration requirements recalibrate.
19.8.2 If the ICC does not meet the calibration requirements have instrument serviced. Notify the Supervisor and the Department Manager
19.8.3 If Low level standard read back fail to meet acceptance criteria then re-analyze initial calibration.

19.9 Internal Standard
19.9.1 If the internal standard fails to meet the requirements for the blank verify the cause of the problem and reanalyze all samples.
19.9.2 If the internal standard fails to meet the requirements for samples dilute 5x and re-analyze For 6020B and DOD.

19.10 Limit of Detection
19.10.1 If LOD verification fails, then repeat the detection limit determination and LOD verification at a higher concentration and set the LOD at the higher concentration.

19.11 Limit of Quantitation
19.11.1 Reevaluate the LOQ when outside the acceptance limit 70-130%.

19.12 Reporting Level Standard (CRI) and LLQC standard or LLCV for DOD
19.12.1 Reanalyze. If it still fails, note in the case narrative.
19.12.2 For DOD, no samples shall be analyzed without a valid Low-level calibration check standard (LLCCV).

20. Contingencies for Handling Out-of-Control or Unacceptable Data

20.1 When all above corrective measures have been taken and the data remains outside the quality assurance criteria set forth above, immediately contact your supervisor and inform the individual of the situation.

20.2 Document the situation clearly in your laboratory notebook and place a copy of the information in the case narrative of the final data report.

20.3 The supervisor must then contact the Quality Assurance Officer, Laboratory Manager, and Technical Director and notify them of the situation. A corrective action plan will be developed amongst these individuals and implemented.

21. Waste Management

21.1 Keep samples for 180 days and dispose them off according to the procedures explained in the SOP for waste disposal.

22. References

22.1 Department of Defense Quality Systems Manual for Environmental Laboratories Version 5.3 September 2019.

22.2 Method 6020B, SW 846 Update V, Revision 2, July 2014 – Inductively Coupled Plasma – Mass Spectrometry.

23. Appendices

23.1	Table 1	Metals Standards Preparation
23.2	Table 2	Metals Standard and Spike Concentration
23.3	Table 3	ICV
23.4	Table 4	"True Value" Concentrations for the elements in Interference Check Sample Part A and Part B
23.5	Table 5	Calibration standard concentrations
23.6	Appendix A	Reporting Limits
23.7	Appendix B	Mass of measurement
23.8	Appendix C	Example Tune Report (Agilent Technologies ICP-MS, 7900)

Table 1 Metals Standards Preparation

Blank/ICB/CCB solution – Prepare by adding 12.5mL HCl + 25mL Nitric acid, and make final volume to 2.5L with DI water

Standard S7 – Prepare by adding 0.5mL 1000ug/mL Copper, Manganese and Zinc each + 0.95mL 10000ug/mL Aluminum + 2.0mL 1000ug/mL Barium, Molybdenum, Titanium + 2.45mL 10000ug/mL Iron and Potassium each + 4.95mL 10000ug/mL Calcium, Magnesium and Sodium each + 25mL Calibration Standard Method 6020 + 0.5mL CHEM-CLP-4 + 0.5mL 1000PPM of Uranium, Strontium, Thorium, Zirconium + 5mL of Concentrated HNO3 + 2.5mL of Concentrated HCL and make final volume 500mL with DI Water.

CCV – Prepare by adding 0.25mL 1000ug/mL Copper, Manganese and Zinc each + 2.475mL 10000ug/mL Aluminum + 1mL 1000ug/mL Barium, Molybdenum, Titanium + 6.225mL 10000ug/mL Iron and Potassium each + 12.475mL 10000ug/mL Calcium, Magnesium and Sodium each + 12.5mL Calibration Standard Method 6020 + 0.25mL CHEM-CLP-4 + 0.25mL 1000PPM of Uranium, Strontium, Thorium, Zirconium + 5mL of Concentrated HNO3 + 2.5mL of Concentrated HCL and make final volume 500mL with DI Water.

Standard S6 – Prepare by adding 50mL Standard S7 to 50mL Blank solution to make Final Volume 100mL.

Standard S5 – Prepare by adding 25mL Standard S7 to 75mL Blank solution to make Final Volume 100mL.

Standard S4 – Prepare by adding 12.5mL Standard S7 to 87.5mL Blank solution to make Final Volume 100mL.

Standard S3 – Prepare by adding 10 mL Standard S6 to 90mL Blank solution to make Final Volume 100mL.

Standard S2 (concentrated solution) – Prepare by adding 0.05mL 1000ug/mL Arsenic, Beryllium, Cadmium, Cobalt, Lead, Manganese, Nickel, Silver, Thallium, Uranium, Strontium, Thorium, Zirconium each + 0.1mL 10000ug/mL Aluminum + 0.1mL 1000ug/mL Antimony, Chromium, Copper and Zinc each + 0.25mL CHEM-CLP-4 + 0.25mL 1000ug/mL Selenium and Vanadium each + 0.5mL 1000ug/mL Barium + 0.25mL 10000ug/mL Iron + 2.5mL 10000ug/mL Calcium, Magnesium, Potassium and Sodium each and make final volume 250mL with Blank solution.

Note: The final concentration of Standard S1 (concentrated solution in ug/L) = 200X CRQL concentration for water matrix.

Standard S2 (working solution) – Prepare by adding 0.5mL Standard S2 (concentrated solution) to 99.5mL Blank solution to make Final Volume 100mL.

Standard S1 – Prepare by adding 10mL of Standard S2 to 90mL of Blank Solution to make Final Volume 100mL.

Standard S8 – Prepare by adding 5.0mL of 10000PPM Calcium, Magnesium, Sodium + 2.5mL of 10,000PPM Iron, Potassium + 1.0mL of 10,000PPM Aluminum and make Final Volume 100mL with Blank Solution

LCS/MS/MSD for Water: Spike the solution approximately at mid-point of the calibration curve. LCS prepared by adding 1.0mL (M&B SPIKE-1) + 1.0mL (M&B SPIKE-2) +1.0mL (M&B SPIKE-3) + 1.0mL (M&B SPIKE-4) to final volume 50mL. Please refer Table 7.

LCS/MS/MSD for Soil: Spike the solution approximately at mid-point of the calibration curve. LCS prepared by adding 2.0mL (M&B SPIKE-1) + 2.0mL (M&B SPIKE-2) +2.0mL (M&B SPIKE-3) + 2.0mL (M&B SPIKE-4) to final volume 100mL. Please refer Table 7.

Prepare LCS/MS/MSD Spiking solutions M&B SPIKE-1, M&B SPIKE-2, M&B SPIKE-3, M&B SPIKE-4 as per Table 6.

Table 2 Metals Spiking Stock Standards

Stock Standard Catalog Number	Analytes Present	Initial Concentration (µg/mL)
Standard Mix 6020 Cal 1	Ba, Co, Mn, Ni, V, Zn, Cu, Cr, Be, Ag, Sb, As, Se, Tl, Pb, Cd, Na, K, Ca, Mg, Al, Fe	20
CHEM-CLP-4 Zirconium Strontium	Mo, B, Sn, Ti, Si Zr Sr	1000 1000 1000
ISS	Bi, In, Li, Rh, Y, Sc, Ho, Tb	10
Tune Solution	Be, Mg, Co, In, Pb	10
IV-STOCK-12	Ba, Be, Bi, Ce, Co, In, Li, Ni, Pb, U	10
Mg 10 PPM	Mg	10000

Tune Solution Preparation: Tune solution prepared by adding 2 ml of IV-STOCK-12 + 2 ml of MG 10 PPM and make final volume to 100 ml with blank solution. Final concentration 200 PPB

Table 3 ICV (Concentrations subject to change)

Element	Concentration (µg/L)
Aluminum	504
Antimony	199
Arsenic	200
Barium	99
Beryllium	99
Cadmium	99
Calcium	2005
Chromium	98
Cobalt	100
Copper	98
Iron	1016
Lead	200
Magnesium	1215
Manganese	100
Nickel	101
Potassium	2004
Selenium	206
Silver	100
Sodium	2019
Thallium	206
Vanadium	100
Zinc	205
Boron	500
Molybdenum	500
Silicon	500
Tin	500
Titanium	500
Thorium	500
Uranium	500
Strontium	500
Zirconium	500

Table 4: "True Value" Concentrations for the Elements in Interference Check Sample Part A and Part B (Concentrations Subject to Change)

Element	Concentration (µg/L)	
	Part A	Part B
Al	[100000]	[100000]
Sb	(1.5)	22
As	(0.1)	19
B	(0)	(0)
Ba	(1.2)	22
Be	(0)	19
Cd	(0.7)	20
Ca	[100000]	[100000]
C	[200000]	[200000]
Cl	[1000000]	[1000000]
Cr	21	40
Co	1	20
Cu	8	25
Fe	[100000]	[100000]
Pb	4	25
Mg	[100000]	[100000]
Mn	7	27
Ni	6	24
P	[100000]	[100000]
K	[100000]	[100000]
Se	(0.3)	19
Ag	(0)	18
Na	[100000]	[100000]
S	[100000]	[100000]
Tl	(0)	21
V	(0.5)	19
Zn	11	29
Mo	[2000]	[2000]
Sn	(0)	50
Ti	[2000]	[2000]
Th	(0)	50
Sr	(0)	50
U	(0)	50
Zr	(0)	50

[ ] Indicates analytes that do not require ICP-MS determination in the ICS
( ) Indicates analyte values that are less than the CRQL and the value is to be used as a set point for the ±2 times CRQL acceptance criteria calculations

Table 5: Calibration standard concentrations

Element	Standard Concentration (ug/L)							
	Std. S1	**Std. S2**	**Std. S3**	**Std. S4**	**Std. S5**	**Std. S6**	**Std. S7**	**Std. S8**
Be	0.1	1	50	125	250	500	1000	-
B	2.5	25	50	125	250	500	1000	-
Na	50	500	5000	12500	25000	50000	100000	500,000
Mg	50	500	5000	12500	25000	50000	100000	500,000
Al	2	20	1000	2500	5000	10000	20000	100,000
Si	1	10	50	125	250	500	1000	-
P	0	0	1000	2500	5000	10000	20000	-
K	50	500	2500	6250	12500	25000	50000	250,000
Ca	50	500	5000	12500	25000	50000	100000	500,000
Ti	0.5	5	250	625	1250	2500	5000	-
V	0.5	5	50	125	250	500	1000	-
Cr	0.2	2	50	125	250	500	1000	-
Mn	0.1	1	500	1250	2500	5000	10000	-
Fe	5	50	2500	6250	12500	25000	50000	250,000
Co	0.1	1	50	125	250	500	1000	-
Ni	0.1	1	50	125	250	500	1000	-
Cu	0.2	2	500	1250	2500	5000	10000	-
Zn	0.2	2	500	1250	2500	5000	10000	-
As	0.1	1	50	125	250	500	1000	-
Se	0.5	5	50	125	250	500	1000	-
Mo	0.5	5	250	625	1250	2500	5000	-
Ag	0.1	1	50	125	250	500	1000	-
Cd	0.1	1	50	125	250	500	1000	-
Sn	0.5	5	50	125	250	500	1000	-
Sb	0.2	2	50	125	250	500	1000	-
Ba	1	10	250	625	1250	2500	5000	-
Tl	0.1	1	50	125	250	500	1000	-
Pb	0.1	1	250	625	1250	2500	5000	-
U	0.1	1	50	125	250	500	1000	-
Sr	0.1	1	50	125	250	500	1000	-
Zr	0.1	1	50	125	250	500	1000	-

TABLE 6 : Metals Spiking Working Standard (* or equivalent)

Standard Name	Supplier*	Analyte	Standard Concentration (ug/mL)	Amount of solution in 100mL	Concentration of working standard (ug/mL)
M & B Spike-1	Inorganic Venture	Cobalt	1000	2.5 mL	25
	Inorganic Venture	Thallium	1000	2.5 mL	25
	Inorganic Venture	Arsenic	1000	2.5 mL	25
	Absolute Standards	Nickel	1000	2.5 mL	25
	Absolute Standards	Selenium	1000	2.5 mL	25
	Inorganic Venture	Beryllium	1000	2.5 mL	25
	Inorganic Venture	Vanadium	1000	2.5 mL	25
	Inorganic Venture	Uranium	1000	2.5 mL	25
	Inorganic Venture	Cadmium	1000	2.5 mL	25
	Inorganic Venture	Silver	1000	2.5 mL	25
	Inorganic Venture	Strontium	1000	2.5 mL	25
	Inorganic Venture	Zirconium	1000	2.5 mL	25
	Absolute Standards	Antimony	1000	2.5 mL	25
	Absolute Standards	Chromium	1000	2.5 mL	25
M & B Spike-2	Inorganic Venture	Iron	10000	12.5 mL	1250
	Inorganic Venture	Barium	1000	12.5 mL	125
	Absolute Standards	Titanium	1000	10 mL	100
	Absolute Standards	Potassium	10000	12.5 mL	1250
	Absolute Standards	Aluminum	10000	5.0 mL	500
	Inorganic Venture	CHEM-CLP-4 (Boron, Molybdenum, Silicon, Tin, Titanium)	1000	2.5 mL	25
	Absolute Standards	Molybdenum	1000	10 mL	100
Standard Name	**Supplier***	**Analyte**	**Standard Concentration (ug/mL)**	**Amount of solution in 50mL**	**Concentration of working standard (ug/mL)**
M & B Spike-3	Absolute Standards	Manganese	1000	12.5	250
	Absolute Standards	Zinc	1000	12.5	250
	Absolute Standards	Copper	1000	12.5	250
	Absolute Standards	Lead	10000	0.625	125
M & B Spike-4	Absolute Standards	Calcium	10000	12.5	2500
	Absolute Standards	Magnesium	10000	12.5	2500
	Absolute Standards	Sodium	10000	12.5	2500

TABLE 7 : Amount of Metals Spiking working Standard used for digestion

Stock Standard Catalog Number	Analytes Present	Concentration of working Std. (µg/mL)	Amount for water matrix (mL) *	Amount for Soil matrix (mL) *	Final Concentration (µg/mL)
M & B Spike -1	Co, Tl, As, Ni, Se	25	**1.0**	**2.0**	0.5
	Be, V, U, Cd, Ag				
	Sr, Zr, Sb, Cr				
M & B Spike -2	Al	500	**1.0**	**2.0**	10
	Fe, K	1250			25
	Ba	125			2.5
	Ti, Mo	100			2.0
	B, Mo, Si, Sn, Ti (CHEM-CLP-4)	25			0.5
M & B Spike -3	Cu, Mn, Zn	250	**1.0**	**2.0**	5
	Pb	125			2.5
M & B Spike -4	Ca, Mg, Na	2500	**1.0**	**2.0**	50

*Final Digested volume is **50mL** for water matrix
*Final Digested volume is **100mL** for soil matrix.

Appendix A

Reporting Limits

Analyte	RL mg/Kg Soil	RL µg/L Water
Aluminum	2.0	20.0
Antimony	0.2	2.0
Arsenic	0.1	1.0
Barium	1.0	10.0
Beryllium	0.1	1.0
Cadmium	0.1	1.0
Calcium	50.0	500.0
Chromium	0.2	2.0
Cobalt	0.1	1.0
Copper	0.2	2.0
Iron	5.0	50.0
Lead	0.1	1.0
Magnesium	50.0	500.0
Manganese	0.1	1.0
Nickel	0.1	1.0
Potassium	50.0	500.0
Selenium	0.5	5.0
Silver	0.1	1.0
Sodium	50.0	500.0
Thallium	0.1	1.0
Vanadium	0.5	5.0
Zinc	0.2	2.0
Boron	2.5	25.0
Molybdenum	0.5	5.0
Tin	0.5	5.0
Titanium	0.5	5.0
Uranium	0.1	1.0
Strontium	0.1	1.0
Zirconium	0.1	1.0

Appendix B

Mass of Measurement

Analyte	Mass
Aluminum	27
Antimony	121
Arsenic	75
Barium	137
Beryllium	9
Cadmium	111
Calcium	44
Chromium	52
Cobalt	59
Copper	63
Iron	57
Lead	208
Magnesium	24
Manganese	55
Molybdenum	98
Nickel	60
Potassium	39
Selenium	82
Silver	107
Sodium	23
Thallium	205
Vanadium	51
Zinc	66
Boron	10
Molybdenum	98
Tin	118
Titanium	47
Uranium	238
Strontium	88
Zirconium	90

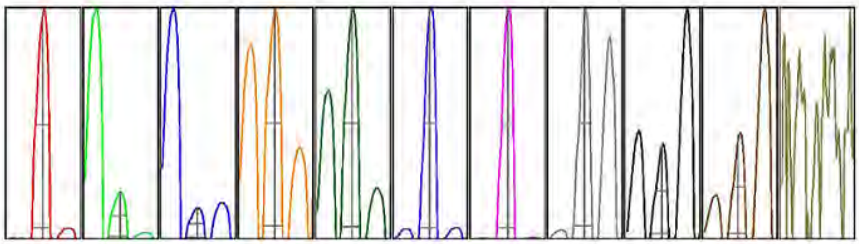
Appendix C

Example Tune Report (Agilent Technologies ICP-MS, 7900)

Performance Report for Tune

Mass Calibration verification

Integration Time [sec] = 0.1



Mass	Peak Height	Axis (Actual)	Axis (Required)	Axis (Flag)	Width-X% (Actual)	Width-X% (Required)	Width-X% (Flag)
9	606	9.00	8.9 - 9.1		0.740	0.900	
24	14580	24.00	23.9 - 24.1		0.785	0.900	
25	1970	25.00	24.9 - 25.1		0.786	0.900	
26	2352	26.00	25.9 - 26.1		0.785	0.900	
59	9640	59.00	58.9 - 59.1		0.778	0.900	
113	988	113.00	112.9 - 113.1		0.730	0.900	
115	22192	115.05	114.9 - 115.1		0.726	0.900	
206	3718	206.00	205.9 - 206.1		0.758	0.900	
207	3270	207.00	206.9 - 207.1		0.730	0.900	
208	7755	207.95	207.9 - 208.1		0.728	0.900	
220			-				

X% = 5 **Integration Time [sec] =** 0.1 **Acquisition Time [sec] =** 268 **Y Axis =** Linear

Appendix C (Continue)

Tune Conditions

Tune Parameters

Plasma Paramters

ParameterName	Value	Unit	ParameterName	Value	Unit	ParameterName	Value	Unit
RF Power	1600	W	Carrier Gas	0.80	L/min			
RF Matching	1.80	V	Option Gas	0.0	%			
Smpl Depth	10.0	mm	Nebulizer Pump	0.10	rps			
S/C Temp	2	℃						

Lenses Parameters

ParameterName	Value	Unit	ParameterName	Value	Unit	ParameterName	Value	Unit
Extract 1	0.0	V	Omega Lens	7.8	V			
Extract 2	-200.0	V	Cell Entrance	-30	V			
Omega Bias	-110	V	Cell Exit	-50	V			
Deflect	13.0	V						

Cell Parameters

ParameterName	Value	Unit	ParameterName	Value	Unit	ParameterName	Value	Unit
Use Gas	false		OctP Bias	-8.0	V			
He Flow	0.0	mL/min	OctP RF	180	V			
Energy Discrimination	5.0	V						

[He]

Mass	Count (Mean)	RSD% (Actual)	RSD% (Required)
59	14912	0.18	
89	1338	10.58	
205	459	2.67	

Mass	Replicate 1 Count	Replicate 2 Count	Replicate 3 Count	Replicate 4 Count	Replicate 5 Count
59	14892	14935	14941	14880	14911
89	1512	1434	1336	1250	1157
205	447	479	461	451	458

Integration Time [sec] = 0.1

Tune Parameters

Plasma Paramters

ParameterName	Value	Unit	ParameterName	Value	Unit	ParameterName	Value	Unit
RF Power	1600	W	Carrier Gas	0.80	L/min			
RF Matching	1.80	V	Option Gas	0.0	%			
Smpl Depth	10.0	mm	Nebulizer Pump	0.10	rps			
S/C Temp	2	℃						

Lenses Parameters

ParameterName	Value	Unit	ParameterName	Value	Unit	ParameterName	Value	Unit
Extract 1	0.0	V	Omega Lens	7.9	V			
Extract 2	-195.0	V	Cell Entrance	-40	V			
Omega Bias	-105	V	Cell Exit	-60	V			
Deflect	2.6	V						

Cell Parameters

ParameterName	Value	Unit	ParameterName	Value	Unit	ParameterName	Value	Unit
Use Gas	true		OctP Bias	-18.0	V			
He Flow	4.1	mL/min	OctP RF	200	V			
Energy Discrimination	5.0	V						

Appendix C (Continue)

Sensitivity and stability

[No Gas]

Mass	Count (Mean)	RSD% (Actual)	RSD% (Required)	RSD% (Flag)
9	3314	1.32	5.00	
24	85007	0.59	5.00	
25	11519	0.70	5.00	
26	13646	1.16	5.00	
59	53514	0.42	5.00	
113	4962	1.77	5.00	
115	111007	1.87	5.00	
206	17703	0.92	5.00	
207	15733	0.46	5.00	
208	38141	0.57	5.00	
220	4	51.99		

Mass	Replicate 1 Count	Replicate 2 Count	Replicate 3 Count	Replicate 4 Count	Replicate 5 Count
9	3290	3286	3296	3307	3391
24	84862	84371	84815	85667	85320
25	11419	11621	11581	11478	11497
26	13520	13635	13472	13757	13849
59	53401	53267	53804	53686	53412
113	5100	4953	4969	4933	4857
115	114186	111933	110331	109207	109377
206	17469	17804	17790	17854	17597
207	15673	15648	15754	15766	15823
208	37787	38164	38329	38308	38120
220	4	3	5	6	1

Integration Time [sec] = 0.1

CHEMTECH 284 Sheffield Street, Mountainside, NJ 07092 (908) 789-8900

READ RECEIPT

Employee Name: _____

Department: _____

_____**M6020B-Metals ICPMS**_____
Method or Document Read (Include Title, Number, Revision, as applicable)

Employee Statement: I have read and understood the information in the above mentioned method or document.

_____ _____
Employee Signature Date

Supervisory Statement: I have reviewed this document or method with the employee.

_____ _____
Supervisor Signature Date

Note: This receipt is to be returned to the Quality Assurance/Quality Control Department for incorporation into employee training record files. If you have questions or would like to review your train record files, please see QA/QC Director.

MERCURY ANALYSIS IN SOIL AND SEDIMENTS BY COLD VAPOR TECHNIQUE

1. Test Method

1.1 Determination of Mercury in Soil and Sediments by Manual Cold Vapor Technique by SW-846, Method 7471B.

2. Applicable Matrices

2.1 Soils, sediments, and solid waste

3. Reporting Limit

3.1 0.014 mg/Kg.

4. Scope and Application

4.1 This method is used for the analysis of Mercury in soils and sediments. Samples are subjected to a heated wet oxidation procedure that breaks down organo-mercury compounds prior to analysis by atomic absorption.

4.2 Some modifications to the Manual Mercury method have been made to accommodate the auto sampler capabilities of the Leeman PS200 system.

5. Summary of Method

5.1 Manual Cold Vapor Atomic Absorption Spectroscopy

5.1.1 Samples and standards are digested using a block digestor, and analyzed manually by cold vapor atomic absorption spectroscopy.

5.1.2 Samples, standards, blanks and QC samples are then run on the analyzer where the auto sampler system adds stannous chloride to form elemental mercury vapor.

5.1.3 The vapor is carried into an optical cell where the absorbance of Mercury at 254nm is measured using a solid state detector.

6. Definitions

6.1 Block Digestor: Piece of equipment that heats the sample in the presence of reagents in order to oxidize. It also reduces the volume of digestate to a pre-determined volume.

6.2 Calibration Blank: A volume of ASTM type II reagent water prepared in same manner (acidified) as the calibration standard.

6.3 Calibration Standard: A solution prepared from the mercury stock standard solution that is used to calibrate the instrument response with respect to analyte concentration.

6.4 Instrument Detection Limit: The mercury concentration that produces a signal equal to three times the standard deviation of the blank signal.

6.5 Method Detection Limit: The minimum concentration of mercury that can be identified, measured, and reported with 99% confidence that the analyte concentration is greater than zero and determined from analysis of seven replicates.

6.6 Stock Standard Solution: A concentrated mercury solution or stock standard solution purchased from a certified commercial source.

7. Interferences

7.1 Some samples with high levels of chloride and may produce chlorine gas after digestion.

7.1.1 To prevent false positive results vent samples under the fume hood and purge dead space in digestion vessel with an empty wash bottle prior to analysis.

7.1.2 Additional potassium permanganate may also be added in the presence of high chloride and to samples with strong reducing properties.

7.1.3 Shake and add additional portions of $KMnO_4$ solution until purple color persists for at least 15 minutes.

7.2 Some samples contain high levels of aromatic compounds such as benzene may also cause false positive interferences.

7.2.1 Where this is suspected, run samples under oxidizing (unreduced) conditions and compare the absorbance with the reduced sample absorbance.

7.2.2 A signal under oxidizing conditions may indicate a positive interference. Subtract this absorbance from the reduced absorbance to obtain a corrected value.

7.2.3 This approach is subject to error and may require further investigation to determine the presence of interference.

7.3 Samples that contain high levels of sulfide may be treated with additional potassium permanganate prior to digestion in order to eliminate interferences.

8. Safety

8.1 The toxicity and carcinogenity of each reagent used in this method has not been fully established. Each chemical should be regarded as a potential health hazard and exposure to these compounds should be minimized.

8.2 Always wear safety glasses for eye protection when working with these reagents.

8.3 Mercury compounds are highly toxic if swallowed, inhaled or absorbed through skin. Use protective gloves when handling concentrated mercury standards.

9. Equipment and Supplies

9.1 Leeman Labs PS200 and Leeman Labs HydraII AA Analyzer from Teledyne Leeman Labs with all manufacturer specified accessory equipment

9.2 Instrument Software (CV1): Envoy 1.9 sp1 (ADO version:6:1)

9.3 Instrument Software (CV1): FTD DLL Version (0x30112)

9.4 Instrument Software (CV2): Win Hg Runner 1.4 (CT Rev 0.286)

9.5 Argon gas (99.998% pure)

9.6 Block digestor tubes Environmental Express #CSC15479.4

9.7 100mL graduated cylinders

9.8 100, 500, 1000 and 2000mL volumetric flasks

9.9 Pipettors

9.10 Thermometer

9.11 Stir bar VWR HTR8068
9.12 Magnetic stirrer
9.13 Adam Highland HCB 1002
9.14 Block digestor Environmental Express Hot Block Model SC154
9.15 Spatula or equivalent tool

10. Reagents and Standards

10.1 Reagent water
10.2 *Potassium Permanganate solution, 5%*: Dissolve 100g $KMnO_4$ in 2000mL reagent water, JT Baker 3227-05
10.3 *Stannous Chloride solution, 5%*: Add 50g $SnCl_2.2H_2O$ to 50mL concentrated HCl and bring the volume to 500mL with deionized water. This mixture is a suspension and should be stirred continuously during use. JT Baker 3980-01
10.4 Mercury calibration standards (See Appendix A)
10.5 Aqua Regia (3:1 HCl:HNO_3) – Prepare immediately before use. Carefully add 3 volumes of HCl to one volume Conc. HNO_3.

11. Sample Handling and Preservation

11.1 Collect samples in plastic containers.
11.2 Store soil and sediments at 4±2°C
11.3 The holding time is 28 days from date of receipt.

12. Quality Control

12.1 Initial Calibration and Initial Calibration Verification (ICV)
12.1.1 Calibrate the instrument prior to each analytical run.
12.1.2 Indicate the date and time of the calibration on the rawdata.
12.1.3 Run the ICV using an independent standard at a concentration of 4.0 µg/L (Source - EPA) immediately after the initial calibration and before sample analyses.
12.2 Continuous Calibration Verification (CCV)
12.2.1 Analyze 5 µg/L of the standard solution at the beginning and end of each sequence and every 10 samples.
12.3 Initial Calibration Blank (ICB)
12.3.1 Prepare a volume of ASTM type II reagent water in the same manner as the calibration standards (acidified).
12.3.2 Analyze immediately after the ICV.
12.4 Continuing Calibration Blank (CCB)
12.4.1 Analyze the CCB immediately following the CCV and after the second and all subsequent CCVs.
12.5 Preparation Blank (PBS)
12.5.1 Subject the PBS (a sample of reagent water) to the same digestion procedures as the samples and is use it to determine if the method analyte or other interferences are present in the laboratory environment, reagents or apparatus.

12.6 Low Standard (CRA) or Low Level Calibration Check Standard (LLCCV for DOD)

12.6.1 Subject the low standard (CRA) or LLCCV, samples to which known quantities (0.2 µg/L) of the method analyte are added, to the same digestion procedures as the samples.

12.6.2 Use the low standard to determine whether the methodology is in control and whether the laboratory is capable of making accurate and precise measurements.

12.7 Laboratory Control Sample LCS

12.7.1 Digest using 0.5-0.6 grams of PTFE Boiling Stone and subject to the same digestion procedures as the samples.

12.7.2 Perform this procedure at a minimum for every 20 samples or one per sample digestion batch type, whichever is greater.

Note: The LCS concentration constitutes sample background concentration used in the recovery calculation of the S and D (See Sample Matrix and Sample Duplicate - Section 12.8).

12.7.3 Analyses of LCS indicate precision associated with laboratory procedures, but not with sample collection, preservation, or storage procedures.

12.8 Sample Matrix Spike (MS) and Sample Duplicate (D)

12.8.1 Digest and analyze two aliquots of the same sample taken in the laboratory to which a known amount (4 µg/L) of analyte has been added.

12.8.2 Perform this procedure at a minimum for every 20 samples or one per sample digestion batch type, whichever is greater.

12.9 Serial Dilution

12.9.1 Analyze one sample out of every batch diluted five fold for samples with concentration 5 times the estimated detection limit.

12.10 Limit of Detection (LOD)

12.10.1 Analyze 0.0035 mg/Kg concentration for LOD/MDL.

12.10.2 LOD is specific to each combination of analyte, matrix, method (including sample preparation) and instrument configuration.

12.10.3 LOD must be verified quarterly.

12.10.4 LOD must be verified on each instrument used, and every time the method is modified.

12.10.5 For MDL procedure, please refer to SOP P203-Laboratory limits and demonstration of capability.

12.11 Limit of Quantitation (LOQ)

12.11.1 LOQ must be greater than the LOD.

12.11.2 LOQ must be verified quarterly for each quality system matrix, method and analyte, by analyzing QC sample containing the analytes of concern in each quality system matrix.

12.11.3 LOQ must be performed if the method is modified.

13. Calibration and Standardization

13.1 Initial Calibration

13.1.1 Calibrate the instrument prior to each analytical run.
13.1.2 Prepare the mercury calibration standards as described in *Appendix A*.
13.1.3 Digest the standards along with the samples.
13.1.4 Run the standards: 0.0, 0.2, 2.5, 5.0, 7.5 and 10 µg/L.
13.1.5 Generate a standard linear curve.
13.1.6 Accept the curve if the correlation coefficient equals 0.995 or greater.
13.1.7 If the correlation coefficient is less than 0.995, determine the cause of poor curve and recalibrate.
13.1.8 Calculate the % deviation between the low and end of the curve to assure linearity.
13.1.9 The calculated concentration of reporting calibration level must be within 70-130% and mid-level standard must be within 90-110%.

14. Procedure

14.1 Sample Preparation

14.1.1 Weigh 0.50-0.60 g (take 0.2g portions from 3 different spots) of well-mixed sample and place in the block digestion tubes.
14.1.2 Add 1.5mL reagent water.
14.1.2 Add 1.5mL Aqua Regia mix into the digestion tubes.
14.1.3 Heat 2mins. in digestion block at 95±3°C.
14.1.4 Remove tube from digestion block and let cool.
14.1.5 Add 15ml of DI water, let it cool.
14.1.6 Add 4.5mL $KMnO_4$ solution. Color should persist for at least 15min. If not add an additional 4.5ml of $KMnO_4$.
14.1.7 Ensure that equal amounts of $KMnO_4$ are added to standards and blanks. Shake and add additional portions of $KMnO_4$ solution, if necessary, until purple color persists for at least 15mins.
14.1.8 Mix thoroughly.
14.1.9 Place digestion tubes in the digestion block at 95±3ºC.
14.1.10 Note the time when the water reaches 95±3ºC following placement of tubes in the bath.
14.1.11 Record this as Digestion Start Time.
14.1.12 Heat samples for 30 minutes.
14.1.13 Remove digestion tubes from the digestion block.
14.1.14 Note time and record this as Digestion End Time.
14.1.15 Allow samples to cool to room temperature.
14.1.16 When samples are at room temperature, to each tube add 2.0mL Sodium Chloride-hydroxylamine hydrochloride solution to reduce the excess permanganate.
14.1.17 Then add 20ml of DI water.
14.1.18 The samples are now ready for analysis.
14.1.19 The instrument automatically adds Stannous Chloride to every standard, field and QC samples at the time of analysis.

14.2 Sample Analysis

14.2.1 *Instrument Power-Up/Set-Up Procedure:* Switch on all components of the Leeman PS200 system in the following order:

14.2.1.1 Argon gas cylinder (line side of regulator should read 60 psi)

14.2.1.2 Computer

14.2.1.2.1 At the DOS prompt (C:\) type "PS" and press Enter key. The PS menu appears on the monitor screen

14.2.1.2.2 Press the Menu (F1) key

14.2.1.2.3 Press "T" for Taskmaster

14.2.1.2.4 Press "1" for analyzer wakeup and warm up

14.2.1.3 Printer

14.2.1.4 Leeman PS200 Analyzer Unit-Press green button on the lower right front of the unit

14.2.1.5 Hollow cathode lamp-Press the blue bottom on the lower right front of the Analyzer unit

14.2.1.6 Fill rinse tank with acidified water

14.2.1.7 Move stannous chloride line from reagent rinse water to the stannous chloride solution.

15. Instrument Operation

15.1 Setting up Analytical Run

15.1.1 Press "MENU" function key. The main menu will appear on the monitor screen.

15.1.2 Press "P" for Protocol.

15.1.3 Press "G" for Get. Type "HGS".

Note: This will select the protocol (or method) that has been previously programmed.

- *Within this protocol is all internal information necessary to analyze all digested samples.*
- *If a new protocol is being established, consult Leeman Labs Manual.*

15.1.4 Type folder name according to the date on which the samples are analyzed.

15.1.4.1 For example, if the day is September 18, 2000 the folder name is 091800 (first run folder is - 091800A; second run - 091800B; etc.)

15.1.4.2 At the prompt “Folder does not exist”, Create (Y or N)? Answer "Y" if folder is to be created.

15.1.4.3 If folder is not to be created answer "N" and begin again by selecting "O" to Open folder.

15.1.5 Press "MENU" function key.

15.1.5.1 From the Main Menu, select "AUTOSAMPLER" and then "R" for rack entry. Type "HGS" for the first rack (samples 1-44) or "HGS1" for the second rack (samples 45-88).

15.1.5.2 Press "C" to clear previous sample identifications.
15.1.5.3 Press "Y" to respond yes to the prompt "Clear rack Entry?"
15.1.6 Enter new sample identifications using the following run sequence:
15.1.6.1 ICV
15.1.6.2 ICB
15.1.6.3 CCV1
15.1.6.4 CCB1
15.1.6.5 CRA (Low Standard 0.2 µg/L)
15.1.6.6 High Standard (10.0 µg/L)
15.1.6.7 CHK STD (7ppb)
15.1.6.8 PBS
15.1.6.9 LCSS
15.1.6.10 Samples to a maximum of 7
15.1.6.11 CCV
15.1.6.11 CCB
15.1.6.12 Samples to a maximum of 10
15.1.6.13 CCV
15.1.6.14 CCB, etc.
15.1.7 Press "MENU" function key. Press "S" for Setup.
15.1.7.1 Press the number "1". At the Rack prompt, answer "HGS" & press enter for the rack name.
15.1.7.2 Enter the number where the auto sampler is to begin sampling at the "FROM" prompt and the number where the auto sampler is to stop sampling (up to number 44) at the "TO" prompt.
15.1.7.3 If a second rack of samples is present, press the number "2" and answer "HGS1" for the rack name.
15.1.7.4 Enter the number where the auto sampler is to begin and end sampling in the rack.

15.2 Calibrating the Instrument
15.2.1 Press "MENU" function key to return to Main Menu.
15.2.2 Press "T" for Taskmaster
15.2.3 Press number 2 "Run Samples with 6 calibration standards". Instrument will calibrate and automatically print the curve.
15.2.4 Press "A" to accept the curve if the correlation coefficient equals 0.995 or greater.
15.2.5 If the correlation coefficient is less than 0.995, determine what difficulty has caused a poor curve to be generated and recalibrate.

15.3 Running Samples
15.3.1 Press "MENU" function key to return to Main Menu.
15.3.2 Press #3 "Run Samples using active protocol" or click F8 twice.
15.3.3 Instrument will analyze the samples using the auto sampler table with previously programmed sample identifications.

15.4 Shutdown Procedure
15.4.1 The auto analyzer is to be left in "OVERNITE" mode.
15.4.2 At the TASKMASTER menu

15.4.2.1 Press #5 "Put analyzer to sleep"
15.4.2.2 Move stannous chloride to reagent water vessel and dip the ends of $SnCl_2$ and sample end tubes in the deionized water
15.4.2.3 Refill rinse tank with acidified water

16. Method Performance

16.1 Method Detection Limit (MDL)
16.1.1 Please refer to SOP P203-Laboratory limits and demonstration of capability for MDL procedure.

17. Pollution Prevention

17.1 Use only the amounts of chemicals required. Do not make large quantities of solutions.
17.2 Use hood when working with acids.
17.3 Keep the area clean and clutter free in the digestion lab and around the instruments in order to avoid any mishaps.
17.4 Keep chemicals away from drains.
17.5 Properly collect and dispose of waste according to Chemtech's Waste Disposal SOP.
17.6 Laboratory is properly equipped with spill cleanup equipment and laboratory personnel trained. Depending upon the size and type of spill, it may be handled by the individual or department creating the spill or by specially trained personnel.
17.7 Small spills may occur routinely and shall be handled by the individual person or department creating the spill. Spill kits are stored in a blue basket or blue cover bin located in each laboratory and chemical storage area. The spill kits can handle water based, solvent and mercury spills. Specially trained personnel handle larger spills, which may pose a threat to health or environment involves a large volume not easily contained.
17.8 A detailed description of the procedure for handling a spill or accident is covered in the CHEMTECH Emergency and Contingency Plan.
17.9 The Safety Coordinator is responsible for implementing the Chemical Hygiene and the CHEMTECH Emergency and Contingency Plans. It is the responsibility of various company personnel to assist in implementing the different aspects of the Plan. These include: Laboratory Coordinator, Technical Director, Operations Manager, Department Managers and Supervisors.

18. Data Assessment and Criteria for QC

18.1 Initial Calibration and Initial Calibration Verification (ICV)
18.1.1 The correlation coefficient "r" must be ≥ 0.995.
18.1.2 The calculated concentration of reporting calibration level must be within 70-130% and mid-level standard must be within 90-110%.
18.1.3 Ensure that the agreement between the true value and the actual value is ±10%.

18.2 Continuous Calibration Verification (CCV)

18.2.1 Ensure that the agreement between the true value and the actual value is ±10% for all subsequent CCVs.

18.3 Initial Calibration Blank (ICB) and Continuing Calibration Blank (CCB)

18.3.1 The concentration of target analyte must be < RL.

18.3.2 For DOD, the concentration of target analyte must be < ½ RL

18.4 Method Blank

18.4.1 The concentration of target analyte must be < RL.

18.4.2 For DOD, the concentration of target analyte must be < ½ RL

18.5 Laboratory Control Sample

18.5.1 Ensure that the agreement between the results of LCS is ±20%.

18.6 Sample Matrix Spike (S) and Sample Spike Duplicate (SD)

18.6.1 Confirm that the S recovery is at or within ±25% to meet acceptance criteria for Method 7471A and within ±20% to meet acceptance criteria for Method 7471B.

18.6.2 Ensure that the agreement between S and D is at or <20%.

Note: Analyses of S and D indicate whether the sample matrix contributes bias to the analytical results and precision associated with laboratory procedures.

18.6.3 If these criteria are not met, reanalyze the LCS, S and D. If criteria are still not met, redigest the LCS, S and D Calculate recovery of S and D in the following manner:

$$R = \frac{Cs - C}{F} \times 100$$

Where:

R	=	Percent recovery
Cs	=	Fortified Sample concentration
C	=	Sample background concentration
F	=	Concentration equivalent of Hg added to Sample

18.7 Serial Dilution

18.7.1 Ensure that the agreement between the true value (undiluted sample) and the actual value (diluted sample) is ±10%.

18.8 Limit of Detection

18.8.1 All analytes spiked should be positively identified.

18.8.2 The apparent signal to noise ratio at the LOD must be at least three and the results must meet all method requirements for analyte identification.

18.9 Limit of Quantitation

18.9.1 Analysis must meet the acceptance criteria of 70-130%.

18.10 High Standard and Low Standard or Low Level Calibration Check Standard (LLCCV For DOD)

18.10.1 Confirm that the agreement between the true value and actual value is ±15% for high standard and ±30% for the low standard.

18.10.2 For DOD, all reported analytes in LLCCV must be within ±20% of the true value.

18.10 Laboratory Duplicate (D)

18.10.1 Ensure that the agreement between the results is <20%.

19. Corrective Actions for Out-of-Control Data

19.1 Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV)

19.1.1 If the QC criteria are not met for ICV or CCV, terminate the analysis and correct the problem.

19.1.2 Recalibrate the instrument and reanalyze all associated samples from last passing ICV or CCV.

19.2 Initial Calibration Blank (ICB)

19.2.1 If the absolute value the ICB exceeds the ±RL, terminate the analysis. For DoD work, ICB should contain no analytes detected ≥ ½ RL.

19.2.2 If criteria from section 19.2.1 do not meet, then Re-calibrate the instrument and start the run again beginning with ICV.

19.3 Continuing Calibration Blank (CCB)

19.3.1 If the absolute value of the CCB exceeds the ±RL, terminate the analysis. For DoD work, CCB should contain no analytes detected ≥ ½ RL.

19.3.2 If criteria from Section 19.3.1 do not meet, then Re-calibrate the instrument and reanalyze all associated samples from last passing CCB.

19.4 Preparatory Blank (PBS)

19.4.1 If the absolute value of the PBS exceeds the ±RL, rerun once. For DoD work, PB should contain no analytes detected ≥ ½ RL (Reporting Limit) or <1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater. If this requirement does not meet, rerun once.

19.4.2 If the absolute value of the PB exceeds again from section 19.4.1 requirement, discard all sample digestates associated with PB.

19.4.3 Determine source of contamination, re-digest and reanalyze the associated samples with a new LRB.

19.5 Serial Dilution

19.5.1 If the serial dilution sample does not meet the 10% criteria, document the failures in the non-conformance and/or case narrative.

19.6 Laboratory Control Sample

19.6.1 If the LCS recovery does not fall within control limits as per Section 18, rerun the LCS.

19.6.2 If the LCS recovery does not fall within control limits again, re-digest and reanalyze the associated samples.

19.6.3 If LCS fails criteria and if it is not possible to re-digest the samples & associated QC, then Q flag must be applied to the specific failing analyte in all sample results in the associated Prep Batch.

19.7 Limit of Detection

19.7.1 If LOD verification fails, then repeat the detection limit determination and LOD verification at a higher concentration and set the LOD at the higher concentration.

19.8 Limit of Quantitation

19.8.1 Reevaluate the LOQ, if analysis is outside the acceptance limit 70-130%

19.9 High Standard and Low Standard (CRA) or Low Level Calibration Check Standard (LLCCV for DOD)

19.9.1 If the ±15% & 30% criterion is not met, document the failures in the non-conformance and/or case narrative.

19.9.2 For DOD, If LLCCV fails to meet criteria of ±20% of the true value, then re-analyze once. If still fail, then identify and correct the source of problem and repeat initial calibration.

20. Contingencies for Handling Out-of-Control or Unacceptable Data

20.1 When all above corrective measures have been taken and the data remains outside the quality assurance criteria set forth above, immediately contact your supervisor and inform the individual of the situation.

20.2 Document the situation clearly in your laboratory notebook and place a copy of the information in the case narrative of the final data report.

20.3 The supervisor must then contact the Quality Assurance Officer, Laboratory Manager, and Technical Director and notify them of the situation. A corrective action plan will be developed amongst these individuals and implemented.

20.4 Following three types of result qualifiers are used for out-of-control and unacceptable data:

20.4.1 *Concentration (C) qualifier*

20.4.1.1 "B" - if the reported value is less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL).

20.4.1.2 "U" - if an analyte is analyzed but not detected.

20.4.2 *Qualifier (Q)*

20.4.2.1 "N" - Spiked sample recovery not met within control limits

20.4.2.2 "*" - Duplicate analysis not within control limits

20.4.3 *Method (M) qualifier*

20.4.3.1 "CV" - Manual Cold Vapor AA.

21. Waste Management

21.1 Keep samples for 180 days after analysis and dispose them off according to the procedures explained in the SOP for waste disposal.

22. Instrument Maintenance

22.1 Daily Maintenance

22.1.1 Lubricate auto sampler rails

22.1.2 Check all pump windings

22.1.3 Check flow through lines/flush lines

22.2 Periodic Maintenance

22.2.1 Clean optical cell

22.2.2 Replace pump windings

22.2.3 Replace lamp

22.2.4 Replace liquid/gas separator

22.2.5 Replace internal tubing

22.2.6 Replace dehydration tube

23. References

23.1 Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique), Method 7471B, Test Methods for Evaluating Solid Waste, SW-846, Revision 2, February 2007.

23.2 Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.3 2019.

24. Appendices

24.1 *Appendix A - Mercury Calibration Standards*

Appendix A

MERCURY CALIBRATION STANDARDS
(With Calibrated Pipettes)

Intermediate A: Leemans Lab Mercury Stock standard at Conc. = 10mg/L

Mercury Intermediate B Final Conc. = 250µg/L

2.5mL Intermediate A + 1mL HNO_3 → 100mL

Working Standards (all made in 1% HNO_3) + all reagents added samples

0.0, PB, ICB, CCB = 1% HNO_3

0.2µg/L	=	0.2mL INT B	→	250mL
2.5µg/L	=	2.5mL INT B	→	250mL
5.0µg/L	=	5.0mL INT B	→	250mL
7.5µg/L	=	7.5mL INT B	→	250mL
10.0µg/L	=	10.0mL INT B	→	250mL
5.0µg/L	=	5.0mL INT B	→	250mL (CCV)
10.0ug/L	=	10.0mL INT B	→	250mL (High Std)
0.2ug/L	=	0.2mL INT B	→	250mL (CRI)
7.0ug/L	=	7.0mL INT B	→	250mL (CHK STD)

Note:

- Use 30mL working standards to digest calibration standards and QC samples.
- Spike 1.0ml of EPA ICV-5 Hg solution, add 1.0ml of concentrated HNO3 bring up to volume in a 100ml volumetric flask.
- Only one working solution is made at 4.0µg/L.
- Spike samples at 4.0µg/L using 0.48mL of Intermediate B in 0.6g sample before digestion.
- ICV standard must be from an independent source from the calibration standards.
- Spike standards are added to samples before any addition of reagents.

CHEMTECH 284 Sheffield Street, Mountainside, NJ 07092 (908) 789-8900

READ RECEIPT

Employee Name: _____

Department: _____

_____**M7471B-Mercury**_____
Method or Document Read (Include Title, Number, Revision, as applicable)

Employee Statement: I have read and understood the information in the above-mentioned method or document.

_____ _____
Employee Signature Date

Supervisory Statement: I have reviewed this document or method with the employee.

_____ _____
Supervisor Signature Date

Note: This receipt is to be returned to the Quality Assurance/Quality Control Department for incorporation into employee training record files. If you have questions or would like to review your train record files, please see QA/QC Director.

Determination of Pesticides by method SW-846 8081B

1. Test Method

1.1 Determination of Pesticides in aqueous, soil, sludge, or solid samples by SW-846 Method 8081B.

2. Applicable Matrices

2.1 Water and wastewater
2.2 Soil, sludge, and solid samples
2.3 Wastes

3. Detection Limit

3.1 See Table 1 for the Reporting limits.

4. Scope and Application

4.1 Compounds that may be analyzed by this procedure are summarized in Table 1.

5. Summary of Method

5.1 A measured volume or weight of liquid or solid sample is extracted using the appropriate matrix-specific sample extraction technique.
5.2 Aqueous samples may be extracted at neutral pH with methylene chloride using separatory funnel.
5.3 Solid samples may be extracted with hexane-acetone (1:1) using automated Soxhlet.
5.4 A florisil column cleanup procedure to eliminate interferences can be employed, if needed.
5.5 Extracts are analyzed by injecting a 2 µL aliquot into a gas chromatograph with dual fused silica capillary column and dual electron capture detectors.
5.6 The chromatographic data is used to determine organochloride pesticides.

6. Definitions

6.1 Calibration**:** To determine, by measurement or comparison with a standard, the correct value of each scale reading on a meter, instrument, or other device. The levels of the applied calibration standard should bracket the range of planned or expected sample measurement.
6.2 Corrective Action**:** The action taken to eliminate the causes of an existing nonconformity, defect or other undesirable situation in order to prevent recurrence.
6.3 Detection Limit**:** The lowest concentration or amount of the target analyte that can be determined to be different from zero by a single measurement at a stated degree of confidence. See Method Detection Limit.
6.4 Holding Times (Maximum Allowable Holding Times)**:** The maximum times that samples may be held prior to analysis and still be considered valid or not compromised.
6.5 Instrument Blank**:** A clean sample (e.g., distilled water) processed through the

instrumental steps of the measurement process; used to determine instrument contamination.

6.6 Blank spike or QC check sample**:** A sample matrix, free from the analytes of interest, spiked with verified known and verified amounts of analytes. It is generally used to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

6.7 Matrix Spike**:** A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of Target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

6.8 Matrix Spike Duplicate**:** A second replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of the precision of the recovery for each analyte.

6.9 Method Blank**:** A sample of a matrix similar to the batch of associated samples (when available) that is free form the analytes of interest, which is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations the impact the analytical results for sample analyses.

6.10 Method Detection Limit**:** The minimum concentration of a substance (an analyte) that can be measured and reported with 99 % confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

6.11 Precision**:** The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms.

6.12 Preservation: Refrigeration and/or reagents added at the time of sample collection (or later) to maintain the chemical and/or biological integrity of the sample.

6.13 Range**:** The difference between the minimum and the maximum of a set of values.

6.14 Surrogate**:** A substance with properties that mimic the analyte of interest. It is unlikely to be found in environment samples and is added to them for quality control purposes.

6.15 Verification**:** Confirmation by examination and provision of evidence that specified requirements have been met.

7. Interferences

7.1 Refer to SOP M3510C, 3580A - Extraction for interferences during extraction procedures.

7.2 Compounds in sample matrix that may interfere with the detector but are not target for this method.

7.3 Phthalate esters introduced by the use of plastic materials during the sample preparation. This can reduce by avoidance of plastic and a solvent reagent rinse to all glassware to be used for sample preparation.

7.4 Carry over from inappropriate cleanup of glassware used for sample preparation

7.5 The presence of Sulfur in the sample. Sample must be analyzed before sulfur

cleanup can be applied since this procedure may affect the recovery of Endrin.

8. Safety

8.1 The chlorinated organic compounds analyzed by this method are considered biohazardous and potentially carcinogens. Appropriate caution must be exercised when coming in contact with these materials. This includes wearing of lab coats, gloves, and eye protection.

8.2 Safety glasses must be worn to protect the eyes from glass fragments, broken fused silica columns, etc. when doing instrument maintenance.

9. Equipment

9.1 HP 5890 or 6890 GC with Dual Capillary Column, Dual ECD Detector and single injection port.

9.2 Carrier Gas: Helium gas (Ultra High Purity (UHP) grade).

9.3 Makeup Gas: Argon/Methane (P-5) (ECD/Nuclear Counter UHP grade)

9.4 Columns:

9.4.1 30M x 0.53mmID, 0.5-1.5 micron film thickness bonded phase fused silica capillary column (*ZB-MR1, ZB-MR2, RTX-CLPest I & II, or equivalent columns.*)

9.4.2 30M x 0.32mmID, 0.25-0.5 micron film thickness bonded phase fused silica capillary column (ZB-MR1, ZB-MR2 or equivalent)

9.5 Recess goose neck liners / Supelco split/splitless

9.6 Microseal Septa

9.7 Mass Hunter GC Data Acquisition Version B07.06.001
MSD-Chemstation Version F.01.01.2317

10 Reagents and Standards

10.1 Hexane (J.T. Baker 9262-3 pesticide residue analysis grade, or equivalent)

10.2 Methylene Chloride, GC grade, J.T. Baker or equivalent

10.3 Acetone, GC grade, J.T. Baker or equivalent

10.4 Performance Evaluation Mix (Degradation Check) (PEM)

10.4.1 Use ready to shoot mix (Ultra Scientific) (or equivalent) containing following compounds:

- α-BHC
- γ-BHC
- β-BHC
- Endrin
- DDT
- Methoxychlor

10.5 Pesticide Stocks (*or equivalent)

Standard Name	Supplier	Concentration of stock	Preparation Details	Final Concentration of working solution
Surrogate Stock Standard	Restek	200ppm	1mL into 10mL volumetric with Hexane	20ppm
Surrogate Working Standard	N/A	20ppm	2mL of Surrogate stock Standard into 200mL Acetone	200ppb
Pesticide Standard Stock Solution	Restek	200ppm	0.5mL into 5mL Hexane	20ppm
Pesticide 100ppb Working Standard	N/A	20ppm	0.5mL Pesticide standard stock solution in 100mL Volumetric with Hexane + 0.5mL 200ppb surrogate Working standard	100ppb
Standard Name	**Supplier**	**Concentration of stock**	**Preparation Details**	**Final Concentration of working solution**
Pesticide 75ppb Working Standard	N/A	100ppb	0.75mL Pesticide 100ppb Working Standard + 0.25mL Hexane	75ppb
Pesticide 50ppb Working Standard	N/A	100ppb	0.5mL Pesticide 100ppb Working Standard + 0.5mL Hexane	50ppb
Pesticide 25ppb Working Standard	N/A	100ppb	0.25mL Pesticide 100ppb Working Standard + 0.75mL Hexane	25ppb
Pesticide 5ppb Working Standard	N/A	50ppb	0.1mL Pesticide 50ppb Working Standard + 0.9mL Hexane	5ppb
Pesticide 50ppb Standard 2nd Source	Restek	100ppb	0.5mL + 0.5mL Hexane	50ppb
Toxaphene 10ppm Working Stock solution	Restek	1000ppm	0.1mL of Toxaphene stock solution into 10mL Volumetric flask with Hexane	10ppm
Toxaphene 1000ppb Working solution	N/A	10/20ppm	1mL Toxaphene 10ppm Working stock solution + 0.5mL Surrogate stock solution into 10ml Hexane	1000ppb
Chlordane 10ppm Working Stock solution	Restek	1000ppm	0.1mL Chlordane Stock Solution into 10mL Volumetric flask with Hexane	10ppm
Chlordane 1000ppb Working solution	N/A	10/20ppm	1mL Chlordane 10ppm Working stock solution +0.5mL of Surrogate stock solution into 10ml volumetric flask in Hexane	1000ppb

Toxaphene 100ppb Working solution 2nd Source	Supelco	1000ppm	0.01mL Chlordane stock solution + 0.5ml of surrogate stock solution into 10mL volumetric flask with Hexane	1000ppb
Chlordane 1000ppb working solution 2nd source	Supelco	1000ppm	0.01mL of Chlordane stock solution + 0.5ml of surrogate stock solution into 10mL volumetric flask with Hexane	1000ppb
Toxaphene 500ppb calibration std	N/A	1000ppb	0.5uL of Toxaphene Working solution + 0.5uL of Hexane	500ppb
Chlordane 500ppb calibration std	N/A	1000ppb	0.5ul of Chlordane Working solution + 0.5uL of Hexane	500ppb
Standard Name	**Supplier**	**Concentration of stock**	**Preparation Details**	**Final Concentration of working solution**
Toxaphene 500ppb ICV STD	N/A	1000ppb	0.5uL Toxaphene 1000ppb 2nd source solution + 0.5uL Hexane	500ppb
Chlordane 500ppb ICV std	N/A	1000ppb	0.5uL Chlordane 1000ppb 2nd source + 0.5uL Hexane	500ppb
Spiking Mix	Supelco	200ppm	0.25mL into 100mL of Acetone	500ppb

10.6 Matrix Spiking Solution

10.6.1 The working stock concentration is prepared from Restek certified ampules at 200ppm. Working stock concentrations are:

Working Stock	1mL of Spiking Mix into 10mL with Hexane
Pesticides Spiking Mix 500ppb	50ppb

10.7 Surrogate Spiking Solution

10.7.1 This solution contains the surrogate compounds at the following concentrations.

TCMX	20ug/L	(Tetrachloro-m-xylene)
DCB	20ug/L	(Decachlorobiphenyl)

10.8 Individual Mix Instrument Calibration Levels/Surrogate calibration

Compound	Level 1 µg/L	Level 2 µg/L	Level 3 µg/L	Level 4 µg/L	Level 5 µg/L
Lindane	5.0	25.0	50.0	75.0	100.0
Heptachlor	5.0	25.0	50.0	75.0	100.0
Aldrin	5.0	25.0	50.0	75.0	100.0
Heptachl.Epox.	5.0	25.0	50.0	75.0	100.0
Endosulfan I	5.0	25.0	50.0	75.0	100.0
Dieldrin	5.0	25.0	50.0	75.0	100.0
Endosulfan II	5.0	25.0	50.0	75.0	100.0
4,4'-DDT	5.0	25.0	50.0	75.0	100.0
Endrin Aldehyde	5.0	25.0	50.0	75.0	100.0
Compound	**Level 1 µg/L**	**Level 2 µg/L**	**Level 3 µg/L**	**Level 4 µg/L**	**Level 5 µg/L**
Methoxychlor	5.0	25.0	50.0	75.0	100.0
a-BHC	5.0	25.0	50.0	75.0	100.0
b-BHC	5.0	25.0	50.0	75.0	100.0
d-BHC	5.0	25.0	50.0	75.0	100.0
Aldrin	5.0	25.0	50.0	75.0	100.0
g-Chlordane	5.0	25.0	50.0	75.0	100.0
a-Chlordane	5.0	25.0	50.0	75.0	100.0
4,4'-DDE	5.0	25.0	50.0	75.0	100.0
Endrin	5.0	25.0	50.0	75.0	100.0
4,4'-DDD	5.0	25.0	50.0	75.0	100.0
Endosulfan Sulfate	5.0	25.0	50.0	75.0	100.0
Endrin Ketone	5.0	25.0	50.0	75.0	100.0
Mirex	5.0	25.0	50.0	75.0	100.0
TCMX(surrogate)	5.0	25.0	50.0	75.0	100.0
DCB (surrogate)	5.0	25.0	50.0	75.0	100.0

10.9 Sample Preparation

10.9.1 For Sample Preparation standard operational procedures refer to the M3510, 3580-Extraction SOP.

11. Sample Collection, Preservation and Handling

11.1 Water samples are collected in 1L glass containers; soil, sludge and solid samples are collected in glass quart jars both with Teflon lined screw caps.

11.2 Keep all samples at 4°C.

11.3 If Residual Chlorine is present in aqueous sample then add 3mL-10% sodium thiosulfate solution per gallon (or 0.008%). Addition of Sodium Thiosulfate solution to sample container may be performed in lab prior to field use.

11.3 Extract water samples within seven days of collection and soil samples within 14 days of collection.

11.4 Analyze all extracted samples within 40 days after extraction.

12. Quality Control

12.1 Resolution Check Sample (Reschk)
- 12.1.1 Analyze Reschk sample at the beginning of the ICAL.

12.2 Performance Evaluation (PEM)
- 12.2.1 Analyze the PEM every 12 hour to monitor the degradation of Endrin and DDT.

12.3 Initial Calibration (ICAL)
- 12.3.1 Perform initial calibration as explained in Section 13.

12.4 Continuing Calibration (CCAL)
- 12.4.1 Analyze a calibration standard at a concentration between the low calibration standard and the highest point of the calibration range to show that the system is operating as it did when initially calibrated. It is recommended to analyze a CCAL after every 10 field samples, however, more than 10 and less than 20 samples can be analyzed in each sequence within a 12 hour clock. For, DOD analysis, CCAL should be analyzed after every 10 field samples

12.5 Method Blank
- 12.5.1 Extract a method blank for each batch of samples of similar matrix and concentration level.
- 12.5.2 Carry the method blank through the entire sample preparation, concentration, and analysis and treat it just like sample.

12.6 Surrogate
- 12.6.1 Spike surrogate compounds into all samples, blanks, and spikes during the extraction procedure.

12.7 Precision and Accuracy
- 12.7.1 Perform an initial one-time demonstration of accuracy and precision per analyst.
- 12.7.2 Prepare four aliquots of a QC check sample at a concentration of 50µg/L.
- 12.7.3 Ensure that the standard used for the QC check sample is from a source other than that used for standard calibration.
- 12.7.4 Extract and analyze the four QC check samples under the same conditions used for sample analysis by this method.

12.8 Matrix Spike/Matrix Spike Duplicate and Laboratory Control Sample (Blank Spike)
- 12.8.1 Choose a representative sample to be used for the MS/MSD.
- 12.8.2 MS/MSD and LCS are required for each matrix type.
- 12.8.3 MS/MSD and LCS are required for every group of samples run as a batch or at least one set of spikes per 20 samples. Spiking level is 50ug/L.
- 12.8.4 Calculate % Recovery and Relative Percent Difference (RPD) for the MS/MSD and % recovery for the LCS
- 12.8.5 Limits are calculated through Control Charts.
- 12.8.6 For **DOD work**- Unless client specified LCS % recovery must be within control limits.

12.9 Manual Integration

12.9.1 At times, manual integration will be necessary due to incomplete or incorrect integration by the automated analytical system.

12.9.2 Manual integration cannot be used to satisfy Quality Control Criteria.

12.9.3 Do not include baseline background noise; include only the area between where the beginning and end of the peak intersects with the baseline.

12.9.4 Any time a compound is integrated in the calibration standard it must then be consistently integrated in the samples.

12.9.5 When a manual integration is performed the hardcopy of the quantitation report will flag the compound with an "m".

12.9.6 Report the before and after manual integration chromatograms.

12.10 Client Special requirements

12.10.1 Special requirements or QC criteria for a specific project will be attached to this SOP for laboratory use.

12.11 Limit of Detection (LOD)

12.11.1 Established LOD is verified by analyzing a clean matrix spiked at the LOD concentration.

12.11.2 LOD is specific to each combination of analyte, matrix, method (including sample preparation) and instrument configuration.

12.11.3 LOD must be verified quarterly.

12.11.4 LOD must be verified on each instrument used, and every time the method is modified.

12.12 Limit of Quantitation (LOQ)

12.12.1 LOQ must be greater than the LOD.

12.12.2 LOQ must be verified quarterly for each quality system matrix, method and analyte, by analyzing QC sample containing the analytes of concern in each quality system matrix 1-2X the claimed LOQ.

12.12.3 LOQ must be performed if the method is modified.

12.13 Accuracy and Precision (DOC)

12.13.1 Perform an initial one-time demonstration of accuracy and precision per analyst.

12.13.2 The standard used for the QC check sample must be from a source other than that used for the calibration standards.

12.13.3 Extract and analyze the four QC check samples under the same conditions used for sample analysis by this method.

12.13.4 Recoveries must meet LCS recovery limits. Repeat if necessary to document performance ability.

12.13.4 For DoD work – Demonstration of Capability study is performed at the LOQ level and evaluated using the LCS limits.

12.14 Method Detection limit (MDL)

12.14.1 Please refer SOP for P203-Laboratory limits and demonstration of capability for MDL procedure.

13. Calibration and Standardization

13.1 Initial Calibration

13.1.1 Analyze five calibration standards at the following concentrations: 5.0, 25.0, 50.0, 75.0, and 100µg/L for pesticides and a single point multicomponent at mid range.

13.1.2 Calibration standards must reflect the range of the samples to be analyzed. The concentration listed is the most common range for the sample type analyzed.

13.1.3 Calculate the Calibration factor of each compound.
CF = Area of Compound/Concentration in ppb

13.1.4 Calculate the %RSD for all target analytes from the initial calibration.

$$\%RSD = \frac{\text{Standard Deviation of CF}}{\text{Mean of CF}} \times 100$$

Where: $\text{mean of CF} = \frac{\text{sum of CF}}{n}$

n = number of calibration standards used

13.1.5 The %RSD should be less than or equal to 20% for each target analyte.

13.1.6 If the calibration does not meet this criterion, check instrument conditions and analyze a new initial calibration.

13.1.7 If the %RSD of any target analyte is 20% or less than the CF it is assumed to be constant over the calibration range, and the average calibration factor may be used for quantitation.

13.1.8 When the %RSD exceeds 20% the plotting and visual inspection of a calibration curve is used, linear regression plotting is used.

13.1.9 Perform a linear regression of the instrument response versus the concentration of the standards. Make certain that the instrument response is treated as the dependent variable (y) and the concentration as the independent variable (x). The regression will produce the slope and intercept terms for a linear equation in the form. Coefficient correlation must be r^2 > 0.990 for linear regression.

$$y = ax + b,$$

Where:
- y = instrument response (peak area or height)
- A = slope of the line (also called the coefficient of x)
- X = concentration of the calibration standard
- B = intercept

13.2 Initial calibration verification and Continuing Calibration

13.2.1 Once initial calibration is analyzed, verify the calibration using a midrange calibration verification check from a different source.

13.2.2 Analyze a continuing calibration standard every ten samples varying the concentration of the standard, or every 12 hours.

13.2.3 It is recommended that a continuing calibration standard is analyzed every 10 samples, however, more than 10 samples could be analyzed so far as a closing continuing calibration is analyzed within a 12 hr clock.

Note that client specific requirements takes precedence over this guideline.

13.3 Retention Time window

13.3.1 Determine the retention time windows by analyzing a mid range standard every 24 hrs for a period of 72 consecutive hrs.

13.3.2 Calculate the standard deviation ± 3 times of each individual compound.

13.3.3 Verify the center of the retention time window for each individual compound using the initial CCV of each analytical sequence.

13.3.4 If the standard deviation is 0.00, use 0.03 as a default.

13.4 Confirmation column **must** meet the same criteria as the primary column for **DOD** work.

14. Procedure

14.1 GC Conditions:

14.1.1 Pesticide Instrument Temperature Programs

- Injection Temp 210ºC
- Maximum temperature 350ºC
- 3.4ml/min, head pressure 20.5 psi
- 100ºC hold 0.5 min.
- 35 ºC/min to 220ºC hold 0.0min
- 20 ºC/min to 320ºC hold 2.0min

14.2 Analytical Sequence

14.2.1 Prime instrument if the instrument was not in use for more than 24 hrs.

14.2.1.1 Use a high concentration (100ppb) standard and follow with an instrument blank.

14.2.1.2 If no problems are detected proceed with the PEM to start the sequence.

14.2.2 All initial calibration standards (if necessary).

14.2.3 Ten samples consecutively. However, more than 10 and less than 20 samples can be analyzed in each sequence within a 12 hour clock.

14.2.4 Inject continuing calibration standards that contain the analytes of interest after every 10 samples (For DOD Work)
Inject the continuing calibration standards that contain the analytes of interest after each group of 10 or 20 samples (whichever can be analyzed within 12 hour)

14.2.5 The sequence must end with the representative continuing calibration standards, consecutively.

14.2.6 Example GC Sequence:

Instrument Blank	Each standard mix of interest
Reschk	
PEM	
Calibration Level One	
Calibration level Two	
Calibration Level Three	
Calibration Level Four	
Calibration Level Five	
Technical Chlordane and Toxaphene	
ICV for pest	
ICV for Toxaphene	
ICV for Chlordane	
Instrument Blank	
Samples (Samples, blanks and QC samples up to ten injections or 12 hours, whichever is less)	
Instrument Blank	
CCV	
Samples 11-20	
Instrument Blank	
CCV	
End	

14.2.7 Dilute the samples whenever target peak size exceeds the calibration range. Make the dilutions such that the largest concentration target analyte becomes approximately mid range as compared with the calibration.

14.3 ECD Analysis of Extracts

14.3.1 Employ the same GC operating conditions for the sample analysis that are used for the initial calibration, same as in Section 9.15.

14.3.2 Evaluate a column mix before analyzing any samples and once every 12 hours during the analytical run.

14.3.3 *DDT and Endrin Breakdown*

- Breakdown occurs when the injection port liner is contaminated with high boiling residue.

14.3.3.1 Analyze a check standard containing DDT and Endrin to determine how much breakdown there is.

14.3.3.2 When breakdown occurs 4,4'-DDE ,4,4'-DDD, Endrin Ketone or Endrin Aldehyde will be present in the run.

14.3.3.3 If the breakdown exceeds 15% take a corrective action.

- Perform maintenance on instrument and change septum.
- Replace the liner (Supelco # 2-0486-25)
- Repeat breakdown test

- Clip the guard column or replace analytical column

14.3.3.4 Calculate breakdown using the following formula:

% Breakdown of DDT = sum of peak areas of (DDD + DDE) X 100
sum of all peak areas of (DDD+DDE+DDT)

% Breakdown of Endrin = sum of peak areas of (endrin ald.+endrin ketone) X 100
sum of all peak areas (endrin+ endrin ald.+endrin ketone)

14.3.4 Run an initial calibration (see section 13.1).

14.3.5 Inject a calibration verification standard (ICV) prior to running any sample analyses.

14.3.5.1 Calibration verification standard concentrations and subsequent calibration factors (CF) must not exceed ±15% when compared to the mean initial calibration factor (CF) for both columns.

14.3.6 Analyze a calibration standard every 10 samples or 12 hours, at the beginning of the analytical sequence and at the end of the 12 hour shift.

- The continuing calibration standard must meet ± 15% or ±20%, as per the Method.
- If this criterion is not met then the sample analysis must halt and any samples after the last passing calibration verification standard must be re-run.
- If the chromatographic problem cannot be fixed by routine instrument maintenance, then a new initial calibration must be employed before sample analysis can continue.

14.3.6.1 Daily retention times for the calibration verification standard must not shift more than 0.05 min for TCMX, and 0.1 min for DCB when compared to the continuing calibration.

14.3.7 Identify the multicomponents by pattern, peak ratios, and retention times for the characteristic peaks.

14.3.7.1 Unless otherwise necessary for specific project, the analysis of multicomponent analytes employ a single-point calibration.

14.3.8 Identify individual compounds using the retention time windows established.

14.3.9 Confirm any "positive hits" tentatively identified as method analyses on the primary column by analysis on the second column.

- Check the quantitative agreement between both columns once identification is confirmed.
- Unless otherwise stated in a project plan report the higher result.
- If there is greater than 40%D difference between the concentrations, then report the higher of the two results, unless overlapping peaks are causing erroneously high results, in which case, report non-effected result and document in the case narrative.

  %D = (higher conc. - lower conc./lower conc.) * 100
- Alternatively, if the concentration is sufficiently high (greater than 2-3 µg/mL in the extract), the analyte must be confirmed by GC/MS.

14.3.10 Dilute and reanalyze any sample that exceeds the upper calibration range.

15. Calculations

15.1 Samples:

$$\mu g/L = \frac{(Ax)\ (Vt)}{(ICF)\ (Vi)\ (Vs)} \times DF$$

$$\mu g/Kg = \frac{(Ax)\ (Vt)}{(ICF)\ (Vi)\ (Ws)\ (D)} \times DF$$

Where:
- Ax = Area for the parameter to be measured.
- ICF = average calibration factor for the calibration standards.
- Vt = Volume of total extract in uL (Take into account dilutions)
- Is = Amount of standard injected in nanograms (ng)
- Vi = Volume of extract injected.
- Vs = Volume of Aqueous extracted (mL).
- D = $\frac{100 - \%\ Moisture}{100}$
- Ws = Weight of sample extracted (g).

15.2 DDT and Endrin Breakdown

$$\%breakdown\ of\ DDT = \frac{sum\ of\ degradation\ peak\ areas\ (DDD + DDE)}{sum\ of\ all\ peak\ areas\ (DDT + DDD + DDE)} \times 100$$

$$\%breakdown\ of\ Endrin = \frac{sum\ of\ degradation\ peak\ areas\ (Endrin\ Aldehyde + Endrin\ Ketone)}{sum\ of\ all\ peak\ areas\ (Endrin + Endrin\ Aldehyde + Endrin\ Ketone)} \times 100$$

16. Method Performance

16.1 Laboratory accuracy and precision data are obtained for the method analytes using laboratory fortified blanks with analytes at mid range concentration for the demonstration of capabilities.

17. Pollution Prevention

17.1 Use amount of chemicals as required. Do not make large quantities of solutions.
17.2 Use the hood when working with strong chemicals or fumes.
17.3 Keep the working area clean and clutter free to avoid any mishaps.

18. Data Assessment and Criteria for QC

18.1 Resolution Check Sample
- 18.1.1 The resolution between two adjacent peaks in the Resolution Check Mixture must be $\geq$ 60% for both columns.

18.2 PEM
- 18.2.1 DDT and Endrin should meet the $\leq$15% breakdown criteria before any samples can be analyzed.

18.3 Initial Calibration
- 18.3.1 All analytes must have a Relative Standard Deviation <20% or a correlation coefficient of 0.99 or better.

18.4 Continuing Calibration and Calibration Verification
- 18.4.1 All response factors must be within $\pm$20% of the average CF from the initial curve for Method 8081B.
- 18.4.2 Initial calibration verification must meet 15% criteria.

18.5 Method Blank

18.5.1 No analytes may be present in the method blank above the LOQ.
18.5.2 For DOD & NC work - No method blank can be ≥ ½ the LOQ.

18.6 Surrogate Recoveries
18.6.1 Surrogate recoveries must within laboratory generated control limits.

18.7 Retention Times
18.7.1 The retention time window is ±3times the standard deviation of the mean absolute value or default to 0.03 minutes. A copy of the excel form used to generate the retention time study must be attach to this SOP and updated whenever a new study is generated.

18.8 Matrix Spike and Matrix Spike Duplicate and LCS
18.8.1 MS/MSD and LCS must meet the % recovery in Attachment 1.
18.8.2 For DoD work-MS/MSD and LCS must meet the criteria.

18.9 Limit of Detection
18.9.1 All analytes spiked should be positively identified.

18.10 Limit of Quantitation
18.10.1 Analysis must meet the acceptance criteria for the laboratory control sample.

19. Data Reporting

19.1 EISC is the software used to calculate and create all forms used to report the sample results.
19.2 If a compound falls within the absolute retention window, it is considered a tentatively identified positive hit.
19.3 Each tentative identification must be confirmed on a second GC column.
19.4 The higher result should be reported.

20. Corrective Actions for Out-of-Control Data

20.1 Resolution Check
20.1.1 Stop analysis, correct the problem before analysis can continue.

20.2 PEM evaluation
20.2.1 If the PEM mix do not meet the 15% criteria instrument maintenance should be performed.
20.2.2 Silanizing or changing the liner and septa should correct the problem. If the criterion is met the analysis should begin with the analysis of the ICAL.
20.2.3 If the problem does not get corrected 30cm of the column should be broken off. At this point the criteria should be met and analysis of the ICAL must followed.

20.3 Initial Calibration
20.3.1 If any compound is greater than 20% RSD the mean of the RSD values of all analytes in the mix including any non-target compound. The mean %RSD must not exceed the <20% criteria.
20.3.2 If there are any major changes to the instrument (source cleaning, change of columns, etc.), perform a new calibration.
20.3.3 If a 20% RSD criteria cannot be achieved individually, a correlation

coefficient of ≥ 0.99 or better may be used.

20.4 Continuing Calibration

20.4.1 If a continuing calibration fails, re-run the continuing calibration and all data after the last passing continuing calibration.

20.4.2 If the standard analyzed after a group of samples exhibits a response above acceptance limit (i.e. >20%D), no re-run is necessary if the analyte is not present in associated sample.

20.4.3 If the standard response is more than 20%D below initial calibration response, then re-injection of all affected samples is necessary to ensure that the detector response has not deteriorated to the point that the analyte would not have been detected even though it was present (i.e., false negative).

20.4.4 Analyze a new initial calibration if corrective action fails to alleviate the problem.

20.5 Method Blank

20.5.1 Re-extract any samples associated with an unacceptable method blank.

20.6 Surrogate Recoveries

20.6.1 If surrogate recoveries in the method blank do not meet criteria, re-extract all samples associated with that blank.

20.6.2 If surrogate recoveries in the LCS fail, check instrument for possible extraction problems. Reextract the entire batch.

20.6.3 If surrogate recoveries fail on both columns for each surrogate, then reextract the sample. Re-run samples if there is not enough samples for re-extraction.

20.7 Retention time

20.7.1 If the retention time falls outside criteria a new RT must be calculated.

20.8 Matrix Spike and Matrix Spike Duplicate and LCS

20.8.1 If any MS/MSD compound data is out of control limits verify LCS results are all within limits and consider it matrix interference.

20.8.2 If MS/MSD recoveries are not within limits, narrate in the case narrative.

20.8.3 If LCS recovery is not within limits, then re-extract the entire batch.

20.8.4 For **DOD work** - If there is insufficient volume to reextract the samples, flag all data in associated samples for that analyte with a Q flag. Mention the problem and action taken on the case narrative.

20.9 Limit of Detection

20.9.1 If LOD verification fails, then repeat the detection limit determination and LOD verification at a higher concentration and set the LOD at the higher concentration.

20.10 Limit of Quantitation

20.10.1 Reevaluate the LOD and the LOQ.

21. Contingencies for Handling Out-of-Control or Unacceptable Data

21.1 Following are the result qualifiers used for out-of-control and unacceptable data:

- **U**: Indicates the compound was analyzed but not detected.
- **J**: Indicates an estimated value, the result reported is below the initial calibration lowest point.
- **B**: Indicates the analytes were found in the blank as well as the sample.
- **E**: Indicates the analyte concentrate exceeds the calibrated range of the GC instrument.
- **D**: Indicates all compounds identified in an analysis at a secondary dilution factor.
- **N**: Indicates presumptive evidence of a compound. This is used for all non-target results where identification is made.

21.2 When all the above mentioned (Section 19) corrective measures have been taken and data remain outside the QA criteria set forth above, immediately contact your supervisor.

21.3 Document the situation clearly in your laboratory notebook and place a copy of the information in the case narrative of the final data report.

21.4 The supervisor must contact the QA/QC Director, Laboratory Manager, and Technical Director and notify the situation.

21.5 A corrective action plan must be developed in order to solve the problem.

21.6 For **Arizona work** - Use Arizona qualifiers to flag the data.

21.7 For **DOD work** – Apply J flag if RPD>40% from primary column result, Q flag if sample is not confirmed.

22. Instrument Maintenance

22.1 Instrument Preventative Maintenance

22.1.1 Maintenance log is kept electronically; refer to P243-Electronic Logbook SOP.

22.1.2 Regularly scheduled maintenance, instrument repairs, and/or any instrument problems are recorded, dated, and initialed electronically.

22.2 Daily (as required)

- Change septa
- Clean inlet liner and change glass wool
- Clean injection port
- Check syringe and replace if the need be.
- Bake instrument for approximately 30min. @ 300ºC (depending on column limitation).

22.3 Monthly

22.3.1 Dust around instrument and instrument surfaces to reduce airborne particles.

22.3.2 Check all fans and clean to remove dust from filter.

22.3.3 Remove syringe, clean, reinstall or replace.

22.3.4 Remove all glassware and acid wash.

22.3.5 Clip 3 inches off of the column

22.4 As Needed

22.4.1 Change the column(s).

23. Documentation Requirements

23.1 Label sample chromatograms with the following information:
- 23.1.1 Sample ID number
- 23.1.2 Date and time of injection
- 23.1.3 Positively identified peaks labeled
- 23.1.4 Dilution, if needed

23.2 Chromatograms before and after manual integration

23.3 Extraction logs must contain:
- 23.3.1 Sample ID numbers in the batch
- 23.3.2 Date extracted and date concentrated and analyst and supervisor initials
- 23.3.3 Surrogate, lot number and concentration
- 23.3.4 Spiking solution, lot number and concentration
- 23.3.5 Sample volume
- 23.3.6 Final extract volume
- 23.3.7 Any comments by analyst
- 23.3.8 Bottom portion initiates an internal chain of custody for the extracts
- 23.3.9 Signature for receipt of extracts from the Extractions Department
- 23.3.10 Prep Batch Number

23.4 Instrument logs must contain:
- 23.4.1 ID of instrument
- 23.4.2 Analyst signature
- 23.4.3 Analysts' comments
- 23.4.4 Tune file name
- 23.4.5 Sequence file name
- 23.4.6 ID file name
- 23.4.7 Calibration file name
- 23.4.8 Standard lot numbers
- 23.4.9 Batch number
- 23.4.10 Dilution, if needed
- 23.4.11 QC batch number
- 23.4.12 Supervisor signature
- 23.4.13 HP Analysis Method
- 23.4.14 HP Processing Method

24. Waste Management

24.1 Keep samples for 180 days after analysis and dispose them off according to the procedures explained in the SOP for waste disposal.

25. Reference

25.1 Organochlorine Pesticides by Gas Chromatography, Method 8081B, Revision 2, February 2007

25.3 Department of Defense Quality System Manual for Environmental Laboratories, Version 5.3 September 2019.

26. Appendices, table, attachments

26.1 Table 1- List of compounds/RL
26.2 Table 2- List of Analytes-Pesticide Performance Evaluation Mixture (PEM)
26.3 Table 3- List of Analytes-Pesticide Resolution Check Mixture (RESCHK)

Table 1 – List of compounds/RL

Compound	RL ug/L	RL ug/Kg
4,4'-DDD	0.05	1.7
4,4'-DDE	0.05	1.7
4,4'-DDT	0.05	1.7
Aldrin	0.05	1.7
alpha-BHC	0.05	1.7
alpha-Chlordane	0.05	1.7
beta-BHC	0.05	1.7
Chlordane	0.50	17
delta-BHC	0.05	1.7
Dieldrin	0.05	1.7
Endosulfan I	0.05	1.7
Endosulfan II	0.05	1.7
Endosulfan sulfate	0.05	1.7
Endrin	0.05	1.7
Endrin aldehyde	0.05	1.7
Endrin ketone	0.05	1.7
gamma-BHC (Lindane)	0.05	1.7
gamma-Chlordane	0.05	1.7
Heptachlor	0.05	1.7
Heptachlor epoxide	0.05	1.7
Methoxychlor	0.05	1.7
Mirex	0.05	1.7
Toxaphene	0.50	17

Table 2 – List of Analytes- Pesticide Performance Evaluation Mixture (PEM)

Analyte	CAS #
alpha-BHC	000319-84-6
beta-BHC	000319-85-7
gamma-BHC (Lindane)	000058-89-9
4,4'-DDT	000050-29-3
Decachlorobiphenyl	002051-24-3
Endrin	000072-20-8
Methoxychlor	000072-43-5
2,4,5,6-Tetrachloro-m-xylene	000877-09-8

Table 3 – List of Analytes-Pesticide Resolution Check Mixture (RESCHK)

Analyte	CAS #
gamma-Chlordane	005103-74-2
4,4'-DDE	000072-55-9
Decachlorobiphenyl	002051-24-3
Dieldrin	000060-57-1
Endosulfan I	000959-98-8
Endosulfan sulfate	001031-07-8
Endrin ketone	053494-70-5
Methoxychlor	000072-43-5
2,4,5,6-Tetrachloro-m-xylene	000877-09-8

CHEMTECH 284 Sheffield Street, Mountainside, NJ 07092 (908) 789-8900

READ RECEIPT

Employee Name: _____

Department: _____

_____ **M8081B-Pesticide**_____
Method or Document Read (Include Title, Number, Revision, as applicable)

Employee Statement: I have read and understood the information in the above mentioned method or document.

_____ _____
Employee Signature Date

Supervisory Statement: I have reviewed this document or method with the employee.

_____ _____
Supervisor Signature Date

Note: This receipt is to be returned to the Quality Assurance/Quality Control Department for incorporation into employee training record files. If you have questions or would like to review your train record files, please see QA/QC Director.

Determination of Polychlorinated Biphenyls (PCBs) by Capillary Gas Chromatography, Electron Capture Detector

1. Test Method

1.1 Determination of Polychlorinated Biphenyls (PCBs) using SW-846 Method 8082A.

2. Applicable Matrices

2.1 Water, soils, and wastes

3. Detection Limits

3.1 Reporting limit for waters is 0.5ug/L and for soils is 17ug/Kg.

4. Scope and Application

4.1 This method describes the GC/ECD analysis for the detection and quantitation of PCBs in waters, soil/sediments samples, and oil samples.

5. Summary of Method

5.1 Extracts are analyzed by injecting a 2 µL aliquot into a gas chromatograph with dual fused silica capillary column and dual electron capture detectors.

5.2 The chromatographic data is used to determine Aroclors, individual PCB congeners, or total PCBs.

6. Definitions

6.1 PCB: Any of several organic compounds used in plastics manufacture, transformers, and capacitators that are toxic and persistent environmental pollutants and tend to accumulate in animal tissue.

6.2 Gas Chromatography (GC): The process in which the components of a mixture are separated from one another by volatilizing the sample into a carrier gas stream passing through and over a bed of packing.

6.3 Calibration: To determine, by measurement or comparison with a standard, the correct value of each scale reading on a meter, instrument, or other device. The levels of the applied calibration standard should bracket the range of planned or expected sample measurement.

6.4 Holding times (Maximum allowable holding times): The maximum times that a sample may be held prior to analysis and still be considered valid or not compromised.

6.5 Instrument Blank: A clean sample processed through the instrumental steps of the measurement process; used to determine instrument contamination.

6.6 Spike blank: A sample matrix, free from the analytes of interest, spiked with verified known and verified amounts of analytes. It is generally used to establish intra-laboratory or analyst specific precision and bias or assess the performance of all or a portion of measurement system.

6.7 Matrix Spike: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. Matrix spikes are used for example to determine the effect of the matrix on methods recovery efficiency.

6.8 Matrix Spike Duplicate: A second replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of the precision of the recovery for each analyte.

6.9 Method Blank: A sample of a matrix similar to the batch of associated samples that is free form the analytes of interest, which is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations the impact the analytical results for sample analyses.

6.10 Method Detection Limit: The minimum concentration of a substance (an analyte) that can be measured and report with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

6.11 Surrogate**:** A substance with properties that mimic the analyte of interest. It is unlikely to be found in environment samples and is added to them for quality control purposes.

7. Interferences

7.1 Refer to SOP M3510C,3580A-Extraction PCB for interferences during extraction procedures.

7.2 Elemental sulfur is readily extracted from soil samples and may cause chromatographic interferences in the determination of PCBs.

8. Safety

8.1 The toxicity or carcinogenicity of each reagent used in this method has not been precisely defined, therefore treat each chemical compound as a potential health hazard.

8.2 Wear appropriate safety clothing and eye protection to minimize exposure

8.3 Use protective gloves when handling corrosive chemicals.

8.4 Read Material Safety Data Sheets (MSDS) for the chemicals used in the laboratory for the identity of the ingredients, the physical and chemical characteristics of the substance, the physical hazards, and safe handling, and safety precautions.

9. Equipment and Supplies

9.1 HP 5890 series II Gas chromatograph systems with dual Electron Capture Detector (ECD) and data system and auto injector.
9.2 Carrier Gas: Helium gas (Ultra High Purity (UHP) grade).
9.3 Makeup Gas: Argon/Methane (P-5) (ECD/Nuclear Counter UHP grade)
9.4 MSD Chemstation Version:

- MSD-Chemstation Version B.07.01.1805
- EnviroQuant Chemstation G1701FA Version F.01.01.2317

9.3 Columns:

- RTX-CLPest, 30m X 0.53 mm or equivalent
- RTX-CLPest II, 30 m X 0.53 mm or equivalent

9.4 Vials, 10-mL glass with Teflon lined screw cap
9.5 Vials, 1 mL glass with teflon lined crimp cap
9.6 Instrument Specifications
9.6.1 Instrument Temperature Program

- Injection Temp 155ºC
- 12 ºC /min to 300ºC, hold for 1 min
- Maximum temperature 300ºC
- 3.40 ml/min, head pressure 24.8 psi
- 125ºC hold 0.0 min.
- 45 ºC/min to 200ºC hold 0.0 min
- 15 ºC/min to 230ºC hold 0.0 min
- 30 ºC/min to 320ºC hold 3.0 min

10. Reagents and Standards

10.1 Stock Standards: Replace yearly or at the expiration date on the standard
10.2 Hexane, methylene chloride
10.3 Stock standards of all Aroclors: (*or equivalent)

Standard Name	Supplier	Concentration of stock	Preparation Details	Final Concentration of working solution
*1660/ surrogate Working Standard	Restek	1000ppm 1016-1260Aroclor/ 20 ppm Pest/PCB Surrogate Stock	0.1mL of 1660 1000ppm + 50uL of Surrogate Standard into 100mL with Hexane	1000/100ppb
Pest/PCB Surrogate Stock	Restek	200ppm Surrogate	1 ml of surrogate standard into 10 ml with Hexane	20 ppm
*1660/Surrogate Working Calibration Standard	N/A	1000ppb Working Standard	7.5mL of 1000ppb Working Standard into 10 mL with Hexane 5mL of 1000ppb Working Standard into 10 mL with Hexane	750ppb 500ppb

			2.5mL of 1000ppb Working Standard into 10 mL with Hexane 1.0mL of 500ppb Working Standard into 10mL with Hexane	250ppb 50ppb
Standard Name	**Supplier**	**Concentration of stock**	**Preparation Details**	**Final Concentration of working solution**
*1221 Working Stock Standard	Restek	1000ppm 1221 Aroclor	50uL of 1000ppm 1221 Aroclor into 10mL with Hexane	5.0ppm
*1232 Working Stock Standard	Restek	1000ppm 1232 Aroclor	50uL of 1000ppm 1232 Aroclor into 10mL with Hexane	5.0ppm
*1242 Working Stock Standard	Restek	1000ppm 1242 Aroclor	50uL of 1000ppm 1242 Aroclor into 10mL with Hexane	5.0ppm
*1248 Working Stock Standard	Restek	1000ppm 1248 Aroclor	50uL of 1000ppm 1248 Aroclor into 10mL with Hexane	5.0ppm
*1254 Working Stock Standard	Restek	1000ppm 1254 Aroclor	50uL of 1000ppm 1254 Aroclor into 10mL with Hexane	5.0ppm
1221 Working Calibration Standard	N/A	5ppm 1221 Aroclor	2mL of 5ppm 1221 Aroclor +50uL of Surrogate Standard into 10 mL with Hexane	1000ppb/100ppb
1232 Working Calibration Standard	N/A	5ppm 1232 Aroclor	2mL of 5ppm 1232 Aroclor +50uL of Surrogate Standard into 10 mL with Hexane	1000ppb/100ppb
1242 Working Calibration Standard	N/A	5ppm 1242 Aroclor	2mL of 5ppm 1242 Aroclor +50uL of Surrogate Stock into 10 mL with Hexane	1000ppb/100ppb
1248 Working Calibration Standard	N/A	5ppm 1248 Aroclor	2mL of 5ppm 1248 Aroclor +50uL of Surrogate Stock into 10 mL with Hexane	1000ppb/100ppb
1254 Working Calibration Standard	N/A	5ppm 1254 Aroclor	2mL of 5ppm 1254 Aroclor +50uL of Surrogate Stock into 10 mL with Hexane	1000ppb/100ppb
1262 Working Stock Standard	Restek	1000 PPM 1262 Aroclor	50uL of 1000ppm 1262 Aroclor into 10mL with Hexane	5.0 PPM
1268 Working Stock Standard	Restek	1000 PPM 1268 Aroclor	50uL of 1000ppm 1268 Aroclor into 10mL with Hexane	5.0 PPM
1262 Working Calibration Standard	Restek	5ppm 1262 Aroclor	2mL of 5ppm 1262 Aroclor +25uL of Surrogate Stock into 10 mL with Hexane	1000ppb/100ppb

1268 Working Calibration Standard	Restek	5ppm 1268 Aroclor	2mL of 5ppm 1268 Aroclor +25uL of Surrogate Stock into 10 mL with Hexane	1000ppb/100ppb
Standard Name	**Supplier**	**Concentration of stock**	**Preparation Details**	**Final Concentration of working solution**
AR1660 1000/100 PPB ICV Working Solution	ULTRA	100ppm Stock Solution	0.25mL of Pest/PCB Surrogate Stock (20 PPM) + 0.50ml of AR1660 100 PPM Stock Solution into 50ml with Hexane	1000/100 PPB ICV
AR1660 500 PPB ICV	ULTRA	1000/100 PPB ICV working solution	0.5ml of AR1660 1000/100 PPB ICV Solution into 1ml with Hexane	500 PPB ICV
AR1221 1000/100 PPB ICV Working Solution	Supelco	1000 PPM Aroclor 1221 Supelco	0.1ml Aroclor 1221 Solution + 0.50ml of Pest/PCB Surrogate Stock 20ppm into 100ml with Hexane	1000/100 PPB AR1221 ICV
AR1221 500 PPB ICV	Supelco	1000/100 PPB ICV Working Solution	0.5ml of AR1221 1000/100 PPB ICV Standard into 1ml with Hexane	AR1221 500 PPB ICV
AR1232 1000/100 PPB ICV Working Solution	Supelco	1000 PPM Aroclor 1232 Supelco	0.1ml Aroclor 1232 Solution + 0.50ml of Pest/PCB Surrogate Stock 20ppm into 100ml with Hexane	1000/100 PPB AR1232 ICV
AR1232 500 PPB ICV	Supelco	1000/100 PPB ICV Working Solution	0.5ml of AR1232 1000/100 PPB ICV Standard into 1ml with Hexane	AR1232 500 PPB ICV
AR1242 1000/100 PPB ICV Working Solution	Supelco	1000 PPM Aroclor 1242 Supelco	0.1ml Aroclor 1242 Solution + 0.50ml of Pest/PCB Surrogate Stock 20ppm into 100ml with Hexane	1000/100 PPB AR1242 ICV
AR1242 500 PPB ICV	Supelco	1000/100 PPB ICV Working Solution	0.5ml of AR1242 1000/100 PPB ICV Standard into 1ml with Hexane	AR1242 500 PPB ICV
AR1248 1000/100 PPB ICV Working Solution	Supelco	1000 PPM Aroclor 1248 Supelco	0.1ml Aroclor 1248 Solution + 0.50ml of Pest/PCB Surrogate Stock 20ppm into 100ml with Hexane	1000/100 PPB AR1248 ICV
AR1248 500 PPB ICV	Supelco	1000/100 PPB ICV Working Solution	0.5ml of AR1248 1000/100 PPB ICV Standard into 1ml with Hexane	AR1248 500 PPB ICV
AR1254 1000/100 PPB ICV Working Solution	Supelco	1000 PPM Aroclor 1254 Supelco	0.1ml Aroclor 1254 Solution + 0.50ml of Pest/PCB Surrogate Stock 20ppm into 100ml with Hexane	1000/100 PPB AR1254 ICV
AR1254 500 PPB ICV	Supelco	1000/100 PPB ICV Working Solution	0.5ml of AR1254 1000/100 PPB ICV Standard into 1ml with Hexane	AR1254 500 PPB ICV

AR1262 1000/100 PPB ICV Working	Supelco	1000 PPM Aroclor 1262 Supelco	0.1ml Aroclor 1262 Solution + 0.50ml of Pest/PCB Surrogate Stock 20ppm into 100ml with Hexane	1000/100 PPB AR1262 ICV
Standard Name	**Supplier**	**Concentration of stock**	**Preparation Details**	**Final Concentration of working solution**
AR1262 500 PPB ICV	Supelco	1000/100 PPB ICV Working Solution	0.5ml of AR1262 1000/100 PPB ICV Standard into 1ml with Hexane	AR1262 500 PPB ICV
AR1268 1000/100 PPB ICV Working Solution	Supelco	1000 PPM Aroclor 1268 Supelco	0.1ml Aroclor 1268 Solution + 0.50ml of Pest/PCB Surrogate Stock 20ppm into 100ml with Hexane	1000/100 PPB AR1268 ICV
AR1268 500 PPB ICV	Supelco	1000/100 PPB ICV Working Solution	0.5ml of AR1268 1000/100 PPB ICV Standard into 1ml with Hexane	AR1268 500 PPB ICV
Pest/PCB Surrogate Spike	Restek	200ppm Surrogate Stock	0.2mL of TCMX and DCB mix into 200mL of Acetone	200ppb

11. Sample Handling and Preservation

11.1 Water Samples: Extract within 7 days of collection and analyze within 40 days.

11.2 Soil Samples: Extract within 14 days of collection and analyze within 40 days.

12. Quality Control

12.1 Instrument Calibration

12.1.1 Perform the instrument calibration as explained in Section 13, Calibration and Standardization.

12.2 Method Blank

12.2.1 Extract a method blank with each group of samples.

12.3 Matrix Spike/Matrix Spike Duplicate

12.3.1 Extract a matrix spike/matrix spike duplicate and a LCS with each group of 20 samples.

12.3.2 For **DOD work**- Unless client specified, LCS % recovery must be within control limits specified in DOD QSM Appendix D.

12.4 Control Charts

12.4.1 Keep Control Charts accuracy charts for spike recovery data.

12.5 Surrogate

12.5.1 Monitor surrogate recoveries and maintain accuracy charts as described in Section 17.4.

12.6 Manual Integration

12.6.1 At times manual integration will be necessary due to incomplete or incorrect integration by the automated analytical system.

12.6.2 Manual integration cannot be used in order to satisfy Quality Control Criteria. Integrate the area of the compound of interest.

12.6.3 Do not include baseline background noise; include only the area between where the beginning and end of the peak intersects with the baseline.

12.6.4 Any time a compound is integrated in the calibration standard it must then be consistently integrated in the samples.

12.6.5 When a manual integration is performed the hardcopy of the quantitation report will flag the compound with an "m".

12.6.6 Sign all compounds flagged with an "m" by initialing and dating them. If more than one compound is flagged they can be both individually signed and dated, or all compounds may be bracketed and signed and dated once to indicate that all-manual integrations have been reviewed.

12.6.7 Report the before and after chromatogram with the raw data.

12.7 Precision and Accuracy

12.7.1 Perform an initial one time demonstration of accuracy and precision per analyst.

12.7.2 Prepare four aliquots of a QC check sample at a concentration of 100/200 ug/L.

12.7.3 Ensure that the standard used for the QC check sample is from a source other than that used for standard calibration.

12.7.4 Extract and analyze the four QC check samples under the same conditions used for sample analysis by this method.

12.7.5 Repeat this procedure once every year after the initial demonstration.

12.8 Method Detection Limit

12.8.1 Determine MDL annually by analyzing seven replicate standards.

12.8.2 Extract the sample according to the method.

12.8.3 Spike the seven replicate at a concentration of 1 to 10 times the MDL.

12.8.4 After acquisition down load the quantitation files to a PC where excel software is used to do the statistical calculations.

12.8.5 Calculate the MDL by determining the standard deviation of the values and multiply by 3.143 for seven points.

12.8.6 The calculated MDLs must be below the quantitation limits for the method. If this condition is not met find the source of the problem (calculation error, integration problems, error in extraction, etc.)

12.8.7 Analyze a MDL verification check immediately after the study.

12.9 Client Special requirements

12.9.1 Special requirements or QC criteria for a specific project will be attached to this SOP for lab use or available in the intranet.

12.10 Limit of Detection (LOD)

12.10.1 Verify established LOD by spiking a clean matrix at the LOD concentration.

12.10.2 LOD is specific to each combination of analyte, matrix, method (including sample preparation) and instrument configuration.

12.10.3 LOD must be verified quarterly.

12.10.4 LOD must be verified on each instrument used, and every time the method is modified.

12.11 Limit of Quantitation (LOQ)

12.11.1 LOQ must be greater than the LOD.

12.11.2 LOQ must be verified quarterly for each quality system matrix, method and analyte, by analyzing QC sample containing the analytes of concern in each quality system matrix 1-2X the claimed LOQ.

12.11.3 LOQ must be performed if the method is modified.

13. Calibration and Standardization

13.1 Instrument Calibration

13.1.1 Prepare a calibration standard of a combination of Aroclor 1016, 1260 from purchased stock standards at five concentration levels. The low level standard approximates the LOQ/RL and the others are 4.0, 10, 20 and 50 times the low level standard.

13.1.2 Analyze a midpoint calibration standard of all other Aroclors with the initial calibration of Aroclor 1016/1260, for pattern identification and retention times on each column.

13.1.3 For DOD work, quantitation is performed using a 5-point calibration. Analyze an initial calibration curve if positive hits are identified for Aroclors besides Aroclor 1016 and Aroclor 1260.

13.2 Analyze injections of 2 µL for each standard.

- Select 3 to 5 characteristic of the Aroclor (can not be the same peaks that are used in another aroclor)
- A Calibration factor (CF) is calculated for each peak at each concentration level.

$$CF = \frac{\text{Integrated area}}{\text{ng inj.}}$$

13.2.1 Calculate the %RSD for all target analytes from the initial calibration.

$$\%RSD = \frac{\text{Standard Deviation of CF}}{\text{Mean of CF}} \times 100$$

Where: $\text{mean of CF} = \frac{\text{sum of CF}}{n}$

n = number of calibration standards used

13.2.2 The %RSD should be less than or equal to 20% for each target peak.

13.2.3 If the calibration does not meet this criterion, check instrument conditions and analyze a new initial calibration.

13.2.4 If the %RSD of any target peak is 20% or less than the CF it is assumed to be constant over the calibration range, and the average calibration factor may be used for quantitation.

13.2.5 Perform a linear regression of the instrument response versus the concentration of the standards. Make certain that the instrument response is treated as the dependent variable (y) and the concentration as the independent variable (x). The regression will produce the slope and intercept terms for a linear equation in the form

$$y = ax + b,$$

where: y = instrument response (peak area or height)

a = slope of the line (also called the coefficient of x)

x = concentration of the calibration standard
b = intercept

- The use of linear regression may not be used as a rationale for reporting results below the calibration range demonstrated by the analysis of the standards.
- The regression calculation will generate a correlation coefficient(r)
- In order to be used for quantitative purposes, the correlation coefficient must be greater or equal to 0.990.
- For **all DOD** work- correlation coefficient must be greater or equal to 0.995.

13.2.6 Initial calibration verification

13.2.6.1 Analyze a mid range standard from a difference source than the initial calibration.

13.2.6.1.1 Acceptance criteria for the ICV is ± 15%D.

13.3 Retention Time Windows

13.3.1 Along with following RSD levels, close attention must be made to retention time (RT) shift within the patterns.

13.3.2 Determine the retention time windows by running a mid range standard every 24 hours for 72hrs consecutively and calculating ± 3 times the standard deviation of 5 prominent peaks unique to each aroclor. Retention time can not shift more than 0.2 min of the initial calibration retention times. If the RT is compromised and general instrument maintenance can not fix the problem then a new initial calibration must be run.

13.3.3 Use the mid range standard at the beginning of every sequence to update the RT windows.

13.4 Continuous Calibration Check

13.4.1 For DOD, analyze Continuous Calibration check standard at midpoint prior to sample analysis after every 10 field samples, and at the end of the analytical sequence. For SW846, analyze Continuous Calibration check standard at midpoint every 12 hours. The concentration of the CCV standard is varied daily for DOD as well as for SW846.

13.4.1.1 Acceptance criteria for the CCV is ± 15%D for every peak by Method 8082, and ±20% by Method 8082A.

13.5 Confirmation analysis

13.5.1 Column use for confirmation must meet the same criteria as the primary column for all **DOD** work.

14. Procedure

14.1 Analysis of Sample Extracts

14.1.1 Analyze the extracts by two dissimilar columns simultaneously by injecting into a single injection port and splitting the inject with a tee adapter to the two columns, each of which goes to an ECD. The same GC operating conditions that were used for the initial calibration must be employed for the sample analysis.

14.1.2 Inject a continuous calibration check (one point from the 1016/1260 initial calibration) each 12-hour shift prior to running any sample analyses.

14.1.3 Identify the Aroclors by pattern, peak ratios, and retention times for the characteristic peaks of each Aroclor.

- For Quantitation the concentration calculated for the characteristic peaks are averaged.
- Omit any peaks with obvious interference from the average.

14.1.4 Confirm any "hits" tentatively identified as method analyses on the primary column by analysis on a second, dissimilar column.

14.1.4.1 GC/MS confirmation is required if there is a positive hit of 10ppm or more.

14.1.4.2 The Dept. Supervisor would inform project manager to re-log the sample for GC/MS analysis.

14.1.4.3 The sample with a positive hit of 50ppm or more would also require separate disposal.

14.1.4.4 The Dept. supervisor would alert sample management to dispose the sample separately.

- The analyst must check the quantitative agreement of the Aroclor between both columns once identification is confirmed.
- Unless otherwise stated in a project plan the higher result will be reported.

Note: Results are reported per method requirement and not always from primary column, for 8082/8082A including DOD work.

- If there is a larger (greater than 40%D) difference between the concentrations, then the lower of the two results will be reported if the difference is due to interference.
  %D = (higher conc. - lower conc./lower conc.) * 100

14.1.5 Dilute and reanalyze any averaged concentration of the Aroclor peaks that exceeds the concentration range of the Aroclor 1016/1260 mix.

14.1.6 Sample batch identification must be clearly identified throughout sample analysis.

- Write the Batch Number associated with the samples in the comments section of the Instrument Run Log.
- Put the Batch Number on the quant report header information and on all QC Forms generated for the package (i.e., Method Blank Summary, Spike Recovery Summary, Surrogate Summary, etc.).

14.2 Analytical Run

A typical sequence in an analytical run for PCB analysis is as follows:

Instrument Blank
PCB 1660/surrogate 1000ppb
PCB 1660/surrogate 750ppb
PCB 1660/ surrogate 500ppb

PCB 1660/surrogate 250ppb
PCB 1660/surrogate 50ppb
PCB 1221 500ppb
PCB 1232 500ppb
PCB 1242 500ppb
PCB 1248 500ppb
PCB 1254 500ppb
ICV
Blank(s)
Samples (Samples, blanks and QC samples up to ten injections)
PCB 1016/1260 CCV
Samples 11-20
PCB 1016/1260 CCV

14.7 Data Reporting

14.7.1 EISC is the software used to calculate and create all forms used to report the sample results.

14.7.2 If a compound falls within the absolute retention window it is consider a tentatively identified positive hit, report the second column confirmation results.

14.7.3 Report the higher result unless otherwise stated in a project plan the higher result will be reported.

14.7.4 If more than one PCB pattern can be recognized and confirmed report all the PCBs recognized.

14.7.5 If a weathered PCB pattern can be recognized and confirmed report total PCB results.

14.8 Documentation Requirements

14.8.1 Label sample chromatograms with the following information:

- Sample ID number
- Volume injection
- Date of injection
- GC column and instrument identification
- Label positively identified peaks
- Temperature program

14.8.2 Extraction logs must contain:

- Sample ID numbers in batch
- Date extracted
- Surrogate, lot number and concentration
- Spiking solution, lot number and concentration
- Sample size
- Final extract volume
- Any comments by analyst.
- Analysts signature

- The right hand side portion initiates an internal chain of custody for the extracts.
- Chemical used for clean up procedure lot number (Florisil, sulfuric acid, etc)

14.8.3 Instrument logs must contain:

- ID of instrument and column
- Temperature program
- Analyst signature
- Dates of all injections of standards, blanks, samples, etc.
- ul injected
- Analysts' comments
- Data file name and number of each run

14.8.4 For all manual integrations before and after chromatograms

15. Calculations

15.1 The computer using the HP Enviroquant software calculates the ng/mL of the analyte in the extract injected.

- When this result, along with extraction information, dilution, etc., are entered into the Excel workbook or LIMS system, sample concentrations are calculated according to the following formulae:

$$\text{Water Concentration } (\mu g/L) = \frac{(ng/mL)\ (mL\ ext.)}{(\mu l\ inj.)\ (mL\ sample)}$$

$$\text{Soil Concentration } (\mu g/kg) = \frac{(ng/mL)\ (mL\ ext.)}{(\mu L\ inj)\ (g\ smp)\ (fract.\ solids)}$$

$$\text{Waste Dilution}(\mu g/kg) = \frac{(ng/mL)\ (mL\ ext)}{(\mu l\ inj.)\ (g\ sample)}$$

15.2 The computer using the Demeter software will calculate the pg/injection. When this result, along with extraction information, dilution, etc., is entered into the software, sample concentrations are calculated according to the following formulas:

$$\text{Water Concentration } (\mu g/L) = \frac{(pg/inj)\ (mL\ ext.)}{(mL\ smp)}$$

$$\text{Soil Concentration } (\mu g/kg) = \frac{(pg/inj)\ (mL\ ext.)}{(g\ smp)\ (fract.\ solids)}$$

$$\text{Waste Dilution } (\mu g/kg) = \frac{(pg/inj)\ (mL\ ext.)}{(g\ sample)}$$

where: pg/mL = concentration calculated by software using the mean CF of the initial calibration and the CF of the sample.
ng/mL = concentration calculated by software using the mean CF of the initial calibration and the CF of the sample.
mL ext. = final volume of extract (mL)
µL inj = ul injected*
mL smp = sample (or TCLP extract) volume in mL
g smp = sample weight in grams

fract. solids = fractional solids = (100 - % moisture)

Note: Since the usual inject is 2 µl, it is assumed that 1.0 µl is injected onto each column and 1.0 µl is used for calculation purposes.

16. METHOD PERFORMANCE

16.1 Analysis is performed in accordance with the method. All quality control and quality assurance procedures are followed. Refer to Section 12.7 and 12.8 for further information.

17. POLLUTION PREVENTION

17.1 Use only the amounts of chemicals required. Do not make large quantities of solutions.
17.2 Use hood when working with solvents.
17.3 Keep the area clean and clutter free in the extractions lab and around the instruments in order to avoid any mishaps.
17.4 Trap exhaust from electron capture detector.
17.5 Trap septum vent and split vent on GC.
17.6 Keep chemicals away from drains.
17.7 Properly collect and dispose of waste according to Chemtech's Waste Disposal SOP.

18. Data Assessment and Criteria for QC

18.1 Instrument Calibration

18.1.1 The relative standard deviation (RSD) of the response factor for all analytes must be less than or equal to 20%.
- If the RSD of any target compound is >20%, then calculate the mean of the RSD values for ALL analytes.
- If it is less than 20% then the average RF can be used for quantitation.

18.1.2 For multi-component analyses curves are obtained from 4 to 6 characteristic peaks.

18.1.3 If a 20% RSD criteria can not be achieved individually or group a correlation coefficient of 0.990 or better may be used. For **DOD** work- 0.995 or better.

18.2 Continuous Calibration Check

18.2.1 Calibration verification standard concentrations and subsequent calibration factors (CF) must not exceed ±15% difference when compared to the mean initial calibration factor (CF) for both columns by Method 8082, and not exceed ±20% by Method 8082A.

18.3 Method Blank

18.3.1 Any target compound must be below the PQL concentration.

18.3.2 Whenever a blank is unacceptable, locate the source of contamination and re-extract and re-analyze all samples associated with the unacceptable blank.

18.3.3 For **DOD & NC work**- All target compounds must be ≤ ½ Reporting Limit.

18.4 Matrix Spike/Matrix Spike Duplicate and LCS

18.4.1 MS/MSD and LCS must meet the % recovery.

18.5 Control Charts

18.5.1 The accuracy assessment is expressed as a recovery interval from P-2s to P+2s, where P is the average recovery and s is the standard deviation.

18.6 Surrogate

18.6.1 Monitor surrogate recoveries and maintain accuracy charts as described in Section 18.4.1.

18.7 Retention Times

18.7.1 Retention times for samples, blank and QC must not shift more than 0.07 min for the Aroclor peaks, 0.05 for the TCMX peak, and 0.1 for the DCB peak, when compared to the calibration verification standard analyzed at the beginning of the analytical sequence.

18.8 Samples

18.8.1 The higher results must be reported even if the calculated % RPD of the results between both columns for any given analyte exceeds 40%. The lower of the two results will be reported if the difference is due to interference.

18.9 Limit of Detection

18.9.1 All analytes spiked should be positively identified.

18.10 Limit of Quantitation

18.10.1 Analysis must meet the acceptance criteria for the laboratory control sample.

19. Corrective Actions for Out-of-Control Data

19.1 Instrument Calibration

19.1.1 Prepare a new calibration if the mean of the RSD values exceed the 20% criteria.

19.2 Continuous calibration check

19.2.1 If the criterion is not met then the sample analysis must halt and any samples after the last passing calibration verification standard must be re-run.

19.2.2 If the standard analyzed after a group of samples exhibits a response above acceptance limit (i.e. >20%D), no re-run is necessary if the analyte is not present in associated sample.

19.2.3 If the standard response is more than 20%D below initial calibration response, then re-injection of all affected samples is necessary to ensure that the detector response has not deteriorated to the point that the analyte would not have been detected even though it was present (i.e., false negative)

19.2.4 If the chromatographic problem cannot be fixed by routine instrument maintenance, then a new initial calibration must be employed before sample analysis can continue.

19.3 Method Blank

19.3.1 Whenever a blank is unacceptable, re-inject to eliminate instrument related problem.
19.3.2 If failure persists, re-extract the blank and all associated samples.

19.4 Matrix Spike/Matrix Spike Duplicate and LCS
19.4.1 If MS/MSD fails, narrative in the case narrative.
19.4.2 If LCS fails to meet requirements, re-extract the entire batch.
19.4.3 If there is insufficient volume to reextract the samples, flag data in associated samples for the failing analyte with a Q flag.

19.5 Surrogate
19.5.1 Investigate any problems with surrogate recoveries, identify the source of the problem and take appropriate remedial action.
19.5.2 DCB is the primary surrogate, however if there is co-eluting matrix interference, the secondary surrogate, TCMX, may be used to evaluate the system stability and extraction efficiency.
19.5.3 Re-extract the sample if both surrogates fail the recovery criteria.

19.6 Limit of Detection
19.6.1 If LOD verification fails, then repeat the detection limit determination and LOD verification at a higher concentration and set the LOD at the higher concentration.

19.7 Limit of Quantitation
19.7.1 Reevaluate the LOD and the LOQ.

20. CONTINGENCIES FOR HANDLING OUT-OF-CONTROL OR UNACCEPTABLE DATA

20.1 Issue a corrective action form any time there is a deviation from the SOP or the client requirements are not met.

20.2 If a sample is damaged, broken, or spilled, contact the project manager and issue a corrective action.

20.3 Initial Calibration
20.3.1 If any compound is greater than 20% RSD the mean of the RSD values of all analytes in the mix including any non target compound. The mean %RSD must not exceed the <20% criteria.
20.3.2 If there are any major changes to the instrument (source cleaning, change of columns, etc.), perform a new calibration.
20.3.3 If a 20% RSD criteria can not be achieved individually or group a correlation coefficient of 0.990 or better may be used. For **DOD** work- 0.995 or better.

20.4 Continuing Calibration
20.4.1 If a continuing calibration fails, re-run the continuing calibration and all data after the last passing continuing calibration.
20.4.2 Analyze a new initial calibration if corrective action fails to alleviate the problem.

20.5 Method Blank
20.5.1 Re-extract any samples associated with unacceptable method blank.

20.6 Surrogate Recoveries

20.6.1 If a sample has both surrogates outside QC limits from each group, re-extract and reanalyze the sample to confirm matrix interference or laboratory error.

20.6.2 If surrogates recoveries in the method blank or LCS do not meet criteria, re-extract all samples associated with that blank.

20.7 Retention time

If the retention time falls outside criteria then check for instrument problem and take necessary corrective action.

20.8 Matrix Spike and Matrix Spike Duplicate and LCS

20.8.1 If any MS/MSD compound data is out of control limits verify LCS results are all within limits and consider it matrix interference.

20.8.2 If LCS and MS/MSD are out of control limits re-analyzed to verify that is an instrument problem.

20.8.3 If still do not meet control limits, re-extract the samples.

20.8.4 If LCS fails criteria flag the data per DOD QSM Appendix D for DOD work.

21. Contingencies for Handling Out-of-Control or Unacceptable Data

21.1 Following are the result qualifiers used for out-of-control and unacceptable data:

- **U**: Indicates the compound was analyzed but not detected.
- **J**: Indicates an estimated value, the result reported is below the initial calibrations lowest point.
- **B**: Indicates the analytes were found in the blank as well as the sample.
- **E**: Indicates the analyte concentrate exceeds the calibrated range of the GC instrument.
- **D**: Indicates all compounds identified in an analysis at a secondary dilution factor.
- **N**: Indicates presumptive evidence of a compound. This is used for all non-target results where identification is made.

21.2 Issue a corrective action form any time there is a deviation from the SOP or the client requirements are not met.

21.3 If a sample or extract is damaged, broken, or spilled, contact the project manager and issue a corrective action.

21.4 For more details regarding corrective action procedure, please refer to Corrective Action Report SOP.

21.5 For DOD work- use flags per DOD QSM Appendix D.

22. Waste Management

22.1 Keep samples for 180 days after analysis and dispose them off according to the procedures explained in the SOP for Waste Disposal.

23. References

23.1 USEPA Test methods for Evaluating Solid Wastes, SW-846, Method 8082 – Polychlorinated Biphenyls (PCBs) by Gas Chromatography, Revision 0, December 1996.

23.2 USEPA Test methods for Evaluating Solid Wastes, SW-846, Method 8082A – Polychlorinated Biphenyls (PCBs) by Gas Chromatography Revision 1, February 2007.

23.3 Department of Defense Quality System Manual for Environmental Laboratories, Version 5.3 September 2019.

24. Appendices

24.1 NA

CHEMTECH 284 Sheffield Street, Mountainside NJ 07092, (908) 789-8900

READ RECEIPT

Employee Name: _____

Department: _____

_____M8082A-PCB_____
Method or Document Read (Include Title, Number, Revision, as applicable)

Employee Statement: I have read and understand the information in the above-mentioned method or document.

_____ _____
Employee Signature Date

Supervisory Statement: I have reviewed this document or method with the employee.

_____ _____
Supervisory signature Date

Note: This receipt is to be returned to the Quality Assurance Department for incorporation into employee training record files. If you have questions or would like to review your train record files, please see QA.

Determination of Chlorinated Acid Herbicides by Capillary Gas Chromatography with Electron Capture Detector

1. Test Method

1.1 Determination of Chlorinated Acid Herbicides using SW-846, 3rd Edition; Method 8151A by Methylation Derivatization.

2. Applicable Matrices

2.1 Water, Soil and Waste

3. Detection Limits

3.1 Refer to Table A for Reporting limits.

4. Scope and Application

4.1 This method is used for the determination of chlorinated Phenoxy Acid Herbicide in water, soil, and TCLP leachates.

4.2 The herbicides are extracted with diethyl ether and/or methylene chloride as acids or esters.

4.3 Any esters are saponified to acids, and then converted to their methyl esters using diazomethane. The methyl esters are analyzed by GC/ECD.

5. Summary of Method

5.1 Samples are extracted with diethyl ether and then esterified with diazomethane.

5.2 Extracts are analyzed by injecting 2ul aliquot into a gas chromatograph with dual fused silica capillary column and dual electron capture detectors.

5.3 The chromatographic data is used to determine the presence of Chlorinated Herbicides.

6. Definitions

6.1 Chlorinated Herbicides**:** organic compounds used in pest control industry.

6.2 Gas Chromatography**:** (GC) instrument used to process the components of a mixture separated from one another by volatizing the sample into a carrier gas stream passing through and over a bed of packing.

6.3 Calibration: to determine, by measurement or comparison with a standard, the correct value of each scale reading on a meter, instrument, or other device. The levels of the applied calibration standard should bracket the range of planned or expected sample measurement.

6.4 Holding times (Maximum allowable holding times): the maximum times that samples may be held prior to analysis and still be considered valid or not compromised.

6.5 Instrument Blank: a clean sample processed through the instrumental steps of the measurement process; used to determine instrument contamination.

6.6 Spike blank: a sample matrix, free from the analytes of interest, spiked with verified known and verified amounts of analytes. It is generally used

to establish intra-laboratory or analyst specific precision and bias or assess the performance of all or a portion of measurement system.

6.7 Matrix Spike: a sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. Matrix spikes are used for example to determine the effect of the matrix on methods recovery efficiency.

6.8 Matrix Spike Duplicate: a second replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of the precision of the recovery for each analyte.

6.9 Method Blank: a sample of a matrix similar to the batch of associated samples that is free form the analytes of interest, which is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations the impact the analytical results for sample analyses.

6.10 Method Detection Limit: the minimum concentration of a substance (an analyte) that can be measured and report with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

6.11 Surrogate**:** a substance with properties that mimic the analyte of interest. It is unlikely to be found in environment samples and is added to them for quality control purposes.

7. INTERFERENCES:

7.1 Organic acids, especially chlorinated acids, cause the most direct interference with the determination. Phenols, including chlorophenols, may also interfere with this procedure.

7.2 Alkaline hydrolysis followed by washing the basic aqueous solution with ethyl ether removes many chlorinated organics and phthalate esters that would cause chromatographic interferences.

7.3 The acid herbicides will react readily with alkaline substances and may be lost during analysis. Therefore, glassware and glass wool must be acid rinsed and sodium sulfate must be acidified prior to use to avoid this possibility.

7.4 Interferences may be caused by contaminants in solvents, reagents and glassware.

7.4.1 Solvent contamination is minimized by using only pesticide grade solvents. Each lot of solvents purchased is checked for interferences before use.

7.4.2 Contamination from reagents is minimized by using high quality reagents. Sodium sulfate is heated at 400º C for 4 hours, cooled in a desiccator and stored in glass bottles until use. Boiling chips are heated to 400º C for 30 minutes and solvent rinsed before use.

7.4.3 All glassware is rinsed with last solvent used, washed with detergent and water and rinsed with tap, then DI water. After drying all glassware, with the exception of the volumetric flasks, is muffled at 400º C for 30 minutes. Before use, glassware is rinsed with solvent to be used.

7.4.4 All of these materials are routinely demonstrated to be free from interferences by the analysis of method blanks.

8. Safety

8.1 Only experienced analysts should be allowed to work with diazomethane due to the potential hazards associated with its use (carcinogenic, explosive).

8.2 Wear appropriate safety clothing and eye protection to minimize exposure.

8.3 Use protective gloves when handling corrosive chemicals.

8.4 Read the Material Safety Data Sheets for the chemicals used in the laboratory for the identity of the ingredients, the physical and chemical characteristics of the substance, the physical hazards and the safe handling and precautions.

8.5 Diethyl ether and methyl-t-butyl ether must be tested (weekly, and each newly opened can) for peroxides. Follow the directions on the peroxide test strip vials. If peroxides are formed, explosion and/or fire may result.

8.6 Only explosion proof hot plates may be used in the ether hood.

8.7 In order to avoid discharging ether to the environment, ether evaporated in the K-D apparatus is condensed and recovered.

8.8 Diazomethane is a toxic carcinogen and can explode under certain conditions. The following precautions must be followed:

8.8.1 Use only in a well ventilated hood - do not breathe vapors.

8.8.2 Use a safety screen or keep hood sash down.

8.8.3 Use mechanical pipetting aides.

8.8.4 Do not heat above 90º C – May result in EXPLOSION.

8.8.5 Avoid grinding surfaces, ground glass joints, sleeve bearings, and glass stirrers EXPLOSION may result.

8.8.6 Store away from alkali metals – May result in EXPLOSION.

8.8.7 Solutions of diazomethane decompose rapidly in the presence of solid materials such as copper powder, calcium chloride and boiling chips.

9. Equipment and Supplies

9.1 Agilent 7890 Series Gas chromatograph with electron capture detector and Mass Hunter Data Acquisition B07.06.001, June 2017.

9.2 Instrument temperature program:

- Injection temp 250ºC
- 80ºC Initial Temperature, hold for 1.5 min
- 25 ºC/min to 190ºC, hold for 1.0 min
- 11 ºC/min to 300 ºC, hold for 0.0 min

- 2.4mL/min of UHP Helium for each column, head pressure 22.9 psi

Detector Specifications: The following flows/temperatures are applied to the column for each analytical run.

- 320^{o} C constant
- 60mL/min of 95% Argon/ 5% Methane, Ultra P5

9.3 Separatory funnels - 60ml, 125ml and 2000ml with Teflon stopcocks and stoppers.
9.4 Concentrator tubes, Kuderna-Danish (K-D), 10ml, 2 cm diameter, not tapered.
9.5 Evaporative flask, Kuderna-Danish, 500ml.
9.6 Snyder columns - 3 ball macro and 2 ball micro.
9.7 Erlenmeyer flasks, 250ml with 24/40 ground glass joint.
9.8 Vials, amber glass, 10ml
9.9 Diazomethane generator
9.10 Glass wool, acid washed
9.11 Drying column, 400 mm x 20 mm ID
9.12 Analytical balance (to 0.0001 g)
9.13 Top loading balance (to 0.01 g)
9.14 Water bath
9.15 Columns:
Column 1: RTX ® CLP Pesticides1 30m X 0.32mm X 0.5 µm or equivalent;
Column 2: RTX ® CLP Pesticides2 30m X 0.32mm X 0.25 µm or equivalent.
9.16 Sand
9.17 Instrument Software: Mass Hunter Data Acquisition B07.06.001, June 2017.

10. Reagents and Standards

10.1 Diethyl ether (J.T. Baker #9244-03 Baker Analyzed, ACS grade or equivalent.
10.2 Methylene chloride, pesticides grade J.T. Baker #9266-A4 or equivalent
10.3 Hexane (95% n-hexane) J.T. Baker #9262-3 pesticide grade or equivalent
10.4 Methanol, J.T. Baker #9077-02, Ultra Resi-Analyzed grade or equivalent.
10.5 Sodium sulfate, ACS #6399, anhydrous, acidified
10.5.1 Weigh 100g sodium sulfate into a ceramic dish.
10.5.2 Add 5mL conc. sulfuric acid per 100g of sodium sulfate (ph≤2).
10.5.3 Add ether, just covering the acidified sodium sulfate to create slurry.
10.5.4 Mix well and let air dry in a well ventilated hood until ether evaporates and the acidified sodium sulfate becomes dry. (Note that acidified sodium sulfate may harden from drying).
10.5.5 Break up clumps of the acidified sodium sulfate until it is free-flowing and transfer the mixture into a clean glass jar.
10.5.6 Check the pH of acidified sodium sulfate by mixing 1g acidified sodium sulfate and 10mL DI water into a small container. Check pH with pH paper strip.

10.6 Concentrated Hydrochloric acid (Instra Analyzed), J.T. Baker #9530-33.
10.7 Concentrated Sulfuric Acid, JT Baker #9673-33 (Instra Analyzed Reagent Grade) or equivalent.
10.8 1:3 Sulfuric acid. Add 250mL concentrated Sulfuric Acid to 750mL of reagent water as total volume 1000mL.
10.9 12N Sulfuric Acid. Add 333mL concentrated Sulfuric Acid to 667mL of reagent water as total volume 1000mL.
10.10 Diazald (N-methyl-N-nitroso-p-toluenesulfonamide) ACS grade.
10.11 Surrogate Spiking Solution - Dichlorophenyl acetic acid (DCAA) (5000ug/ml)
10.12 Matrix Spiking Solution (in acetone)
10.13 Calibration Mix: Prepare from the methyl esters of all targeted compounds and surrogates. Concentration subject to change (* or equivalent)

Standard Name	Supplier	Conc. of stock	Preparation Details	Final Conc. of working solution
*Herbicides Surrogate Spiking Solution	Restek	10ug/mL	1mL into 10mL with Hexane	1000ppb
*Herbicides Working Solution	Restek	200ug/ml	Take 1ml of Herbicide Stock solution and 1ml of Herbicide Surrogate stock into 100ml with Hexane	2000ppb
*Herbicides Calibration Standard	NA	2000ppb	Take 750ul of Herbicide working solution and make final volume of 1ml with Hexane	1500ppb
*Herbicides Calibration Standard	NA	2000ppb	Take 500ul of Herbicide Working solution and make final volume of 1ml with Hexane	1000ppb
*Herbicides Calibration Standard	NA	1000ppb	Take 750ul of 1000ppb Herbicide Standard and make final volume of 1ml with Hexane	750ppb
*Herbicides Calibration Standard	NA	1000ppb	Take 500ul of 1000ppb Herbicide standard and make final volume of 1ml with Hexane	500ppb
*Herbicides Calibration Standard	NA	1000ppb	Take 200ul of 1000ppb Herbicide standard and make final volume of 1ml	200ppb
*Herbicides 2nd Source Calibration Standard	Ultra	20ug/ml/200ug/ml	1ml of Herbicide Stock solution and 0.1ml of Herbicide Surrogate stock into 10ml with Hexane	2000ppb

11. Sample Handling and Preservation

11.1 Water samples:
11.1.1 Samples are collected in 1 liter amber glass bottles with Teflon lined screw caps. All samples must be "grab," and the bottle is not to be pre-rinsed with sample before collection. Samples must be iced or refrigerated at 4º C from time of collection until extraction.

11.1.2 Water samples must be extracted within seven days. All samples must be analyzed within 40 days of extraction.

11.2 Soil and Sediment:

11.2.1 Samples are collected in a wide mouth glass jar with Teflon lined cap. Samples are iced or refrigerated from time of collection until extraction.

11.2.2 Soils samples must be extracted within fourteen days. All samples must be analyzed within 40 days of extraction.

12. Quality Control

12.1 Initial Calibration

12.1.1 Perform an initial calibration as described in section 13.

12.2 Continuing Calibration

12.2.1 Analyzed a standard to show that the system is operating as it did when initially calibrated. The concentration of the standard is varied daily.

12.3 Method Blank

12.3.1 Extract a reagent blank with each group of samples.

12.4 Matrix Spike/Matrix Spike Duplicate

12.4.1 Extract a matrix spike/matrix spike duplicate and a LCS with each group of 20 samples.

12.5 Surrogate

12.5.1 Monitor surrogate recoveries and maintain accuracy charts as described in Section 12.6.

12.6 Control charts

12.6.1 Keep accuracy charts for spike recovery data and surrogates.

12.7 Manual Integration

12.7.1 At times manual integration will be necessary due to incomplete or incorrect integration by the automated analytical system.

12.7.2 Manual integration cannot be used in order to satisfy Q Quality Control Criteria. Integrate the area of the compound of interest.

12.7.3 Do not include the baseline background noise; include only the area between where the beginning and end of the peak intersects with the baseline.

12.7.4 Any time a compound is integrated in the calibration standard it must then be consistently integrated in the samples.

12.7.5 When a manual integration is performed the hardcopy of the quantitation report will flag the compound with an “m”

12.7.6 Sign all compounds flagged with an “m” by initialing and dating them. If more than one compound is flagged they can be both individually signed and dated, or all compounds may be bracketed and signed and dated once to indicate that all manual integrations have been reviewed.

12.7.7 Refer to P243-Electronic Logbook SOP for further details on manual integrations.

12.8 Precision and Accuracy
- 12.8.1 Perform an initial one time demonstration of accuracy and precision per analyst.
- 12.8.2 Prepare four aliquots of a QC check sample at a concentration of 100/200ug/L.
- 12.8.3 Ensure that the standard used for the QC check sample is from a source other than that used for standard calibration.
- 12.8.4 Extract and analyze the four QC check samples under the same conditions used for sample analysis by this method.
- 12.8.5 Repeat the procedure once every year after the initial demonstration

12.9 Method Detection Limit
- 12.9.1 Refer SOP P203-Laboratory limits and demonstration of capability.

12.10 Client Special requirements
- 12.10.1 Special requirements or QC criteria for a specific project will be attached to this SOP for lab use.

12.11 Limit of Detection (LOD)
- 12.11.1 Establish LOD by spiking a quality system matrix at approximately 2-3X the detection limit for single analyte tests and 1-4X detection limit for multiple analyte tests.
- 12.11.2 LOD is specific to each combination of analyte, matrix, method (including sample preparation) and instrument configuration.
- 12.11.3 LOD must be verified quarterly.
- 12.11.4 LOD must be verified on each instrument used, and every time the method is modified.

12.12 Limit of Quantitation (LOQ)
- 12.12.1 LOQ must be greater than the LOD.
- 12.12.2 LOQ must be verified quarterly for each quality system matrix, method and analyte, by analyzing QC sample containing the analytes of concern in each quality system matrix 1-2X the claimed LOQ.
- 12.12.3 LOQ must be performed if the method is modified.

13. Calibration and Standardization

13.1 Initial Calibration
- 13.1.1 Standards are prepared from an esterified high concentration standard. Prepare the standard as per table on 10.16. The lowest standard analyzed must be equal to or less than the reporting limit.
- 13.1.2 2ul of the standards are injected into the GC.
- 13.1.3 A calibration factor (CF) is calculated for each analyte at each concentration:

$$CF = \frac{\text{Integrated area}}{\text{ng. injected}}$$

- 13.1.4 Calculate the %RSD for all target analytes from the initial calibration.

$$\%RSD = \frac{\text{Standard Deviation of CF}}{\text{Mean of CF}} \times 100$$

Where: $\text{mean of CF} = \frac{\text{sum of CF}}{n}$

n = number of calibration standards used

13.1.5 The %RSD should be less than or equal to 20% for each target analyte.

13.1.6 If the calibration does not meet this criterion, check instrument conditions and analyze a new initial calibration.

13.1.7 If the %RSD of any target analyte is 20% or less than the CF it is assumed to be constant over the calibration range, and the average calibration factor may be used for quantitation.

13.1.8 When the %RSD exceeds 20% the plotting and visual inspection of a calibration curve is used. For compounds with %RSD greater than 20%, use a linear regression plotting.

13.1.9 Perform a linear regression of the instrument response versus the concentration of the standards. Make certain that the instrument response is treated as the dependent variable (y) and the concentration as the independent variable (x). The regression will produce the slope and intercept terms for a linear equation in the form. The regression will produce the slope and intercept terms for a linear equation in the form

$$y = ax + b$$

where:
y = instrument response (peak area or height)
a = slope of the line (also called the coefficient of x)
x = concentration of the calibration standard
b = intercept

13.1.10 Analyze an initial calibration verification standard (ICV) from a different source.

13.1.10.1 The ICV must meet a + 15% difference criteria from the initial calibration values.

13.2 Retention Time Windows

13.2.1 Determine the retention time windows by running a mid range standard every 24 hours for 72 hrs consecutively and calculating ± 3 times the standard deviation.

13.2.2 Retention time can not shift more than 0.2 min from the initial calibration absolute retention time. If the RT is compromised and general instrument maintenance cannot fix the problem then a new initial calibration must be run.

13.2.3 Use the mid range standard at the beginning of every sequence to update the center retention time value.

13.3 Continuing Calibration Check

13.3.1 Run a mid range standard every ten samples, at the beginning and at end of the analytical sequence.

14. Procedure

14.1 Extraction of water samples

14.1.1 Mark the water meniscus on the side of the sample container.

14.1.2 Pour the entire sample (for TCLP extracts, use only 100ml) into a 2-liter separatory funnel.

14.1.3 With each set of samples extracted, extract one blank consisting of 1 liter of reagent water. A TCLP blank consists of 100ml of the tumbled and filtered extraction fluid used.

14.1.4 With each set of samples extracted, extract one LCS consisting of 1 liter of reagent water in separatory funnel and spike with 1ml of the matrix spiking solution. If MS/MSD is not performed then prepare one more LCS with the set of samples.

14.1.5 For the sample selected to be spiked for MS/MSD, prepare two more aliquots of 1 liter sample in separatory funnels and spike each with 1ml of the matrix spiking solution. If the sample is a TCLP extract then two 100ml aliquots of extract must be spiked with 1mL of matrix spiking solution.

14.1.6 Add 1ml of surrogate spiking solution to each sample, preparation blank, MS/MSD and LCS.

14.1.7 Add 250g of NaCl to the sample, seal and shake to dissolve the salt. Use 25g of NaCl for TCLP extract.

14.1.8 Add 17mL of 6 N NaOH to the sample and shake. Check the pH of the sample with pH paper.

14.1.9 If the sample does not have a pH ≥12, adjust the pH by adding more 6 N NaOH.

14.1.10 Keep the sample at room temperature for 2 hours until the hydrolysis step is complete, shaking the sample in separatory funnel periodically.

14.1.10 Add 60mL of Methylene Chloride to the sample bottle and rinse the bottle. Transfer the methylene chloride to the separatory funnel and extract the sample by vigorously shaking the funnel for 2 minutes with periodic venting the release excess pressure.

14.1.11 Allow the organic layer to separate from the water phase for 10 minutes. If an emulsion forms, it must be broken up by stirring, filtering through glass wool, centrifugation or sonification.

14.1.12 Discard the methylene chloride phase.

14.1.13 Add 60mL methylene chloride to the separatory funnel. Repeat the extraction procedure and discard the methylene chloride phase. Perform a third extraction in the same manner with methylene chloride.

14.1.14 Add 17mL of cold (4°C) 12N sulfuric acid and check the pH with pH paper. If the pH is not ≤ 2 then adjust the pH ≤ 2 by adding more acid.

14.1.15 Add 120mL diethylether to the sample bottle and shake to rinse the bottle; then add to sample in the separatory funnel.

14.1.16 Extract by shaking for 2 minutes with periodic venting.

14.1.17 Allow the phases to separate for 10 minutes. If an emulsion forms, it must be broken up by stirring, filtering through glass wool, centrifugation or sonification.

14.1.18 Drain the aqueous phase into a 1 liter flask or a second separatory funnel.

14.1.19 Collect the solvent extract in a 250mL round glass bottle containing 10g acidified sodium sulfate. Add more acidified sodium sulfate if needed.

14.1.20 Repeat the extraction two more times using 60mL diethylether each time and combine the extracts in the Erlenmeyer flask.

14.1.21 Allow extract to sit for at least 2 hours in the sodium sulfate to dry. Shake the samples periodically to allow the sodium sulfate to dry the sample.

14.1.22 Transfer the ether extract into a 500mL K-D flask with concentrator tube through a funnel plugged with acid washed glass wool.

14.1.23 Rinse the flask and funnel with 20-30mL ether.

14.1.24 Add 2 or 3 glass beads and attach a 3 ball Snyder column.

14.1.25 Place in a hot water bath (60-65º C) and concentrate. When the apparent volume of liquid reaches 1ml, remove the K-D from the water bath and allow to drain and cool.

14.1.26 Remove the Snyder column and rinse the flask and lower joint with 1-2 ml diethyl ether.

14.1.27 Concentrate on the Nitrogen water bath to 0.5 ml.

14.1.28 Remove from the water bath and allow to drain and cool.

14.1.29 Rinse the walls of the concentrator tube several times with diethyl ether.

14.1.30 Dilute the extract with 1mL of isooctane and 0.5mL of methanol. Dilute to a final volume of 5mL with diethyl ether. The sample is now ready for esterification.

14.1.31 Determine the original sample volume by refilling the sample bottle to the mark and transferring to a graduated cylinder.

14.2 Extraction of soil samples

14.2.1 Add 30 g of the well mixed soil sample to a 100mL beaker.

14.2.2 Adjust the pH to 2 with concentrated HCl and monitor the pH for 15 minutes with occasional stirring. If necessary, add additional HCl until the pH remains at 2.

14.2.3 For the sample selected to be spiked, acidify two additional 30g aliquots and spike each with 1ml of the Matrix Spiking Solution.

14.2.4 For the LCS, use 30g of sand and spike with 1ml of the Matrix Spiking Solution.

14.2.5 With each set of samples extracted, extract one blank consisting of 30g of reagent sand.

14.2.6 Add 1ml of Surrogate Spiking Solution to each sample, LCS, spike and blank.

14.2.7 Add 60mL of methylene chloride/acetone (1:1,v/v) to the extraction beaker and perform soxtherm extraction.
14.2.8 Transfer the extract into 60mL vial containing 10g acidified sodium sulfate.
14.2.9 Vigorously shake the extract and drying agent and let drying agent remain in contact with extract for a minimum of 2hrs.
14.2.10 Transfer the contents of the flask to round flask with concentrator tube attached. Add boiling chips and attach macro Snyder column.
14.2.11 Evaporate the extract on the water bath to approximately 5mL.
14.2.12 Remove the flask and allow to cool.
14.2.13 Add 30ml water, 5 ml 37% KOH and 3 or 4 glass beads and attach a 3-ball macro Snyder column.
14.2.14 Place in hot water bath (60-65º C) for 2 hours and distill the solvent.
14.2.15 Continue heating till chattering stops.
14.2.16 Remove the flask from the water bath and allow to cool.
14.2.17 Transfer the hydrolyzed aqueous solution to a 500ml separatory funnel.
14.2.18 Extract the solution three times with 100ml Methylene chloride. Discard the methylene chloride phase.
14.2.19 Adjust the pH of the solution to <2 by adding 5 ml of cold 1:3 sulfuric acid (check with pH paper).
14.2.20 Extract once with 40mL of diethyl ether and twice with 20mL portions of diethyl ether.
14.2.21 Transfer the extract into a 500mL Erlenmeyer flask containing 10g of acidified anhydrous sodium sulfate.
14.2.22 Periodically, vigorously shake the extract and drying agent and allow drying agent to remain in contact with the extract for at least 2 hours.
14.2.23 Concentrate the extract according to steps 14.1.22 through 14.1.30 of the water extraction method.

14.3 Esterification (5mL of all extracts)
14.3.1 Add 2mL of diazomethane solution. (See Appendix B for diazomethane preparation instructions)
14.3.2 Let sample stand for at least 10min (swirl occasionally).
14.3.3 Yellow color should persist for this period.
14.3.4 Rinse the inside wall of vial with 700uL of diethyl ether.
14.3.5 Reduce the sample volume to approximately 2ml to remove excess diazomethane with Nitrogen (no heat).
14.3.6 The yellow color will disappear.
14.3.7 Dilute sample to 10mL with Hexane.
14.3.8 The extract is ready for analysis by GC/ECD. Analyze samples as soon as possible.

14.4 Analysis by GC/EC

14.4.1 A 2uL of sample (the same as the volume used for standards) is injected into the gas chromatograph. (SEE temperature program on section 9.2).

14.4.2 Analytes are identified by comparing retention times of sample peaks with those of the standards.

14.4.3 In order to insure that chromatographic conditions are constant the retention time of the surrogate compounds in all standards and samples are monitored. Any run of a standard, blank, or sample is considered invalid and must be rerun if the surrogate RT does not fail within the window.

14.4.4 Any peaks tentatively identified as method analytes on the primary column must be confirmed by analysis on a second, dissimilar column. If the %RPD between the two column is <40% then the higher of the two results will be reported.

14.4.5 If the %RPD is >40% report the higher result unless the difference is caused by an interference, in which case then the lower result will be reported.

14.4.6 If the concentration is sufficiently high (greater than 5ppm) the analyte may be confirmed by GC/MS.

14.4.7 If the response of any analyte peak exceeds the calibration range for that compound the extract must be diluted and reanalyzed.

14.5. Analytical Sequence (Calibration concentration subject to change based on instrument sensitivity or saturation issues).

Instrument Blank (IBLK)
200ppb Herbicides Std
500ppb Herbicides Std
750ppb Herbicides Std
1000ppb Herbicides Std
1500ppb Herbicides Std
Initial Calibration Verification (2^{nd} Source)
Instrument Blank
1000ppb CCC (vary concentration daily)
Samples, Blank, Blank Spike, MS/MSD (up to 10 injections)
Instrument Blank
1000ppb CCC (vary concentration daily)
Samples up to 10 injections
Instrument blank
1000ppb CCC (vary concentration daily) (end if analysis is complete)

14.6 Instrument Maintenance

14.6.1 For routine maintenance.

- Change septa

- Clean inlet liner and change glass wool
- Clean injection port
- Check syringe and replace if the need be.
- Bake instrument for approximately 30min. @ 300ºC (depending on column limitation).

14.6.2 Replace column when peak tailing is observed.

14.6.3 Maintenance logs are kept electronically; refer to P243-Electronic Logbook SOP.

14.7 Documentation Requirements

14.7.1 Label sample chromatograms with the following information:

- Sample ID number
- Volume injection
- Date of injection
- GC column and instrument identification
- Label positively identified peaks
- Temperature program

14.7.2 Extraction logs must contain:

- Sample ID numbers in batch
- Date extracted
- Surrogate, lot number and concentration
- Spiking solution, lot number and concentration
- Sample size
- Final extract volume
- Any comments by analyst.
- Analysts signature
- The right hand side portion initiates an internal chain of custody for the extracts.

14.7.3 Instrument logs must contain:

- ID of instrument and column
- Temperature program
- Analyst signature
- Dates of all injections of standards, blanks, samples, etc.
- ul injected
- Analysts' comments
- Data file name and number of each run

15. Calculations

$$\mu g/L = \frac{(Ax)\,(Vt)\,(MW)}{(ICF)\,(Vi)\,(Vs)} \times DF$$

$$\mu g/Kg = \frac{(Ax)\,(Vt)\,(MW)}{(ICF)\,(Vi)\,(Ws)\,(D)} \times DF$$

Where:
Ax = Area for the parameter to be measured.
ICF = average calibration factor for the calibration standards.
Vt = Volume of total extract in uL (Take into account dilutions)

Is = Amount of standard injected in nanograms (ng)
Vi = Volume of extract injected.
Vs = Volume of Aqueous extracted (mL).
D = $\frac{100 - \%\ \text{Moisture}}{100}$
MW = molecular weight of the compound

16. METHOD PERFORMANCE

16.1 Analysis is performed in accordance with the method. All quality control and quality assurance procedures are followed. Please refer to Section 12.8 and 12.9 for further information.

17. Pollution Prevention

17.1 Use only the amounts of chemicals required. Do not make large quantities of solutions.
17.2 Use hood when working with solvents.
17.3 Keep the area clean and clutter free in the extractions lab and around the instruments in order to avoid any mishaps.
17.4 Trap exhaust from electron capture detector.
17.5 Trap septum vent and split vent on GC.
17.6 Keep chemicals away from drains.
17.7 Properly collect and dispose of waste according to Chemtech Waste Disposal SOP.

18. Data Assessment and Criteria for QC

18.1 Initial Calibration
- 18.1.1 The relative standard deviation (RSD) of the response factor for all analytes must be less than or equal to 20%.
- 18.1.2 The ICV must meet ± 15% D for each compound.

18.2 Continuing Calibration
- 18.2.1 The percent recovery of the CCC must be within 15% D for each compound.

18.3 Method Blank
- 18.3.1 A method blank must be extracted with each group of samples.
- 18.3.2 Free of any target compound at a concentration greater than the MDL.
- 18.3.3 For NC & DOD Work, Method Blank should contain no analytes detected >1/2 Reporting Limit (LOQ) or >1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater.

18.4 Matrix Spike/Matrix Spike Duplicate
- 18.4.1 A matrix spike and matrix spike duplicate must be extracted with each group of 20 samples. (TCLP extracts are spiked one per matrix type.)

18.5 Control Charts

18.5.1 Accuracy charts must be kept for spike recovery data. The accuracy assessment is expressed as a recovery interval from P-2s to P+2s, where P is the average recovery and s is the standard deviation.

18.6 Surrogate

18.6.1 Surrogate recoveries are monitored and accuracy charts are maintained as described in Section 3.

18.6.2 Surrogate recovery limits are from the control charts. If surrogate fail the recovery criteria the sample is reextracted. See attachment A for control limits.

18.7 Limit of Detection

18.7.2 All analytes spiked should be positively identified.

18.7.3 The apparent signal to noise ratio at the LOD must be at least three and the results must meet all method requirements for analyte identification.

18.8 Limit of Quantitation

18.8.2 Analysis must meet the acceptance criteria for the laboratory control sample.

19 Corrective Actions for Out of Control Data

19.1 Initial Calibration

19.1.1 If the RSD of any target compound is >20%, then calculate the mean of the RSD values for all analytes.

19.1.2 If the mean is within 15% criteria, the average can be used for quantitation.

19.1.3 If the ICV does not meet criteria the initial calibration must be reanalyze followed by the ICV again.

19.2 Continuing Calibration Check

19.2.1 If the criteria are not met, then sample analysis must halt and any samples after the last passing calibration verification standard must be reanalyzed.

19.2.2 If the standard analyzed after a group of samples exhibits a response above the acceptance limit biased high, then no reanalysis is necessary if the analyte is not present in the associated sample.

19.2.3 If the standard response does not meet criteria biased low, then reanalyze all samples associated with the CCV to ensure that the detector response has not deteriorated such that the analyte would not be detected even if present in the sample (i.e. false negative result).

19.2.4 If the chromatographic problem cannot be fixed by routine instrument maintenance, then a new initial calibration must be analyzed before sample analysis can continue.

19.2 Method Blank

19.3.1 Whenever a blank is unacceptable, the source of contamination must be located and all samples associated with the unacceptable blank must be reextracted and reanalyzed.

19.3 Matrix Spike/ Matrix Spike Duplicate and LCS

19.4.1 If any MS/MSD compound data is out of control limits verify LCS results are all within limits and consider it matrix interference.
19.4.2 If LCS and MS/MSD are out of control limits re-analyzed to verify that is an instrument problem.
19.4.3 If still do not meet control limits re-extract and reanalyze the samples.
19.4.4 For USACE work- reanalyze the MS/MSD for confirmation and document the problem in the case narrative.
19.4.5 For **DOD work** - If there is insufficient volume to reextract the samples, flag all data in associated samples for that analyte with a Q flag. Mention the problem and action taken on the case narrative.

19.5 Limit of Detection
19.5.1 If LOD verification fails, then repeat the detection limit determination and LOD verification at a higher concentration and set the LOD at the higher concentration.

19.6 Limit of Quantitation
19.6.1 Reevaluate the LOQ, if outside the acceptance limit of 70-130%.

20. Contingencies for Handling Out-of-Control or Unacceptable Data

20.1 Corrective Action Procedure
20.1.1 Issue a corrective action form any time there is a deviation from the SOP or the client requirements are not met.
20.1.2 If a sample or extract is damaged, broken, or spilled, contact the project manager and issue a corrective action.
20.1.3 For more details regarding corrective action procedure, please refer to Corrective Action Report SOP.

20.2 Following are the result qualifiers used for out-of-control and unacceptable data:
- **U**: Indicates the compound was analyzed but not detected.
- **J**: Indicates an estimated value, the result reported is below the initial calibrations lowest point.
- **B**: Indicates the analytes were found in the blank as well as the sample.
- **E**: Indicates the analyte concentrate exceeds the calibrated range of the GC instrument.
- **D**: Indicates all compounds identified in an analysis at a secondary dilution factor.
- **N**: Indicates presumptive evidence of a compound. This is used for all non-target results where identification is made.

21. Waste Management

21.1 Keep samples for 180 days after analysis and dispose them off according to the procedures explained in the SOP for Waste Disposal.

22. References

22.1 USEPA Test methods for Evaluating Solid Wastes, SW-846, Method 8151A – Chlorinated Acid Herbicides by Gas Chromatography, Revision 1, December 1996.

22.2 Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.3 September 2019.

23. Appendices

23.1 Appendix A: Detection limit table
23.2 Appendix B: Diazomethane preparation

Appendix A

Analyte	Reporting Limit (µg/L)	Reporting Limit (µg/kg)
2,4,5-T	2	67
2,4,5-TP (Silvex)	2	67
2,4-D	2	67
2,4-DB	2	67
3,5-Dichlorobenzoic Acid	2	67
4-Nitrophenol	2	67
Dalapon	2	67
DCPA	2	67
Dicamba	2	67
Dichlorprop	2	67
Dinoseb	2	67
MCPA	200	6700
MCPP	200	6700
Pentachlorophenol	2	67
Picloram	2	67

Appendix B
Diazomethane preparation

1. Fill the condenser with dry ice.
2. Add Acetone slowly until the "cold finger " is 1/3 full
3. Add 20mL of 2-ethanol and 16mL to a solution of potassium hydroxide (10g in 16mL of water) in the reaction vessel.
4. Attach a 100mL receiving flask to the condenser and cool the receiver in an ice bath.
5. Place a separatory funnel with a solution of Diazald (10g) in 90mL of ether.
6. Warm the reaction vessel to 65°C with a water bath.
7. Add the Diazald solution over a period of 20 minutes.
8. Add 10mL of ether when all the diazald has been used.
9. Maintain the same rate that the diazald was added.
10. Continue the distillation until the distillate is colorless.
11. Keep the cold finger cool at all times. Add dry ice is necessary.

Note: The rate of Diazald addition must be the same as the rate of distillation

CHEMTECH 284 Sheffield Street, Mountainside NJ 07092 (908) 789-8900

READ RECEIPT

Employee Name:_____

Department:_____

_____**M8151A-Herbicide**_____

Method or Document Read (Include Title, Number, Revision, as applicable)

Employee Statement: I have read and understand the information in the above mentioned method or document.

_____ _____
Employee Signature Date

Supervisory Statement: I have reviewed this document or method with the employee.

_____ _____
Supervisory Signature Date

Note: This receipt is to be returned to the Quality Assurance Department for incorporation into employee training record files. If you have questions or would like to review your train record files, please see QA.

VOLATILE ORGANIC COMPOUNDS BY GC/MS

1. TEST METHOD

1.1 Determination of Volatile Organic Compounds by using SW-846 Method 8260D using SW-846 Method 5030B-Purge and Trap for Aqueous Samples and SW-846 Method 5035A – Closed System Purge and Trap and Extraction for Volatile Organics in Soil and Waste Samples.

2. APPLICABLE MATRICES

2.1 Ground and surface water, wastewater, aqueous sludges, soils and sediments.

3. DETECTION LIMITS

3.1 MDL is verified quarterly.

4. SCOPE AND APPLICATION

4.1 This SOP outlines the procedure used to determine volatile organic compounds by Gas Chromatography/Mass Spectrometer (GC/MS). This SOP is used for both aqueous and non-aqueous samples, with method variations described where applicable to the different matrices.

4.2 The compounds determined by this method can be found in Table 1.

5. SUMMARY OF TEST METHOD

5.1 Water Samples

5.1.1 Helium is bubbled through a 5mL/25mL portion of the sample in a purge chamber at 30 to 40mL/min at ambient temperature.

5.1.2 The purgeables are transferred from the aqueous to the vapor phase and are passed through a sorbent trap.

5.1.3 After purge time is complete, the trap is heated and backflushed with helium to desorb the purgeables onto the gas chromatographic (GC) column.

5.1.4 The GC is temperature programmed to separate the purgeables, which are then detected with a mass spectrometer.

5.1.5 The peaks detected are identified by retention time and characteristic ion patterns.

5.1.6 Quantitation is done using the internal standard technique along with response factors generated by running known amounts of standards.

5.2 Soil Samples: Low Level

5.2.1 A small diameter soil core-sampling device is used to collect about 5g of soil sample.

5.2.2 The sample is either extruded into a tared sample container supplied by the laboratory, either containing 5mL organic-free water and magnetic stir bar, or 1g sodium bisulfate in 5mL water with magnetic stir bar, or magnetic stir bar, or the samples may be shipped in EnCore samplers.

5.2.3 If samples are received in EnCore samplers, either analyze the samples within 48 hours or transfer them to tared 40mL glass sample containers and note the weight of the sample and the date and time of transfer.

5.2.4 Add 5mL organic free reagent water to soil samples received without the reagent water or sodium bisulfate.

5.2.5 Analyze by purge and trap GC/MS, under a heated curve.

5.3 Soil Samples: High Level Methanol Preserved

5.3.1 A small diameter soil core-sampling device is used to collect about 5g of soil sample.

5.3.2 The sample is extruded into a tared sample container supplied by the laboratory, containing 10mL of purge and trap grade methanol.

5.3.3 Analyze 100µL of methanol extract in 5mL of organic free reagent water and analyze by purge and trap GC/MS, under a non-heated curve.

6. DEFINITIONS

6.1 Calibration**:** To determine, by measurement or comparison with a standard, the correct value of each scale reading on a meter, instrument, or other device. The levels of the applied calibration standard should bracket the range of planned or expected sample measurement. (NELAC)

6.2 Internal standards**:** A known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method.

6.3 Laboratory Control Sample (however named, such as laboratory fortified blank, spiked blank, or QC check sample): A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes. It is generally used to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

6.4 Matrix Spike (spiked sample or fortified sample)**:** A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of Target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

6.5 Matrix Spike Duplicate (spiked sample or fortified sample duplicate)**:** A second replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of the precision of the recovery for each analyte.

6.6 Method Blank**:** A sample of a matrix similar to the batch of associated samples (when available) that is free form the analytes of interest, which is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations the impact the analytical results for sample analyses.

6.7 Method Detection Limit**:** The minimum concentration of a substance (an analyte) that can be measured and reported with 99 % confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

6.8 Quantitation Limits**:** The maximum or minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be quantified with the confidence level required by the data user.

6.9 Trip Blank**:** Organic-free reagent water that is place in a 40mL vial and carried through sampling and handling to serve as a check on the contamination of volatiles by diffusion.

6.10 Volatile Organic Compound**:** Any compound containing carbon and hydrogen or containing carbon and hydrogen in combination with any other element which has a vapor pressure of 1.5 psi absolute (77.6 mm Hg) or greater under actual storage conditions.

6.11 Verification**:** Confirmation by examination and provision of evidence that specified requirements have been met.

7. INTERFERENCES

7.1 Common interferences with this method include impurities in the purge or carrier gas; leaks within the purge and trap unit or the GC/MS system; and solvent vapors (particularly methylene chloride) within the laboratory.

7.2 All plumbing materials used in connection with the purge and trap unit and the GC are stainless steel, copper, or Teflon rather than non- polytetrafluoroethylene (PTFE) or plastic tubing since this type of material may out-gas organic compounds.

7.3 Analyze laboratory reagent blanks after each calibration to show that the system is free of contamination.

7.4 Contamination by carry-over can occur when a low-level sample is analyzed immediately after a high level sample.

- In this case, the system must be proven clean with the analysis of a blank, and the low-level sample must be reanalyzed.

8. SAFETY

8.1 The toxicity or carcinogenicity of each reagent used in this method has not been precisely defined, therefore treat each chemical compound as a potential health hazard.

8.2 Wear appropriate safety clothing and eye protection to minimize the exposure.

8.3 Use protective gloves when handling corrosive chemicals.

8.4 Read Material Safety Data Sheets (MSDS) for the chemicals used in the laboratory for the identity of the ingredients, the physical and chemical characteristics of the substance, the physical hazards, safe handling and safety precautions.

9. EQUIPMENT AND SUPPLIES

9.1 Sample containers

9.1.1 40mL glass VOA vials with screw cap, Greenwood Catalog#340C1251443, or equivalent.

9.2 Syringes

9.2.1 5mL glass gas-tight with shut-off valve – SGE Catalog #008760 or equivalent.

9.2.2 10µL (Hamilton Catalog #80000), 25µL (Hamilton Catalog #80200), 50µL (Hamilton Catalog #80900), 100µL (Hamilton Catalog #81000) and 1mL (Hamilton Catalog #81330) or equivalent glass gas-tight microsyringes.

9.3 Volumetric flask

9.3.1 Class "A" glassware only. 5mL, 10mL, 50mL and 100mL sizes used to prepare stock standards.

9.4 Balances
- 9.4.1 Top loading balance (Mettler PE300 or equivalent) capable of reading to ±0.01g.

9.5 pH paper
- 9.5.1 pH paper – EMD Cat # EM9580 or equivalent.

9.6 Purge and Trap System
- 9.6.1 See Table 5, 6 and 7
- 9.6.2 The desorber is capable of rapidly heating the trap as required by this method. The temperature program begins at the purge temperature, continues to the desorb temperature, and ends with the bake temperature.
- 9.6.3 Purging chambers are designed to accept a 5mL/25mL sample size with a water column at least 3 cm deep.
  - The purge gas flows through the sample in finely divided bubbles.

9.7 Gas Chromatograph
- 9.7.1 GCs used for analysis are Agilent 7890A, 7890B, 8890 or equivalent.
- 9.7.2 Different GC columns are used based on analytical method and target compound separation.
- 9.7.3 For instrument specifications, see Table 8, 9 and 10.

9.8 Mass Spectrometer
- 9.8.1 Agilent 5977A, 5977B and 5975C mass selective detectors or equivalent are used for this procedure. See Table 8.

9.9 Data Systems
- 9.9.1 Hewlett Packard MSD Chemstation Software is used to view, evaluate, quantitate and print the data.
- 9.9.2 Hewlett Packard MSD Chemstation Software Version:
  MSD Chemstation E.02.02.1431, MSD Chemstation C.00.07
  MSD Chemstation G1701BA Version B.01.00,
  MSD Chemstation D.01.00
  MSD Chemstation G1034 Version C.01.05
  MSD Chemstation D.03.00.611
- 9.9.3 Mass spectral library from HP Analytical, NIST11 MS Spectral Database is used in tentative identification of unknown peaks.
- 9.9.4 Store all GC/MS data on magnetic media for five years, so that it may be retrieved as needed once the hard disk has been cleared.

10. REAGENTS AND STANDARDS

10.1 Reagents
- 10.1.1 DI Water - analyte free, generated by boiling de-ionized water and transferring the hot water to a clean glass jar for cooling before use.
- 10.1.2 Methanol - purge and trap grade. Used in the preparation of stock standards, and for extraction of soils. JT Baker Catalog #9077-02 or equivalent.
- 10.1.3 p-BromoFluoroBenzene (BFB) *Supplier subject to change
- 10.1.4 Trip Blank: Prepare Trip Blank with 5mL analyte-free water in 40mL vials, acidified by 1:1 HCl to pH < 2. Label the trip blank vial with the initial of the preparer and the date and time that the trip blank was prepared.

10.2 Standards

10.2.1 Prepare fresh standards as needed, store them in glass vials with Teflon faced septa. Replace after 6 months. For standard preparation see table 11

10.2.2 The initial verification standards are purchased from a second source or a different lot number from the same supplier is used.

11. SAMPLE COLLECTION, PRESERVATION, SHIPMENT AND STORAGE

11.1 Water Samples

11.1.1 Sample containers used for this method are glass bottles with Teflon faced septa or Teflon faced lid-liners.

11.1.2 Collect at least two vials for each sample to allow for possible re-runs or dilutions.

11.1.3 Collect a third volatile vial to ensure the sample is properly preserved.

- After analysis, record in the instrument logs the pH of the sample.

11.1.4 Collect extra sample if site specific matrix spike and matrix spike duplicate (MS/MSD) are required.

Note: Care should be taken when sampling such that no air bubbles or headspace is present in the sample containers.

11.1.5 Preserve water samples to be analyzed for aromatics with 1:1HCl to pH<2.

11.1.6 Samples are iced at 2-6°C upon sampling and delivered to the laboratory.

11.1.7 Samples are stored at 2-6°C from the time of receipt until analysis.

11.1.8 Analyze preserved samples within 14 days from sampling and unpreserved samples within 7 days from sampling.

11.2 Soil Samples: High Level Closed-System vials (preserved with Methanol)

11.2.1 Sample vials are provided by the laboratory containing 10mL of Methanol.

11.2.2 Weigh bottles before they leave the laboratory.

11.2.3 Add sample using a special device that will deliver approximately 5g of sample directly into the vial.

11.2.4 Seal vial immediately, ice at 2-6°C and deliver to the lab.

11.2.5 Upon receipt, weigh samples and record weight for use in final sample calculations.

11.2.6 Store samples at 2-6°C until analysis.

11.2.7 Analyze 100uL of the methanol extract in 5mL organic-free water or equivalent, within 14 days from sampling.

Note: A separate container is required for percent moisture determination.

11.3 Soil Samples: Low Level using EnCore Samplers

11.3.1 The laboratory provides EnCore samplers for sample collection.

11.3.2 Collect at least 3 EnCore samples.

11.3.3 Ice samples at 2-6°C or freeze at -7 to -15°C and deliver to laboratory.

Note: A separate container (4oz or 8oz jar) is required for percent moisture determination purposes.

11.3.4 Upon receipt, the whole EnCore kit sample (about 5.0g) is transferred into 40ml vial within 48 hours.
11.3.5 Record the date and time of sample transfer.
11.3.6 Seal vial immediately, and either analyze immediately with 5mL organic-free water within 48 hours or freeze at -7 to -15°C, within 48 hours from sampling, for analysis with 5mL organic-free water within 14 days from sampling.

11.4 Soil Samples: Low Level Closed-System vials (no chemical preservation)
11.4.1 Collect about 5g soil sample in 40mL labeled, tared vial with stir bar.
11.4.2 Collect at least 3 vials for analysis, and another vial for determination of percent solids.
11.4.3 Ice samples at 2-6°C or freeze at -7 to -15°C and deliver to the laboratory.
11.4.4 Upon receipt, weigh samples and record weight for use in final sample calculations.
11.4.5 Store samples at 2-6°C or freeze at -7 to -15°C and analyze with 5mL organic-free water within 48 hours or freeze at -7 to -15°C, within 48 hours from sampling, for analysis with 5mL organic-free water within 14 days from sampling.

11.5 Soil Samples: Low Level Closed-System vials (no chemical preservation) with organic-free water
11.5.1 Collect about 5g soil sample in 40mL labeled, tared vial with 5mL organic-free water and stir bar.
11.5.2 Collect at least 3 vials for analysis, and another vial for determination of percent solids.
11.5.3 Ice samples at 2-6°C or freeze at -7 to -15°C and deliver to the laboratory.
11.5.4 Upon receipt, weigh samples and record weight for use in final sample calculations.
11.5.5 Store samples at 2-6°C or freeze at -7 to -15°C and analyze with 5mL organic-free water within 48 hours or freeze at -7 to -15°C, within 48 hours from sampling, for analysis within 14 days from sampling.

11.6 Soil Samples: Low Level
11.6.1 Samples are collected in 4oz or 8oz jars with no headspace and iced at 2-6°C.
11.6.2 Collect a separate jar for percent solids determination.
11.6.3 Samples are stored at 2-6°C.
11.6.4 If samples are analyzed within 48 hours of sampling, analyze about 5g well-mixed sample with 5mL organic-free water in a 40mL glass vial. Sample received in 4 oz jar can be preserved within 48 hours into Terracores. Preserved samples then can be analyzed within 14 days.
11.6.5 If samples cannot be analyzed within 48 hours from sampling, preserve by adding about 5g well mixed sample to 10mL methanol in a 40mL glass vial. This preserved sample must be analyzed within 14days of sampling. Analyze 100uL of the methanol extract with 5mL organic-free water.

Note: This technique may be used for waste characterization, unknown or oily wastes, where chemical reaction with freezing or preservative is not known. The sample must be mixed very quickly with a spatula or equivalent device and added to 5mL organic-free water to minimize the loss of volatile organic compounds.

Any vial that is frozen must be laid on its side to prevent breakage, and thawed before analysis.

12. QUALITY CONTROL

12.1 BFB - MS Tuning Check Compound

12.1.1 Analyze every 12 hours.

12.2 Initial Calibration

12.2.1 Analyze a minimum of five concentration levels, for e.g.: 1, 5, 20, 50, 100, 150, 200µg/L. (Concentration levels are subject to change based on instrument sensitivity and/or saturation, and project requirements, certain ketones and other compounds are added at an elevated concentration).

12.2.2 Assure that relative response factors (RRFs) and % Relative Standard Deviation (%RSD) criteria are met.

12.2.3 A new initial calibration is required when continuing calibrations do not pass required criteria. A new initial calibration is required after 31 days.

12.2.4 Set the retention time window using the midpoint standard of the curve when ICAL is performed.

12.3 Continuing Calibration

12.3.1 Analyze a calibration check solution from the primary every 12 hours immediately after the BFB.

12.3.2 Solution is used to verify instrument performance as compared to the initial calibration.

12.3.3 Assure that RRFs and % Difference (%D) criteria are met.

12.3.4 Retention for CCC, Samples and QC is updated using mid-point of ICAL. Retention is not updated using CCV check samples.

12.4 Method Blanks

12.4.1 Prepare specifically for each matrix type.

12.4.2 Analyze immediately after the calibration standards each day to ensure that the system is free from carry-over or any other interferences.

12.5 Surrogates (S)

12.5.1 Monitor and report for all blanks, samples, and spikes.

12.5.2 Assure that recoveries are within limits.

12.6 Matrix Spike/Matrix Spike Duplicate and Blank Spike

12.6.1 Choose a representative sample to be used for MS/MSD.

12.6.2 MS/MSD is required for each matrix type. For water samples, MS/MSD is analyzed only if the client provides extra sample volume. Otherwise, a Blank Spike and Blank Spike Duplicate are analyzed.

12.6.3 MS/MSD and LCS are required for every group of samples run as a batch or every 20 samples.

12.6.4 Calculate % Recovery and Relative Percent Difference (RPD).

12.7 Internal Standards (IS)
- 12.7.1 Monitor the integrated area and the retention time of the quant ion of the IS for all standards, blanks, samples and spikes.

12.8 Accuracy and Precision
- 12.8.1 Each analyst must perform an initial, one time demonstration of accuracy and precision. Documentation must be delivered to the QA officer for inclusion in personnel folder.
- 12.8.2 Prepare four aliquots of LCS sample from a source other than that used for calibration.
- 12.8.3 Analyze these four aliquots under the same conditions used for sample analysis.
- 12.8.4 IDOC must be performed every time there is a significant change in the method, personnel, instrument type, or sample matrix.
- 12.8.5 All of the IDOCs are kept in the employee's training files.

12.9 Method Detection Limits
- 12.9.1 Please refer SOP P203-Laboratory Limits and Demonstration of Capability for MDL procedure.

12.10 Manual Integration
- 12.10.1 At times, manual integration will be necessary due to incomplete or incorrect integration by the automated analytical system.
- 12.10.2 Manual integration cannot be used to satisfy Quality Control Criteria.
- 12.10.3 Do not include baseline background noise; include only the area between where the beginning and end of the peak intersects with the baseline.
- 12.10.4 Any time a compound is integrated in the calibration standard it must then be consistently integrated in the samples per professional judgment.
- 12.10.5 When a manual integration is performed, the hardcopy of the quantitation report will flag the compound with an "m".
- 12.10.6 Print the before and after manual integration chromatograms with the raw data.

12.11 Limit of Detection (LOD)
- 12.11.1 Establish LOD by spiking a quality system matrix at approximately 1-4X detection limit.
- 12.11.2 LOD is specific to each combination of analyte, matrix, method (including sample preparation) and instrument configuration.
- 12.11.3 LOD must be verified quarterly.
- 12.11.4 LOD must be verified on each instrument used, and every time the method is modified.

12.12 Limit of Quantitation (LOQ)
- 12.12.1 LOQ must be greater than the LOD.
- 12.12.2 LOQ must be verified quarterly for each quality system matrix, method and analyte, by analyzing QC sample containing the analytes of concern in each quality system matrix 1-2X the claimed LOQ.
- 12.12.3 LOQ must be performed if the method is modified.

12.13 Initial Calibration Verification (ICV)
- 12.13.1 Analyze a second source initial calibration verification standard at mid level concentration immediately following the initial calibration curve.

13. CALIBRATION AND STANDARDIZATION

13.1 GC/MS Tuning and Performance Check

13.1.1 Analyze the BFB solution every 12 hours to verify acceptable instrument performance.

13.1.3 Retune the MS and reanalyze the BFB if the spectrum does not meet criteria.

13.1.4 Tune the mass axis and abundance scales such that the analysis of the instrument performance check solution (BFB) meets the criteria outlined in Table 2.

13.1.5 Once an acceptable BFB has been acquired, instrumental conditions must remain the same throughout the calibration and sample analyses.

13.1.6 Prior to the analysis of Initial calibration standards, tune the GC/MS system using perfluorotributylamine (PFTBA).

13.2 Initial Calibration

13.2.1 After tuning criteria have been met, analyze an initial calibration consisting of a minimum of five calibration standards; e.g. at the following concentration levels: 1, 5, 20, 50, 100, 150 and 200µg/L (The standard concentrations may be subject to change based on instrument sensitivity and/or saturation, and project requirements. Ketones and certain other compounds are added at elevated concentrations).

13.2.2 Analyze an initial calibration verification standard from a second source.

Note: The lowest standard analyzed must be equal to the reporting limit.

13.2.3 Tabulate the area response of the characteristic ions against the concentration for each target analyte and internal standards using MS Chemstation software.

13.2.4 The RRF is calculated as follows:

$$RRF = \frac{A_s \times C_{is}}{A_{is} \times C_s}$$

Where A_s = Peak area of the analyte or surrogate
A_{is}= Peak area of the internal standard
C_s = Concentration of the analyte or surrogate
C_{is}= Concentration of the internal standard

13.2.5 Calculate the %RSD for all target analytes from the initial calibration.

$$\%RSD = \frac{\text{Standard Deviation of RRF}}{\text{Mean of RRF}} \times 100$$

Where: $\text{mean of RRF} = \frac{\text{sum of RRF}}{n}$

n = number of calibration standards used

13.2.6 The %RSD should be ≤20% for each analyte for Method 8260D.

13.2.6.1 System performance check compounds (SPCCs) (For Method 8260D): Minimum Average RRF for Chloromethane, 1,1-Dichloroethane and Bromoform must be 0.10; Minimum Average RRF for Chlorobenzene and 1,1,2,2-Tetrachloroethane must be 0.30.

13.2.6.2 Calibration Check Compounds (CCCs) (For Method 8260D): The RSD for each individual CCC must be ≤ 30%. The CCC include 1,1-Dichloroethene, Chloroform, 1,2-Dichloropropane, Toluene, Ethylbenzene, Vinyl Chloride.

13.2.6.3 1,4-Dioxane minimum RRF requirement is 0.05 and <50% RSD.

13.2.6.4 For DOD, Each analyte must meet one of the three options, Option 1: RSD for each analyte ≤ 15%, Option 2: linear least squares regression for each analyte: r2 ≥ 0.99, Option 3: non-linear least squares regression (quadratic) for each analyte: r2 ≥ 0.99.

13.2.7 When the %RSD of all target analytes meet criteria, the curve is assumed to be constant over the calibration range, and the average response factor is to be used for quantitation.

13.2.8 When the client requests extra target compounds, a curve for these compounds will be deemed acceptable only when a ±30% RSD is achieved between the five initial responses factors.

13.2.9 When the %RSD exceeds criteria, perform a linear regression (five-point curve) or quadratic regression (six-point curve) of the instrument response versus the concentration of the standards. Make certain that the instrument response is treated as the dependent variable (y) and the concentration as the independent variable (x). The regression will produce the slope and intercept terms for a linear equation in the form

$$y = ax + b,$$

Where $y = (A_s / A_{is})$ = Ratio of the response (peak area)
$x = (C_s / C_{is})$ = Ratio of concentration of the calibration standard
A_s = Peak response of analyte
A_{is} = Peak response of internal standard
C_s = Concentration of analyte
C_{is} = Concentration of internal standard
a = slope of the line (also called the coefficient of x)
b = intercept

13.2.9.1 The use of linear regression may not be used as a rationale for reporting results below the calibration range demonstrated by the analysis of the standards.

13.2.9.2 The regression calculation will generate a correlation coefficient(r).

13.2.9.3 In order to be used for quantitative purposes, the correlation coefficient must be greater than or equal to 0.990.

13.2.9.4 Inspect the curve to determine if the linearity fits all the standards.

13.2.9.5 If the criteria cannot be met, recalibrate the instrument again or report the failures in the case narrative and/or non-conformance sheet.

13.2.10 Establish the retention time window position for each analyte and surrogate, once per initial calibration, at the midpoint standard of the initial calibration curve.

13.2.11 The relative retention time (RRT) is established by calculating the ratio of retention time of analyte over retention time of its associated internal standard.

13.2.12 The RRT of each target analyte must be within $\pm$0.06RRT units. If criteria are not met, then correct the problem by performing instrument maintenance, and then rerun the initial calibration curve.

13.2.13 If the height of the valley between two isomer peaks < 50% of the sum of the two peak heights, then the isomers are reported as individual compounds. Otherwise, structural isomers are identified as isomeric pairs. E.g. m/p-Xylenes.

13.3 Continuing Calibration

13.3.1 Analyze a BFB. Make sure it meets criteria listed in Table 2.

13.3.2 Analyze a continuing calibration check standard and compare it to the mean RRF of the initial curve rather than running an entire initial calibration curve every 12 hours.

13.3.3 Calculate %D for all target analytes.

$$\%D = \frac{RRF_C - RRF_I}{RRF_I} \times 100$$

Where RRF_C = Relative Response factor from continuing calibration
RRF_I = Mean Relative Response factor from initial calibration

13.3.4 If continuing calibration passes criteria listed in Section 18.3, proceed with analysis of blanks and samples.

13.4 Method Blank and Blank Spike

13.4.1 Prepare specifically for each matrix type.

13.4.2 Analyze immediately after the calibration standards each day.

13.4.3 If the method blank passes criteria listed in Section 18.4 and Blank Spike passes criteria in Section 18.6, proceed with analysis of samples.

13.5 Initial Calibration Verification

13.5.1 Analyze second source ICV immediately after the initial calibration standards.

14. PROCEDURE

14.1 Allow all standards to warm to ambient temperature prior to use.

14.2 Rinse all syringes to be used with purge and trap quality methanol.

Note: Analyze samples using a 12-hour sequence.

- *The 12-hour period begins with the injection time of the BFB for DOD work.*
- *The 12-hour period begins with the last initial calibration standard when samples analyzed after initial calibration and/or 12-hours period begins with continuing calibration verification for 8260D regular work.*

Convention for Data File Naming

- *Subdirectories are named according to the department name, than instrument name, month, date, and lastly the file number E.g. VA091702*

Where	*Department*	*= VOA*
	Instrument	*= A*
	Month	*= September*
	Date	*= 17th*
	Year	*= 2002*

- *Data File is named as: department name – instrument name – sequentially. E.g. VA000001, VA000002 etc.*

14.3 BFB Tuning

14.3.1 Add 2µl of 25µg/mL BFB solution to 5mL/25mL reagent water and purge.

14.3.2 Use the same conditions for the BFB as for all blanks, standards, samples and spikes.

14.3.3 Analyze the BFB as follows:

- Click on the instrument icon.
- Edit sequence to run BFB
- Click on OK
- Click on run sequence
- Wait for instrument to complete the run

14.3.4 Use the MSChemStation software to acquire the spectrum of BFB in the following manner:

- Integrate m/z 95 (the major ion of BFB) to find the max scan or apex of the peak.
- Average three scans; the max scan and the scans immediately before and after the max.

Note: Background subtract, must be a scan chosen before the elution of the BFB peak but no more than 20 scans from the beginning of the BFB peak.

14.3.5 Check the resulting spectrum; it must meet the ion abundance criteria outlined in Table 2.

14.4 Initial Calibration

14.4.1 After tuning criteria have been met, initially calibrate the GC/MS system at a minimum of five concentration levels. See Table 12 for water working standard preparation and Table 13 for soil working standard preparation.

Note: Calibration standards for water matrix are made in 40ml vial and for soil matrix in 5ml syringe.

- *Aqueous samples and high level soils are purged at ambient temperature, and low-level soils are purged at 40°C.*
- *Therefore, calibrations for waters and high level soils must use an unheated purge, while calibrations for low level soils require a heated purge at 40°C.*

14.4.1.1 Analyze all standards, blanks, and samples under the following instrumental conditions:

- Click on the instrument icon.
- Click on Edit sequence to run the curve
- Click on OK
- Click on run sequence
- Wait for instrument to complete the run

Note: The GC column separates the analytes that are then detected by the mass spectrometer.

14.4.2 Acquire data for each of the five calibration points.

- Compare the data using a METHOD FILE set up for the target, internal standard, and surrogate compounds, containing expected retention times, and ion ratios for each analyte.
- A quant ion and one or two secondary ions have been chosen (Table 3) for each analyte and make up a characteristic ratio used to identify each compound.
- The quant ion for each compound is integrated and these areas are used to generate RFs.

14.4.3 Create a calibration file inside the METHOD from the data points run for the initial curve.

- The METHOD shows a RF for each analyte at each concentration level.
- The average RF, the relative retention time (each analyte's distance from the internal standard), and the Relative Standard Deviation (RSD) are calculated.

14.4.4 Once a valid initial curve is run and evaluated, run ICV and then proceed with the analysis of blanks, spikes and samples if there is time remaining in the 12-hour period.

- Update the average response factors from the curve into the METHOD and they will be used for quantitation for all blanks and samples that follow.
- If there is no time remaining, begin a new 12-hour sequence with the analysis of a BFB.
- If the BFB passes criteria, analyze a continuing calibration check standard.

14.5 Continuing Calibration

14.5.1 Analyze a BFB.

14.5.2 If the BFB passes criteria, analyze a continuing calibration check standard.

14.5.3 If the continuing calibration meets criteria, proceed with the analysis of blanks and samples.

14.5.4 If continuing calibration does not meet criteria (Section 18.3), analysis must stop. See section 19.3.

14.5.5 A continuing calibration must be performed every twelve hours. Monitor internal standard areas and retention times for the continuing calibration verification.

- The extracted ion current profile (area of the quantitation ion) must not change by more than a factor of 2 in either direction from the midpoint of the initial calibration.
- The retention time for any internal standard must not change by more than 30 seconds.

14.5.6 Should either of these two items be out of limits, the GC/MS system must be inspected for potential problems and corrections made as needed.

14.6 Method Blank and Blank Spike

14.6.1 Analyze a method blank immediately following either the initial or continuing calibration of the GC/MS system, and prior to analyzing any samples.

14.6.2 For Method Blank preparation, see Table 4.

14.6.3 Purge the water blank and methanol soil blank at ambient temperature and the soil blank at heated purge.

14.6.4 Analyze the method blank after the calibration standards to ensure that the system is free from carryover or any other interferences that may be present.

- *Note: No analytes may be present in the blank above the RL with the following exceptions: Methylene Chloride and Acetone are allowed to be present at a level of 2x RL. These compounds are routinely found in the air in the laboratory. Identification of these compounds in a sample at or above the RL have to be flagged with a B on the result page for the sample and a discussion in the case narrative needs to be included about the positive identification of these compounds in the sample.*

14.6.5 The method blank must meet the same QC requirements as the samples for that particular matrix type.

- Surrogate recovery limits and internal standard area criteria must be met for a blank to be valid.

14.6.6 If the blank does not meet criteria, the system must be checked for problems and action may need to be taken.

- The system may need to be baked out to remove residue from previous samples. Heat oven to 220°C for one hour and bake the trap. Increase the temperature of the transfer line.
- A new blank must be run and criteria met before analysis of samples can begin.

14.7 Sample Analysis

Note: Samples may only be analyzed once the tune, calibration, and blank have all met criteria except in cases where samples must be loaded on the instrument overnight, in which case, the QC and calibration samples are checked after analysis.

- *Before loading the sample, rinse the 5mL syringe with reagent water 3 times.*
- *Allow all samples to warm to ambient temperature before loading.*

14.7.1 Water Samples prepared manually
- 40ml sample vial is prepared by adding surrogates and internal standards as described in Table 4.
- The vial is loaded on Autosampler.
- Autosampler takes 5ml/25ml in to the sparge tube.
- Determine the pH of each water sample and record it on the Analysis Run log page.
- Test the pH by dipping the pH paper into the sample vial after analysis is complete.
- Record the pH of each sample.

14.7.2 Water Samples loaded on the Autosampler
- Load the vial onto the ARCON auto-sampler where the robotic mechanisms move the sample through steps that include:
- collection of 25mL/5ml of water,
- add surrogate or internal standard as described in Table 4
- 11minute purge

14.7.3 High Level Soil Analysis of Methanol preserved samples
- Add 100µL of the methanol extract to a 40mL vial containing 40mL of reagent water.
- Add internal standards and surrogates as described in Table 4.

14.7.4 Low-level Closed-System Soil Analyses for samples containing Sodium Bisulfate preservative or organic-free water
- Load the vial onto the ARCON auto-sampler where the robotic mechanisms move the sample through steps that include:
- addition of internal standards and surrogates as described in Table 4
- heating for 1.5 minutes at 40°C
- stirring the sample and maintaining 40°C during the 11minute purge time.

14.7.5 Low-level Soil Analysis for samples without preservative or organic-free water
- using a 5mL syringe, add 5mL of organic-free reagent water with addition of surrogate and internal standards as described in Table 4
- Load vial to Arcon Autosampler

14.7.6 Analyze the sample as follows:
- Click on the instrument icon
- Click on Edit sequence, add samples to sequence
- Click on OK

- Click on run sequence
- Wait for instrument to be ready

Note: The auto-sampler unit goes through the same sequence for all samples, blanks, and standards.

- *Purge the sample with helium for 11 minutes.*
- *Heat low level soils to 40°C during this purge time, water and high level samples are purged at room temperature.*
- *The sample is desorbed while rapidly heating the trap and back-flushed with helium.*
- *The trap is then baked to remove any residue remaining on the trap.*
- *The trap is allowed to cool down to room temperature, and is then ready to accept the next sample.*

Note: Any analyte that exceeds the calibration range requires a dilution.

14.7.7 Sample Dilutions

- If any target compound exceeds the initial calibration range in a sample, the sample must be diluted.
- The dilution factor must get the largest analyte peak in the upper half of the initial calibration range.
- All dilutions must meet the same QC requirements as non-diluted samples.

14.7.7.1 Water samples:

- For water samples requiring a 10x dilution, take 1mL aliquot sample with a gas tight 5mL syringe and add it to 9 mL reagent water in a Class A 10 mL volumetric flask.
- Invert the flask three times before adding contents to a 5mL gastight syringe.
- Add surrogate and internal as described in Table 4
- Further dilutions may be made in a similar manner depending upon the level of dilution required.

14.7.7.2 Low Level Soils:

- For low level soil samples, the smallest amount of sample allowed to be weighed is 0.1 g.
- Any sample requiring a more dilute analysis must be treated as a high level soil and extracted with methanol.

14.7.7.3 High Level Soils:

14.7.7.3.1 For high level soils, dilutions are done by injecting less amount of methanol extract into the 5mL syringe. Example: inject 50uL for a 2x dilution.

14.8 Matrix Spike/Matrix Spike Duplicate and Blank Spike

14.8.1 With each group of samples analyzed as a batch, analyze a blank spike, matrix spike and matrix spike duplicate.

14.8.2 The purpose of these matrix spikes is to determine whether the sample matrix contributes to the analytical results.

14.8.3 Spike a representative sample with the target compounds.

14.8.4 Calculate the % recovery and relative % difference (RPD) between the recoveries and ensure that they meet the criteria for the MS/MSD.

14.8.4.1 Calculate the % recovery for the Blank Spike.

14.8.5 To calculate Spike recoveries:

$$\frac{SSR-SR}{SA} \times 100$$

Where: SSR = spiked sample result
SR = sample result (for MS/MSD calculation only)
SA = spike added

14.8.6 Prepare water and low level soil matrix spikes and blank spike as described in Table 4

14.8.7 For high level soil matrix spikes, add spiking solution/internal standard/surrogate as described in Table 4 to 5g soil.

14.8.8 Extract the matrix spike and blank spike sample and analyze as any other high level sample.

14.8.9 Field or trip blanks may not be used for MS/MSD purposes.

14.8.10 One MS/MSD and Blank Spike is required for every group of samples run as a batch or at least one set of spikes per 20 samples and if MS/MSD is not given for water samples run blank spike and blank spike duplicate.

14.9 Analytical Sequence (Subject to change)

Initial Analytical Run	Continuous Analytical Run
• BFB	• BFB
• VSTDICC001	• VSTDCCC050
• VSTDICC005	• MB
• VSTDICC020	• Samples
• VSTDICC050	• LCS
• VSTDICC100	• MS
• VSTDICC200	• MSD
• ICV	VSTDCCC050 (for DOD Work only)
• MB	
• Samples	
• LCS	
• MS	
• MSD	
• VSTDCCC050 (for DOD Work only)	

14.10 Manual Integration

Note: At times manual integration will be necessary due to incomplete or incorrect integration by the automated analytical system. This normally occurs when there is matrix interference, baseline noise or compound co-elution.

Manual integration cannot be used in order to solely satisfy Quality Control Criteria. It should also not be used as a substitute for corrective action on the chromatographic system. All manual integrations must be noted in the case narrative.

14.10.1 Integrate the area of the quantitation ion of the compound of interest.
14.10.2 Do not include baseline background noise, and include only the area between where the beginning and end of the peak intersects with the baseline.
14.10.3 Integrate the compound in the sample any time it is integrated in the calibration standard using professional judgment.
14.10.4 Flag the compound with an "m" in the hardcopy (quantitation report) when a manual integration is performed.
14.10.5 Print out the EICP for all compounds that have been manually integrated. Print out the spectrum of the manually integrated compound before and after the manual integration is done.

14.11 Data Interpretation

- Maintain all GC and mass spectral data generated with each run of the instrument within a data file.
- Store data files on the computer hard drive, and archive on the server for retrieval as needed once the hard drive has been cleared.
- For quantitation, send data files through MSChemstation Software, where the computer compares known information about target compounds to what is present in each data file.
- Information contained in the Method File used by the program includes:
  The relative retention time of each analyte
  The ion to be used for quantitation and one or two secondary ions, which are characteristic to each compound (Table 3).
  The response factor for each analyte to be used in determining the concentration.

14.11.1 Procedure

Naming Methods: Method prefix, instrument name, matrix, month, date, e.g., 82BS0104.M

14.11.1.1 Sequence log pages are maintained electronically for each instrument
14.11.1.2 Click the MSChemstation icon on the processing PC.
14.11.1.3 Load the method by using the pull down menu top left choice and click on select method.
14.11.1.4 Load the first BFB Data File from the first instrument log using the pull down menu top left choice and click on select data file.
14.11.1.5 Find the BFB peak on the chromatogram and click on the max scan (max ion 95).
- Note the scan number.

14.11.1.6 Determine where the scan to the left and the scan to the right are located by clicking slightly to the right and left of the max scan noting the scan numbers.

14.11.1.7 Drag the cursor from the max scan –1 to the max scan +1.

- Click on a background scan directly to the left of the BFB peak and click on subtract in the pull down menu called Tuner.

14.11.1.8 Click on "evaluate BFB".

Note: If all ion ratios pass, save the information in a file.

- *The Autofind options under the Tuner pull down menu does the same thing as steps 14.11.1.6 – 14.11.1.10.*

14.11.1.9 Click on Save BFB to Forms File under the Tuner pull down menu.

14.11.1.10 Click on Print BFB under the Tuner menu.

- The criterion is listed in Table 2.

14.11.1.11 Load the midpoint file from the initial calibration.

14.11.1.12 Click on quantitate to screen

14.11.1.13 Click on clear all calibration responses

14.11.1.14 Click on calibrate

- Add new level
- Enter standard level and 50 for internal standard concentration.

14.11.1.15 Load the next initial calibration data file.

- Repeat steps 14.11.1.12 – 14.11.1.15
- Do this for all five initial calibration points (5, 20, 50, 100, and 200µg/L).

14.11.1.16 Print out the initial calibration using the pull down menu, click on response factors to printer.

14.11.1.17 Carefully review all information on the printout.

- Look for isomeric pairs that separate chromatographically and have the same retention time and response factors (ethylbenzene, o-xylene & m/p-xylene).
- Verify that all compounds are picked up. Check to see if the initial calibration meets criteria.

14.11.1.18 Qarea using the pull down menu, each point that needs editing and repeat step 14.11.1.15 choosing recalibrate.

14.11.1.19 Load the second BFB.

14.11.1.20 Pass it by repeating steps 14.11.1.5 – 14.11.1.9.

14.11.1.21 Load the check standard data file.

- Send to quant using the pull down menu.
- Click on View Results on screen and verify that all of the compounds are being picked up by the program correctly. If not, Qarea using pull down menu.

14.11.1.22 Retention time for CCV, samples and QC is evaluated using the mid-point of ICAL. Retention time is not updated using the CCV check samples.

14.11.1.23 Verify that Quantitate using Initial Calibration is clicked on.

14.11.1.24 Load next data file (blank), quantitate it and review in qarea, checking surrogate recoveries, correct integration of peaks, internal standard area recoveries and any necessary dilutions of target compounds.

14.11.1.25 Repeat step 14.11.1.24 for each blank, sample and spike that is associated with the SDG maintaining the order of steps 14.11.1.20 – 14.11.1.26 when you get to the next BFB. See Section 14.11.2 for Data Interpretation.

14.11.1.26 Send each blank and sample to the tentative identified program using the software pull down menus. Use information from the summary discussion to review the non-target data.

14.11.1.27 Print out each run, standards and spikes in medium format (quant report and chromatogram), blanks and samples in full format (quant report + Chromatogram + spectra).

14.11.1.28 Put the reports in data file order with the BFB report first. Put the instrument logs with each set of reports.

- Data is now ready for **LIMS forms.**

14.11.2 Data Interpretation for MS Chemstation Software

14.11.2.1 Examine all spectra for all possible "hits" or matches made to target compounds from printed out file by an analyst trained in the interpretation of mass spectra by doing the following:

14.11.2.2 Generate a reference spectrum for each analyte by running known standards (QREF from pull down menu).

14.11.2.3 Compare this reference to the spectrum of the peak found in the sample.

14.11.2.4 Compare the criteria required for positive identification of an analyte as follows:

- The analyte in the sample must elute at the same relative retention time as in the daily calibration standard (±0.06 RRT units).
- All ions present in the reference spectrum >10% of the largest ion must be found in the sample spectrum.
- The ratio of the ions found in the sample must agree within ±20% of the ions found in the reference spectrum.
- Ions >10% in the sample spectrum but not found in the reference spectrum must be accounted for.
- Quantitative analysis is done once a target compound is identified by the internal standard method using the equations below. The relative response factor from the initial calibration standard is used to calculate the concentration of the sample.

14.11.2.5 Send all samples and blanks through a library search program in an effort to identify up to 30 non-target compounds, upon client's request.

14.11.2.6 Do <u>not</u> report the following compounds:

- Compounds less than 10% of the nearest internal standard area,
- Compounds which elute earlier than 30 seconds before the first target compound or three minutes after the last purgeable compound,
- Carbon dioxide, and
- Semi volatile target compounds.

14.11.2.7 The computer software provides a mass spectral library for comparison to unknown compounds found in samples. Criteria for making tentative identifications are:

- Ions >10% of the largest ion in the reference spectrum must be present in the sample spectrum.
- The relative intensities of major ions should agree within ±20%.
- Molecular ions present in the reference spectrum must be present in the sample spectrum.
- Ions present in the sample spectrum, but not the reference spectrum should be reviewed for possible background contamination or presence of co-eluting compounds.
- Ions present in the reference but not the sample should be verified by performing manual background subtraction to remove interferences.
- If after review, the analyst is at a loss to identify the compound use the following method:
    - If the computers match probability is 85% or greater report that compound.
    - If the computer match probability is <85%, try to classify the compound and give it a name like "unknown chlorinated hydrocarbon" if it can be determined.

14.11.2.8 Do the quantitation of tentatively identified compounds based on comparison of the total ion area of an unknown peak to the total ion area of the nearest internal standard:

- Do not identify peaks that have an area <10% of the nearest internal standard.
- Since no calibrations are run for these unknown peaks, use response factor of 1 to calculate concentrations.

14.11.2.9 Identify 15 of the largest alkane peaks if they are in the sample.

- Also provide the library search information for each peak.

14.12 Documentation Requirements

14.12.1 Assure that GC and GC/MS Instrument log contains the following:

- CHEMTECH sample ID
- pH of water sample
- Dilution details
- All standards, samples, blanks, etc., run on the instrument in the order they were analyzed
- Date and time of injection of each sample and standard
- Computer data file number
- Analyst signature
- Supervisor signature

14.12.2 Label all chromatograms as follows:

- CHEMTECH and/or client sample number
- Volume/weight injected
- Date and time of injection
- GC column ID
- GC Instrument ID
- Identified compound names

14.12.3 The following quant reports and chromatograms and data system printouts must be included in the data package:

- All standards and blanks from initial and continuing calibrations
- All samples, blanks, blank spikes and MS/MSD

14.13 Instrument Maintenance

14.13.1 See Maintenance P255 SOP

14.14 % Moisture

14.14.1 All soil results are reported on a dry weight basis. The % moisture is determined for all of the samples in the laboratory by the metals department.

14.15 Record in the logbook if there are any instrument errors.

- Rerun the samples.

Note: Errors include

- *Leaked samples*
- *Electric shutdown*

15. CALCULATIONS

15.1 Water Calculation in ug/L

$$\frac{(A_x)(I_s)(Df)}{(A_{is})(RRF)(V_0)}$$

Where A_x = Area for the compound to be measured
A_{is} = Area for the specific internal standard
I_s = Amount of internal standard added in nanograms (ng)
RRF = Relative response factor of the initial calibration curve standard.
V_o = Volume of water purged in milliliters (mL)
Df = Dilution factor.

15.2 Low Level Soil Calculation in ug/Kg dry weight basis

$$\frac{(A_x)(I_s)(Df)}$$

$$\frac{(A_{is})\ (RRF)(W_s)(D)}$$

Where A_x = Area for the compound to be measured
A_{is} = Area for the specific internal standard
I_s = Amount of internal standard added in nanograms (ng)
RRF = Relative response factor of the initial calibration curve standard.
Df = Dilution factor
W_s= Weight of sample
$D = \frac{100 - \%moisture}{100}$

15.3 High Level Soil Calculation in ug/Kg dry weight basis

$$\frac{(A_x)(I_s)\ (V_t)\ 1000\ (Df)}{(A_{is})\ (RRF)(V_a)(W_s)(D)}$$

Where A_x = Area for the compound to be measured
A_{is} = Area for the specific internal standard
I_s = Amount of internal standard added in nanograms (ng)
RRF = Relative response factor of the initial calibration standard.
V_t = Total volume of methanol extract in milliliters (mL), (usually 10 mL)
V_a = Volume of aliquot in microliters (uL) (usually 100 uL)
Df = Dilution factor
W_s= Weight of sample
$D = \frac{100 - \%moisture}{100}$

Note: If there are interferences to the quant ion caused by either high background or co-eluting compounds with similar ions, use a secondary ion for quantitation. A list of the target analytes and their primary and secondary ions is found in Table 3.

16. METHOD PERFORMANCE

16.1 Analysis is performed in accordance with the method. All quality control and quality assurance procedures are followed. Refer to P203-Laboratory Limits and Demonstration of capabilities SOP for further information.

16.2 Each analyst will make a one-time demonstration of the ability to generate acceptable accuracy and precision with this method. Refer to P203-Laboratory Limits and Demonstration of capabilities SOP for further information.

17. POLLUTION PREVENTION

17.1 Use only the amounts of chemicals required. Do not make large quantities of solutions.

17.2 Use hood when working with solvents.

17.3 Keep the area clean and clutter free in the extractions lab and around the instruments in order to avoid any mishaps.

17.4 Trap exhaust from vacuum pumps.

17.5 Keep chemicals away from drains.

17.6 Properly collect and dispose of waste according to Chemtech's Waste Disposal SOP.

17.7 Laboratory is properly equipped with spill cleanup equipment and laboratory personnel trained. Depending upon the size and type of spill, it may be handled by the individual or department creating the spill or by specially trained personnel.

17.8 Small spills may occur routinely and shall be handled by the individual person or department creating the spill. Spill kits are stored in a blue basket or blue cover bin located in each laboratory and chemical storage area. The spill kits can handle water based, solvent and mercury spills. Specially trained personnel handle larger spills, which may pose a threat to health or environment involves a large volume not easily contained.

17.9 A detailed description of the procedure for handling a spill or accident is covered in the CHEMTECH Emergency and Contingency Plan.

17.10 The Safety Coordinator is responsible for implementing the Chemical Hygiene and the CHEMTECH Emergency and Contingency Plans. It is the responsibility of various company personnel to assist in implementing the different aspects of the Plan. These include: Laboratory Coordinator, Technical Director, Operations Manager, Department Managers and Supervisors.

18. DATA ASSESSMENT AND ACCEPTANCE CRITERIA FOR QC

18.1 BFB-MS Tuning Check Compounds

18.1.1 Spectrum produced must meet the criteria outlined in Table 2.

18.2 Initial Calibration

18.2.1 All Criteria in section 13.2 must be satisfied.

18.3 Continuing Calibration

18.3.1 The %D for each analytes & surrogates must be ≤20% for opening Continuous Calibration for 8260D and DOD.
For DOD, End Continuous Calibration % D for each analytes and surrogates must be ≤50%.

18.3.2 The SPCC and CCC criteria must be met for Method 8260B.

18.3.3 1,4-Dioxane must meet 0.05 minimum RRF and < 50% D.

18.3.3 If the analyte is failing biased high, with no positive hits in the samples analyzed under this calibration check sample for that analyte, then no further corrective action is taken. The failure is documented in the case narrative/ non-conformance.

18.4 Method Blank

18.4.1 No analyte should be present in the blank at a concentration greater than the ½ RL (reporting limit).

18.4.2 If the analyte is present greater than the above criteria, all associated sample results must be flagged with the B qualifier.

18.4.3 For DoD work – No analyte must be detected at > ½ RL and >1/10 the amount measured in any sample or >1/10 the regulatory limit (whichever is greater).

18.5 Surrogates

18.5.1 Surrogate recovery limits must be within the limits specified for each matrix.

18.6 MS/MSD and Blank Spike

18.6.1 The %recovery for all analytes must be within control limits.

18.6.2 2-Chloroethylvinyl ether recovery may not meet criteria for water MS/MSD due to acidification of the sample for preservation. Mention this in the case narrative/non-conformance.

18.7 Internal Standard

18.7.1 Monitor all samples, blanks, and spikes for retention time shift and fluctuation of extracted ion areas.

18.7.2 Make sure that the GC retention time is within ±30 seconds of the corresponding internal standard in the midpoint standard of the initial calibration.

18.7.3 Verify that the areas of the internal standard do not change by more than a factor of 2 (-50% to +100%) from the areas in the midpoint standard of the initial calibration. On days when ICAL is not performed, the daily initial CCV can be used.

18.7.4 Monitor all continuing calibration verification standards for retention time shift and fluctuation of extracted ion areas.

18.7.5 Verify that the retention time is within ±30 seconds of the corresponding internal standard in of the initial calibration.

18.7.6 Verify that the areas of the internal standard do not change by more than a factor of 2 (-50% to +100%) from the areas of the corresponding internal standard in the midpoint standard of the initial calibration. On days when ICAL is not performed, the daily initial CCV can be used.

18.8 Initial Calibration Verification

18.8.1 The ICV standard recoveries must be within the 70-130% range. Up to 10% of the compounds may be allowed to fail marginally.

18.8.2 For DoD work, all project analytes must be within ±20% of true value.

18.9 Limit of Detection

18.9.1 All analytes spiked should be positively identified.

18.10 Limit of Quantitation

18.10.1 Analysis must meet the acceptance criteria for the laboratory control sample or 50-150%.

19. CORRECTIVE ACTION FOR OUT-OF-CONTROL DATA

19.1 BFB-MS Tuning Check Compounds

19.1.1 Rerun the BFB tune.

19.1.2 If it still fails, re-tune the instrument and run again. If it still fails, clean the source.

19.2 Initial Calibration

19.2.1 After the system performance check has met the criteria, CCCs are used to check the validity of the initial calibration.

19.2.2 If the QC criterion is not met for any CCC, take a corrective action prior to sample analysis.

19.2.3 If the problem cannot be corrected, generate a new calibration or report the failures in the case narrative and/or non-conformance sheet.

19.3 Continuing Calibration

19.3.1 If the criteria for continuing calibration are not met, rerun the continuing calibration.

19.3.2 If the continuing calibration fails again, acquire a new initial calibration or report the failures in the case narrative and/or non-conformance sheet.

19.4 Method Blank

19.4.1 Rerun the method blank if it fails the first time.

19.4.2 If it fails second time, evaluate the system and contact the department supervisor.

19.4.3 For DoD work – Reprocess the failing blank with the associated samples in a subsequent preparation batch, except when the sample analysis results in a non-detect.

19.5 Surrogates

19.5.1 Should any injection fail to meet the required limits, reanalyze the sample.

19.5.2 If the second injection is acceptable, report only the second set of data.

19.5.3 If the second injection also fails, report both sets of data.

19.5.4 In the case of high level soils, first reanalyze the original methanol extract.

19.5.5 If this fails, re-extract the sample, then analyze the new extract.

19.6 Laboratory Control Sample

19.6.1 If recovery of the LCS is outside the control limits, re-analyze the LCS.

19.6.2 If the recovery is above the control limits, and the affected compound is not detected above the LOQ in any associated client sample, the data may be reported with a "Q" flag applied to the compound and the failure documented in the case narrative/ non-conformance.

19.6.3 If the recovery is below the control limits, or the affected compound is detected above the LOQ in any associated client sample, the LCS and affected samples must be re-extracted.

19.6.3.1 If the samples cannot be re-extracted, the results must be reported with a "Q" flag, and the failure documented in the case narrative/ non-conformance.

19.6.3.2 If the data will be reported associated with the failed LCS, for DOD projects, the client must be informed of the failure and consulted for corrective actions.

19.7 MS/MSD

19.7.1 No corrective action is required if limits are exceeded for MS/MSD analysis but the blank spike meets the criteria. However if more than 50% of the recoveries or 50% of the %RPD's are out, find the cause of this and reanalyze one or both of the spikes.

19.8 Internal Standards

19.8.1 If any sample fails to meet criteria, re-analyze the sample.

19.8.2 If the reanalysis is within limits, then report only the second set of data.

19.8.3 If the re-analysis also fails, report both sets of data.

19.8.4 If the continuing calibration verification standard fails criteria, a new initial calibration needs to be performed.

19.9 Limit of Detection

19.9.1 If LOD verification fails, then repeat the detection limit determination and LOD verification at a higher concentration and set the LOD at the higher concentration.

19.10 Limit of Quantitation

19.10.1 Reevaluate the LOQ, If outside the acceptance limit of 70-130%.

19.11 Initial calibration verification (ICV)

19.11.1 If criteria are not met, rerun ICV once. If criteria still not met, then verify whether failed compounds are required for associated samples or not. If failed compounds are not required for associated samples then continue with the analysis otherwise reanalyze a new initial calibration curve.

20. Contingencies for handling out-of-control or unacceptable data

20.1 Following are the result qualifiers used for out-of-control and unacceptable data:

- **U**: Indicates the compound was analyzed but not detected.
- **J**: Indicates an estimated value, the result reported is below the initial calibrations lowest point.
- **B**: Indicates the analytes were found in the blank as well as the sample.
- **E**: Indicates the analyte concentrate exceeds the calibrated range of the GC instrument.
- **D**: Indicates all compounds identified in an analysis at a secondary dilution factor.
- **N**: Indicates presumptive evidence of a compound. This is used for all non-target results where identification is made.
- **Q**: Indicates a QC (LCS) failure associated with the compound

20.2 Issue a corrective action form any time there is a deviation from the SOP or the client requirements are not met.

20.3 If a sample or extract is damaged, broken, or spilled, contact the project manager and issue a corrective action.

20.4 For more details regarding corrective action procedure, please refer to Corrective Action Report SOP.

20.5 For **DOD** work- use DOD QSM flagging criteria.

21. WASTE MANAGEMENT

21.1 Keep samples for 30 days after analysis and dispose them off according to the procedures explained in the SOP for waste disposal.

22. REFERENCES

22.1 USEPA Test Methods for Evaluating Solid Wastes, SW-846, Method 5030B-Purge and Trap for Aqueous Samples, Revision 2, December 1996.

22.2 USEPA Test Methods for Evaluating Solid Wastes, SW-846, Method 5030C-Purge and Trap for Aqueous Samples, Revision 3, May 2003.

22.3 USEPA Test Methods for Evaluating Solid Wastes, SW-846, Method 5035A – Closed System Purge and Trap and Extraction for Volatile Organics in Soil and Waste Samples. Revision 1, July 2002.

22.4 USEPA Test Methods for Evaluating Solid Wastes, SW-846, Method 8000B – Determinative Chromatographic Separations. Revision 2, December 1996

22.5 USEPA Test Methods for Evaluating Solid Wastes, SW-846, Method 8260D – Volatile Organic Compounds by GC/MS, Revision 4, June 2018.

22.6 Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.3, September 2019.

23. LIST OF TABLES/ATTACHMENTS

23.1 Table 1: Target Compound List
23.2 Table 2: BFB Tuning Criteria
23.3 Table 3: Characteristic Ions for Volatile Target Compounds
23.4 Table 4: QC/Sample Preparation
23.5 Table 5: Purging Conditions
23.6 Table 6 & 7: Purge & Trap system
23.7 Table 8: Instrument Specifications
23.8 Table 9: Instrument Temperature and Flow Conditions
23.9 Table 10: Instrument Temperature Conditions (or equivalent)
23.11 Table 11: Standards and Solutions (or equivalent)
23.12 Table 12: Water working standard preparation
23.13 Table 13: Soil working standard preparation

TABLE 1
TARGET COMPOUND LIST

COMPOUND NAME	COMPOUND NAME
1,1,1,2-Tetrachloroethane	Carbon disulfide
1,1,1-Trichloroethane	Carbon Tetrachloride
1,1,2,2-Tetrachloroethane	Chlorobenzene
1,1,2-Trichloroethane	Chloroethane
1,1,2-Trichlorotrifluoroethane	Chloroform
1,1-Dichloroethane	Chloromethane
1,1-Dichloroethene	cis-1,2-Dichloroethene
1,1-Dichloropropene	cis-1,3-Dichloropropene
1,2,3-Trichlorobenzene	Cyclohexane
1,2,3-Trichloropropane	Dibromochloromethane
1,2,4-Trichlorobenzene	Hexachloroethane
1,2,4-Trimethylbenzene	Dibromomethane
1,2-Dibromo-3-Chloropropane	Dichlorodifluoromethane
1,2-Dibromoethane	Ethyl Benzene
1,2-Dichlorobenzene	Hexachlorobutadiene
1,2-Dichloroethane	Isopropylbenzene
1,2-Dichloropropane	m/p-Xylenes
1,3,5-Trimethylbenzene	Methyl Acetate
1,3-Dichlorobenzene	Methyl tert-butyl Ether
1,3-Dichloropropane	Methylcyclohexane
1,4-Dichlorobenzene	Methylene Chloride
2,2-Dichloropropane	Naphthalene
2-Butanone	n-Butylbenzene
2-Chloroethyl vinyl ether	N-propylbenzene
2-Chlorotoluene	o-Xylene
2-Hexanone	p-Isopropyltoluene
Diethyl ether	Sec-butylbenzene
4-Chlorotoluene	Styrene
4-Methyl-2-Pentanone	t-1,3-Dichloropropene
Acetone	Tert butyl alcohol
Acrolein	tert-Butylbenzene
Acrylonitrile	Tetrachloroethene
Benzene	Toluene
Bromobenzene	trans-1,2-Dichloroethene
Bromochloromethane	Trichloroethene
Bromodichloromethane	Trichlorofluoromethane
Bromoform	Vinyl Acetate
Bromomethane	Vinyl chloride
Allyl chloride	Ethyl acetate
Ethyl methacrylate	Isobutyl alcohol
Methacrylonitrile	1,4-Dioxane

TABLE 2
BFB TUNING CRITERIA

Mass	Ion Abundance Criteria
95	Base peak, 50-200 percent of mass 174
96	5.0-9.0 percent of mass 95
173	Lass than 2.0 percent of mass 174
174	50-200 percent of mass 95
175	5.0-9.0 percent of mass 174
176	95-105 percent of mass 174
177	5.0-10.0 percent of mass 176

TABLE 3
CHARACTERISTIC IONS FOR VOLATILE TARGET COMPOUNDS

Analyte	Primary Ion*	Secondary Ion(s)	Internal Standard for Quantitation
Dichlorodifluoromethane	85	87	IS1
Chloromethane	50	52	IS1
Vinyl chloride	62	64	IS1
Bromomethane	94	96	IS1
Chloroethane	64	66	IS1
Trichlorofluoromethane	151	101,153	IS1
1,1-Dichloroethene	96	61, 63	IS1
Carbon disulfide	76	78	IS1
Methylene Chloride	84	49, 86	IS1
Acetone	58	43	IS1
t-Butyl alcohol	59	74	IS1
trans-1,2-Dichloroethene	96	61, 98	IS1
Acrolein	56	55,58	IS1
Acrylonitrile	53	40,39	IS1
t-Butyl methyl ether	73	57	IS1
1,1-Dichloroethane	63	65, 83	IS1
2-Butanone	72	43	IS1
2,2-Dichloropropane	77	97	IS1
cis-1,2-Dichloroethene	96	61, 98	IS1
Bromochloromethane	128	49,130	IS1
Chloroform	83	85	IS1
1,1,1-Trichloroethane	97	99, 61	IS1
Carbon tetrachloride	117	119	IS2
1,1-Dichloropropene	75	110,77	IS2
Benzene	78	76,77	IS2
1,2-Dichloroethane	62	98	IS2
Trichloroethene	95	97, 130, 132	IS2
1,2-Dichloropropane	63	112	IS2
Bromodichloromethane	83	85, 127	IS2
Dibromomethane	174	95,174	IS2
cis-1,3-Dichloropropene	75	77, 39	IS2
Vinyl Acetate	43	86	IS1
trans-1,3-Dichloropropene	75	77, 39	IS2
1,1,2-Trichloroethane	83	97, 85	IS2

TABLE 3
CHARACTERISTIC IONS FOR VOLATILE TARGET COMPOUNDS

Analyte	Primary Ion*	Secondary Ion(s)	Internal Standard for Quantitation
2-Chloroethyl vinyl ether	63	65,106	IS2
1,3-Dichloropropane	76	78	IS2
Dibromochloromethane	129	127	IS2
Bromoform	173	175, 254	IS3
4-Methyl-2-pentanone	100	43, 85	IS2
Toluene	92	91	IS2
Tetrachloroethene	164	129, 131, 166	IS3
Isopropylbenzene	105	120	IS4
1,1,2,2-Tetrachloroethane	83	131, 85	IS3
2-Hexanone	43	58, 57, 100	IS2
1,2-Dibromoethane	107	109,188	IS2
Chlorobenzene	112	77, 114	IS3
1,1,1,2-Tetrachloroethane	131	133,119	IS3
Ethylbenzene	91	106	IS3
o- Xylene	106	91	IS3
m+p- Xylene	106	91	IS3
Styrene	104	78	IS3
Bromobenzene	156	77,158	IS4
1,2,3-Trichloropropane	75	77	IS4
n-Propylbenzene	91	120	IS4
2-Chlorotoluene	91	126	IS4
1,3,5-Trimethylbenzene	105	120	IS4
4-Chlorotoluene	91	126	IS4
tert-Butylbenzene	119	91,134	IS4
1,2,4-Trimethylbenzene	105	120	IS4
sec-Butylbenzene	105	134	IS4
p-Isopropyltoluene	119	134,91	IS4
1,3-Dichlorobenzene	146	111,148	IS4
1,4-Dichlorobenzene	146	111,148	IS4
n-Butylbenzene	91	92	IS4
1,2-Dichlorobenzene	146	111,148	IS4
1,2-Dibromo-3-Chloropropane	75	155,157	IS4
1,2,4-Trichlorobenzene	180	182,145	IS4
Hexachlorobutadiene	225	223,227	IS4
Naphthalene	128	--	IS4
1,2,3-Trichlorobenzene	180	182,145	IS4
Cyclohexane	56	69, 84	IS1
Methyl acetate	43	74	IS1
Methyl cyclohexane	83	59, 98	IS2

TABLE 3
CHARACTERISTIC IONS FOR VOLATILE TARGET COMPOUNDS

Analyte	Primary Ion*	Secondary Ion(s)	Internal Standard for Quantitation
Trichlorotrifluoroethane	101	103	IS1
Diethyl ether	74	45	IS1
Hexachloroethane	117	201	IS4
Allyl chloride	41	39, 76	IS1
Ethyl acetate	43	61, 70	IS2
Ethyl methacrylate	69	41, 39	IS2
Isobutyl alcohol	43	41, 42	IS1
Methacrylonitrile	41	39, 67	IS2
1,4-Dioxane	88	43, 58	IS2
Surrogate Compounds (System Monitoring Compounds)			
Dibromofluoromethane	113	--	IS2
1,2-Dichloroethane-d4	65	102	IS1
Toluene-d8	98	70, 100	IS2
4-Bromofluorobenzene	95	174, 176	IS2
Internal Standards			
Pentafluorobenzene (IS 1)	168	--	IS1
1,4-Difluorobenzene (IS 2)	114	68, 88	IS2
Chlorobenzene-d5 (IS 3)	117	82, 119	IS3
1,4-Dichlorobenzene-d4 (IS 4)	152	115, 150	IS4

*The primary ion should be used unless interferences are present, in which case, a secondary ion may be used.
**m/z 43 is used for quantitation of 2-Butanone, but m/z 72 must be present for positive identification.

TABLE 4
QC/Sample Preparation (concentrations are subject to change)

QC/Samples	Matrix	Internal Std (ul) 50ppm	Surrogate (ul) 50ppm	MeOH Added (ul)	Final volume (ml)
50 ppb CCC	Water	40.0	40.0	NA	40mL
20 ppb CCC	Water	40.0	40.0	NA	40mL
Method Blank	Water	40.0	40.0	NA	40mL
High Level Soil Blank	Water	800.0	800.0	100	40mL
Blank Spike/MS/MSD	Water	40.0	40.0	NA	40mL
Sample	Water	40.0	40.0	NA	40mL
50 ppb CCC	Soil	5.0	5.0	NA	5mL
20 ppb CCC	Soil	5.0	5.0	NA	5mL
Method Blank	Soil	5.0	5.0	NA	5mL
Blank Spike/MS/MSD	Soil	5.0	5.0	NA	5mL
Sample	Soil	5.0	5.0	NA	5mL

Note: Follow the above table if surrogate and internal standard solutions are added manually. If surrogate and internal standard solutions are added by the auto sampler, then the same stock solution is used to add these solutions using the auto sampler loop. The same technique and amount of solution is added to all calibration standards and samples following an initial calibration curve.

TABLE 5
Purging Conditions (subject to change)

Instrument Name	Purge Flow	Purge Temp.	Purge Time	Dry Purge Time	Desorb Temp.
MSVOAD	40mL/min	40ºC	11 Min.	0.5Min.	250ºC
MSVOAN	40 mL/min	40ºC	11 Min.	0.5Min.	250ºC
MSVOAW	40 mL/min	40ºC	11 Min.	0.5Min.	250ºC
MSVOAX	40 mL/min	40ºC	11 Min.	0.5Min.	250ºC
MSVOAY	40 mL/min	40ºC	11 Min.	0.5Min.	250ºC

TABLE 6
Purge & Trap System (subject to change)

Instrument Name	Auto-sampler	Concentrator	Sample Heater
MSVOAD	Centurian (est)	Evolution (est)	Yes and Stirrer
MSVOAN	Atomax-XYZ	Atomax-XYZ	Yes and Stirrer
MSVOAW	Atomax	Atomax	Yes and Stirrer
MSVOAX	Atomax	Atomax	Yes and Stirrer
MSVOAY	Atomax	Atomax	Yes and Stirrer

TABLE 7
Purge & Trap system (subject to change)

Instrument Name	Desorb Time	Bake Temp.	Bake Time.	2016 Line and Valve Temp.
MSVOAD	1 Min.	260ºC	5 Min.	150ºC
MSVOAN	1 Min.	260ºC	5 Min.	125ºC
MSVOAW	1 Min.	260ºC	5 Min.	110ºC
MSVOAX	1 Min.	260ºC	5 Min.	120ºC
MSVOAY	1 Min.	260ºC	5 Min.	110ºC

Trap = Vocarb 3000, K, 9, 10 from Tekmar Catalog # 14-5864-403, 14-9909-403, 14-9908-403 or equivalent.

TABLE 8
Instrument Specifications (subject to change)

Instrument Name	Column	Supplier	Catalog #	Model of GC	Model of MS
MSVOAD	RXi-624Sil 30M x 0.25mm ID x 1.4 um film thickness	Restek	13868	Agilent 8890	Agilent 5977B
MSVOAN	RXi-624Sil 30M x 0.25mm ID x 1.4 um film thickness	Restek	13868	Agilent 7890A	Agilent 5975C
MSVOAW	RXi-624Sil 30M x 0.25mm ID x 1.4 um film thickness	Restek	13868	Agilent 7890B	Agilent 5977B
MSVOAX	DB-624 UI 20M x 0.18mm ID x 1 um film thickness	Agilent	121-1324ui	Agilent 7890B	Agilent 5977B
MSVOAY	RXi-624Sil 30M x 0.25mm ID x 1.4 um film thickness	Restek	13868	Agilent 8890	Agilent 5977B

TABLE 9
Instrument Temperature and Flow Conditions (or equivalent) (subject to change)

Instrument Name	Injector Temperature	Detector B Temperature Mass Spectrometer	Carrier Flow
MSVOAD	220ºC	250ºC	30mL/Minute
MSVOAN	220ºC	250ºC	30mL/Minute
MSVOAW	200ºC	250ºC	30mL/Minute
MSVOAX	200ºC	250ºC	30mL/Minute
MSVOAY	200ºC	250ºC	30mL/Minute

TABLE 10
Instrument Temperature Conditions (or equivalent) (subject to change)

Instrument Name	Initial Temperature	Initial Hold	Temperature Ramp	Final Temperature	Final Hold
MSVOAD	40ºC	5 Minutes	11 ºC /Minute Ramp A = 20 ºC /Minute	60ºC Final A = 220 ºC	0 Minute Final A = 2.0 Minutes
MSVOAN	40ºC	5 Minutes	11 ºC /Minute Ramp A = 20 ºC /Minute	60ºC Final A = 220 ºC	0 Minute Final A = 2.0 Minutes
MSVOAW	40ºC	5 Minutes	11 ºC /Minute Ramp A = 20 ºC /Minute	60ºC Final A = 220 ºC	2 Minutes Final A = 2.0 Minutes
MSVOAX	40ºC	5 Minutes	11 ºC /Minute Ramp A = 20 ºC /Minute	60ºC Final A = 220 ºC	0 Minute Final A = 2.0 Minutes
MSVOAY	40ºC	5 Minutes	11 ºC /Minute Ramp A = 20 ºC /Minute	60ºC Final A = 220 ºC	0 Minute Final A = 2.0 Minutes

TABLE 11
Standards and Solutions (or equivalent)

Standard Name	Supplier	Catalog Number	Concentration of stock	Preparation Details	Final Concentration of working solution
8260 Internal Standard	Restek	555581	25,000 ug/mL	20uL into 10mL Volumetric QS DI water	50ug/mL
Arcon 8260 Internal Standard	Restek	555581	25,000 ug/mL	100uL into 10mL Volumetric QS DI water	250ug/mL
Arcon 8260 Surrogate Standard	Restek	555582	25,000 ug/mL	100uL into 100mL Volumetric QS DI water	250ug/mL
8260 Surrogate Standard	Restek	555582	25,000 ug/mL	20uL into 100mL Volumetric QS DI water	50ug/mL
8260 Calibration Working STD Acrolein only	Absolute	91980	5000ug/mL	4.0mL into 25mL volumetric QS DI water	160ug/mL
8260 Calibration working STD Bromochloromethane only	Restek	30225	2,000 ug/mL	4.0mL in 50mL Volumetric QS DI water	160.0ug/mL
BFB	Restek	30067	2500ug/mL	250ul into 25mL volumetric QS DI water	25ug/mL
8260 Calibration working Stock Standard 160ppm	Restek	555408 555406 555407 30006 30489 30042 30499 30225 556166 30470	8000ug/mL 2000ug/mL 10,000ug/mL 5,000ug/mL 2000ug/mL 2000ug/mL 10,000ug/mL 2000ug/mL 2000- 40,000ug/mL 50,000ug/mL	1000uL 800uL 800uL 1600uL 800uL 800uL 800uL 800uL 800uL 160uL in 10mL Volumetric QS DI water	160ug/mL for most components
8260 Calibration working Stock Standard 100ppm	-----	-----	160ug/mL	625uL 160ug/mL Stock solution in 325mL DI water	100ppm
8260 Calibration working Stock Standard 20ppm	-----	-----	160ug/mL	125uL 160ug/mL Stock solution in 875mL DI water	20ppm
8260 Calibration working Stock Standard 10ppm	-----	-----	160ug/mL	62.5uL 160ug/mL Stock solution in 937.5mL DI water	10ppm

TABLE 12
Water Working Standard Preparation

Water Working Standard Level	Stock Solution Std. Concentration (ppm)	Volume used(ul)	Surrogate (ul) 50ppm	Internal std (ul) 250ppm	Final volume (ml)
1 ppb	10ppm	4.0uL	0.8ul	8.0ul	40mL Vial
5 ppb	20ppm	10.0uL	4.0ul	8.0ul	40mL Vial
10 ppb	20ppm	20.0uL	8.0ul	8.0ul	40mL Vial
20 ppb	160ppm	5.0uL	16.0ul	8.0ul	40mL Vial
50 ppb	160ppm	12.5uL	40.0ul	8.0ul	40mL Vial
100 ppb	160ppm	25.0uL	80.0ul	8.0ul	40mL Vial
150 ppb	160ppm	37.5uL	120.0ul	8.0ul	40mL Vial
200 ppb	160ppm	50.0uL	160.0ul	8.0ul	40mL Vial
50 ppb ICV	160ppm	12.5uL	40.0ul	8.0ul	40mL Vial

TABLE 13
Soil Working Standard Preparation

Soil Working Standard Level	Stock Solution Std. Concentration (ppm)	Volume used from stock (ul)	Surrogate (ul) 50ppm	Internal std (ul) 50ppm	Final volume (ml)
5 ppb	10ppm	2.5ul	0.5ul	5ul	5mL Vial
10 ppb	10ppm	5.0ul	1.0ul	5ul	5mL Vial
20 ppb	20ppm	5.0ul	2.0ul	5ul	5mL Vial
50 ppb	100ppm	2.5ul	5.0ul	5ul	5mL Vial
75 ppb	100ppm	3.75ul	7.5ul	5ul	5mL Vial
100 ppb	100ppm	5.0ul	10.0ul	5ul	5mL Vial
200 ppb	100ppm	10.0ul	20.0ul	5ul	5mL Vial
50 ppb ICV	100ppm	2.5ul	5.0ul	5ul	5mL Vial

CHEMTECH 284 Sheffield Street, Mountainside, NJ (908) 789-8900

READ RECEIPT

Employee Name: _____

Department: _____

_____ **M8260D-SWGCMSVOA**_____

_____

Method or Document Read (Include Title, Number, Revision, as applicable)

Employee Statement: I have read and understand the information in the above mentioned method or document.

_____ _____

Employee Signature Date

Supervisory Statement: I have reviewed this document or method with the employee.

_____ _____

Supervisory Signature Date

Note: This receipt is to be returned to the Quality Assurance Department for incorporation into employee training record files. If you have questions or would like to review your train record files, please see QA.

DETERMINATION OF EXTARCTABLE SEMI-VOLATILE ORGANIC COMPOUNDS BY SW-846 METHOD 8270E

1. TEST METHOD

1.1 Determination of extractable semi-volatile organic compounds by SW-846 Method 8270E.

2. APPLICABLE MATRICES

2.1 Ground and surface water, wastewater, soils/sediments, and solid waste.

3. DETECTION LIMITS

3.1 Limit of Quantitation and Limit of Detection are verified quarterly.

4. SCOPE AND APPLICATION

4.1 The following method outlines the procedure used for the Gas Chromatography/Mass Spectrometry (GC/MS) analysis of a number of semi-volatile compounds.
4.2 The compounds determined by this method are extractable by organic solvents and lend themselves to gas chromatography.
4.3 This method is applicable to waters, such as groundwater, soils/sediment and solid waste.
4.4 The compounds determined by this method can be found in Table 1.

5. SUMMARY OF METHOD

5.1 Analyze all extracts by GC/MS and quantitate using internal standard technique along with response factors for each analyte generated from known amounts of standards.
5.2 Non-target compounds are tentatively identified by a library search program. Hewlett Packard software is used exclusively for acquisition and data reduction procedures.

6. DEFINITIONS

6.1 Calibration**:** to determine, by measurement or comparison with a standard, the correct value of each scale reading on a meter, instrument, or other device. The levels of the applied calibration standard should bracket the range of planned or expected sample measurement.
6.2 Calibration Curve: The graphical relationship between the known values, such as concentration, of a series of calibration standards and their instrument response.

6.3 Duplicate Analyses: The analysis or measurements of the variable of interest performed identically on two sub-samples of the same sample. The results from duplicate analyses are used to evaluate analytical or measurement precision but not the precision of sampling, preservation or storage internal to the laboratory.

6.4 Matrix Spike: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of Target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

6.5 Matrix Spike Duplicate: A second replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of the precision of the recovery for each analyte.

6.6 Method Blank: A sample of a matrix similar to the batch of associated samples (when available) that is free form the analytes of interest, which is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses.

6.7 Method Detection Limit: The minimum concentration of a substance (an analyte) that can be measured and reported with 99 % confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

6.8 Semivolatile Organic Compounds: Compounds that are amenable to analysis by extraction of the sample with an organic solvent, also called base/neutral/acid (BNA) compounds.

7. INTERFERENCES

7.1 Common interferences with this method include contaminants in solvents, reagents, glassware and sample processing hardware.

7.2 Laboratory method blanks or instrument blanks are routinely analyzed to show that the system is free of contamination.

8. SAFETY

8.1 The toxicity and carcinogenity of each reagent in this method has not been fully established. Each chemical should be regarded as a potential health hazard and exposure to these compounds should be minimized.

8.2 Always wear safety glasses for eye protection when working with these reagents.

8.3 Use protective gloves when handling corrosive chemicals.

8.4 Read Material Safety Data Sheets (MSDS) for the chemicals used in the laboratory for the identity

9. EQUIPMENT AND SUPPLIES

9.1 Mass Spectrometer

9.1.1 Hewlett Packard Model 5973 & Agilent Model 5973, 5975, 5977 or equivalent.

9.1.2 The 5973, 5975 & 5977 scan from 35 to 500 amu every 1 second or less, utilizing 70 volts (nominal) electron energy in the electron impact ionization mode.

9.2 Gas Chromatograph

9.2.1 Temperature programmable Hewlett Packard Model 6890 & Agilent Model 6890 and Model 7890 or equivalent.

9.2.2 The MS is capable of producing a mass spectrum that meets all instrument performance criteria (Table 2) when 50ng of Decafluorotriphenylphosphine (DFTPP) is injected.

9.2.3 Column - 30m x 0.25-mm x 0.5 µm film thickness fused silica ZB-Semivolatiles Guardian (Nonpolar, 5% Phenyl-Arylene/95% Dimethylpolysiloxane) Phenomenex, Catalog # 7HG-G027-17-GGA.

9.2.4 Column - 20m x 0.18-mm x 0.36 µm film thickness fused silica DB-UI 8270D (low polarity, similar to 5% Phenyl-Arylene/95% Dimethylpolysiloxane) Agilent Catalog # 121-9723.

9.3 GC is directly interfaced to the Mass Spectrometer.

9.4 Data System-computer system is interfaced to the Mass Spectrometer.

9.4.1 The PCs are used to acquire and process data.

9.4.2 Systems are equipped with Agilent Technologies MSD Chemstation Aug 2003 edition, version G1701DA & EISC Software.

9.4.3 The computer systems are capable of continuous acquisition and storage of all GC/MS data.

9.4.4 System allows for searching of any GC/MS data file for ions of a specific mass and plotting it versus time or scan number. This is Extracted Ion Current Profile (EICP).

9.4.5 A computer accessible library allows for the searching of non-targeted spectra.

9.4.6 Mass spectral library from Agilent Analytical NIST11 MS Spectral Database that contains 174,947 Electronic Mass Spectra for 147,198 compounds that are used in tentative identification of unknown peaks.

9.4.7 The data system flags all data files that have been edited manually by the laboratory.

9.4.8 Instrument Software: MSD Chemstation F.01.01.2317

9.4.9 Instrument Software: Enviroquant Chemstation F.01.01.2317

9.5 All GC/MS data is stored on Amazon server so that it may be retrieved as needed.

9.6 Hewlett-Packard Automatic Sampler Model 7673 (2uL or 1uL splitless inject) & Agilent Technologies Automatic Sampler Model 7683, 7693 (2uL or 1uL splitless inject) or equivalent.

9.7 Volumetric flasks (5mL, 10mL, 25mL, 50mL, 100mL, 500mL, 1000mL and 2000mL)

9.8 O-ring Agilent #5180-4132 or equivalent

9.9 10 µL Injection Syringe Cat # 20169 from Hamilton or equivalent

9.10 Inlet Liner Restek # 22407 or equivalent.
9.11 Septa Restek # 27143 or equivalent
9.12 Gold seal Restek # 21318 or equivalent
9.13 Vespel/Graphite Ferrule Restek # 20229 & 20231 or equivalent

10. REAGENTS AND STANDARDS

10.1 Reagents
10.1.1 Methylene Chloride, pesticide grade JT Baker #9264-03 or equivalent for making dilutions and standard preparation.
10.1.2 Water-analyte free. Laboratory DI water
10.1.3 Acetone – JT Baker 9254-03, Ultra Resi Analyzed or equivalent.

10.2 Calibration Standards: Standard mixes in Methylene chloride.

- Store all standards at <-10 deg.C, protected from light, in sealed (unopened) vials or teflon-sealed screw-cap bottles.
- Replace all solutions after 6 months, or sooner, if comparison with quality control samples indicates a problem.
- Prepare the calibration standards according to the following Table (*or equivalent)

8270E calibration stock standard

*Standard Name	*Supplier	Catalog Number	Concentration of stock	Preparation Details	Final Concentration of Stock Solution
*8270E Calibration Stock Standard	CPI International	Z-010223-01 Z-010074-07 Z-110381-01 Z-010442-07 Z-110817-01 Z-110816-01 Z-110094-02 Z-112090-04	2,000ug/mL 1,000ug/mL 1,000ug/mL 1,000ug/mL 1,000ug/mL 1,000ug/mL 5,000ug/mL 7,500ug/mL	0.5mL 1.0mL 1.0mL 1.0mL 1.0mL 1.0mL 0.4mL 0.267mL Combined in vial with 3.833mL of Methylene chloride final volume is 10.0mL	100ug/mL each Spike compound and 200ug/mL each Surrogate compound

8270E-SIM calibration stock standard

*Standard Name	*Supplier	Catalog Number	Concentration of stock	Preparation Details	Final Concentration of Stock Solution
*8270E SIM Calibration Stock Standard	CPI International Restek	Z-010223-01 Z-110381-01 Z-110816-01 Z-110094-02 Z-112090-04 33913	2,000ug/mL 1,000ug/mL 1,000ug/mL 5,000ug/mL 7,500ug/mL 2,000ug/mL	0.125mL 0.250mL 0.250mL 0.050mL 0.0335mL 0.125mL Combined in vial with 24.1665mL of Methylene chloride final volume is 25.0mL	10ug/mL each Spike compound and each Surrogate compound

8270E Second Source Calibration Solution: (Different LOT# from Primary Source)

Standard Name	Supplier	Catalog Number	Concentration of stock	Preparation Details	Final Concentration of Stock Solution
*8270E Second Source Calibration Stock	Restek	555223 555224 31850 30287 31082 31083	1,000ug/mL 1,000ug/mL 1,000ug/mL 2,000ug/mL 5,000ug/mL 7,500ug/mL	0.2mL 0.2mL 0.2mL 0.1mL 0.080mL 0.053mL Combined in vial with 1.167mL of Methylene chloride final volume is 2.0mL	100ug/mL each Spike compound and 200ug/mL each Surrogate compound

8270E-SIM Second Source Calibration Solution: (Different LOT# from Primary Source)

Standard Name	Supplier	Catalog Number	Concentration of stock	Preparation Details	Final Concentration of Stock Solution
*8270E-SIM Second Source Calibration Stock	Restek CPI	31853 31850 31087 555223 555224 33913 Z-110094-02-05	2,000ug/mL 1,000ug/mL 10,000ug/mL 1,000ug/mL 1,000ug/mL 2,000ug/mL 5,000ug/mL	0.032mL 0.064mL 0.0063mL 0.064mL 0.064mL 0.032mL 0.0128mL Combined in volumetric flask with Methylene chloride to final volume is 2.0mL	3.2ug/mL each Spike compound Surrogate compound

10.3 Laboratory Control Sample and Matrix Spike/Matrix Spike Duplicate – See Extraction SOP.

10.4 Internal standard solution, all compounds at 2000ng/µL in methylene chloride for 8270E.

Standard Name	Supplier	Catalog Number	Concentration of stock	Preparation Details	Final Concentration of Stock Solution
*8270E Internal Standard	Restek	31206	2,000ug/mL	None Required	2000ug/mL each compound

10.5 Internal standard solution, all compounds at 40ng/µL in methylene chloride for 8270E-SIM.

Standard Name	Supplier	Catalog Number	Concentration of stock	Preparation Details	Final Concentration of Stock Solution
*8270E-SIM Internal Standard	Restek	31206	2,000ug/mL	0.020mL Combined in vial with Methylene Chloride to final volume 1.0mL.	40ug/mL each compound

Internal standard compounds:

1,4-Dichlorobenzene-d4	Napththalene-d8	Acenaphthene-d10
Phenanthrene-d10	Chyrsene-d12	Perylene-d12

10.6 Decafluorotriphenylphosphine (DFTPP) tune solution, 50ng/L` in methylene chloride, also contains 4,4-DDT, benzidine and pentachlorophenol – Protocol CLPS-T4

Standard Name	Supplier	Catalog Number	Concentration of stock	Preparation Details	Final Concentration of Stock Solution
*DFTPP	Restek	31615	1,000ug/mL	1.0mL Combined in volumetric flask with 19.0 mL of Methylene chloride final volume is 20.0mL	50ug/mL each compound

10.6.1 Prepare by making a 1:20 dilution of Protocol (50-ug/mL) solution, and store in the same manner as standards.

10.7 Extra targeted compounds (when requested by the client) at an appropriate concentrate purchased from Restek, CPI, Supelco, Aldrich or an alternate supplier in concentrated mixtures.

10.7.1 Store spiking solutions in the same manner as surrogate solutions (see above) and prepare by making an appropriate dilution of the concentrated mixture in a volumetric flask.

10.8 Record all standard receipts in the Standard Receipt Logbook.

10.9 Record all standard preparation details in the Organic Standard Prep Logbook.

10.10 Sample Preparation

10.10.1 For sample preparation standard operational procedure refer to the SOP M3541-ASE Extraction & M3510C,3580A-Extraction SVOC for solid and aqueous sample preparation respectively.

11. SAMPLE COLLECTION, PRESERVATION, SHIPMENT AND STORAGE

11.1 Collect water samples in 1L amber glass containers with Teflon lined caps.

11.2 Collect soil samples in 8 oz or 16 oz. glass jars with Teflon lined caps.

11.3 Protect all samples from light and refrigerate at 4ºC from the time of sampling until extraction.

11.4 Holding Times

11.4.1 The extraction holding time for water samples is 7 days; the extraction holding time for soil samples is 14 days.

11.4.2 Analyze all extracts within 40 days of their extraction date.

12. QUALITY CONTROL

12.1 DFTPP

12.1.1 Analyze a MS tuning check compounds every 12 hours.

12.1.2 Spectrum produced must meet criteria outlined in Table 2. Evaluate DFTPP using Autofind or by evaluating the average of 3 scans (apex, apex + 1, apex – 1) and background correction not more than 20 scans before the elution of the DFTPP peak.

12.1.3 Verify the %DDT breakdown from the tuning check. Degradation of DDT to DDE and DDD should not exceed 20%. Please refer section 15.3 for %DDT breakdown calculation information.

12.1.4 Verify the Benzidine and Pentachlorophenol peak tailing. Benzidine and Pentachlorophenol should be present at their normal responses and no peak tailing should be present over a factor of 2. Please refer section 15.3 for Peak Tailing calculation information.

12.2 Initial Calibration

12.2.1 Analyze seven calibration standards at the concentrations: 5, 10, 20, 40, 50, 60 & 80 ug/mL for SCAN analysis and 0.1, 0.2, 0.4, 0.8, 1.6, 3.2, 5.0 ug/mL for SIM analysis (concentrations subject to change based on instrument/column sensitivity or saturation).

12.2.2 Assure that relative response factors (RRFs) and % relative standard deviation (%RSD) criteria are met. Acceptance criteria are listed in Section 13.2.7.

12.2.3 Confirm the integrity of the initial calibration by analyzing an initial calibration verification standard (second source) immediately after the initial calibration. The acceptance criteria are listed in Section 18.8 of this SOP.

12.2.4 According to SW 846 Method 8270E, Revision 6, July 2018, Section 1.4.6, compound 1,2-Diphenylhydrazine is unstable (even at room temperature) and readily converts to azobenzene. Given this analyte's stability problems, it would be acceptable to calibrate for 1,2-diphenylhydrazine using azobenzene. Under these circumstances (poor compound separation) the results for either of these compounds should be reported as a combined concentration.

12.2.5 According to SW 846 Method 8270E, Revision 6, July 2018, Section 1.4.5, compound N-Nitrosodiphenylamine decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine. For this reason, it is acceptable to report the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration.

12.3 Continuing Calibration

12.3.1 Analyze continuing calibration standard to show that the system is operating as it did when it was initially calibrated.

12.3.2 Analyze a continuing calibration check, after the DFTPP and before the analysis of any blanks, spikes, or samples.

12.3.3 Make sure that continuing calibration meets RRF and % difference (%D) criteria listed in Section 18.3. For SIM analysis, all compounds must have %D less than 20%.

12.3.4 Please review section 12.2.4 & 12.2.5 for special comment about Azobenzene and N-Nitrosodiphenylamine.

12.4 Method Blank

12.4.1 Extract a method blank for each batch of samples of similar matrix and concentration level.

12.4.2 Carry the method blank through the entire sample prep, concentration, and analysis and treat it just like a sample.

12.4.3 No analytes detected > ½ RL and >1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). For common laboratory contaminants, no analytes detected >RL.

12.5 Surrogate Recoveries

12.5.1 Spike surrogate compounds into all samples, blanks and spikes during the extraction procedure.

12.5.2 Make sure that all samples, blanks and spikes meet criteria as established by the laboratory control limits using control charts.

12.6 Laboratory Control Sample (LCS), Matrix Spike/Matrix Spike Duplicate (MS/MSD)

12.6.1 Perform a LCS, MS and MSD for each batch.

12.6.2 Choose a representative sample to be used for the MS/MSD.

12.6.3 An MS/MSD is required for each matrix type, for water samples if there is not enough sample for spiking LCS & LCSD performed.

12.6.4 Calculate % recovery and %D.

12.7 Internal Standards (IS)
- 12.7.1 Monitor the integrated area and the retention time of the quant ion of the IS for all standards, blanks, samples and spikes.
- 12.7.2 Monitor the integrated area and the retention time of the continuing calibration immediately after analysis.
- 12.7.3 Refer to Section 18.7 for internal standard criteria.

12.8 Accuracy and Precision
- 12.8.1 Perform an initial one-time demonstration of accuracy and precision per analyst.
- 12.8.2 The standard used for the QC check sample must be from a source other than that used for the calibration standards.
- 12.8.3 Extract and analyze the four QC check samples under the same conditions used for sample analysis by this method.
- 12.8.4 Recoveries must meet LCS recovery limits. Repeat if necessary to document performance ability.
- 12.8.5 For DoD work – Demonstration of Capability study is performed at the LOQ level and evaluated using the LCS limits.

12.9 Manual Integration (Refer to P243-Manual Integration Policy and Electronic Logbook SOP for further details)
- 12.9.1 At times manual integration will be necessary due to incomplete or incorrect integration by the automated analytical system.
- 12.9.2 Manual integration cannot be used to satisfy Quality Control Criteria.
- 12.9.3 Do not include baseline background noise; include only the area between where the beginning and end of the peak intersects with the baseline.
- 12.9.4 Any time a compound is integrated in the calibration standard it must then be consistently integrated in the samples.
- 12.9.5 When a manual integration is performed the hardcopy of the quantitation report will flag the compound with an “m”.
- 12.9.6 Report the before and after manual integration chromatograms with the raw data.

12.10 Client Special requirements
- 12.10.1 Special requirements or QC criteria for a specific project will be attached to this SOP for laboratory use.

12.11 Limit of Detection (LOD)
- 12.11.1 Verify LOD by spiking a quality system matrix at the established LOD concentration.
- 12.11.2 LOD is specific to each combination of analyte, matrix, method (including sample preparation) and instrument configuration.
- 12.11.3 LOD must be verified quarterly.
- 12.11.4 LOD must be verified on each instrument used, and every time the method is modified.

12.12 Limit of Quantitation (LOQ)
- 12.12.1 LOQ must be verified quarterly for each quality system matrix, method and analyte, by analyzing QC sample containing the analytes of concern in each quality system matrix 1X the claimed LOQ.

12.12.3 LOQ must be performed if the method is modified.

12.13 Method Detection Limit (MDL)

12.13.1 Please refer to SOP P203-Laboratory Limits and Demonstration of Capability for MDL procedure.

13. CALIBRATION AND STANDARDIZATION

13.1 Tune and Performance Check of GC/MS

13.1.1 Prior to the analysis of calibration standards, tune GC/MS system using PFTBA (perfluorotributylamine).

13.1.2 Tune the mass axis and abundance scales such that the analyses of the instrument performance check solution (DFTPP) meet the criteria outlined in Table 2.

13.1.3 Retune the MS and reanalyze the DFTPP if the spectrum does not meet criteria.

13.1.4 Analyze the DFTPP solution every 12 hours to verify acceptable instrument performance.

13.1.5 Once an acceptable DFTPP has been acquired, instrument conditions must remain the same throughout the calibration and sample analyses.

13.1.6 Verify Benzidine and Pentachlorophenol peak tailing and the %DDT breakdown for column performance and injection port inertness.

13.1.7 All these checks must be done prior to the initial calibration analysis and the continuing calibration.

13.2 Initial Calibration

13.2.1 After the tuning criteria has been met, run an initial calibration at the following concentration levels: 5, 10, 20, 40, 50, 60 & 80 ug/mL for SCAN analysis and 0.1, 0.2, 0.4, 0.8, 1.6, 3.2, 5.0 ug/mL for SIM analysis (DOD & All other) including the second source initial calibration verification solution at 40ug/mL for scan analysis and 0.4ug/mL for SIM analysis. (Standard concentrations subject to change based on instrument/column sensitivity or saturation).

Note: Refer to Table 5 for SIM analysis.

- *A separate initial calibration is required for each instrument. If there are any major changes to the instrument (source cleaning, change of columns, etc.), perform a new calibration.*
- *System performance and calibration check criteria must be met prior to the analysis of any blanks, spikes or samples.*

13.2.2 Tabulate the area response of the characteristic ions against the concentration for each target analyte and each internal standard.

13.2.3 Verify the retention time for each calibration standard agrees within 0.06min.

13.2.4 Calculate relative response factors (RRF) for each target analyte relative to one of the internal standards.

13.2.5 The RRF is calculated as follows:

$$RF = \frac{A_s \times C_{is}}{A_{is} \times C_s}$$

Where:
A_s = Peak area of the analyte or surrogate
A_{is} = Peak area of the internal standard
C_s = Concentration of the analyte or surrogate
C_{is} = Concentration of the internal standard
CF = Area of Compound/Concentration in ppm

13.2.6 Calculate the %RSD for all target analytes from the initial calibration.

$$\%RSD = \frac{\text{Standard Deviation of CF}}{\text{Mean of CF}} \times 100$$

Where:
$$\text{Mean of CF} = \frac{\text{sum of CF}}{n}$$
n = number of calibration standards used

13.2.7 The %RSD should be less than or equal to 15% for each target analyte for Method 8270E DOD and less than or equal to 20% for each target analyte for Method 8270E & 8270E SIM. For DOD 8270E SIM Analysis, % RSD for each analyte should be ≤20%. If Pentachlorophenol is a target analyte, as RSD of ≤40% allowed.

13.2.8 If the %RSD of any target analyte meets criteria in Section 13.2.7, then the RRF is assumed to be constant over the calibration range, and the average response factor may be used for quantitation.

13.2.9 When the %RSD exceeds criteria, plot and visually inspect the calibration curve.

13.2.9.1 If the %RSD of the calibration or response factors is greater then required criteria, employ a regression equation.

13.2.9.2 Perform a linear or quadratic regression of the instrument response versus the concentration of the standards.

- Make certain that the instrument response is treated as the dependent variable (y) and the concentration as the independent variable (x).
- The regression will produce the slope and intercept terms for a linear equation in the form

$$y = ax + b,$$

Where $y = (A_s / A_{is})$ = Ratio of the response (peak area)

$x = (C_s / C_{is})$ = Ratio of concentration of the calibration standard
A_s = Peak response of analyte
A_{is} = Peak response of internal standard
C_s = Concentration of analyte
C_{is} = Concentration of internal standard
a = slope of the line (also called the coefficient of x)
b = intercept

- The use of linear regression may not be used as a rationale for reporting results below the calibration range demonstrated by the analysis of the standards.
- The regression calculation will generate a correlation coefficient(r) that is a measure of the "goodness of fit" of the regression line to the data.
- In order to be used for quantitative purposes, it must be greater or equal to 0.99.

13.2.10 Minimum RRF requirement for DOD SIM analysis surrogates is 0.40

13.2.11 Please review section 12.2.4 & 12.2.5 for special comment about Azobenzene and N-Nitrosodiphenylamine.

13.3 Continuing Calibration

13.3.1 Analyze a DFTPP. Make sure it meets criteria listed in Table 2.

13.3.2 Analyze continuing calibration check standard at midpoint concentration and compare it to the initial curve rather than running an entire initial calibration curve every 12 hours.

13.3.3 Calculate %D for all target analytes.

$$\%D = \frac{RRF_C - RRF_I}{RRF_I} \times 100$$

Where: RRF_C = Relative Response factor from continuing calibration
RRF_I = Mean Relative Response factor from initial calibration

13.3.4 If continuing calibration passes criteria listed in Section 18.3, proceed with analysis of blanks and samples.

13.3.5 Please review section 12.2.4 & 12.2.5 for special comment about Azobenzene and N-Nitrosodiphenylamine.

14. PROCEDURE

Note: At the beginning of each day, evaluate the instrument for potential problems, particularly around the injection port area.

- *Check the autosampler syringe for clogs or bends in the needle or the plunger.*
- *Check that the glass inlet liner is clean, and change the septum and O-ring.*

- *Depending upon the nature of the samples analyzed the previous day, clip a portion of the GC column. After re-assembly is complete, bake the system at 300º C for approximately 1/2 hour.*

14.1 Fill Run log with all of the required information.
14.1.1 Continue to fill out laboratory run log page as you perform this procedure.

14.2 Allow all standards to warm to ambient temperature prior to use.

14.3 Tune Performance Check of GC/MS
14.3.1 Tune the GC/MS system using PFTBA (perfluorotributylamine) to adjust the mass and abundance scales as desired for the analytical range of this method.
- Recommended: 69= 100%, 219 = 40%, and 502 = 1%.

14.3.2 Verify the tune by analyzing the instrument performance check solution (DFTPP).

14.3.3 The resulting spectra produced must meet the criteria outlined in Table 2.

Note: Convention for Data File Naming
- *Name data files according to the department name, than instrument and sequential file number.*
- *E.g., the subdirectory is named as: department name – instrument name – month – date – year.*
- *Directory is named as: department – instrument – month – date – injection number (01, 02, 03, etc.) BF041202 B is for BNA, F is for instrument.*
- *File name example BFXXXXXX.D*

14.3.4 Analyze the DFTPP (decafluorotriphenylphosphine) as follows:
- Click on the instrument icon.
- Click on Edit sequence to acquire next available data file and to run DFTPP
- Click on OK
- Click on run sequence
- Wait for instrument to complete run
-

14.3.5 The proceeding will inject a mixture of 50ng DFTPP, benzidine and pentachlorophenol and p-p'DDT onto the GC column.

14.3.6 Use the following temperature program for the instrument (subject to change):

Instrument Identifier	Initial Temp	Initial Hold	Rate °C/min	Final Temp	Final Hold	Injection Port Temp	Detector B Temp
BNA G	50°C	0.5 min.	10-160-0 15-260-0 20-310-12	310 °C	12 min.	250 °C	310 °C
BNA M	50°C	0.5 min	10-160-0 15-260-0 20-325-8	325 °C	8 min.	275 °C	320 °C
BNA N	50°C	0.5 min	10-160-0 15-260-0 20-325-8	325 °C	8 min.	275 °C	320 °C
BNA P	50°C	0.5 min	10-160-0 15-260-0 20-325-8	325 °C	8 min.	275 °C	320 °C
BNA E	50°C	0.5 min	10-160-0 15-260-0 20-325-8	325 °C	8 min.	275 °C	320 °C
BNA F	40°C	3.4 min.	25 °C/min.	320 °C	5 min.	275 °C	320 °C

Instrument Identifier	Head Pressure	Split Valve Purge Time	Septum Vent Flow	Split Vent Flow
BNA G	EPC	NA	NA	6 mL/min.
BNA M	EPC	NA	NA	6 mL/min.
BNA N	EPC	NA	NA	6 mL/min.
BNA P	EPC	NA	NA	6 mL/min.
BNA E	EPC	NA	NA	6 mL/min.
BNA F	EPC	NA	NA	Splitless

14.3.7 Use the MSD ChemStation software to acquire the spectrum of DFTPP in the following manner: Integrate m/z 198 (the major ion of DFTPP) to find the max scan or apex of the peak.

14.3.7.1 Average three scans; the max scan and the scans immediately before and after the max and subtract background less than 20 scans before the elution of DFTPP peak or perform Autofind DFTPP.

Note: If the spectrum does not meet criteria, the MS must be re-tuned and the DFTPP must be re- analyzed.

- *Analysis of the DFTPP solution to verify acceptable instrument performance must be done every 12 hours.*
- *Once an acceptable DFTPP has been acquired, instrumental conditions must remain the same throughout calibration and sample analysis.*
- *Analyze samples using a 12-hour sequence. The 12-hour period begins at the injection time of the DFTPP.*

- *DFTPP acceptance criteria must be met before any standards, samples, MS/MSD or blanks are analyzed.*

14.3.8 In addition, examine benzidine and pentachlorophenol for peak shape. If tailing is visible clip the column, replace inlet liner, replace septa and bake system for 1 hour and retest.

14.3.9 Calculate the %DDT breakdown before proceeding to the initial calibration.

14.4 Initial Calibration

14.4.1 After tuning criteria has been met, initially calibrate the GC/MS system at 7 concentration levels: 5, 10, 20, 40, 50, 60, 80µg/mL for SCAN analysis and 0.1, 0.2, 0.4, 0.8, 1.6, 3.2, 5.0 ug/mL for SIM analysis (DOD & All other) (concentrations subject to change based on instrument/column sensitivity or saturation).

14.4.2 Prepare the calibration standards by diluting the 100-µg/mL stock (10-µg/mL for SIM) as follows (subject to change) & prepare calibration verification standard by diluting the 100-ug/ml (10-µg/mL for SIM) stock with Methylene Chloride as follows (subject to change).

For 8270E calibration standard

Standard Name	Source (refer section 10.2)	Amount Of Stock	Preparation
5ppm Calibration Point	Calibration Stock Standard	50uL	Final volume 1000uL
10ppm Calibration Point	Calibration Stock Standard	100uL	Final volume 1000uL
20ppm Calibration Point	Calibration Stock Standard	200uL	Final volume 1000uL
40ppm Calibration Point	Calibration Stock Standard	400uL	Final volume 1000uL
50ppm Calibration Point	Calibration Stock Standard	500uL	Final volume 1000uL
60ppm Calibration Point	Calibration Stock Standard	600uL	Final volume 1000uL
80ppm Calibration Point	Calibration Stock Standard	800uL	Final volume 1000uL
40ppm Calibration Verification Standard	Second Source Calibration Stock Standard	400uL	Final volume 1000uL

For 8270E-SIM calibration standard

Standard Name	Source (refer section 10.2)	Amount Of Stock	Preparation
0.1ppm Calibration Point	0.4ppm Calibration Point	0.250uL	Final volume 1000uL
0.2ppm Calibration Point	0.4ppm Calibration Point	0.500uL	Final volume 1000uL
0.4ppm Calibration Point	SIM Calibration Stock Standard	0.040uL	Final volume 1000uL
0.8ppm Calibration Point	SIM Calibration Stock Standard	0.080uL	Final volume 1000uL
1.6ppm Calibration Point	SIM Calibration Stock Standard	0.160uL	Final volume 1000uL
3.2ppm Calibration Point	SIM Calibration Stock Standard	0.320uL	Final volume 1000uL
5.0ppm Calibration Point	SIM Calibration Stock Standard	0.500uL	Final volume 1000uL
0.4ppm Calibration Verification Standard	Second Source SIM Calibration Stock Standard	0.125uL	Final volume 1000uL

14.4.3 Add 10uL (for SCAN analysis) of internal standard (2000ug/mL) and 10uL (for SIM analysis) of Internal Standard (40ug/mL) to each 1mL calibration standard, so that a 1uL injection of the calibration standard onto the GC column will yield 20ng of internal standard for SCAN analysis and 0.4ng of internal standard for SIM analysis.

14.4.4 Analyze the standards, blanks, and samples under the following instrumental conditions:

14.4.4.1 Inject 2 µL or 1uL of each extract onto the column using the splitless injection mode.

- Click on the instrument icon.
- Click on Edit sequence to run the curve
- Click on OK
- Click on run sequence
- Wait for instrument to complete the run

14.4.4.2 Temperature program and GC parameters as follows (subject to change)

Instrument Identifier	Initial Temp	Initial Hold	Rate °C/min	Final Temp	Final Hold	Injection Port Temp	Detector B Temp
BNA G	50°C	0.5 min.	10-160-0 15-260-0 20-310-12	310 °C	12 min.	275 °C	320 °C
BNA M	50°C	0.5 min	10-160-0 15-260-0 20-325-8	325 °C	8 min.	275 °C	320 °C
BNA N	50°C	0.5 min	10-160-0 15-260-0 20-325-8	325 °C	8 min.	275 °C	320 °C
BNA P	50°C	0.5 min	10-160-0 15-260-0 20-325-8	325 °C	8 min.	275 °C	320 °C
BNA E	50°C	0.5 min	10-160-0 15-260-0 20-325-8	325 °C	8 min.	275 °C	320 °C
BNA F	40°C	3.4 min.	25 °C/min.	320 °C	5 min.	275 °C	320 °C

Note: Initially the final hold is set at 12 minutes and the rate at 13 °C/minute. As the column is used and a portion is clipped off during daily maintenance, the final temperature and rate is decreased so that compound separation can continue to be achieved. Benzo(b) and Benzo(k)fluoranthene being the two most difficult to separate. Make sure some separation is evident. The initial rate must not be set to below 8 °C/minute. The final hold must not be set below 1minute.

Instrument Identifier	Head Pressure	Split Valve Purge Time	Septum Vent Flow	Split Vent Flow
BNA G	EPC	NA	NA	6 mL/min.
BNA M	EPC	NA	NA	6 mL/min.
BNA N	EPC	NA	NA	6 mL/min.
BNA P	EPC	NA	NA	6 mL/min.
BNA E	EPC	NA	NA	6 mL/min.
BNA F	EPC	NA	NA	Splitless

Note: The GC column separates the analytes that are then detected by the mass spectrometer detector.

14.4.5 Acquire data for each of the calibration standards.
- 14.4.5.1 Compare the data using a METHOD FILE set up for the target compounds, containing expected retention times, and ion ratios for each analyte.
- 14.4.5.2 A quant ion and one or two secondary ions have been chosen (Table 3) for each analyte and make up a characteristic ratio used to identify each compound.
- 14.4.5.3 The quant ion for each compound is integrated and these areas are used to generate RRFs.

14.4.6 Create a calibration file inside the METHOD from the data points run for the initial curve.
- 14.4.6.1 The METHOD shows a RRF for each analyte at each concentration level.
- 14.4.6.2 The average RRF, the relative retention time (each analytes distance from the internal standard), and the Relative Standard Deviation (RSD) are calculated.
- 14.4.6.3 Reanalyze any data point that appears drastically different from the others.

14.4.7 Monitor internal standard areas and retention times from initial calibration.

14.4.8 Once a valid initial curve is run, proceed with the analysis of blanks, spikes and samples if there is time remaining in the 12-hour period.
- 14.4.8.1 Update the average response factors from the curve into the METHOD and they will be used for quantitation for all blanks and samples that follow. See section 13.3.
- 14.4.8.2 If there is no time remaining, begin a new 12-hour sequence with the analysis of a DFTPP.
- 14.4.8.3 If the DFTPP passes criteria, analyze a continuing calibration check standard.

14.5 Continuing Calibration

14.5.1 Analyze a DFTPP.

14.5.2 If the DFTPP passes criteria (see section 13.1 and Table 2), analyze a continuing calibration check standard.

14.5.3 If the continuing calibration meets criteria, proceed with the analysis of blanks and samples.
- In this case, update the retention times from the continuing calibration check standard into the METHOD, but not the responses. Continue to use the initial calibration for all quantitation.

14.5.4 If continuing calibration does not meet criteria, then perform instrument maintenance, reanalyze the continuing calibration standard. If reanalysis of the continuing calibration does not meet criteria, analysis must stop and a new DFTPP and initial calibration must be run for DOD method.

14.5.5 A continuing calibration must be performed every twelve hours at the levels specified in the analytical sequence section 14.9.

14.5.5.1 The extracted ion current profile (area of the quantitation ion) must not change by more than 2 times (2X) from the mid-point of the initial calibration and less than half (0.5X) from the mid-point of the initial calibration.

14.5.5.2 The retention time for any internal standard must not change by more than 0.50 minutes.

14.5.5.3 Should either of these two items be out of limits, the GC/MS system must be inspected for potential problems and corrections made as needed.

14.6 Sample and Method Blank Analysis or Instrument Blank Analysis

14.6.1 Following successful calibration of the GC/MS system, analyze sample, spikes and method blank extracts. The same instrument conditions must be employed for sample analysis as were used for calibration.

14.6.2 Add 10uL (for SCAN analysis) of 2000ug/mL internal standard and 10uL (for SIM analysis) of 40ug/mL internal standard solution into each 1.0-mL blank, sample, and spike.

14.6.3 Shake each extract briefly to mix in the internal standard.

14.6.4 Inject 2uL or 1uL of each extract onto the GC column.

14.6.4.1 The GC column separates the semivolatile compounds that are then detected with the mass spectrometer.

14.6.4.2 If any target analytes are detected at a concentration above the highest calibration standard, a dilution is required.

14.6.4.3 Additional internal standard must be added to the diluted extract to maintain a concentration of 20ng/uL in the extract for SCAN analysis and 0.4ug/mL in the extract for SIM analysis.

14.6.5 Run samples until the 12 hour clock is up since the injection of the latest DFTPP.

- Click on the instrument icon.
- Click on Edit sequence to acquire next available data file and to run DFTPP
- Click on OK
- Click on run sequence

Note: Sequence will run for 12 hours. After 12 hours follow the instructions given below if we are not running second sequence.

14.6.6 Cool off the instrument.

- Replace the septum and inlet liner.
- Clip off 2-3 inches of the column.
- Reinstall the column and heat oven to 300ºC for 30 minutes. Start with new 12-hour sequence.

14.7 Dilutions Analysis for Samples

14.7.1 Water Samples

Note: Samples require dilution when:

- *Target compounds are over the linear range of instrument*
- *"Loaded" to the point where chromatographic overload does not allow for the identification of internal standards/surrogates, target and non-target peaks.*
- *Sample extracts that require dilution are handled in the following manner and re-acquired under a valid calibration.*
- *The dilution factor should get the largest analyte peak in the upper half of the initial calibration range.*

14.7.1.1 Label a new injection vial with the sample information as the undiluted sample extract including the dilution factor used.

14.7.1.2 Label two 40 mL VOA vials one as clean methylene chloride and one as waste methylene chloride.

- Fill one vial with clean methylene chloride and add required amount of internal standard so that it will maintain the 20ug/mL concentration for SCAN analysis, and 0.4ug/mL concentration for SIM analysis.
- For example: For 1mL clean Methylene Chloride, add 10uL of Internal Standard solution.

14.7.1.3 For a 10x dilution to be performed on a 1.0-mL extract use a 1000 µL syringe.

14.7.1.4 Rinse it well with methylene chloride pulling clean methylene chloride into the syringe and dispensing it into the waste vial.

- Do this three times at the beginning and in between each dilution.

14.7.1.5 Withdraw 900 µL from the clean methylene chloride vial and put it into the injector vial.

14.7.1.6 Withdraw 100 µL from the sample extract and put it into the injector vial.

14.7.1.7 Cap the vial.

14.7.1.8 For other dilutions follow the table below: (Prepare clean Methylene Chloride and add required amount of internal standard to maintain 20ug/mL concentration of internal standard for SCAN and 0.4ug/mL concentration for SIM analysis)

Dilution	µL of clean methylene chloride with Internal Standard	µL of Sample Extract
2x	500	500
5x	800	200
10x	900	100
20x	950	50
50x	980	20
100x	990	10

14.7.2 Soil Samples

14.7.2.1 Label a new injection vial with the sample information as the undiluted sample extract including the dilution factor used.

14.7.2.2 Label two 40 mL VOA vials one as clean methylene chloride and one as waste methylene chloride.

- Fill one vial with clean methylene chloride and add required amount of internal standard to maintain 20ug/mL concentration of internal standard for SCAN analysis and 0.4ug/mL concentration for SIM analysis.
- For example: Add 10uL internal standard solution to 1mL clean Methylene Chloride

14.7.2.3 For a 10x dilution to be performed on a 0.5-mL extract use a 1000 µL syringe.

14.7.2.4 Rinse it well with methylene chloride pulling clean methylene chloride into the syringe and dispensing it into the waste vial.

- Do this three times at the beginning and in between each dilution.

14.7.2.5 Withdraw 450 µL from the clean methylene chloride vial and put it into the injector vial.

14.7.2.6 Withdraw 50 µL from the sample extract and put it into the injector vial

14.7.2.7 Cap the vial.

14.7.2.8 For other dilutions follow the table below: (Prepare clean Methylene Chloride and add the required amount of internal standard solution to maintain 20ug/mL concentration for SCAN and 0.4ug/mL concentration for SIM analysis. For example: Add 10uL internal standard solution to 1mL Methylene Chloride)

Dilution	µL of clean methylene chloride with Internal Standard	µL of sample extract
2x	250	250
5x	400	100
10x	450	50
20x	475	25

14.8 Matrix Spike/Matrix Spike Duplicate

14.8.1 With each group of samples analyzed as a batch, analyze a blank spike matrix spike and matrix spike duplicate.

14.8.2 The purpose of these matrix spikes is to determine whether the sample matrix contributes to the analytical results.

14.8.3 Spike a representative sample with all of the compounds being analyzed for at a concentration of 50ug/L for water and 1670ug/Kg for soil. 1.0mL of a 50ug/mL solution is used by the extractions department. See SOP M3510C, 3580A, 3541-Extraction SVOA

14.8.4 Calculate the % recovery and relative % difference (RPD) between the recoveries and ensure that they meet the criteria.

14.8.5 To calculate spike recovery (%R):

$$\%R = \frac{SSR-SR}{SA} \times 100$$

Where: SSR = spiked sample result
SR = sample result
SA = spike added

14.8.6 To calculate relative percent difference (RPD) for the Matrix Spike/ Matrix Spike Duplicate:

$$\%\ RPD = \frac{MSR-MSDR}{½(MSR + MSDR)} \times 100$$

Where: MSR = matrix spike recovery
MSDR = matrix spike duplicate recovery

14.8.7 Field or trip blanks may not be used for MS/MSD purposes.

14.9 Analytical Sequence (For SCAN analysis) (Analytical Sequence for SIM analysis remains same except for the concentration of the Initial calibration standards and Continuing calibration standard)

Initial Analytical Run	Continuous Analytical
• DFTPP	• DFTPP
• SSTDICC005 (5ppm)	• SSTDCCC040 (40ppm)
• SSTDICC010 (10ppm)	• MB(Method Blank)* or IB(Instrument Blank)
• SSTDICC020 (20ppm)	• LCS (Blank Spike)*
• SSTDICCC040 (40ppm)	• MS (Matrix Spike)*
• SSTDICC050 (50ppm)	• MSD(Matrix Spike Duplicate)*
• SSTDICC060 (60ppm)	• Samples
• SSTDICC080 (80ppm)	
• SSTDICV040 (40ppm) Initial Calibration verification Standard (Second Source)	
• MB(Method Blank)* or IB(Instrument Blank)	
• LCS (Blank Spike)*	
• MS (Matrix Spike)*	
• MSD(Matrix Spike Duplicate)*	
• Samples	

* These are Extraction QC samples and do not run with every 12-hour sequence. QC samples are run only once.

14.10 Manual Integration

Note: At times manual integration will be necessary due to incomplete or incorrect integration by the automated analytical system. This normally occurs when there is matrix interference, baseline noise or compound co-elution.

- *Manual integration cannot be used in order to solely satisfy Quality Control Criteria. It should also not be used as a substitute for corrective action on the chromatographic system. All manual integrations should be noted in the case narrative.*

14.10.1 Integrate the area of the quantitation ion of the compound of interest.
14.10.2 Do not include baseline background noise, and include only the area between where the beginning and end of the peak intersects with the baseline.
14.10.3 Integrate the compound in the sample any time it is integrated in the calibration standard.
14.10.4 Flag the compound with an "m" in the hardcopy (quantitation report) when a manual integration is performed.
14.10.5 Print out the EICP for all compounds that have been manually integrated.
14.10.6 Document the reason for the manual integrations.

14.11 Data Interpretation

14.11.1 Summary

14.11.1.1 Maintain all GC and mass spectral data generated with each run of the instrument within a data file.
14.11.1.2 Store data files on the computer hard drive, and archive on magnetic tapes for retrieval as needed once the hard drive has been cleared.
14.11.1.3 For quantitation, send data files through MSD Chemstation, where the computer compares known information about target compounds to what is present in each data file.
14.11.1.4 Information contained in the Method used by the program MSD Chemstation includes:
- The relative retention time of each analyte.
- The ion to be used for quantitation and one or two secondary ions that are characteristic to each compound (Table 3).
- The response factor for each analyte to be used in determining the concentration.

14.11.1.5 Method Files are updated at least daily, with newly generated response factors and retention times, whether from an initial or continuing calibration.

14.11.2 Procedure MSD Chemstation

*Naming Methods: Department name, instrument name, month, date, and prefix/suffix e.g. 'SOM-EPA' for CLP method as **SOM-EPA**-BM041320.M, '8270' for 8270 method as **8270**-BM041320**.**M)*

Create a default method. For example, 8270.M which is a default method for Method 8270. Then save the new method with name 8270-BM041320.M.

14.11.3 Data Interpretation for MSD Chemstation

14.11.3.1 Examine spectra for all possible "hits" or matches made to target compounds are printed out and examined by an analyst trained in the interpretation of mass spectra.

14.11.3.2 Generate a reference spectrum for each analyte by running known standards.

14.11.3.3 Compare this reference spectrum and the spectrum of the peak found in the sample.

14.11.3.4 The criteria required for positive identification of an analyte are as follows:

- The analyte in the sample must elute at the same relative retention time as in the daily calibration standard (±0.10 RRT units).
- All ions present in the reference spectrum >10% of the largest ion must be found in the sample spectrum.
- The ratio of the ions found in the sample must agree within ±20% of the ions found in the reference spectrum.
- Ions >10% in the sample spectrum but not found in the reference spectrum must be accounted for.

14.11.3.5 Quantitative analysis is done once a target compound is identified by the internal standard method using the equations below. The relative response factor from the continuing calibration standard is used to calculate the concentration of the sample.

14.11.3.6 "Qdel" each data file.

- Use this program to remove the false computer hits from the quant report.

14.11.3.7 If there are interferences to the quant ion caused by either high background or co-eluting compounds with similar ions, use a secondary ion for quantitation.

- A list of the target analytes and their primary and secondary ions is found in Table 3.

14.11.3.8 Perform a library search on all blanks and samples in order to identify non-target compounds.

14.11.3.9 Send each sample and blank to the library search program using the pull down menus in Enviroquant for each data file.

14.11.3.10 Compare all non-target peaks, using total ion areas, to the nearest internal standard and concentrations are calculated using a response factor of 1.

14.11.3.11 Do not include the following:

- Non-targets with responses less than 10% of the nearest internal standard,
- Non-targets which elute prior to 30 seconds before the first semivolatile target compounds or later than 3 minutes after the last target compounds.
- Compounds that appear on the volatile target compound list.
- Include a summary of name and concentration in the sample in the case narrative.
- Also provide the library search information for each peak.

14.11.3.12 Search and report peaks that are suspected to be aldol condensation products (4-methyl-4-hydroxy-2-pentanone and 4-methyl-3-pentene-2-one) and flag with an "A" on Form I TIC.

- Count these peaks as part of the 30 largest non-target peaks.

14.11.3.14 The computer software provides a mass spectral library of compounds for comparison to unknown compounds found in samples. Criteria for making tentative identifications are as follows:

- Ions greater than 10% of the largest ion in the reference spectrum must be present in the sample spectrum.
- The relative intensities of major ions should agree within 20%.
- Molecular ions present in the reference spectrum must be present in the sample spectrum.
- Ions present in the sample spectrum but not in the reference spectrum should be examined for possible background contamination or presence of co-eluting compounds.
- Ions present in the reference spectrum but not in the sample spectrum should be verified by performing manual background subtraction to remove interference.

14.11.3.15 If after review, the analyst is at a loss to identify the compound use the following method:

- If the computers match probability is 85% or greater report that compound.
- If the computer match probability is <85%, try to classify the compound and give it a name like “unknown chlorinated hydrocarbon” if it can be determined.

14.11.3.16 Display (graphically) and inspect whenever there is a reason to suspect that the GC/MS data system has misquantified a particular compound due to poor baseline definition or perpendicular placement.

- This type of problem is most likely to occur in "dirty" samples that have many poorly resolved peaks.
- Redraw baseline &/or perpendicular to give the correct area for the compound if it is determined that a compound has been misquantified.
- Recalculate the concentration of that compound calculated using the new area and the current response factor for that compound.
- Flag the corrected area with a "M" (for manual integration) on the quant report.

14.11.3.17 Use Table 4 to determine which internal standard is used to "QUANT" each of the target compounds.

14.12 Documentation Requirement

14.12.1 Label the sample Chromatograms with the following information:

- Date and time of injection
- Identified compound names

14.12.2 Make sure that the extraction logs contain:

14.12.3 Extraction logs must contain:

- Sample ID numbers in the batch
- Date extracted and date concentrated
- Analyst and supervisor initials
- Surrogate lot number and concentration
- Spiking solution lot number and concentration
- Reagent lot number and concentration
- Type of extraction performed (sonication, continuous, separatory funnel or waste dilution)
- Sample weight\volume
- Final extract volume
- Any comments by analyst
- Signature for receipt of extracts in the BNA Department from the Extractions Department
- Prep Batch Number.

14.12.4 Assure that GC Instrument log contains the following:

- CHEMTECH sample ID
- Dilution details
- All standards, samples, blanks, etc., run on the instrument in the order they were analyzed
- Computer data file number, each column

14.13 Instrument Maintenance

14.13.1 Instrument Preventative Maintenance

14.13.1.1 Daily maintenance and repair log is saved electronically for each instrument.

14.13.2 Daily

14.13.2.1 Change the septum and inlet liner, clip off column as per the requirement.

14.13.3 Monthly

14.13.3.1 Dust around instrument and instrument surfaces to reduce airborne particles.

14.13.3.2 Check all fans and clean to remove dust from filter.

14.13.3.3 Remove syringe, clean, reinstall or replace.

14.13.4 Every 6 Months

14.13.4.1 Replace roughing pump oil.

14.13.4.2 Replace forline trap absorbent.

14.13.4.3 Lubricate turbo pump.

14.13.5 Yearly

14.13.5.1 Renew chemical filter.

14.13.5.2 Clean injection port.

14.13.6 As Needed

14.13.6.1 Clean source.

14.13.6.2 Change column.

15. CALCULATIONS

Quantitative analysis is done once a target compound is identified by the internal standard method using the equations below. The relative response factor from the initial calibration standard is used to calculate the concentration of the sample.

15.1 Water Calculation (concentration in ug/L) =

$$\frac{(A_x)(I_s))(V_t)\ (Df)}{(A_{is})\ (RRF)(V_0)\ (V_i)}$$

Where, A_x = Area for the compound to be measured
A_{is} = Area for the specific internal standard
I_s = Amount of internal standard added in nanograms (ng)
RRF = Relative response factor of initial calibration standard average.
V_o = Volume of water extracted in milliliters (mL)
V_i = Volume of extract injected in microliters (uL)
V_t = Volume of concentrated extract in microliters (uL)
Df = Dilution factor

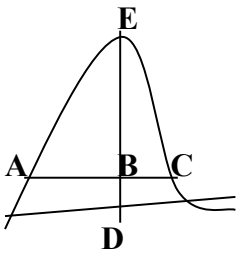
15.2 Soil/Sediment Calculation (Concentration in ug/Kg dry weight basis) =

$$\frac{(A_x)(I_s))(V_t)\ (Df)}{(A_{is})\ (RRF)(W_s)\ (V_i)\ (D)}$$

Where, A_x = Area for the compound to be measured
A_{is} = Area for the specific internal standard
I_s = Amount of internal standard added in nanograms (ng)
RRF = Relative response factor of initial calibration standard average
V_i = Volume of extract injected in microliters (uL)
V_t = Volume of concentrated extract in microliters (uL)
W_s = Weight of sample extracted in grams (g)
Df = Dilution factor
D = $\frac{100 - \%moisture}{100}$

15.3 % breakdown of DDT= $\frac{\text{sum of peak areas of (DDD + DDE) X 100}}{\text{sum of all peak areas of (DDD+DDE+DDT)}}$

15.4 %Tailing= BC/AB (Enviroquant software calculated)



Where: AB = 1/2 the width of the peak at 10% from the start of the peak
BC = the width of the peak at 10% the peak height from the center of the peak to the end of the of the peak
BD = %10 of the peak height
DE = the peak height

16. METHOD PERFORMANCE

16.1 Each analyst will demonstrate the ability to generate acceptable accuracy and precision with this method.

17. POLLUTION PREVENTION

17.1 Use only the amounts of chemicals required. Do not make large quantities of solutions.
17.2 Use hood when working with solvents.
17.3 Keep the area clean and clutter free in the extraction lab and around the instruments in order to avoid any mishaps.
17.4 Trap septum vent and split vent on GC.
17.5 Keep chemicals away from drains.
17.6 Properly collect and dispose of waste according to Chemtech's Waste Disposal SOP.

17.7 Laboratory is properly equipped with spill cleanup equipment and laboratory personnel trained. Depending upon the size and type of spill, it may be handled by the individual or department creating the spill or by specially trained personnel.

17.8 Small spills may occur routinely and shall be handled by the individual person or department creating the spill. Spill kits are stored in a blue basket or blue cover bin located in each laboratory and chemical storage area. The spill kits can handle water based, solvent and mercury spills. Specially trained personnel handle larger spills, which may pose a threat to health or environment involves a large volume not easily contained.

17.9 A detailed description of the procedure for handling a spill or accident is covered in the CHEMTECH Emergency and Contingency Plan.

17.10 The Safety Coordinator is responsible for implementing the Chemical Hygiene and the CHEMTECH Emergency and Contingency Plans. It is the responsibility of various company personnel to assist in implementing the different aspects of the Plan. These include: Laboratory Coordinator, Technical Director, Operations Manager, Department Managers and Supervisors

18. DATA ASSESSMENT AND ACCEPTANCE CRITERIA FOR QC

18.1 DFTPP

18.1.1 Resulting spectrum must meet all the QC criteria in Table 2. If criteria are not met, then retune the Mass Spectrometer and reanalyze DFTPP.

18.2 Initial Calibration

18.2.1 The RSD must be ≤15% for each target analyte for Method 8270E DOD and ≤20% for each target analyte for Method 8270E.

18.2.2 Any extra compounds requested by client must meet the 30% RSD criterion.

18.2.3 For DoD SIM Analysis, % RSD for each analyte should be ≤20%. If Pentachlorophenol is a target analyte, as RSD of ≤40% allowed.

18.3 Continuing Calibration

18.3.2 The %D for each compound must be ≤20% for 8270E, DOD & DOD SIM Analysis. For DOD Scan and SIM Analysis, %D for each compound in the End Calibration Check standard must be ≤50%.

18.3.3 For the extra targeted compounds the %D must be ≤20.

18.4 Method Blank or Instrument Blank

18.4.1 The method blank must contain target compounds ½<RL for all target compounds.

18.4.2 For DoD work – No analytes detected > ½ LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater, except for common laboratory contaminants that should not be detected at ≥RL.

18.5 Surrogate Recoveries

18.5.1 Surrogate recovery limits must be within the limits specified for each matrix.

18.5.2 All surrogates must be greater than 10%.

18.6 Matrix Spike Recoveries and LCS

18.6.1 MS/MSD limits are generated in-house using control charts.

18.6.2 For **DOD** work - compare the % recovery to the DOD QSM requirements in Appendix C unless client specific criteria are required.

18.7 Internal Standards

18.7.1 Monitor all samples, blanks, and spikes for retention time shift and fluctuation of extracted ion areas.

18.7.2 The internal standard retention time must be within ±30 seconds from the retention time of the midpoint standard in the ICAL for DOD work. For all other work internal standard retention time must be within ±30 seconds from the daily initial CCV is used.

18.7.3 The EICP area must be within 50% to 200% of the ICAL midpoint standard for DOD Work. For all other work the EICP area must be within 50% to 200% of the ICAL midpoint standard or daily CCV standard.

18.7.4 Refer to Table 4 for internal standards and their associated target compounds used for quantitation. Retention for CCC, Samples & QC is evaluated using the mid-point of ICAL. Retention is not updated using the CCV check sample.

18.8 Initial Calibration Verification

18.8.1 The ICV standard recoveries must be within 70-130% range.

18.8.2 For DoD work – All analytes must be within ±20% of the expected value (initial source).

18.9 Limit of Detection

18.9.1 All analytes spiked should be positively identified.

18.10 Limit of Quantitation

18.10.1 Analysis must meet the acceptance criteria for the laboratory control sample.

19. CORRECTIVE ACTIONS FOR OUT-OF-CONTROL DATA

19.1 DFTPP

19.1.1 If tailing is visible clip the column, replace inlet liner, replace septa and bake system for 1 hour and retest the DFTPP tune.

19.1.2 If the %DDT breakdown exceeds criteria, replace inlet liner, replace septa and bake system for 1 hour and retest.

19.1.3 If the tune criteria are not met reanalyze the DFTPP after retuning the Mass Spectrometer.

19.1.4 If it still fails, clean the source.

19.2 Initial Calibration

19.2.1 If the QC criterion is not met for any analyte, take corrective action prior to sample analysis.

19.2.2 If the problem cannot be corrected, generate a new five/six point calibration.

19.3 Continuing Calibration

19.3.1 If the criteria for continuing calibration are not met, rerun the continuing calibration after appropriate instrument maintenance.

19.3.2 If the continuing calibration fails again follow the steps given in Section 19.2.

19.4 Method Blank or Instrument Blank
- 19.4.1 Reanalyze the method blank or Instrument Blank
- 19.4.2 For Instrument Blank, if it still fails then correct the problem with the analytical system and start the analytical sequence from DFTPP.
- 19.4.3 For Method Blank, if it still fails to meet criteria, then re-extract the method blank and all associated samples.
- 19.4.4 If there is not enough sample volume to re-extract, then mention in the case narrative/non-conformance.
- 19.4.5 For DoD work – Reprocess the failing blank with the associated samples in a subsequent preparation batch, except when the sample analysis results in a non-detect.

19.5 Surrogate Recoveries
- 19.5.1 If a sample falls outside QC limits from each group, re-extract and reanalyze the sample to confirm matrix interference or laboratory error.
- 19.5.2 If the second injection is acceptable, report only the second set of data.
- 19.5.3 If the second injection also fails, report both sets of data.
- 19.5.4 If surrogate recoveries in the method blank do not meet criteria, re-extract all samples associated with that blank.
- 19.5.6 For DOD SIM Analysis Surrogates, 50%-150% limit can be used until in-house limits are established.

19.6 Matrix Spike and Matrix Spike Duplicate and LCS
- 19.6.1 If any MS/MSD compound data is out of control limits verify LCS results are all within limits and consider it matrix interference.
- 19.6.2 If MS/MSD recoveries do not meet criteria, no further corrective action is taken. Note the failures in the case narrative.
- 19.6.3 If LCS recoveries do not meet criteria, then rerun the LCS. If the LCS recoveries still do not meet criteria, re-extract and rerun the entire batch of samples. For DOD work, if it is not possible to re-extract the entire batch of samples and the associated QC, then Q flag must be applied to the specific failing analyte in all samples results in the associated preparation batch.

19.7 Internal Standards
- 19.7.1 If any sample fails to meet criteria, re-analyze the sample.
- 19.7.2 If the reanalysis is within limits, then report only the second set of data.
- 19.7.3 If the re-analysis also fails, report both sets of data.

19.8 Initial Calibration Verification
- 19.8.1 Reanalyze the Initial Calibration Curve if the ICV does not meet criteria.

19.9 Limit of Detection
- 19.9.1 If LOD verification fails, then repeat the detection limit determination and LOD verification at a higher concentration and set the LOD at the higher concentration.

19.10 Limit of Quantitation
- 19.10.1 Reevaluate the LOD and the LOQ.

20. CONTINGENCIES FOR HANDLING OUT-OF-CONTROL OR UNACCEPTABLE DATA

20.1 Issue a corrective action form any time there is a deviation from the SOP or the client requirements are not met.

20.2 If a sample is damaged, broken, or spilled, contact the project manager and issue a corrective action.

20.3 Following are the result qualifiers used for out-of-control and unacceptable data:

- **U**: Indicates the compound was analyzed but not detected.
- **J**: Indicates an estimated value, the result reported is below the initial calibrations lowest point.
- **B**: Indicates the analytes were found in the blank as well as the sample.
- **E**: Indicates the analyte concentrate exceeds the calibrated range of the GC instrument.
- **D**: Indicates all compounds identified in an analysis at a secondary dilution factor.
- **N**: Indicates presumptive evidence of a compound. This is used for all non-target results where an identification is made.

21. WASTE MANAGEMENT

21.1 Keep samples for 40 days after analysis and dispose of them according to the procedures explained in the SOP for waste disposal.

22. REFERENCES

22.1 USEPA Test Methods for Evaluating Solid Wastes, SW-846, Method 8000B – Determinative Chromatographic Separations. Revision 2, December 1996

22.2 USEPA Test Methods for Evaluating Solid Wastes, SW-846, Method 8000C – Revision 3, March 2003.

22.3 Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), Method 8270D. Test Methods for Evaluating Solid Waste, SW-846, Revision 4, February 2007.

22.4 Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), Method 8270E Revision 6, June 2018.

22.5 Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.3, September 2019.

23. LIST OF TABLES/ATTACHMENTS

Table 1 Target Compounds
Table 2 DFTPP Key Ions and Ion Abundance Criteria
Table 3 Characteristic Ions for Semivolatile Target Compounds, Surrogates and Internal Standards
Table 4 Internal Standards Used for Quantitation
Table 5 SIM analysis Quantitation Ions and Groups

Table 1
Target Compound List

Compound	Compound	Compound
1,1-Biphenyl	Azobenzene **	Pentachlorophenol
1,2,4-Trichlorobenzene	Benzidine	Phenanthrene
1,2-Dichlorobenzene	Benzo(a)anthracene	Phenol
1,3-Dichlorobenzene	Benzo(a)pyrene	Pyridine
1,4-Dichlorobenzene	Benzo(b)fluoranthene	Pyrene
2,2-oxybis(1-Chloropropane)	Benzo(g,h,i)perylene	2,3,4,6-Tetrachlorophenol
2,4,5-Trichlorophenol	Benzo(k)fluoranthene	1,2,4,5-Tetrachlorobenzene
2,4,6-Trichlorophenol	Benzoic acid	1,4-Dioxane
2,4-Dichlorophenol	Benzyl Alcohol	
2,4-Dimethylphenol	Benzaldehyde	
2,4-Dinitrophenol	bis(2-Chloroethoxy)methane	
2,4-Dinitrotoluene	bis(2-Chloroethyl)ether	
2,6-Dinitrotoluene	bis(2-Ethylhexyl)phthalate	
2-Chloronaphthalene	Butylbenzylphthalate	
2-Chlorophenol	Caprolactam	
1-Methylnaphthalene	Carbazole	
2-Methylnaphthalene	Chrysene	
2-Methylphenol	Dibenz(a,h)anthracene	
2-Nitroaniline	Dibenzofuran	
2-Nitrophenol	Diethylphthalate	
3,3-Dichlorobenzidine	Dimethylphthalate	
3+4-Methylphenols	Di-n-butylphthalate	
3-Nitroaniline	Di-n-octyl phthalate	
4,6-Dinitro-2-methylphenol	Fluoranthene	
4-Bromophenyl-phenylether	Fluorene	
4-Chloro-3-methylphenol	Hexachlorobenzene	
4-Chloroaniline	Hexachlorobutadiene	
4-Chlorophenyl-phenylether	Hexachlorocyclopentadiene	
4-Nitroaniline	Hexachloroethane	
4-Nitrophenol	Indeno(1,2,3-cd)pyrene	
Acenaphthene	Isophorone	
Acenaphthylene	Naphthalene	
Acetophenone	Nitrobenzene	
Anthracene	n-Nitrosodimethylamine	
Atrazine	N-Nitroso-di-n-propylamine	
Aniline	N-Nitrosodiphenylamine**	

** Please review Section 12.2.4 & 12.2.5 for special comment about Azobenzene and N- Nitrosodiphenylamine

Table 2

DFTPP QC Criteria for Method 8270E

Mass	Ion Abundance Criteria
68	<2% of mass 69
69	Present
70	<2% of mass 69
197	<2% of mass 198
198	Base peak, present
199	5-9% of mass 198
365	>1% of mass 198
441	<150% of mass 443
442	Base Peak or Present
443	15-24% of mass 442
% DDT Breakdown	<20%
Benzidine and Pentachlorophenol peak tailing	<2

Table 3
Characteristic Ions for Semivolatile Target Compounds and Surrogates

Parameter	Primary Ion	Secondary Ion(s)
N-Nitrosodimethylamine	42	74, 44
1,4-Dioxane	88	58, 43
Benzaldehyde	77	105, 106
Phenol	94	65, 66
bis(2-Chloroethyl)ether	93	63, 95
2-Chlorophenol	128	64, 130
1,3-Dichlorobenzene	146	148, 111
1,4-Dichlorobenzene	146	148, 111
1,2-Dichlorobenzene	146	148, 111
2-Methylphenol	107	108, 77, 79, 90
Benzyl Alcohol	79	108, 77
2,2'-oxybis(1-Chloropropane)	45	77, 121
4-Methylphenol	107	108, 77, 79, 90
N-Nitroso-di-n-propylamine	70	42, 101, 130
Hexachloroethane	117	201, 199
Acetophenone	105	71, 51, 120
Nitrobenzene	77	123, 65
Isophorone	82	95, 138
2-Nitrophenol	139	65, 109
2,4-Dimethylphenol	122	121, 107
bis(2-Chloroethoxy)methane	93	95, 123
2,4-Dichlorophenol	162	164, 98
1,2,4-Trichlorobenzene	180	182, 145
Naphthalene	128	129, 127
Benzoic Acid	122	105, 77
4-Chloroaniline	127	129, 65, 92
Hexachlorobutadiene	225	223, 227
Caprolactam	113	55, 56
4-Chloro-3-methylphenol	107	144, 142
1-Methylnaphthalene	142	141
2-Methylnaphthalene	142	141
1,2,4,5-Tetrachlorobenzene	216	214, 179, 108
Hexachlorocyclopentadiene	237	235, 272
2,4,6-Trichlorophenol	196	198, 200
2,4,5-Trichlorophenol	196	198, 97, 132, 99
1,1'-Biphenyl	154	153, 76
2-Chloronaphthalene	162	164, 127
2-Nitroaniline	65	92, 138
Dimethyl phthalate	163	194, 164

Table 3 (Cont.)
Characteristic Ions for Semivolatile Target Compounds and Surrogates/Internal Standards

Parameter	Primary Ion	Secondary Ion(s)
Acenaphthylene	152	151, 153
3-Nitroaniline	138	108, 92
Acenaphthene	154	152, 153
2,4-Dinitrophenol	184	63, 154
4-Nitrophenol	139	109, 65
2,6-Dinitrotoluene	165	63,89
Dibenzofuran	168	139
2,4-Dinitrotoluene	165	63, 89
2,3,4,6-Tetrachlorophenol	232	131, 130, 166
Diethylphthalate	149	177, 150
4-Chlorophenyl-phenyl ether	204	206, 141
Fluorene	166	165, 167
4-Nitroaniline	138	92, 108
Azobenzene	77	182, 105, 51
4,6-Dinitro-2-methylphenol	198	51, 105
N-nitrosodiphenylamine	169	168, 167
4-Bromophenyl-phenylether	248	250, 141
Hexachlorobenzene	284	142, 249
Atrazine	200	173, 215
Pentachlorophenol	266	264, 268
Phenanthrene	178	179, 176
Anthracene	178	179, 176
Carbazole	167	166, 139
Di-n-butylphthalate	149	150, 104
Fluoranthene	202	101, 203
Pyrene	202	200, 203
Butylbenzylphthalate	149	91, 206
3,3'-Dichlorobenzidine	252	254, 126
Benzo(a)anthracene	228	229, 226
bis(2-ethylhexyl)phthalate	149	167, 279
Chrysene	228	226, 229
Di-n-octyl phthalate	149	167, 43
Benzo(b)fluoranthene	252	253, 125
Benzo(k)fluoranthene	252	253, 125
Benzo(a)pyrene	252	253, 125
Indeno(1,2,3-cd)pyrene	276	138, 227
Dibenz (a,h)anthracene	278	139, 279
Benzo(g,h,i)perylene	276	138, 277

Table 3 (Cont.)		
Surrogates		
Phenol-d6	99	42, 71
2-Fluorophenol	112	64
2,4,6-Tribromophenol	330	332, 141
Nitrobenzene-d5	82	128, 54
2-Fluorobiphenyl	172	171
Terphenyl	244	122, 212
2-Chlorophenol-d4	132	68, 134
1,2-Dichlorobenzene-d4	152	115, 150
Fluoranthene-d10 (SIM)	212	106, 104
2-Methylnaphthalene-d10 (SIM)	152	151
Internal Standards		
Parameter	**Primary Ion**	**Secondary Ion(s)**
1,4-Dichlorobenzene-d4	152	150-115
Acenaphthene-d10	164	162, 160
Phenanthrene-d10	188	94,80
2-Fluorobiphenyl	172	171
Chrysene-d12	240	120, 236
Perylene-d12	264	260, 265

Table 4
Internal Standards Used for Quantitation of Each Compound

1,4-Dichlorobenzene-d_4
1,3-dichlorobenzene
Benzaldehyde
Phenol
1,4-Dioxane
bis(2-Chloroethyl)ether
2-Chlorophenol
2-Methylphenol
Benzyl Alcohol
2,2'-oxybis(1-Chloropropane)
1,2-dichlorobenzene
4-Methylphenol
N-Nitroso-di-n-propylamine
Hexachloroethane
Phenol-d_6 (surr)
2-Fluorophenol (surr)
n-nitrosodimethylamine
1,4-dichlorobenzene
2-chlorophenol-d4
1,2-dichlorobenzene-d4
1,4-Dioxane
Aniline

Naphthalene-d_8
Nitrobenzene
Isophorone
2-Nitrophenol
2,4-Dimethylphenol
bis(2-Chloroethoxy)methane
2,4-Dichlorophenol
Naphthalene
Benzoic Acid
4-Chloroaniline
Hexachlorobutadiene
1,2,4-trichlorobenzene
4-Chloro-3-methylphenol
2-Methylnaphthalene
1-Methylnaphthalene
Acetophenone
Caprolactam
Nitrobenzene-d_5 (Surr)
2-Methylnaphthalene-d10 (Surr)

Table 4 (Cont.)
Internal Standards Used for Quantitation of Each Compound

Acenaphthene-d_{10}
Hexachlorocyclopentadiene
2,4,6-Trichlorophenol
2,4,5-Trichlorophenol
2,4,6-Tribromophenol(Surr)
2-Chloronaphthalene
2-Nitroaniline
Dimethylphthalate
2,6-Dinitrotoluene
Acenaphthylene
3-Nitroaniline
Acenaphthene
2,4-Dinitrophenol
4-Nitrophenol
Dibenzofuran
2,4-Dinitrotoluene
Diethylphthalate
Fluorene
4-Chlorophenyl-phenylether
4-Nitroaniline
Azobenzene
2-Fluorobiphenyl (surr)
1,2,4,5-Tetrachlorobenzene
2,3,4,6-Tetrachlorophenol

Phenantherene-d_{10}
4,6-Dinitro-2-methylphenol
4-Bromophenyl-phenylether
N-nitrosodiphenylamine
Hexachlorobenzene
Di-n-butylphthalate
Atrazine
Pentachlorophenol
Phenanthrene
Anthracene
Fluoranthene
Fluoranthene-d10 (Surr)

Chrysene-d_{12}
Pyrene
Butylbenzylphthalate
3,3'-Dichlorobenzidine
Benzo(a)anthracene
Chrysene
bis(2-ethylhexyl)phthalate
Terphenyl-d_{14} (surr)
Di-n-octylphthalate
Benzidine

Perylene-d_{12}
Benzo(g,h,i)perylene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)pyrene
Indeno(1,2,3-cd)pyrene
Dibenz(a,h)anthracene

Surr = Surrogate Compound

Table 5
SIM Analysis Quantitation Ions and Groups (subject to change)

Group No.	Parameter	Primary Ion	Secondary Ion(s)
1	n-Nitrosodimethylamine	42	74
	1,4-Dioxane	88	58, 43
	2-Fluorophenol	112	64
2	Phenol-d6	99	42 ,71
	Bis(2-Chloroethyl)ether	93	63, 95
	2-Chlorophenol-d4	132	68, 134
	1,4-Dichlorobenzene-d4	152	115
	1,2-Dichlorobenzene-d4	152	115, 150
	Nitrobenzene-d5	82	128, 54
	Naphthalene-d8	136	68
	Hexachlorobutadiene	225	223, 227
	2-Methylnaphthalene-d10 (Surr)	152	151
3	2-Fluorobiphenyl	172	171
	Acenaphthene-d10	164	162, 160
	2,4,6-Tribromophenol	330	332, 141
	Hexachlorobenzene	284	142, 249
	4,6-Dinitro-2-methylphenol	198	51,105
	Atrazine	200	173,215
	Pentachlorophenol	266	264, 268
	Phenanthrene-d10	188	94, 80
	Fluoranthene-d10 (Surr)	212	106, 104
4	Terphenyl-d14	244	122, 212
	Benzo(a)anthracene	228	229, 226
	Chrysene-d12	240	120, 236
5	Benzo(b)fluoranthene	252	253, 125
	Benzo(k)fluoranthene	252	253, 125
	Benzo(a)pyrene	252	253, 125
	Perylene-d12	264	260, 265
6	Indeno(1,2,3-cd)pyrene	276	138, 227
	Dibenzo(a,h)anthracene	278	139, 279

Surr = Surrogate Compound

CHEMTECH 284 Sheffield Street, Mountainside, NJ 07092 (908) 789-8900

READ RECEIPT

Employee Name: _____

Department: _____

_____ **M8270E-BNA**_____
Method or Document Read (Include Title, Number, Revision, as applicable)

Employee Statement: I have read and understood the information in the above-mentioned method or document.

_____ _____
Employee Signature Date

Supervisory Statement: I have reviewed this document or method with the employee.

_____ _____
Supervisor Signature Date

Note: This receipt is to be returned to the Quality Assurance/Quality Control Department for incorporation into employee training record files. If you have questions or would like to review your train record files, please see QA/QC Director.

QA Control Code: A2070088

SOP Name:	Determination of Total Cyanide by Method SW-846 9012B
SOP ID:	M9012B-Total, Amenable and Reactive Cyanide
Revision #:	20
Date Created:	January 25, 2002
Effective Date:	May 20, 2021
Reason for Revision:	Annual Review, Changes suggested by Supervisor
Supercedes:	M9012B-Total, Amenable and Reactive Cyanide -19

Approvals:

Analyst	Date
Supervisor	Date
QA/QC Director	Date
Technical Director	Date

TOTAL CYANIDE

1. Test Method

1.1 Determination of Total, Amenable and Reactive Cyanide by Method SW 846 9012B.

2. Applicable Matrices

2.1 Water, wastewater, soil, and sludge

3. Reporting Limit

3.1 Water: 5µg/L

3.2 Soil: 0.25mg/Kg

4. Scope and Application

4.1 This method is used to determine the concentration of inorganic cyanide in wastes or leachate. This method detects inorganic cyanides that are present as either soluble salts or complexes. It is used to determine values for both total cyanide and cyanide amenable to chlorination.

5. Summary of Method

5.1 The cyanide as hydrocyanic acid (HCN) is released from cyanide complexes by means of a midi reflux-distillation operation and absorbed in a scrubber containing NaOH solution.

- The cyanide ion in the absorbing solution is determined colorimetrically.

5.2 In the colorimetric measurement, the cyanide is converted to cyanogen chloride, CNCl, by reaction with chloramine-T at pH less than 8 without hydrolysis to the cyanate.

- After the reaction is complete, color is formed on the addition of pyridinebarbituric acid reagent.
- The absorbance is read at 575 nm.

6. Definitions

6.1 Colorimetry: An analytical method based on measuring the color intensity of a substance or a colored derivative.

6.2 Reflux Distillation: The distillation process in which the condensed liquid from rising vapor is allowed to flow back down a fractionating column toward the still.

- As the liquid comes in contact with the rising vapor, it results in an improved separation of the contents.
- The separation resulting from contact of the countercurrent streams of vapor and liquid is called rectification or fractionation.

6.3 Analyst: the designated individual who performs the “hands-on” analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.

6.4 Batch: Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents.

6.4.1 Preparation Batch: is composed of one to 20 environmental samples of the same matrix, meeting the above-mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours.

6.4.2 Analytical Batch: is composed of prepared environmental samples (extracts, digestates or concentrates), which are analyzed together as a group. An analytical batch can include prepared samples originating from various environmental matrices and can exceed 20 samples.

6.5 Blank: A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis the blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results.

6.6 Calibration: To determine, by measurement or comparison with a standard, the correct value of each scale reading on a meter, instrument, or other device. The levels of the applied calibration standard should bracket the range of planned or expected sample measurement.

6.7 Corrective Action: The action taken to eliminate the causes of an existing nonconformity, defect or other undesirable situation in order to prevent recurrence.

6.8 Detection Limit: The lowest concentration or amount of the target analyte that can be determined to be different from zero by a single measurement at a stated degree of confidence.

6.9 Duplicate Analyses: The analysis or measurements of the variable of interest performed identically on two sub-samples of the same sample. The results from duplicate analyses are used to evaluate analytical or measurement precision but not the precision of sampling, preservation or storage internal to the laboratory.

6.10 Holding Times (Maximum Allowable Holding Times): The maximum times that samples may be held prior to analysis and still be considered valid or not compromised.

6.11 Matrix Spike (spiked sample or fortified sample): A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

6.12 Method Blank: A sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest, which is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses.

6.13 Initial Calibration Verification: Initial Calibration verification is used to access the accuracy of initial calibration standards.

6.14 Continuing Calibration Verification: Continuing calibration verification is evaluated to determine whether the instrument was within acceptable calibration throughout the period in which the samples are analyzed.

6.15 Method Detection Limit: The minimum concentration of a substance (an analyte) that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

6.16 Precision: The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms.

6.17 Preservation: Refrigeration and/or reagents added at the time of sample collection (or later) to maintain the chemical and/or biological integrity of the sample.

6.18 Pure Reagent Water: Water (defined by national or international standard) in which no target analytes or interferences are detected as required by the analytical method.

6.19 Range: The difference between the minimum and the maximum of a set of values.

6.20 Spike: A known mass of target analyte added to a blank sample or sub-sample, used to determine recovery efficiency or for other quality control purpose.

6.21 Standard: The document describing the elements of laboratory accreditation that has been developed and established within the consensus principles of NELAC and meets the approval requirements of NELAC procedures and policies.

6.22 Standard Operating Procedures (SOPs): A written document which details the method of an operation, analysis or action whose techniques and procedures are thoroughly prescribed and which is accepted as the method for performing certain routine or repetitive task.

6.23 Test Method: An adoption of a scientific technique for a specific measurement problem, as documented in a laboratory SOP.

7. Interferences

7.1 Chlorine, sulfide, Nitrate/Nitrite, and surfactants are interferences in this method. Interferences are eliminated or reduced by using the distillation procedure.

7.2 Sulfides adversely affect the colorimetric procedures.

7.2.1 If a drop of lead acetate test paper indicates the presence of sulfides, treat the sample with powdered cadmium carbonate.

7.2.2 Yellow cadmium precipitates if the sample contains sulfide.

7.2.3 Repeat the process until lead acetate paper does not darken any more.

7.2.4 Filter the solution through a dry filter paper into a dry beaker, and from the filtrate, measure the sample to be used for analysis.

7.3 The presence of surfactants may cause the sample to foam during refluxing.

7.3.1 If this occurs, the addition of an antifoaming agent will prevent the foam from collecting in the condenser.

7.4 Oxidizing agents such as chlorine decompose most cyanides. Chlorine interferences can be removed by adding an excess of ascorbic acid.

8. Safety

8.1 Wear appropriate safety clothing and eye protection.
8.2 Use protective gloves when handling corrosive chemicals.
8.3 Always use safety carts when transporting large bottles of chemicals.
8.4 Read material safety data sheet (MSDS) for the chemical used in the laboratory for the identity of the ingredients, the physical and chemicals characteristics of the substance, the physical hazards, and safe handling and safety precautions.
8.5 Always prepare Pyridine reagent under hood.

9. Equipment and Supplies

9.1 Midi reflux distillation apparatus
9.2 Instrument
  9.2.1 Konelab 20 Spectrophotometer
  9.2.2 Instrument Software: Thermo Scientific Aquakem 7.2AQ1
9.3 Auto Sampler cuvette
9.4 Auto-pipette-100 to 1000µL adjustable
9.5 Assorted volumetric glassware (Class A)
9.6 Stirrer
9.7 pH meter
9.8 Incandescent or amber light
9.9 Vacuum source
9.10 Potassium Iodide (KI) Starch paper
9.11 Lead acetate paper
9.12 Nitrate/Nitrite Test strips
9.13 pH strips

10. Reagents and Standards

10.1 Reagents
  10.1.1 Sodium hydroxide, 0.25N: Dissolve 210g NaOH in ASTM Type II Water and dilute to 21L
  10.1.2 Magnesium *chloride solution, 51% (w/v), 2.5M*: Dissolve 510 g of MgCl2:6H2O in ASTM Type II water and dilute to 1L
  10.1.3 Sulfuric *acid, 50% (v/v), 18N*: Add a portion of concentrated H_2SO_4 to an equal portion of ASTM Type II Water
  10.1.4 Cadmium carbonate, powdered
  10.1.5 Sulfamic *acid (0.4N):* Dissolve 40g H_2NSO_3H in 1L water
  10.1.6 Reagent grade water
  10.1.7 Buffer solution
  10.1.8 Calcium hypochlorite solution (0.35M), $Ca(OCl)_2$: Combine 5g calcium hypochlorite and 100mL water. Shake before using. Store in amber glass bottle in the dark. Prepare monthly
  10.1.9 Ascorbic Acid
10.2 Standards
  10.2.1 Stock cyanide solution, 1000 mg/L CN purchased commercially.
  10.2.2 Intermediate cyanide standard solution, 5mg/L CN: Dilute 0.25mL of stock cyanide solution to 50mL volumetric flask with 0.25N NaOH.

- Prepare this solution fresh daily.

10.2.3 Prepare ICV standard at 99ppb concentration from EPA or from a source other than the calibration standards. The ICV standard distilled same way as sample.

ICV Standard (ppb)	Amount of standard solution (mL)	Amount of 0.25N NaOH (mL)
99	0.5 mL of EPA Stock Standard (9900ppb)	49.5

10.2.4 Prepare LCS at 100ppb concentration from a source other than the calibration standards.

10.2.5 Calibration standards prepared into 50mL volumetric flasks. These standards are not distilled.

Standard concentration, ppb	Amount of standard solution	Amount of 0.25N NaOH (mL)
0	0mL	50.0
5	0.5 mL of 500ppb standard	49.5
10	1.0 mL of 500ppb standard	49.0
50	0.5 mL of 5mg/L standard	49.5
100	1.0 mL of 5mg/L standard	49.0
250	2.5mL of 5mg/L standard	47.5
500	5.0 mL of 5mg/L standard	45.0

10.2.6 Prepare High Standard at 500ppb concentration from first source. The High Standard is distilled. Spike 5mL from 5 mg/L to 50 mL NaOH.

10.2.7 Prepare Low Standard at 10ppb concentration from first source. The Low Standard is distilled. Spike 0.1mL from 5 mg/L to 50 mL NaOH.

10.2.8 Matrix spike/Matrix spike duplicate: Add 0.4mL of 5ppm first source standard to 50mL sample for both soil and water matrices for a 40ppb spike concentration.

10.2.9 Prepare CCV standard at 250ppb concentration from first source. The CCV standard is not distilled.

10.3 Analysis color reagents

10.3.1 Sodium monobasic, monohydrate phosphate 1M (Buffer)

10.3.1.1 Dissolve 138g to 1L with DI water.

10.2.1.2 Refrigerate. Prepare every six months.

10.3.2 Chloramine-T solution,

10.3.2.1 Dissolve 0.08g of water-soluble chloramine-T in 20mL of reagent water. Prepare fresh at time of analysis.

10.3.3 Pyridine-barbituric acid color reagent solution

10.3.1.1 Prepare this solution in the hood.

10.3.3.2 Transfer 15g of barbituric acid into a 250mL volumetric flask and add enough water to cover the barbituric acid

10.3.3.3 Add 75ml of pyridine and mix.

10.3.3.4 Add 15ml conc. Hydrochloric Acid and mix until all the barbituric acid is dissolved.
10.3.3.5 Let the solution cool to room temperature.
10.3.3.6 Dilute to the mark with DI water and mix. This solution is stable for six months.
10.3.3.7 Refrigerate this solution in an amber bottle when not in use.
10.3.4 Sodium Hydroxide solution 1.25N
10.3.4.1 Dissolve 50g NaOH in ASTM Type II Water and dilute to 1L

10.4 50% (w/v) NaOH: Dissolve 500g NaOH pellets in 1L DI water (For Preservation).

Note: Record all stock cyanide solutions prepared in the stock reagents logbook with lot number of reagents, method of preparation, concentration, date, and prepared by.

- *Give the stock solution a CHEMTECH ID number.*

11. Sample Handling and Preservation

11.1 All bottles must be thoroughly cleansed and rinsed to remove soluble materials from containers.
11.2 Oxidizing agents such as chlorine decomposes most cyanides.
11.2.1 Test a drop of the sample with KI-Starch paper; a blue color indicates the need for treatment.

Follow below procedure for the treatment of oxidizing agents using Ascorbic Acid.

11.2.2 Add ascorbic acid, a few crystals at a time, until a drop of sample produces no color on the indicator paper.
11.2.3 Add additional 0.6g of ascorbic acid for each liter of sample volume.

11.3 Preserve water samples with 2mL of 50%NaOH per liter of sample (pH >12) at the time of collection.
11.4 Store samples at 4°C±2°C and analyze them within 14 days.
11.5 Analyze the sample within 24 hours if Ascorbic Acid is used for treatment

12. Quality Control

12.1 Instrument Calibration
12.1.1 Calibrate instrument daily.
12.1.2 Record standardization date on batch log page.
12.1.3 Prepare calibration standards daily from intermediate solution.
12.1.4 One cyanide standard must be at the RL and one standard must be blank.
12.1.5 ICAL must meet criterion $r \geq 0.995$ (See section 13.3)
12.1.6 One high and one low distilled standard must be analyzed once per multipoint calibration.

12.1.7 Distilled standards must meet recovery limits ±10%

12.2 Initial Calibration Verification (ICV)

12.2.1 Verify the accuracy of the initial calibration immediately after the system is calibrated using second source distilled standard.

12.3 Continuing Calibration Verification (CCV)

12.3.1 Analyze a CCV at the beginning and end of the run, and every 10 samples or every 2 hours whichever is more frequent.

12.4 Initial Calibration Blank (ICB) and Continuing Calibration Blank (CCB)

12.4.1 Analyze ICB and CCB immediately following every ICV and CCV respectively.

12.5 Preparation Blank

12.5.1 Analyze one preparation blank consisting of deionized water, which must be carried through procedure, for each 20 samples batch or per matrix type.

12.6 Matrix Spike/Matrix Spike Duplicate

12.6.1 Analyze one spike and spike duplicate sample for each group of 10 samples of a similar matrix.

$$\% \text{ Recovery} = \frac{(SSR - SR)}{SA} \times 100$$

Where: SSR = Spiked sample results
SR = Sample results
SA = Spike added

12.7 Sample Duplicate

12.7.1 Analyze one duplicate sample from each group of samples of a similar matrix every 20 samples.

$$RPD = \frac{S - D}{(S+D)/2} \times 100$$

Where: RPD = Relative percent difference
S = First sample value (original)
D = Second sample value (duplicate)

12.8 Laboratory Control Sample (LCS)

12.8.1 Analyze one LCS sample per batch of 20 samples.

12.9 Limit of Detection (LOD)

12.9.1 LOD/MDL std 2.5ppb - spike 1.25ml of 100ppb cyanide intermediate std into 50ml 0.25N NaOH

12.9.2 LOD is specific to each matrix (including sample preparation) and instrument configuration.

12.9.3 LOD must be verified quarterly.

12.9.4 LOD must be verified on each instrument used, and every time the method is modified.

12.9.5 For MDL procedure, refer SOP P203- Laboratory limits and demonstration of capability.

12.10 Limit of Quantitation (LOQ)

12.10.1 LOQ must be greater than the LOD.

12.10.2 LOQ must be verified quarterly for each quality system matrix, method and analyte, by analyzing QC sample containing the analytes of concern in each quality system matrix.

12.10.3 LOQ Std 5.0ppb - spike 2.5ml of 100ppb cyanide intermediate std into 50ml 0.25N NaOH.

12.10.4 LOQ must be performed if the method is modified.

13. Calibration and Standardization

13.1 Calibration preparation

13.1.1 ICV (CN) from EPA or from a source other than the calibration standards. Prepare according to section 10.2.3

13.1.2 Calibration standards: Prepare standards at 5ppb, 10ppb, 50ppb, 100ppb, 250ppb, 500ppb and a Blank, by pipetting suitable volumes of standard solution to 50mL volumetric flasks according to section 10.2.5. Prepare each standard solution to 50mL with 0.25 N NaOH. Standards must bracket the concentration of samples. If dilution is required, use the blank solution.

13.2 Instrument Operation

13.2.1 Login

13.2.1.1 Type username and password

13.2.2 Check deionized water bottle and waste bottle.

13.2.2.1 Refill the deionized water bottle if necessary and empty waste bottle.

13.2.3 Empty cuvette waste compartment.

13.2.4 Startup system computer software.

13.2.4.1 Set reagents in the instrument at the assigned positions.

13.2.5 If the cuvette message appears, load cuvettes.

13.2.6 Perform all necessary initialization procedures.

13.2.7 Run 1:10 Sodium hypochlorite: water solution to clean the instrument.

13.2.8 Run DI water blank and check standard deviation is < 1 for all wavelengths.

13.2.9 Calibration

13.2.9.1 Select each calibration points from the list created previously in the dropdown menu.

13.2.9.2 Press F2, Insert the segment with calibration standard.

13.2.9.3 Return to the main screen

13.2.9.4 Press F6 Calibration and QC Selection to select the method to be used.

13.2.9.5 Press F1 to calibrate

13.2.9.6 Return to the main screen

13.2.9.7 Press Page Up on the keyboard to start the analysis.

13.2.10 Sample and QC samples analysis

13.2.10.1 Type names of QC samples and samples in each position in the order in each segment beginning from segment#1.

13.2.10.2 Assign the test name to all QC samples and samples in each position in the order in each segment begging from segment#1.

13.2.10.3 Press F2, insert samples/QC samples as typed in each segment beginning from segment#1.
13.2.10.4 Return to the main screen.
13.2.10.5 Press Page Up on the keyboard to start the analysis.
13.2.11 At the end of the analysis press results reports.
13.2.12 Click on standby.
13.2.13 Insert washing solution cup (diluted Sodium hypochlorite) cup.
13.2.14 Clear Daily files
13.2.15 Log off

13.3 Calibration:

13.3.1 Load calibration std (prepared as in section 10.2.5) in segment to do calibration. The Instrument will analyze calibration curve using 0ppb, 5ppb, 10ppb, 50ppb, 100ppb, 250ppb, 500ppb.

13.3.2 Once the calibration standards are analyzed, the instrument's built-in program automatically calculates the correlation coefficient r and displays on the screen giving "r" values. The value for "r" must be greater than or equal to 0.995.

13.3.3 Calculate Relative Error (%RE) for all calibration standards. Lowest calibration standard must meet 30% criteria and all other calibration standard must meet 10% criteria. Note %RE in the raw data.

- Relative error is calculated using the following equation:

$$\% \text{ Relative Error} = \frac{x'_i - x_i}{x_i} \times 100$$

x_i = True value for the calibration standard
x'_i = Measured concentration of the calibration standard

13.3.4 Check the initial calibration by analyzing ICV, ICB, CCV, and CCB.

14. Procedure

14.1 Pretreatment for cyanides amenable to chlorination

14.1.1 Two sample aliquots are required to determine cyanides amenable to chlorination. To one 50-mL aliquot, or a volume diluted to 50mL, add calcium hypochlorite solution dropwise while agitating and maintaining the pH between 11 and 12 with sodium hydroxide solution (1.25N).

CAUTION: *The initial reaction product of alkaline chlorination is the very toxic gas cyanogen chloride; therefore, it is recommended that this reaction be performed in a hood.*

For convenience, the sample may be agitated in a 1-liter beaker by means of a magnetic stirring device.

Note: Perform the test under incandescent light, amber light or dark, to prevent photodecomposition of some metal-cyanide complexes.

14.1.2 Test for residual chlorine with KI-starch paper and maintain this excess for 1hr. continuing agitation. A distinct blue color on the test paper indicates a sufficient chlorine level. If necessary, add additional hypochlorite solution.

14.1.3 After 1hr, add few crystals of ascorbic acid until KI starch paper shows no residual chlorine. Add an additional 0.6g of ascorbic acid for each 1-liter aliquot of sample, to ensure the presence of excess reducing agent.

14.1.4 Test for total cyanide in both the chlorinated and unchlorinated aliquots. (The difference of total cyanide in the chlorinated and unchlorinated aliquots is the cyanide amenable to chlorination.)

14.2 Pretreatment of samples for sulfide

14.2.1 Place a drop of sample on lead acetate test paper (which has been pre-moistened with pH 4 acetate buffer solution) to detect the presence of sulfides. If sulfides are present, the test strip will turn black.

14.2.2 The volume of sample should then be treated with powdered cadmium carbonate. Yellow cadmium sulfide precipitates if the sample contains sulfide.

14.2.3 Repeat this operation until a drop of the sample does not darken the acetate test paper.

14.2.4 Filter the solution through a dry filter paper into a dry beaker and from the filtrate, measure the sample to be used for analysis.

14.2.5 Record your observation as presence or absence of sulfide.

14.3 Pretreatment of samples for chlorine

14.3.1 Test for the presence of oxidizing agents by placing a drop of the sample on a strip of potassium iodide-starch test paper (KI-starch paper). A blue color indicates the need for treatment.

14.3.2 For the treatment of oxidizing agents, Ascorbic Acid or 0.1N Sodium Arsenite can be used. Follow below procedure if Ascorbic Acid is used for the treatment of oxidizing agent.

14.3.3 Add ascorbic acid a few crystals at a time until a drop of sample produces no color on the indicator paper.

14.3.4 Then add an additional 0.6g of ascorbic acid for each liter of sample volume.

Follow below procedure if 0.1N Sodium Arsenite is used for the treatment of oxidizing agent.

14.3.5 Add 0.1N Sodium Arsenite solution a few mL at a time until a drop of sample produces no color on the indicator paper

14.3.6 Add an additional 5 mL of Sodium Arsenite solution for each liter of sample.

14.4 Distillation

14.4.1 For *aqueous samples*: Pipet 50mL of sample or an aliquot diluted to 50mL, into the distillation flask.

14.4.2 For *solid samples*: Weigh 1.0g of sample for Total Cyanide analysis and 5.0g of sample for Reactive Cyanide analysis (to the nearest 0.01g) into the distillation flask and dilute to 50mL with ASTM Type II water.

14.4.3 Add 50mL of 0.25N NaOH to the gas absorbing impinger.

14.4.4 Connect the boiling flask, condenser, and absorber in the train.
- The excess cyanide trap contains 0.5N NaOH.

14.4.5 Turn on the vacuum and adjust the gang (Whitney) values to give a flow of three bubbles per second from the impingers in reaction vessel.

14.4.6 After five minutes of vacuum flow, if the sample is known to contain nitrate or nitrite, or if Bismuth nitrate was added to the sample, add 5mL 0.4N sulfamic acid solution through the inlet tube and after allowing to mix for 3minutes, inject 5mL of 50% (v/v) H_2SO_4 through the top air inlet tube of the distillation head into the reaction vessel.

14.4.7 Allow the airflow to mix the flask contents for 3 minutes.

Note: The acid volume must be sufficient to bring the sample/solution pH to less than 2.0.

14.4.8 Add 2 mL of magnesium chloride solution through the top air inlet tube of the distillation head into the reaction flask.
- Quell the excessive foaming from samples containing surfactants by adding another 2 mL of magnesium chloride solution.

14.4.9 Turn on the heating block and set the temperature at 122 - 128°C.
- Heat the solution to boiling, taking care to prevent solution backup by periodic adjustment of the vacuum flow.

Note: Do not heat samples for Reactive Cyanide analysis

14.4.10 After one hour of refluxing, turn off the heat and continue the vacuum for an additional 15 minutes.
- The flasks should be cool at this time.

14.4.11 After cooling, close off the vacuum at the gang valve and remove the absorber. Seal the receiving solutions and store them at 4°C until analyzed. The solution must be analyzed for cyanide within the 14 day holding time.

14.5 Analysis:

14.5.1 Follow Step 13.2 for analytical setup and instrument operation.

14.5.2 After the analytical run, review the data for out-of-limit recovery as outlined in Section 18.

14.6 Analytical Run

14.6.1

Initial Analytical Run	Continuous Analytical Run
0µg/L Blank standard (not distilled)	CCV
5ug/L calibration standard (not distilled)	CCB
10µg/L calibration standard (not distilled)	10 Samples
50ug/L calibration standard (not distilled)	CCV
100µg/L calibration standard (not distilled)	CCB
250µg/L calibration standard (not distilled)	
500ug/L calibration standard (not distilled)	
ICV 99ug/L second source (distilled)	

ICB (not distilled)
CCV 250ug/L standard (not distilled)
CCB (not distilled)
Preparation Blank (distilled)
100ug/L LCS (distilled)
S10ug/L (distilled) (Low Standard)
S500 µg/L (distilled) (High Standard)
4 Samples (distilled)
Sample D (distilled)
Sample S (distilled 40ug/L spike)
CCV 250ug/L standard (not distilled)
CCB (not distilled)

15. Calculations

15.1 Prepare a standard curve by plotting absorbance of standards versus cyanide concentration values (total µg CN/L).

- Perform a linear regression analysis.

15.2 Using regression analysis equation calculate sample receiving solution concentrations from the calibration curve.

15.3 Cyanide in Aqueous Samples

$$CN, ug/L = \frac{C \times V_f \times DF}{V}$$

Where: C = ug/L CN of sample from regression analysis
V_f = Final sample volume after distillation (0.050L)
DF = Dilution Factor
V = volume of original sample for distillation (0.050L)

15.4 Cyanide in Soil Samples

$$CN, mg/Kg = \frac{C \times V_f \times DF}{W \times S \times 1000}$$

Where: C = µg/L CN of sample regression analysis curve
W = wet weight of original sample in g
DF = Dilution Factor
S = % solids/100
V_f = sample receiving solution volume (0.050 L)

16. Method Performance

16.1 Precision and accuracy data are obtained for CN using laboratory fortified blank spiked with CN concentration of 100ug/L.

16.2 Perform DOC prior to performing any test and after any significant change in instrument type, personnel, test method, or sample matrix.

16.2.1 Use LCS criteria to evaluate DOC.

17. Pollution Prevention

17.1 Use amount of chemicals as required. Do not make large quantities of solutions.
17.2 Use the hood when working with strong chemicals or fumes.
17.3 Keep the work area clean and clutter free to avoid any mishaps.

18. Data Assessment and Criteria for QC

18.1 Instrument Calibration
18.1.1 The calibration curve must demonstrate a correlation coefficient of ≥0.995. Relative Error must be withing 30% for the lowest std and 10% for all the other calibration standards.
18.2 Initial Calibration Verification (ICV)
18.2.1 The ICV must be within the 85 – 115% recovery limits.
18.2.2 For DOD, The ICV must be within the 90 – 110% recovery limits.
18.3 High Standard
18.3.1 The control limit is ±10%.
18.4 Low Standard
18.4.1 The control limit is ±10%.
18.5 Continuing Calibration Verification (CCV)
18.5.1 The control limits for CCVs are 90 – 110%.
18.6 Initial Calibration Blank (ICB) & Continuing Calibration Blank (CCB)
18.6.1 The value of blanks must not exceed than ½ RL.
18.7 Preparation Blank
18.7.1 The value of blanks must not exceed than ½ RL.
18.8 Matrix Spike/Matrix spike duplicate
18.8.1 The control limits for spike recovery are 75 – 125% and ±20% RPD.
18.8.2 For DoD work, MS/MSD Water recovery limit is 83 – 116% & MS/MSD Soil recovery limit is 76-120%.
18.9 Sample Duplicates
18.9.1 The control limits for duplicate analysis are ±20% for samples with value ≥ 5x RL.
18.10 Laboratory Control Sample (LCS)
18.10.1 Control limits for LCS recovery limit is 85 – 115%.
18.10.2 For DoD work, LCS Water recovery limit is 83 – 116% & LCS Soil recovery limit is 76-120%
18.11 Limit of Quantitation
18.11.1 Analysis must meet the acceptance criteria 70-130% recovery.

19. Corrective Actions for Out-of-Control Data

19.1 Initial Calibration Verification
19.1.1 Terminate the analysis if measurement exceeds control limits.
19.1.2 Find the problem and correct it.
19.1.3 Recalibrate the instrument and verify the calibration.
19.2 High Standard
19.2.1 If High standard recovery is not within control limits, stop analysis.
19.2.2 Find the problem.

19.2.3 Resume analysis once a passing high standard is analyzed.

19.3 Low Standard
- 19.3.1 If Low standard recovery is not within control limits, stop analysis.
- 19.3.2 Find the problem.
- 19.3.3 Resume analysis once a passing Low standard is analyzed.

19.4 Continuing Calibration Verification
- 19.4.1 Stop the analysis if measurement exceeds control limits.
- 19.4.2 Find the problem and correct it.
- 19.4.3 Recalibrate the instrument and verify the calibration.
- 19.4.4 Reanalyze the preceding 10 analytical samples or all analytical samples since the last complaint CCV.

19.5 Initial Calibration Blank (ICB) & Continuing Calibration Blank (CCB)
- 19.5.1 If the blank value exceeds the limit, terminate analysis.
- 19.5.2 Find the problem and correct it.
- 19.5.3 Recalibrate the instrument and verify the calibration.
- 19.5.4 Reanalyze preceding 10 analytical samples or all samples since last complaint CCB.

19.6 Preparation Blank
- 19.6.1 If the blank is not within control limit, redistill and rerun the entire batch.

19.7 Matrix Spike/Matrix spike duplicate
- 19.7.1 Perform a post digestion (distillation) spike for CN when pre-digestion/pre-distillation spike recovery falls outside control limits and the sample does not exceed 4x the spike added.

19.8 Sample Duplicate
- 19.8.1 If Duplicate sample is outside control limits, check technique (especially homogeneity of sample.
- 19.8.2 Rerun duplicate.
- 19.8.3 If duplicate still fails, contact supervisor, technical director for assistance.

19.9 Laboratory Control Sample (LCS)
- 19.9.1 If results for the LCS fall outside the control limits, terminate the analyses.
- 19.9.2 Find the problem and correct it.
- 19.9.3 Redistill and reanalyze samples associated with the LCS.
- 19.9.4 If it is not possible to re-prep the samples and associated QC, then "Q" flag must be applied to the specific failing analyte in all sample results in the associated preparation batch.

19.10 Limit of Quantitation
- 19.10.1 Reevaluate the LOQ.

20. Contingencies for Handling Out-of-Control or Unacceptable Data

20.1 Corrective Action Procedure
- 20.1.1 Issue a corrective action form any time there is deviation from the SOP or when the client requirements are not met.
- 20.1.2 If a sample is damaged, broken, or spilled, contact the project manager and issue a corrective action.

20.1.3 For further information on corrective action process please refer to Corrective Action Report SOP.

21. Waste Management

21.1 Keep samples for 180 days after analysis and dispose them off according to the procedures explained in the SOP for Waste Disposal.

22. References

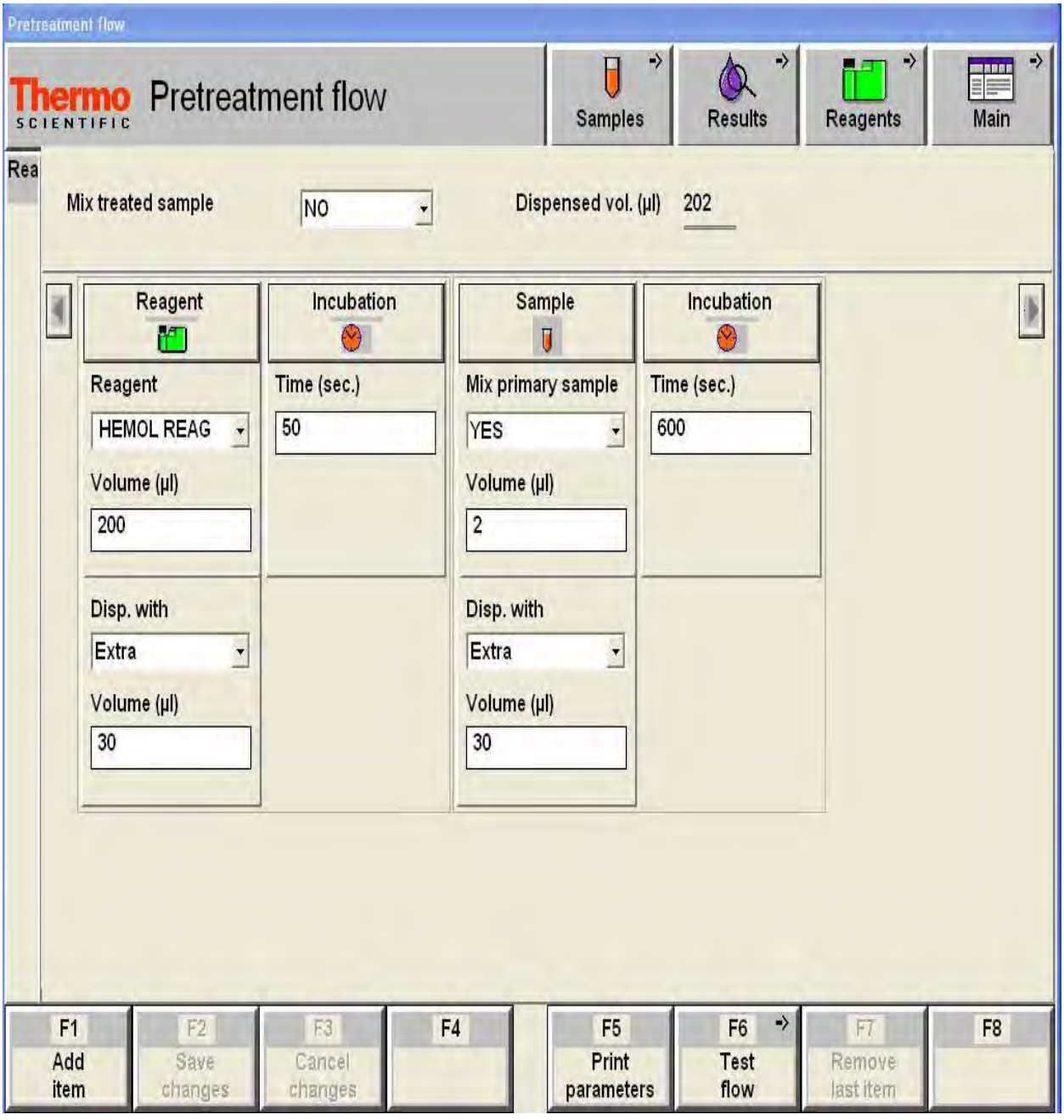
22.1 USEPA Test Methods for Evaluating Solid Wastes, SW-846, Method 9012B, Revision 2, November 2004.

22.2 Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.3 2019.

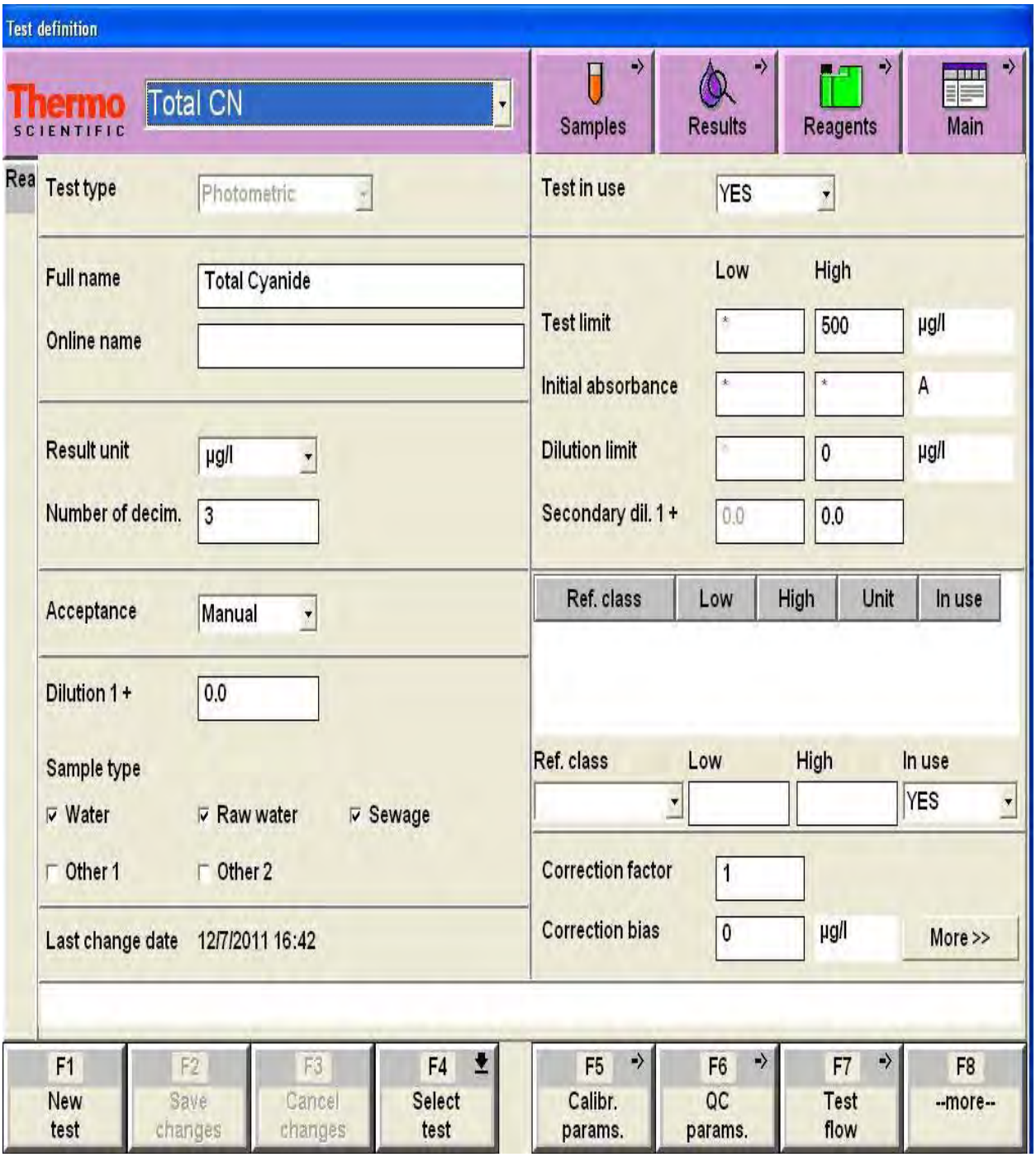
23. List of Tables, Appendix, Attachments

23.1 Appendix A: Suggested Instrument Operational Conditions

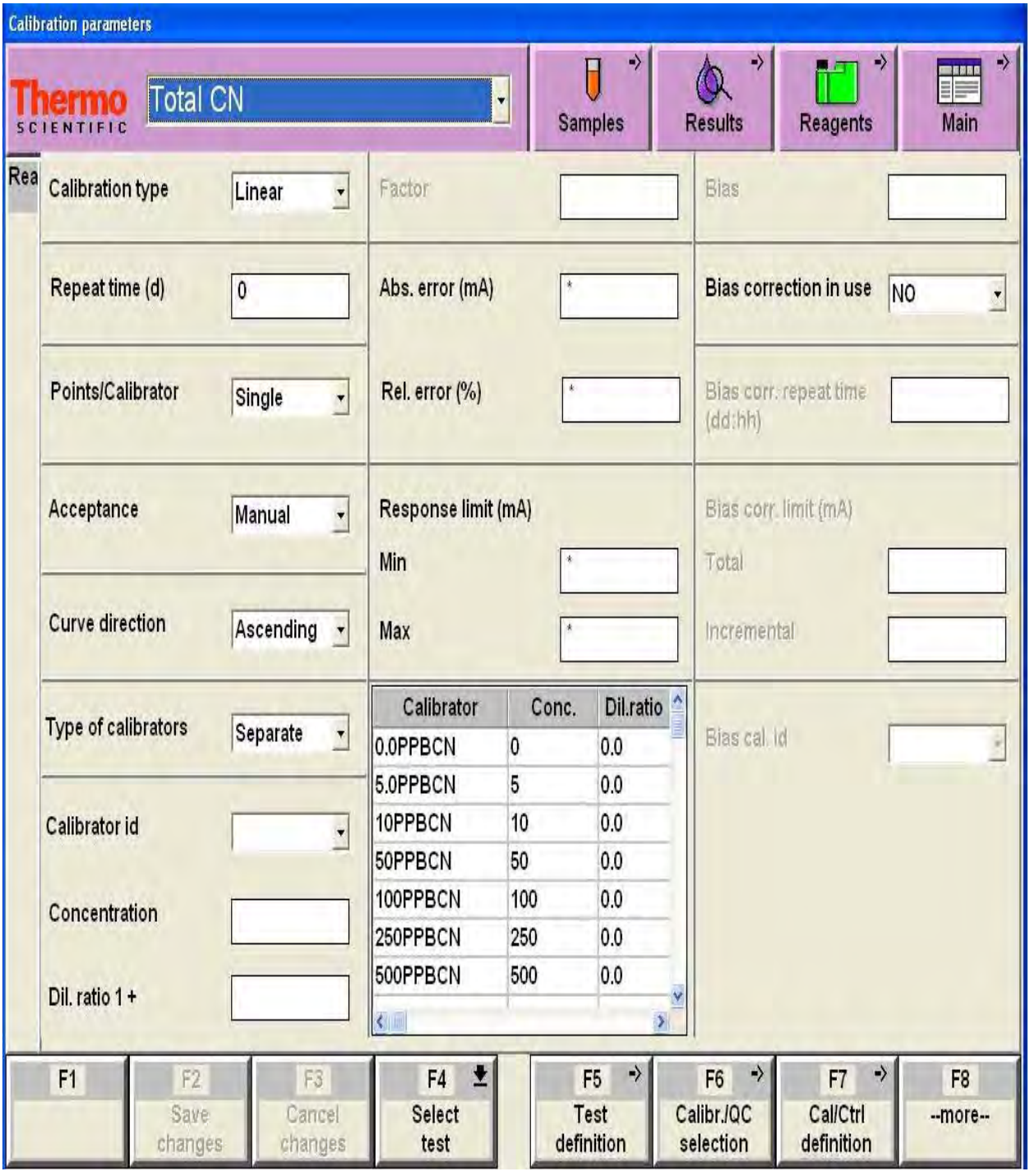
Appendix A


Pretreatment flow
Thermo SCIENTIFIC
Pretreatment flow
Samples
Results
Reagents
Main
Mix treated sample
NO
Dispensed vol. (µl)
202
Reagent
Incubation
Sample
Incubation
Reagent
HEMOL REAG
Time (sec.)
50
Mix primary sample
YES
Time (sec.)
600
Volume (µl)
200
Volume (µl)
2
Disp. with
Extra
Disp. with
Extra
Volume (µl)
30
Volume (µl)
30
F1
Add item
F2
Save changes
F3
Cancel changes
F4
F5
Print parameters
F6
Test flow
F7
Remove last item
F8

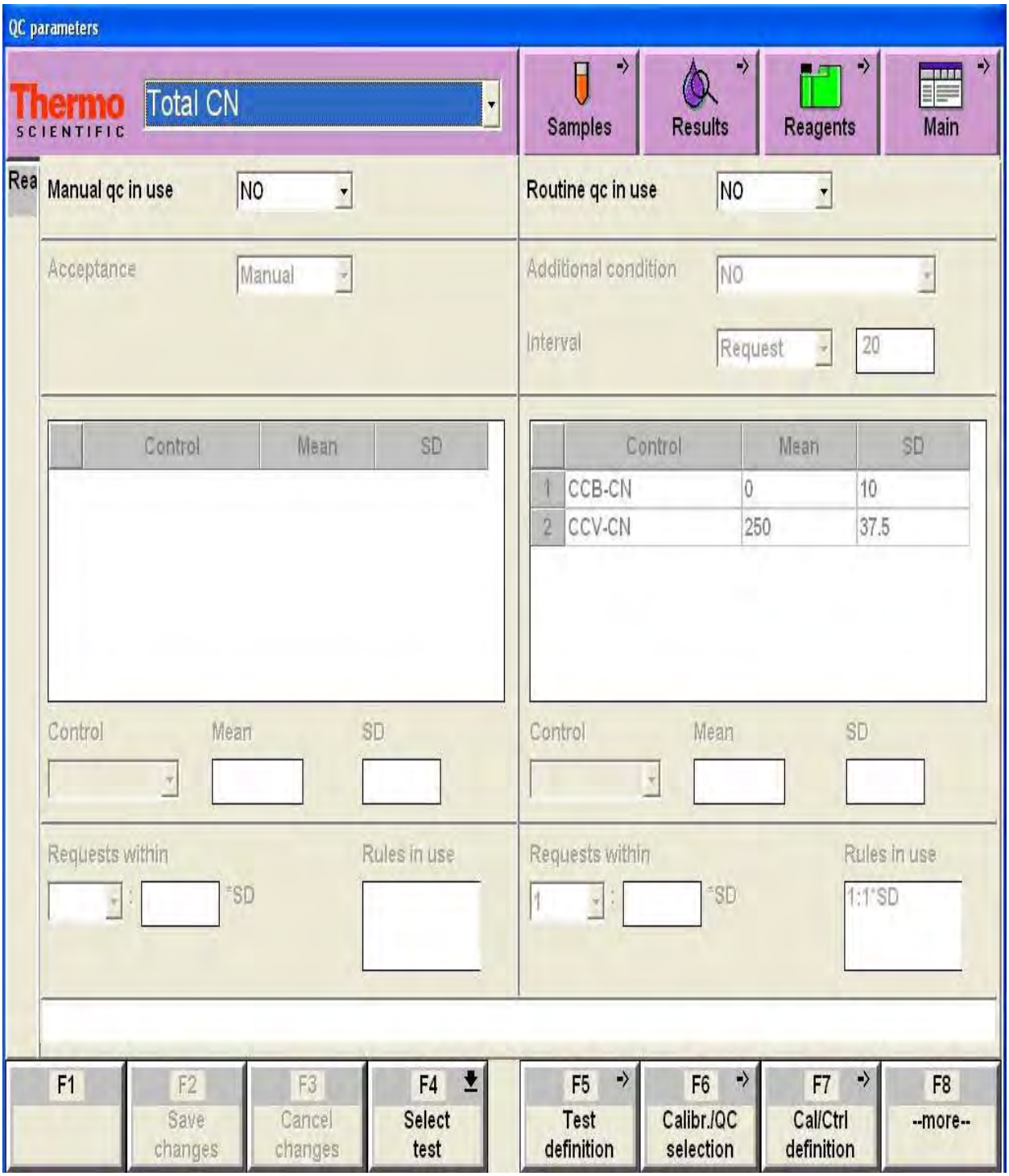
Appendix A (Continue)



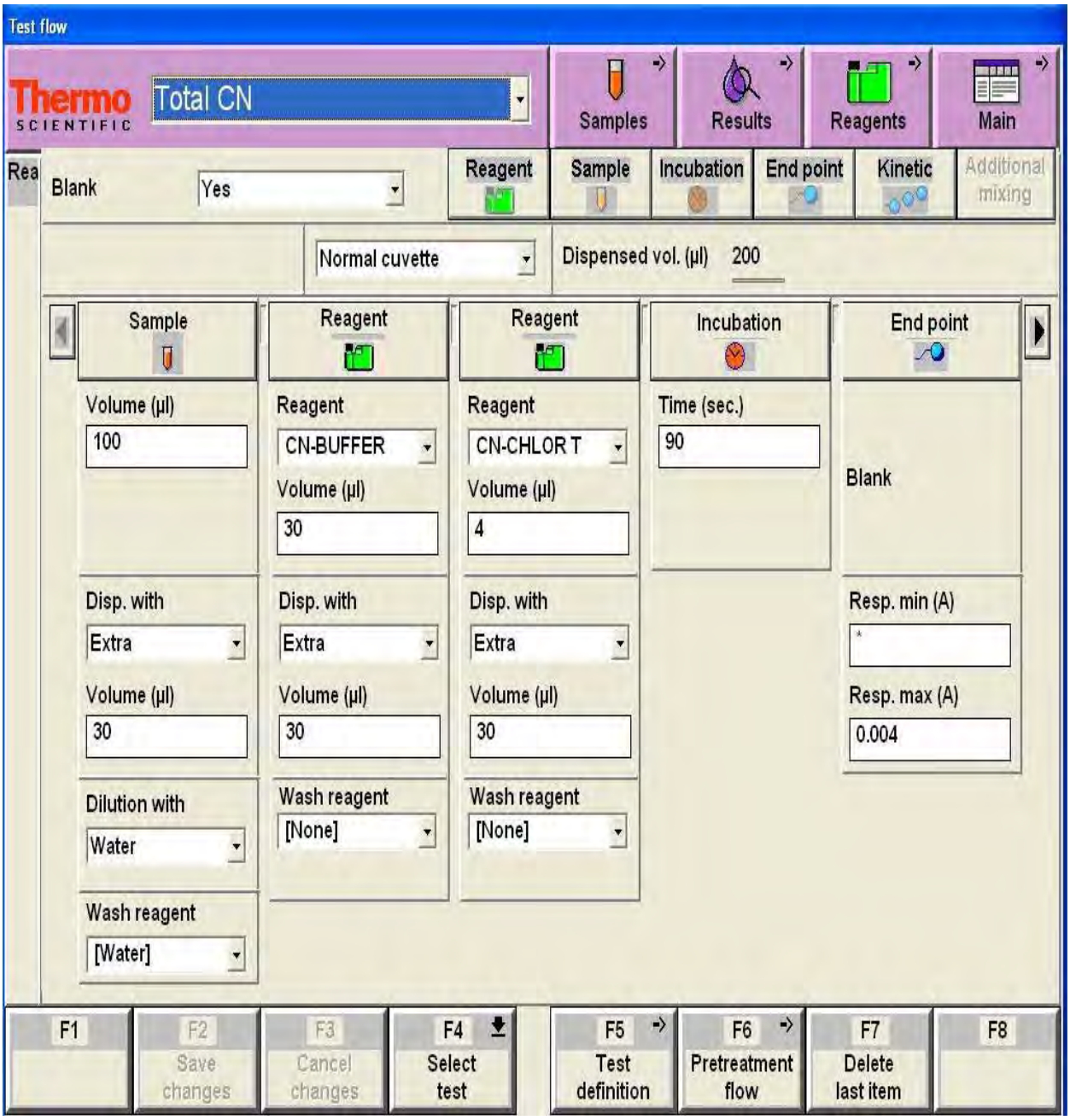
Appendix A (Continue)



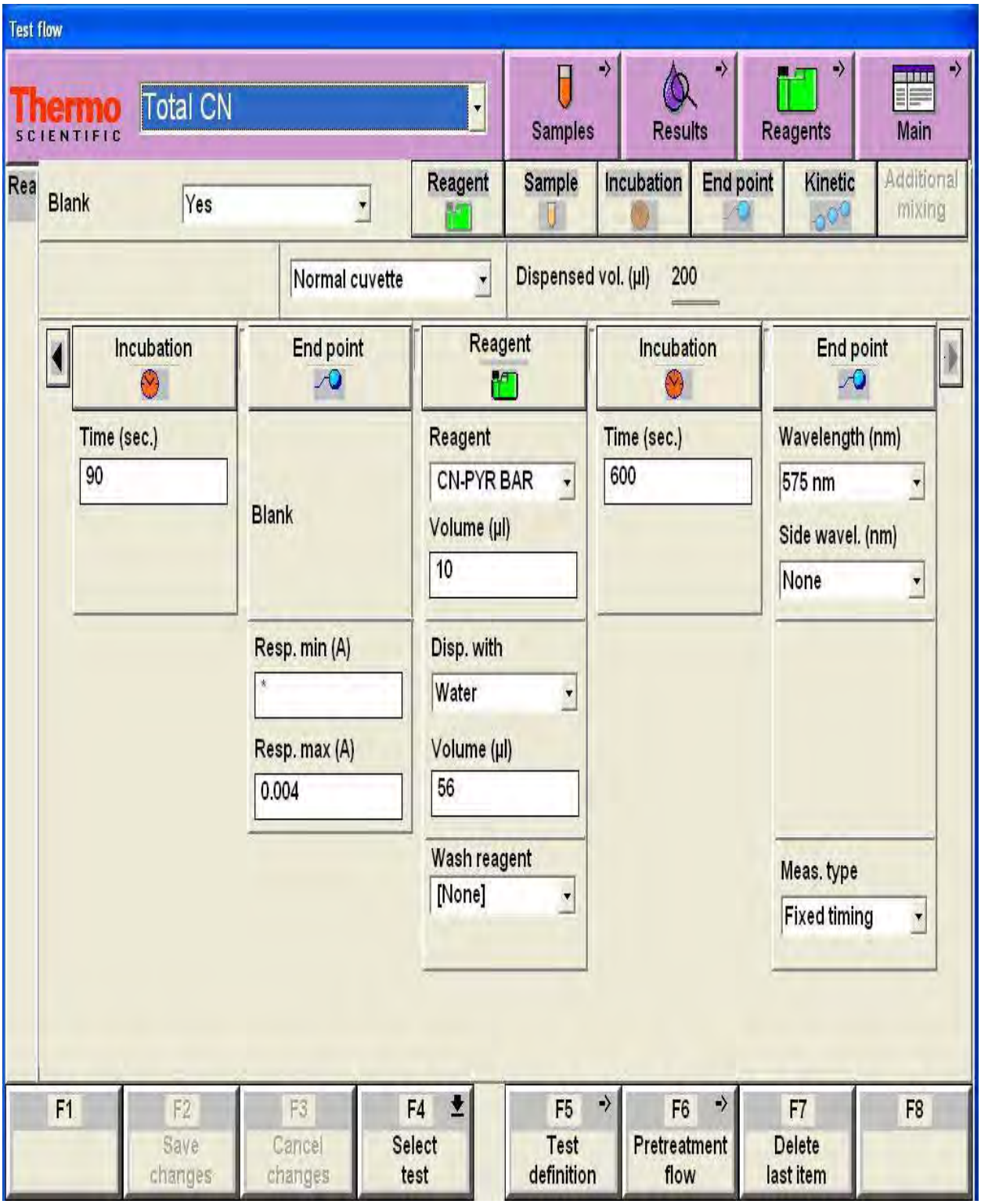
Appendix A (Continue)



Appendix A (Continue)



Appendix A (Continue)



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READ RECEIPT

Employee Name: _____

Department: _____

_____**M9012B-Total, Amenable and Reactive Cyanide**_____
Method or Document Read (Include Title, Number, Revision, as applicable)

Employee Statement: I have read and understood the information in the above mentioned method or document.

_____ _____
Employee Signature Date

Supervisory Statement: I have reviewed this document or method with the employee.

_____ _____
Supervisor Signature Date

Note: This receipt is to be returned to the Quality Assurance/Quality Control Department for incorporation into employee training record files. If you have questions or would like to review your train record files, please see QA/QC Director.

DETERMINATION OF SULFIDES

1. Test Method

1.1 Determination of Sulfides by Method SW846 9034 or SM4500 S F.

2. Applicable Matrices

2.1 Waste Water & Ground Water
2.2 Solid waste
2.3 Effluents

3. Reporting Limit

3.1 1.0 mg/L

4. Scope and Application

4.1 This procedure may be used as a determinative step for acid-soluble and acid-insoluble sulfides following distillation of the sample by SW-846 Method 9030.
4.2 Method 9034 is suitable for measuring sulfide concentrations in samples that contain 0.2 mg/kg to 50 mg/kg of sulfide.

5. Summary

5.1 Sulfide is extracted from the sample by a preliminary distillation procedure (See Method 9030) and precipitated in a zinc acetate scrubber as zinc sulfide.
5.2 The sulfide is oxidized to sulfur by adding a known excess amount of iodine.
5.3 The excess iodine is determined by titration with a standard solution of sodium thiosulfate until the blue iodine starch complex disappears.
5.4 As the use of standard sulfide solutions is not possible because of oxidative degradation, quantitation is based on sodium thiosulfate.

6. Definitions

6.1 Analyst: the designated individual who performs the "hands-on" analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.
6.2 Batch: Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents.
6.2.1 Preparation Batch: is composed of one to 20 environmental samples of the same matrix, meeting the above-mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours.
6.2.2 Analytical Batch: is composed of prepared environmental samples (extracts, digestates or concentrates), which are analyzed together as a group. An analytical batch can include prepared samples originating from various environmental matrices and can exceed 20 samples.
6.3 Blank: A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis. The

blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results.

6.4 Corrective Action: The action taken to eliminate the causes of an existing nonconformity, defect or other undesirable situation in order to prevent recurrence.

6.5 Duplicate Analyses: The analysis or measurements of the variable of interest performed identically on two sub-samples of the same sample. The results from duplicate analyses are used to evaluate analytical or measurement precision but not the precision of sampling, preservation or storage internal to the laboratory.

6.6 Holding Times (Maximum Allowable Holding Times): The maximum times that samples may be held prior to analysis and still be considered valid or not compromised.

6.7 Method Blank: A sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest, which is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses.

6.8 Preservation: Refrigeration and/or reagents added at the time of sample collection (or later) to maintain the chemical and/or biological integrity of the sample.

6.9 Pure Reagent Water: Water (defined by national or international standard) in which no target analytes or interferences are detected as required by the analytical method.

6.10 Standard: The document describing the elements of laboratory accreditation that has been developed and established within the consensus principles of NELAC and meets the approval requirements of NELAC procedures and policies.

6.11 Standard Operating Procedures (SOPs): A written document which details the method of an operation, analysis or action whose techniques and procedures are thoroughly prescribed and which is accepted as the method for performing certain routine or repetitive task.

6.12 Test Method: An adoption of a scientific technique for a specific measurement problem, as documented in a laboratory SOP.

6.13 Matrix Spike: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

6.14 Laboratory Control Sample: A sample of clean reference matrix that is prepared by adding a known mass of target analyte for which an independent estimate of target analyte concentration is available.

7. Interferences

7.1 Aqueous samples must be taken with a minimum of aeration to avoid volatilization of sulfide or reaction with oxygen, which oxidizes sulfide to sulfur compounds that are not detected.

7.2 Reduced sulfur compounds, such as sulfite and hydrosulfite, decompose in acid, and may form sulfur dioxide. This gas may be carried over to the zinc acetate gas scrubbing bottles and subsequently react with the iodine in the determinative step to yield false high values. The addition of formaldehyde into the zinc acetate gas scrubbing bottles removes this interference. Any sulfur dioxide entering the scrubber will form an addition compound with the formaldehyde, which is unreactive towards the iodine in the acidified mixture. The method shows no sensitivity to sulfite or hydrosulfite at concentrations up to 10 mg/kg of the interferent.

7.3 Interferences for acid-insoluble sulfides have not been fully investigated. However, sodium sulfite and sodium thiosulfate are known to interfere in the procedure for soluble sulfides. Sulfur also interferes because it may be reduced to sulfide by tin (II) chloride in this procedure.

7.4 The iodometric method suffers interference from reducing substances that react with iodine, including thiosulfate, sulfite, and various organic compounds.

7.5 The insoluble method should not be used for the determination of soluble sulfides because it can reduce sulfur to sulfide, thus creating positive interference.

8. Safety

8.1 Wear appropriate safety clothing and eye protection.

8.2 Use protective gloves when handling corrosive chemicals

8.3 Always use safety carts when transporting large bottles of chemicals.

8.4 Read material safety data sheet (MSDS) for the chemical used in the laboratory for the identity of the ingredients, the physical and chemicals characteristics of the substance, the physical hazards, and safe handling and safety precautions.

9. Equipment and Supplies

9.1 Class A graduated cylinder

9.2 Class A micro burette, 10mL with 0.02mL graduation intervals

9.3 Class A volumetric pipettes

9.4 Class A volumetric flasks

10. Reagents and Standards

10.1 Starch solution- 0.5% (w/v), Purchase prepared solution or prepare in lab - dissolve 2 g soluble starch and 2 g salicylic acid, as a preservative, in 100 mL hot reagent water.

10.2 Iodine solution (approximately 0.025N) (May be purchased commercially):

10.2.1 Dissolve 25 g potassium iodide, KI, in 700 mL of reagent water in a 1 liter volumetric flask.

10.2.2 Add 3.2 g iodine, I_2. Allow to dissolve.

10.2.3 Add 2 mL 6N HCl for acid soluble sulfides, or 10 mL 6N HCl for acid insoluble sulfides.

10.2.3.1 6N HCL: This is a 1:1 ratio. Pour 500 mL of concentrated HCl into 400 mL of reagent water and bring to 1 L.

10.2.4 Dilute to 1 liter and standardize as follows:

10.2.4.1 Dissolve approximately 2g KI in 150mL of reagent water.

10.2.4.2 Add exactly 20 mL of the iodine solution to be titrated and dilute to 300 mL with reagent water.

10.2.4.3 Titrate with 0.025N sodium thiosulfate until the amber color fades to yellow.

10.2.4.4 Add starch indicator solution.

10.2.4.5 Continue titration drop by drop until the blue color disappears.

10.2.5 Run in replicate

10.2.6 Calculate the normality as follows:

$$\text{Normality } (I_2) = \frac{\text{mL of titrant x normality of titrant}}{\text{sample size in mL}}$$

10.3 Sodium sulfide nonanhydrate, Na2S.9H2O (This chemical is good for 1 year after open)

(This can be purchased commercially or prepared as below).

10.3.1 Sulfide Stock Std 1000ppm – dissolve 0.75gram of Sodium Sulfide Na2S.9H2O into DI water and make final 100ml.

10.3.2 Prepare the stock std daily without head space

10.3.3 Standards must be prepared at pH > 9 and < 11.

10.3.4 Protect standard from exposure to oxygen by preparing it without headspace.

10.3.5 Sulfide 25ppm LCS standard – Spike 1.25ml of sulfide 1000ppm std and make final volume 50ml with DI water.

10.3.6 Sulfide 25ppm MS-MSD standard – spike 1.25ml in 50ml of sample.

10.4 Standard sodium thiosulfate solution (0.025N), $Na_2S_2O_3.5H_2O$

(This can be purchased commercially or prepared as below):

10.4.1 These standards are unstable and should be prepared daily.

10.4.2 Dissolve 6.205 +/- 0.005 g $Na_2S_2O_3.5H_2O$ in 500 mL reagent water.

10.4.3 Add 1.5 mL 6N NaOH or 9.0 mL 1N NaOH or 0.4 g solid NaOH and dilute to 1000 mL) use for 3 months after confirming the normality. To check the Normality, refer SOP SM5210B-BOD-CBOD, section 13.1.

11. Sample Collection, Shipment, and Storage

11.1 All aqueous samples and effluents must be preserved with zinc acetate and sodium hydroxide.

11.1.1 Use four drops of 2N zinc acetate solution per 100mL of sample. Adjust the pH to grater than 9 with 6N sodium hydroxide solution.

11.2 Fill the sample bottle completely and stopper with a minimum of aeration. The treated sample is relatively stable and can be held for up to **seven** days.

11.3 Distillates that are not analyzed immediately should be stored in a sealed flask at 4° C.

12. Quality Control

12.1 Preparation Blank

12.1.1 Analyze one preparation blank, consisting of deionized water, daily for each batch of 20 or fewer samples, whichever is more frequent.

12.2 Duplicate Samples

12.2.1 Analyze a duplicate sample daily for each batch of 20 or fewer samples, whichever is more frequent.

12.3 Blank Spike

12.3.1 Analyze a blank spike daily for each batch of 20 or fewer samples, whichever is more frequent.

12.4 Spike Samples

12.4.1 Analyze a matrix spike/matrix spike duplicate daily for each batch of 20 or fewer samples, whichever is more frequent.

12.5 Limit of Detection (LOD)

12.5.1 Verify LOD by spiking a quality system matrix at the established LOD concentration.

12.5.2 Sulfide LOD-MDL spike 0.5ppm – Dilute 1mL of sulfide std 25ppm to final volume of 50mL with DI water.

12.5.2 LOD is specific to each combination of matrix, method (including sample preparation) and instrument configuration.

12.5.3 LOD must be verified quarterly.

12.5.4 LOD must be verified on each instrument used, and every time the method is modified.

12.6 Limit of Quantitation (LOQ)

12.6.1 Sulfide LOQ spike 1.0ppm – Dilute 2mL of sulfide std 25ppm to final volume of 50mL with DI water.

12.6.2 LOQ must be verified quarterly for each quality system matrix, method and analyte, by analyzing QC sample containing the analytes of concern in each quality system matrix.

12.6.3 LOQ must be performed if the method is modified.

13. Calibration and Standardization

13.1 Titrant Standardization- See Section 10.2.4

14. Procedure

14.1 Using a volumetric pipette, pipette 4.0mL of standardized 0.025N iodine solution to titration flask.

14.2 Transfer the whole 20ml of gas scrubbing solution obtained in method 9030 to the titration flask.

14.3 Prepare a rinse solution of 1 mL of standardized 0.025N iodine solution, 1 mL of 6N HCl, and 10mL reagent water to rinse the remaining white precipitate (zinc sulfide) from the gas scrubbing bottles into the flask. There should be no visible traces of precipitate after rinsing. Rinse the gas scrubbing bottles with more 10ml DI water and transfer into the flask and make final volume 50ml.

14.4 If the distillation for acid-soluble sulfide is being used, add 1ml of 6N HCl and if it is acid-insoluble then use 5ml of 6N HCL in section 14.3

14.5 If at any point the amber color of the iodine disappears or fades to yellow, add more 0.025N iodine.

14.6 Record the total volume of standardized 0.025N iodine solution used.

14.7 Using a micro burette, titrate the solution in the flask with standard 0.025N sodium thiosulfate solution until the amber color fades to yellow.

14.8 Add enough of the starch indicator for the solution to turn dark blue and continue titrating until the blue disappears or fades to clear.

14.9 Record the volume of the titrant used.

15. Calculations

15.1 Calculate the concentration of sulfide using the following equation:

$$\frac{(\text{mL } I_2 \times \text{N } I_2) - (\text{mL titrant} \times \text{N titrant}) \times (32.06 \text{ g/2 eq.})}{\text{sample weight (kg) or sample volume (L)}} = \text{sulfide (mg/kg or mg/L)}$$

16. Method Performance

16.1 Precision and accuracy data are obtained by analyzing a blank spike with a concentration of 25mg/L four times.

16.2 Method Detection Limit: Refer SOP P203- Laboratory limits and demonstration of capability for MDL procedure.

17. Pollution Prevention

17.1 Use the hood when working with strong chemicals or fumes.

17.2 Keep the work area clean and clutter free to avoid any mishaps.

17.3 Use only the required amount of chemicals to avoid the generation of extra waste.

18. Data Assessment and Criteria for QC

18.1 Method Blank

18.1.1 The value of the blank < ½ RL.

18.2 Duplicate Samples

18.2.1 The control limits are ± 20 RPD

18.3 Blank Spike

18.3.1 The control limits are 80-120% recovery.

18.4 Matrix Spike

18.4.1 The control limits are 75-125% recovery.

18.5 Limit of Quantitation

18.5.1 Analysis must meet the acceptance criteria 70-130%.

19. Corrective Actions for Out-of-Control Data

19.1 Preparation Blank

19.1.1 If value of blank is above ½ RL, all samples associated with the blank must be redigested and reanalyzed for that analyte.

19.2 Duplicate Sample: If duplicate sample is outside control limits:

19.2.1 Check technique (esp. homogeneity of sample)

19.2.2 Rerun duplicate

19.2.3 If duplicate still fails - contact supervisor, technical director for assistance.

19.3 Blank Spike: If the blank spike is outside of control limits:

19.3.1 If the limits are not met, re-analyze the blank spike.

19.3.2 If the limits are still not met after two consecutive analyses, re-prepare and reanalyze all samples in that batch.

19.4 Matrix Spike: If spike sample is outside control limits:

19.4.1 Try a dilution (eliminate interference)

19.4.2 Check calculation

19.4.3 Check technique (pipetting, homogeneity)

19.4.4 If spike still fails - contact supervisor, technical director for assistance.

19.5 Limit of Quantitation

19.5.1 Reevaluate the LOQ, if outside the acceptance criteria 70-130%.

20. Contingencies for Handling Out-of-Control and Unacceptable Data

20.1 When all the above mentioned (Section 19) corrective measures have been taken and data remain outside the QA criteria set forth above, immediately contact your supervisor.

20.2 Document the situation clearly in your laboratory notebook and place a copy of the information in the case narrative of the final data report.

20.3 The supervisor must contact the QA/QC Director, Laboratory Manager, and Technical Director and notify them of the situation.

20.4 A corrective action plan must be developed in order to solve the problem.

21. Waste Management

21.1 Keep samples in house for 180 days after analysis and dispose of them according to the procedure explained in the SOP for waste disposal.

22. References

22.1 Test Methods for Evaluating Solid Wastes, Revision 0, Dec. 1996, Method 9034, Titrimetric Procedure for Acid-Soluble and Acid-Insoluble Sulfides

22.2 Test Methods for Evaluating Solid Wastes, Revision 0, Dec. 1996, Method 9030B, Titrimetric Procedure for Acid-Soluble and Acid-Distillation

22.3 Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.3 2019.

22.4 Standard methods for examination of water and wastewater, Method SM 4500 S F, Approved By Standard Method Committee 2000, Editorial Revision 2011.

23. List of Tables, Appendix, Attachments

23.1 NA

CHEMTECH 284 Sheffield Street, Mountainside, NJ 07092 (908) 789-8900

READ RECEIPT

Employee Name: _____

Department: _____

_____**M9034/SM4500 S F - Sulfide**_____

Method or Document Read (Include Title, Number, Revision, as applicable)

Employee Statement: I have read and understood the information in the above mentioned method or document.

_____ _____
Employee Signature Date

Supervisory Statement: I have reviewed this document or method with the employee.

_____ _____
Supervisor Signature Date

Note: This receipt is to be returned to the Quality Assurance/Quality Control Department for incorporation into employee training record files. If you have questions or would like to review your train record files, please see QA/QC Director.

SOIL AND WASTE PH

1. Test Method

1.1 Determination of pH in soil and waste by SW-846 Method 9045D.

2. Applicable Matrices

2.1 Soil

2.2 Waste (may be solids, sludges, or non-aqueous liquids).

3. Method Detection Limit

3.1 NA

4. Scope and Application

4.1 This method is an electrometric procedure for measuring pH in soils and waste samples. Wastes may be solids, sludges, or non-aqueous liquids. If water is present, it must constitute less than 20% of the total volume of the sample.

5. Summary

5.1 The sample is mixed with reagent water, and the pH of the resulting aqueous solution is measured.

6. Definitions

6.1 Analyst: the designated individual who performs the "hands-on" analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.

6.2 Batch: Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents.

6.2.1 Preparation Batch: is composed of one to 20 environmental samples of the same matrix, meeting the above-mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours.

6.2.2 Analytical Batch: is composed of prepared environmental samples (extracts, digestates or concentrates), which are analyzed together as a group. An analytical batch can include prepared samples originating from various environmental matrices and can exceed 20 samples.

6.3 Blank: A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis the blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results.

6.4 Calibration: To determine, by measurement or comparison with a standard, the correct value of each scale reading on a meter, instrument, or other device. The levels of the applied calibration standard should bracket the range of planned or expected sample measurement.

6.5 Duplicate Analyses: The analysis or measurements of the variable of interest performed identically on two sub-samples of the same sample. The results from duplicate analyses are used to evaluate analytical or measurement precision but not the precision of sampling, preservation or storage internal to the laboratory.

6.6 Holding Times (Maximum Allowable Holding Times): The maximum times that samples may be held prior to analysis and still be considered valid or not compromised.

7. Interferences

7.1 Samples with very low or very high pH may give incorrect readings on the meter. For samples with a true pH of >10, the measured pH may be incorrectly low. Minimize this error by using a low-sodium-error electrode. Strong acid solutions, with a true pH of <1, may give incorrectly high pH measurements.

7.2 Coatings of oily material or particulate matter can impair electrode response. Remove these coatings can usually by gentle wiping or detergent washing, followed by a deionized water rinse. An additional treatment with hydrochloric acid (1:10) may be necessary to remove any remaining film.

8. Safety

8.1 Wear appropriate safety clothing and eye protection.

8.2 Use protective gloves when handling corrosive chemicals.

8.3 Always use safety carts when transporting large bottles of chemicals.

8.4 Read material safety data sheet (MSDS) for the chemicals used in the laboratory for the identity of the ingredients, the physical and chemical characteristics of the substance, the physical hazards, and safe handling and safety precautions.

9. Equipment and Supplies

9.1 pH meter: with temperature compensating probe – Thermo Orion 350 from Thermo Scientific

9.2 Gel-Filled Combination pH electrode – 9106BNWP from Thermo Scientific

9.3 Magnetic stirrer and Teflon coated stirring bars

9.4 50 ml beaker

9.5 Temperature probe – PerpHecT ATC probe 927006 from Thermo Scientific

10. Reagents and Standards

10.1 Deionized water

10.2 Primary standard buffer solutions: pH 4.0, 7.0 and 10.0 for initial calibration

10.3 Secondary standard buffer solution: pH 7.0 as ICV

10.4 Buffer solutions: 2.0 and 12.0 for continuing calibration

11. Sample Collection, Shipment, and Storage

11.1 Samples must be analyzed within 15 minutes of sample collection. If not, data must be qualified.

12. Quality Control

12.1 Duplicate Sample

12.1.1 Run one duplicate sample daily or for every batch of 10 or fewer samples, whichever is more frequent.

13. Calibration and Standardization

13.1 Calibrate each instrument/electrode system each day of use at pH 4.0, 7.0 and 10.0.

13.2 Repeat adjustments on successive portions of the two buffer solutions until readings are within 0.05 pH units of the buffer solution value.

13.3 Note the passing slope and temperature on the batch document.

13.4 Analyze second source ICV at pH 7.0 to verify the calibration. Result should be within ±0.1pH unit of the known value.

13.5 When the pH meter is used for longer than three hours, check pH at 7.0 (first source) every three hours. The pH cannot differ by more than +/-0.1 pH units from the standard buffer value or the meter must be recalibrated.

13.6 Analyze CCV at pH 2.0 or pH 12.0 at the beginning and end of the run and every 10 samples. Results should be within ±0.1 unit of the known value.

14. Procedure

14.1 Turn meter on and warm up for 30 minutes. Standardize meter.

14.2 Place 20g sample in a 50mL beaker. Add 20mL DI water. Cover. Record weight of sample analyzed.

14.3 Continuously stir suspension for five minutes.

14.4 Let the soil suspension stand for about 1hour, or 15mins for waste materials.

14.5 If the sample absorbs all the reagent water, then repeat analysis with 20g sample and 40mL DI water.

14.6 Immerse the electrode just below the suspension.

14.7 If the supernatant is multiphasic, decant the oily phase and measure pH of the aqueous phase.

14.8 Temperature of the sample and standards must not differ by more than 2^0C from the buffer solution.

14.9 Note and record sample pH and temperature

Note: Measure the standard and sample at 25+10C if the pH is above 12.0. If the supernatant is multiphasic, decant the oily phase and measure the pH of the aqueous phase. The electrode may need to be cleaned if it becomes coated with an oily material.

15. Calculations

15.1 pH meters read directly in pH units. Report pH to the nearest 0.01 unit and temperature to the nearest 0.1^0C.

16. Method Performance

16.1 Precision and accuracy data are obtained for pH by analyzing duplicate samples.

17. Pollution Prevention

17.1 Use amount of chemicals as required. Do not make large quantities of solutions.
17.2 Use the hood when working with strong chemicals or fumes.
17.3 Keep the work area clean and clutter free to avoid any mishaps.

18. Data Assessment and Criteria for QC

18.1 Duplicate Samples
18.1.1 The control limits are ±0.1 pH unit.

19. Corrective Actions for Out-of-Control Data

19.1 Duplicate Sample: If duplicate sample is outside control limits:
19.1.1 Check technique (esp. homogeneity of sample)
19.1.2 Rerun duplicate.
19.1.3 If duplicate still fails - contact supervisor, technical director for assistance.

20. Contingencies for Handling Out-of-Control and Unacceptable Data

20.1 When all the above mentioned (Section 19) corrective measures have been taken and data remain outside the QA criteria set forth above, immediately contact your supervisor.
20.2 Document the situation clearly in your laboratory notebook and place a copy of the information in the case narrative of the final data report.
20.3 The supervisor must contact the QA/QC Director, Laboratory Manager, and Technical Director and notify them of the situation.
20.4 When necessary, a corrective action plan must be developed in order to solve the problem.

21. Waste Management

21.1 Keep sample for 180 days after analysis and dispose of them according to the procedures explained in the SOP for waste disposal.

22. References

22.1 Test Methods for Evaluating Solid Wastes, SW-846, Method 9045D, Revision 4, November 2004 - pH Electrometric Measurement
22.2 Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.3, September 2019.

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READ RECEIPT

Employee Name: _____

Department: _____

_____**M9045D-pH**_____

Method or Document Read (Include Title, Number, Revision, as applicable)

Employee Statement: I have read and understood the information in the above-mentioned method or document.

_____ _____
Employee Signature Date

Supervisory Statement: I have reviewed this document or method with the employee.

_____ _____
Supervisor Signature Date

Note: This receipt is to be returned to the Quality Assurance/Quality Control Department for incorporation into employee training record files. If you have questions or would like to review your train record files, please see QA/QC Director.

PAINT FILTER LIQUIDS TEST

1. Test Method

1.1 Determination of Paint Filter Liquids Test in waste by SW-846 Method 9095B.

2. Applicable Matrices

2.1 Waste

3. Method Detection Limit

3.1 1mL/100g

4. Scope and Application

4.1 This method is used to determine the presence of free liquids in a representative sample of waste.

5. Summary

5.1 A predetermined amount of material is placed in a paint filter. If any portion of the material passes through and drops from the filter within the 5-minute test period, the material is deemed to contain free liquids.

6. Definitions

6.1 Analyst: the designated individual who performs the "hands-on" analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.

6.2 Batch: Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents.

6.3 Duplicate Analyses: The analysis or measurements of the variable of interest performed identically on two sub-samples of the same sample. The results from duplicate analyses are used to evaluate analytical or measurement precision but not the precision of sampling, preservation or storage internal to the laboratory.

6.4 Holding Times (Maximum Allowable Holding Times): The maximum times that samples may be held prior to analysis and still be considered valid or not compromised.

6.5 Precision: The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms.

6.6 Standard: The document describing the elements of laboratory accreditation that has been developed and established within the consensus principles of NELAC and meets the approval requirements of NELAC procedures and policies.

6.7 Standard Operating Procedures (SOPs): A written document which details the method of an operating, analysis or action whose techniques and procedures are thoroughly prescribed and which is accepted as the method for performing certain routine or repetitive task.

6.8 Test Method: An adoption of a scientific technique for a specific measurement problem, as documented in a laboratory SOP.

7. Interferences

7.1 Filter media were observed to separate from the filter cone on exposure to alkaline materials. This development causes no problem if the sample is not disturbed.

7.2 Temperature affects the test results if sample are too chilled. Analysis at room temperature resolves the problem.

8. Safety

8.1 Wear appropriate safety clothing and eye protection.

8.2 Use protective gloves when handling corrosive chemicals.

9. Equipment and Supplies

9.1 Conical paint filter: Mesh number 60 ± 5% (fine-meshed size). Available at local paint stores.

9.2 Glass funnel: If the paint filter, with the waste, cannot sustain its weight on the ring stand, then a fluted glass funnel with a mouth large enough to allow at least 1 inch of the filter mesh to protrude should be used to support the filter. The funnel should be fluted or have a large open mouth in order to support the paint filter yet not interfere with the movement, to the graduated cylinder, of the liquid that passes through the filter mesh.

9.3 Ring stand and ring, or tripod

9.4 Graduated cylinder or beaker: 100 ml capacity having minimum 1mL graduation

10. Reagents and Standards

10.1 N/A

11. Sample Collection, Shipment, and Storage

11.1 A 100 ml or 100 g representative sample is required for the test. If it is not possible to obtain a sample of 100 ml or 100 g that is sufficiently representative of the waste, the analyst may use larger size samples in multiples of 100 ml or 100 g, i.e., 200, 300, 400 ml or g. However, when larger samples are used, analysts shall divide the sample into 100 ml or 100 g portions and test each portion separately. If any portion contains free liquids, the entire sample is considered to have free liquid.

11.2 Store samples in a tightly closed container to avoid loss of moisture.

11.3 Refrigerate the sample at 4^0C until analyzed.

11.4 There is no holding time for this test.

12. Quality Control

12.1 Duplicate Sample

12.1.2 Run one duplicate sample daily or for every batch of 20 or fewer samples, whichever is more frequent.

13. Calibration and Standardization

13.1 No calibration is required.

14. Procedure

14.1 Assemble the apparatus using a ring stand and a fluted funnel as shown in the fig in Appendix A.

14.2 Place the filter in the funnel.

14.3 Weigh 100 grams representative of the waste and place into the filter.

14.4 Allow sample to drain for 5 minutes into the graduated cylinder.

14.5 If any portion of the test material collect in the graduated cylinder during the 5 minute period, then the material is deemed to contain free liquids for the purpose of 40 CFR 264.314 and 265.314.

14.6 Report the results as mL/100g.

14.7 In order to assure uniformity and standardization of the test, material such as sorbent pads or pillows which do not conform to the shape of the paint filter should be cut into small pieces and poured into the filter. Sample size reduction may be accomplished by cutting the sorbent material with scissors, shears, a knife, or other such device so as to preserve as much of the original integrity of the sorbent fabric as possible. Sorbents enclosed in a fabric should be mixed with the resultant fabric pieces. The particles to be tested should be reduced smaller than 1 cm (i.e., should be capable of passing through a 9.5 mm (0.375 inch) standard sieve). Grinding sorbent materials should be avoided as this may destroy the integrity of the sorbent and produce many "fine particles" which would normally not be present.

14.8 For brittle materials larger than 1 cm that do not conform to the filter, light crushing to reduce oversize particles is acceptable if it is not practical to cut the material. Materials such as clay, silica gel, and some polymers may fall into this category.

15. Calculations

15.1 NA

16. Method Performance

16.1 NA

17. Pollution Prevention

17.1 Use the hood when working with strong chemicals or fumes.

17.2 Keep the work area clean and clutter free to avoid mishaps.

18. Data Assessment and Criteria for QC

18.1 Duplicate sample

18.1.1 Results must be within $\pm$20%.

19. Corrective Actions for Out-of-Control Data

19.1 If the Duplicate sample is out of control, check the technique and repeat the test.

20. Contingencies for Handling Out-of-Control and Unacceptable Data

20.1 NA

21. Waste Management

21.1 Keep sample for 180 days after analysis and dispose of them according to the procedures explained in the SOP for waste disposal.

22. References

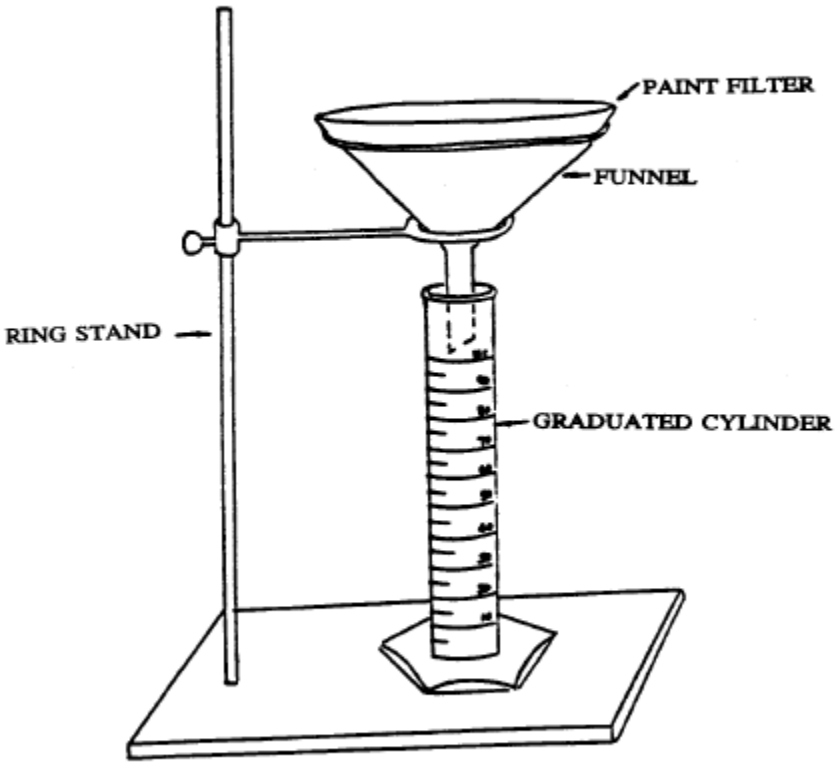
22.1 Test Methods for Evaluating Solid Waste, SW-846, Method 9095B – Revision 2, November 2004 – Paint Filter Liquids Test.

22.3 Department of Defense Quality Systems Manual for Environmental Laboratories Version 5.3 2019.

23. Appendices, Tables, Attachments

23.1 Appendix A: Paint Filter Test Apparatus

Appendix A



CHEMTECH 284 Sheffield Street, Mountainside, NJ 07092 (908) 789-8900

READ RECEIPT

Employee Name: _____

Department: _____

_____**M9095B-Free Liquids**_____

Method or Document Read (Include Title, Number, Revision, as applicable)

Employee Statement: I have read and understood the information in the above-mentioned method or document.

_____ _____
Employee Signature Date

Supervisory Statement: I have reviewed this document or method with the employee.

_____ _____
Supervisor Signature Date

Note: This receipt is to be returned to the Quality Assurance/Quality Control Department for incorporation into employee training record files. If you have questions or would like to review your train record files, please see QA/QC Director.

EXTRACTABLE PETROLEUM HYDROCARBONS BY METHOD NJDEP EPH

1. Test Method

1.1 This method utilizes a gas chromatograph (GC) fitted with a flame ionization detector (FID) to determine the collective concentrations of extractable aliphatic and aromatic petroleum hydrocarbons in water and soil/sediment matrices.

2. Applicable Matrices

2.1 This method can be used for the quantitative analysis of environmental samples (water, soil, sediment, and sludge) for residues from commercial petroleum products such as crude oil, diesel fuel, waste oil, fuel oil Nos. 2-6, lubricating oil, processed oil and bunker fuel.

2.1 This method shall not be used for the quantitative analysis of gasoline, mineral spirits, petroleum naphtha and other petroleum products which contain a significant percentage of hydrocarbons lighter than C9 in water and soil/sediment/sludge matrices at contaminated sites.

3. Approximate Dynamic Range

3.1 EPH
Soil 80 -16000 mg/kg
Aqueous 0.8 - 160 mg/L

3.2 Individual Carbon Ranges
Soil 10 - 2000 mg/kg
Aqueous 0.10 - 20 mg/L

4. Scope and Application

4.1 This method utilizes a gas chromatograph (GC) fitted with a flame ionization detector (FID) to determine the collective concentrations of extractable aliphatic and aromatic petroleum hydrocarbons in water and soil/sediment matrices.

4.2 This method can be used for the quantitative analysis of environmental samples (water, soil, sediment, and sludge) for residues from commercial petroleum products such as crude oil, diesel fuel, waste oil, fuel oil Nos. 2-6, lubricating oil, processed oil and bunker fuel.

4.3 This method shall not be used for the quantitative analysis of gasoline, mineral spirits, petroleum naphtha and other petroleum products which contain a significant percentage of hydrocarbons lighter than C9 in water and soil/sediment/sludge matrices at contaminated sites.

4.4 Applicable Programs are Underground Storage Tanks (UST), New Jersey Spill Fund, Comprehensive Environmental Response Compensation and Liability Act (CERCLA), Industrial Site Recovery Act (ISRA), Sludge Residuals, and Resource Conservation and Recovery Act (RCRA).

4.5 This method replaces the Total Petroleum Hydrocarbons (TPH) method based on Freon 113 extraction and analysis by infrared spectroscopy (i.e., Method 418.1). The FID response produces extractable petroleum hydrocarbon (EPH)

chromatograms that can be used to calculate concentrations of specified carbon ranges for both aliphatic and aromatic fractions.

4.6 This method provides results for specific carbon number ranges in both aliphatic and aromatic fractions of EPH thereby providing a more accurate assessment of potential health risk at environmental sites.

4.7 Lower boiling hydrocarbons may co-elute with extraction solvents.

4.8 The EPH measured by this method is quantitatively restricted to the semi-volatile components as partial loss of volatiles (including those compounds lighter than C9) occurs during the extraction and/or concentration process.

4.9 The gas chromatographic conditions are not designed for samples containing EPH with carbon numbers greater than C44.

5. Summary of Method

5.1 Petroleum residues are extracted from sample matrices with methylene chloride, dried over sodium sulfate, solvent exchanged to hexane and concentrated in a Kuderna-Danish apparatus.

5.2 The extracts are separated into aliphatic and aromatic fractions using silica gel columns, either commercially available or lab prepared.

5.3 Each of the aliphatic and aromatic fractions are re-concentrated and subsequently analyzed separately by capillary column GC/FID.

5.4 Each of the resultant chromatograms of the aliphatic and aromatic fractions are used to quantitate four distinct carbon number ranges. Each carbon number range is defined using equivalent carbon (EC) numbers.

5.5 The EC number is related to a compound's boiling point and retention time on a gas chromatography column normalized to the actual carbon numbers of n-alkanes.

5.6 Retention times are halfway between those of n-tetradecane (a straight 14-carbon chain compound) and n-hexadecane (a straight 16-carbon chain compound).

5.7 The EC numbers are used because they are more closely related to environmental mobility. The four EC number ranges for the aliphatic fractions are: EC9 to EC12, EC12 to EC16, EC16 to EC21 and EC21 to EC40.

5.8 Similarly, the resultant chromatograms of the aromatic fractions are used to quantitate four distinct carbon number ranges. The four carbon number ranges for the aromatic fractions are: EC10 to EC12, EC12 to EC16, EC16 to EC21 and EC21 to EC36.

5.9 Surrogate compounds are added to all samples before extraction and their recoveries are monitored. Percent recoveries for the surrogates can be expected to be in the 50 - 90 % range.

5.10 Fractionating surrogates are added to the hexane extract just prior to fractionation to monitor the efficiency of the fractionation process. Percent recoveries for the fractionating surrogates can be expected to be in the 40 - 95% range.

5.11 The EPH concentration is determined by integration of the FID chromatogram

5.12 Average calibration factors or response factors using the aliphatic standard mixture are used to calculate the concentration of each carbon range. Average calibration factors or response factors using the aromatic standard mixture are

used to calculate the concentration of each carbon range. Concentrations of each carbon range from both fractions are summed for a total EPH concentration.

5.13 The sensitivity of the method may be dependent on the level of interference rather than on instrumental limitations. The quantitation limit for each carbon range in soil is approximately 10mg/kg and in water 100ug/L.

5.14 The following compounds are analyzed:

5.14.1 Aliphatic Hydrocarbon Standard
n-Nonane (C9)
n-Decane (C10)
n-Dodecane (C12)
n-Tetradecane (C14)
n-Hexadecane (C16)
n-Octadecane (C18)
n-Eicosane (C20)
n-Heinicosane (C21)
n-Docosane (C22)
n-Tetracosane (C24)
n-Hexacosane (C26)
n-Octacosane (C28)
n-Triacontane (C30)
n-Dotriacontane (C32)
n-Tetratriacontane (C34)
n-Hexatriacontane (C36)
n-Octatriacontane (C38)
n-Tetracontane (C40)

5.14.2 Aromatic Hydrocarbon Standard
Aromatic Hydrocarbon (EC #)
Acenaphthene (C15.5)
Acenaphthylene (C15.06)
Anthracene (C19.43)
Benzo[a]anthracene (C26.37)
Benzo[a]pyrene (C31.34)
Benzo[b]fluoranthene (C30.14)
Benzo[g,h,i]perylene (C34.01)
Benzo[k]fluoranthene (C30.14)
Chrysene (C27.41)
Dibenz[a,h]anthracene (C30.36)
Fluoranthene (C21.85)
Fluorene (C16.55)
Indeno[1,2,3-cd]pyrene (C35.01)
2-Methylnaphthalene (C12.89)
Naphthalene (C11.7)
Phenanthrene (C19.36)
Pyrene (C20.8)
1,2,3-Trimethylbenzene (C10.1)

6. Definitions

6.1 Analyst: The designated individual who performs the "hands-on" analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.

6.2 Batch: Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents.

6.3 Preparation Batch: Composed of one to 20 environmental samples of the same NELAC-defined matrix, meeting the above-mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours.

6.4 Corrective Action: The action taken to eliminate the causes of an existing nonconformity, defect or other undesirable situation in order to prevent recurrence.

6.5 Gas Chromatography: A method of chemical analysis in which the components of a mixture are separated from one another by volatilizing the sample passing it through a capillary column and the compounds are identified.

6.6 Holding Times (Maximum Allowable Holding Times): The maximum times that samples may be held prior to analysis and still be considered valid or not compromised.

6.7 Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of anlaytes. It is generally used to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

6.8 Matrix Spike: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of Target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

6.9 Matrix Spike Duplicate: A second replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of the precision of the recovery for each analyte.

6.10 Method Blank: A sample of a matrix similar to the batch of associated samples (when available) that is free form the analytes of interest, which is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses.

6.11 Method Detection Limit: The minimum concentration of a substance (an analyte) that can be measured and reported with 99 % confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

6.12 Surrogate: A substance with properties that mimic the analyte of interest. It is unlikely to be found in environment samples and is added to them for quality control purposes.

6.13 Reagent Water: Reagent water is defined as water in which interference is not observed at the MDL of each parameter of interest.

7. Interferences

7.1 Method interferences are reduced by washing all glassware and then rinsing with tap water, distilled water, methanol, and methylene chloride.

7.2 High purity reagents such as Burdick and Jackson GC2 methylene chloride, Baker capillary grade methylene chloride or equivalent must be used to minimize interference problems.

7.3 Before processing any sample, the analyst shall demonstrate daily, through the analysis of method blank, that the entire system is interference-free.

7.4 Matrix interferences may be caused by contaminants that are co-extracted from the sample. The extent of matrix interference will vary considerably from source to source (e.g., fatty acids, biogenic materials, oxidized biodegradation products), depending upon the nature and diversity of the site being sampled. The silica gel cleanup procedure, USEPA SW-846 Method 3630B, can be used to overcome many of these interferences but unique samples may require additional cleanup approaches such as SW-846 Methods 3610B, 3620B and 3660B to achieve the necessary analytical sensitivity.

7.5 Naturally occurring alkanes may be detected by this method and may interfere with product identification. Naturally occurring plant waxes include predominantly odd carbon number alkanes from n-C25 through n-C35, and exhibit a dominant odd/even chain length distribution.

8. Safety

8.1 The toxicity or carcinogenicity of each reagent used in this method has not been defined precisely. Each chemical compound should be treated as a potential health hazard.

8.2 Exposure to these chemicals must be reduced to the lowest possible level.

9. Equipment and Supplies

9.1 Gas Chromatograph with a flame ionization detector (FID). The FID signal is sent to a PC for processing.

Instrument Name	Column	Supplier	Catalog #	Software	Version
FID C FID E FID D	RXI-1MS 20M x 0.18mm ID x 0.18um film thickness (equivalent)	Restek	13302	HP Chemstation MSD Chemstation	G1701-AA Aug 2003 MSD Chemstation Version D.01.00 Build 75

9.2 Auto sampler Agilent 7683

9.3 Disposable Borosilicate Glass Pasteur pipettes

9.4 Syringes: 10µL, 100µL and 200µL
9.5 Volumetric Flask: 10mL, 25mL, 100mL
9.6 Inlet Liner Supelco Catalog # 2-0486-25 or equivalent
9.7 Septum Supelco Catalog # 22647 or equivalent
9.8 O-Ring Supelco Catalog # 21004-U or equivalent
9.9 Analytical balance capable of accurately weighing 0.0001g.
9.10 Boiling chips (Teflon® preferred) - Solvent extracted approximately 10/40 mesh.
9.11 Water bath - Top, with concentric ring cover, capable of temperature control. The bath should be used in a hood.
9.12 Gas-tight syringe - One milliliter (mL) with chromatographic needles.
9.13 Magnetic stirrer and 2-inch Teflon coated stirring bars.
9.14 Nitrogen concentration system composed of a precleaned pasteur pipette, with a small plug of glass wool (previously washed with solvent and dried) loaded at the tip end, and filled with approximately 1-2 cm of precleaned alumina. The top of the pipette is attached to a hydrocarbon free nitrogen gas source using precleaned Teflon tubing. This concentration step should be performed at room temperature or lower to retain light end compounds.

10. Reagents and Standards (see Appendix A)

10.1 Reagent water
10.2 Methylene chloride, methanol, carbon disulfide and hexane - pesticide grade, Burdick and Jackson GC2, Baker Capillary Grade or equivalent.
10.3 Sodium sulfate - (ACS) granular, anhydrous. Purify by heating at 400oC for four hours in a shallow tray, cool in a desiccator and store in a sealed glass bottle.
10.4 Silica gel desiccant (for fractionation) - 100/200 mesh (Davison Chemical Grade 923 or equivalent). Before use, activate for at least 16 hours at 130oC in a shallow glass tray that is loosely covered in foil. Cool and store.
10.5 Commercially available Solid Phase Extraction (SPE) cartridges (20ml tube volume/5g bed weight) may be used (Restek - Massachusetts TPH Specialty SPE Cartridge or equivalent). (Please note: Silica gel is hygroscopic. Unused cartridges must be stored in properly maintained desiccators prior to use to prevent absorption of moisture from air.)
10.6 Hydrochloric acid, 1:1 - Mix equal volumes of (ACS grade) concentrated HCl and distilled water.
10.7 Aliphatic Hydrocarbon Stock Standard - Commercially available from Restek, check the table below. Custom NJEPH Aliphatic Calibration Standard contains 18 aliphatic compounds, naphthalene, and 2-methylnaphthalene. Two surrogate compounds first, Ortho-Terphenyl and 1-Chlorooctadecane should be added to the calibration standard to make the final concentration of 100 ug/ml in Hexane
10.8 Aromatic Hydrocarbon Stock Standard – Commercially available from Restek, check the table below. Custom NJEPH Aromatic Calibration Standard contains 18 aromatic compounds. The surrogate compound (ortho-Terphenyl) and the fractionating surrogate compounds (1-Bromonaphthalene and 2-Fluorobiphenyl) should be added to the calibration standard to make the final concentration of 100 ug/ml in Methylene chloride.

10.9 Surrogate Spiking Solution – Commercially available from Restek, check the table below

10.10 Laboratory Control Sample (LCS) (Blank Spike) Solution - The LCS solution is the same as the matrix spiking solution. 1mL is used to fortify either reagent water or clean sand (or sodium sulfate).

10.11 Matrix spiking solution (MSS) - Commercially available from Restek, check the table below. The source of the standards shall be different than those from which the calibration standards are made. A 1mL aliquot is added to the sample designated as the matrix spike.

10.12 Fractionating Surrogate Spiking Solution - Commercially available from Restek, check the table below. An aliquot of 1ml of the fractionating surrogate spiking solution is added to the 1ml EPH sample extract just prior to fraction separation with silica gel.

10.13 Fractionating Check Solution - This solution is used to monitor the fractionation efficiency of the silica gel cartridge/column and establish the optimum hexane volume required to efficiently elute the aliphatic fraction without significant aromatic breakthrough. Prepare the solution containing 200ng/uL of all the compounds listed in the aliphatic hydrocarbon standard and 200ng/uL of all the compounds listed in the aromatic hydrocarbon standard in hexane.

Supplier/Name of Standard	Catalog Number	Stock Concentration	Compounds	Final Working Standard Concentration
Restek/Custom NJEPH Aliphatic Calibration Standard	30540	2000 ug/ml	18 compounds from C9 to C40 for Aliphatic carbon compounds +2 compounds from Aromatic carbon compounds (Naphthalene and 2-Methylnaphthalene)	5,10,20,50, 100 ug/ml each compound
Restek/Custom NJEPH Aromatics Calibration Standard	30541	2000 ug/ml	18 compounds from C10.1 to C35.01 for Aromatic carbon compounds	5,10,20,50, 100 ug/ml each compound
Restek/MA Fractionation Surrogate Spike Mix	31480	4000 ug/ml	2-Fluorobiphenyl 2-Bromonaphthalene	5,10,20,50,100 ug/ml
Restek/Custom NJEPH Aliphatics Matrix Spike Mix	30542	200 ug/ml	18 compounds from C9 to C40.	100 ug/ml
Restek/Custom NJEPH Aromatics Matrix Spike Mix	30543	200 ug/ml	18 compounds from C10.1 to C35.01 fro Aromatic carbon compounds	100 ug/ml

Supplier/Name of Standard	Catalog Number	Stock Concentration	Compounds	Final Working Standard Concentration
Retek/o-Terphenyl Standard (OTP)	31097	10,000 ug/ml	Surrogate	5,10,20,50,100 ug/ml for initial calibration and 100 for extraction
Restek/1-Chlorooctadecane Standard (COD)	31098	10,000 ug/ml	Surrogate	5,10,20,50,100 ug/ml for initial calibration and 100 for extraction
Second Source Standard for ICV-Absolute/NJ EPH Aliphatic n-Hydrocarbons-Revised	95899	1000 ug/ml	18 compounds from C9 to C40 for Aliphatic carbon compounds +2 compounds from Aromatic carbon compounds (Naphthalene and 2-Methylnaphthalene)	20 ug/ml each compound
Second Source Standard for ICV-Absolute/NJ EPH Aromatic Hydrocarbons	95709	2000 ug/ml	18 compounds from C10.1 to C35.01 for Aromatic carbon compounds	20 ug/ml each compound

11. Sample Handling and Preservation

11.1 Aqueous Matrix

11.1.1 Collect a representative water sample in a 1 L narrow mouth bottle. A delay between sampling and analysis of greater than four hours requires sample preservation by the addition of 5ml HCl. Confirmation of a pH < 2 must be obtained in the field.

11.1.2 Sample must be chilled to 4±2oC at the time of collection and stored at 4±2oC until received at the laboratory.

11.1.3 The laboratory must determine the pH of all water samples as soon as possible after sample receipt and prior to extraction. Any sample found to contain a pH > 2 must be noted and the pH must be adjusted as soon as possible. Samples are to be stored at 4±2oC until extraction.

11.1.4 Samples must be extracted within fourteen days from the time of collection. Extracts must be analyzed within 40 days of extraction.

11.2 Solid Matrix

11.2.1 Collect a representative soil-sediment sample in a four-ounce, wide-mouth jar with a minimum of air space.

11.2.2 Samples must be chilled at 4±2oC at the time of collection and stored at 4±2oC until analyzed.

11.2.3 Samples must be extracted within fourteen days from the time of collection. Extracts must be analyzed within 40 days of extraction.

12. QC Control

12.1 Instrument Calibration

12.1.1 Analyze calibration as explained in section 13.

12.2 Method Blank

12.2.1 With each sample batch, analyze a method blank

12.3 Instrument Blank

12.3.1 Analyze an instrument blank each day before the calibration and after the calibration.

12.4 Surrogate Recoveries

12.4.1 Spike all extracts with surrogates. Add fractionating surrogate compounds prior to the extract being separated into aliphatic and aromatic fractions.

12.5 Matrix Spike Recoveries and LCS

12.5.1 Spike a minimum of five percent or one per batch, whichever is more frequent of all samples in each matrix, with the matrix spiking solution. Analyze a LCS and LCSD for each analytical batch (up to 20 samples of a similar matrix) by fortifying a reagent water or clean sand (or sodium sulfate) blank with 1.0mL of the matrix spiking solution.

12.6 Sample Duplicate

12.6.1 Analyze 5% of the samples for each matrix in duplicate.

12.7 Control Charts

12.7.1 Establish control charts, accuracy charts for spike and LCS.

12.7.2 Update the control charts every year.

12.8 Manual Integration

12.8.1 At times manual integration will be necessary due to incomplete or incorrect integration by the automated analytical system.

12.8.2 Manual integration cannot be used in order to satisfy Quality Control Criteria. Integrate the area of the compound of interest.

12.8.3 Do not include baseline background noise

12.8.3.1 Integrate the total area. Do not skim or reintegrate the area unless necessary.

12.8.4 Any time a compound is integrated in the calibration standard it must then be consistently integrated in the samples.

12.8.5 When a manual integration is performed the hardcopy of the quantitation report will flag the compound with an “m”.

12.8.6 Document the reason for the manual integration on the quant report or on the analysis run log.

12.9 Precision and Accuracy

12.9.1 Aqueous matrix

12.9.1.1 Prepare seven 1L aliquots of the well-mixed reagent water spiked with 1.0mL of matrix spiking solution and 1.0mL of the surrogate spiking solution.

12.9.1.2 Follow all extraction, fractionation and analytical procedures.

12.9.2 Soil and Sediment
12.9.2.1 Prepare seven 10g aliquots of clean sand (or sodium sulfate) spiked with 1.0mL of matrix spiking solution and 1.0mL of the surrogate spiking solution.
12.9.2.2 Follow all extraction, fractionation and analytical procedures.
12.9.3 For each matrix, calculate the mean recovery for each of the aliphatic and aromatic compounds using the seven results.
12.9.4 For each matrix calculate the percent relative standard deviation (%RSD) of the seven replicates.

12.10 Method Detection Limit
12.10.1 Please refer SOP P203-Laboratory limits and demonstration of capability for MDL procedure.

13. Calibration and Standardization

13.1 GC Conditions (*or equivalent)

***Instrument Temperature Conditions**

Instrument Name	Initial Temperature	Initial Hold	Temperature Ramp	Final Temperature	Final Hold
FID C FID E	40ºC	1 Minutes	15 ˚C/Minute	330 ˚C	2.7 Minutes

***Instrument Temperature and Flow Conditions**

Instrument Name	Injector Temperature	Detector Temperature	Detector Air Flow	Detector Hydrogen Flow	Carrier Flow
FID C FID E	250ºC	350 ˚C	350 mL/Minute	40 mL/Minute	10 mL/Minute

13.2 Calibration Standard (*Standards concentrations subject to change)

Standard	Preparation Information
100 ppm Aliphatic EPH STD	Add 0.25 ml of COD + 0.25 ml of OTP+ 1.25 ml of Custom Aliphatic Calibration Standard + 23.5 ml of Hexane
50 ppm Aliphatic EPH STD	Add 0.5 ml of 100 ppm Aliphatic STD + 0.5 ml of Hexane
20 ppm Aliphatic EPH STD	Add 0.2 ml of 100 ppm Aliphatic STD + 0.8 ml of Hexane
10 ppm Aliphatic EPH STD	Add 0.1 ml of 100 ppm Aliphatic STD + 0.9 ml of Hexane

Standard	Preparation Information
5 ppm Aliphatic EPH STD	Add 0.1 ml of 50 ppm Aliphatic STD + 0.9 ml of Hexane
100 ppm Aromatic EPH STD	Add 0.25 ml of OTP + 0.625 ml of Fractionation Surrogate Spike mix + 1.25 ml of Custom Aromatic Calibration Standard + 22.875 ml of Methylene chloride
50 ppm Aromatic EPH STD	Add 0.5 ml of 100 ppm Aromatic STD + 0.5 ml of Methylene chloride
20 ppm Aromatic EPH STD	Add 0.2 ml of 100 ppm Aromatic STD + 0.8 ml of Methylene chloride
10 ppm Aromatic EPH STD	Add 0.1 ml of 100 ppm Aromatic STD + 0.9 ml of Methylene chloride
5 ppm Aromatic EPH STD	Add 0.1 ml of 50 ppm Aromatic STD + 0.9 ml of Methylene chloride
100 PPM Aliphatic EPH STD (2^{nd} Source)	Add 0.25 ml of COD + 0.25 ml of OTP+ 2.5 ml of NJEPH Aliphatic n-Hydrocarbon Standard (absolute) + 22 ml of Hexane
20 PPM Aliphatic EPH ICV STD	Add 0.2 ml of 100 ppm Aliphatic ICV STD + 0.8 ml of Hexane
100 PPM Aromatic EPH STD (2^{nd} Source)	Add 0.25 ml of OTP + 0.625 ml of Fractionation Surrogate Spike mix + 1.25 ml of NJEPH Aromatic Hydrocarbon Standard (absolute) + 22.875 ml of Methylene chloride
20 PPM Aromatic EPH ICV STD	Add 0.2 ml of 100 ppm Aromatic ICV STD + 0.8 ml of Methylene chloride

13.3 Calibration Calculations and Criteria

13.3.1 Calibrate the GC-FID with an initial five-point calibration. The recommended standard concentrations of each individual component are 5ng/uL, 10ng/ul, 20ng/uL, 50ng/uL and 100ng/uL.

13.3.2 Separate calibrations are to be conducted for each fraction.

13.3.3 The highest concentration point should be twice the expected sample concentration and within the linear range of the instrument.

13.3.4 To maintain the standards in solution, a 10% carbon disulfide/90% methylene chloride solvent may be required. Standards with concentrations greater than 20mg/L may need to be equilibrated to room temperature prior to analysis.

13.3.5 Prepare the calibration standards to contain 100ng/uL of each surrogate. The surrogate OTP and the fractionating surrogates are included in the Aromatic Hydrocarbon Standard. The surrogate COD is included in the Aliphatic Hydrocarbon Standard.

13.3.6 A calibration factor (CF) must be established for each individual component. Also, a separate calibration factor (CF) must be established for each carbon range of interest. Calculate CFs for the C9-C12, C12-

C16, C16-C-21 and C21-C40 Aliphatic Hydrocarbon carbon ranges from the appropriate aliphatic analysis chromatogram. Calculate CFs for C10-C12, C12-C16, C16-C-21 and C21-C36 Aromatic Hydrocarbon carbon ranges from the appropriate aromatic analysis chromatogram.

13.3.7 For the aliphatic fraction, use the following compounds as carbon range markers:

Range	Compound	EC
C9-C12	n-Nonane	9.0
	n-Dodecane	12.0
C12-C16	n-Dodecane + 0.1 min	
	n-Hexadecane	16.0
C16-C21	n-Hexadecane + 0.1 min	
	n-Heinicosane	21.0
C21-C40	n-Heinicosane + 0.1min	
	n-Tetracontane	40.0

13.3.8 For the aromatic fraction, use the following compounds as carbon range markers:

Range	Compound	EC
C10-C12	1,2,3-Trimethylbenzene	10.1
	Naphthalene	11.7
C12-C16	Naphthalene + 0.1 min	
	Acenaphthene	15.5
C16-C21	Acenaphthene + 0.1 min	
	Pyrene	20.8
C21-C36	Pyrene + 0.1min	
	Benzo(g,h,i)perylene + 1.0 minute	34.01

Note: The "+ 0.1 minutes" noted above in both the aromatic and aliphatic fractions are maximums. Use less than the "compound + 0.1 minute" as the carbon range marker if peak shape and chromatographic resolution are favorable.

13.3.9 The Calibration Factor (CF) is the ratio of the peak area to the concentration injected. For individual compounds, the calibration factors are determined by the following equation:

$$CF = \frac{\text{Area of peak}}{\text{Concentration injected (ng/uL)}}$$

13.3.10 For the carbon ranges, tabulate the summation of the peak areas of all the compounds in each carbon range against the total concentration injected for that carbon range. The Calibration Factor (CF), defined as the ratio of the summed peak area to the concentration injected, is calculated for each carbon range using the following equation:

$$\text{Carbon Range CF} = \frac{\text{Summed area of peaks in the range}}{\text{Total Concentration injected (ng/uL)}}$$

Note: The areas for the surrogates must be subtracted out from the area summation of the range in which they elute. Also, any areas associated with naphthalene and 2-methylnaphthalene in the aliphatic fraction must be subtracted out from the appropriate carbon range.

13.3.11 The percent relative standard deviation (%RSD) of the calibration factors for each compound and surrogate must be < 25% over the working calibration range.

$$\%RSD = \frac{\text{Standard Deviation of 5 CFs}}{\text{Mean of 5 CFs}}$$

13.3.12 The percent relative standard deviation (%RSD) of the calibration factors for each carbon range for the compounds and surrogates must be ≤ 25% over the working calibration range.

$$\%RSD = \frac{\text{Standard Deviation of 5 Range CFs}}{\text{Mean of 5 Range CFs}}$$

13.3.13 If any %RSD is >25%, the source of the problem should be identified and the problem resolved

13.3.14 Once Initial Calibration meets all QC criteria, immediately analyze ICV standard for Aliphatic and Aromatic fraction.

13.3.15 Initial Calibration verification % D for each compound, for each carbon range, for each fraction and for each surrogates must be <25% (<30% for any single compound in a range). If this criterion does not meet for any carbon range and any fraction then a new initial calibration needs to be analyzed for that fraction and that carbon range.

13.4 Retention Time (RT) Windows

13.4.1 Before establishing windows, make sure the GC system is within optimum operating conditions. Make three injections of the Aromatic Hydrocarbon and Aliphatic Hydrocarbon standard mixtures. Serial injections over less than a 72 hr period result in retention time windows that are too restrictive.

13.4.2 Calculate the mean and the standard deviation of the three retention times (use any function of retention time including absolute retention time or relative retention time) for each individual compound in the aromatic standard, each individual compound in the aliphatic standard and all surrogates.

13.4.3 The retention time window is equal to plus or minus three times the standard deviation of the mean retention times for each compound in the aromatic and aliphatic standards. The default value for the retention time is equal to ± 0.1 minutes, if the standard deviation is zero or close to zero.

13.4.4 Establish the midpoint of the retention time window for each surrogate by using the absolute retention for each surrogate from the mid-concentration standard of the initial calibration. The absolute retention time window equals the midpoint + 3 SD.

13.4.5 Calculate retention time windows for each aromatic standard compound, each aliphatic standard compound and each surrogate on each GC column and whenever a new GC column is installed.

13.5 Continuous Calibration Check (CCC)

13.5.1 At a minimum, the working calibration factors for each fractional carbon range must be verified on each working day, after every 20 samples or every 24 hours (whichever is more frequent) and at the end of the analytical sequence by the injection of the mid-level calibration standards (both aliphatic and aromatic).

13.5.2 Calculate the percent differences (D %) between the continuing calibration factors and the average calibration factors from the initial calibrations for each compound, for each carbon range for each fraction and for the surrogates.

13.5.3 If the %D of any carbon range is >25% (>30% for any single compound in a range) then a new calibration curve has to be generated for that range. Any sample associated with a non-compliant calibration must be reanalyzed.

$$\%D = \frac{CF_{Avg} - CF_{cc}}{CF_{Avg}}$$

Where:

CF_{Avg} = Average Calibration Factor calculated from initial calibration
CF_{cc} = Calibration Factor calculated from continuing calibration standard

13.5.4 The retention times of surrogates in the calibration verification standard analyzed at the beginning of the analytical shift must fall within the absolute retention time windows.

13.5.5 The purpose of this check is to ensure that retention times do not continually drift further from those used to establish the widths of the retention time windows.

13.5.6 If the retention time of any surrogate at the beginning of the analytical shift does not fall within the ± 3SD window (minimum ±0.10 min.), then a new initial calibration must be performed.

13.5.7 In addition, the retention times of all surrogates in the subsequent calibration verification standards analyzed during the analytical shift must fall within the absolute retention time windows.

13.5.8 Surrogate Standards (SS) - The SS responses and retention times in the calibration check standard must be evaluated during or immediately after data acquisition. If the retention time(s) for the SS is outside the determined RT window, the chromatographic system must be inspected for malfunctions and corrections must be made. If the area(s) for the SS changes by ±50% from the last daily calibration standard check, the GC must be inspected for malfunctions and corrections must be made.

13.6 Mass Discrimination

13.6.1 Mass discrimination can take place in the injection port of the gas chromatograph. The higher boiling point molecules may not enter the column with the same efficiency as the lower boiling point molecules with

a resulting bias toward the lower boiling molecules. This phenomenon must be checked and if present corrected prior to calibrating and analyzing samples.

13.6.2 Mass discrimination is minimized by placing a small plug of silanized glass wool one centimeter from the base of the glass injection liner. The end of the capillary column is placed just below the glass wool. The capillary column should be placed flush with the surface of the gold seal. A full range alkane standard should be run to test the degree of mass discrimination before performing any actual sample analyses. The response ratio of C30/C20 shall be ≥ 0.8. If less than 0.8, the column should be repositioned until the mass discrimination is minimized.

13.7 Possible Breakdown for Naphthalene and 2-methylnaphthalene

13.7.1 Each field and QC sample must be evaluated for potential breakthrough on a sample-specific basis by evaluating the %recovery of the fractionation surrogates and on a batch-specific basis by quantifying the concentrations of naphthalene and 2-methylnaphthalene in both the aliphatic and aromatic fractions of the LCS and LCSD.

Note: Because naphthalene and substituted naphthalenes are weakly polar, the compounds readily mobilize into the aliphatic extract if excessive amounts of hexane are used to elute the silica gel column. As a result, the aliphatic fraction is monitored for the presence of naphthalene and 2- methylnaphthalene in the LCS and LCSD on a batch basis.

13.7.2 If either the concentration of naphthalene or 2-methylnaphthalene in the aliphatic fraction exceeds 5% of the total concentration for naphthalene or 2- methylnaphthalene in the LCS or LCS duplicate, then fractionation must be repeated on all stored affected sample extracts.

Note: The total concentration for naphthalene or 2-methylnaphthalene in the LCS/LCS duplicate pair includes the summation of the concentration detected in the aliphatic and aromatic fractions.

Example of Naphthalene % Breakthrough Calculation

Naphthalene in aromatic fraction = 50
Naphthalene in aliphatic fraction = 1.5
Total Naphthalene concentration = 51.5
% Naphthalene Breakthrough = (1.5 / 51.5) *100 = 2.9%

Note: This calculation also may be applied to determine the breakthrough of 2-methylnaphthalene.

13.7.3 Additionally, if the fractionation surrogate recovery for either compound is outside 40%-140% for any sample extract then fractionation must be repeated on the affected sample.

14. Procedure

14.1 Dissolved Product (Aqueous Samples): Separatory Funnel Extraction

14.1.1 Aqueous samples are extracted using separatory funnel techniques assuming a sample volume of 1L. When a sample volume of 2L is to be extracted, use 250, 100 and 100-mL volumes of methylene chloride for the serial extraction.

14.1.2 Mark the water meniscus on the side of the sample bottle for later determination of sample volume. Pour the entire sample into a 2L separatory funnel. Measure/adjust pH to 2 with 6N HCL. Add 100ug of surrogates (1ml of the surrogate spiking solution) into the separatory funnel and mix well.

14.1.3 Add 60mL of methylene chloride to the sample bottle, seal and shake for 30 seconds to rinse the inner surface. Transfer the solvent to the separatory funnel and extract the sample by shaking the funnel for two minutes with periodic venting to release excess pressure. Allow the organic layer to separate from the water phase for a minimum of 5 minutes. Stirring, filtration of the emulsion through glass wool, centrifugation, or other physical methods may be used for separation. Collect the methylene chloride extract in a 250mL Erlenmeyer flask with a glass stopper.

14.1.4 Add a second 60mL volume of methylene chloride to the sample bottle and repeat the extraction procedure a second time, combining the extracts in the Erlenmeyer flask. Perform a third extraction in the same manner. Label the combined extract.

14.1.5 Assemble a Kuderna-Danish (K-D) concentrator by attaching a 10mL concentrator tube to a 500mL evaporative flask.

14.1.6 Pour the combined extract through a solvent rinsed drying column containing about 10cm of anhydrous sodium sulfate, and collect the extract in the K-D concentrator. Rinse the Erlenmeyer flask and column with 20 to 30mL of methylene chloride to complete the quantitative transfer.

14.1.7 Add one or two clean boiling chips and attach a three-ball Snyder column to the evaporative flask for each fraction. Prewet each Snyder column by adding about 1mL of methylene chloride to the top. Position the K-D apparatus in a hot water bath (60oC to 65oC) so that the concentrator tube is partially immersed in the hot water, and the entire lower rounded surface of the flask is bathed with hot vapor. Adjust the vertical position of the apparatus and the water temperature as required to complete the concentration in 15 to 20 minutes. At the proper rate of the distillation the balls of the column will actively chatter but the chambers will not flood with condensed solvent. When the apparent volume of liquid reaches 1mL, remove the K-D apparatus from the water bath and allow it to drain and cool for at least 10minutes.

14.1.8 Exchange the methylene chloride with hexane by adding 50ml of hexane to the top of the Snyder column. Concentrate the extract to less than

10mL, raising the temperature of the water bath, if necessary, to maintain proper distillation.

14.1.9 Remove the Snyder column and rinse the flask and its lower joint into the concentrator tube with approximately 0.2mL of hexane. Place the concentrator tube containing the hexane extract onto a nitrogen blow-down apparatus. Adjust the final volume to 1.0mL with the solvent under a gentle stream of nitrogen.

Note: Caution must be exercised during blow-down to prevent the loss of the lower boiling EPC constituents. The fraction extract volume should never be reduced below 1mL

14.1.10 Add 1mL of the concentrated fractionation surrogate spiking solution to the 1mL hexane extract. The 2mL extract is ready to be cleaned and fractionated. If cleanup will not be performed immediately, transfer the extract to a Teflon lined screw cap vial and refrigerate.

14.1.11 Determine the original sample volume by refilling the sample bottle to the mark with water and transferring the liquid to a 1000mL graduated cylinder. Record sample volume to the nearest 5mL.

14.2 Sample preparation, soils and sediments: Soxhlet Extraction

14.2.1 Homogenize the soil sample with a solvent-rinsed stainless steel spatula. Weigh about 5g ±.01g of the sample into a tared aluminum pan. Dry at 105 degrees Celsius for 12 hours and calculate the percent solids content.

14.2.2 Blend 10-30g of the solid sample with 10-30g of anhydrous sodium sulfate and place in an extraction thimble. (The sample weight used should be such that, after correction for % moisture, the dry weight of the sample is equivalent to 10g. Samples with expected concentrations greater than 2500mg/Kg may be extracted using a smaller sample size.) The extraction thimble must drain freely for the duration of the extraction period. A glass wool plug above and below the sample in the Soxhlet Extractor is an acceptable alternative for the thimble. Add 100ug of the surrogate standard spiking solution onto the sample.

14.2.3 Place 300mL of the extraction solvent into a 500-mL round-bottom flask containing one or two clean boiling chips. Attach the flask to the extractor and extract sample for 16-24 hours at 4-6 cycles/hr.

14.2.4 Allow the extract to cool after the extraction is complete. Dry and concentrate the extract.

14.2.5 Add 1mL of the concentrated fractionation surrogate spiking solution to the 1mL hexane extract. The resultant 2mL extract is ready to be cleaned and fractionated. If cleanup will not be performed immediately, transfer the extract to a Teflon lined screw cap vial and refrigerate.

14.3 Extract fractionation

14.3.1 Each sample fractionation requires 1mL of sample extract. As the final volume of the extract prior to fractionation is 2 mL, an additional fractionation is available should it be required. For example, if the original

fractionation yields unacceptable breakthrough of naphthalene and/or unacceptable recoveries for the fractionation surrogate standards, the remaining 1mL extract may have to undergo fractionation. Silica gel columns/cartridges must never be overloaded. Overloading may result in the premature breakthrough of the aromatic fraction. It is recommended that for a 1mL extract fractionated on a 5g cartridge, the extract should contain no more than 5mg total EPH. (This equates to 25000ug/mL in the extract or 2500mg/Kg in the sample.)

14.3.2 Demonstrate Fractionation Capability

14.3.2.1 Every new lot of silica gel/SPE cartridges must be evaluated with the Fractionating Check Solution to establish the optimum volume of hexane to efficiently elute aliphatic hydrocarbons while not allowing significant aromatic hydrocarbon breakthrough.

14.3.2.2 The amount of hexane used is critical and is to be optimized prior to the analysis of any samples. Excessive hexane can cause the elution of lighter aromatics into the aliphatic fraction. Insufficient hexane could result in low recoveries of the aliphatics. The volume of hexane used should not exceed 20mL. A fractionation check solution (FCS) is prepared in hexane containing all the compounds at a nominal concentration of 200ng/uL each component.

14.3.2.3 To demonstrate proper fractionating capability, at least four 1mL replicates of the FCSs must be fractionated using the procedures detailed below and analyzed. The mean measured concentration (Cxmean) of the individual fractionation compounds is determined using the following equation:

$$\text{Mean \% Recovery} = \frac{C_{xmean} - \text{True Concentration} \times 100}{\text{True Concentration}}$$

Where:

$$C_{xmean} = \frac{C_1 + C_2 + C_3 + \ldots\ldots + C_n}{n}$$

14.3.2.4 For each analyte included in the FCS, the % mean recovery must be between 40% and 140%. Lower recoveries are permissible for n-Nonane. However, if recovery is <25% then the problem must be found and the fractionation check repeated.

14.3.3 Fractionate the extract into separate aromatic and aliphatic components.

14.3.3.1 Prepare the column by placing about 1cm of glass wool (moderately packed) at the bottom of the column. Make sure the stopcock turns smoothly.

14.3.3.2 Fill the column with a slurry of 5g activated silica gel in about 10ml methylene chloride. Tap the side of the column to assure uniform packing. Top the column with approximately 1 to 2 cm sodium sulfate.

14.3.3.3 Rinse the column/SPE cartridge with 30ml methylene chloride if there are concerns of contaminants in the silica gel. Let the solvent flow through the column until the head of the solvent is just above the top of the column packing. Discard the eluted methylene chloride.

14.3.3.4 Rinse the column with 30mL of hexane (60mL if pre-rinsed with methylene chloride). Let the hexane flow through the column until the head of the column is just above the frit. Close the stopcock to stop flow. Discard the hexane.

14.3.3.5 Load 1mL of the combined sample extract/fractionation surrogate solution onto the column. Open the stopcock and start collecting the eluant immediately in a 25mL flask labeled "aliphatics."

14.3.3.6 Just prior to the exposure of the column frit to air, elute the column with an additional 19mL of hexane so a total of 20mL of hexane has passed through the column. (It is essential that "plug flow" of the extract be achieved through the silica gel column/cartridge.) Hexane should be added in 1 to 2mL increments with additions occurring when the level of solvent drops to a point just prior to exposing the column frit to air. The use of a stopcock is required. Ensure that the silica gel is uniformly packed in the column. If any channeling, streaking or changes in the silica gel matrix occurs during fractionation, it is probable that procedure shall have to be repeated with another 1mL aliquot.

14.3.3.7 Following the recovery of the aliphatic fraction, elute the column with 20mL methylene chloride. Collect the eluant in a 25mL volumetric flask. Label this fraction aromatics.

14.3.3.8 Transfer the contents of the aliphatic and aromatic volumetric flasks into separate, labeled graduated concentrator tubes. Concentrate each of the extracts to a final volume of 1mL under a gentle stream of nitrogen. Analyze each of the extracts separately.

14.3.3.9 Analyze the extracts separately.

14.3.3.10 The recoveries of the fractionation surrogates must be within 40% - 40%. If the fractionation surrogate recovery is outside 40% - 140% then fractionation must be repeated on the affected sample

14.4 Analytical Run

14.4.1 The time sequence begins with the analysis of the first initial calibration standard or continuing calibration standard and ends with a closing calibration standard. The calibration curve must be verified every 24 hours or 20 samples, whichever is more frequent.

14.4.2 Sequence (for each fraction)

1. Instrument Blank
2. Analytical Batch Opening Initial Calibration or mid-range Continuing Calibration
3. Method Blanks
4. Extraction Batch LCS
5. Extraction Batch LCS Duplicate
6. Samples (up to 20)
7. Matrix Spike
8. Matrix Spike Duplicate (if requested).
9. Instrument Blank
10. Closing mid-range Continuing Calibration Standard after 20 samples (at a minimum of once every 24 hours) and at the end of an analytical batch. This standard may be used as the Analytical Batch Opening Continuing Calibration for the next analytical batch if batches are processed continuously

15. Calculations

15.1 The area of the surrogates must be subtracted from their corresponding carbon range summed area. Any areas associated with naphthalene and/or 2-methylnaphthalene in an aliphatic carbon range must be subtracted from the appropriate aliphatic carbon range summed area prior to calculating the calibration factors.

15.1.1 Aqueous samples:

$$C\ (ug/L) = \frac{(A)\ (D)\ (V_e)}{CF\ (V_s)}$$

Where:

C = Concentration of each compound or hydrocarbon range, ug/L
A = Area response of each compound or carbon range to be measured
D = Dilution Factor
V_s = Volume of sample extracted, mL
V_e = Final volume of extract, uL
CF = Calibration factor of each compound or carbon range for each fraction

15.1.2 Nonaqueous – Soils/Sediments/Sludge:

$$C\ (ug/g) = \frac{(A)\ (D)\ (V_e)}{CF\ (S)}$$

Where:

C = Concentration of each compound or hydrocarbon range, ug/g (dry weight basis)
A = Area response of each compound or carbon range to be measured
D = Dilution Factor
V_e = Final volume of extract, uL
CF = Calibration factor of each compound or carbon range for each fraction

S = Dry sample weight, mg

15.1.3 Total EPH concentration = Total of 4 Aromatic Carbon Ranges and 4 Aliphatic Carbon Ranges.

16. Method Performance

16.1 Analysis is performed in accordance with the method. All quality control and quality assurance procedures are followed. Refer to P203-MDL SOP for further information.

16.2 Each analyst will make a demonstration of the ability to generate acceptable accuracy and precision with this method. Refer to P203-MDL SOP for further information.

17. Pollution Prevention

17.1 Use only the amounts of chemicals required. Do not make large quantities of solutions.

17.2 Use hood when working with solvents.

17.3 Keep the area clean and clutter free in the extractions lab and around the instruments in order to avoid any mishaps.

17.4 Trap septum vent and split vent on GC.

17.5 Keep chemicals away from drains.

17.6 Properly collect and dispose of waste according to Chemtech Waste Disposal SOP.

17.7 Laboratory is properly equipped with spill cleanup equipment and laboratory personnel trained. Depending upon the size and type of spill, it may be handled by the individual or department creating the spill or by specially trained personnel.

17.8 Small spills may occur routinely and shall be handled by the individual person or department creating the spill. Spill kits are stored in a blue basket or blue cover bin located in each laboratory and chemical storage area. The spill kits can handle water based, solvent and mercury spills. Specially trained personnel handle larger spills, which may pose a threat to health or environment involves a large volume not easily contained.

17.9 A detailed description of the procedure for handling a spill or accident is covered in the CHEMTECH Emergency and Contingency Plan.

17.10 The Safety Coordinator is responsible for implementing the Chemical Hygiene and the CHEMTECH Emergency and Contingency Plans. It is the responsibility of various company personnel to assist in implementing the different aspects of the Plan. These include: Laboratory Coordinator, Technical Director, Operations Manager, Department Managers and Supervisors

18. Data Assessment and Criteria for QC

18.1 Initial Calibration

18.1.1 The percent relative standard deviation (%RSD) of the calibration factors for each compound and surrogate must be < 25% over the working calibration range. The percent relative standard deviation (%RSD) of the

calibration factors for each carbon range for the compounds and surrogates must be < 25% over the working calibration range.

18.2 Initial Calibration Verification (ICV)
18.2.1 See section 13 for acceptance criteria.

18.3 Continuing Calibration
18.3.1 See Section 13 for the acceptance criteria.

18.4 Method/Instrument Blank
18.4.1 Target compound concentration in the blank must not be more than RL.
18.4.2 For DOD Work, Method Blank should contain no analytes detected > ½ LOQ (Reporting Limit) or >1/10 the amount measured in any Sample of 1/10 the regulatory limit whichever is greater.
18.4.3 Samples should not be blank corrected.

18.5 Matrix Spike, Matrix Spike Duplicate, LCS and LCSD
18.5.1 The recoveries of each of the compounds in the LCS/LCSD, MS/MSD must be between 40% - 140%. Lower recoveries are permissible for n-Nonane but the recoveries must be greater than 25% and must be noted in the case narrative. In addition to the individual recoveries, the recoveries of each of the carbon ranges should be determined and reported.
18.5.2 The RPDs for the aliphatic and aromatic carbon range concentrations (the sum of the individual compounds' concentrations within a carbon range) must be <25% for LCS/LCSD and <50% for MS/MSD.

18.6 Surrogate Recoveries
18.6.1 The recovery must be within 40% - 140%.

18.7 Sample Duplicate
18.7.1 Duplicate results should not differ by more than 50%.

19. Corrective Action Procedure for Out-of-Control Data

19.1 Initial Calibration
19.1.1 If individual compound or carbon range >25%, re-analyze the curve.

19.2 Initial Calibration Verification (ICV)
19.2.1 If criteria are not met, then re-analyze initial calibration.

19.3 Continuous calibration check
19.3.1 If the criteria are not met, then the sample analysis must halt and any samples analyzed after the last passing calibration verification standard must be re- run.
19.3.2 If the chromatographic problem cannot be fixed by routine instrument maintenance, then a new initial calibration must be employed before sample analysis can continue.

19.4 Method/Instrument Blank
19.4.1 Whenever a blank is unacceptable, locate the source of contamination and re-extract and reanalyze all samples associated with the unacceptable blank.

19.5 Matrix Spike/Matrix Spike Duplicate and LCS/LCSD

19.5.1 If recovery falls outside of the designated range, verify that the LCS meets criteria and consider the problem matrix interference.
19.5.2 Identify and correct the problem.
19.5.3 If LCS fails to meet requirement re-extract the entire batch if the source of the problem is not instrument related.

19.6 Surrogate
19.6.1 Check calculations to assure there are no errors.
19.6.2 Check instrument performance. Check the sample preparation procedure for loses due to temperature control and surrogate solutions for degradation contamination, etc.
19.6.3 Reanalyze the extract if the steps above fail to reveal a problem. If reanalysis yields surrogate recoveries within the stated limits, the reanalysis data should be used.
19.6.4 If the surrogate could not be measured because the sample was diluted prior to analysis, then qualify the surrogate recovery. No additional corrective action is required.
19.6.5 If the steps above fail to reveal a problem, then it may be necessary to re-extract and re-analyze the sample.

20. Contingencies for Handling Out-of-Control or Unacceptable Data

20.1 Following are the result qualifiers used for out-of-control and unacceptable data:
- **U**: Indicates the compound was analyzed but not detected.
- **J**: Indicates an estimated value, the result reported is below the initial calibrations lowest point.
- **B**: Indicates the anlaytes were found in the blank as well as the sample.
- **E**: Indicates the analyte concentrate exceeds the calibrated range of the GC instrument.
- **D**: Indicates all compounds identified in an analysis at a secondary dilution factor.

20.2 Issue a corrective action form any time there is a deviation from the SOP or the client requirements are not met.
20.3 If a sample is damaged, broken, or spilled, contact the project manager and issue a corrective action.

21. Waste Management

21.1 Keep samples for 60 days after analysis and dispose them off according to the procedures explained in the SOP for waste disposal.

22. References

22.1 This quantitative EPH method is adopted from the "Method for the Determination of Extractable Petroleum Hydrocarbons (EPH)," Massachusetts Department of Environmental Protection (1); the "Method for the Determination of Extractable Petroleum Hydrocarbons (EPH) Fractions," Washington State Department of Ecology (2); the "Leaking Underground Fuel Tanks Field Manual" of the California State Water Resources Control Board (3); "Test Methods for

Evaluating Solid Waste" USEPA Method 8015B (4); "Method for the Determination of Total Petroleum Range Organics," Florida Department of Environmental Protection (5); and "Quantitation of Semi-Volatile Petroleum Products in Water, Soil, Sediment and Sludge," New Jersey Department of Environmental Protection OQA-QAM-025-02/08 (6).

22.2 This method is adapted with modifications from ASTM Method D3328-82 and the US Coast Guard Oil Spill Identification Procedure for Total Petroleum (7, 8).

22.3 Department of Defense Quality Systems Manual for Environmental Laboratories Version 1 April 2003, Version 4.2 October 2010, Version 5.0, July 2013, Version 5.1 January 2017

22.4 NJDEP EPH Method Revision 3, August 2010

23. Attachment, Tables, Appendix

23.1 NA

CHEMTECH 284 Sheffield Street, Mountainside NJ 07092 (908) 789-8900

READ RECEIPT

Employee Name: _____

Department: _____

_____**MNJDEP-EPH**_____
Method or Document Read (Include Title, Number, Revision, as applicable)

Employee Statement: I have read and understand the information in the above-mentioned method or document.

_____ _____
Employee Signature Date

Supervisory Statement: I have reviewed this document or method with the employee.

_____ _____
Supervisory Signature Date

Note: This receipt is to be returned to the Quality Assurance Department for incorporation into employee training record files. If you have questions or would like to review your train record files, please see QA.

Appendix P

Drone SOPs

UAV INSPECTIONS LLC
SUBSIDIARY OF ENVOCARE

1527 Route 27, Suite 105
Somerset, NJ 08873
Cell Phone: 732 801 8377

Sample Checklists

Pre-Flight Checklist (Day Before)

Flight Date: _____ Checked By/Operator:_____

Location Address: _____ Equipment In Use_____

- ☐ Check Weather _____
- ☐ Firmware Updated
- ☐ App Updated
- ☐ Flight Route/Area Planned
- ☐ Site Survey/Obstacle Check
- ☐ Shot List and Storyboard
- ☐ Obtain Required Permissions
- ☐ Check NOTAMS
- ☐ Pre-Notifications
- ☐ Notify Law Enforcement (Non-Emergency Number)
- ☐ Aircraft Batteries Charged
- ☐ Controller Charged
- ☐ Ground Station Charged
- ☐ Equipment Packed
- ☐ First Aid Kit Packed
- ☐ SD Card Formatted

UAV INSPECTIONS LLC
SUBSIDIARY OF ENVOCARE

1527 Route 27, Suite 105
Somerset, NJ 08873
Cell Phone: 732 801 8377

Pre-Flight Checklist (Immediately Before Flight)

Flight Date: _____ Checked By/Operator:_____

Location Address: _____ Equipment In Use _____

- ☐ Inspect Aircraft for faults
- ☐ Warn All Spectators
- ☐ Home Point Set
- ☐ Lens Cover Removed
- ☐ Gimbal Clamp Removed
- ☐ SD card in Aircraft
- ☐ Check Signal Strength (RTK and Drone)
- ☐ Check Satellite Strength (RTK and Drone)
- ☐ Propellers Tightened & Free to Move
- ☐ Compass Calibrated
- ☐ Correct Flight Mode Selected
- ☐ Batteries Properly Fitted
- ☐ Batteries Properly Fitted
- ☐ Batteries Correct Temperature
- ☐ Double Check Obstacles
- ☐ Safety Training – Observer
- ☐ Review SOW with Traffic Control Officer (if applicable)
- ☐ Notify Air Traffic Control (if applicable)
- ☐ Take-Off and Landing Point Established (Home)
- ☐ Flip Antenna Out

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Cell Phone: 732 801 8377

Pre-Flight Checklist (Take Off)

☐ Time: _____

☐ Controller Turned on

☐ Turn on Aircraft

☐ Press Record

☐ Hover for 15ft for 15 Seconds to Monitor Behavior and Sound

☐ Check all Controls are Responsive

☐ By:_____

Pre-Flight Report

Authorizer By (client/engineer/project staff) (Facility owner name & title)	
Address/Geo Location	
Altitude to be flown at	
Mission Overview	
Frequencies	
Planned Flight time	
Contingency Procedure: lost link, diver, etc.	
Hazards unique to the flight being flown	
Closest Airport	
Emergency Contact	
Law Enforcement	911
Closest Tower Frequency	
Site Manager /Field Supervisor	
Roles	
RPIC	
Observer 1	
Observer 2	

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Weather	
Temperature Degree F	
Wind (speed MPH)	
Visibility (statute miles)	
General Weather Description	

Post-Flight Report

Flight Date: _____ Checked By/Operator:_____

Location Address: _____ Equipment In Use _____

☐ Time: _____

☐ Turn off the Drone, Then the controller

☐ Ensure Desired Footage was Captured

☐ Notify Air Traffic Control after completion (if applicable)

☐ Inspect Drone for any Damage

☐ Fasten Gimbal Lock

☐ Pack Equipment & Log Flight

☐ Any Accidents: _____

Signature of Pilot: _____ Date_____